GOVERNMENT OF TAMIL NADU

HIGHER SECONDARY SECOND YEAR

COMPUTER APPLICATIONS
Theory & Practical

A Publication Under Free Textbook Programme of Government of Tamil Nadu

DEPARTMENT OF SCHOOL EDUCATION

UNTOUCHABILITY IS INHUMAN AND A CRIME

12th_Computer_Application_English version FM.indd 1 19-01-2023 16:57:48

Government of Tamil Nadu

First Edition - 2019

Revised Edition - 2020, 2022, 2023

Reprint - 2021, 2024

(Published under New Syllabus)

NOT FOR SALE

Content Creation

State Council of Educational
Research and Training

© SCERT 2019

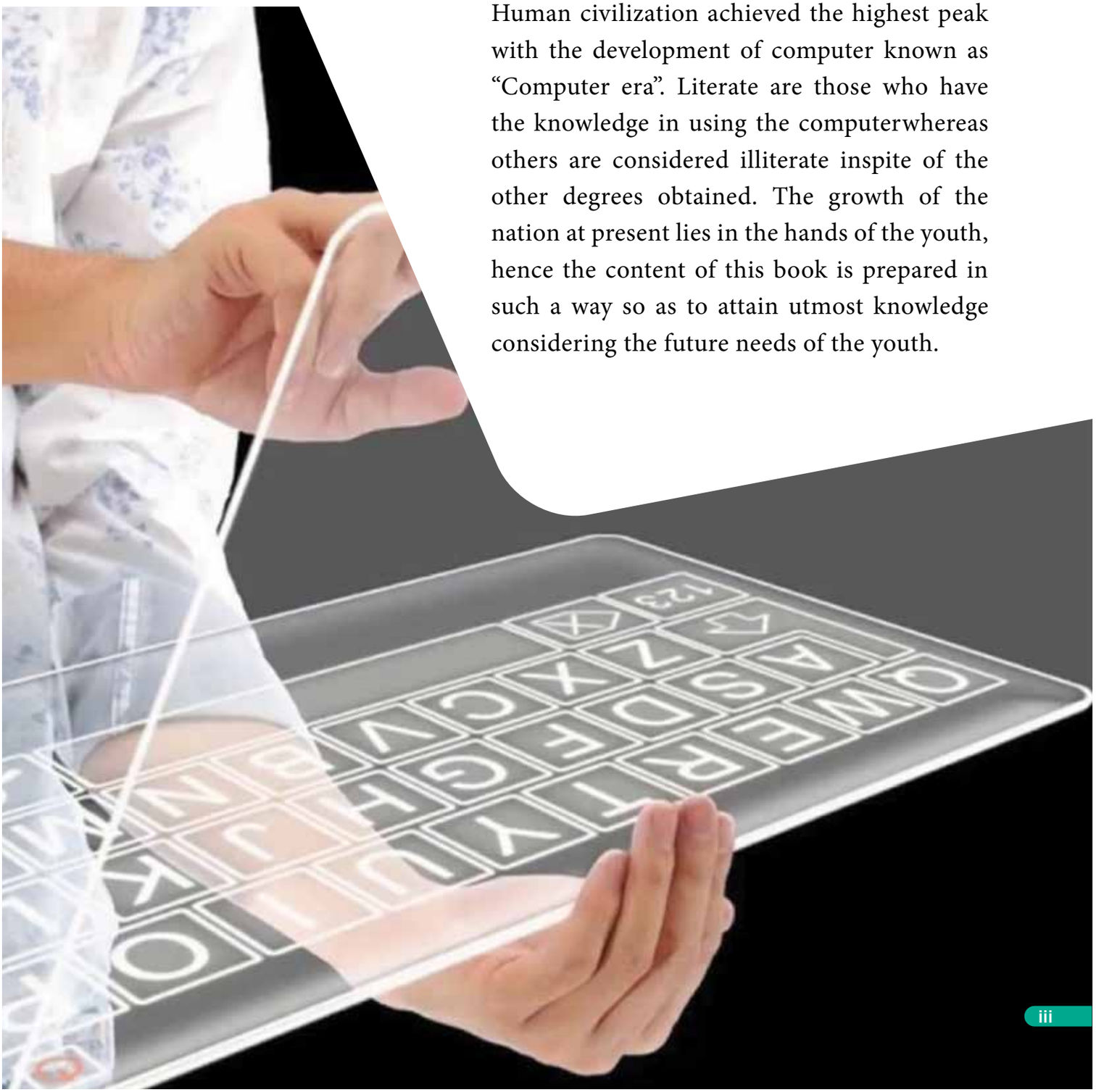
Printing & Publishing

Tamil NaduTextbook and
Educational Services Corporation

www.textbooksonline.tn.nic.in

12th_Computer_Application_English version FM.indd 2 17/12/2023 11:18:52

PREFACE



Human civilization achieved the highest peak with the development of computer known as “Computer era”. Literate are those who have the knowledge in using the computerwhereas others are considered illiterate inspite of the other degrees obtained. The growth of the nation at present lies in the hands of the youth, hence the content of this book is prepared in such a way so as to attain utmost knowledge considering the future needs of the youth.

12th_Computer_Application_English version FM.indd 3 19-01-2023 16:57:49

HOW TO USE THE BOOK

Career Guidance — List of job opportunities on successful completion of course

Learning Objectives — Learning objectives briefly describe the contents of the unit. It also outlines the knowledge gained by the students.



Interesting facts to motivate students to gain more information regarding the unit.

Infographics — Visual representations of the unit for better understanding.

Concept Figures — Conceptual diagrams that potrays the technique of drafting and sewing.



To facilitate reading at anytime, anywhere.

Activity — Skill oriented activities based on the units for better understanding.

Evaluation — Access students under the category of understanding, reproducing and application oriented.

Glossary — Explanation of significant terms.

Model Question Paper — A model question paper to help students to face examinations.

References — List of related books for further reading.

12th_Computer_Application_English version FM.indd 4 19-01-2023 16:57:49

CAREER GUIDANCE

COURSES	COLLEGES/UNIVERSITIES	PROFESSION
B.E / B.Tech	All University and their affiliated Colleges and Self financing Colleges in India and Abroad.	Software Engineer, Hardware Engineer, Software Development, Healthcare Section, IT & ITEs
Science and Humanities		
B.Sc (Computer Science) BCA B.Sc (Maths, Physics, Chemistry, Bio-Chemistry, Geography, journalism, Library Sciences, Political Science, Travel and Tourism)	All University and their affiliated Colleges and Self financing Colleges in India and Abroad.	Government Job and Private Company BPO, Geologist, Journalist
Law		
LLB B.A+LLB B.Com BBM+LLB BBA+LLB	All University and their affiliated Colleges and Self financing Colleges in India and Abroad.	Lawyer, Legal Officer, Govt Job
CA CA-Chartered Accountant CMA-Cost Management Accountant. CS-Company Secretary (Foundation)	The Institute of Chartered Accountant of India (ICAI)	CA, Private Organization, Government ,Banking sectors and prospects for self – employment.
Diploma	Government Polytechnic and Selffinancing colleges	Junior Engineer (Government and Private)
Commerce Courses		
B.com-Regular, B.com-Taxation & Tax Procedure, B.com-Travel &Tourism, B.com-Bank Management, B.com-Professional, BBA/BBM-Regular, BFM- Bachelors in Financial Markets, BMS-Bachelors in Management Studies, BAF- Bachelors in Accounting & Finance, Certified Stock Broker & Investment Analysis, Certified Financial Analyst, Certified Financial Planner, Certified Investment Banker	All University and their affiliated Colleges and Self financing Colleges in India and Abroad.	Private Organization, Government, Banking sectors and prospects for self – employment.
Management Courses		
Business Management Bank Management Event Management Hospital Management Human Resource Management Logistics Management	All University and their affiliated Colleges and Self financing Colleges in India and Abroad.	Private Organization, Government, Banking sectors and prospects for self – employment.
Science and Humanities		
B.Sc.Botany B.Sc.Zoology B.Sc.Dietician & Nutritionist B.Sc.Home Science B.Sc.Food Technology B.Sc.Dairy Technology B.Sc. Hotel Management B.Sc. Fashion Design B.Sc. Mass Communication B.Sc. Multimedia B.Sc. -3D Animation	All University and their affiliated Colleges and Self financing Colleges in India and Abroad.	Government Job and Private Company BPO, Geologist, Journalist

12th_Computer_Application_English version FM.indd 5 19-01-2023 16:57:49

CONTENTS

CHAPTER No.	CHAPTER TITLE	PAGE No.	MONTH
CHAPTER 01	Multimedia	01	June
CHAPTER 02	An Introduction to Adobe PageMaker	17	June
CHAPTER 03	Introduction to Database Management System	57	June
CHAPTER 04	PHP: Hypertext Preprocessor	84	July
CHAPTER 05	Functions and Arrays in PHP	98	July
CHAPTER 06	Conditional Statements in PHP	108	July
CHAPTER 07	Loops in PHP	117	August
CHAPTER 08	Forms and Files	125	August
CHAPTER 09	Connecting PHP and MYSQL	132	August
CHAPTER 10	Introduction to Computer Networks	139	September
CHAPTER 11	Network Examples and Protocols	148	September
CHAPTER 12	Domain Name System (DNS)	162	October
CHAPTER 13	Network Cabling	176	October
CHAPTER 14	Open Source Concepts	190	October/ November
CHAPTER 15	E-Commerce	198	November
CHAPTER 16	Electronic Payment Systems	219	November
CHAPTER 17	E-Commerce Security Systems	234	December
CHAPTER 18	Electronic Data Interchange- EDI	246	December
PRACTICALS		254	

QDV1S

E-book

WLH7B

Assessment

12th_Computer_Application_English version FM.indd 6 19-01-2023 16:57:49



01
CHAPTER

Multimedia

LEARNING OBJECTIVES

After the completion of this chapter, the students learn about

- **Multimedia**
- **The Components of Multimedia**
- **Animation**
- **The File Formats for Multimedia**
- **The Multimedia Production**

1.1 Introduction to Multimedia

Multimedia allows the users to combine and change data from various sources like image, text, graphics, video, audio and video to a single platform. Multimedia has become the latest enriching experience in the field of information sector. The fast growing of multimedia technology over the last decade has brought a lot of changes to computing, entertainment and education.

The phenomenal growth of multimedia technologies and applications has presented the computerized field with great challenges and opportunities. Multimedia is becoming more popular among the user in the terms of its uses and applications. Multimedia application plays vital role in terms of presenting information to the users.



Figure: 1.1 Introduction to Multimedia

12th_Computer_Application_English version CHAPTER 01.indd 1 19-01-2023 16:56:54

1.2 Multimedia Definition

The word multimedia consists of two words “multi” and “media”.

Multimedia is a computer based presentation technique that incorporates text, images, sound, video and animation.

1.3 Components of Multimedia

Multimedia has five major components like text, images, sound, video and animation. They are explained in detail below:



Figure: 1.2 Components of Multimedia

1.3.1 Text

Text is the basic component of the multimedia.



Figure: 1.3 Text

Static Text

Static text will remain static as a heading or in a line, or in a paragraph. The words are given along with the images to explain about the images. In static text, the words will either give information or support an image or an video.

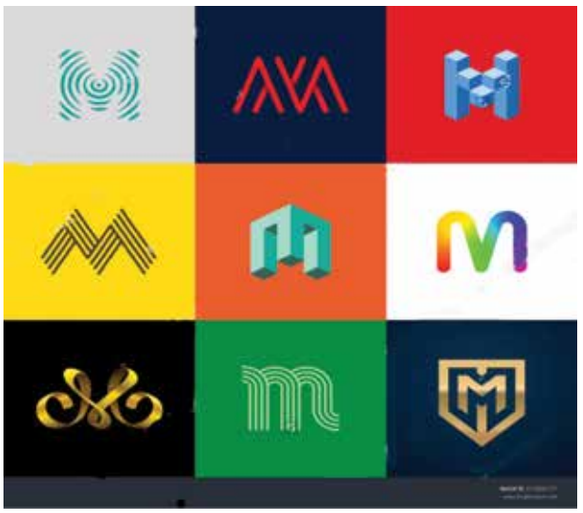


Figure: 1.4 Static Text

Hypertext

A hypertext is a system which consists of nodes, the text and the links between the nodes, which defines the path the user need to follow for the text access in non-sequential ways. The author of the working system created this structure. The user is permitted to define their own paths in more sophisticated hypertext systems. The user is provided with the flexibility and choice to navigate in hypertext. In a multimedia product, text is used to convey the information and must be placed at appropriate position in order to obtain the well-formatted sentences and paragraphs. The readability of the text depends on the spacing and punctuation. The message communication is more appropriate with improved Fonts and styles.

12th_Computer_Application_English version CHAPTER 01.indd 2 19-01-2023 16:56:54

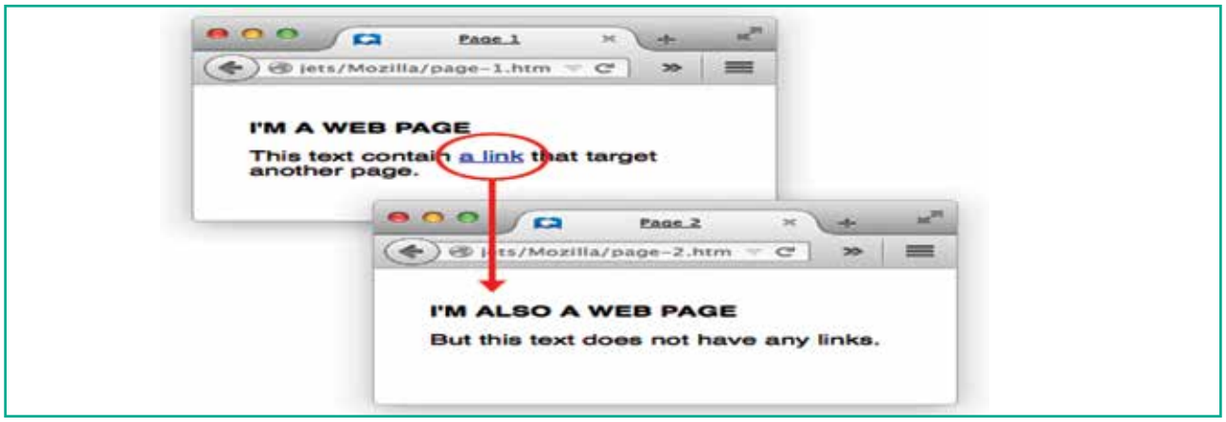


Figure: 1.5 Hyper Text

1.3.2 Image

Images acts as an vital component in multimedia. These images are generated by the computer in two ways, as raster images and as vector images.

Raster Images

The common and comprehensive form of storing images in a computer is raster image. Raster image is made up of the tiny dots called pixel. Each pixel consists of two or more colors. Based on how much data, in bits is used to determine the number of colors, the color depth is determined. Eg. one bit is two colors, four bits means sixteen colors, eight bits indicates 256 colors, and so on. Examples of raster image file types are : BMP, TIFF, GIF, JPEG

Vector Images

Vector image is a type of image made up of geometric shapes. The advantage of vector image is relatively small amount of data is required to represent the image and thereby only less memory is needed to store. Compression techniques are used to reduce the file size of images that is useful for storing large number of images and speeding transmission for networked application. Examples of vector image file types are : AI, EPS, SVG, CDR



Figure: 1.6 Images

1.3.3 Animation

Animation is the process of displaying still images so quickly so that they give the impression of continuous movement. In animation the screen object is a vector image. Using numerical transformations the movement of that image along its path is calculated for their defining coordinates. The least frame rate of at least 16 frames per second gives the impression of smoothness and for natural looking it should be at least 25 frames per second. Animation may be in two or three dimensional. A two dimensional animation, brings an image alive, that occur on the flat X and Y axis of the screen. while in three dimensional

12th_Computer_Application_English version CHAPTER 01.indd 3 19-01-2023 16:56:54

animation it occurs along the three axis X, Y and Z. Animation tools are very powerful and effective. The two basic types of animations are Path animation and Frame animation.

Path Animation

Path animation involves moving an object on a screen that has a constant background e.g. a cartoon character may move across the screen regardless of any change in the background or the character.



Figure: 1.7 Animation

Frame Animation

In frame animation, multiple objects are allowed to travel simultaneously and the background or the object also changes.

1.3.4 Sound

Sound is a meaningful speech in any language and is the most serious element in multimedia, providing the pleasure of music, special effects and so on. Decibels is the measurement of volume, the pressure level of sound.



Figure: 1.8 Sound

Musical Instrument Digital Identifier (MIDI)

Musical Instrument Digital Identifier (MIDI) is a standard communication tool developed for computers and electronic instruments. This tool is flexible and easy for composing the projects in multimedia. Tools for synthesizing the sound and software for sequencing are necessary for MIDI.

Digital Audio

Sampled sound is a Digitized sound. A sample of sound is taken and stored every n^{th} fraction of a second as digital information in bits and bytes. The quality of this recording depends on the sampling rate. Sampling rate is defined as how often the samples are taken and how many numbers are used to represent the value of each sample (bit depth, resolution and sample size). The finer the quality of the captured sound and the resolution is achieved while played back, when more often the sample is taken and the more data is stored about that sample.

1.3.5 Video

Video is defined as the display of recorded event, scene etc. The powerful way to convey information in multimedia applications are embedding of video. The video can be categorized in two types as analog video and digital video.

Analog Video

In analog video, the video data are stored in any non-computer media like video tape, laser disc, film etc. It is divided further in two types as Composite and Component Analog Video. Composite Analog Video has all the video components like

12th_Computer_Application_English version CHAPTER 01.indd 4 19-01-2023 16:56:54

brightness, color, and synchronization combined into one signal. Thus the quality of the composite video resulted in color blending, low clarity and high generational loss.

Digital Video

Digital video is an electronic representation of moving visual images in the form of encoded digital data. This is in contrast to analog video where images are displayed in rapid succession.

1.4 File Formats for Multimedia

The following is an outline of current file formats used for the production and delivery of multimedia data.

1.4.1 Text Formats

RTF

Rich Text Format is the primary file format introduced in 1987 by Microsoft with the specification of their published products and for cross-platform documents interchange.

Plain text

Plain text files can be opened, read, and edited with most text editors. The commonly used text editors are Notepad (Windows), Gedit or nano (Unix, Linux), TextEdit (Mac OS X) and so on. Plain text is the original and popular way of conveying an e-mail.

1.4.2 Image Formats

TIFF (Tagged Image File Format)

This format is common in desktop publishing world (high quality output), and is supported by almost all software packages. Recent versions of TIFF allows image compression, and the format is comfortable for moving large files between computers.

BMP (Bitmap)

Initially this format is in use with Windows 3.1. It is quite large and uncompressed and hence BMP is used for the high-resolution or large images.

DIB (Device Independent Bitmap)

A device independent bitmap contains a colour table. The colour describes how pixel values corresponds to RGB colour values, which describes colors that are produced by emitting light.

GIF (Graphics Interchange Format)

GIF is a compressed image format. Most of the computer color images and backgrounds are GIF files. This file format is best suitable for graphics that uses only limited colors, and it is the most popular format used for online color photos. 8-bit Color look up table is used by the GIF format to identify its color values. This format is supported widely.

JPEG (Joint Photographic Experts Group)

JPEG is a commonly used method of lossy compression for digital images. The degree of compression can be adjusted and it works good with photographs, naturalistic artwork, and similar material but functions less on lettering, live drawings or simple cartoons.

TGA (Tagra)

It is the first popular format for high-resolution images. TGA files are common in animation video industry.

12th_Computer_Application_English version CHAPTER 01.indd 5 19-01-2023 16:56:54

PNG (Portable Network Graphics)

PNG is an extensible file format for the less loss, portable and well compressed storage of raster images. PNG acts as replacement for GIF and also replaces multiple common uses of TIFF. PNG works good with online viewing applications like World Wide Web. So it is fully streamable with a best display option.

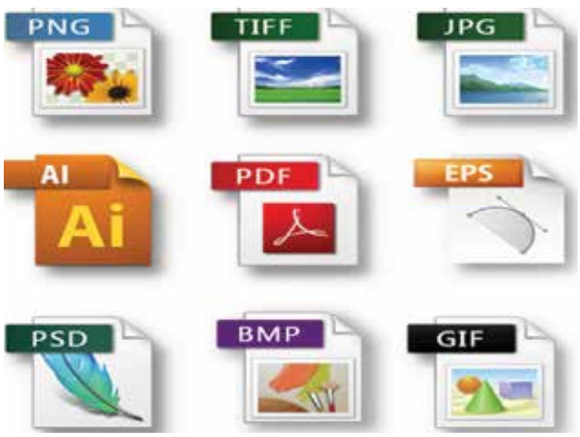


Figure: 1.9 Image file Formats

1.4.3 Digital Audio File Formats

WAV (Waveform Audio File Format)

It is the most popular audio file format in windows for storing uncompressed sound files. In order to attain the reduced file size it can also be converted to other file formats like MP3.

MP3 (MPEG Layer-3 Format)

MPEG Layer-3 format is the most popular format for storing and downloading music. The MP3 files are roughly compressed to one-tenth the size of an equivalent WAV file.

OGG

OGG is a free, open source container format that is designed for obtaining better streaming and evolving at high end quality digital multimedia. It can be compared to MP3 files in terms of quality.

AIFF (Audio Interchange File Format)

It is an audio file format developed by Apple Inc. used for storing sound data for personal computers and other electronic audio devices.

WMA (Windows Media Audio)

It is a popular windows media audio format owned by Microsoft. WMA is a file extension used with windows media player.

RA (Real Audio Format)

Real Audio format is designed for streaming audio over the Internet. The digital audio resources are usually stored as a computer file in computer's hard drive or CD/DVD. Besides the variety of audio file formats available, the most common formats are wave files (.WAV) and MPEG Layer-3 files (.MP3), WMA and RA.



Figure: 1.10 Digital Audio File Formats

1.4.4 Digital Video File Formats

AVI (Audio/Video Interleave)

AVI is the video file format for Windows. Here sound and picture elements are stored in alternate interleaved chunks in the file.

12th_Computer_Application_English version CHAPTER 01.indd 6 19-01-2023 16:56:54

MPEG (Moving Picture Experts Group)

MPEG is a standard for generating digital video and audio compression under the International Standards Organization (ISO) by the group of people. The group has developed MPEG-1, the standard on which Video CD and MP3 are based, MPEG-2, the standard that supports products as Digital Television set top boxes and DVD, MPEG-4, the standard for multimedia and mobile web.MPEG-7, the standard for search of audio and visual content. Research on MPEG-21 "Multimedia Framework" has started in 2000. Simply MPEG is the standards for digital video and audio compression.



Figure: 1.11 Digital Video File Formats

1.5 Multimedia Production

1.5.1 Steps in Multimedia Production

Adequate time and efficient planning is required for multimedia production. This assures that the project will proceed smoothly and ensures that the information reaches the target audience. Following are the phases for development of complex multimedia projects.

1. **Conceptual Analysis and Planning**

   The process of multimedia making begins with a conceptual ignition point. Conceptual analysis identifies a appropriate theme, budget and content availability on that selected theme. Additional criteria like copyright issues also are considered in this phase.

2. **Project design**

   Once the theme is finalized objectives, goals, and activities are drawn for the multimedia project. General statements are termed as goals. The specific statements in the project is known as the objectives. Activities are series of actions performed to implement an objective. These activities contribute to the Project design phase.

3. **Pre-production**

   Based on the planning and design, it is necessary to develop the project. The following are the steps involved in pre-production:

4. **Budgeting**

   Budgeting for each phases like consultants, hardware, software, travel, communication and publishing is estimated for all the multimedia projects.

5. **Multimedia Production Team**

   The production team for a high-end multimedia project requires a team effort. The team comprises of members playing various roles and responsibilities like Script

12th_Computer_Application_English version CHAPTER 01.indd 7 19-01-2023 16:56:55

writer, Production manager, Editor, Graphics Architect, Multimedia Architect and Web Master.

6. **Hardware/Software Selection**

   All multimedia Application requires appropriate tools to develop and playback the application. Hardware includes the selection of fastest CPU, RAM and huge monitors, sufficient disc for storing the records. Selection of the suitable software and file formats depends on the funds available for the project being developed.

7. **Defining the Content**

   Content is the "stuff" provided by content specialist to the multimedia architect with which the application is developed, who prepares the narration, bullets, charts and tables etc.

8. **Preparing the structure**

   A detailed structure must have information about all the steps along with the timeline of the future action. This structure defines the activities, responsible person for each activity and the start/end time for each activity.

9. **Production**

   In the multimedia application, after the pre-production activities, the production phase starts. This phase includes the activities like background music selection, sound recording and so on. Text is incorporated using OCR software, Pictures shot by digital camera, Video clips are shot, edited and compressed. A pilot project is ready by this time.

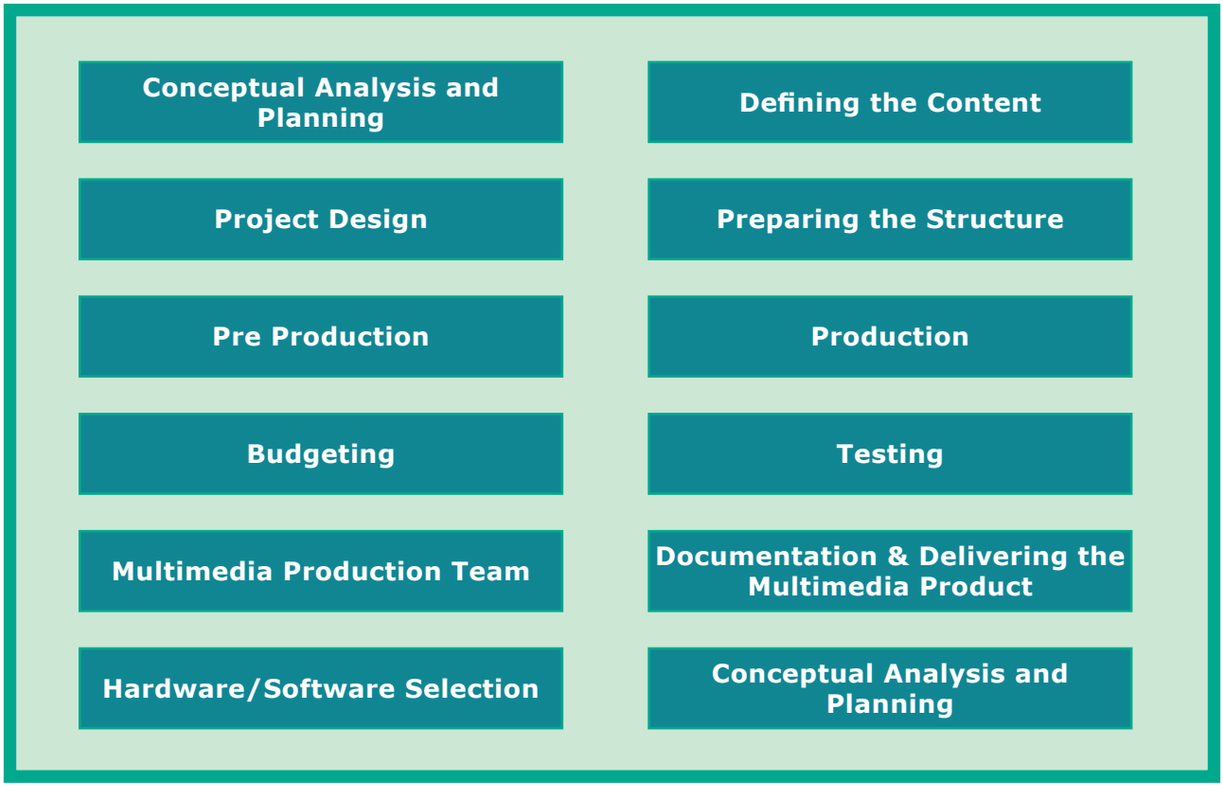


Figure 1.12 Steps in Multimedia Production

12th_Computer_Application_English version CHAPTER 01.indd 8 19-01-2023 16:56:55

10. **Testing**

The complete testing of the pilot product is done before the mass production to ensure that everything is in place, thereby avoiding the failure after launch. If it's an web based product, its functioning is tested with different browsers like Internet Explorer, Chrome, Mozilla and Netscape Navigator. After the testing process is over, the product is incorporated with valid suggested changes.

11. **Documentation**

User documentation is a mandatory feature of all multimedia projects. The documentation has all the valuable information's starting from the system requirement till the completion of testing. Contact details, e-mail address and phone numbers are provided for technical support and sending suggestions and comments.

12. **Delivering the Multimedia Product**

Multimedia applications are best delivered on CD/DVD or in the website . In reality various challenges are faced while delivering through internet, like bandwidth problems, huge number of plug-ins required to play audio and video and long downloading time. Finally, a multimedia application is delivered in a more effective way by the integration of two mediums CD-ROM/DVD and Internet.

1.5.2 Multimedia Production Team

Managing team members in a way to get maximum outcome with high degree of efficiency is mandatory in multimedia production. The fine quality high-end multimedia production application requires a specialized team comprising of the following members:

1. **Production Manager**

In a multimedia production, the role of production manager is to define, and coordinate, the production of the multimedia project in time and with full quality. The production manager should be an expertise in the technology, good at proposal writing, good communication skills and budget management skills. Also must have experience in human resource management and act as an efficient team leader.

2. **Content Specialist**

Content specialist is responsible for performing all research activities concerned with the proposed application's content. Program content refers to projects information, graphics, data or facts presented through the multimedia production.

3. **Script Writer**

Video and film scripts represents a linear sequence of events. The script writer visualizes the concepts in three dimensional environment and if needed uses the virtual reality integration into the program.

4. **Text Editor**

The content of a multimedia production always must flow logically and the text should always be structured and correct

12th_Computer_Application_English version CHAPTER 01.indd 9 19-01-2023 16:56:55

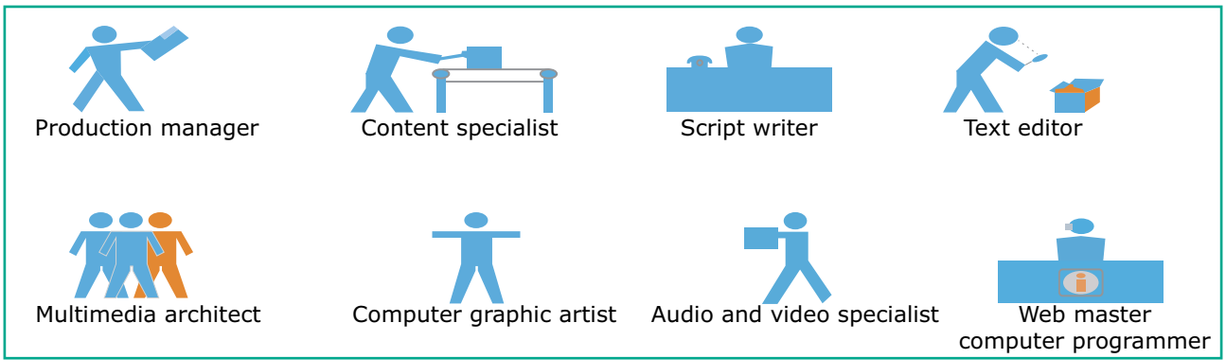


Figure: 1.13 **Multimedia Production Team**

grammatically. Text and narration is an integrated part of the application.

5. **Multimedia Architect**

   The multimedia architect integrates all the multimedia building blocks like graphics, text, audio, music, video, photos and animation by using an authoring software.

6. **Computer Graphic Artist**

   The role of Computer Graphic Artist is to deal with the graphic elements of the programs like backgrounds, bullets, buttons, pictures editing, 3-D objects, animation, and logos etc.

7. **Audio and Video Specialist**

   The roles of these specialists are needed for dealing with narration and digitized videos to be added in a multimedia presentation. They are responsible for recording, editing sound effects and digitizing.

8. **Computer Programmer**

   The computer programmer writes the lines of code or scripts in the appropriate language. These scripts usually develops special functions like developing the software to give the size and shape of video windows, controlling peripherals and so on.

9. **Web Master**

   The responsibility of the web master is to create and maintain an Internet web page. They convert a multimedia presentation into a web page. Final multimedia product is a joint effort of the entire team. Initially, the production manager identifies the project content, while the web master provides access to a wide range of community through web-services.

1.6 Multimedia on Internet

Major applications have been developed with the integration of internet and multimedia like maps, media rich blogs etc. A comprehensive study on use of internet and multimedia in USA says that an estimated 55 million consumers use Internet radio and video services each month. Image is the most widely used multimedia resource on internet. Social networking sites like Facebook, Whatsapp, Twitter etc. also enables multimedia rich contents to be exchanged online.

12th_Computer_Application_English version CHAPTER 01.indd 10 19-01-2023 16:56:55



Figure: 1.14 Multimedia on Internet

1.7 Applications of Multimedia

Multimedia is the most fast growing area in the field of information technology. A Multimedia is an application which is a collection of multiple media sources like text, images, sound/audio, animation and video on a single platform. Predominantly, Entertainment and Education are the fields where multimedia is used in majority.

1. **Education**

   Multimedia plays an vital role in offering an excellent alternative method to traditional teaching by allowing the students to explore and learn various concepts through animation. Students, teachers and the parents enjoy this multimedia mode of learning and multimedia learning materials. Multimedia based teaching and learning system named as MODULO at GMU in Germany developed is a web-based environment that aims to provide students with flexible and decentralized learning environment based on their educational background.

   In India, multimedia is used in different ways for teaching and learning like e-learning, distance learning, virtual learning and so on. EDUSAT (Education Satellite) is launched in India for serving the educational sector of the country for emulating virtual classroom in an effective manner.

2. **Entertainment**

The remarkable advancement in the entertainment industry is due to the Multimedia Technology mainly. This technology is needed in all mode of entertainment like radio, TV, online gaming, video on demand etc.

Video on demand or movies on demand is a service that provides movies to television sets on an individual basis at homes. Movies are stored in a central server and transmitted through a communication network. A set-top box connected to the communication network converts

12th_Computer_Application_English version CHAPTER 01.indd 11 19-01-2023 16:56:55

the digital information to analog signals and inputs it to the television set.

3. **Business Systems**

Business applications for multimedia include presentations, training, internet protocols and so on. The marketing and advertising agencies are using animation techniques for sales promotion. High resolution projectors are common for multimedia presentations on the road. Cell phones and personal digital assistants with Bluetooth and Wi-Fi communication technology makes multimedia communication for business more efficiently.

4. **Medical Services**

Medical services are grown drastically with the development of multimedia. Medical Students practices surgery methods via simulation prior to actual surgery. Tiny digital cameras are inserted in human body and it displays the inner site of the body through which the medical practitioners can see the internal parts without actually dissecting it.

5. **Public Places**

Multimedia is available in many public places like trade shows, libraries, railway stations, museums, malls, airports, banks, hotels and exhibitions in the form of kiosks. It helps the customers by providing information to them. The information presented in kiosk are enriched with animation, video, still pictures, graphics, diagrams, maps, audio and text. Banks uses kiosks in the form of ATM machines.

6. **Multimedia Conferencing**

Multimedia conferencing or video-conferencing is a system that performs face-to-face interactions among participating users, located far from each other, as if they were sitting and discussing in a single room.

12th_Computer_Application_English version CHAPTER 01.indd 12 19-01-2023 16:56:55

POINTS TO REMEMBER

- Multimedia allows the users to combine and change data from various sources like image, text, graphics, video, audio and video to a single platform.
- Multimedia has five major components like text, images, sound, video and animation.
- Static text, will remain static as a heading or in a line, or in a paragraph.
- A hypertext is a system which consists of nodes, the text and the links between the nodes, which defines the paths the user need to follow for the text access in non-sequential ways.
- Images acts as an vital component in multimedia. These images are generated by the computer in two ways, as raster images and as vector images.
- Animation is the process displaying still images so quickly so that they give the impression of continuous movement. In animation the screen object is a vector image in animation.
- Sound is a meaningful speech in any language and is the most serious element in multimedia, providing the pleasure of music, special effects and so on.
- Musical Instrument Digital Identifier (MIDI) is a standard communication tool developed for computers and electronic instruments.
- Video can be categorized in two types as Analog video and Digital video.

12th_Computer_Application_English version CHAPTER 01.indd 13 19-01-2023 16:56:55

GLOSSARY

Multimedia	Multimedia allows the users to combine and change data from various sources like image, text, graphics, video, audio and video to a single platform.
Raster Image	Raster image is made up of the tiny dots called pixel.
Vector Image	Vector image is a type of image made up of geometric shapes.
Animation	Animation is the process of displaying still images quickly so that they give the impression of continuous movement. In animation the screen object is a vector image.
Path Animation	Path animation involves moving an object on a screen that has a constant background e.g. a cartoon character may move across the screen regardless of any change in the background or the character.
Musical Instrument Digital Identifier (MIDI)	Musical Instrument Digital Identifier (MIDI) is a standard communication tool developed for computers and electronic instruments.

12th_Computer_Application_English version CHAPTER 01.indd 14 19-01-2023 16:56:55

EVALUATION

Part - I

Choose the correct answer

Lesson 1 Multimedia and Desktop Publishing

1. What is multimedia?
   a) a type of computer hardware
   b) a type of computer software
   c) a type of computer network
   d) the use of multiple forms of media to communicate information
2. _____ has five major components like text, images, sound, video and animation.
   a) Multimedia b) Master Page
   c) Master item d) Multi-word
3. What is a raster image?
   a) a type of image made up of pixels
   b) a type of image made up of geometric shapes
   c) a type of image made up of text
   d) a type of image made up of sound waves
4. What is a vector image?
   a) a type of image made of pixels
   b) a type of image made up of geometric shapes
   c) a type of image made up of text
   d) a type of image made up of sound waves
5. Which of the following is a raster image file format?
   a) JPEG b) EPS
   c) CDR d) SVG
6. Which of the following is a vector image file format?
   a) PSD b) JPEG
   c) EPS d) BMP
7. RTF (Rich Text Format) file format was introduced by _____
   a) TCS b) Microsoft
   c) Apple Inc. d) IBM

12th_Computer_Application_English version CHAPTER 01.indd 15 19-01-2023 16:56:55

8. The expansion of JPEG is _____

a) Joint Photographic Experts Group

b) Joint Photo Experts Group

c) Join Photon Experts Group

d) Joint Photographic expressGroup

9. AIFF file format was developed by _____

a) TCS b) Microsoft

c) Apple Inc. d) IBM

10. Which of the following is an audio file format?

a) MP3 b) AVI

c) MPEG d) PNG

Part - II

Short Answers

1. Define Multimedia.
2. List out Multimedia Components.
3. Classify the TEXT components in multimedia.
4. Classify the IMAGE components in multimedia.
5. Define Animation.

Part - III

Explain in Brief Answer

1. List out image file formats.
2. List out audio file formats.
3. List out video file formats.

Part - IV

Explain in detail

1. Explain in detail about Production team roles and responsibilities.
2. Explain in detail about different file formats in multimedia files.

12th_Computer_Application_English version CHAPTER 01.indd 16 19-01-2023 16:56:55



02
CHAPTER

An Introduction to Adobe PageMaker

LEARNING OBJECTIVES

After the completion of this chapter, the student

- **learns about what Desktop publishing is.**
- **creates documents using PageMaker**
- **creates Text Blocks**
- **changes a Text block size**
- **inserts text from other software like MS-Word in the PageMaker document**
- **uses frames to hold text in place of using text blocks and so many**

2.1 Desktop Publishing

We hear and see the term '**Desktop publishing**' a lot these days. What exactly is it? What does it mean? Desktop publishing (abbreviated DTP) is the creation of page layouts for documents using DTP software.

Today, there are several Desktop Publishing (DTP) software available in the market. Some of the popular DTP software are **Adobe PageMaker, Adobe InDesign, QuarkXPress**, etc.

2.2 Introduction to Adobe PageMaker

Adobe PageMaker is **a page layout software**. It is used to design and produce documents that can be printed. You can create anything from a simple business card to a large book.

Page layout software includes tools that allow you to easily position text and graphics on document pages. For example, using PageMaker, you can create a newsletter that includes articles and pictures on each page. You can place



Figure 2.1 Various page layout software

12th_Computer_Application_English version CHAPTER 02.indd 17 19-01-2023 16:59:05

pictures and text next to each other, on top of each other, or beside each other—wherever you want them to go. Figure 2.1 shows various page layout softwares

2.3 Opening PageMaker

In the Windows 7 operating system, we can open Adobe PageMaker using the command sequence **Start→All Programs → Adobe → PageMaker 7.0 → Adobe PageMaker 7.0.**

The Adobe PageMaker window will be opened as shown in Figure 2.2

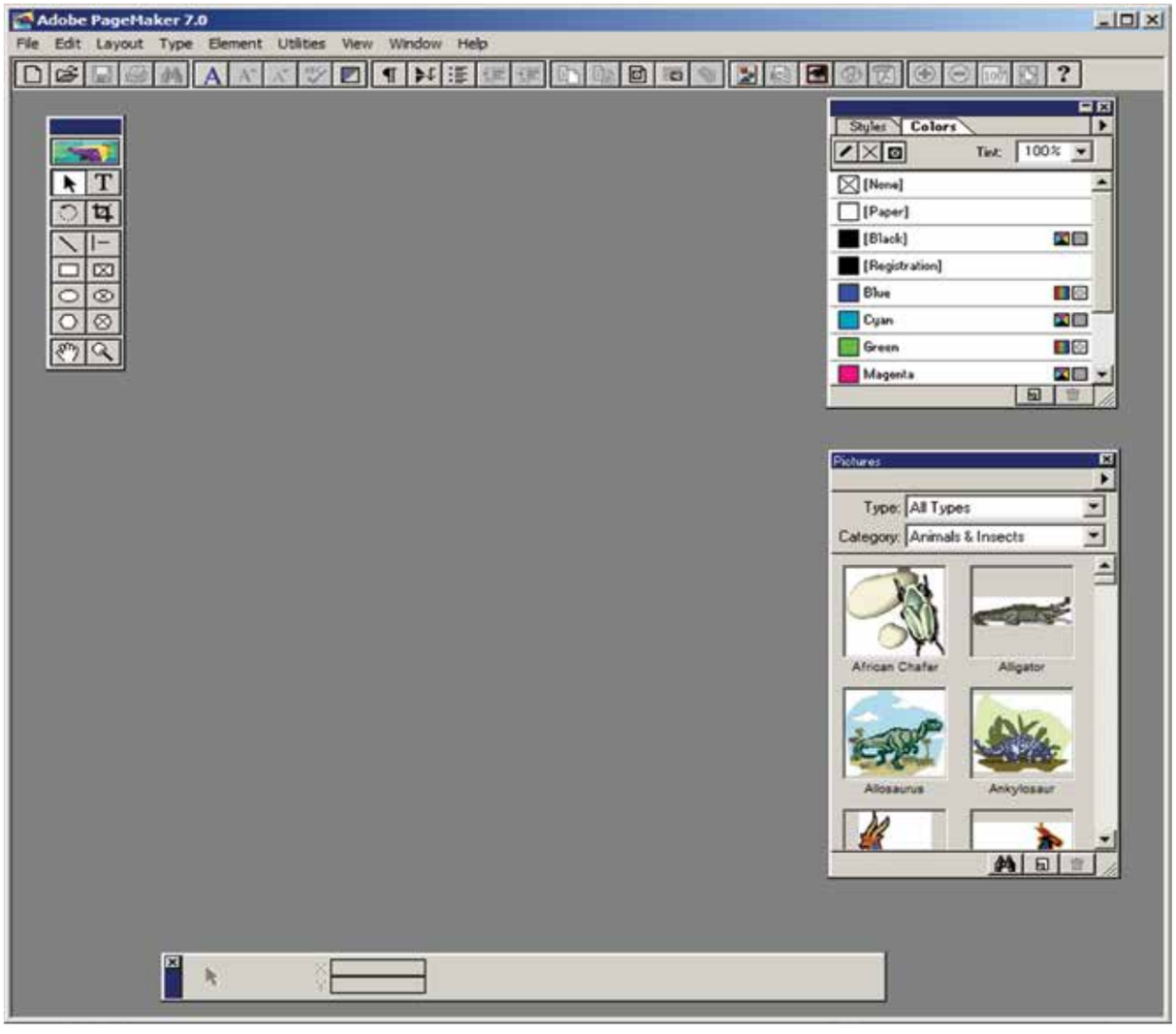


Figure 2.2 Adobe PageMaker window

2.4 Creating a New Document

To create a new document,

1. Choose **File > New** in the menu bar. (or) Press Ctrl + N in the keyboard. Now **Document Setup dialog box** appears.(Figure 2.3)
2. Enter the appropriate settings for your new document in the Document Setup dialog box.
3. Click on **OK.**

12th_Computer_Application_English version CHAPTER 02.indd 18 19-01-2023 16:59:05

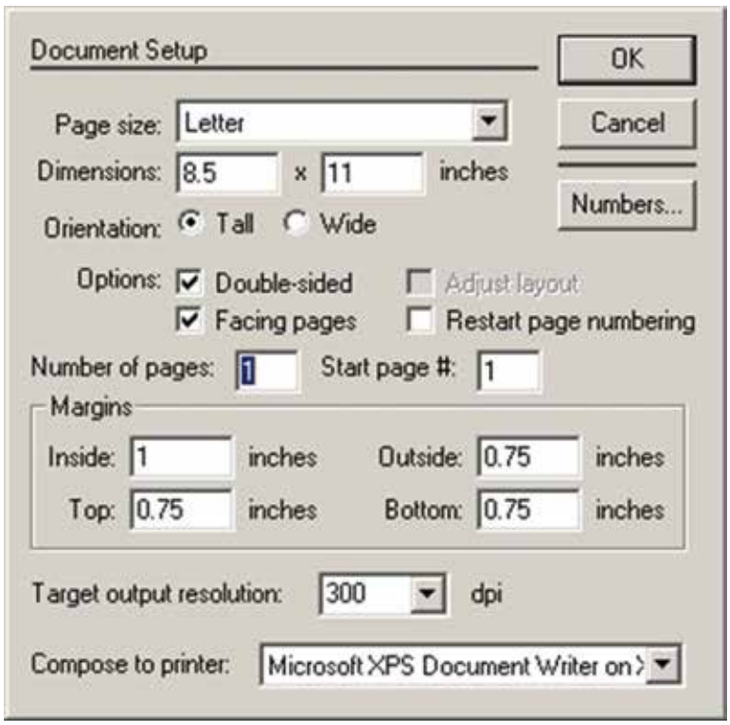


Figure 2.3 **Document Setup dialog box**

Now a new document called **Untitled - 1** opens on the screen as shown in Figure 2.4.

A document page is displayed within a dark border. The area outside of the dark border is referred to as the pasteboard. Anything that is placed completely in the pasteboard is not visible when you print the document. You can use the pasteboard to temporarily hold elements while designing your document.

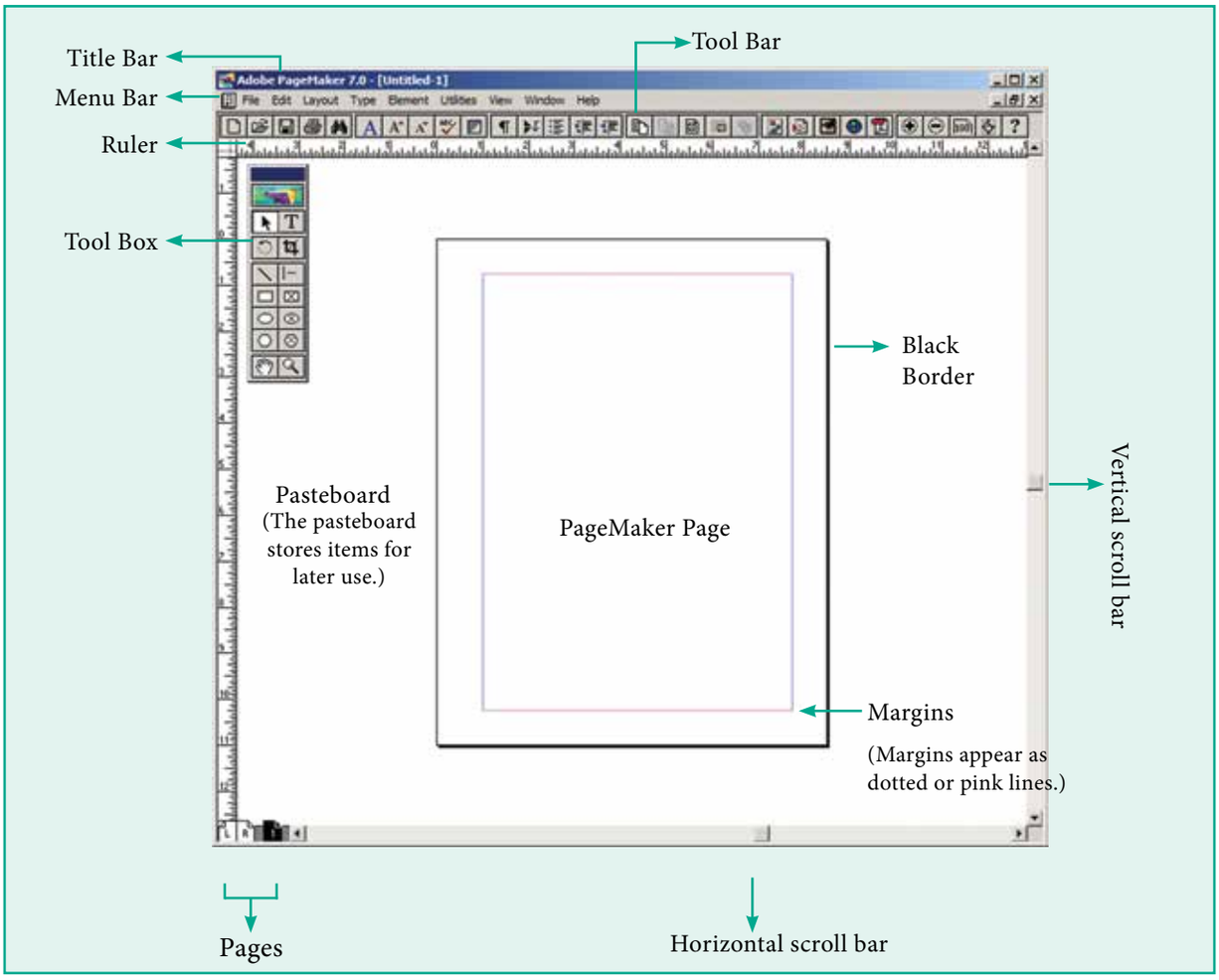


Figure 2.4 **PageMaker Document Window**

12th_Computer_Application_English version CHAPTER 02.indd 19 19-01-2023 16:59:06

The main components of the PageMaker window are **Title bar, Menu bar, Toolbar, Ruler, Scroll bars and Text area.** Let us have a look at these components.

Title bar



Figure 2.5 Title bar

It is the topmost part of the window. It shows the name of the software and the name of the document at the left, and the control buttons (Minimize, Maximize and Close) at the right.

In Figure 2.5 we can see the name of the software (Adobe PageMaker 7.0) at the left. It is followed by the default name of the document(Untitled-1) which can be changed when we save the document with a user-supplied name.

We know that on clicking the Minimize button the document window is minimised to a small icon and kept in the task bar, Maximise button is used for maximising the current document window to fit the whole screen area, and the Close button closes the software itself.

Menu bar



Figure 2.6 Menu bar

It contains the following menus **File, Edit, Layout, Type, Element, Utilities, View, Window, Help.** When you click on a menu item, a pulldown menu appears. There may be sub-menus under certain options in the pull-down menus. Refer Figure 2.6

Toolbar

If you place the mouse pointer on a button in the Toolbar, a short text will appear with its description called '**Tool Tip**'. Refer Figure 2.7



Figure 2.7 Toolbar

Toolbox

The Figure 2.8 shows the PageMaker toolbox.

To move the toolbox, drag the toolbox by its **title bar**. Select a tool from the default toolbox by clicking it.

If the toolbox is not available on the screen, you can perform these steps to show the toolbox.

12th_Computer_Application_English version CHAPTER 02.indd 20 19-01-2023 16:59:06

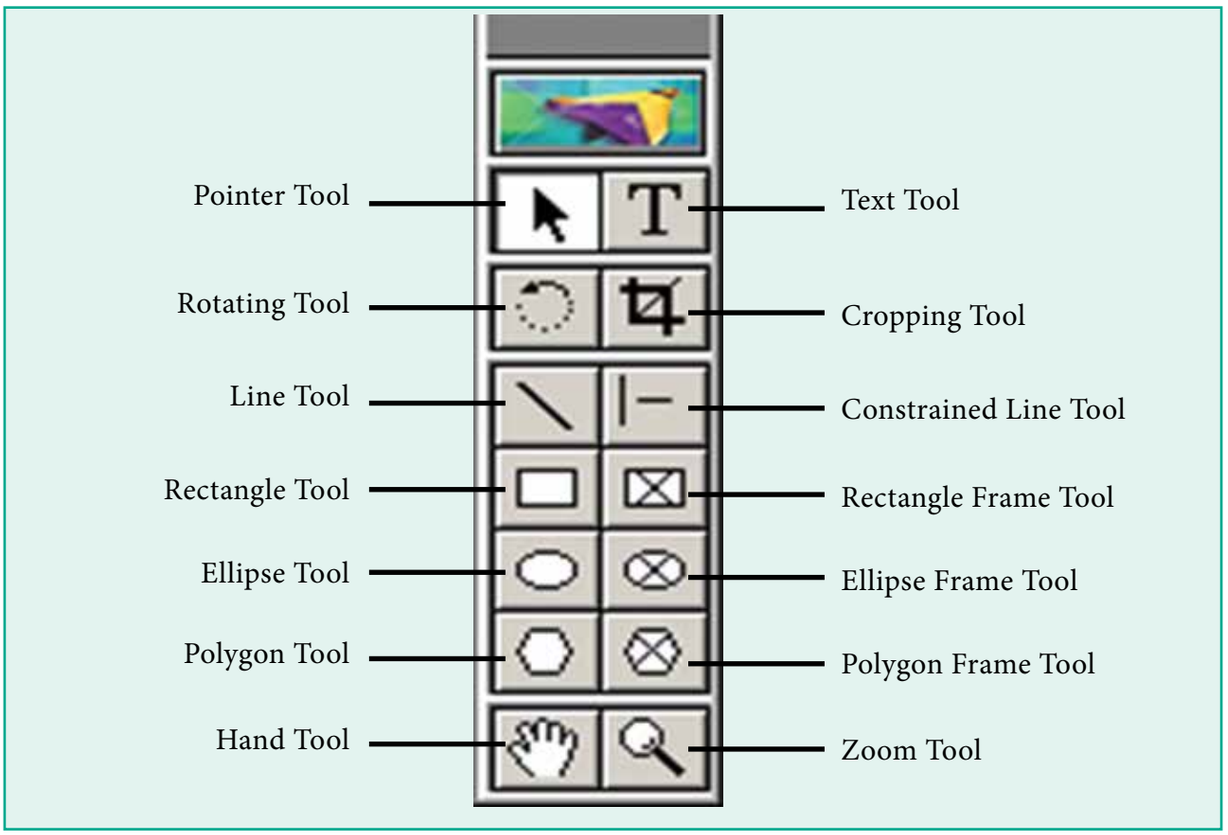


Figure 2.8 **Toolbox**

1. Click on **Window**. The Window menu will appear.
2. Click on **Show tools**.

The toolbox appears in front of your document window. If you want to hide the toolbox, you can perform these steps to hide the toolbox.

1. Click on **Window**. The Window menu will appear.
2. Click on **Hide tools** to hide the toolbox.

The Keyboard shortcuts and Toolbox usages are shown in Table 2.1 & Table 2.2

Table 2.1 Keyboard Shortcuts

S. No.	Tools	Keyboard Short Cut
1	Pointer Tool	F9
2	Rotating Tool	Shift + F2
3	Line Tool	Shift + F3
4	Rectangle Tool	Shift + F4
5	Ellipse Tool	Shift + F5
6	Polygon Tool	Shift + F6
7	Hand Tool	Shift + Alt + Drag Left mouse button
8	Text Tool	Shift + Alt + F1
9	Cropping Tool	Shift + Alt + F2
10	Constrained Line Tool	Shift + Alt + F3
11	Rectangle Frame Tool	Shift + Alt + F4

12th_Computer_Application_English version CHAPTER 02.indd 21 19-01-2023 16:59:06

Table 2.2 Tool Box Usage

Tool	Toolbox	Cursor	Use
Pointer Tool			Used to select, move, and resize text objects and graphics.
Text tool			Used to type, select, and edit text.
Rotating tool			Used to select and rotate objects.
Cropping tool			Used to trim imported graphics.
Line tool		+	Used to draw straight lines in any direction.
Constrained line tool		+	Used to draw vertical or horizontal lines.
Rectangle tool		+	Used to draw squares and rectangles.
Rectangle frame tool		+	Used to create rectangular placeholders for text and graphics.
Ellipse tool		+	Used to draw circles and ellipses.
Ellipse frame tool		+	Used to create elliptical placeholders for text and graphics.
Polygon tool		+	Used to draw polygons.
Polygon frame tool		+	Used to create polygonal placeholders for text and graphics.
Hand tool			Used to scroll the page (an alternative to the scroll bar)
Zoom tool			Used to magnify or reduce an area of the page.

12th_Computer_Application_English version CHAPTER 02.indd 22 19-01-2023 16:59:06

Scroll bars

Scrolling is the process of moving up and down or left and right through the document window. There are two scrollbars namely Vertical and Horizontal scroll bars for scrolling the document vertically or horizontally.

Rulers

There are two ruler bars. One is at the top and the other is at the left side.

To show the ruler

1. Click on **View**. The View menu will appear.
2. Click on **Show Rulers**. Rulers appear along the top and left sides of the document window.

To hide the ruler

1. Click on **View**. The View menu will appear.
2. Click on **Hide Rulers** to hide the rulers.

2.5 Entering Text in the Document

In PageMaker the text can be typed inside a **text block.** So, you must use the **Text tool** to create the text blocks. After creating a Text block, you can type the text directly into the text block. As the characters are typed, the flashing vertical bar called the **insertion point** or I-beam which moves to the right. When the text being typed reaches the end of the text block, PageMaker will automatically wrap the text to the next line. The **Enter key** must not be pressed at the end of the each line in text block. The Enter key should be pressed only at the end of a paragraph or when a blank line is to be inserted.

2.6 Editing Text in the Document

Editing means making changes to the text. When you edit a document, you revise the text. Editing may be inserting and deleting words and phrases, correcting errors, and moving and copying text to different places in the document.

2.6.1 Selecting Text

Text can be selected using the **mouse** or the **keyboard**.

Selecting Text using the mouse

To select text using a mouse, follow these steps :

1. Place the Insertion point to the left of the first character to be selected.
2. Press the left mouse button and drag the mouse to a position where you want to stop selecting.
3. Release the mouse button.
4. The selected text gets highlighted.

To Select	Press
A Word	Double-click with I-beam
A Paragraph	Triple-click with I-beam

Selecting Text using the Keyboard

To select text using a keyboard, follow these steps :

1. Place the Insertion point to the left of the first character you wish to select.
2. The **Shift** key is pressed down and the movement keys are used to highlight the required text.
3. When the **Shift** key is released, the text is selected.

12th_Computer_Application_English version CHAPTER 02.indd 23 19-01-2023 16:59:06

To Select	Press
One character to the left	Shift + ←
One character to the right	Shift + →
One line up	Shift + ↑
One line down	Shift + ↓
To the end of the current line	Shift +End
To the beginning of the current line	Shift + Home
Entire Document	Ctrl + A

2.6.2 Deleting Text

You can easily delete a character, or word, or block of text.

To delete a character, do the following :

1. Position the insertion point to the **left of the character** to be deleted.
2. Press **Delete key** on the keyboard. (or)
3. Position the insertion point to the **right of the character** to be deleted.
4. Press **Backspace key** on the keyboard.

To delete a block of text, do the following :

1. Select the text to be deleted.
2. Press **Delete or Backspace** in the keyboard (or) **Edit > Clear** command.

2.6.3 Undo Command

The **Undo** command is used to reverse the action of the last command. To reverse the last command, click on Edit>Undo in the menu bar (or) press Ctrl + Z in the keyboard.

2.6.4 Copying and Moving Text

The **Copy** and **Paste** commands of PageMaker can be used to copy text from one location in a document and paste it at another location. The **Copy** command creates a duplicate of the selected text, leaving the original text unchanged. The **Paste** command pastes the copied text at the position where the insertion point is placed.

The **Cut** and **Paste** commands can be used to move text from one position in a document to the other. The **Cut** command deletes the selected text from its original position. The **Paste** command then places this text at the position where the insertion point is placed.

Moving the Text

The selected text can be easily cut and pasted in the required location.

To cut and paste text .

1. Select the text to be moved.
2. Choose **Edit > Cut** in the menu bar. (or) Press **Ctrl + X** in the keyboard (or) Click the right mouse button and choose **cut** from the pop-up menu.
3. Insertion point is moved to the place where the text is to be pasted.
4. Choose **Edit > Paste** in the menu bar. (or) **Press Ctrl + V** in the keyboard. (or) Click the right mouse button and choose **Paste** from the pop-up menu.

The text can also be moved in this way to another location.

The following keyboard shortcuts can be used to move text

Ctrl + X → to Cut

Ctrl + V → to Paste

12th_Computer_Application_English version CHAPTER 02.indd 24 19-01-2023 16:59:06

Copying the Text

The selected text can be easily copied and pasted in the required location.

To copy and paste text .

1. Select the text to be coped.
2. Choose **Edit > Copy** in the menu bar (or) Press **Ctrl + C** in the keyboard (or) Click the right mouse button and choose **Copy** from the pop-up menu.
3. Insertion point is moved to the place where the text is to be pasted.
4. Choose **Edit > Paste** in the menu bar (or) **Press Ctrl + V** in the keyboard (or) Click the right mouse button and choose **Paste** from the pop-up menu.

The text can also be copied in this way to another location.

Keyboard shortcuts for copy and paste:

Ctrl + C → to Copy
Ctrl + V → to Paste

2.7 Text Block

A text block contains the text you type, paste, or import. You can't see the borders of a text block until you select it with the pointer tool.

You can create text blocks in two ways:

1. Click or drag the text tool on the page or pasteboard, and then type.
2. Click a loaded text icon in an empty column or page.

2.7.1 Creating a Text Block with the Text tool

To create a text block with the text tool:

1. Select the text tool (T) from the toolbox. The pointer turns into an I-beam. Refer Figure 2.9

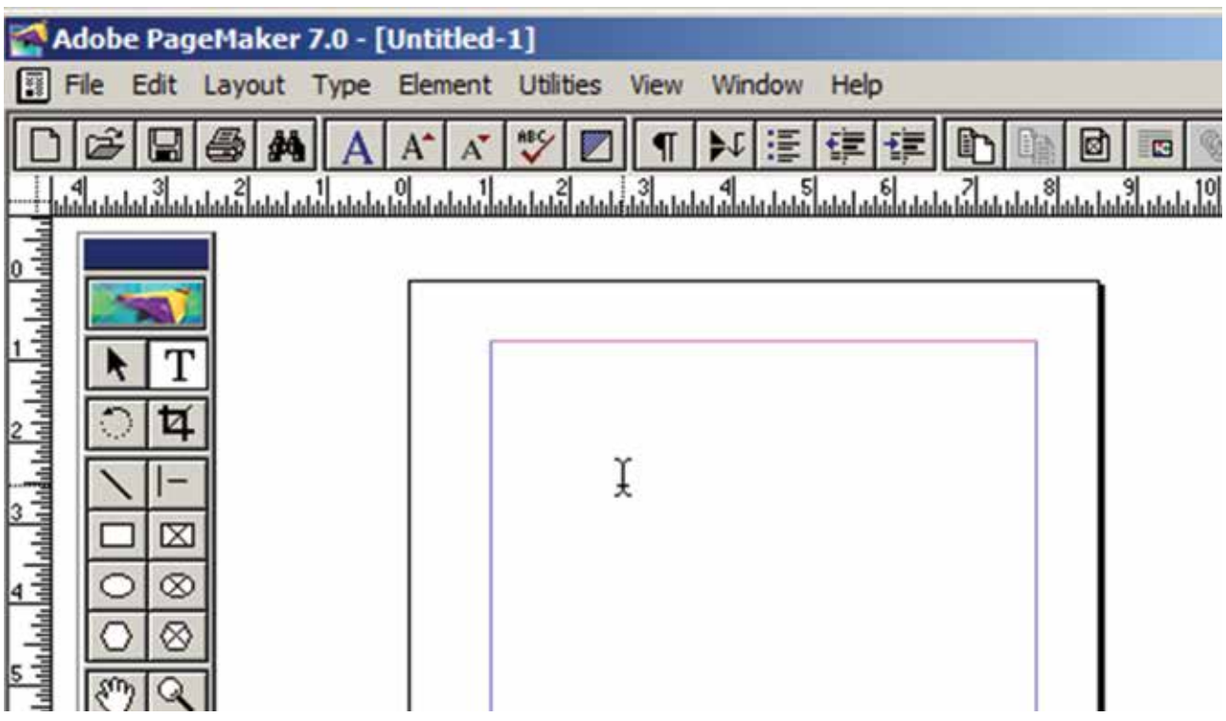


Figure 2.9 I - beam

12th_Computer_Application_English version CHAPTER 02.indd 25 19-01-2023 16:59:07

2. On an empty area of the page or pasteboard, do one of the following:

   Click the I-beam where you want to insert text. (Refer Figure 2.10) This creates a text block to the width of the column or page. By default, the insertion point jumps to the left side of the text block.

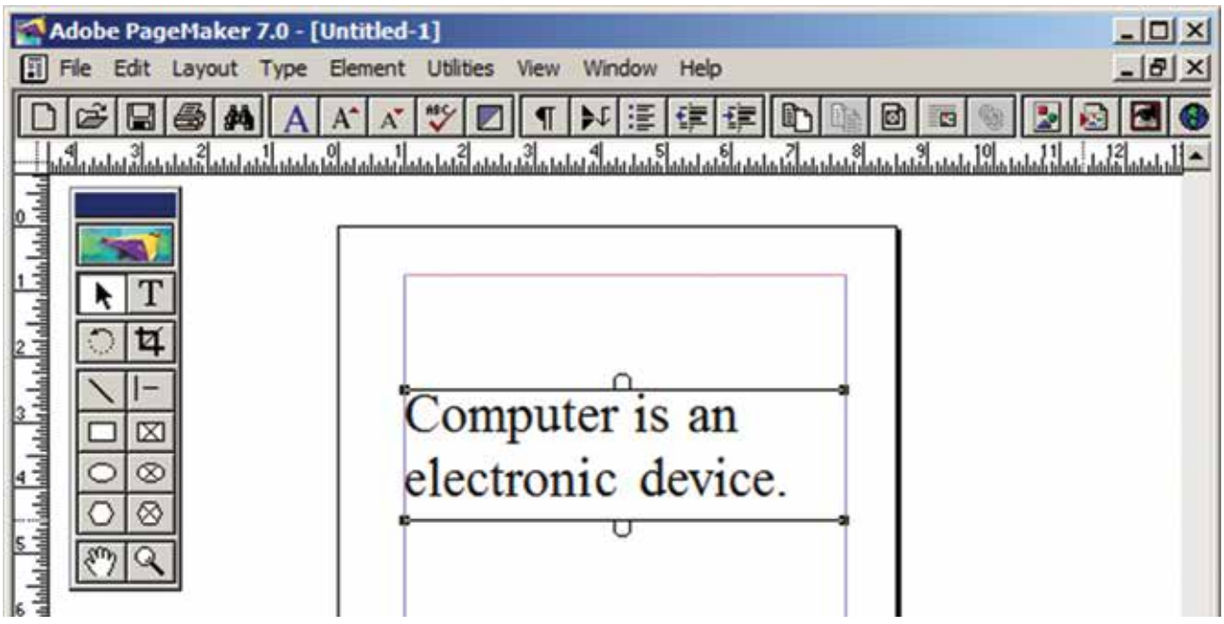


Figure 2.10 Text block

3. Type the text you want.

   Unlike with a text frame, you do not see the borders of a text block until you click the text with the pointer tool. Refer 2.11

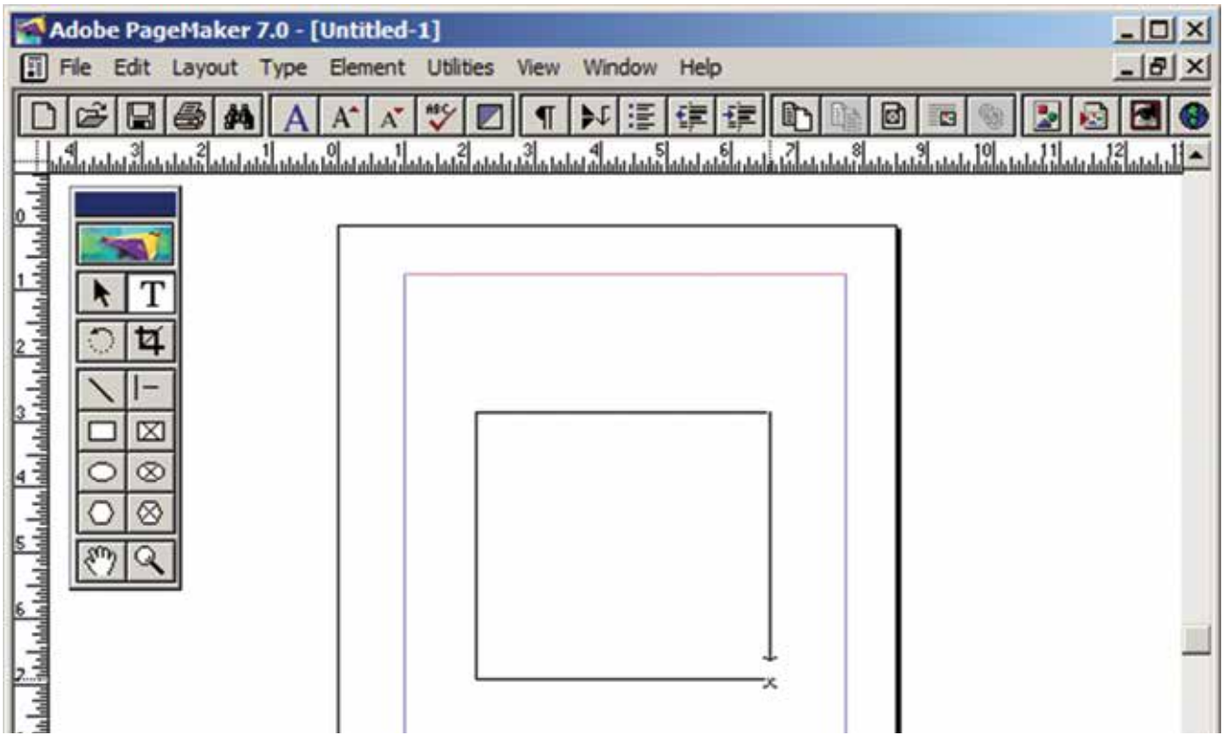


Figure 2.11 Creating a Text Block with the Text tool

12th_Computer_Application_English version CHAPTER 02.indd 26 19-01-2023 16:59:07

2.7.2 Moving a Text Block

To move a block without changing its shape, place the cursor anywhere inside the block, and click and drag it to the required position. Refer 2.12

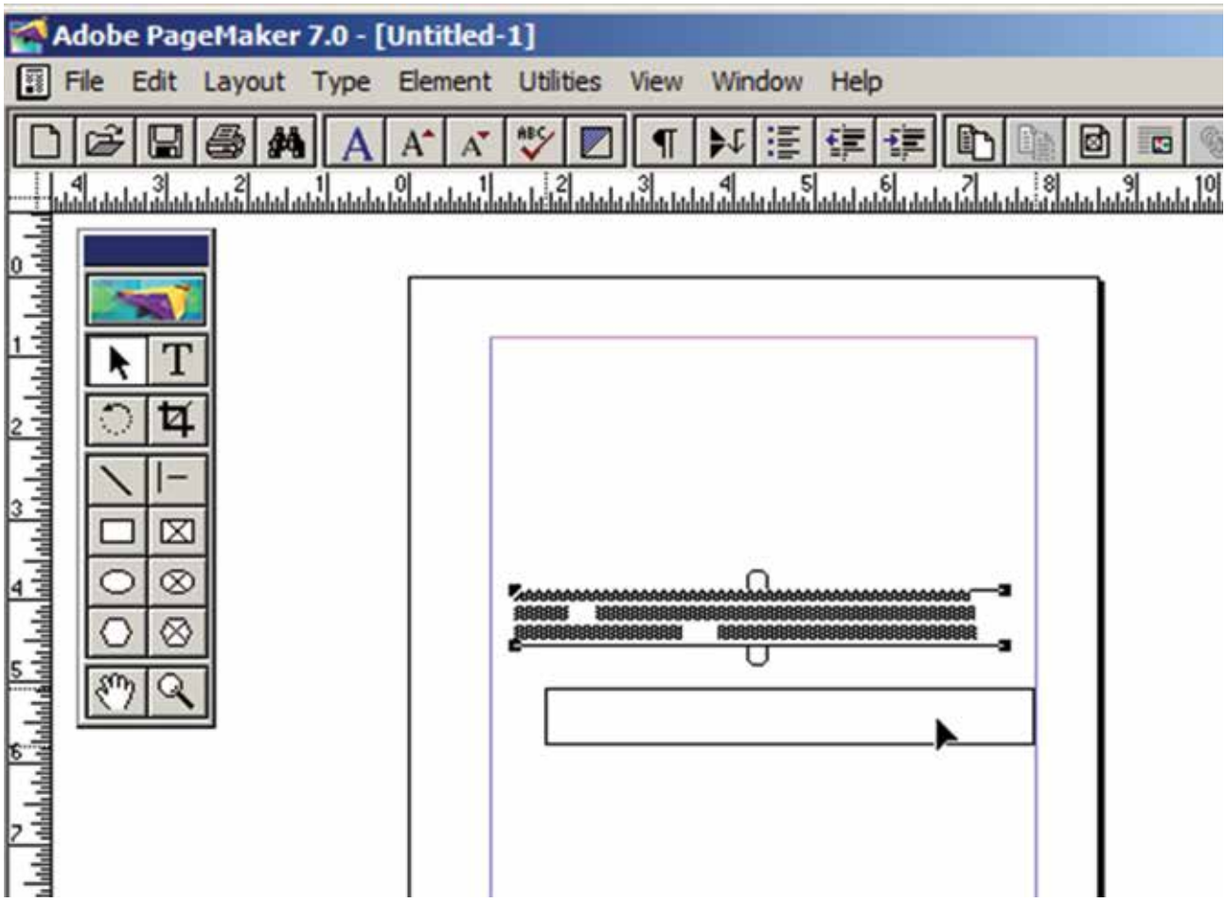


Figure 2.12 Moving a Text Block

2.7.3 Resizing a Text Block

When you select a text block with the Pointer tool, the block's boundaries become visible. Two handles are seen above and below the text block. These handles are called **Windowshades**. There is a dark square on both ends of the handle. These are used to change the size of the text block. Refer Figure 2.13 to Figure 2.15

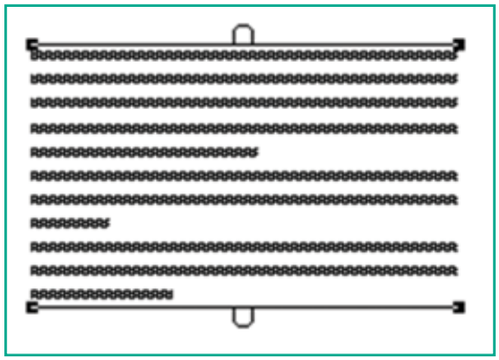


Figure 2.13 Windowshades

12th_Computer_Application_English version CHAPTER 02.indd 27 19-01-2023 16:59:08

To resize a Text block

1. Click on **the Pointer tool.**
2. Click either the left or right corner handle on the bottom of the text block and drag. When you release the mouse button, the text in the text block will reflow to fit the new size of the text block.

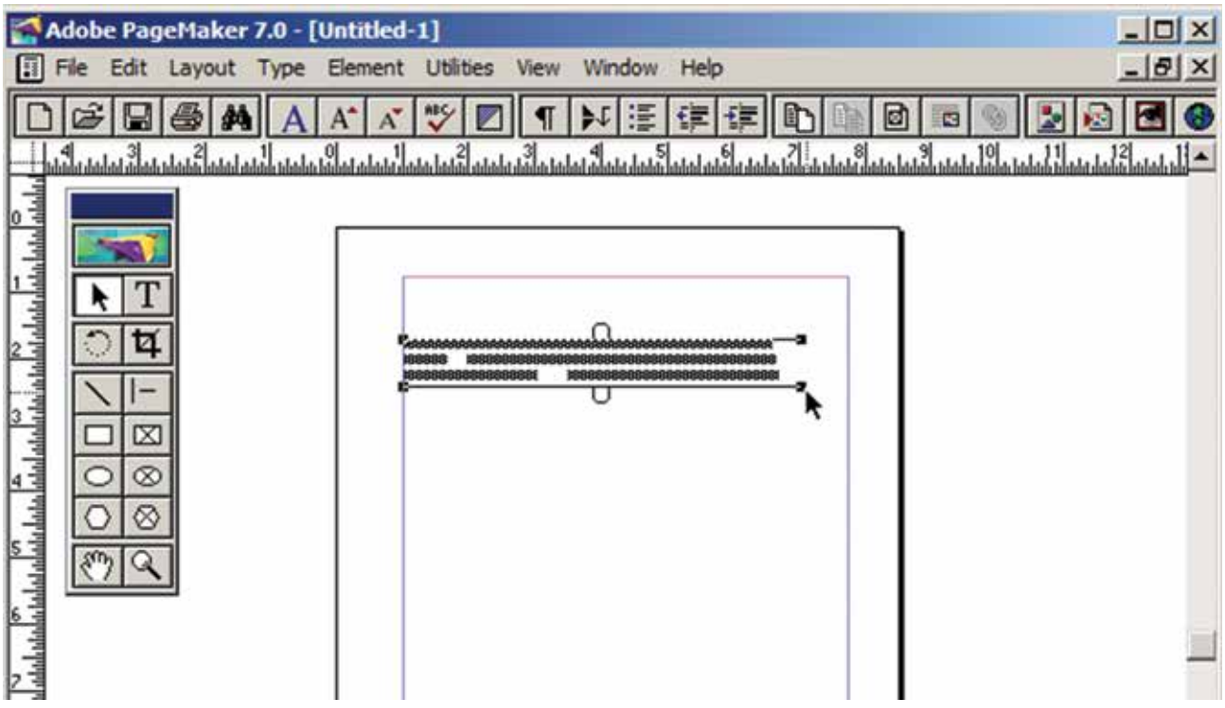


Figure 2.14 Resizing text block

3. A red triangle in the bottom windowshade means there is more text in the text block than is visible on the page. Drag the windowshade handle down to show more text.

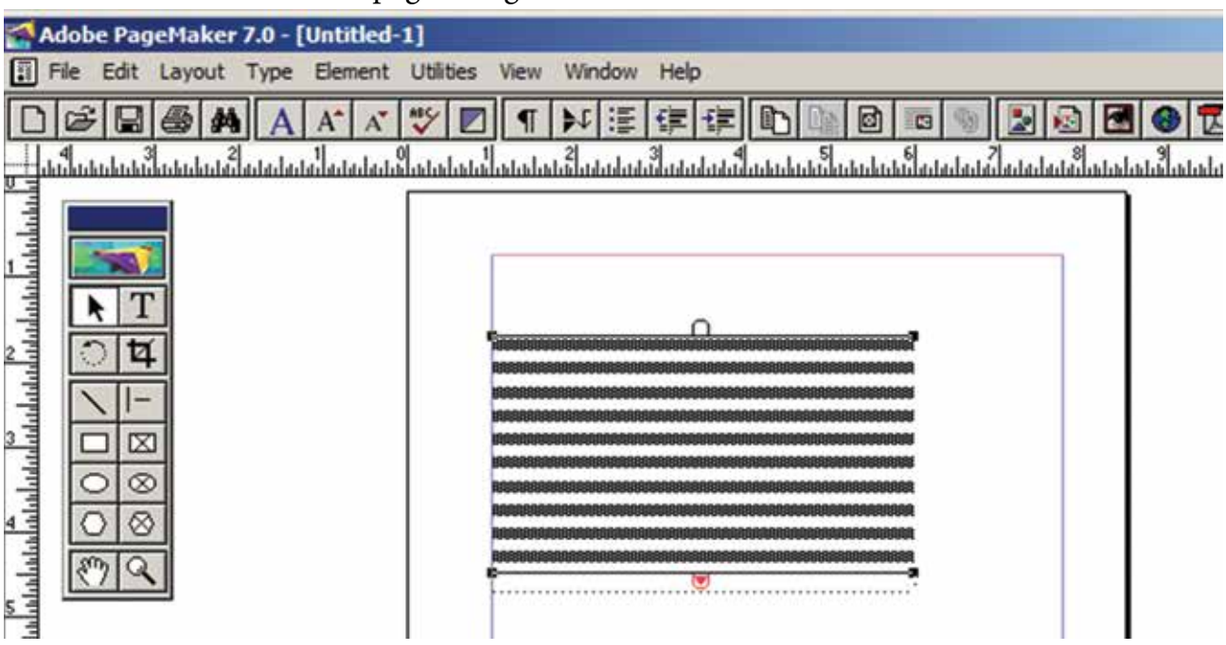


Figure 2.15 A red triangle in the bottom windowshade

12th_Computer_Application_English version CHAPTER 02.indd 28 19-01-2023 16:59:09

2.7.4 Splitting a Text Block into two

To split a text block into two

1. Place the cursor on the bottom handle, click and drag upwards. When you release the bottom handle will contain a red triangle. Refer Figure 2.17-18

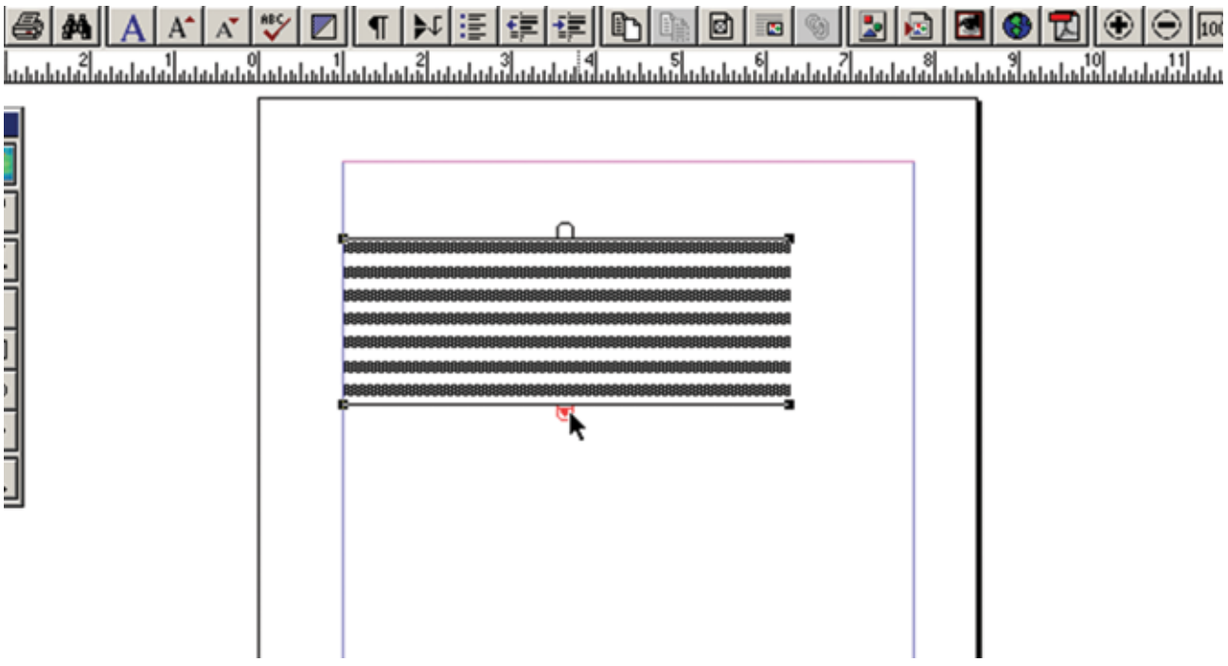


Figure 2.16 A red triangle in the bottom handle

2. Click once on this, and the cursor changes to a loaded text icon.

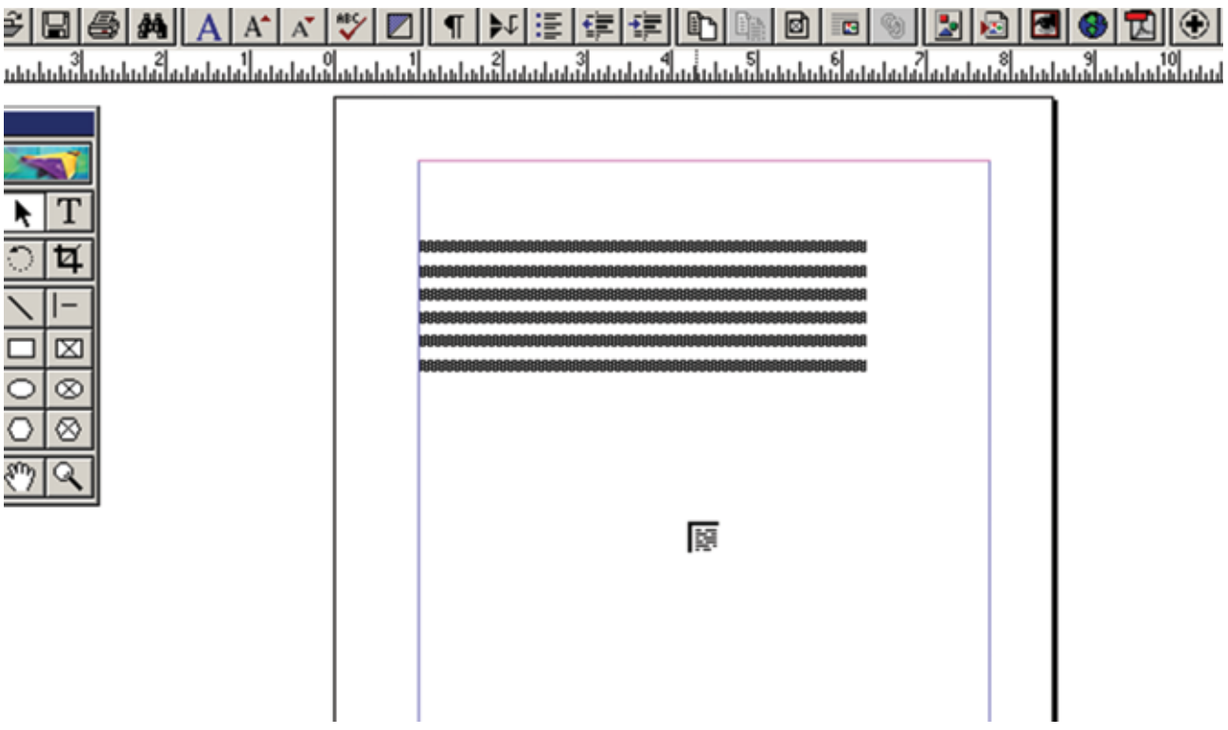


Figure 2.17 A loaded text icon

12th_Computer_Application_English version CHAPTER 02.indd 29 19-01-2023 16:59:10

3. Position this where the second part of the text is to be, and click.

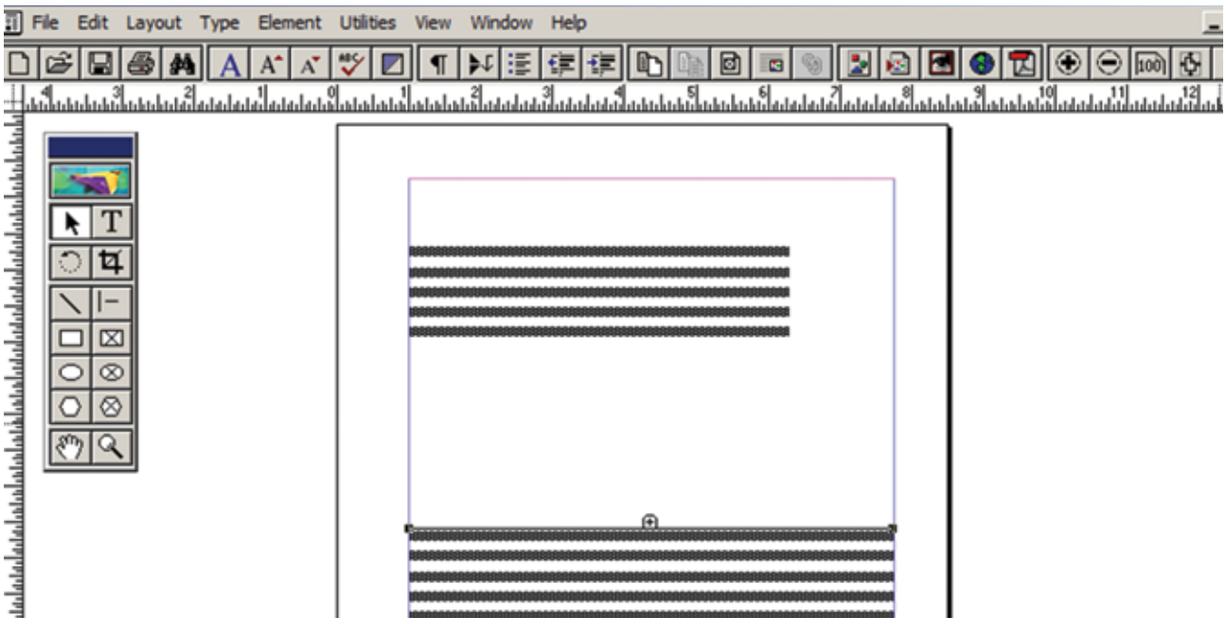


Figure 2.18 Splitting a Text block

2.7.5 Rejoining split blocks

To rejoin the two text blocks

1. Place the cursor on the bottom handle of the second text block, click and drag the bottom handle up to the top.
2. Then place the cursor on the bottom handle of the first text block, and click and drag the bottom handle down if necessary.

2.7.6 Placing (Importing) Text

You can insert text from other software program like MS-Word in to a PageMaker document. Refer Figure 2.19 to Figure 2.22

1. Choose **File** > **Place.** The **Place dialog box** will appear.

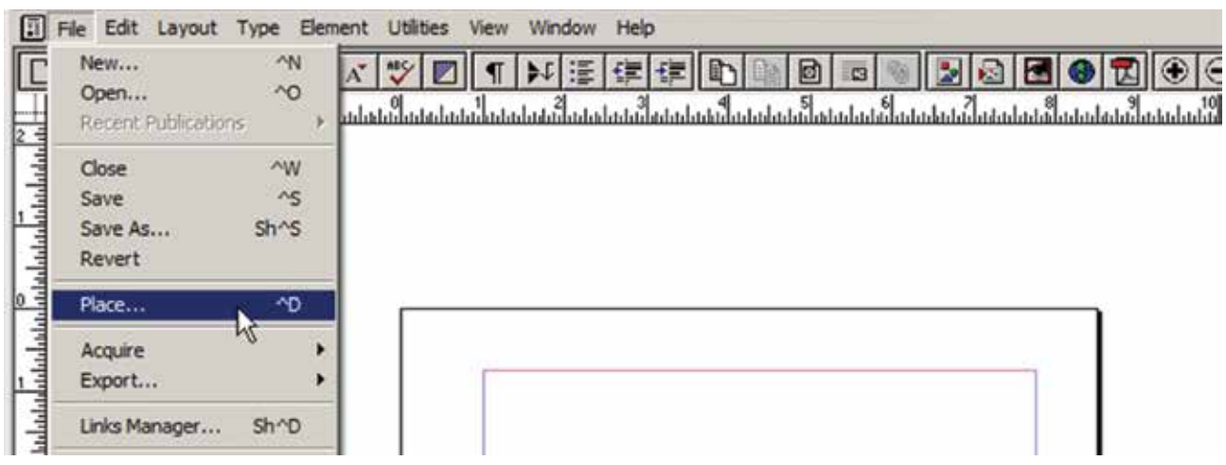


Figure 2.19 Place option in the File Menu

12th_Computer_Application_English version CHAPTER 02.indd 30 19-01-2023 16:59:10

2. Locate the document that contains the text you want to place and select it.

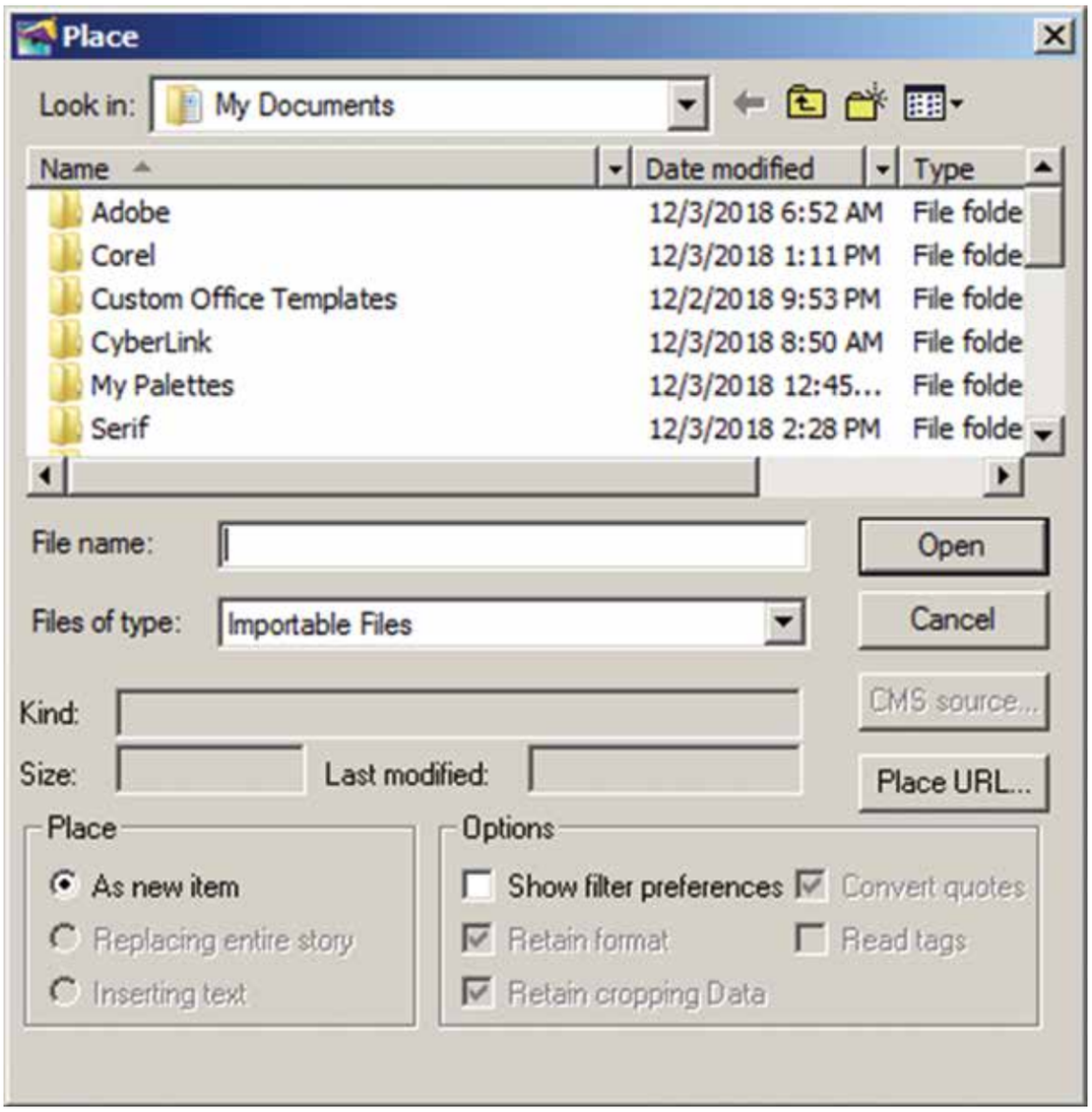


Figure 2.20 Place dialog dialog box

3. Click on **Open** in the Place dialog box. The pointer changes to the loaded text icon ( ).
4. Make a text block to place the text. (Or) Click in the page to place the text. The text will be placed in the page.

   If the text to be placed is too big to fit on one page, PageMaker allows you to place it on several pages. This can be done manually or automatically.

Manual text flow

- Position the loaded text icon at a corner of the area where you want to place text, hold down the mouse button, and drag to define the text block. Release the mouse button.
- Text flows into the defined area. If there is more text than that fits in the text block you defined, a red triangle appears in the bottom windowshade handle.

12th_Computer_Application_English version CHAPTER 02.indd 31 19-01-2023 16:59:10

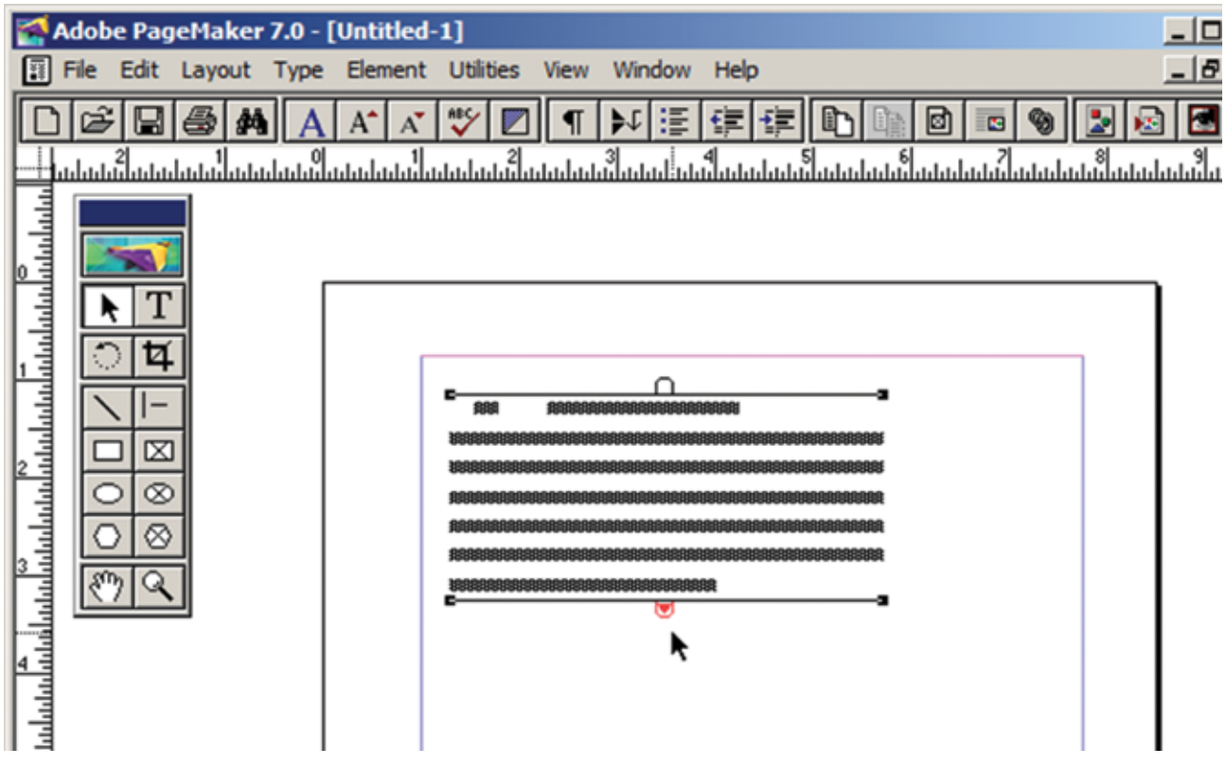


Figure 2.21 A red triangle in the bottom windowshade handle

- Click once on this and the loaded text icon reappears. Now generate a new text block and click. Repeat this process until there is no more text to place.

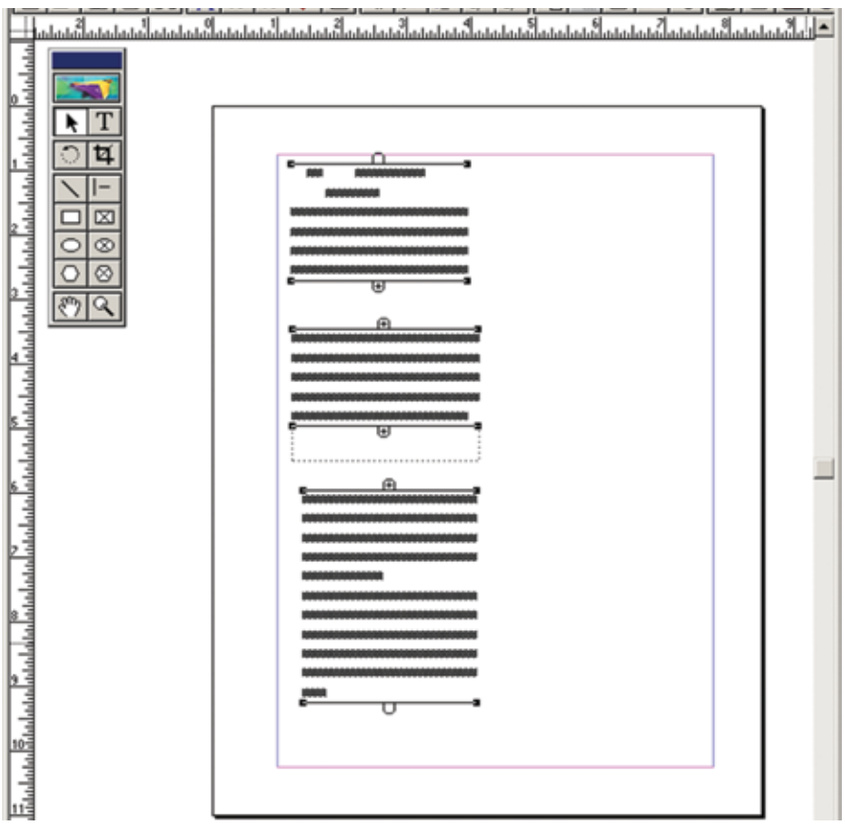


Figure 2.22 Text blocks

12th_Computer_Application_English version CHAPTER 02.indd 32 19-01-2023 16:59:11

Similarly if you want to place the text in a page, position the loaded text icon at the top of the page and click. Text flows into the page. If there is more text than fits in the page, a red triangle appears in the bottom windowshade handle.

Click once on this and the loaded text icon reappears. Now generate a new page (or pages) by selecting **Layout** > **Insert Pages** in the menu bar. Place the loaded text icon at the top of the next page and click. Repeat this process until there is no more text to place.

Automatic text flow

Before importing the text, first select **Layout** > **Autoflow** in the menu bar. Then you should import the text. Now the loaded text icon looks different - it contains a squiggly arrow( ).

Place the loaded text icon at the top of the page and click. Now the text will automatically flow on to the succeeding pages, creating new ones, if necessary.

2.8 Understanding story

A PageMaker story is similar to a newspaper article. The front page of a newspaper may contain several independent articles, some of which continue on other pages. In PageMaker, several stories may appear on the same publication page and continue elsewhere in the publication.

2.9 Threading text blocks

All text in PageMaker resides inside containers called **text blocks**.

A Text block can be connected to other text block so that the text in one text block can flow into another text block. Text blocks that are connected in this way are **threaded text blocks**. The process of connecting text among Text blocks is called **threading text**. Text that flows through one or more threaded blocks is called a **story**.

Once you have a loaded text icon, you can use one of three text-flow options to place text in text blocks.

To cancel a loaded text icon, click the pointer tool in the toolbox, now the text is deleted.

A threaded text block can be identified by a plus sign in its top and/or bottom handles. Refer Figure 2.23-Fig 2.25

Unthreaded text is where a text block stands alone, without being connected to any other block. These blocks have nothing in their top and bottom handles.

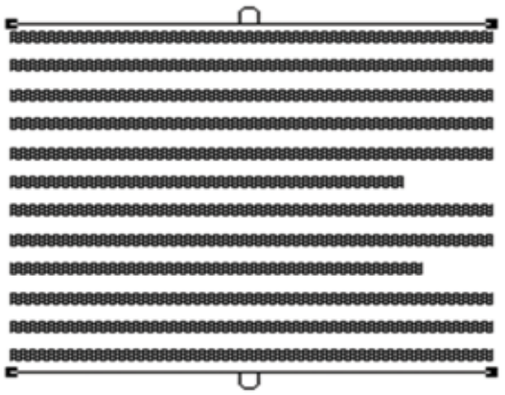


Figure 2.23 Unthreaded text

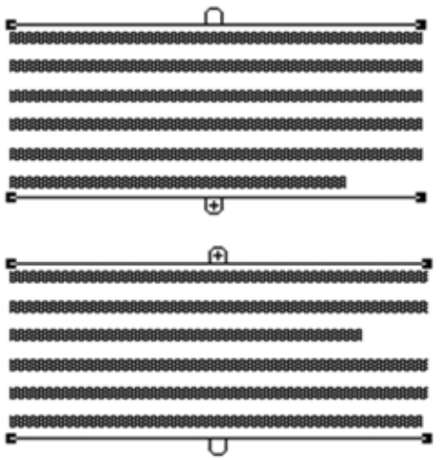


Figure 2.24 Threaded text

12th_Computer_Application_English version CHAPTER 02.indd 33 19-01-2023 16:59:12

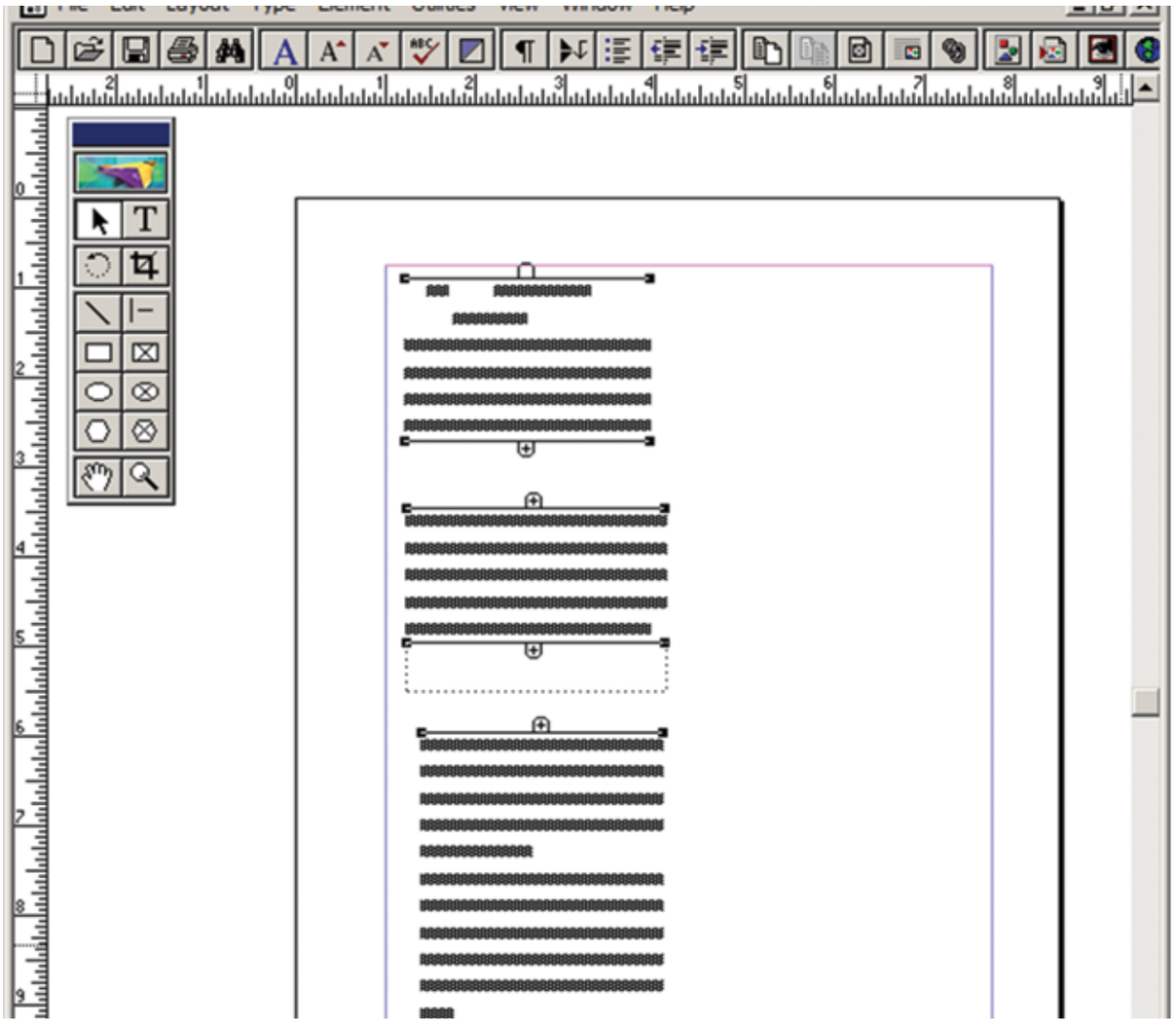


Figure 2.25 Threading Text Blocks

2.9.1 To unthread a threaded block

Method - 1:

Select the block that you wish to unthread with the pointer tool. Click on Edit > Cut in the menu bar.(the block disappear). Now click on the Edit > Paste in the menu bar. The block will reappear in the same position, but it is now an unthreaded block.

BEWARE: if the block is in the middle of a story, say the second of the three, the first block is now threaded directly to the third.

Method - 2:

Select the block that you wish to unthread with the pointer tool. Then choose the Text tool and select all the text in the block. Then click on Edit > Cut in the menu bar.(the block disappear). Now click the insertion point within an existing threaded block. Then click on Edit > Paste in the menu bar. The text will be added in this block.

2.10 Placing Text in a Frame

You can also use frames to hold text in place of using text blocks. Refer Figure 2.26

12th_Computer_Application_English version CHAPTER 02.indd 34 19-01-2023 16:59:12

To place text in a Frame

1. Click on any one Frame tool from the Toolbox.
2. Draw a frame with one of PageMaker's Frame tools (Rectangle frame tool or Ellipse Frame Tool or Polygon frame Tool). Make sure the object remains selected.
3. Click on **File** > **Place.** The Place dialog box will appears.
4. Locate the document that contains the text you want to place, select it.
5. Click on **Open**.
6. Click inside the frame to place the text in it.

   The text will be placed in the frame.

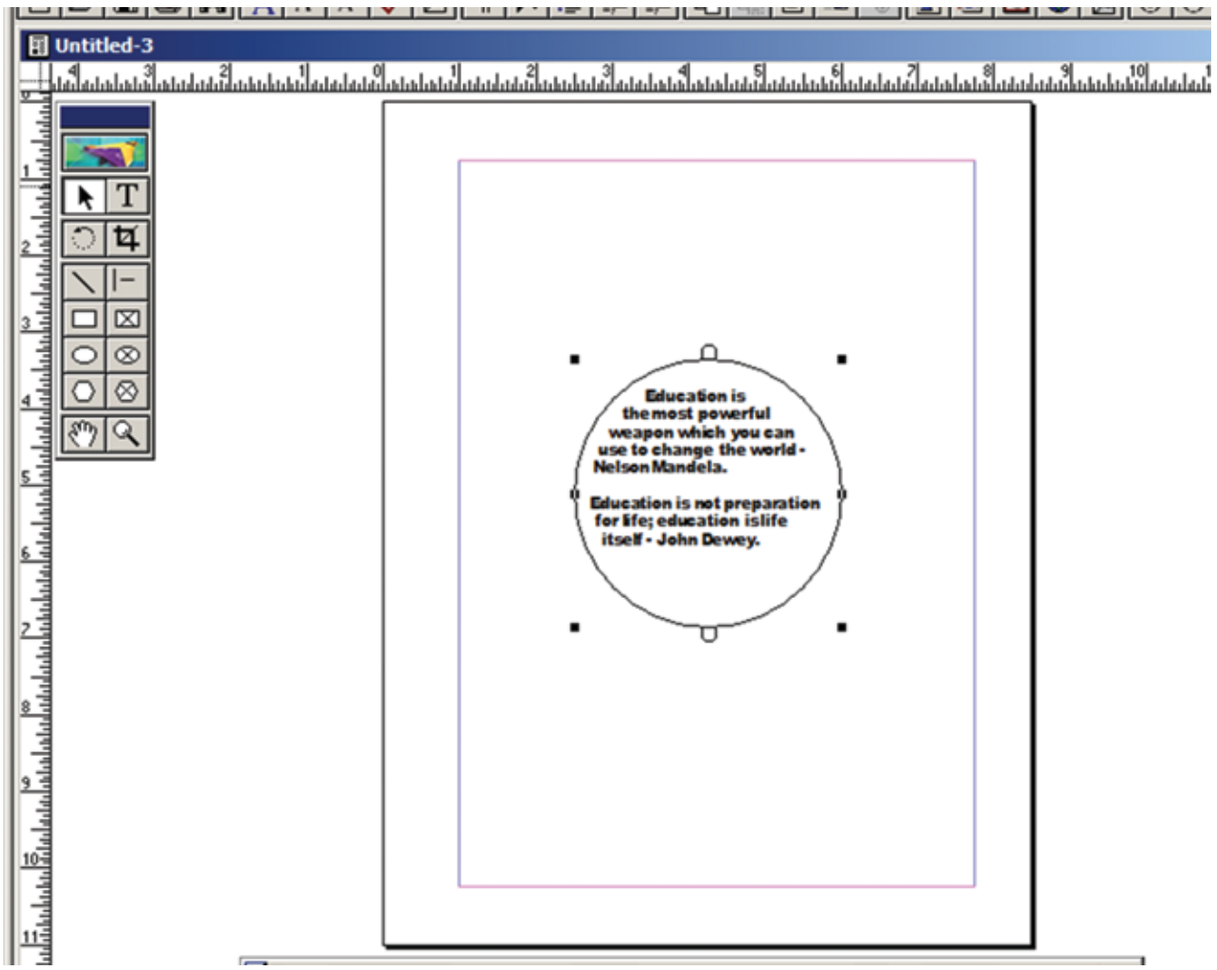


Figure 2.26 Placing text in a Frame

DO YOU KNOW?

- In PageMaker, text and graphics that you draw or import are called objects.
- An object can be on a page or on the pasteboard.
- Text can be contained either in text blocks or text frames.

12th_Computer_Application_English version CHAPTER 02.indd 35 19-01-2023 16:59:13

2.10.1 Linking Frames containing Text

A single frame may not be large enough to hold an entire story when you are using a large amount of text, you can link frames together so that an entire story is visible.

To link Frames containing text

1. Draw a **second frame** with the Frame tool of your choice.
2. Click the **first frame** to select it.
3. Click on the **red triangle** to load the text icon.
4. Click the **second frame**. PageMaker flows the text into the second frame.

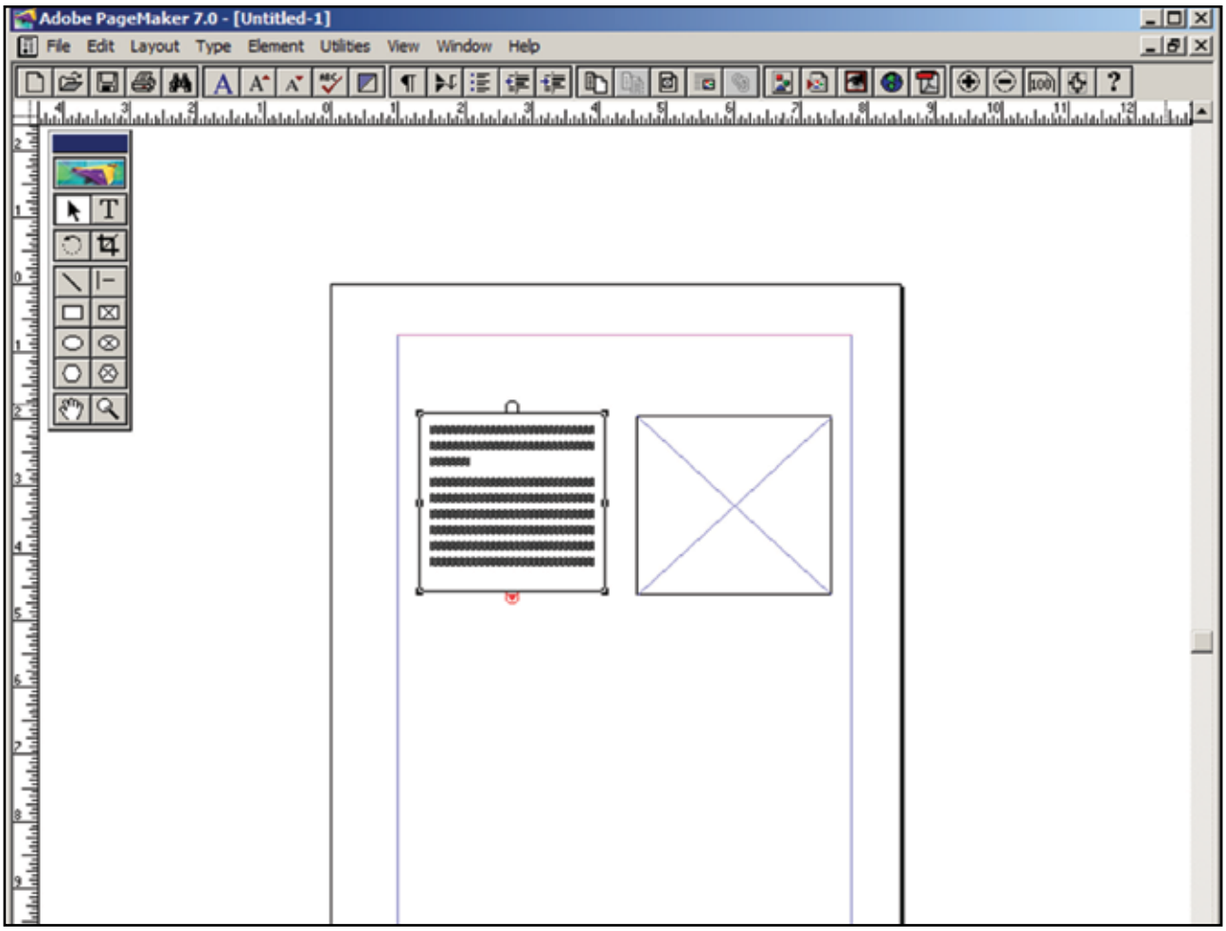


Figure 2.27 Linking Frames containing Text

2.10.2 Converting text in a Text block to a Frame

After created text in a text block, if you want to convert it to a frame. You can do this by using these steps.

1. Draw the **frame** of your choice using one of the PageMaker's Frame tool.
2. Select the text block you want to insert in the frame.
3. Click the frame while pressing the Shift key. Now both elements will be selected.
4. Choose **Element** > **Frame** > **Attach Content** on the Menu bar.
5. Now the text appears in the frame. Refer Figure 2.28

12th_Computer_Application_English version CHAPTER 02.indd 36 19-01-2023 16:59:13

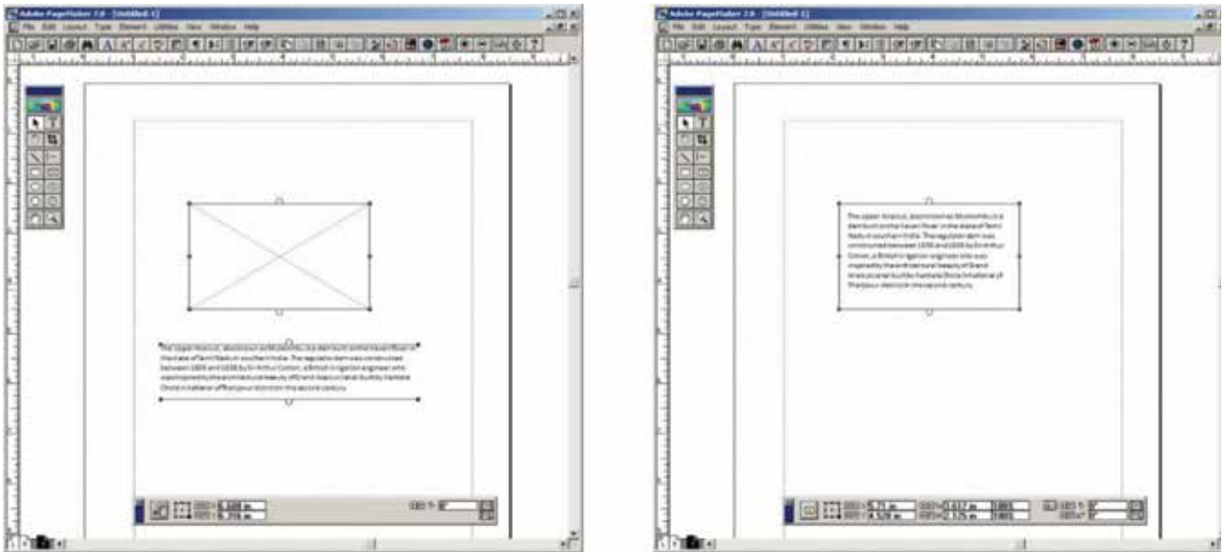


Figure 2.28 Converting text in a Text block to a Frame

2.10.3 Separating Text from the Frame

Once text has been attached to a frame or flowed inside it, you can separate the text and frame.

To separate text from a frame

1. Click the frame with the **Pointer** tool.
2. Choose **Element > Frame > Separate Content** in the menu bar. The text will not appear in the frame. It will be separated from the frame.

2.11 Saving, Closing and Opening Documents

The below section explains about various operations with the documents.

2.11.1 Saving a Document

You can save your document for future use. Saving a document allows you to review later and edit the document. Saved file can be used on other computer also.

To save a document for a first time following steps are used:

1. (a) Choose **File > Save** in the menu bar. (or)

   (b) Click on the **Save icon**( ) in the Tool bar. (or)

   Press **Ctrl + S** in the Keyboard.

   (c) A **Save Publication** dialog box as shown in the Figure 2.29 appears on the screen.

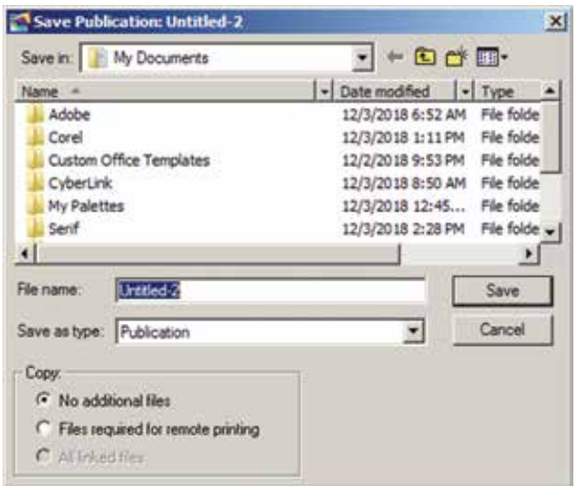


Figure 2.29 Save Publication dialog box

2. The file name is given in the **File name** list box.
3. Then click on the **Save** button to save the document. The document is now saved and a file name appears in the title bar.

12th_Computer_Application_English version CHAPTER 02.indd 37 19-01-2023 16:59:13

Once a file is saved under a name, to save it again the name need not be entered again. The file can be saved simply by selecting the **File > Save** command or by clicking the **Save** button (or) clicking **Ctrl + S** in the keyboard.

2.11.2 Saving a Document with a new name or in a different location

You can save a document with a new name or in a different location using **Save As** command. **Save As** command creates a new copy of the document. So, two versions of the document exist. The versions are completely separate, and the work you do on one document has no effect on the other.

To save a document with a new name or in a different location:

1. Choose **File > Save As** in the menu bar. (or) Press **Shift + Ctrl + S** in the keyboard.

   Now Save Publication dialog box will appear. Refer Figure 2.30
2. Type a new name or specify a new location.
3. Click the **Save** button.

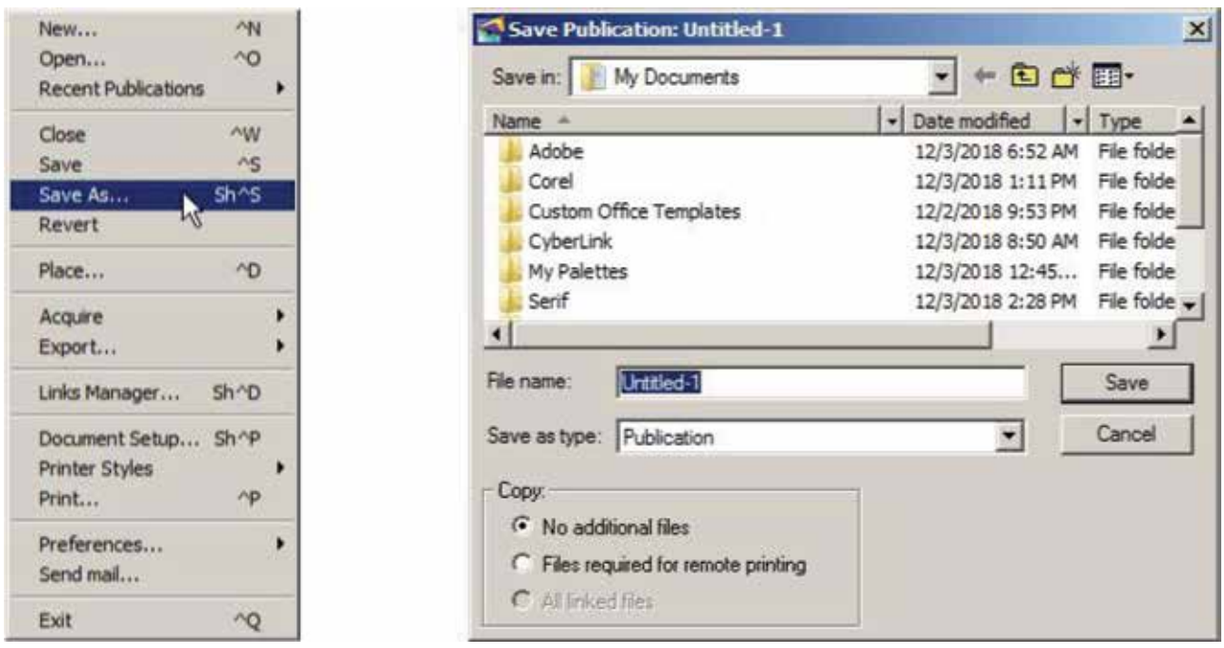


Figure 2.30 Saving a Document with a new name or in a different location

2.12 Closing a Document

After a document is saved, it is not closed. It remains open so that the user can continue working. When the work is finished, the user should save and close the document.

After saving, the document can be closed using the **File > Close** command in the menu bar (or) **Ctrl +W** in the keyboard.

2.13 Opening an existing Document

To open a document that has been saved and closed the following steps are used:

1. (a) Choose **File > Open** in the menu bar (or)

   Click on the **Open icon** ( ) in the Tool bar (or)

12th_Computer_Application_English version CHAPTER 02.indd 38 19-01-2023 16:59:14

Press **Ctrl + O** in the Keyboard.

A **Open Publication** dialog box as shown in the figure 2.31 appears on the screen.

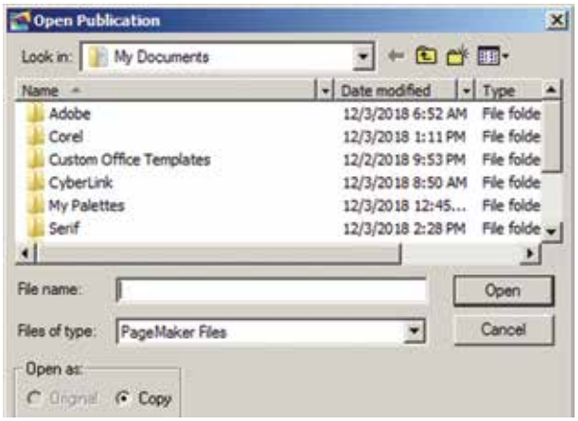


Figure 2.31 Open Publication dialog box

2. The file name is given in the **File name** list box.

   The name of the file to be opened can be chosen from the list, which is displayed.

3. Then click on the **Open** button.

   Now the required file is opened.

2.14 Moving Around the Document

We can move the insertion point to anywhere in the document by using the mouse or the Keyboard.

To move the insertion point with the mouse, the mouse pointer is moved to the required spot and the mouse button is clicked. The insertion point jumps to that spot. It is to note that mouse pointer is different from the insertion point.

To move the insertion point with the keyboard the arrow keys and other key combination can be used.

The below Table 1.1 lists the common movement keys. If the key combination is joined with a plus sign, the first key must be pressed and held down and the second key is to be pressed.

Table 1.1 Keyboard Movement Keys

Move	Press
One character to the left	Left Arrow
One character to the right	Right Arrow
One word to the left	Ctrl + Left Arrow
One word to the right	Ctrl + Right Arrow
Up one line	Up Arrow
Down one line	Down Arrow
To the end of a line	End
To the beginning of a line	Home
Up one paragraph	Ctrl + Up Arrow
Down one paragraph	Ctrl + Down Arrow

2.15 Scrolling the Document

In PageMaker, there are two sets of scroll bars; one for **up and down movement** and the other for the **left and right movement** of the document.

PageMaker's scroll bars work differently than those in a word processor. Note that they are set to the center of each bar. Also, they scroll only the page you are currently on. Use the scroll bar on the right side to move up and down. Use the scroll bar at the bottom to move left and right.

The scrolling procedure is as follows:

1. To scroll left and right the left and right arrow respectively should be clicked.

12th_Computer_Application_English version CHAPTER 02.indd 39 19-01-2023 16:59:14

2. To scroll up and down the up and down arrow respectively should be clicked.
3. To scroll a relative distance in the document the scroll box should be drawn up or down.

2.16 Magnifying and reducing with the zoom tool

Use the zoom tool to magnify or reduce the display of any area in your publication. You can also double-click the zoom tool to jump to Actual Size, or press Alt as you double-click the tool to go to Fit in Window view. Refer Figure 2.32

To magnify or reduce with the zoom tool:

1. Select the zoom tool.

   The pointer becomes a magnifying glass with a plus sign in its center, indicating that the zoom tool will magnify your view of the image. (The magnifying glass shows a minus sign in its center when in reduction mode.) To toggle between magnification and reduction, press the Ctrl key.
2. Position the magnifying glass at the center of the area you want to magnify or reduce, and then click to zoom in or out.

   Continue clicking until the publication is at the magnification level you want. When the publication has reached its maximum magnification or reduction level, the center of the magnifying glass appears blank.

To magnify part of a page by dragging:

1. Select the zoom tool.
2. Drag to draw a marquee around the area you want to magnify.

   To zoom in or out while using another tool:

   Press **Ctrl+Spacebar** to zoom in. Press **Ctrl+Alt+Spacebar** to zoom out.

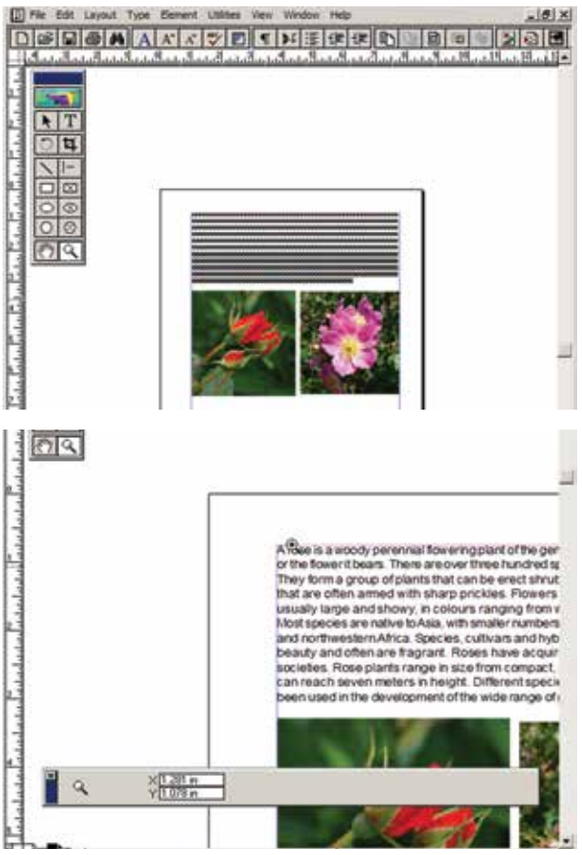


Figure 2.32 Magnifying with the zoom tool

2.17 Formatting a Document

Formatting is the process of changing the general arrangement of text, i.e., improving the appearance of the text by using various fonts, font colors, and font styles. A font is a set of letters, numbers or symbols in a certain style. Each font looks different from other fonts.

12th_Computer_Application_English version CHAPTER 02.indd 40 19-01-2023 16:59:15

2.17.1 Character Formatting using Character Specifications Dialog Box

Character formatting means displaying text in a certain way. Character formatting consists of text properties - bold, italic, underline, font type, font size, font color, etc. Refer Figure 2.33, 2.34 and 2.35

The steps to apply character formatting to text are as follows :

1. Select the text to be formatted.
2. Choose **Type** > **Character** in menu bar (or) Press **Ctrl** + **T** on the keyboard.

   The **Character Specifications** dialog box appears.
3. Make the appropriate changes in the dialog box.
   - Click the drop-down menu arrow of the **Font** box and select the desired font.
   - Click the drop-down menu arrow of the **Font Size** box and select the font size.
   - Click the drop-down menu arrow of the **Font Color** box and select the desired color.
   - Click the Bold, Italic, or Underline buttons to make the text bold, italic, or underlined respectively.
4. Click on OK.

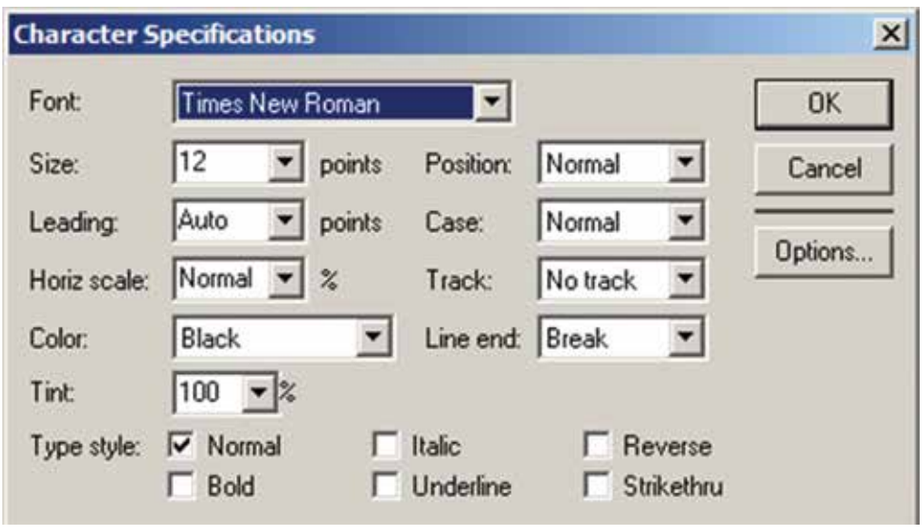


Figure 2.33 Character Specifications dialog box

2.17.2 Character Formatting using the Control Palette

The Control Palette is especially useful when you are doing lot of formatting.

Its features change based on the object that is selected on your layout.

If the Control palette is not showing then use the following steps:

1. Click on **Window** > **Show Control Palette** sequence in the menu bar. (or)
2. Press **Ctrl** + ‘ in the keyboard.

   Now the Control Palette appears on the window.

12th_Computer_Application_English version CHAPTER 02.indd 41 19-01-2023 16:59:15

To modify character attributes using the Character Control Palette:

1. Select the text you want to modify.
2. Make the appropriate changes in the Control palette. Refer Figure 2.34

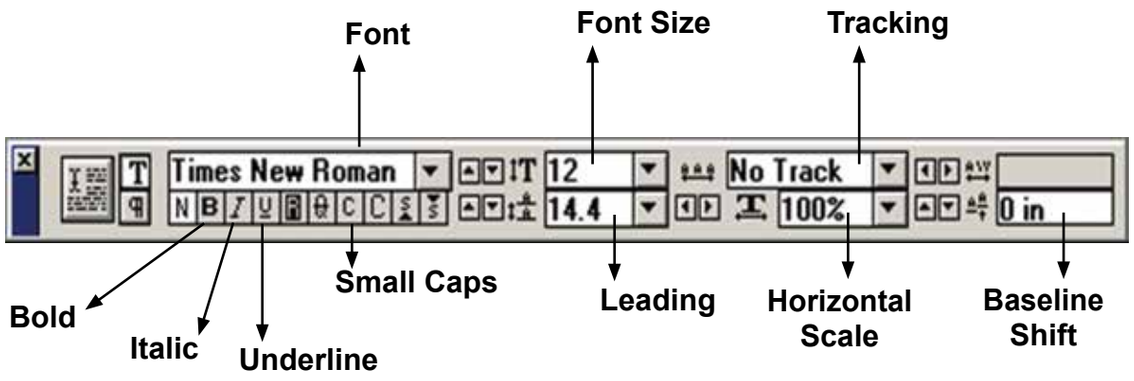


Figure 2.34 Character Control Palette

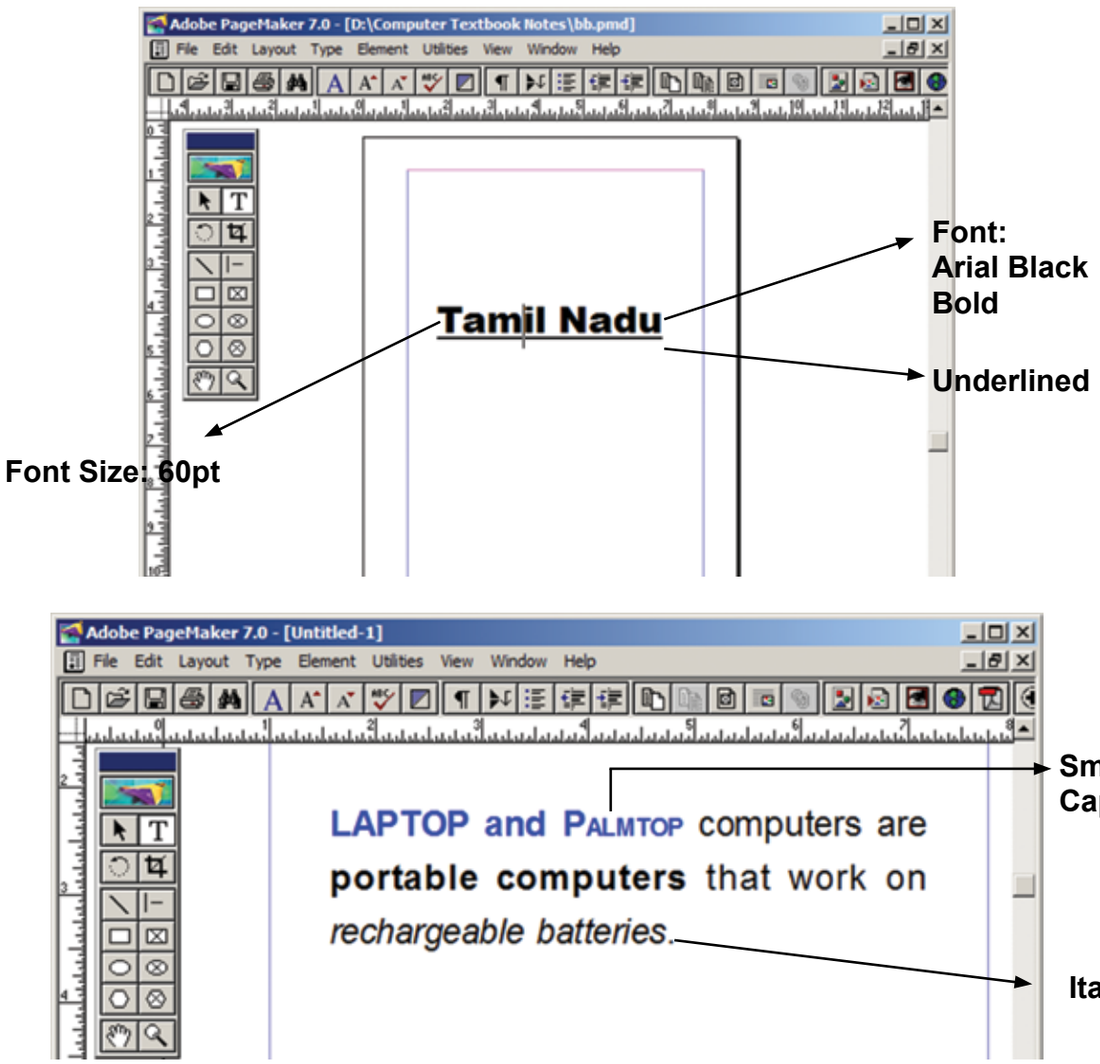


Figure 2.35 Modifying character attributes using the Character Control Palette

12th_Computer_Application_English version CHAPTER 02.indd 42 19-01-2023 16:59:16

2.17.3 Changing Text Colour

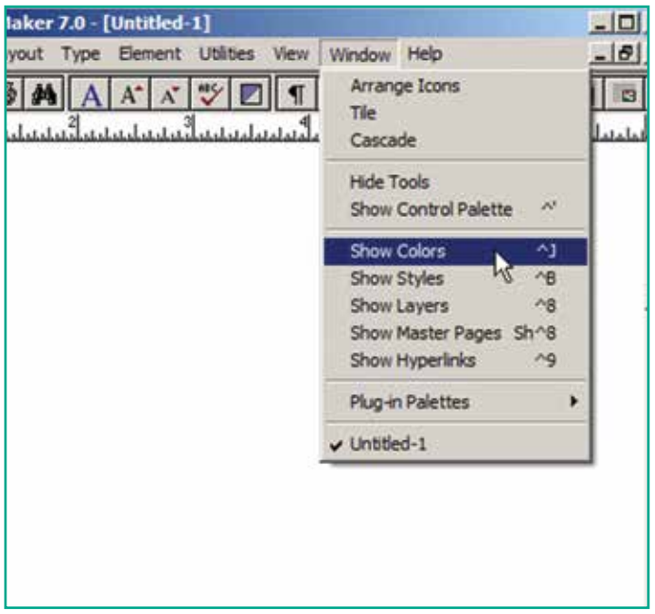
You can change the colour of the text. Your design may look beautiful if you choose a text colour other than black.

To colour characters

1. Select the text you want to colour.
2. Choose **Window** > **Show Colors** in Menu bar. The **Colors palette** appears. Refer Figure 2.36

   Click the colour you want to apply to the selected text.

   The characters change to the colour you selected in the palette.



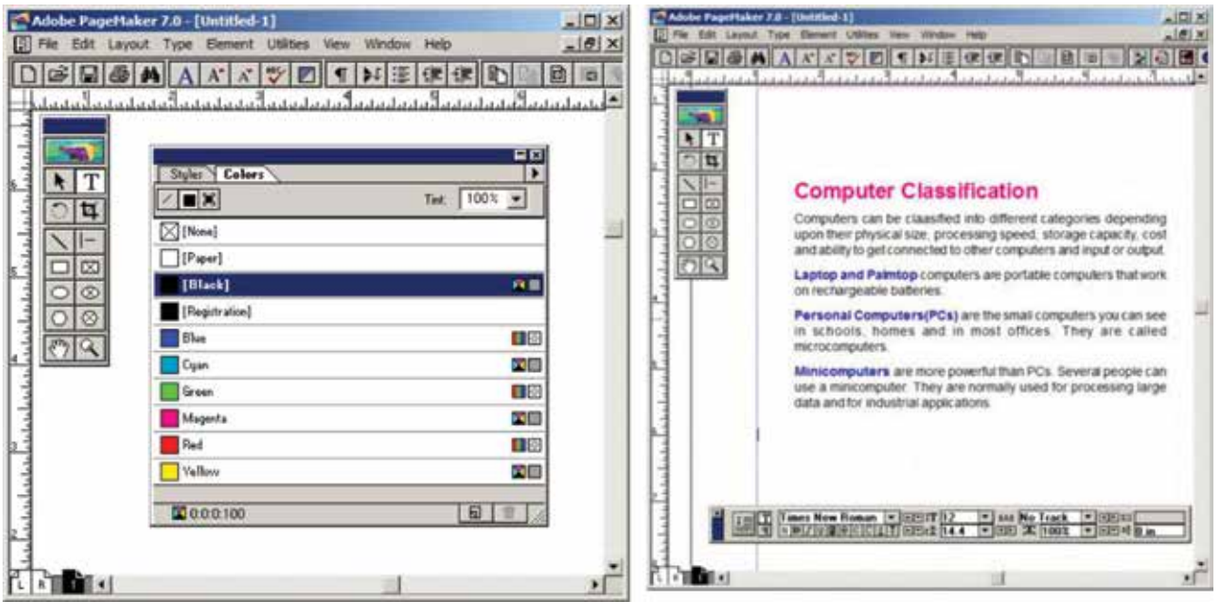


Figure 2.36 Changing Text Colour

2.18 Drawing

There are so many drawing tools in PageMaker. **Line tool, Rectangle tool, Ellipse tool** and **Polygon tool** are four main drawing tools.

2.18.1 Drawing Lines

PageMaker has two Line tools. The first one creates a straight line at any orientation. The second is a constrained Line tool that draws only at increments of 45 degrees. You can change the property of tools by double-clicking on them. Refer Figure 2.37 to Figure 2.40

To draw a line

1. Select the Line tool from the toolbox. The cursor changes to a crosshair.
2. Click and drag on the screen to draw your line. As you drag, a line appears.

12th_Computer_Application_English version CHAPTER 02.indd 43 19-01-2023 16:59:16

3. Release the mouse button and the line will be drawn and selected, with sizing handles on either end.

   Resize the line by clicking and dragging the handles, if necessary.

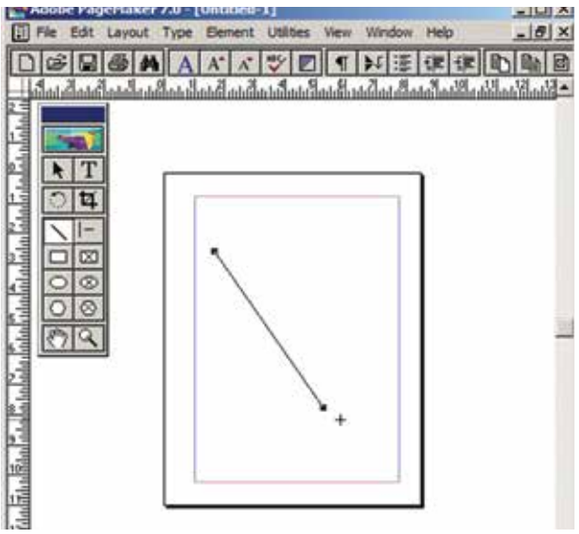


Figure 2.37 A straight Line

To draw a Dotted line

1. Double click the **Line tool** from the toolbox. A **Custom Stroke** dialogue box appears.

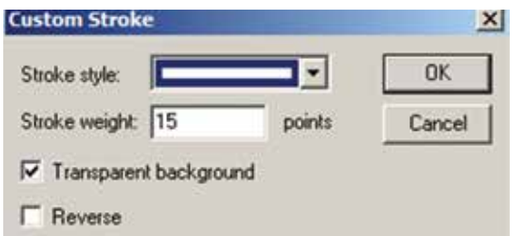


Figure 2.38 Custom Stroke dialog box

2. Select the required **Stroke style** in the drop-down list box.

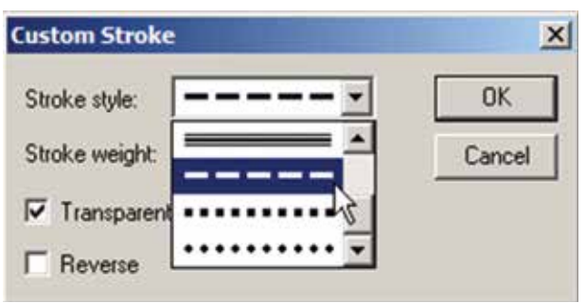


Figure 2.39 Stroke style drop-down list box

3. Then click OK button. Now the cursor changes to a crosshair.
4. Click and drag on the screen to draw your dotted line. As you drag, the line appears.
5. Release the mouse button and the line will be drawn and selected, with sizing handles on either end.

   Resize the line by clicking and dragging the handles, if necessary.

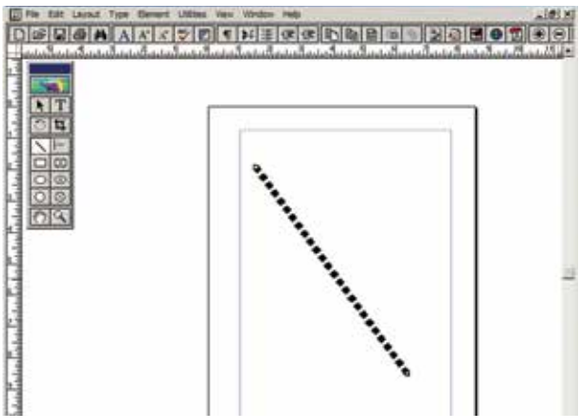


Figure 2.40 Dotted line

2.18.2 Drawing Rectangles or Ellipses

You can also draw rectangles and ellipses shapes by using the same technique as used in line drawing. Refer Figure 2.41 and 2.42

1. To draw a rectangle or ellipse:
   Click on the **Rectangle** or **Ellipse tool** from the toolbox.
   The cursor changes to a **crosshair**.
2. Click and drag anywhere on the screen. As you drag, a rectangle or ellipse appears.
3. Release the mouse button when the rectangle or ellipse is of the desired size.

   Press the **Shift key** while you're drawing to constrain the shape to a square or circle.

12th_Computer_Application_English version CHAPTER 02.indd 44 19-01-2023 16:59:17

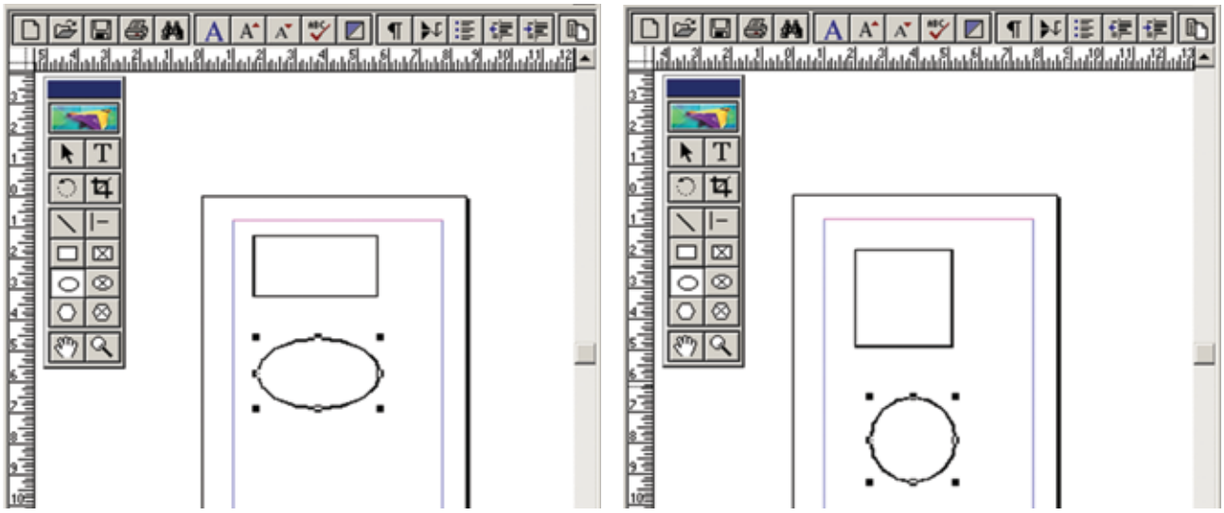


Figure 2.41 Drawing a Rectangle or Ellipse - Drawing a square or circle

Drawing a Rounded Corner Rectangle

To draw a rounded-corner rectangle:

1. **Double-click** the **Rectangle tool** in the toolbox.
   The **Rounded Corners** dialog box appears.
2. Choose a corner setting from the preset shapes.
3. Click on OK. The cursor changes to a **crosshair**.
4. Click and drag anywhere on the screen.
5. Release the mouse button when the rectangle is the desired size.
   Press the Shift key as you draw to constrain the shape to a rounded-corner square.

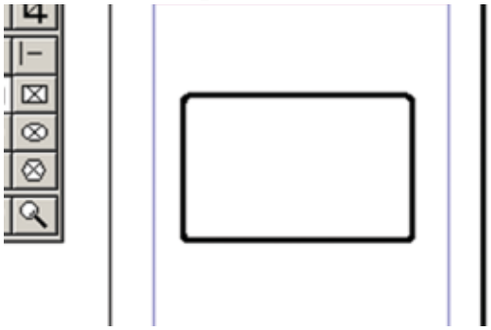


Figure 2.42 Drawing a Rounded Corner Rectangle

2.18.3 Drawing Polygon

To draw a Polygon

1. Click on the **Polygon tool** from the toolbox.
   The cursor changes to a **crosshair**.
2. Click and drag anywhere on the screen. As you drag, a Polygon appears.
3. Release the mouse button when the Polygon is of the desired size. Refer Figure 2.43

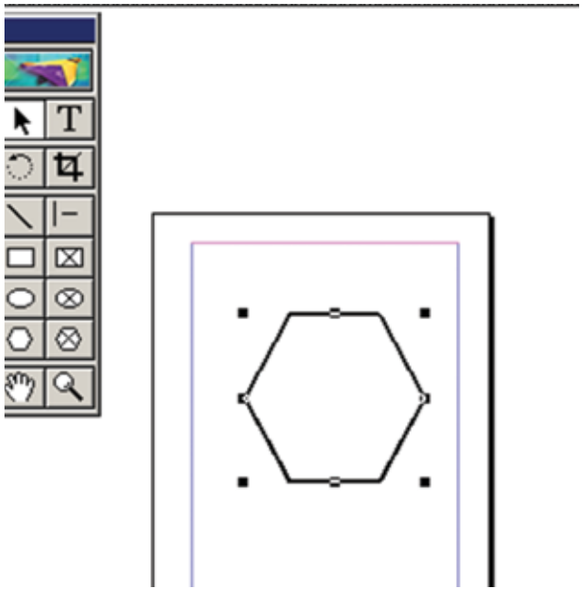


Figure 2.43 Drawing a Polygon

12th_Computer_Application_English version CHAPTER 02.indd 45 19-01-2023 16:59:18

2.18.4 Drawing a Star using Polygon tool

To draw a Star

1. Click on the **Polygon tool** from the toolbox.

   The cursor changes to a **crosshair**.

2. Click and drag anywhere on the screen. As you drag, a Polygon appears.
3. Release the mouse button when the Polygon is of the desired size.
4. Choose Element > Polygon Settings in the menu bar.

   Now Polygon Settings dialogue box appears.

5. Type 5 in the Number of sides text box.
6. Type 50% in Star inset textbox.
7. Click OK. Now the required star appears on the screen. Refer Figure 2.44 - 2.46

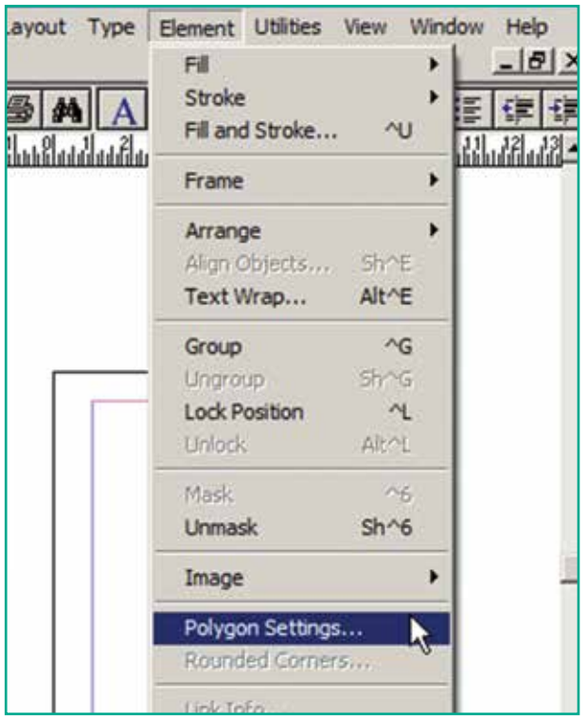


Figure 2.44 Element Menu

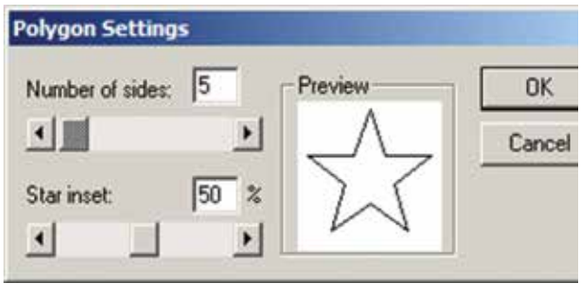


Figure 2.45 Polygon settings dialog box

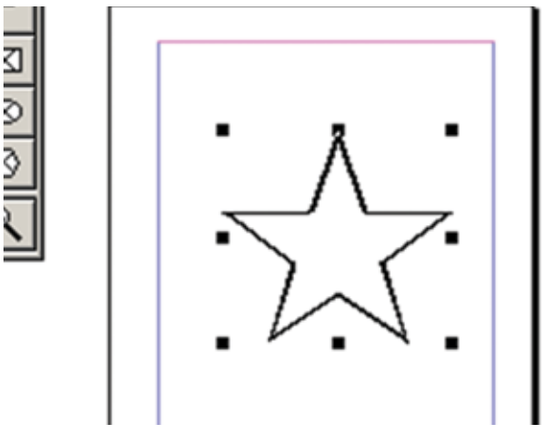


Figure 2.46 A Star



Star Inset percentage bends the polygon lines inwards to form a star-shaped object.

Drawing a star with given number of sides and required inset

1. The value of 'Star inset' is 50%

   The number of sides is 15

The result of the star shape is shown Figure 2.47.

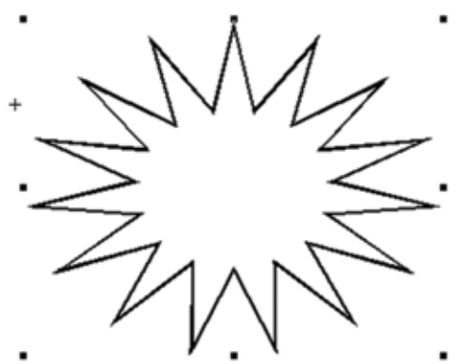


Figure 2.47 A Star with 15 sides and 50% inset

12th_Computer_Application_English version CHAPTER 02.indd 46 19-01-2023 16:59:18

2. The value of 'Star inset' is 25%

   The number of sides is 25

The result of the star shape is shown Figure 2.48.

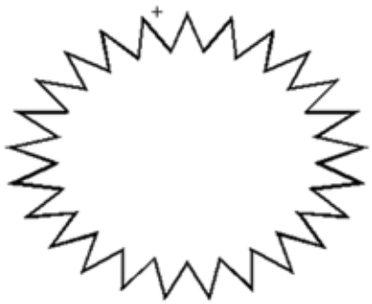


Figure 2.48 A Star with 25 sides and 25% inset

3. The value of 'Star inset' is 70%

   The number of sides is 35

The result of the star shape is shown Figure 2.49.



Figure 2.49 A Star with 35 sides and 70% inset

2.18.5 Filling Shapes with Colors and Patterns

Filling Rectangle with colour

1. Draw a rectangle using Rectangle tool.
2. Select the rectangle.
3. Choose **Window** > **Show colors** in the menu bar. (or) Press Ctrl + J

   Now **Colors palette** appears.
4. Click on the required colour from the Colors Palette.
5. The rectangle will be filled with the colour. Refer Figure 2.50 and 2.51

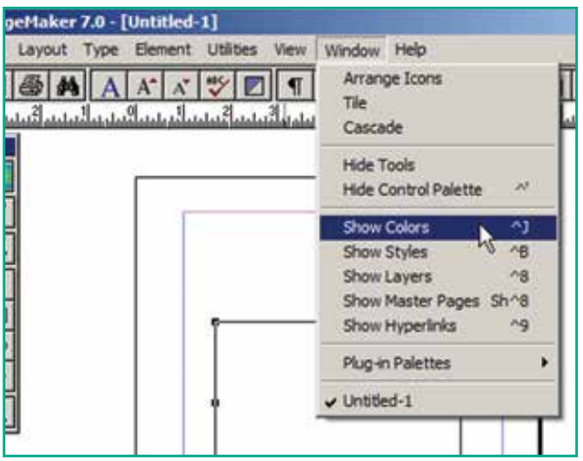


Figure 2.50 Show colors option in Window Menu

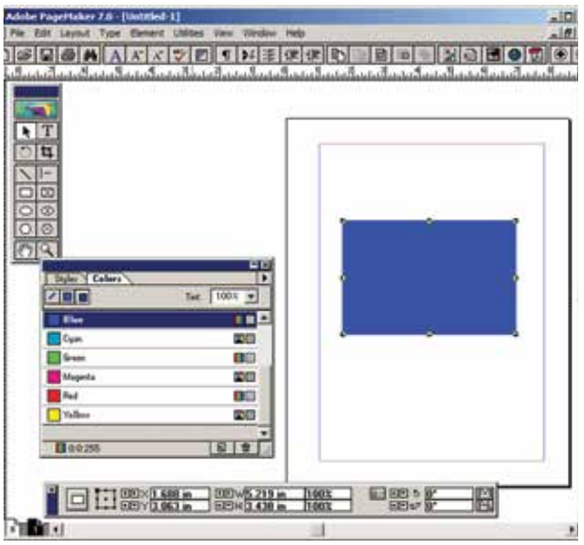


Figure 2.51 Filling Shapes with Colors

2.19 Working with pages

The main purpose of PageMaker is composing pages. You can insert new pages into a document, remove existing pages, move between pages, and sort pages in a large document.

2.19.1 Going to a specific Page

PageMaker provides several methods for navigating through the pages in your publication.

12th_Computer_Application_English version CHAPTER 02.indd 47 19-01-2023 16:59:19

Method 1:

You can move from one page to another by using the **Page up** and **Page down** keys on your keyboard. This is probably the navigation methods you will use most often.

Method 2:

You can move from one page to another by using the page icons at the left bottom of the screen. Click on the page icon that corresponds to the page that you want to view. The page is displayed.

Method 3:

Using the Go to Page dialog box. Refer Figure 2.52 and 2.53

To go to a specific page in a document

1. Choose **Layout > Go to Page** in the menu bar (or) Press **Alt + Ctrl + G** in the keyboard. Now the **Go to Page** dialog box appears.

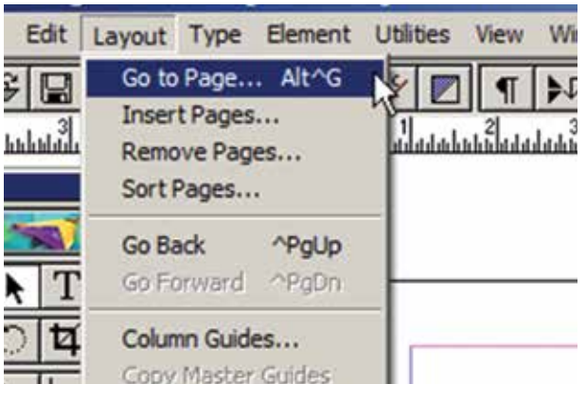


Figure 2.52 Go to page option in the Layout Menu

2. In the dialogue box, type the page number that you want to view.

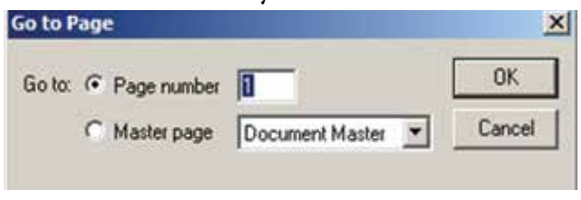


Figure 2.53 Go to Page dialog box

3. Then click on OK. The required page is displayed on the screen.

2.19.2 Inserting Pages

You can add more pages to a document. You can insert pages before, after, or between the pages you're currently viewing. When you insert pages, PageMaker automatically renumbers the pages in your publication. Refer Figure 2.54 and 2.55

To insert pages

1. Go to the page immediately before the page you want to insert.
2. Choose **Layout > Insert Pages** in the menu bar. The **Insert Pages** dialog box appears.

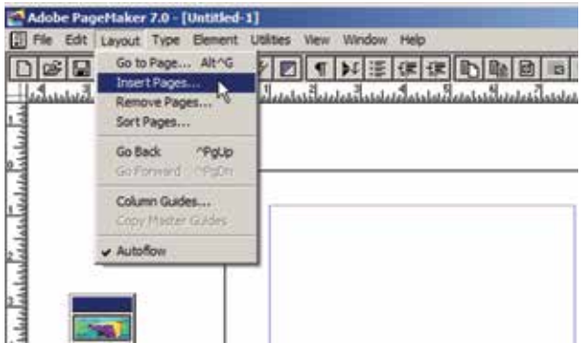


Figure 2.54 Insert Page option in the Layout Menu

3. Type the number of pages you want to insert.
4. To insert pages after the current page, choose 'after' from the pop-up menu.
5. Click on Insert button.

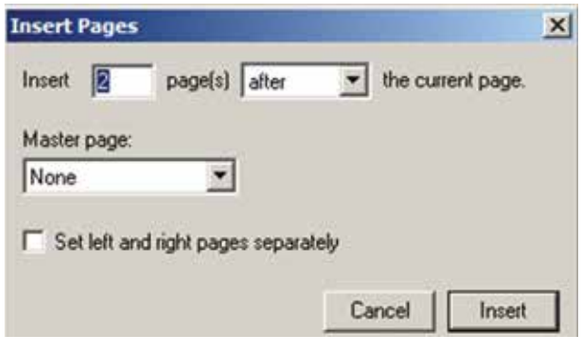


Figure 2.55 Insert pages dialog box

6. The new pages are inserted in your publication.

12th_Computer_Application_English version CHAPTER 02.indd 48 19-01-2023 16:59:20

2.19.3 Removing Pages

You can remove the unused pages from your document using Remove Pages dialog box.

1. Choose **Layout** > **Remove Pages** in the menu bar. The **Remove Pages** dialog box appears. Refer Figure 2.56 and 2.57

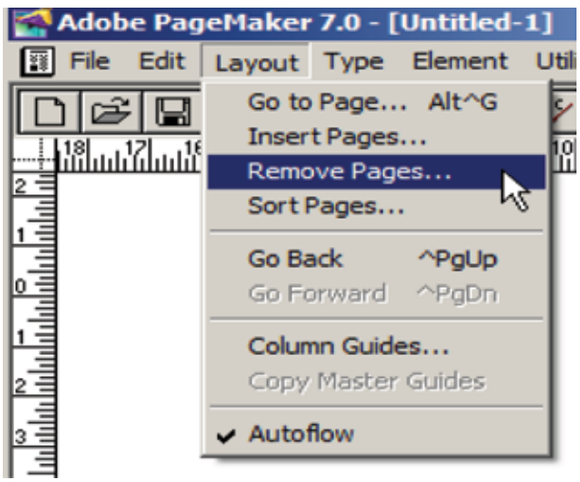


Figure 2.56 Remove pages option in the Layout Menu

2. Type the page range you want to remove.

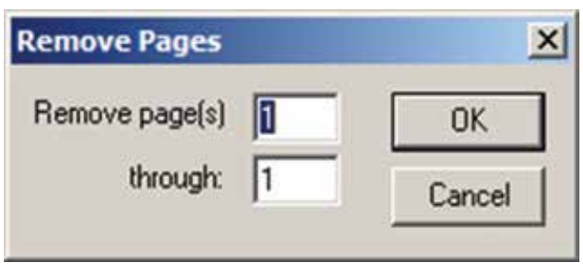


Figure 2.57 Remove pages dialog box

3. Click on OK button.

2.20 Master Pages

Any text or object that you place on the master page will appear on all the document pages to which the master is applied. It shortens the amount of time because you don't have to create the same objects repeatedly on subsequent pages.

Master Pages commonly contain repeating logos, page numbers, headers, and footers. They also contain nonprinting layout guides, such as column guides, ruler guides, and margin guides.

A master item cannot be selected on a document page.

You can create, modify, and delete objects on master pages just like any other objects, but you must do so from the master pages themselves.

At the lower left corner of a document (publication) window you can find an icon which represents the master pages. The letters L and R (L denotes left and R denotes right) mark the master page icon for facing pages. A single-sided publication icon is marked by an R alone. Refer Figure 2.58

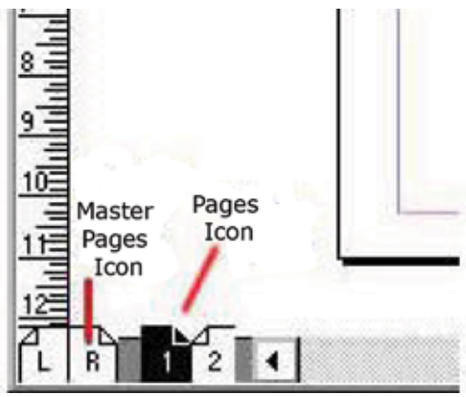


Figure 2.58 Master Pages Icon

2.20.1 Inserting Page Numbers in Master Pages

To make page numbers appear on every page

1. Click on Master Pages icon.
2. Then click on Text Tool. Now the cursor changes to I - beam.
3. Then Click on the left Master page where you want to put the page number.

12th_Computer_Application_English version CHAPTER 02.indd 49 19-01-2023 16:59:20

4. Press Ctrl + Alt + P.
5. The page number displays as 'LM' on the left master page.
6. Similarly click on the right Master page where you want to put the page number.
7. Press Ctrl + Alt + P.
8. The page number displays as 'RM' on the right master page, but will appear correctly on the actual pages. Refer Figure 2.59

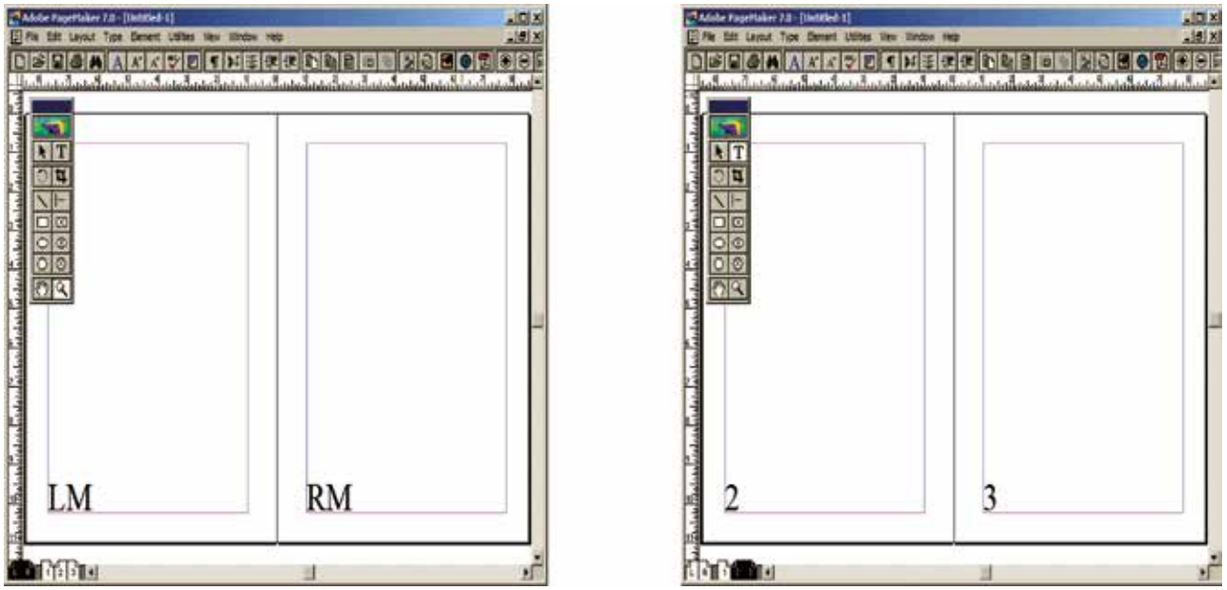


Figure 2.59 Inserting Page Numbers in Mater Pages

2.20.2 Hiding Master Items

To make the master items invisible on a particular page, switch to the appropriate page, then choose **View > Display Master items** (which is usually ticked). Refer Fig 2.60

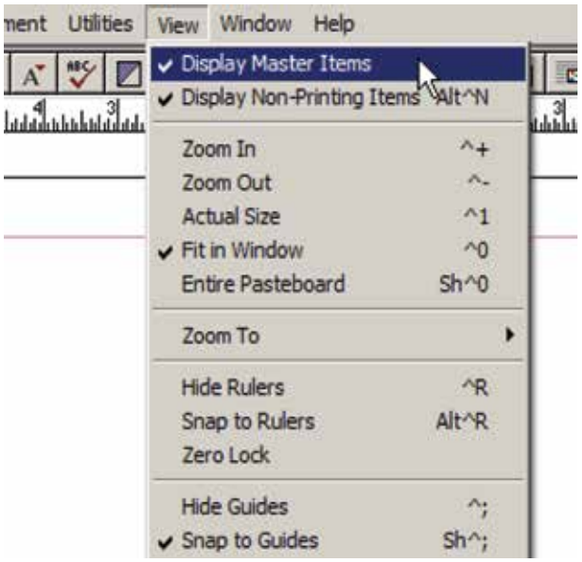


Figure 2.60 DisplayMaser Items in the View Menu

2.20.3 Showing Master Page Palette

Master Pages palette organize all the command you will need to work with Master Pages. Refer Figure 2.61 and 2.62

To show Master Page Palette

1. Choose **Windows> Show Master Pages** in the menu bar. The **Master Pages Palette** appears.

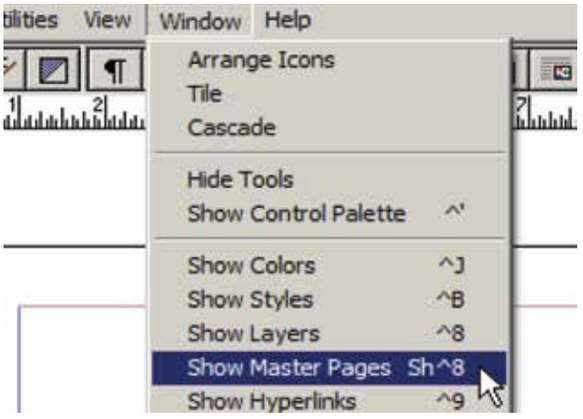


Figure 2.61 Show Master Pages in the Window Menu

12th_Computer_Application_English version CHAPTER 02.indd 50 19-01-2023 16:59:21

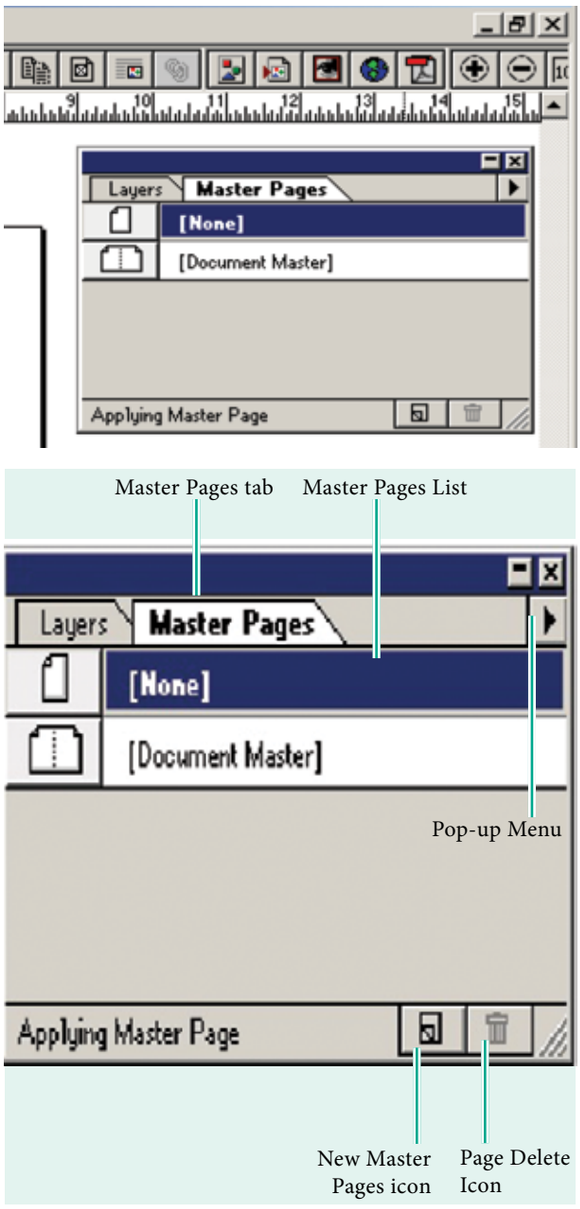


Figure 2.62 Master Page Palette

2.20.4 Creating Master Pages

By default, all PageMaker documents have a Master Page already created '**Document Master**'. But sometimes you will require more than one Master Page.

You can set up multiple master pages for any publication, each page containing a specific combination of headers, footers, page numbers, frames, and other elements that you want to use over and over.

When you create a new Master Page, you will be asked to name the new Master page and set its margins and column guides.

To create a new Master Page

1. Click the **New Master Page icon** in the Master Pages palette. The **New Master Page dialog** box appears.
2. Enter the name of the new master page in the **Name** field.
3. Make the appropriate changes in the Margins and Column Guides fields.
4. Click on OK. A new Master Page appears in the Master Pages palette. Refer Figure 2.63 and 2.64

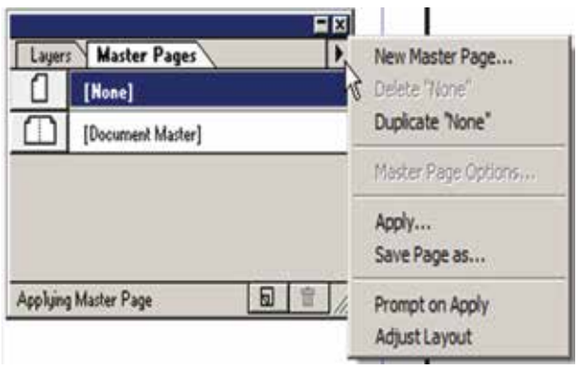


Figure 2.63 New Master Page Icon

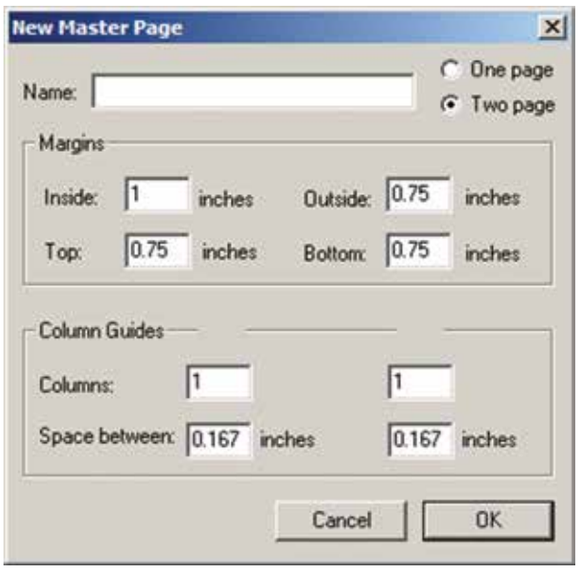


Figure 2.64 New Master Page dialog box

12th_Computer_Application_English version CHAPTER 02.indd 51 19-01-2023 16:59:21

2.21 Print a document

1. Choose **File** > **Print** in the menu bar (or) Press **Ctrl** + **P** in the keyboard. The **Print Document dialog box** appears.
2. Choose the settings in the Print Document dialog box as
   - Select the printer from the **Printe**r drop-down list box.
   - Choose the pages to be printed in the **Pages** group box by selecting one of the following available options :

All: This option prints the whole document.

Ranges: This option prints individual pages by the page number or a range of pages.

You can use commas to separate the page numbers

(e.g., 5,7,19).

Use a hyphen to print page ranges(e.g., 10-17; this will print all pages from page numbers 10 to 17).

To print from a particular page to the end of the document, enter the starting page number followed by a hyphen (e.g., 5 -).

You may also combine individual page numbers and a range of pages (e.g., 5, 9, 15-26).

Print : You can also print only odd-numbered or even-numbered pages. Select the Odd pages or Even pages option from the Print drop-down list box. Refer Figure 2.65

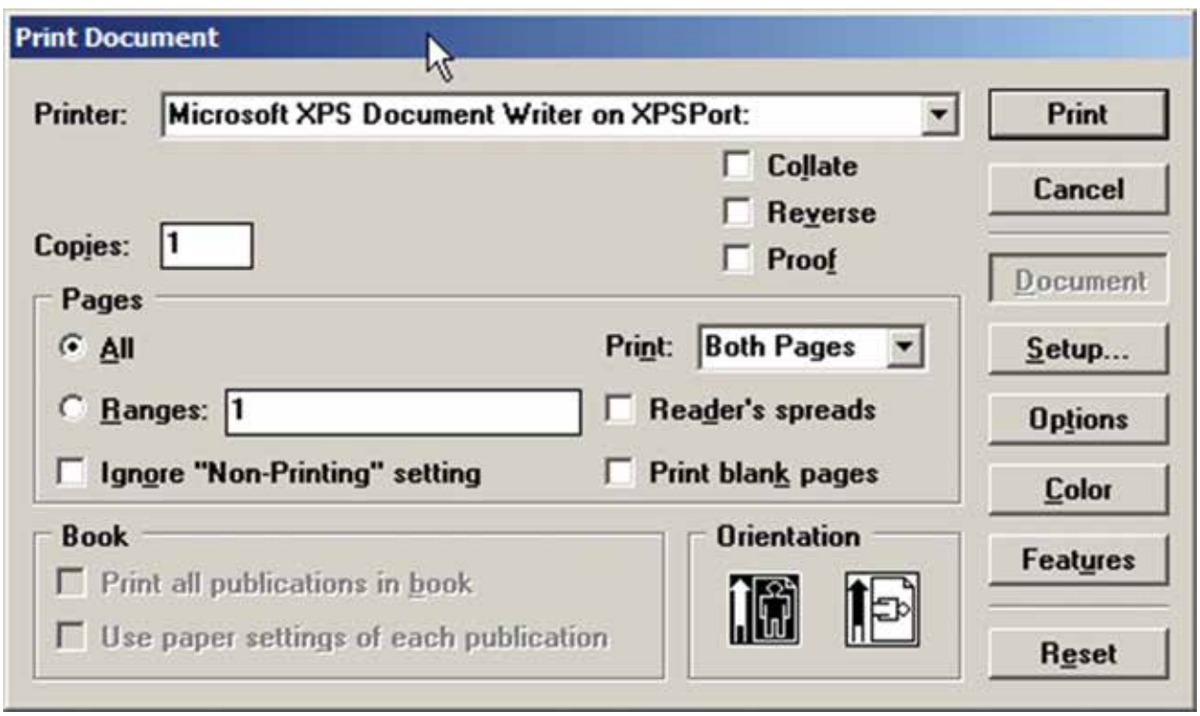


Figure 2.65 Print Document dialog box

12th_Computer_Application_English version CHAPTER 02.indd 52 19-01-2023 16:59:21

- Type the number of copies you want in the **Copies** text box.
- You can choose whether to **collate** the pages or not. Suppose you want to print 4 copies of a 5 pages document.

If the **Collate** option is not selected. PageMaker will first print 4 copies of page 1, then 4 copies of page 2, and so on.

If the **Collate** option is selected, PageMaker will print a complete set of pages 1 to 5, then a second set, and so on.

4. After choosing from the options in the **Print Document** dialog box, click Print button to print the document. Make sure the printer is switched on.

POINTS TO REMEMBER

- Desktop publishing (abbreviated DTP) is the creation of page layouts for documents using DTP software.
- Some of the popular DTP software are **Adobe PageMaker, Adobe InDesign, QuarkXPress**, etc.
- Adobe PageMaker is **a page layout software**. It is used to design and produce documents that can be printed.
- In PageMaker document, the area outside of the dark border is referred to as the **pasteboard**.
- **Editing** means making changes to the text. When you edit a document, you revise the text.
- A text block contains text you type, paste, or import. You cannot see the borders of a text block until you select it with the pointer tool.
- A Text block can be connected to other text block so that the text in one text block can flow into another text block. Text blocks that are connected in this way are **threaded text blocks**.
- The process of connecting text among text blocks is called **threading text**.
- Text that flows through one or more threaded blocks is called a **story**.
- Any text or object that you place on the master page will appear on all the document pages to which the master is applied.
- Master Pages commonly contain repeating logos, page numbers, headers, and footers.
- A master item cannot be selected on a document page.

12th_Computer_Application_English version CHAPTER 02.indd 53 19-01-2023 16:59:21

GLOSSARY

Header	Text that is repeated at the top of each page
Footer	Text that is repeated at the bottom of each page
Symbol	A sign or a special character that can be inserted in a PageMaker document
Margins	The amount of space between the text and the edge of the page on all four sides
Orientation	The direction(along the height or along the width) in which the page is being printed
Menu	A list of commands
Editing	Making changes to the text
Undo	Reversing the last command
Redo	Reversing the Undo command

EVALUATION

OLNT7

Part I

Choose the correct answer

1. DTP stands for _____

   (a) Desktop Publishing (b) Desktop Publication

   (c) Doctor To Patient (d) Desktop Printer

2. _____ is a DTP software.

   (a) Lotus 1-2-3 (b) PageMaker

   (c) Maya (d) Flash

3. Which menu contains the New option?

   (a) File menu (b) Edit menu

   (c) Layout menu (d) Type menu

4. In PageMaker Window, the area outside of the dark border is referred to as _____.

   (a) page (b) pasteboard

   (c) blackboard (d) dashboard

12th_Computer_Application_English version CHAPTER 02.indd 54 19-01-2023 16:59:21

5. Shortcut to close a document in PageMaker is _____

(a) Ctrl + A (b) Ctrl + B

(c) Ctrl + C (d) Ctrl + W

6. A _____ tool is used for magnifying the particular portion of the area.

(a) Text tool (b) Line tool

(c) Zoom tool (d) Hand tool

7. _____ tool is used for drawing boxes.

(a) Line (b) Ellipse

(c) Rectangle (d) Text

8. Place option is present in _____ menu.

(a) File (b) Edit

(c) Layout (d) Window

9. To select an entire document using the keyboard, press _____

(a) Ctrl + A (b) Ctrl + B

(c) Ctrl + C (d) Ctrl + D

10. Character formatting consists of which of the following text properties?

(a) Bold (b) Italic

(c) Underline (d) All of these

11. Which tool lets you edit text?

(a) Text tool (b) Type tool

(c) Crop tool (d) Hand tool

12. Shortcut to print a document in PageMaker is _____

(a) Ctrl + A (b) Ctrl + P

(c) Ctrl + C (d) Ctrl + V

Part - II

Short Answers

1. What is desktop publishing?
2. Give some examples of DTP software.

12th_Computer_Application_English version CHAPTER 02.indd 55 19-01-2023 16:59:21

3. Write the steps to open PageMaker.
4. How do you create a New document in PageMaker?
5. What is a Pasteboard in PageMaker?
6. Write about the Menu bar of PageMaker.
7. Differentiate Ellipse tool from Ellipse frame tool.
8. What is text editing?
9. What is threading text blocks?
10. How do you insert a page in PageMaker?

Part - III

Explain in Brief Answer

1. What is PageMaker? Explain its uses.
2. Mention three tools in PageMaker and write their keyboard shortcuts.
3. Write the use of any three tools in PageMaker along with symbols.
4. How do you rejoin split blocks?
5. How do you link frames containing text?
6. What is the use of Master Page?
7. How to you insert page numbers in Master pages?

Part - IV

Explain in detail

1. Explain the tools in PageMaker toolbox.
2. Write the steps to place the text in a frame.
3. Write the steps to draw a star using polygon tool?

12th_Computer_Application_English version CHAPTER 02.indd 56 19-01-2023 16:59:21



03
CHAPTER

Introduction to Database Management System

LEARNING OBJECTIVES

To understand database concepts, components and its functions.

- **To know about relational model of data**
- **To understand Query languages for databases.**
- **Enables to write SQL commands and query processing**
- **To enhance the programming skills and Techniques using MySQL**

3.1 Introduction to Database Management System

DBMS stands for Database Management System, so let us break down the words what they really mean. A database is a place where we store, retrieve and manage data. So what's a data then? Meaningful information like your name, your favorite color etc to complex data like astronomical data that scientist handle, everything comes under database. The management system refers to a set of programs to manage the data, we have with various actions like storing, retrieving, filtering etc. Some of the popular Database Management System is MySQL, Oracle etc. Giving protection to data, user-friendly for users etc, are some of the notable features of good DBMS.

3.1.1 Introduction to DBMS

Definition: "A database management system (DBMS) is system software for creating and managing databases. The DBMS provides users and programmers with a systematic way to create, retrieve, update and manage data."

What type of data is stored in a database?

In a database, we would be grouping only related data together and storing them under one group name called table. This helps in identifying which data is stored where and under what name.

3.1.2 Evolution of DBMS

The concept of storing the data started before 40 years in various formats. In earlier days they have used punched card technology to store the data. Then files were used. The file systems were known as predecessor of database system. Various access methods in file system were indexed, random and sequential access. The file system had more limitations like

12th_Computer_Application_English version CHAPTER 03.indd 57 19-01-2023 17:00:14

Data Duplication – Same data is used by multiple resources for processing, thus created multiple copies of same data wasting the spaces.

High Maintenance – Access control and verifying data consistency needs high maintenance cost.

Security – less security provided to the data.

So database systems became popular to overcome the above limitations of file system.

3.1.3 DBMS Concepts

There exist few standards that are applicable to all forms of database management Systems like Relational Database Management System (RDBMS) and Object Database Management System (ODBMS). All DBMS adheres to the following two basic concepts.

ACID Properties – The acronym stands for Atomicity, Consistency, Isolation and Durability. **A**tomicity follows the thumb rule "All or Nothing", while updating the data in database for the user performing the update operation. This update operation is called as transaction and it either commits (successful updating) or aborts (updating failure). **C**onsistency ensures that the changes in data value to be constant at any given instance. This property helps in the successful transaction. **I**solation property is needed during concurrent transaction. When multiple users do the transactions by accessing same object at the same time, the transaction is known as concurrent transaction. To prevent the conflict in database update, the transactions are isolated from other user and serialized. This is also known as Degree of Consistency. **D**urability is defined as the system's ability to recover all committed transactions during the failure of storage or the system.

Concurrency Control and Locking – It is the DBMSs mechanism used for data sharing. When the same data is shared among multiple users, proper access control is needed and privilege of changing the applications data item is controlled through Locking.

3.2 DBMS Database Models

The database technology came into existence in terms of models with relational and object-relational behavior. The major database models are listed below:

3.2.1 Hierarchical Database Model

The famous Hierarchical database model was IMS (Information Management

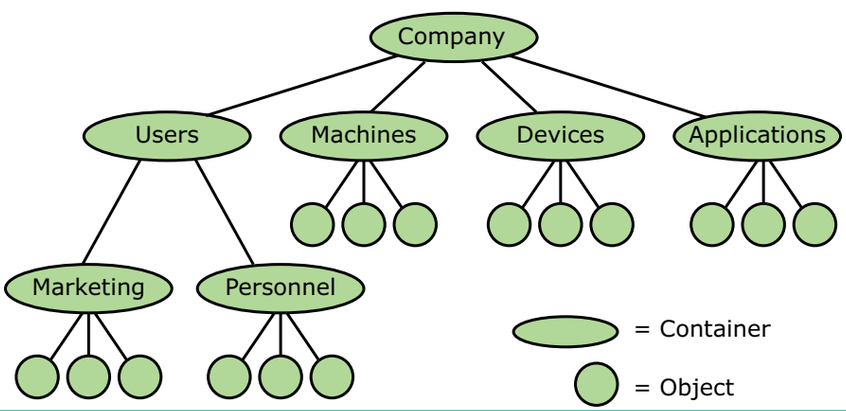


Figure: 3.1 Hierarchical database model

12th_Computer_Application_English version CHAPTER 03.indd 58 19-01-2023 17:00:14

System), IBM's first DBMS. In this model each record has information in parent/ child relationship like a tree structure. The collection of records is called as record types, which are equivalent to tables in relational model. The individual records are equal to rows. See Figure 3.1

In the above model we have many advantages like less redundant data, efficient search, data integrity and security. This model also has few limitations like complex to implement and difficulty in handling many to many relationships.

3.2.2 Network model

The first developed network data model was IDS (Integrated Data Store) at Honeywell. Network model is similar to Hierarchical model except that in this model each member can have more than one owner. The many to many relationships are handled in a better way. This model identified the three database components Network schema, Sub schema and Language for data management. See Figure 3.2

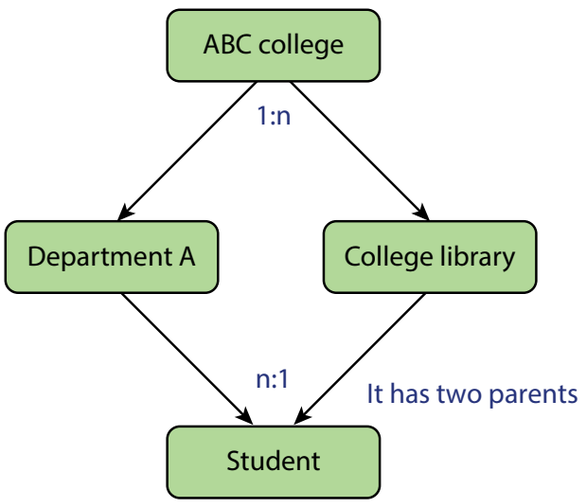


Figure: 3.2 **Network Model**

Network schema – schema defines all about the structure of the database.

Sub schema – control on views of the database for the user

Language – basic procede for accessing the database.

The major advantage of this model is the ability to handle more relationship types, easy data access, data integrity and independence. The limitation of network model is difficulty in design and maintenance.

3.2.3 Relational model

Oracle and DB2 are few commercial relational models in use. Relational model is defined with two terminologies Instance and Schema. See Figure 3.3

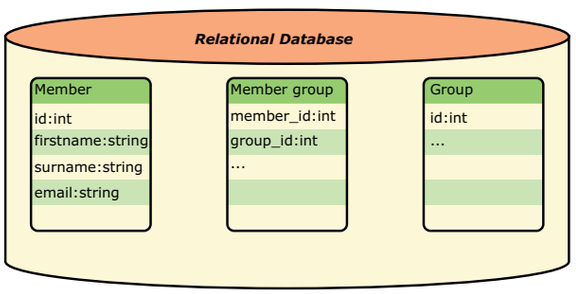


Figure: 3.3 **Relational database model**

Instance – A table consisting of rows and columns

Schema – Specifies the structure including name and type of each column.

A relation (table) consists of unique attributes (columns) and tuples (rows).

3.2.4 Object-oriented database model

This model incorporates the combination of Object Oriented Programming(OOP's) concepts and database technologies. Practically, this model serves as the base of Relational model. Object oriented model

12th_Computer_Application_English version CHAPTER 03.indd 59 19-01-2023 17:00:14

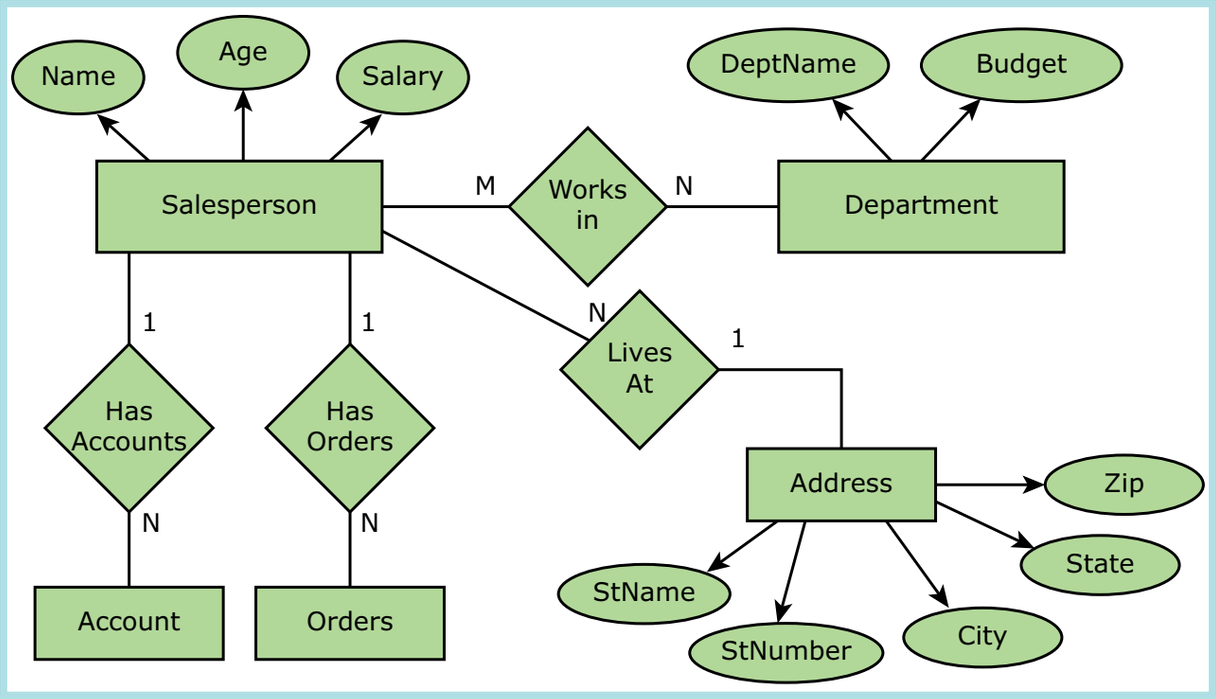


Figure: 3.4 **Object-oriented database model**

uses small, reusable software known as Objects. These are stored in object oriented database. This model efficiently manages large number of different data types. Moreover complex behaviors are handled efficiently using OOP's concepts. See Figure 3.4

3.3 Relational Database Management System

Basic RDBMS concepts

Any database whose logical organization is based on relational data model is known as Relational Database. A DBMS that manages the relational database is known as Relational Data Base Management System. RDBMS is basis for SQL and for all modern database systems like MySQL, oracle and Microsoft Access. The basic RDBMS concept includes Database, Tables, Tuple, Attribute, Schema and Key which are discussed in RDBMS Jargons.

3.4 RDBMS Jargons

3.4.1 Database

The most popular Relational Database is MySQL. It is an open source SQL database supporting different platforms like Windows, Linux and MAC Operating Systems. The other relational databases available are Oracle, MS SQL Server and MS Access. The features of RDBMS are

- High Availability
- High Performance
- Robust Transactions and support
- Ease of management
- Less cost

3.4.2 Table

In relational database model, table is defined as the collection of data organized in terms of rows and columns. Table is the simple representation of relations. The true relations cannot have duplicate rows

12th_Computer_Application_English version CHAPTER 03.indd 60 19-01-2023 17:00:14

where as the table can have. The example of Employee table is shown below in Table 3.1.

Table 3.1 Table Structure

ID	NAME	AGE	SALARY
1	Alex	26	22,000
2	Divya	25	20,000
3	Tulsi	28	30,000

3.4.3 Column

The table consists of several rows and columns. Table can be divided into smaller parts, in terms of columns. Each column is known as attributes. In the Employee table four attributes are available namely Id, Name, Age and Salary. The attribute is defined in a table to hold values of same type. This is known as Attribute Domain. In the Employee table, the Name field will hold only characters not the numbers in it.The vertical entity in a table is known as Attribute or Column.

3.4.4 Row

A single entry in a table is called as Row or Record or Tuple. Set of related data's are represented in a row or tuple. The horizontal entity in a table is known as Record or row. See Table 3.2

Table 3.2 Row Structure

ID	NAME	AGE	SALARY
1	Alex	26	22,000

3.4.5 Key

The candidate key that is chosen to perform the identification task is called the primary key and any others are Alternate keys. Every tuple must have, by definition, a unique value for its primary key. A primary key which is a combination of more than one attribute is called a composite primary key.

3.4.6 Foreign Key

A foreign key is a "copy" of a primary key that has been exported from one relation into another to represent the existence of a relationship between them. A foreign key is a copy of the whole of its parent primary key i.e if the primary key is composite, then so is the foreign key. Foreign key values do not (usually) have to be unique. Foreign keys can also be null. A composite foreign key cannot have some attribute(s) null and others non-null.

3.4.7 Super Key

An attribute or group of attributes, which is sufficient to distinguish every tuple in the relation from every other one is known as Super Key. Each super key is called a candidate key. A candidate key is selected from the set of Super Key. While selecting candidate key, redundant attributes should not be taken. The candidate key is also known as minimal super keys.

3.4.8 Composite Key

A key with more than one attribute to identify rows uniquely in a table is called Composite key. This is also known as Compound Key.

3.5 ER Model

Generally we use an ER model to know the concept of database design and this model consists of a collection of entities(real world objects)where each of these entities will be interconnected with each other with conditions and dependencies(i.e. one entity is dependent on another).

12th_Computer_Application_English version CHAPTER 03.indd 61 19-01-2023 17:00:14

3.5.1 ER Modeling basic concepts

The basic concepts of ER model consists of

1. Entity or Entity type
2. Attributes
3. Relationship

These are the general concepts which help to create an ER diagram and produce an ER model. With the help of these any database design can be created and viewed to know the concept in that database design.

3.5.2 Entity or Entity type

An Entity can be anything a real-world object or animation which is easily identifiable by anyone even by a common man.

Eg: In a company's database Employee, HR, Manager are considered as entities, where each of these entity will be having their own attributes. An entity is represented by a rectangular box. See Figure 3.5.



Figure 3.5 Entity

Types of Entity:

1. Strong Entity
2. Weak Entity
3. Entity Instance

Strong Entity

A Strong entity is the one which doesn't depend on any other entity on the schema or database and a strong entity will have a primary key with it (i.e. a unique id which other entities will not have in their attributes).It is represented by one rectangle.In the above example it is a strong entity because it has a primary key(a unique id) as the roll no because for every one roll no varies and it will not be same.

Weak Entity

A weak entity is dependent on other entities and it doesn't have any primary key like the Strong entity. It is represented by double rectangle.

For Example:

Here the marks is the weak entity and there are no unique id or primary key for that entity. So they are dependent on the existence of the other entity. See Table 3.3

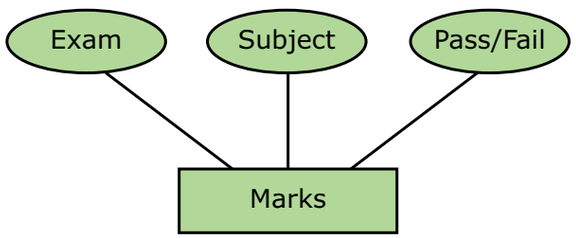


Figure: 3.6 Weak Entity

3.5.3 Entity Instance

Instances are the values for the entity if we consider animals as the entity their instances will be dog, cat, cow… Etc. So an Entity Instance denotes the category values for the given entity.

Table: 3.3 Entity Instances

Entity	Instances
Human	Male , Female
Animals	Dog, cats, lion
Jobs	Engineer, Doctor, Lawyer
Actors	Ajith, Vijay, Vikram
Electronics	Laptop, Mobile

12th_Computer_Application_English version CHAPTER 03.indd 62 19-01-2023 17:00:14

3.5.4 Attributes

An attribute is the information about that entity and it will describe, quantify, qualify, classify, and specify an entity. An attribute will always have a single value, that value can be a number or character or string.

Types of attributes:

1. Key Attribute
2. Simple Attributes
3. Composite Attributes
4. Single Valued Attribute
5. Multi Valued Attribute

3.5.4.1 Key Attribute

Generally a key attribute describes a unique characteristic of an entity.

3.5.4.2 Simple Attribute

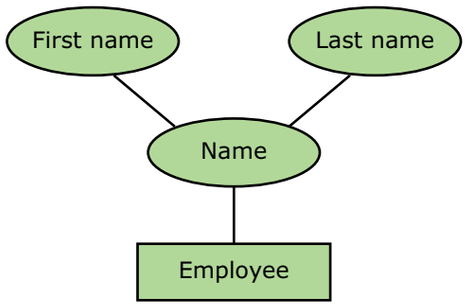


Figure 3.7 Simple Attribute

The simple attributes cannot be separated. It will have a single value for that entity. For Example: Let us consider the name as the attribute for the entity employee and here the value for that attribute is a single value. See Figure 3.7

3.5.4.3 Composite Attributes

The composite attributes can be sub-divided into simple attributes without change in the meaning of that attribute. For Example: In the above diagram the employee is the entity with the composite attribute Name which are sub-divided into two simple attributes first and last name.

3.5.4.4 Single Valued Attributes:

A single valued attribute contains only one value for the attribute and they don't have multiple number of values. For Example:Age- It is a single value for a person as we cannot give 'n' number of ages for a single person,therefore it is a single valued attribute. See Table 3.4

Table: 3.4 Single Valued Attributes

Attribute	Values
Age	3
Roll no	85

In the above table are the some examples for single valued attributes. See Figure 3.8

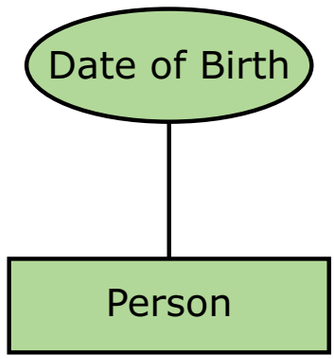


Figure 3.8 Single Valued Attributes

3.5.4.5 Multi Valued Attributes:

A multi valued attribute has more than one value for that particular attribute.For Example:Degree - A person can hold n number of degrees so it is a multi-valued attribute.

In Table 3.5 are some examples for Multi valued attributes.

Table: 3.5 Attributes and Values

Attribute	Values
Degree	B.Tech, MBA
Bank_Account	SBI, HDFC

12th_Computer_Application_English version CHAPTER 03.indd 63 19-01-2023 17:00:15

3.5.5 Relationship Type

In ER Model, relationship exists between two entities. Three types of relationships are available and the Entity-Relationship(ER) diagram is based on the three types listed below.

One-to-One relationship: Consider two entities A and B. one-to-one (1:1) relationship is said to exist in a relational database design, if 0 or 1 instance of entity A is associated with 0 or 1 instance of entity B, and 0 or 1 instance of entity B is associated with 0 or 1 instance of entity A.

One-to-Many relationship: Consider two entities A and B. one-to-many (1:N) relationship is said to exist in a relational database design, for 1 instance of entity A there exists 0 or 1 or many instances of entity B, but for 1 instance of entity B there exists 0 or 1 instance of entity A.

Many-to-Many relationship:Consider two entities A and B. many-to-many (M:N) relationship is said to exist in a relational database design, for 1 instance of entity A there exists 0 or 1 or many instances of entity B, and for 1 instance of entity B there exists 0 or 1 or many instance of entity A.

In reality one-to-one are in less usage, where as one-to-many and many-to-many are commonly used. However in relational databases, many-to-many are converted into one-to-many relationships.

3.5.5.1 Relationship instance

It is a finite set of liples in the RDBMS systems relation instances never have duplicate . E.g if **Works-for** is the relationship between the Employee entity and the department entity, then Ram works for Comp.sc department, shyam works for electrical department ..etc are relationship instances of the relationship, works for.

3.5.5.2 Degree of a relationship

The number of entity types involved is known as Degree of relationship. One – Unary, Two – Binary, Three – Ternary.E.g An employee of an organization acts as manager of few other employees. It also connects one entity to itself as a loop. so **manager-of** is unary. Similarly employee **works-for**department, connects two entities and is binary. If a customer purchase an item, it involves shop keeper also and is a ternary relationship.

3.5.5.3 Cardinality

It is defined as the number of items that must be included in a relationship.ie number of entities in one set mapped with the number of entities of another set via the relationship. The three classifications in Cardinality are one-to-one, one-to-many and Many-to-Many. See Figure 3.9-3.11



Figure 3.9 Cardinality

In the above example we have two entities Person and Vehicle. If we consider a person driving vwchicle, then we have one-to-one relationship between Person and Vehicle. See Figure 3.10



Figure 3.10 CardinalityRelation 1 to n

In the above example, Customer places the Order is a one-to-many relationship.

12th_Computer_Application_English version CHAPTER 03.indd 64 19-01-2023 17:00:15

Here the customer can place multiple orders and the order is related to only one customer. See Figure 3.11



Figure: 3.11 Cardinality Relation n to n

The example of many-to-many relationship is Students registering the Courses. A student can register more than one courses and A course can be registered by many students. Hence it is many-to-many.

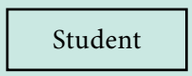
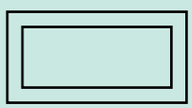
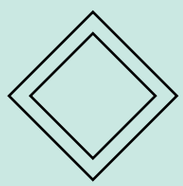
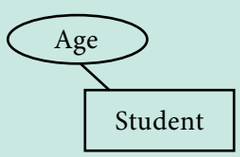
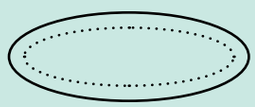
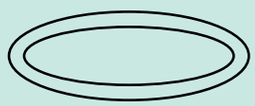
3.6 ER-Diagram

ER Diagram presents data visually on how they are related to each other. This model follows separate notations for representing data into entities, attributes and relationship between the entities.

3.6.1 ER-Modeling Diagram Notations

Entities, Attributes and Relationship forms the components of ER Diagram and the defined symbols and shapes are summarized below in Table 3.6.

Table 3.6 ER diagram Notations

ER Component	Description (how it is represented)	Notation
Entity - Strong	Simple rectangular box	
Entity – Weak	Double rectangular boxes	
Relationships	Rhombus symbol - Strong	
between Entities	Rhombus within rhombus – Weak	
Attributes	Ellipse Symbol connected to the entity	
Key Attribute for Entity	Underline the attribute name inside Ellipse	
Derived Attribute for Entity	Dotted ellipse inside main ellipse	
Multivalued Attribute for Entity	Double Ellipse	

12th_Computer_Application_English version CHAPTER 03.indd 65 19-01-2023 17:00:15

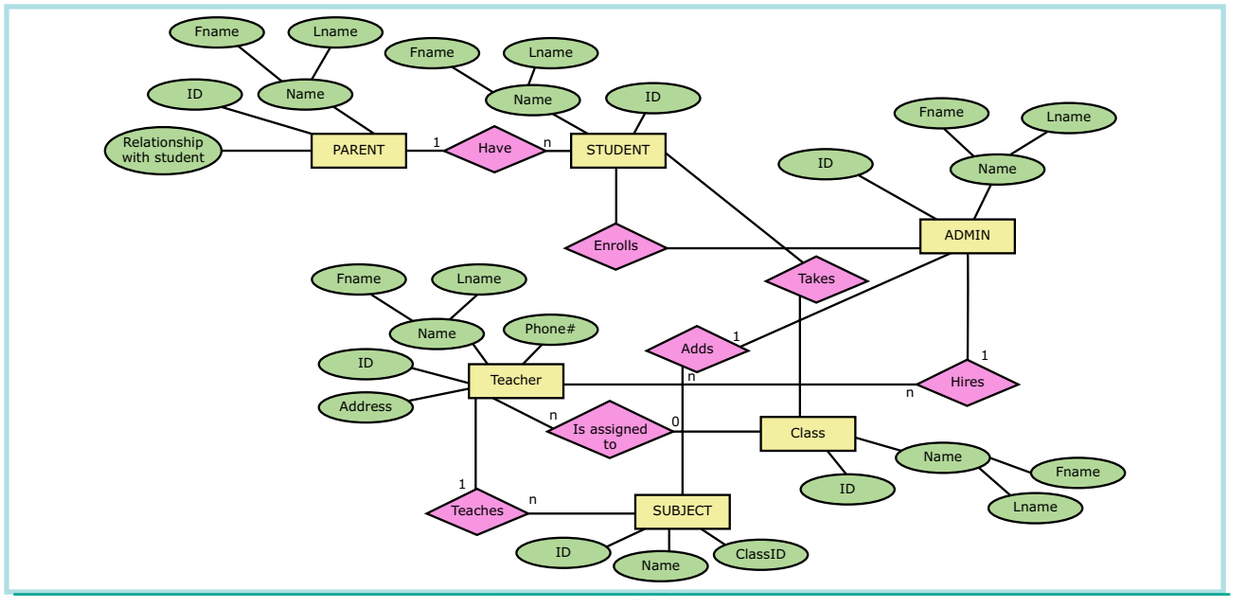


Figure: 3.12 **ER-Diagram**

3.6.2 Example

Fig 3.12 is an example of ER Diagram for the scenario of School Management System. We have many entities like Parent, student, Admin, Teacher, class and subjects. The attributes of few entity is given below:

Parent – Name, Id, Fname, Lname.
Student – Id, Name, Fname, Lname.
Teacher – Name, Id, Phone#, Address.

The relationships that exist between the entities are as follows:

- Parent **HAVE** Student
- Admin **ENROLLS** Student
- Admin **HIRES** Teacher
- Admin **ADDS** Subject
- Teacher **TEACHES** Subject
- Teacher **IS ASSIGNED TO** Class

Key Attributes are listed with underline.

3.7 Introduction to MYSQL

3.7.1 About MYSQL

MySQL is an open source relational database management system. Its name is a combination of "My" the name of the founder Monty Widenius's daughter and "SQL". A clear definition of database and SQL is mandatory to understand MySQL. In simple, a database is defined as the structured collection of data. Ex. Photo gallery is a database which has collection of photos (data). SQL - structured query language is not a database. It is a standardized language used to access the database and the data's are processed to turn into efficient information. The SQL standard always refers to the current version and the current version is 2003. MySQL is open source software that allows managing relational databases. It also provides the flexibility of changing the source code as per the needs. It runs on multiple platforms like Windows, Linux and is scalable, reliable and fast.

3.7.2 Overview of Web Database

Many databases are in existence to meet out the needs of the application. These databases are broadly divided into Heavy and Light databases. Heavy databases support all the desktop applications whereas the web applications are

12th_Computer_Application_English version CHAPTER 03.indd 66 19-01-2023 17:00:15

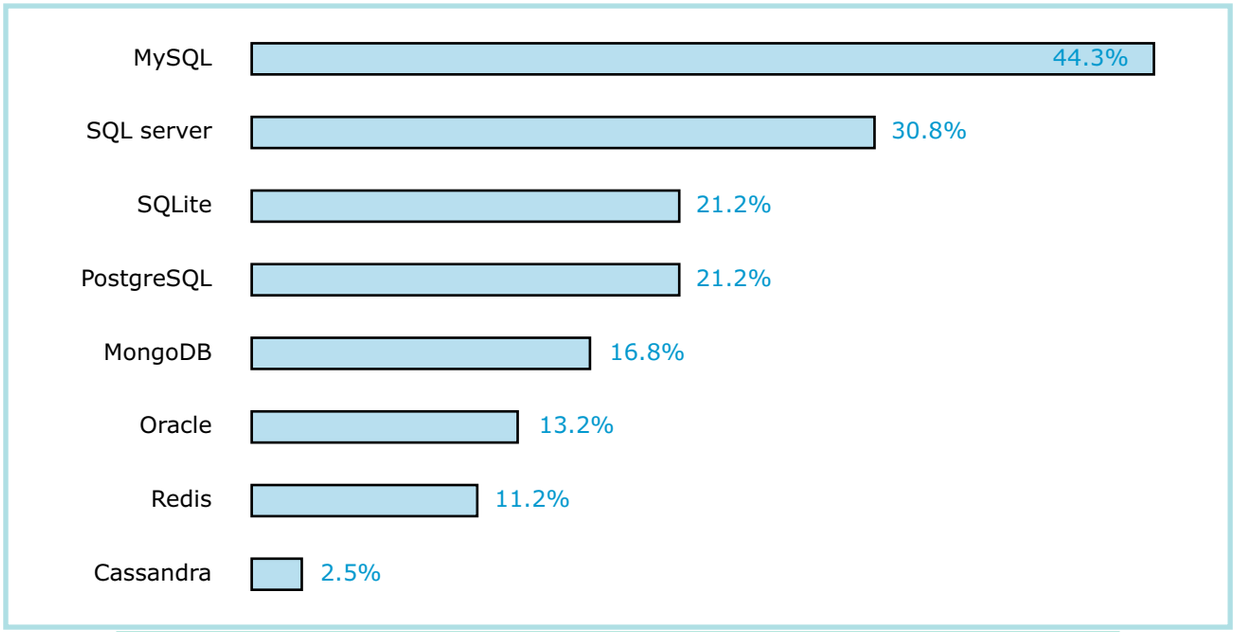


Figure: 3.13 Most Popular databases - Statistics

supported by Light databases. Below are the lists of commonly used databases.

- DB2
- MySQL
- Oracle
- PostgreSQL
- SQLite
- SQL Server
- Sybase

Due to the rapid growth in the web domain, most of the desktop applications are being converted into web applications. These transformations to the web results in the availability of many web applications in the network. Heavy databases did not meet out the network issues efficiently. Light databases were able to handle all the issues raised by the network. So all the light databases that supports the web applications are also known as Web Databases. See Figure 3.13

MySQL is the most commonly used database in the world due to its ease of use.

3.8 MySQL - Administration

3.8.1 MySQL – Administration Responsibilities

In general there exists a role known as Database Administrators (DBA's) who takes care of configuration, installation, performance, security and data backup. DBA's posses the skills on database design, database queries, RDMS, SQL and networking. The primary task is the creation of new user and providing them with access rights.

Creating New User Account to MySQL

In **MySQL** database, there exists a table named **user**. The newly created account must have an entry in this **user** table. Consider the admin creates an account with username and password. The user account is activated with various access rights like INSERT, SELECT and UPDATE. Consider the **user** table has the following fields host, name, password, select_priv, insert_priv and update_priv.

12th_Computer_Application_English version CHAPTER 03.indd 67 19-01-2023 17:00:15

A new user account is added with values to the **user** table using the following INSERT query in MySQL database. The Syntax for inserting record is INSERT INTO table name (Parameter1,Parameter2, Parameter3..) VALUES (Value1, Value2, Value3..); All the query is in SQL will terminate with semicolon(;).

```
mysql> INSERT INTO user (host, name, password, select_priv, insert_priv, update_priv)
VALUES ('localhost', 'guest', PASSWORD('guest123'), 'Y', 'Y', 'Y');
```

Query OK, 1 row affected (0.20 sec) – This statement implies that the query is executed successfully with the time in seconds.

mysql>FLUSH PRIVILEGES;

The above command is executed after every new account creation. This command is similar to rebooting the server so that newly created account and the access privilege are updated in the server. Manual server rebooting is avoided by this command.The inserted record is retrieved using SELECT query and the structure is shown below Table 3.7 & 3.8:

mysql>SELECT * FROM user WHERE name = 'guest';

Table 3.7 Example Table

host	name	password	select_ priv	insert_ priv	update_ priv
localhost	guest	j2gd6vxd1bj3k13g4	Y	Y	Y

Since MySQL is more secured, it provides function to encrypt the password. Thus the password 'guest123' is encrypted and stored as 'j2gd6vxd1bj3k13g4' using PASSWORD() function. The parameters select_priv, insert_priv and update_priv are few privileges set for the new user. If the flag is set as 'Y' then access is granted and if flag set as 'N' then access is denied.

Table 3.8 List of privileges available in MySQL

Privileges	Action Performed (If Granted)
Select_priv	User can select rows from database tables.
Insert_priv	User can insert rows into database tables.
Update_priv	User can update rows of database tables.
Delete_priv	User can delete rows of database tables.
Create_priv	User can create new tables in database.
Alter_priv	User can make changes to the database structure.

3.8.2 Administrative MySQL Command

The Database Administrator (DBA) frequently uses few commands to control the entire database. These commands are known as Administrative MySQL Commands. The following are few such important commands used frequently while working with MySQL.

1. **USE Database** – This command is used to select the database in MySQL for working. If there exists a database named **test**, it is used as working database using the below Syntax.

   Syntax:

```
mysql > use test;
    Database changed
mysql>
```


12th_Computer_Application_English version CHAPTER 03.indd 68 19-01-2023 17:00:15

2. **SHOW Databases** – Lists all the databases available in the database server. See Table 3.9

Syntax:

mysql > show databases;

Table 3.9 Database List

Database
test
mysql
employee
students
parents

3. **SHOW Tables** – Lists all the tables available in the current database we are working in. See Table 3.10

Syntax:

mysql > show tables;

Table 3.10 Table List

Tables_in_test
school
salary
employee
library
sports

4. **SHOW COLUMNS FROM tablename** – Lists all the attributes, attribute type, Is Null value permitted, key information, default value and other information for the given table. The show columns for **sports** table is given below in Table 3.11.

Syntax:

mysql > show columns from sports;

Table 3.11 Column List

Field	Type	Null	Key	Default	Extra
Team_id	int(5)	yes		null	
Team_name	varchar (10)	yes		null	
Team_size	int(5)	yes		null	
Team_rank	int(5)	yes		null	

5. **SHOW INDEX FROM tablename** – The query shows all the indexes for the given table.

Syntax:

mysql > show indexes from sports;

6. **SHOW TABLE STATUS LIKE tablename\G** – This command provides with detailed report on the performance of the table.

3.8.3 MySQL Installation

Download and install XAMPP Server Software from Internet. Refer Figure 3.14 to 3.23.

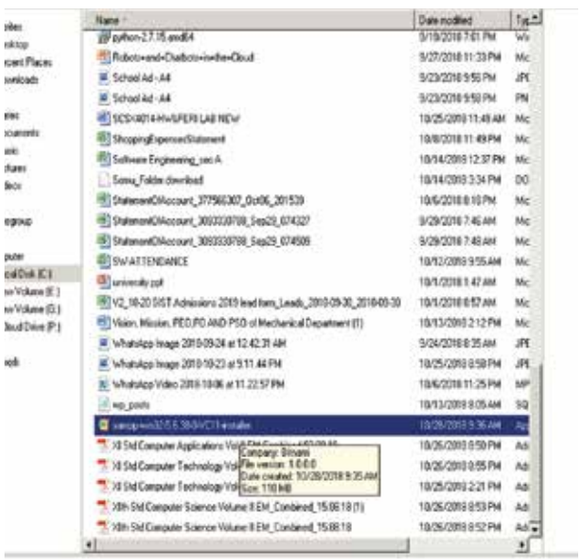


Figure: 3.14 XAMPP Server executable file

Click the Welcome Page Next Button

12th_Computer_Application_English version CHAPTER 03.indd 69 19-01-2023 17:00:15



Figure: 3.15 XAMPP Server Welcome Wizard

Select the Required component along with MYSQL component and click next button

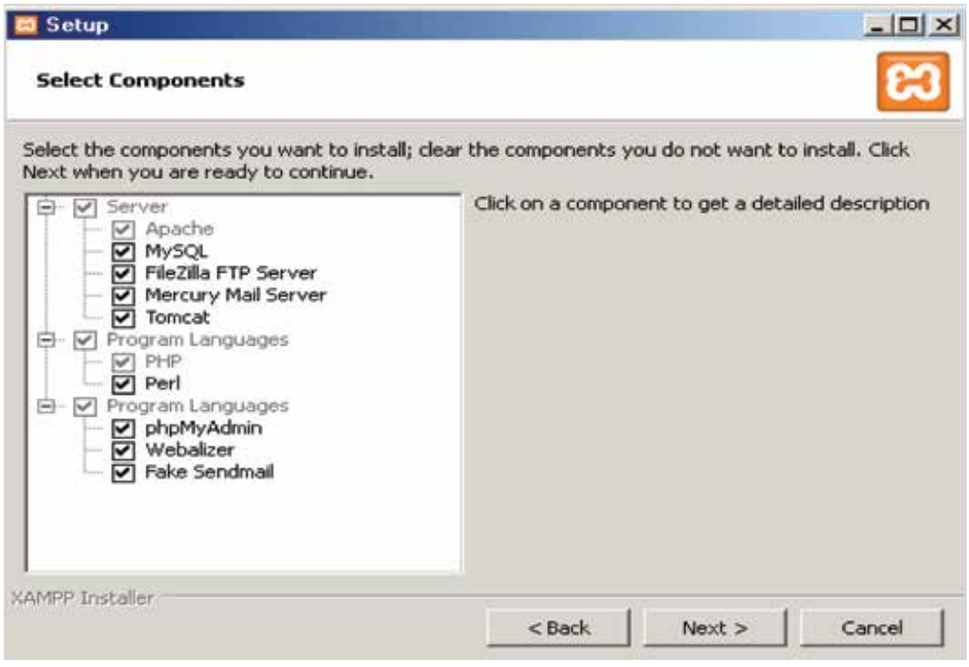


Figure: 3.16 XAMPP Server Component Wizard

12th_Computer_Application_English version CHAPTER 03.indd 70 19-01-2023 17:00:16

Choose The Installation Folder and click Next

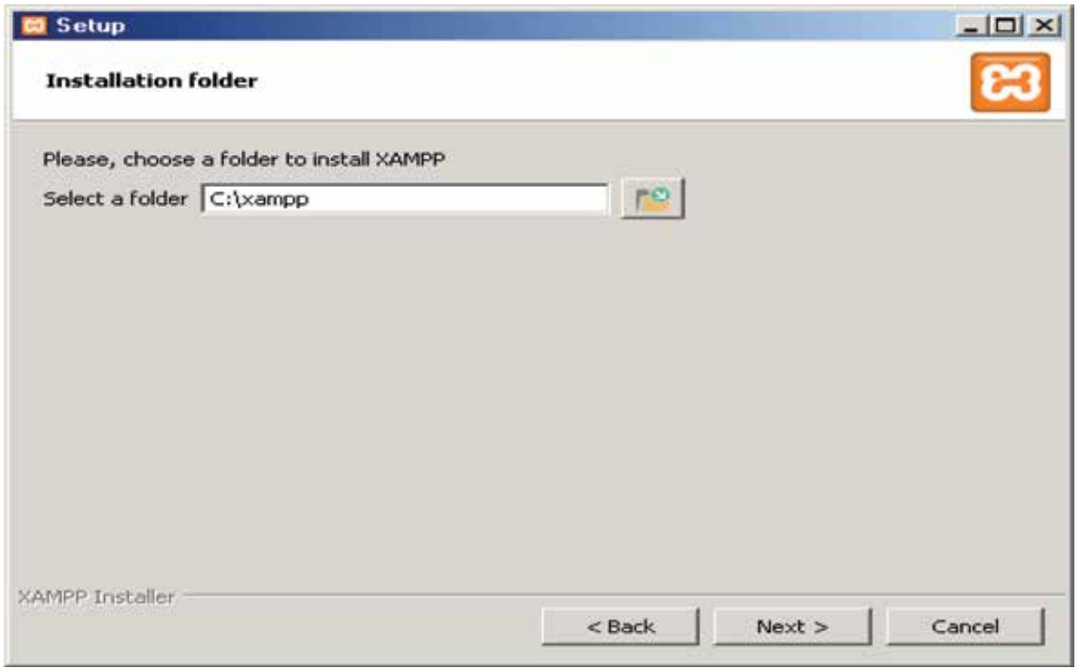


Figure: 3.17 XAMPP Server install path

Click Next Button in Setup ready page

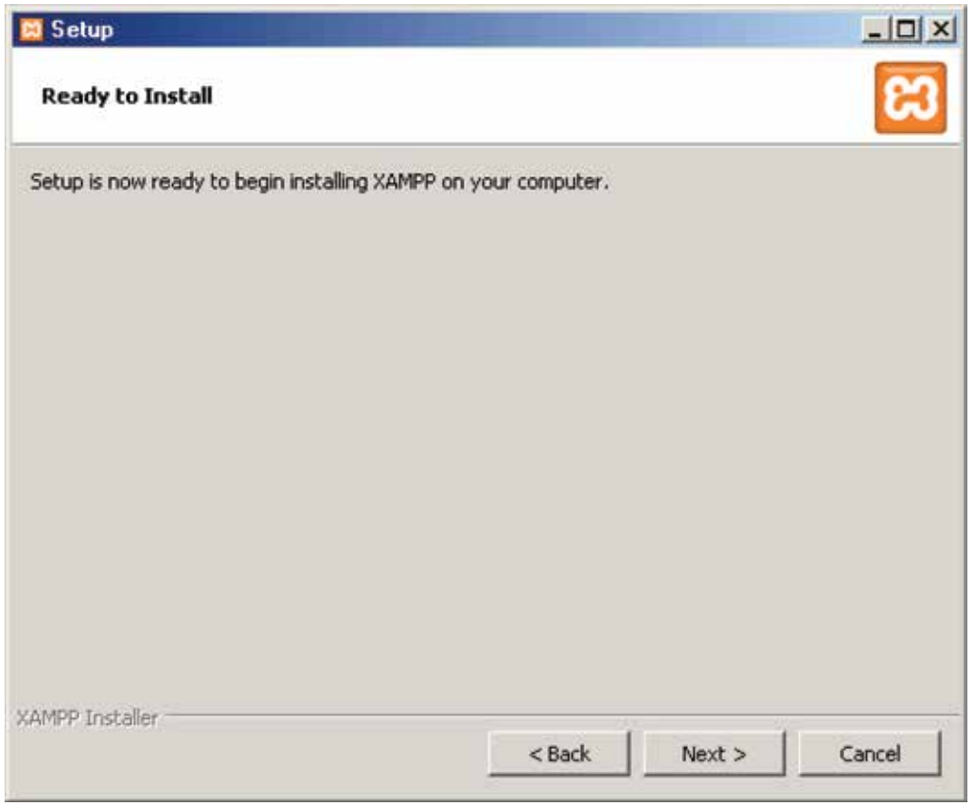


Figure: 3.18 XAMPP Server setup completion

12th_Computer_Application_English version CHAPTER 03.indd 71 19-01-2023 17:00:16

Installation get started

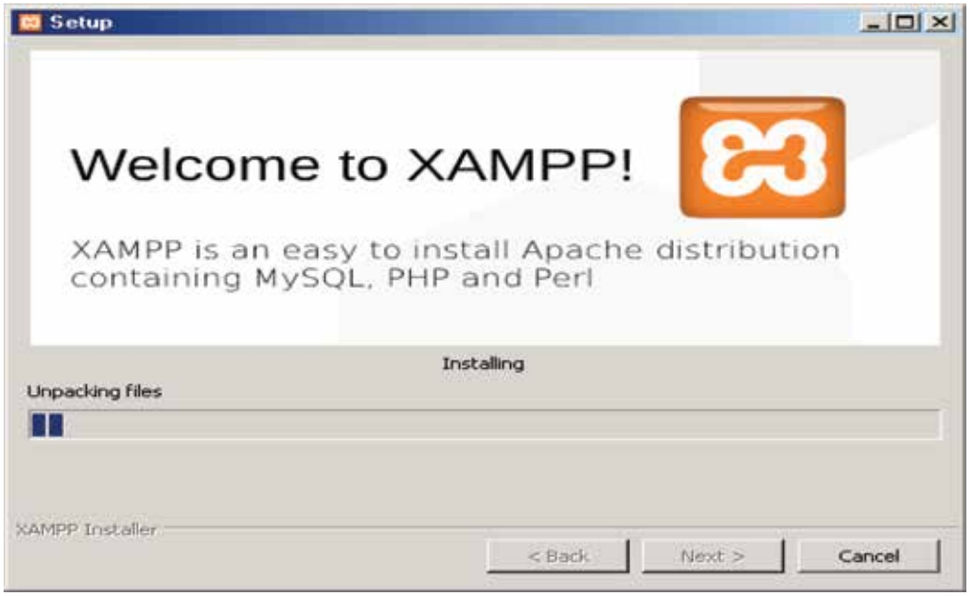


Figure: 3.19 XAMPP Server setup Progress window

After installing Click finish button and open the XAMMP Control panel

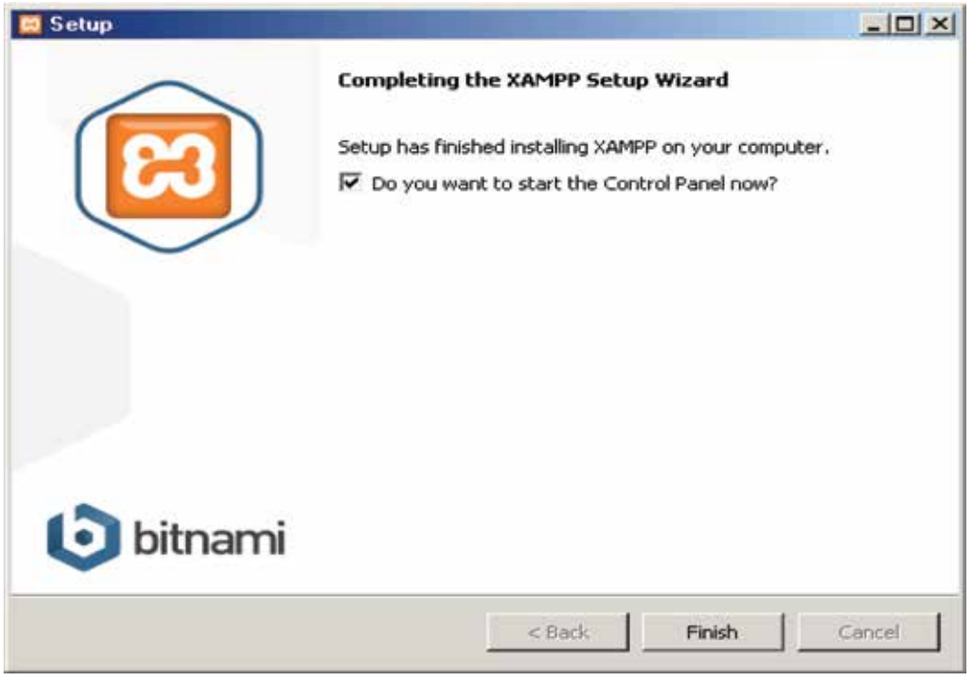


Figure: 3.20 XAMPP Server setup completion

In the Control Panel start the Apache and MySQL Services one by one

12th_Computer_Application_English version CHAPTER 03.indd 72 19-01-2023 17:00:16

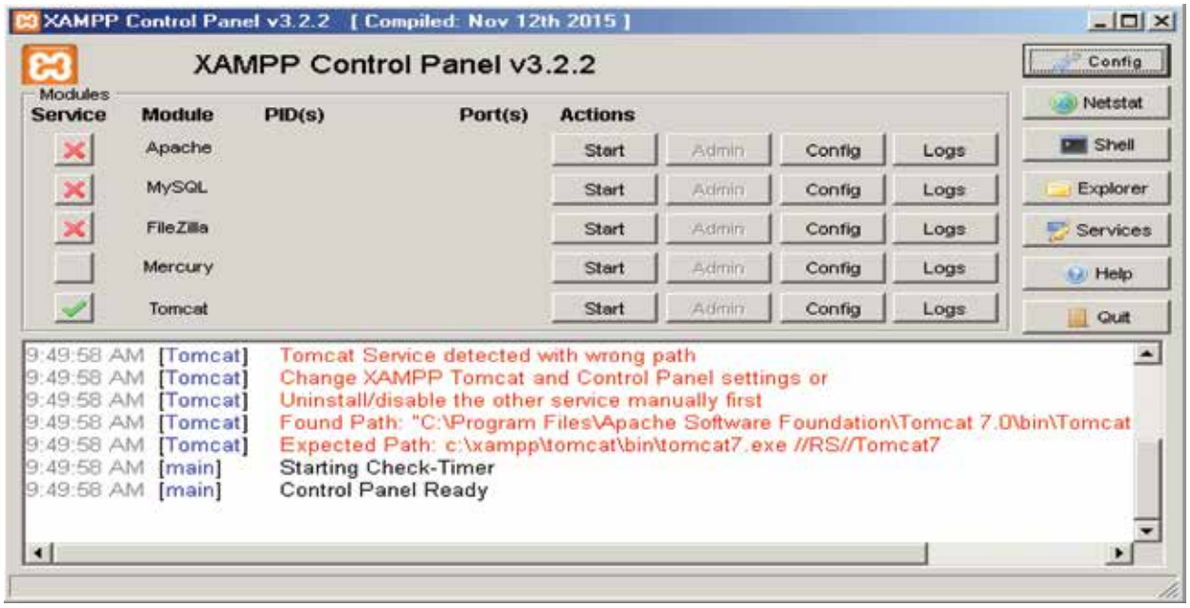


Figure: 3.21 XAMPP Server Control panel

The two services get started one by one

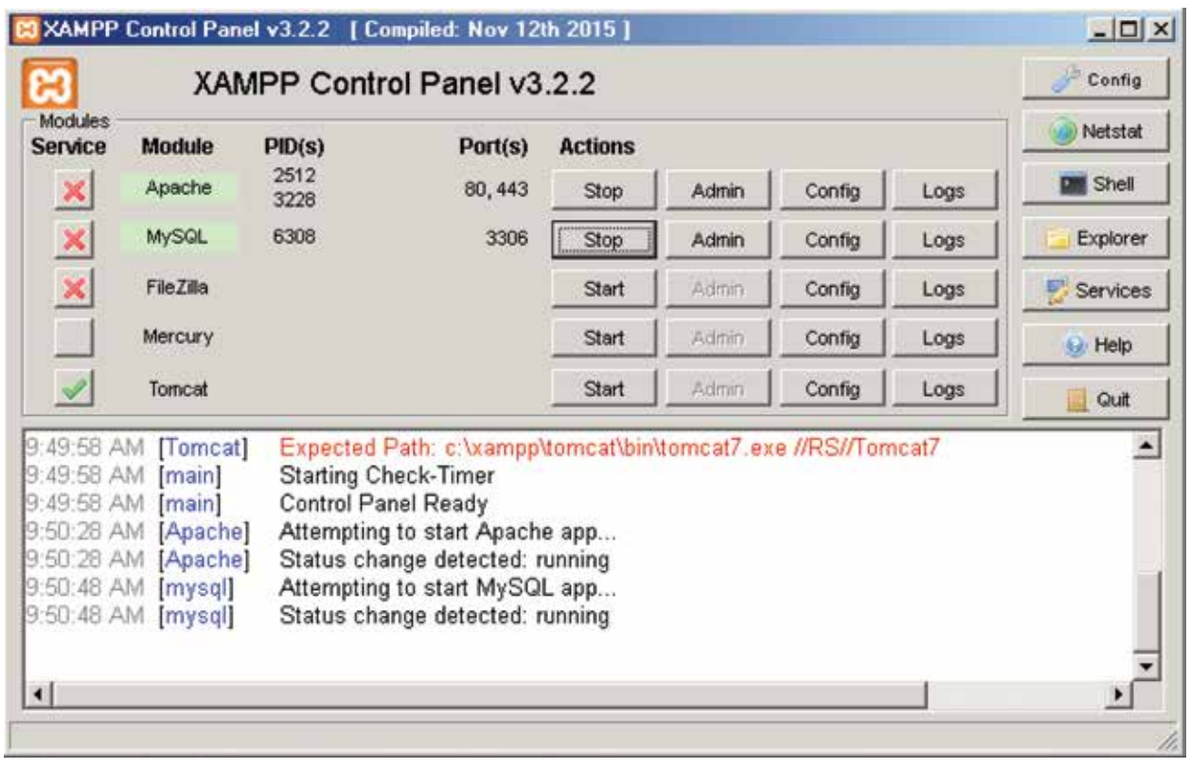


Figure: 3.22 XAMPP Server Services start option

12th_Computer_Application_English version CHAPTER 03.indd 73 19-01-2023 17:00:16

Open the URL http://localhost/phpmyadmin URL in a browser to access MySQL database.

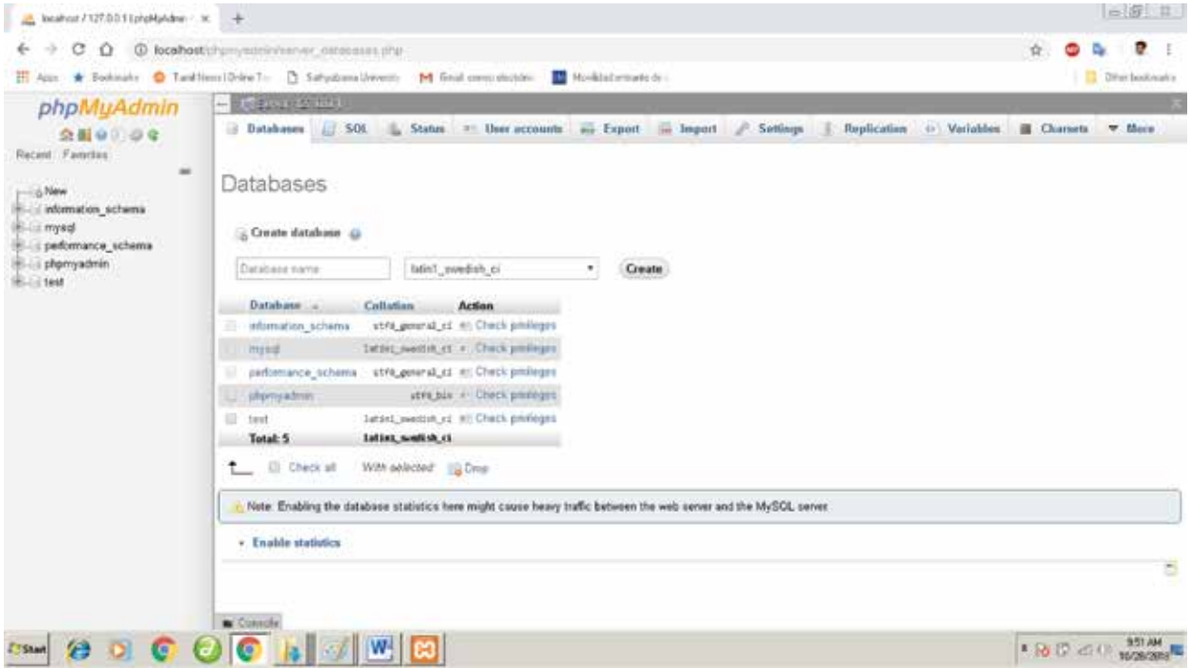


Figure: 3.23 PHP Myadmin Mysql Database server User interface

3.9 MYSQL Administration open source software tools

Types of software tools

Many open source tools are available in the market to design the database in a better and efficient manner. PhpMyAdmin is most popular for Web Administration. The popular Desktop Application tools are MySQL Workbench and HeidiSQL.

PHPMYADMIN (Web Admin)

This administrative tool of MySQL is a web application written in PHP. They are used predominantly in web hosting. The main feature is providing web interface, importing data from CSV and exporting data to various formats. It generates live charts for monitoring MySQL server activities like connections, processes and memory usage. It also helps in making the complex queries easier.

MySQL Workbench (Desktop Application)

It is a database tool used by developers and DBA's mainly for visualization. This tool helps in data modeling, development of SQL, server configuration and backup for MySQL in a better way. Its basic release version is 5.0 and is now in 8.0 supporting all Operating Systems. The SQL editor of this tool is very flexible and comfortable in dealing multiple results set.

HeidiSQL (Desktop Application)

This open source tool helps in the administration of better database systems. It supports GUI (Graphical User Interface) features for monitoring server host, server connection, Databases, Tables, Views, Triggers and Events.

12th_Computer_Application_English version CHAPTER 03.indd 74 19-01-2023 17:00:17

3.10 Designing Databases

The process of creating, implementing and maintaining the enterprise data in a system is known as Designing of databases. Better understanding of the application is necessary before designing the database. The performance and success of an application depends on good database design. MySQL provides performance dashboard, reports and statistics regarding the design of database.

Create Conceptual Design

It is the primary phase in database design, where detailed discussion about the creation of databases, tables, columns and data types is discussed based on the requirement of the application. As an end result the model is framed to attain the expectation of the application's end user.

- **Create Database**

The three major parts that forms a database are Tables, Queries and Views.

Tables - similar to an excel sheet, containing multiple rows and columns. Where each row is a record and each column is an attribute.

Queries – It is a question with multiple conditions posted to the database. The records in the database that satisfies the passed conditions are retrieved.

Views – A set of stored queries.

Example: create a database to store the personaldetails.

```
mysql> create database personaldetails;
Query Ok, 1 row affected
mysql> USE personaldetails;
Database changed.
```

The created database is listed using SHOW command. See Table 3.12

```
mysql> show databases;
```

Table 3.12 Database List

Database
employee
personaldetails
sports

- **Create Table**

In an application, each page reveals some functionality. Each such functions are designed to a table. For example, in an online shopping site like Amazon, multiple pages are maintained like customer profile, products, orders in cart and payment page. All these can be created as tables like Customer, Products, Order and Payment respectively.

- **Create Columns**

Each table will have many columns related to the functionality of the table. This column determines what values are stored in the table. For example, the Customer table contains the columns like firstname, lastname, phone, email, age, address and pincode. These columns hold the Customer information in the table. Each column is assigned with appropriate value type. The efficiency and performance of the table purely depends on the data types assigned to the columns.

- **Insert Rows**

Once the database is created, tables and the columns with the appropriate value type are defined. Then records are inserted to the table.

12th_Computer_Application_English version CHAPTER 03.indd 75 19-01-2023 17:00:17

INSERT INTO TABLE_NAME (column1, column2, column3, ... columnN)

VALUES (value1, value2, value3, ...valueN);

3.11 SQL

SQL- Structured Query Language is a standard language used for accessing and manipulating databases. It is declared as standard by American National Standards Institute (ANSI) and International Organization for Standardization (ISO) in 1986 and 1987 respectively.

About SQL

- Though SQL is standard language, different versions are maintained to meet out the requirements. Few major functions performed using SQL are listed below:
- Executes queries against a database.
- Retrieves data from database.
- Inserts and updates records in a database
- Delete records from database.
- Creates new databases and new tables in a database.

Types of SQL Commands

Different SQL commands are available to perform various functions. SQL commands are classified into five major categories depending on their functionality. See Table 3.13

Data Definition Language (DDL)

The DDL commands are used to define database schema (Structure). Also to create and modify the structure of the database object in the database. CREATE, ALTER, DROP,RENAME and TRUNCATE commands belongs to this category.

Table: 3.13 SQL DDL COMMANDS List

Commands	Description
CREATE	Used to create database or tables
ALTER	Modifies the existing structure of database or table
DROP	Deletes a database or table.
RENAME	used to rename an existing object in the database
TRUNCATE	Used to delete all table records

Data Manipulation Language (DML)

These SQL commands deals with the manipulation of data present in the database. Most of SQL commands come under DML. INSERT, UPDATE, and DELETE commands belong to this category. See Table 3.14

Table: 3.14 SQL DML COMMANDS List

Commands	Description
INSERT	Adds new rows into database table.
UPDATE	modifies existing data with new data in a table.
DELETE	Deletes the records from the table.

Data Query Language (DQL)

SELECT is the only SQL command used to fetch or retrieve the data from database tables that come under DQL. See Table 3.15

Table: 3.15 SQL DQL COMMANDS List

Commands	Description
SELECT	Retrieve data from the table.

12th_Computer_Application_English version CHAPTER 03.indd 76 19-01-2023 17:00:17

Transaction Control Language (TCL)

These SQL commands manage the transactions in SQL databases. It also helps to save the change into database permanently. COMMIT, ROLLBACK, SET TRANSACTION and SAVEPOINT commands belongs to this category. See Table 3.16

Table: 3.16 SQL TCL COMMANDS List

Commands	Description
COMMIT	Permanently saves into database.
ROLLBACK	Restore database to original form since the last COMMIT.
SET TRANSACTION	Sets the transaction properties such as read-write or read only access.
SAVE POINT	Used to temporarily save a transaction so that we can rollback to that point whenever required.

Data Control Language (DCL)

The SQL commands that implement security on database objects like table, view, stored procedure etc. GRANT and REVOKE commands belongs to this category. See Table 3.17

Table: 3.17 SQL DCL COMMANDS List

Commands	Description
Grant	used to give permission to specific users on specific database objects like table, view etc.
Revoke	used to take out permission from specific users on specific database objects like table, view etc.

3.12 Basic SQL Commands

Create/Drop /Selecting Database

Create Database – used to create new SQL Database. The Syntax and example to create studentDB is given below.

Syntax: CREATE database databasename;

Example: mysql>create database studentDB;

The database created now can be viewed using the following Syntax:

mysql>Show databases;

As a result, the newly created studentDB will be listed.

Drop Database – used to remove any of the existing SQL Database. The Syntax and example to delete student DB is given below.

Syntax: DROP database databasename;

Example: mysql>DROP database studentDB;

The deleted database will not be viewed,when we list all databases using the Syntax, Show databases;

Select Database – Many databases are available in the repository, from which the suitable database is selected using the below command.

Syntax: USE databasename;

Example: mysql>USE studentDB;

Once the database is selected, multiple operations are performed as per the needs of the application.

12th_Computer_Application_English version CHAPTER 03.indd 77 19-01-2023 17:00:17

- Insert Record

  Database will have multiple tables. Tables are created using the create command with various fields added to it as per their need. Any table is complete only with the record available in it. So new row are added to the table using the Insert command. The Syntax and example for inserting new record into the table is given below:

Syntax 1:
INSERT INTO tablename (column1, column2, column3)

VALUES (value1, value2, value3);

Syntax 2:
INSERT INTO tablename VALUES (value1, value2, value3);

Consider we have a table named Biodata, which has three columns namely firstname, lastname and age. Now the new record is added to the table using either Syntax1 or Syntax2 as shown below.

mysql>INSERT INTO Biodata (firstname, lastname, age)

VALUES (Krishna, Sam, 10);

(or)

mysql>INSERT INTO Biodata VALUES (Krishna, Sam, 10);

- Select Record

From the multiple records available in the table, the enquired data are retrieved from the table-using the SELECT command with some conditions specified in it. We can retrieve all the fields of a record or specify the necessary fields in a table. The records of any table are retrieved using the SELECT Syntax given below in Table 3.18 and 3.19

Syntax1: SELECT * from tablename;

Example: **mysql**>SELECT * from Biodata;

Table:3.18 SQL Select Record List

Firstname	Lastname	Age
Krishna	S	10
Sugal	S	14
Arun	J	15
Mani	K	18

Syntax2: SELECT column1, column2 from tablename;

Example: **mysql**>SELECT firstname, age from Biodata;

Table:3.19 SQL Select Record List

Firstname	Age
Krishna	10
Sugal	14
Arun	15
Mani	18

Deleting Record

The existing record in a table is removed from the table using DELETE command. Entire record or specified columns in the table can be deleted. If we want to perform delete operation on specific columns, then the condition is given using WHERE clause. If the condition is not specified, then the entire data will be deleted. See Table 3.20 and 3.21

Syntax1: DELETE from tablename WHERE columnname=”value”;

Example: mysql>DELETE from Biodata WHERE firstname=”Mani”;

12th_Computer_Application_English version CHAPTER 03.indd 78 19-01-2023 17:00:17

Table:3.20 SQL Delete Record List		
firstname	**lastname**	**age**
Krishna	S	10
Sugal	S	14
Arun	J	15

Syntax2: DELETE from tablename;

Example: mysql>DELETE from Biodata ;

Table:3.21 SQL Delete Record List		
firstname	**lastname**	**age**

Modifying Record

SQL provides us with modifying and updating the existing records in a table using UPDATE command. The age of Krishna in Biodata table is changed using the below Syntax.

Syntax1: UPDATE tablename

SET column1="new value"

Where column2="value2";

Example: mysql>UPDATE Biodata SET age=13 WHERE firstname="Krishna";

WHERE Clause

In SQL command WHERE clause is used to specify the selection criteria Based on that data's are retrieved or modified as per the query. In the WHERE conditions, operations like =, !=, >, >=, < , <= are used to frame the query statement. WHERE clause is used in SELECT and UPDATE query statement for the condition. The number of records updated in a table depends on the WHERE condition.

Using Operators

While forming the SQL query we use major operators like Arithmetic, Comparison and Logical in the WHERE clause. The purpose of each operator is listed below in Table 3.22.

Table:3.22 MySQL Operators	
Operator Type	**Operator**
Arithmetic Operator	+, -, *, /, %
Comparison Operator	=, !=, <, >, <>, >=, <=,
Logical Operator	AND, ANY, BETWEEN, EXISTS, IN, LIKE, NOT, OR, UNIQUE

Sorting Records

The Query results are listed in Ascending or Descending order using the command ORDER BY clause. In some databases the results are sorted by default in Ascending order and is given in Syntax1. The results are displayed in descending order as per Syntax2. See Table 3.23 and 3.24

Syntax1: select * from tablename ORDER BY columnname;

Example: select * from Biodata ORDER BY firstname;

Table:3.23 Select Record List		
firstname	**lastname**	**age**
Arun	J	15
Krishna	S	13
Sugal	S	14

12th_Computer_Application_English version CHAPTER 03.indd 79 19-01-2023 17:00:17

Syntax2: select * from tablename ORDER BY columnname DESC;

Example: select * from Biodata ORDER BY firstname DESC;

Table:3.24 Select Record List		
firstname	**lastname**	**age**
Sugal	S	14
Krishna	S	13
Arun	J	15

Grouping Records, Having Clause

In SQL we can have identical data in a group. Consider a table named Exams with fields Rollno, Subject and Marks. In the below table multiple rows of records are available for different subjects. Using the GROUP BY command, the rollno's are grouped and marks are added up against the Rollno with SUM(marks). See Table 3.25 and 3.26.

Table:3.25 Select Record List		
Rollno	**Subject**	**Marks**
201901	Tamil	81
201904	English	75
201901	English	96
201903	Tamil	92
201902	Tamil	78
201904	Tamil	83
201903	English	81
201905	Tamil	89
201902	English	80
201905	English	90

Example: Select Rollno, SUM(Marks) from Exams GROUP BY Rollno;

Table:3.26 Select Record List	
Rollno	**Marks**
201901	177
201902	158
201903	173
201904	158
201905	179

Joining Tables

When we have to select data from more than 2 tables SQL JOIN clause is used. Consider two tables Exams and Profile. The Exams table has the fields Rollno, Subject and Marks. The data of **Profile** table is shown below in Table 3.27 & 3.28.

Table: 3.27 Select JOIN Record List		
Rollno	**Name**	**Hobby**
201901	Krishna	Gardening
201902	Sugal	Photography
201903	Charles	Reading
201904	Venilla	Singing
201905	Pragathi	Painting

Example: SELECT Profile.Name, Profile. Hobby, SUM(Exams.Marks)As Total

FROM Profile, Exams

WHERE Profile.Rollno = Exams.Rollno

GROUP BY Profile.Name, Profile.Hobby;

12th_Computer_Application_English version CHAPTER 03.indd 80 19-01-2023 17:00:17

Table: 3.28 Select Join Record List		
Name	**Hobby**	**Total**
Krishna	Gardening	177
Sugal	Photography	158
Charles	Reading	173
Venilla	Singing	158
Pragathi	Painting	179

In the Query Statement, the marks are added and listed under the column name Total for each of the Rollno from both the tables.

GLOSSARY

Backup	It is a program or process of copying table contents into a file for future reference. It's a challenging task for DBA's
Primary Key	This key of relational table identifies each record in the table in a unique way.
Relationship	There exists a relationship between two tables when the foreign key of one table references primary key of other table.
Cardinality	It is defined as the number of different values in any given table column
Open Source	Open source – refers to the design that is publicly accessible by people for modification and sharing
SQL	It (Structured query Language) is a programming language designed mainly for managing data in RDBMS
Record	Record is referred in a table, which are composed of fields.
Query	In SQL, all commands are named as query. The query statement is executed against the databases.
Join	Retrieves data from two or more tables, by referencing columns in the tables that hold identical values

12th_Computer_Application_English version CHAPTER 03.indd 81 19-01-2023 17:00:17

EVALUATION

P1AZX

Part - I

Choose the correct answer

1. Which language is used to request information from a Database?

   a) Relational b) Structural c) Query d) Compiler

2. The ---------- diagram gives a logical structure of the database graphically?

   a) Entity-Relationship b) Entity

   c) Architectural Representation d) Database

3. An entity set that does not have enough attributes to form primary key is known as

   a) Strong entity set b) Weak entity set c) Identity set d) Owner set

4. ---------- Command is used to delete a database.

   a) Delete database database_name

   b) Delete database_name

   c) drop database database_name

   d) drop database_name

5. MySQL belongs to which category of DBMS?

   a) Object Oriented b) Hierarchical c) Relational d) Network

6. MySQL is freely available and is open source.

   a) True b) False

7. ---------- represents a “tuple” in a relational database?

   a) Table b) Row c) Column d) Object

8. Communication is established with MySQL using

   a) SQL b) Network calls c) Java d) API’s

9. Which is the MySQL instance responsible for data processing?

   a) MySQL Client b) MySQL Server c) SQL d) Server Daemon Program

12th_Computer_Application_English version CHAPTER 03.indd 82 19-01-2023 17:00:17

10. The structure representing the organizational view of entire database is known as -------- in MySQL database.

a) Schema b) View c) Instance d) Table

Part - II

Short Answers

1. Define Data Model and list the types of data model used.
2. List few disadvantages of file processing system.
3. Define Single and multi valued attributes.
4. List any two DDL and DML commands with its Syntax.
5. What are the ACID properties?
6. Which command is used to make permanent changes done by a transaction?
7. What is view in SQL?
8. Write the difference between SQL and MySQL.
9. What is Relationship and List its types.
10. State few advantages of Relational databases.

Part - III

Explain in Brief Answer

1. Explain on Evolution of DBMS.
2. What is relationship in databases? List its types.
3. Discuss on Cardinality in DBMS.
4. List any 5 privileges available in MySQL for the User.
5. Write few commands used by DBA to control the entire database.

Part - IV

Explain in detail

1. Discuss on various database models available in DBMS.
2. List the basic concepts of ER Model with suitable example.
3. Discuss in detail on various types of attributes in DBMS.
4. Write a note on open source software tools available in MySQL Administration.
5. Explain the DDL command of their functions in SQL.

12th_Computer_Application_English version CHAPTER 03.indd 83 19-01-2023 17:00:17



04
CHAPTER

PHP: Hypertext Preprocessor

LEARNING OBJECTIVES

After the completion of this chapter, the students learn about

- **Introduction to PHP**
- **Features of PHP**
- **Using PHP with HTML, JavaScript, and CSS for Web Development**
- **Data types in PHP**
- **'Echo' statement**
- **The types of operators in PHP**

4.1 Introduction to PHP

PHP stands for **PHP: Hypertext Preprocessor**. It was created by Rasmus Lerdorf in 1994. PHP is a server-side scripting language, which means that the code is executed on the server rather than in the user's browser. It is widely used for web development.

PHP is a powerful language that is used to create dynamic and interactive web pages. A dynamic web page is a page whose content can change each time it is viewed. It is particularly well-suited for creating database-driven websites, because it can be used to interact with databases in a very efficient way.

PHP is an interpreted language, which means you do not have to compile it and create an executable file. Instead, PHP files are interpreted line by line by the web server.

4.2 Features of PHP

PHP has many features that make it a popular choice for web development. Here are a few of its main features:

Server-side scripting language: PHP is a server-side scripting language, which means that the scripts are executed on the server and the output is sent to the client (i.e., the web browser). This allows you to create dynamic web pages that can interact with databases.

Open-source software: PHP is an open-source software, which means that the source code is available for anyone to view and modify.

Platform independent: PHP can be run on many different operating systems, including Windows, Linux, and macOS.

Database support: This makes it easy to create database-driven websites.

12th_Computer_Application_English version CHAPTER 04.indd 84 19-01-2023 17:01:20



A **static web page** is a page that has fixed content that does not change, unless it is manually updated by the web developer. The content on a static web page is the same every time it is viewed.

A **dynamic web page**, on the other hand, is a page whose content can change each time it is viewed.

4.3 Using PHP with HTML, JavaScript, and CSS for Web Development

PHP is often used in combination with HTML, JavaScript, and CSS to create dynamic and interactive web applications.

HTML (HyperText Markup Language) is used to structure and format the content of a web page.

JavaScript is a client-side scripting language that is used to add interactivity to web pages.

CSS (Cascading Style Sheets) is a style sheet language that is used to control the appearance of a web page. It can be used to define the layout, font, and color of a page.

4.4 The PHP Syntax

We should always keep in mind these two basic rules of PHP:

1. PHP code is enclosed in <?php and ?> tags. These tags are called opening and closing tags.

Example :

```
<?php
// PHP code
?>
```

2. A PHP statement must end with a semicolon (;).

Example :

```
<?php
echo "Hello, World!"; // This is a valid PHP statement
?>
```

4.5 Types of PHP tags

PHP supports three different sets of tags:

1. PHP Default tags
2. Short open tags
3. HTML script embed tags

PHP Default tags: In the PHP Default tags, PHP code is enclosed in <?php and ?> tags.

```
<?php
  // PHP code
?>
```

Short open tags: Short open tags are an alternative to the default syntax, and they allow you to use <? and ?> instead of <?php and ?>.

```
<?
  // PHP code
?>
```

HTML script embed tags: You can also embed PHP code within HTML script tags, like this:

```
<script language="php">
  // PHP code
</script>
```


12th_Computer_Application_English version CHAPTER 04.indd 85 19-01-2023 17:01:20

Types of PHP tags	Opening tag	Closing tag
1. PHP Default tags	<?php	?>
2. Short open tags	<?	?>
3. HTML script embed tags	<script language="php">	</script>

4.6 Variable in PHP

In PHP, a variable is a named location in memory where a value can be stored. Variables are denoted by a dollar sign ($) followed by the name of the variable.

Rules for naming variables

All variables in PHP follow certain syntactical rules:

- A variable's name must start with a dollar sign ($), for example, $name
- The variable's name can contain a combination of strings, numbers, and the underscore, for example, $my_report1.
- The first character after the dollar sign must be either a letter or an underscore (it cannot be a number).
- Variable names in PHP are case-sensitive. This is a very important rule. It means that $name and $Name are entirely different variables.

The following are all valid variable names:

$name

$age

$is_admin

$_hidden

The following are all Invalid variable names :

$1st_name (starts with a number)

$full-name (contains a hyphen)

$full name (contains a space)

4.7 Variable declaration

In PHP, variables are declared by assigning a value to them. There is no need to specify the type of a variable when declaring it, as the type is determined by the value it holds.

Here is an example of variable declaration in PHP:

```
$name = "Balu";
$age = 30;
$is_admin = true;
$prices = array(10, 20, 30);
```

In the example above, we are declaring four variables: $name, $age, $is_admin, and $prices. The first three variables are assigned simple values (a string, an integer, and a boolean), while the fourth variable is assigned an array.

4.8 Data types in PHP

Values assigned to variables in PHP will be of a set data type. The following are the eight data types:

1. Integer
2. Float
3. String
4. Boolean
5. Array
6. Object
7. Resource
8. NULL

12th_Computer_Application_English version CHAPTER 04.indd 86 19-01-2023 17:01:20

Integer: Integer is a data type which contains whole numbers. It can be positive, negative, or zero.

Examples :

```
$age = 30;
$count = -10;
```

Float: Float is a data type which contains decimal numbers.

Examples :

```
$price = 19.99;
$weight = 65.5;
```

String: String is a data type which contains a sequence of characters enclosed in single quotes (' ') or double quotes (" ").

Examples :

```
$name = "Barath";
$message = 'Hello, World!';
```

Boolean: Boolean is a data type which contains the value True or False.

Examples :

```
$is_admin = true;
$is_logged_in = false;
```

Array: An array is a data type which has multiple values in a single variable.

Examples :

```
$prices = array(10, 20, 30);
$items = array("item1", "item2", "item3");
$prices = array(19.99, 24.99, 29.99);
```

Object: An object is a data type that represents an instance of a class.

Examples :

```
$user = new User();
$product = new Product();
```

Resource: A resource is a special type of data that represents a connection to an external resource, such as a file or a database.

12th_Computer_Application_English version CHAPTER 04.indd 87 19-01-2023 17:01:20

Examples :

```
$fp = fopen("file.txt", "r");
// $fp is a resource
$conn = mysqli_connect("localhost", "username", "password",
"database"); // $conn is a resource
```

NULL: NULL is a special data type which contains NULL value. A null value simply means no value. The keyword NULL is not case sensitive.

Examples :

```
$x = null;
$y = " ";
```

4.9 Comments in PHP

Comments are used in PHP to add explanations and notes to your code. They are ignored by the PHP interpreter.

There are two types of comments in PHP: single-line comment and multi-line comments.

To add a single line comment to our code, we precede the comment with # or //.

Examples :

```
# This is a comment
// This is also a comment
```

To add multiple lines comment, we enclose the comment in /*...*/.

Examples :

```
/*This is an example of a
multi-line comment. */
```

4.10 'Echo' statement

In PHP, the echo statement is used to output a string or other data to the screen. It is a simple and efficient way to display information to the user. The echo statement can be used in several different ways:

- To output a single string: (String values must be enclosed in **single or double quotes**.)

  Examples :

```
echo 'Hello, world!';
```


12th_Computer_Application_English version CHAPTER 04.indd 88 19-01-2023 17:01:20

- To output multiple strings, separated by commas:

  Examples :

```
echo "Hello, world!";
```

- To output the value of a variable:

  Examples :

```
$name = "Kumar";
echo "My name is $name";
```

- To output the result of an expression.

  Examples :

```
$x = 10;
$y = 20; echo $x + $y;
// Outputs '30'
```

- To output multiple variables in the same echo statement, you can separate them with a comma.

  Examples :

```
echo $x, $y, $z;
```

- To concatenate (join) multiple strings together, you can use the concatenation operator (.).

  Examples :

```
$name = "Mani";
echo "My name is" . $name;
```

- To print multiple lines of text, you can use multiple echo statements.

  Examples :

```
echo 'This string has multiple';
echo 'lines.';
```

- To output a string of text that contains a single quote, you can use double quotes to enclose the string.

  Examples :

```
echo "It's a nice day today.";
```

Note : In PHP, the echo statement does not require parentheses around its arguments. However, you can use parentheses if you want to, and it will not cause an error. For example:

```
echo("Hello, World!");
```


12th_Computer_Application_English version CHAPTER 04.indd 89 19-01-2023 17:01:20

This is equivalent to the following:

```
echo "Hello, World!";
```

4.11 Our First PHP Script

Here is a simple PHP script that outputs the text "Hello, World!" to the user's web browser:

```
<?php
  echo "Hello, World!";
?>
```

To run this script, you will need to save it with a **.php** extension and place it in a location that is accessible to a web server. When you access the script through a web browser, it will execute the PHP code and display the output "Hello, World!" on the page.

Note: The <?php and ?> tags indicate the start and end of a PHP block, respectively.

4.12 Operators

An operator is a symbol that performs a given action on a value or group of values. The values the operation is performed upon are known as operands.

The types of operators in PHP are

- Arithmetic operators
- Assignment operators
- Comparison operators
- Logical operators
- Increment/decrement operators
- String operators

4.12.1 Arithmetic Operators

Arithmetic operators are used to perform math operations, for example, addition, subtraction, multiplication, and division.

Operator	Operator Name	Example	Output
+	Addition	5+2	7
-	Subtraction	5-2	3
*	Multiplication	5*2	10
/	Division	5/2	2.5
%	Modulus	5%2	1

Note :

- The asterisk(*) is used as a multiplication operator, rather than the regular multiplication symbol(x).
- The modulus operator returns the remainder of dividing.

12th_Computer_Application_English version CHAPTER 04.indd 90 19-01-2023 17:01:20

4.12.2 Assignment Operator

The assignment operator = is used to assign a value to a variable.

The assignment operator takes the value of its right-hand operand and assigns it to its left-hand operand.

Operator	Operator Name	Example	Output
=	Assignment Operator	$a = 5;	5

Combined Assignment Operators

Operator	Operator Name	Example	Equivalent to	Output
+=	Addition assignment	$a = 5; $b = 2; $a + = $b;	$a = $a + $b;	7
-=	Subtraction assignment	$a = 5; $b = 2; $a - = $b;	$a = $a – $b;	3
*=	Multiplication assignment	$a = 5; $b = 2; $a * = $b;	$a = $a * $b;	10
/=	Division assignment	$a = 5; $b = 2; $a / = $b;	$a = $a / $b;	2.5
%=	Modulo assignment	$a = 5; $b = 2; $a % = $b;	$a = $a % $b;	1

4.12.3 Comparison Operators

Comparison operators are used to compare two values and determine whether a certain condition is true or false.

12th_Computer_Application_English version CHAPTER 04.indd 91 19-01-2023 17:01:20

Operator	Operator Name	Meaning	Example	Output
>	Greater than	It returns True if left is greater than right	5>2	True
<	Less than	It returns True if left is less than right	5<2	False
>=	Greater than or equal to	It returns True if left is greater than or equal to right	5>=2	True
<=	Less than or equal to	It returns True if left is less than or equal to right	5<=2	False
==	Equal to	It returns True if left is equivalent to right	5==5	True
			5==5.0	True
===	Identical	It returns True if left is equivalent to right and they are the same type	5===5	True
			5===5.0	False
!=	Not equal to	It returns True if left is not equivalent to right	5!=5	False
			5!=6	True
!==	Not identical	It returns True if left is equivalent to right and they are not the same type	5!==5	False
			5!==5.0	True

4.12.4 Logical Operators

Logical operators are used to perform logical operations on variables and values.

Operator	Operator Name	Meaning	Example	Output
&&	Logical AND	It returns true if both operands are true, and false otherwise.	(5>3) && (5>7)	False
||	Logical OR	It returns true if at least one of the operands is true, and false otherwise.	(5>3) || (5>7)	True
xor	XOR	It returns true if exactly one of the operands is true, and false otherwise.	(5>3) xor (5>7)	True
!	Logical NOT	It returns the opposite of the operand (i.e., true if the operand is false, and false if the operand is true).	! (5>3)	False

12th_Computer_Application_English version CHAPTER 04.indd 92 19-01-2023 17:01:20

4.12.5 Increment / Decrement Operators

In PHP, the increment operator ++ is used to increase the value of a variable by 1, and the decrement operator -- is used to decrease the value of a variable by 1.

The increment and decrement operators can be used as either prefix or postfix operators.

Operator	Operator Name	Example	Meaning
++ (increment operator)	++ $a (Pre-increment)	$x = ++$a	First, $a is incremented by 1 and then the value is returned.
	$a ++ (Post-increment)	$x = $a ++	First, the value of $a is returned and then it is incremented by 1.
- - (decrement operator)	- - $a (Pre-decrement)	$x = - - $a	First, $a is decremented by 1 and then the value is returned.
	$a - - (Post-decrement)	$x = $a - -	First, the value of $a is returned and then it is decremented by 1.

4.12.6. String Operator

String operators have concatenation operator(.) and concatenation assignment operator(.=). Concatenation means adding one or more variables to an existing variable.

Operator	Operator Name	Meaning	Example	Output
. (Dot)	Concatenation	It concatenates (joins) two strings together	$a = 'Hello'; $b = 'World'; $c = $a . $b;	HelloWorld
. = (Dot equal to)	Concatenation assignment	It appends one string to another and assigns the result to a variable in a single statement.	$a = 'Hello'; $b = 'World'; $a .= $b;	HelloWorld

12th_Computer_Application_English version CHAPTER 04.indd 93 19-01-2023 17:01:20

4.13 Embedding PHP code in HTML

To embed PHP code in an HTML file, you can use the following structure:

```
<html>
    <head>
        <title>My PHP Page</title>
    </head>
    <body>
        <?php
        // PHP code
        ?>
    </body>
</html>
```

You can place the PHP code anywhere within the <body> element of the HTML file.

It is important to note that the PHP code must be enclosed within <?php and ?> tags. Everything between these tags is treated as PHP code and will be executed by the PHP interpreter.

Example : Embedding PHP code in HTML

```
<html>
    <head>
        <title>My PHP Page</title>
    </head>
    <body>
        <?php
        echo "Hello, World!";
        ?>
    </body>
</html>
```

This will output the message "Hello, World!" on the webpage when the PHP script is executed.

4.14 How a PHP Script Works

When a PHP script is embedded in an HTML file, the PHP code is executed on the server before the HTML file is sent to the client's web browser. This means that the client will only see the output of the PHP script, and not the actual PHP code itself.

Steps:

1. The client sends a request for a webpage to the server.
2. The server receives the request and processes it. If the webpage contains PHP code, the server passes the PHP code to the PHP interpreter.
3. The PHP interpreter executes the PHP code and generates output.
4. The output from the PHP script is combined with the rest of the HTML file to create the final webpage.
5. The server sends the completed webpage to the client's web browser.
6. The client's web browser receives the webpage and renders it for the user to view.

This is a simplified explanation of how a PHP script embedded in an HTML file works.

It is important to note that PHP scripts are executed on the server, not on the client's computer. This means that the client's web browser does not need to have any special software installed in order to run a PHP script. All that is required is a standard web browser.

12th_Computer_Application_English version CHAPTER 04.indd 94 19-01-2023 17:01:20

POINTS TO REMEMBER

- PHP stands for **PHP: Hypertext Preprocessor.**
- PHP is a server-side scripting language.
- PHP code is enclosed in <?php and ?> tags.
- A variable's name must start with a dollar sign ($), for example, $name.
- There are eight data types in PHP.
- There are two types of comments in PHP: single-line comment and multi-line comments.
- Single line comments begin with two forward slashes (/ /) or a single hash sign (#).
- Multiline comments begin with a forward slash followed by an asterisk (/*) and end with an asterisk followed by a forward slash (*/).
- The echo statement is used to output a string of text or a variable.
- The assignment operator = is used to assign a value to a variable.
- The concatenation operator is a single dot.

A-Z GLOSSARY

HTML	HTML stands for Hyper Text Markup Language. This language is designed for creating websites.
PHP	PHP is server-side scripting language.
ECHO	Echo statement is used to display output in PHP.
WAMP	WAMP is abbreviation for "Windows, Apache, MySQL, and PHP".

12th_Computer_Application_English version CHAPTER 04.indd 95 19-01-2023 17:01:20

EVALUATION

Part - I

Choose the most appropriate answer from the given four alternatives.

1. The expansion of PHP is _____

   a) PHP: Hypertext Preprocessor

   b) Personal Hypertext Preprocessor

   c) Pretext Home page

   d) Preprocessor Home Page

2. What is the extension of PHP file?

   a) .html b) .xml c) .php d) .ph

3. The PHP script should start with _____

   a) <?php b) <php c) <php? d) <:?

4. How many data types does PHP support?

   a) 18 b) 28 c) 8 d) 38

5. Every variable name in PHP must begin with a _____ symbol.

   a) # b) // c) $ d) <

6. _____ in PHP are case – sensitive.

   a) variable names b) keywords

   c) Variable names and keywords d) None of the above

7. The assignment operator is _____

   a) = b) == c) === d) !=

8. _____ operators perform an action to compare two values.

   a) arithmetic b) comparison c) increment d) logical

9. Which operator is called “identical”?

   a) = b) == c) === d) <>

10. _____ is a data type which contains decimal numbers.

    a) Integer b) Float c) Boolean d) NULL

12th_Computer_Application_English version CHAPTER 04.indd 96 19-01-2023 17:01:20

Part – II

Answer the following questions. **(2 marks)**

1. What is PHP?
2. What is a dynamic web page?
3. What are the different types of comments in PHP. Give an example.
4. List out any four operators in PHP.
5. What is 'Echo' statement used for? Give an example.

Part – III

Answer the following questions. **(3 marks)**

1. What are the features of PHP?
2. Explain the types of PHP Tags.
3. Write about the rules for naming a variable in PHP?
4. List out the different types of data types in PHP.
5. Write about the syntax of PHP.

Part – IV

Answer the following questions. **(5 marks)**

1. What are the datatypes in PHP? Explain.
2. Explain operators in PHP with examples.

STUDENT ACTIVITY

Find out the following web technology details from famous website using free web tools : http://similarweb.com or http://pub-db.com

1. Programing details
2. Webserver details
3. Hosting Country details

12th_Computer_Application_English version CHAPTER 04.indd 97 19-01-2023 17:01:20



05
CHAPTER

Functions and Arrays in PHP

LEARNING OBJECTIVES

After the completion of this chapter, the students learn about

- Functions in PHP
- Arrays in PHP

5.1 Functions in PHP

Functions are an important feature of PHP, and are used to reuse code. A function is a block of code that performs a specific task.

There are several advantages of using functions in PHP:

- **Code reuse**

  Functions allow us to reuse code, which can save us time and effort when writing and maintaining our code.

- **Testing and debugging**

  Functions allow us to test and debug our code more easily, as we can test individual functions separately from the rest of the code.

- **Modularity**

  Functions allow us to break down our code into smaller, modular pieces, which can make it easier to maintain and modify.

5.2 Types of functions in PHP

In PHP, there are several types of functions that we can use.

1. Built-in functions

These are functions that are pre-defined in the PHP language and can be used to perform a variety of tasks, such as calculating the length of a string or sorting an array.

2. User-defined functions

These are functions that we can create ourself to perform specific tasks in our PHP code.

DO YOU KNOW?

A function name must start with a letter or an underscore. Function names are **NOT case-sensitive**.

12th_Computer_Application_English version CHAPTER 05.indd 98 19-01-2023 17:02:02

5.2.1 User-defined functions

We can define a user defined function by using the '**function**' keyword, followed by the name of the function and a set of parentheses.

Here is the general syntax for creating a function in PHP:

Function definition (or declaration)

Syntax

```
function   functionName([parameter list])
{
  // code to be executed
}
```

Let's break this down

- The '**function**' keyword is used to define a function.
- **functionName** is the name of the function. It can be any valid PHP identifier, as long as it is not a reserved word.
- **parameter list** is a comma-separated list of variables. These parameters are optional and we can have as many or as few as we like.
- Inside the curly braces, we can put any code we want the function to execute. This can include PHP statements, loops, conditions, and so on.

5.2.2 Calling a function

Calling a function is another name for executing the function. A function is called simply by using the function name, along with an argument list, as a statement.

Syntax

```
functionName( );                    (or)
functionName(argument list);
```

We can also pass arguments to a function by including them within the parentheses, separated by commas.

functionName($arg1, $arg2, $arg3);

12th_Computer_Application_English version CHAPTER 05.indd 99 19-01-2023 17:02:02

Examples

Here are some examples of user-defined functions in PHP that accept different numbers of parameters:

(a) Function with no parameters:

```
<?php
  function printGreeting()
  {
    echo "Hello, world!";
  }
  printGreeting();      // Output will be  "Hello, world!".
?>
```

(b) Function with 1 parameter:

```
<?php
  function greet($name)
  {
    echo "Hello, $name!";
  }
  greet("Barath");      // Output will be "Hello, Barath!".
?>
```



Where should we use the term parameter and argument?

Parameters: function definition

Arguments: function call

(c) Function with 2 parameters:

```
<?php
  function addNumbers($x, $y)
  {
    echo $x + $y;
   }
  addNumbers(10,40);      // Output will be "50".
?>
```


12th_Computer_Application_English version CHAPTER 05.indd 100 19-01-2023 17:02:02

5.3 Array

An array is a special data type. It can hold many values under a single variable name.

An array element can be any type of data.

There are three main types of arrays in PHP:

1. Indexed array
2. Associative array
3. Multi-dimensional array



All the data held in an array must be of the same data type in traditional programming languages. But for PHP, this restriction does not hold.

5.3.1 Indexed array

An indexed array is an array that uses a numeric index to access its elements. The index is a number that starts at 0 for the first element and increases by 1 for each subsequent element.

We can create an indexed array in PHP,

- by enclosing a comma-separated list of values in **square brackets** (or)
- by using the **array()** function.

Syntax

```
$arrayVariable = [ element1, element2, element3, … elementN];
                                (or)
$arrayVariable = array( element1, element2, element3, … elementN);
```

Examples

(a) $fruits = [‘apple’, ‘banana’, ‘orange’];

(b) $fruits = array(‘apple’, ‘banana’, ‘orange’);

In the example above, the elements in the array are “apple”, “banana”, and “orange”. The first element has an index of 0, the second element has an index of 1, and so on.

(c) $numbers = array(1, 2, 3, 4, 5);

(d) $colours = array(“red”, “green”, “blue”);

(e) $num = array(10, 10.5, 20, 20.5);

12th_Computer_Application_English version CHAPTER 05.indd 101 19-01-2023 17:02:02

Accessing the elements of an indexed array

To access the elements of an indexed array in PHP, you can use the array index in square brackets. The index starts at 0 and increments by 1 for each element in the array.

Here is an example of how to access the elements of an indexed array:

```
$fruits = array("apple", "banana", "orange", "mango");

echo $fruits[0];   // Output will be "apple".

echo $fruits[1];   // Outputs will be "banana".

echo $fruits[2];   // Outputs will be "orange".

echo $fruits[3];   // Outputs will be "mango".
```

5.3.2 Associative array

An associative array is a data structure that stores a collection of **key-value pairs**. The keys are used to identify the values, and the values can be of any data type. The keys in an associative array are often called "labels" because they label or identify the corresponding values.

We can create an associative array in PHP,

- by enclosing a comma-separated list of key-value pairs in **square brackets** (or)
- by using the **array()** function.

Syntax

```
$arrayVariable = [
   "key1" => "value1",
   "key2" => "value2",
   "key3" => "value3"
          ⋮
   "keyN⇒ "valueN"
];
```

(or)

```
$arrayVariable = array(
   "key1" => "value1",
   "key2" => "value2",
   "key3" => "value3"
          ⋮
   "keyN⇒ "valueN"
);
```


12th_Computer_Application_English version CHAPTER 05.indd 102 19-01-2023 17:02:02

Example 1

```
$student = [
    "Name" => "Ram",
    "Age" => 25,
    "Place" => "Trichy"
];
```

(OR)

```
$student = array(
    "Name" => "Ram",
    "Age" => 25,
    "Place" => "Trichy"
);
```

Example 2

```
$marks = [
    "studentName" => "Ravi",
    "ExamNo" => 12425,
    "Tamil" => 95,
    "English" => 80,
    "Computer Applications" => 97
];
```

(OR)

```
$marks = array(
    "studentName" => "Ravi",
    "ExamNo" => 12425,
    "Tamil" => 95,
    "English" => 80,
    "Computer Applications" => 97
);
```


12th_Computer_Application_English version CHAPTER 05.indd 103 19-01-2023 17:02:02

5.3.2.1 Accessing the elements of an associative array

We can access the values in an associative array using the keys:

```
echo $arrayVariable[“key1”];     //Output will be “value1”.
echo $arrayVariable [“key2”];    //Output will be “value2”.
echo $arrayVariable [“key3”];    //Output will be “value3”.
```

Here are some examples of associative arrays in PHP:

Example1

```
<?php
   $ages = array(
       “Arun” => 25,
       “Balu” => 30,
       “Naveen” => 28
);
echo $ages[“Arun”];          // Output will be 25.
echo $ages[“Balu”];          // Output will be 30.
echo $ages[“Naveen”];        // Output will be 28.
?>
```

Example 2:

```
<?php
   $student = array(
     “name” => “Barath”,
     “age” => 23,
     “place”=> “Sirugambur”,
     “city” => “Trichy”,
);
echo $student[“name”];       // Output will be “Barath”.
echo $student[“age”];        // Output will be 23.
?>
```


12th_Computer_Application_English version CHAPTER 05.indd 104 19-01-2023 17:02:02

5.3.3 Multidimensional array

In PHP, a multidimensional array is an array that contains one or more arrays as its elements. The elements of a multidimensional array can themselves be arrays, creating an array of arrays, also known as a nested array.

Example 1 : A multidimensional array that contains one array as its element.

```
$arr = array(
array(1, 2, 3),
);
echo $arr[0][1];  // Output will be 2.
```

This array contains one element, which is an array containing three integers. You can access the elements of this array using two sets of square brackets, with the first set specifying the row and the second set specifying the column.

Example 2 : A multidimensional array that contains three arrays as its elements.

```
$arr = array(
array(1, 2, 3),
array(4, 5, 6),
array(7, 8, 9)
);

echo $arr[1][2];  // Output will be 6.
```

We can access the elements of the array using two sets of square brackets, with the first set specifying the row and the second set specifying the column.

POINTS TO REMEMBER

- A function is a collection of code that performs a specific task.
- The user-defined function will be written by the programmer.
- Array names must begin with a $ symbol, followed by either an uppercase orlowercase letter (a-z or A-Z) or the _ symbol.
- An associative array is a data structure with which keys and values can be stored.

12th_Computer_Application_English version CHAPTER 05.indd 105 19-01-2023 17:02:02

GLOSSARY

Function	A function is a block of code that performs a specific task.
Array	An array is a special data type. It can hold many values under a single variable name. An array element can be any type of data.

EVALUATION

IC9F4

Part - I

Choose the most appropriate answer from the given four alternatives.

1. A_____is a block of code that performs a specific task.
   a) parameter b) function c) class d) label

2. Pre-defined functions are also called _____.
   a) user-defined functions b) recursive functions
   c) built-in functions d) lambda functions

3. Which one of the following is the right way of defining a function in PHP?
   a) function functionname() { // code to be executed }
   b) function() {}
   c) def myFunction():
   d) None of the above

4. A user-defined function in PHP starts with the keyword _____.
   a) function b) def c) defined d) funct

5. Which of the following is a correct way to call a function in PHP?
   a) functionName(); b) call functionName;
   c) execute functionName; d) run functionName();

6. What is an array in PHP?
   a) An array is a special data type.
   b) It can hold many values under a single variable name.
   c) An array element can be any type of data.
   d) All of the above

7. How many types of arrays are there in PHP?
   a) 2 b) 3 c) 4 d) 5

12th_Computer_Application_English version CHAPTER 05.indd 106 19-01-2023 17:02:02

8. What is the index of the first element in an indexed array in PHP?
   a) 0 b) 1 c) 2 d) 3

9. What is the index of the third element in an indexed array in PHP with 5 elements?
   a) 2 b) 3 c) 4 d) 5

10. How do you create an indexed array in PHP?
   a) By enclosing a comma-separated list of values in square brackets
   b) By using the array() function
   c) By enclosing a comma-separated list of values in curly braces
   d) Both A and B

11. How do you access the elements of an indexed array in PHP?
   a) By using the array index in square brackets
   b) By using the array key in square brackets
   c) By using the array index in curly braces
   d) By using the array key in curly braces

Part - II

Answer the following questions. **(2 marks)**

1. What is a function?
2. What are the different types of functions in PHP?
3. Write short notes on built-in functions in PHP?
4. What is an array in PHP and what are its main types?
5. How do you create an indexed array in PHP?

Part - III

Answer the following questions. **(3 marks)**

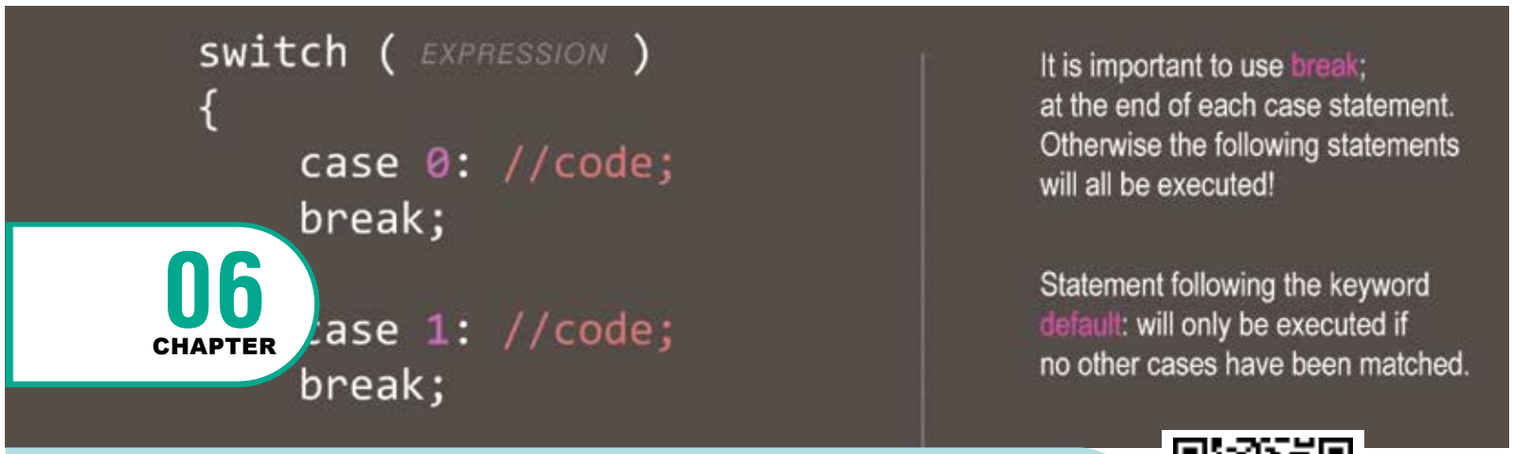
1. What are the advantages of using functions in PHP?
2. What is the syntax for defining a function in PHP?
3. How do you call a function in PHP?
4. Write short notes on an Associative array.

Part - IV

Answer the following questions. **(5 marks)**

1. Explain the user-defined function with suitable examples.
2. Explain indexed array and associative array in PHP.

12th_Computer_Application_English version CHAPTER 05.indd 107 19-01-2023 17:02:02



06
CHAPTER

Conditional Statements in PHP

1T09G

LEARNING OBJECTIVES

- To understand the importance of Conditional Statements
- To know different types of Conditional Statements in PHP

6.1 Control statements or Control Structures

Statements in a script need not necessarily be executed in a sequential order. Some segments in a script are executed based on a condition. In such situations the flow of control jumps from one part of the script to another. The statements that cause such jumps are called as **control statements** or **control structures**.

The two major categories of control structures are **Conditional statements** and **Looping statements.**

DO YOU KNOW?

The statements that cause a jump of control from one part of a script to another are called **Control statements or Control Structures**.

6.2 PHP conditional statements

Conditional statements in PHP execute code based on a specific condition.

There are several types of conditional statements in PHP. They are

1. 'if' statement
2. 'if …else' statement
3. 'if … elseif … else' statement
4. 'switch' statement

6.2.1 'if'statement

The if statement is the simplest of all the conditional statements.

A block of code is executed if a certain condition is true.

12th_Computer_Application_English version CHAPTER 06.indd 108 19-01-2023 17:02:34

Syntax :

```
if (condition)
{
  // code to be executed if condition is true;
}
```

Example :

```
<?php
        $x = 10;
        if ($x > 5)
        {
          echo "x is greater than 5";
        }
?>
```

In this example, the condition is $x > 5, which is true because the value of $x is 10, which is greater than 5. Therefore, the code inside the curly braces (echo "x is greater than 5";) will be executed, and the string "x is greater than 5" will be output.

It's important to note that the code inside the curly braces will only be executed if the condition is true. If the condition is false, the code will be skipped.

6.2.2 if ... else statement

The if ... else statement is a conditional statement in PHP. It executes one block of code if a condition is true and another block of code if the condition is false.

Syntax

```
if (condition)
{
  // True-block;
}
else
{
   // False-block;
}
```

If the condition is True then the True-block is executed and if the condition is False then the False- block is executed.

12th_Computer_Application_English version CHAPTER 06.indd 109 19-01-2023 17:02:34

Example :

```
<?php
    $x = 10;
    if ($x > 5)
    {
     echo "x is greater than 5";
    }
    else
    {
     echo "x is not greater than 5";
    }
?>
```

Output

x is greater than 5

6.2.3 'if... elseif ...else' Statement

The **if ... elseif ... else** statement is a conditional statement in PHP. This statement allows you to check multiple conditions and run different code based on which condition is true.

This type of statement begins with the keyword '**if**'. It can be followed by one or more '**elseif**'. Finally ends with an '**else**' part.

Syntax

```
if (condition1)
{
  // code to be executed if condition1 is true;
}
elseif (condition2)
{
// code to be executed if condition1 is false and condition2 is true;
}
elseif (condition3)
{
  // code to be executed if condition1 and condition2 are false and condition3 is true;
}
else
{
  // code to be executed if all conditions are false;
}
```


12th_Computer_Application_English version CHAPTER 06.indd 110 19-01-2023 17:02:34

Example :

```
<?php
    $x = 12;
    if ($x > 20)
    {
     echo “x is greater than 20”;
    }
    elseif ($x > 15)
    {
     echo “x is greater than 15 but not greater than 20”;
    }
    elseif ($x > 10)
    {
     echo “x is greater than 10 but not greater than 15”;
    }
    else
    {
     echo “x is not greater than 10”;
    }
?>
```

Output

x is greater than 10 but not greater than 15

It’s important to note that only one of the blocks of code will be executed, depending on which condition is true. If none of the conditions are true, the code inside the ‘**else block**’ will be executed.

6.2.4 ‘switch’ statement

This is a multiple branching statement where, based on a condition, the control is transferred to one of the many possible points.

The **switch** statement is used to specify multiple conditions. It runs a different code block for different conditions.

12th_Computer_Application_English version CHAPTER 06.indd 111 19-01-2023 17:02:34

Syntax

```
switch (expression)
{
  case value1:
    //code to be executed if expression = value1;
   break;
  case value2:
   //code to be executed if expression = value2;
   break;
  ...
  default:
   //code to be executed if expression is not equal to any of the values;
}
```

Example :

```
<?php
    $x = 10;
    switch ($x)
    {
      case 5:
        echo “x is equal to 5”;
        break;
      case 10:
        echo “x is equal to 10”;
        break;
      case 15:
        echo “x is equal to 15”;
        break;
      default:
        echo “x is not equal to 5, 10, or 15”;
    }
?>
```

Output

x is equal to 10

12th_Computer_Application_English version CHAPTER 06.indd 112 19-01-2023 17:02:34

In this example, the expression is $x, which has a value of 10. The switch statement checks each case to see if the value of $x is equal to the value specified in the case. In this case, the case that matches the value of $x is case 10:, so the code inside that block (echo "x is equal to 10";) will be executed, and the string "x is equal to 10" will be output.

It's important to note that the **break** statement is used to terminate each **case**. If a **break** statement is not used, the code will continue to execute for all subsequent **case** statements until a **break** is encountered. The **default** case is optional, and will be executed if none of the other **case** statements match the value of the expression.

POINTS TO REMEMBER

- The curly braces { } separate the blocks of statements within a control structure.
- **Condition / expression** must be enclosed in parentheses.
- The **elseif** can also be written as two separate words: **else if**.
- The role of the **break** statement in a switch statement is to terminate the case and exit the switch statement.

A-Z GLOSSARY

Control statements / Control Structures	The statements that cause a jump of control from one part of a script to another are called Control statements or Control Structures.
Conditional statements	Conditional statements in PHP execute code based on a specific condition.

12th_Computer_Application_English version CHAPTER 06.indd 113 19-01-2023 17:02:34

EVALUATION

29R65

Part - I

Choose the correct answer

1. Which of the following is NOT a type of conditional statement in PHP?

   a) if b) if ... else c) if ... elseif ... else d) while

2. What type of statement is the **if...else** statement?

   a) Conditional statement

   b) Looping

   c) Input statement

   d) Output statement

3. What is the simplest conditional statement in PHP?

   a) **if-else** statement

   b) **if** statement

   c) **switch** statement

   d) **if-elseif-else** statement

4. How does the **if** statement work in PHP?

   a) A block of code is executed if a certain condition is true.

   b) A block of code is executed if a certain condition is false.

   c) A block of code is executed if multiple conditions are true.

   d) A block of code is executed if multiple conditions are false.

5. What happens if the condition in an "**if**" statement is false?

   a) The code inside the curly braces is executed.

   b) The code inside the curly braces is skipped.

   c) The program terminates.

   d) None of the above

12th_Computer_Application_English version CHAPTER 06.indd 114 19-01-2023 17:02:35

6. What is the syntax for an **if-else** statement in PHP?

   a) if(condition) { //True-block; }

   b) if(condition) { //True-block; } else { //False-block; }

   c) if-else(condition) { //True-block; } else { //False-block; }

   d) if-elseif(condition) { //True-block; } else { //False-block; }

7. Which of the following is used to specify multiple conditions in an **if ... elseif ... else** statement?

   a) AND b) OR c) case d) elseif

8. Which of the following is used to specify multiple conditions in a **switch** statement?

   a) AND b) OR c) case d) if

9. What happens if none of the **case** values match the expression in a **switch** statement?

   a) The default case block is executed

   b) The program terminates

   c) The nearest case block is executed

   d) The first case block is executed

10. Which of the following is used to terminate the **switch** statement?

    a) return b) continue c) goto d) break

Part II

Short Answers

1. What are the different types of conditional statements in PHP?
2. Write the syntax for an **if** statement in PHP.
3. What is the purpose of the **if ... else** statement?
4. Write the syntax for an **if … else** statement in PHP.
5. What is the role of the break statement in a **switch** statement?

12th_Computer_Application_English version CHAPTER 06.indd 115 19-01-2023 17:02:35

Part III

Explain in Brief Answer

1. Write the syntax for an **if ... elseif ... else** statement in PHP.
2. Write the syntax for a **switch** statement in PHP?
3. In an **if ... elseif ... else** statement, where is the code executed if all conditions are false?

Part IV

Explain in detail

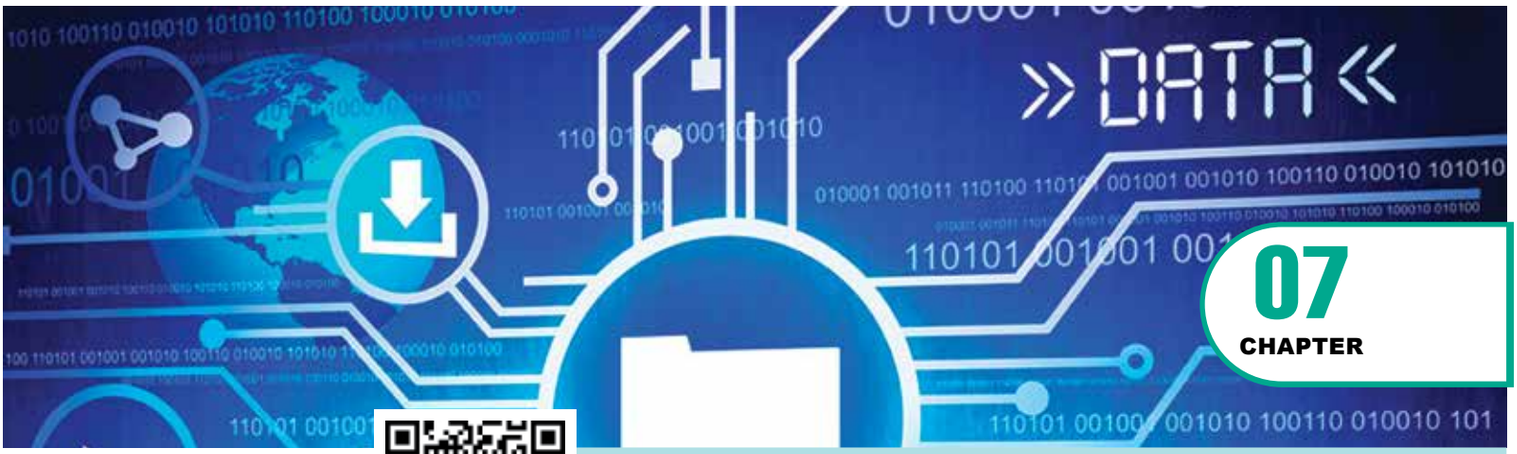
1. Explain **if … elseif … else** statement with an example.
2. Discuss in detail about switch statement with an example.



STUDENT ACTIVITY

- Create simple decision making scenario using if else statement in student management application
- Explain real world usages in using Conditional Statements

12th_Computer_Application_English version CHAPTER 06.indd 116 19-01-2023 17:02:35



07
CHAPTER

ISXP1

LOOPS IN PHP

LEARNING OBJECTIVES

- To understand the importance of Looping Structure
- To know different types of Looping Structure in PHP

7.1 Loop in PHP

In PHP, a loop executes a set of instructions(a block of code) repeatedly for a certain number of times or until a certain condition is met.

There are several types of loops in PHP. They are.

- for loop
- do … while loop
- while 1oop
- foreach loop

7.2 for loop

'**for loop**' is called as the **entry-check loop.**

The **for loop** is used to execute a block of code a specific number of times.

Syntax

```
for (initialization; condition; increment/decrement)
{
   //code to be executed;
}
```


12th_Computer_Application_English version CHAPTER 07.indd 117 19-01-2023 17:03:45

The **initialization** part is executed only once at the beginning of the loop. It is used to initialize variables. The **condition** is evaluated before each iteration of the loop. If it is true, the code block is executed. If it is **false**, the loop is terminated. The **increment/ decrement** part is executed after each iteration of the loop. It is used to update variables.

Example 1

To print the numbers from 1 to 5 in **ascending order**

```
for ($i = 1; $i<= 5; $i++)
{
  echo $i . "<br>";
}
```

Output

```
1
2
3
4
5
```

Example 2

To print the numbers from 5 to 1 in **descending order**

```
for ($i = 5; $i>= 1; $i – –)
{
  echo $i . "<br>";
}
```

Output

```
5
4
3
2
1
```

7.3 while loop

'**while loop**' is called as the **entry-check** loop.

The **while loop** is used to execute a block of code while a certain condition is true.

Syntax

```
while (condition)
{
   //code to be executed;
}
```

The condition is evaluated at the beginning of each iteration of the loop. If it is true, the code block is executed. If it is false, the loop is terminated.

12th_Computer_Application_English version CHAPTER 07.indd 118 19-01-2023 17:03:45

Example

To print the numbers from 1 to 5

```
$i = 1;
while ($i<= 5)
{
  echo $i . "<br>";
  $i++;
}
```

Output

```
1
2
3
4
5
```

7.4 do...while loop

'**do … while loop**' is called as the **exit-check** loop.

The **do...while loop** is similar to the **while loop**, except that the code block is always executed at least once, even if the condition is **false**.

Syntax

```
do
{
  //code to be executed;
} while (condition);
```

The condition is evaluated at the end of each iteration of the loop. If it is true, the code block is executed again. If it is false, the loop is terminated.

Example

To print the numbers from 1 to 5

```
$i = 1;
do {
  echo $i . "<br>";
  $i++;
} while ($i<= 5);
```

Output

```
1
2
3
4
5
```


12th_Computer_Application_English version CHAPTER 07.indd 119 19-01-2023 17:03:45

7.4.1 The differences between the 'while loop' and the 'do...while loop'

In PHP, the **while loop** and the **do...while loop** are both used to execute a block of code multiple times while a certain condition is true. However, there are some differences between these two looping structures:

- **Execution order**

  The **while loop** first evaluates the condition before executing the code block. If the condition is true, the code block is executed. If the condition is false, the loop is terminated.

  On the other hand, the **do...while loop** first executes the code block and then evaluates the condition. If the condition is true, the code block is executed again. If the condition is false, the loop is terminated.

- **Minimum number of iterations**

  The **while loop** may not execute the code block at all if the condition is false from the beginning.

  The **do...while loop**, on the other hand, guarantees that the code block will be executed at least once, even if the condition is false.

7.5 foreach loop

The **foreach loop** is used to iterate over elements of an **array**.

Syntax

```
foreach ($array as $value)
{
   //code to be executed;
}
```


12th_Computer_Application_English version CHAPTER 07.indd 120 19-01-2023 17:03:45

Example

To print the the elements of an array:

```
$array = array(1, 2, 3, 4, 5);
foreach ($array as $value)
{
  echo $value . "<br>";
}
```

Output

```
1
2
3
4
5
```

You can also use the **foreach loop** to iterate over the **keys and values** of an associative array by using the following syntax:

```
foreach ($array as $key => $value)
 {
   //code to be executed;
}
```

The **foreach loop** will iterate over each element of the array and assign the key of the element to the $key variable and the value of the element to the $value variable.

Example

```
$array = array("a" => 1, "b" => 2, "c" => 3);
foreach ($array as $key => $value) {
  echo $key . " => " . $value . "<br>";
}
```

Output

```
a=>1
a=>2
a=>3
```

The **foreach loop** is particularly useful when you want to perform a set of actions on each element of an array, such as printing the elements, summing them up, or modifying them in some way. It is a simple and efficient way to iterate over arrays in PHP.

12th_Computer_Application_English version CHAPTER 07.indd 121 19-01-2023 17:03:45

POINTSTOREMEMBER

- A **loop** is a control structure. It executes a set of instructions(a block of code) repeatedly for a certain number of times or until a certain condition is met.
- '**for loop**' is called as the **entry-check loop**.
- '**while loop**' is called as the **entry-check loop**.
- '**do … while loop**' is called as the **exit-check loop**.
- The **foreach loop** is used to iterate over elements of an **array**.

GLOSSARY

Loop	A **loop** is a control structure that repeatedly executes a block of code until a certain condition is met or a specific number of times.
Block of code / Code Block	A **block of code**, also known as a **code block**, is a group of statements to be executed together as a single unit.

EVALUATION

UH2XK

Choose the correct answer

1. Which of the following is NOT a type of loop statement in PHP?

   a) for b) if ... else c) while d) do … while

2. What type of loop is "for loop" in PHP?

   a) Entry-Check Loop b) Exit-Check Loop

   c) Counter Loop d) Iteration Loop

3. What is the syntax for for loop in PHP?

   a) for(initialization; condition; increment) { // code}

   b) foreach(initialization; condition; decrement) { // code}

   c) while(condition)

   d) do{...}while(condition)

12th_Computer_Application_English version CHAPTER 07.indd 122 19-01-2023 17:03:45

4. What are the three parts of the for loop syntax in PHP?

a) initialization, condition, increment

b) initialization, code block, condition

c) code block, condition, increment

d) condition, initialization, code block

5. When is the 'initialization' part of a for loop executed?

a) Before each iteration b) After each iteration

c) Only once at the beginning of the loop d) Only once at the end of the loop

6. What is the purpose of the 'increment' part of a for loop?

a) To initialize variables b) To update variables

c) To check the condition d) To execute the code block

7. What type of loop is "while loop" in PHP?

a) Entry-Check Loop b) Exit-Check Loop

c) Counter Loop d) Iteration Loop

8. What type of loop is "do...while loop" in PHP?

a) Entry-Check Loop b) Exit-Check Loop

c) Counter Loop d) Iteration Loop

9. Which looping structure should be used to iterate over elements of an array in PHP?

a) for loop b) while loop c) do...while loop d) foreach loop

10. What is the output of the following code?

```
$array = array(1, 2, 3, 4, 5);
foreach ($array as $value)
{
echo $value;
}
```

a) 1 2 3 4 5 b) 5 4 3 2 1 c) 1 1 1 1 1 d) None of the above

12th_Computer_Application_English version CHAPTER 07.indd 123 19-01-2023 17:03:46

Part II **(2 Marks)**

Short Answers

1. What is the purpose of a loop in PHP?
2. Write the syntax for an 'for' loop in PHP.
3. Write the syntax for 'while' loop in PHP.
4. How is the 'condition' in a while loop evaluated?
5. What is the output of the following code snippet?

```
$i = 1;
while ($i <= 5)
{
echo $i . "<br>";
$i++;
}
```

Part III **(3 Marks)**

Explain in Brief Answer

1. Describe the three parts of a for loop in PHP (initialization, condition and increment) and explain their purpose.
2. Write a PHP code to print 1 to 10 numbers in **ascending** order using **for loop**.
3. Explain the difference between **while loop** and **do … while loop** in PHP.

Part IV **(5 Marks)**

Explain in detail

1. Explain '**for**' loop with example.
2. Write a PHP code to print 10 to 20 numbers in ascending order using **while loop** and **do… while loop**.
3. Explain '**foreach**' loop with examples.

STUDENT ACTIVITY

- Create simple array element and display the values using foreach
- Explain real world usages in using Looping Structure

12th_Computer_Application_English version CHAPTER 07.indd 124 19-01-2023 17:03:46



08
CHAPTER

Forms and Files

LEARNING OBJECTIVES

- To understand the importance of HTML Form in Web Application
- To know the File handling technique in PHP
- To know the Basics of Web based file management system

8.1 HTML Forms

Main objective of PHP and HTML form controls are to collect data from users. In the web development, user access website or web pages from remote client machine and feed the data to server. These data are collected via HTML form controls like textbox, dropdown box and radio button etc., and sent to server using server side programming like PHP.

Basic HTML Form Controls

The following control are available in HTML forms:

- Text inputs
- Buttons
- Checkbox
- Radio box
- File Select
- Form Tag

Text inputs contain textbox and text area controls. Buttons may contain Submit button, Reset button and Cancel Button. Checkbox is a important feature which

Pizza Shop 2.0

Name	
Pizza Topping	○ Supreme ○ Vegetarian ○ Hawaiian
Pizza Sauce	Tomato ▾
Optional Extras	☐ Extra Cheese ☐ Gluten Free Base
Delivery Instructions:	
Send my order	

Figure 8.1 Example of HTML form Page

12th_Computer_Application_English version CHAPTER 08.indd 125 19-01-2023 17:04:49

selects more than one value from the HTML form. Radio box is similar to checkbox but one value can be chosen at a time. File select is the best feature to select one file from the local machine to server machine at a time. Form tag is used to mention a method (POST or GET) and control the entire form controls in the HTML document. Refer Figure 8.1 and 8.2

8.1.1 PHP Basic Form Handling

When the user keys in the input data in HTML controls and clicks the submit button the request will be generated and reaches a PHP file which is mentioned in the FORM tag under the Action attribute. All the input values are synchronized and sent to the server via POST method or GET method. Method is an attribute of form tag in HTML. Once the data reaches the server, two PHP variables such as $_POST and $_GET collects the data and prepares the response accordingly.

Post Method: The input data sent to the server with POST method is stored in the request body of the client's HTTP request.

Get Method: The input data sent to the server with POST method via URL address is known as query string. All input data are visible by user after they click the submit button.

Example:

Test.html:

```
<html>
<body>

<form action=”welcome.php” method=”post”>

Name: <input type=”text” name=”name”><br>
E-mail: <input type=”text” name=”email”><br>
<input type=”submit”>
</form>

</body>
</html>
```

Welcome.php:

```
<html>
<body>
Welcome <?php echo $_POST[“name”]; ?><br>
Your email address is: <?php echo $_POST[“email”]; ?>
</body>
</html>
```


12th_Computer_Application_English version CHAPTER 08.indd 126 19-01-2023 17:04:49

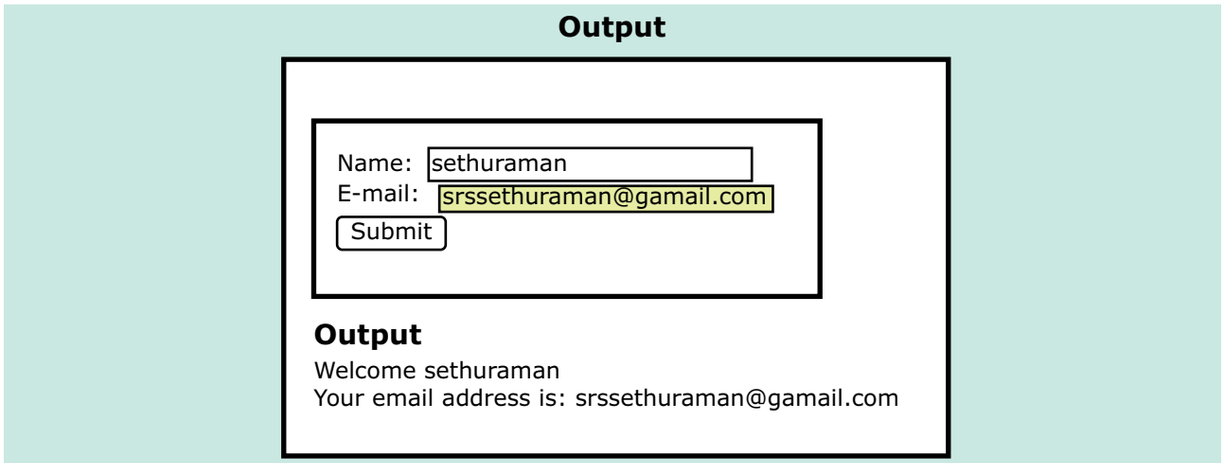


Figure 8.2 Login module

- In the above example the HTML File contains two Text Box (Name and Email), One Button and one form tag. The remote server PHP file (welcome. php) is mentioned in form tag under the Action Attribute.
- In "Welcome.Php" file, PHP variables such as $_POST and $_GET collects the data and prepares the response accordingly.
- Eventually the user will receive the output response in the client machine's browser screen.

8.1.2 Basic PHP Form Validation

Validation is a process of checking the input data submitted by the user from client machine. There are two types of validation available in PHP. They are as follows,

Client-Side Validation: The input data validations are performed on the client machine's web browsers using client side scripts like Java script or adding "required" attribute in HTML input tags.

Server Side Validation: After the submission of data, validations are performed on the server side using the programming like PHP, ASP or JSP etc. available in the server machine.



A HTML form will take input from the site visitor and then will post it to a back-end application such as CGI, ASP Script or PHP script etc. The back-end application will perform required processing on the passed data based on defined business logic inside the application.

Validation rules for HTML input field

Name (Text Input)	:	Must contain letters and white-spaces
Email (Text Input)	:	Must contain @ and .strings
Website (Text Input)	:	Must contain a valid URL
Radio	:	Must be selectable minimum one value
Check Box	:	Must be checkable minimum one value
Drop Down menu	:	Must be selectable minimum one value

12th_Computer_Application_English version CHAPTER 08.indd 127 19-01-2023 17:04:49

Client Side Validation:

Before sending the data to server side program (PHP) the programmer can write few validations from browser in the client machine. For this validation, we have to add additional "required" attribute in HTML input tag. Refer Figure 8.3.

Example:

<input> required Attribute in HTML

```
<form action="welcome.php">
 Username: <input type="text"
name="name" required>
 <input type="submit">
</form>
```

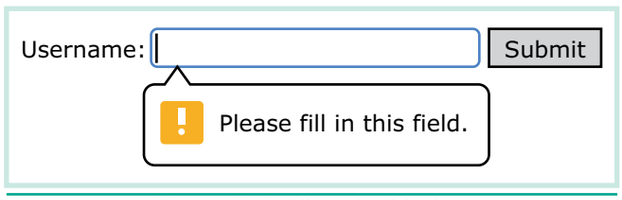


Figure 8.3 Client Validation

8.2 Files

File handling is an important activity of all web application development process. Files are processed for different tasks using the following events:

- PHP Open a File,
- PHP Read a File,
- PHP Close a File,
- PHP Write a File,
- PHP Appending a File and
- PHP uploading a File.

PHP Open a File

fopen() is a system function available in PHP. This function helps to open a file in the server. It contains two parameters one for the file and the other one specifies in which mode the file should be opened (Read/Write).

Syntax:

$file_Object= fopen("FileName", "Read/WriteMode") or die("Error Message!");

Example:

```
<?php
$myfile = fopen("Student.txt", "r") or die("Unable to open file!");
?>
```

PHP Read a File:

The fread() function reads from an open file. The file object comes from fopen function.

Syntax:

fread($file_Object,filesize("FileName"));

12th_Computer_Application_English version CHAPTER 08.indd 128 19-01-2023 17:04:49

Example:

```
<?php
fread($myfile,filesize("Student.txt"));
?>
```

PHP Close a File:

The fclose() function is used to close an opened file. The file object comes from fopen function.

Syntax:

```
fclose($file_Object);
```

Example:

```
<?php
$myfile = fopen("student.txt", "r");
// some code to be executed....
fclose($myfile);
?>
```

PHP write a File:

The fwrite() function is used to write to a file.

Syntax:

```
fwrite($myfile, $txt);
```

POINTS TO REMEMBER

- Form Attribute action Backend script ready to process your passed data.
- Method to be used to upload data. The most frequently used are GET and POST methods.
- Target Specify the target window or frame where the result of the script will be displayed. It takes values like _blank, _self, _parent etc.
- You can use the enctype attribute to specify how the browser encodes the data before it sends it to the server.

GLOSSARY

HTML	Hypertext Markup Language is the standard markup language for creating web pages and web applications.
FORM Validation	Validation of HTML form data is important to protect your form from hackers and spammers!
Files handling	File handling is an important part of any web application. You often need to open and process a file for different tasks.
File upload	A PHP script can be used with a HTML form to allow users to upload files to the server.

12th_Computer_Application_English version CHAPTER 08.indd 129 19-01-2023 17:04:49

EVALUATION

X0QBY

Part - I

Choose the correct answer

1. What are HTML forms used for?

   a) To collect input from users b) To create server-side programming language

   c) To create a database d) To send emails

2. Which of the following is NOT a form control available in HTML forms?

   a) Text inputs b) Buttons c) Checkboxes d) Cropping Tool

3. Which tag is used to create an HTML form?

   a) form b) input c) textarea d) select

4. What form control allows the user to select multiple values?

   a) text inputs b) buttons c) checkboxes d) radio buttons

5. What form control allows the user to select only one value at a time?

   a) text inputs b) buttons c) checkboxes d) radio buttons

6. What is the purpose of validation in PHP?

   a) To check the input data submitted by the user from the client machine

   b) To display data to users

   c) To store data on the server

   d) To send data to the client

7. How many types of validation are available in PHP?

   a) One b) Two c) Three d) Four

8. Which PHP function can be used to open a file?

   a) fopen() b) fread() c) fclose() d) fwrite()

12th_Computer_Application_English version CHAPTER 08.indd 130 19-01-2023 17:04:49

9. What PHP function can be used to read a file?

a) fopen() b) fread() c) fclose() d) fwrite()

10. What PHP function can be used to close a file?

a) fopen() b) fread() c) fclose() d) fwrite()

Part - II

Short Answers

1. What is the main objective of PHP and HTML form controls?
2. What are the basic HTML form controls available?
3. How are data collected via HTML form controls sent to the server?
4. What is Validation in PHP?
5. What are the two types of validation available in PHP?

Part - III

Explain in Brief Answer

1. Explain the difference between checkbox and radio button in HTML forms.
2. Explain the difference between the POST method and GET method of sending data to the server in PHP.
3. What are the different file handling tasks that can be performed using PHP?

Part - IV

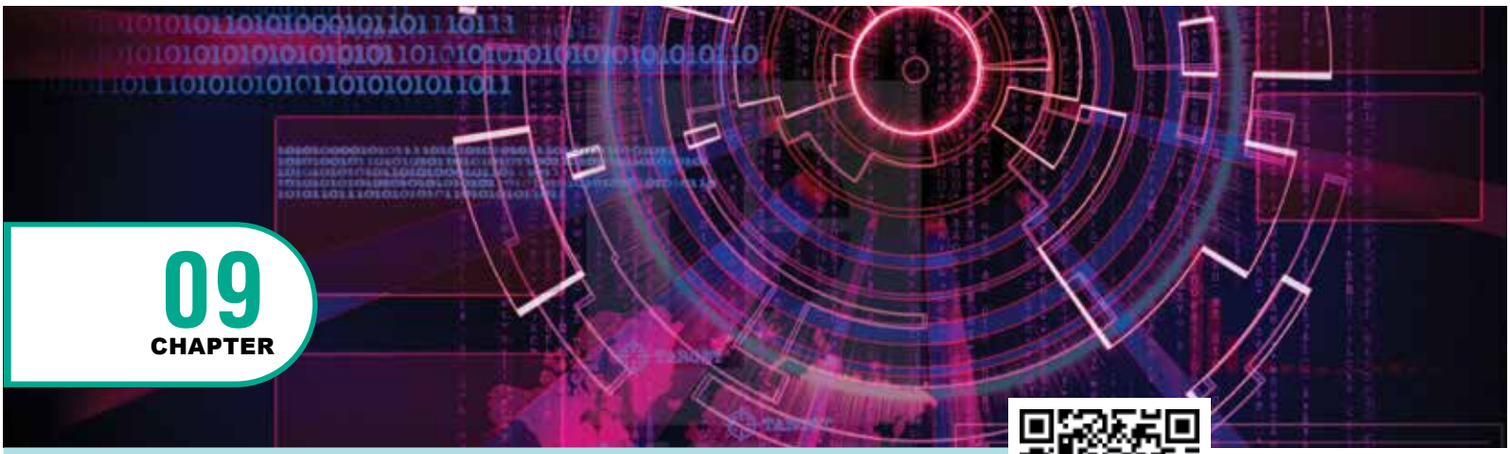
Explain in detail

1. Discuss in detail about HTML form controls.
2. Explain in detail of File handling functions in PHP.

STUDENT ACTIVITY

- Create simple student Login Form to validate username and password using java script (client side validation)
- Create simple student registration form to inert studnets details like Student Name, username and password etc. using java script (client side validation)

12th_Computer_Application_English version CHAPTER 08.indd 131 19-01-2023 17:04:49



09
CHAPTER

Connecting PHP and MYSQL

Z8WRN

LEARNING OBJECTIVES

- To understand the importance of Database Connectivity
- To know the PHP MySQL functions
- To know the features of MySQL Connection Process
- To know the Basics of Web Databases

Connecting PHP and MySQL

Data is important in computer and Internet related applications. Numerous growths of data need a secure and convenient environment to store and manipulate autonomously. All these features are available in Relational Database Management System (RDMS) such as MySQL, Oracle, IBM DB2, and Microsoft SQLSERVER etc. These databases are connected with Programing language and perform major operations like INSERT, SELECT, UPDATE and DELETE using Structured query language (SQL). The combination of PHP and MySQL has become very popular server side web scripting language in Internet. Refer Figure 9.1.

This chapter covers MySQL and PHP scripting language connectivity, which covers Database connection establishment, Database Selection, SQL statement execution, and Connection termination.

9.1 MySQL Function in PHP

In PHP Scripting language many functions are available for MySQL Database connectivity and executing SQL queries.

MySQLi is extension in PHP scripting language which gives access to the MYSQL database. MySQLi extension was introduced version 5.0.0,

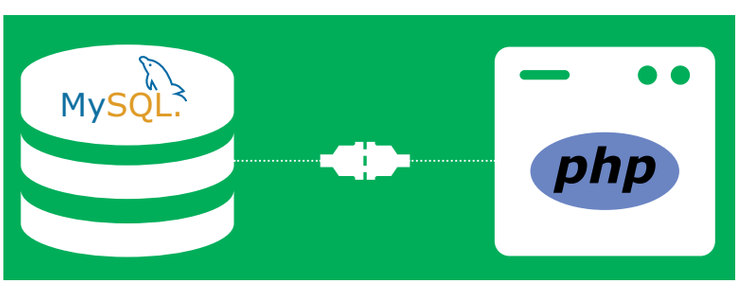


Figure 9.1 Browser Button

12th_Computer_Application_English version CHAPTER 09.indd 132 19-01-2023 17:05:14

The MySQLi extension contains the following important functions which are related to MySQL database connectivity and management.

- Mysqli_connect() Function
- Mysqli_close() Function
- Mysqli_query()Function

9.1.1 Database Connections:

Before accessing MySQL Database, connect to Database Server machine via PHP scripting language using Mysqli_connect() Function.

Syntax:

```
mysqli_connect("Server Name ","User Name","Password","DB Name");
```

This function requires four parameters to connect to database server. Database Server name, Database username, password and Database Name.

9.1.2 Managing Database Connections

The below code describes managing database connection methods and features.

```
<?php
$servername = "localhost";
$username = "username";
$password = "password";

$DB_name = "School_DB";

$conn = mysqli_connect($servername, $username, $password,$DB_name);

if (!$conn) {
   die("Connection failed: " . mysqli_connect_error());
}
```


12th_Computer_Application_English version CHAPTER 09.indd 133 19-01-2023 17:05:14

echo “Connected successfully”;

?>

In the above code snippet, four variables are used to connect to the Database server. They are

- $servername -> Database Server Server IP address
- $username -> Database Server User Name
- $password -> Database Server Password
- $DB_Name -> Database Name

The mysqli_connect function uses these variables to connect Database server to PHP. If connection gets fail, output will be printed with MySQL error code. Otherwise connection is success.

9.1.3 Performing Queries

The main goal of MySQL and PHP connectivity is to retrieve and manipulate the data from MySQL database server. The SQL query statements help in PHP MySQL extension to achieve the objective of MySQL and PHP connection. “mysqli_query” is a function, that helps to execute the SQL query statements in PHP scripting language.

Syntax:

```
mysqli_query(“Connection Object”,”SQL Query”)
```

Example:

```
$con=mysqli_connect(“localhost”,”my_user”,”my_password”,”Student_DB “);
$sql=”SELECT student_name,student_age FROM student”;mysqli_query($con,$sql);
```

9.1.4 Closing Connection:

mysqli_close() Function is used to close an existing opened database connection between PHP scripting and MySQL Database Server.

Syntax:

```
mysqli_close(“Connection Object”);
```

Example:

```
<?php
```


12th_Computer_Application_English version CHAPTER 09.indd 134 19-01-2023 17:05:14

```
$con=mysqli_connect("localhost","$user","$password","SCHOOL_DB");
mysqli_close($con);
?>
```

Example of PHP and MySQL Program:

```
<?php
$servername = "localhost";
$username = "username";
$password = "password";
$dbname = "school_DB";
$connection = mysqli_connect('$servername ', '$username', '$password','$dbname');
if (mysqli_connect_errno())
 {
 echo "Failed to connect to MySQL: " . mysqli_connect_error();
 }
sql_stmt = "SELECT * FROM my_contacts"; //SQL select query
$result = mysqli_query($connection,$sql_stmt);//execute SQL statement$rows =
mysqli_num_rows($result);// get number of rows returned
 if ($rows) {
        while ($row = mysqli_fetch_array($result)) {
 echo 'ID: ' . $row['id'] . '<br>';
 echo 'Full Names: ' . $row['full_names'] . '<br>';
 echo 'Gender: ' . $row['gender'] . '<br>';
 echo 'Contact No: ' . $row['contact_no'] . '<br>';
 echo 'Email: ' . $row['email'] . '<br>';
 echo 'City: ' . $row['city'] . '<br>';
 echo 'Country: ' . $row['country'] . '<br><br>';
 }
}
mysqli_close($connection); //close the database connection
?>
```

In the above code the SQL query retrieves two records from student table in school database. These records are populated into client browser using PHP scripting language.

12th_Computer_Application_English version CHAPTER 09.indd 135 19-01-2023 17:05:14

Facebook technology stack consist of application written in many language, including PHP and many others. Facebook still uses PHP but it has built a compiler for it so it can be turned into native code. Facebook has many things built in PHP. Actually it's not the real PHP, Facebook has written alternative version of PHP that is, HipHop's HPHP'c which help to convert PHP code into C++.

PHP has also attracted the development of many software frameworks that provide building blocks and a design structure to promote rapid application development (RAD). Some of these include PRADO, CakePHP, Symfony, CodeIgniter, Laravel, Yii Framework, Phalcon and Zend Framework, offering features similar to other web frameworks.

POINTS TO REMEMBER

- PHP is Open source & Community support scripting language
- PHP is a server-side scripting language designed for Web development.
- Seventy Percentage of Website has been built by PHP and MySQL
- Major of the webservers can support PHP scripting language
- PHP can embed easily with HTML and client side scripting language
- PHP has built-in function which can be easily connected to MySQL database
- PHP scripting language has been supported by many Software frameworks

GLOSSARY

SQL	SQL is a domain-specific language used in programming and designed for managing data held in a relational database management system
Queries	A query is a request for data or information from a database table or combination of tables.
MySQL	MySQL is an open-source relational database management system
SERVER	A server is a computer or a device that provides functionality for other programs or devices, called "clients". This architecture is called the client–server model, and a single overall computation is distributed across multiple processes or devices.
Database	A database is an organized collection of data, generally stored and accessed electronically from a computer system.

12th_Computer_Application_English version CHAPTER 09.indd 136 19-01-2023 17:05:14

EVALUATION

MTXKN

Part - I

Choose the correct answer

1. Which is the correct function to execute the SQL queries in PHP ?

   a) mysqli_query("Connection Object","SQL Query")

   b) query("Connection Object","SQL Query")

   c) mysql_query("Connection Object","SQL Query")

   d) mysql_query("SQL Query")

2. Which is the correct function Closing Connection in PHP ?

   a) mysqli_close("Connection Object");

   b) close("Connection Object");

   c) mysql_close("Connection Object");

   d) mysqli_close("Database Object");

3. Which is the correct function to establish Connection in PHP ?

   a) mysqli_connect("Server Name ","User Name","Password","DB Name");

   b) connect("Server Name ","User Name","Password","DB Name");

   c) mysql_connect("Server Name ","User Name","Password","DB Name");

   d) mysqli_connect ("Database Object");

4. Which is the not a correct MySQL Function in PHP ?

   a) Mysqli_connect() Function

   b) Mysqli_close() Function

   c) mysqli_select_data() Function

   d) mysqli_affected_rows() Function

5. How many parameter are required for MYSQLi connect function in PHP ?

   a) 2 b) 3 c) 4 d) 5

6. How many parameter are required for MYSQLi query function in PHP ?

   a) 2 b) 3 c) 4 d) 5

12th_Computer_Application_English version CHAPTER 09.indd 137 19-01-2023 17:05:14

7. How many parameter are required for MYSQLi Close function in PHP ?

   a) 1 b) 2 c) 3 d) 5

8. Which version of PHP supports MySQLi fuctions ?

   a) Version 2.0

   b) Version 3.0

   c) Version 4.0

   d) Version 5.0

Part - II

Short Answers

1. What are the MySQLi function available PHP?
2. What is MySQLi function?
3. What are the types MySQLi function available PHP?
4. Difference between Connection and Close function?
5. Give few examples of MySQLi Queries.
6. What is Connection string?

Part - III

Explain in Brief Answer

1. Write the Syntax for MySQLi Queries.
2. Write is the purpose of MySQLi function available.
3. Write MySQL Connection Syntax with example.

Part - IV

Explain in detail

1. Discuss in detail about MySQL functions with example .
2. Explain in details types of MySQL connection method in PHP.
3. Explain MySQLi Queries with examples.

STUDENT ACTIVITY

- Create simple student Login Form to validate username and password using PHP and MySQL (Server side validation)
- Create simple student registration form to inert studnets details like Student Name, username and password etc. using PHP and MySQL (Server side validation).

12th_Computer_Application_English version CHAPTER 09.indd 138 19-01-2023 17:05:14



10
CHAPTER

Introduction to Computer Networks

YNLAE

LEARNING OBJECTIVES

- To know about computer networking & the Internet
- Discuss about the evaluations of the Internet
- To learn about the applications of computer networking
- Uses of computer networks at home, business, mobile, social media

10.1 Introduction

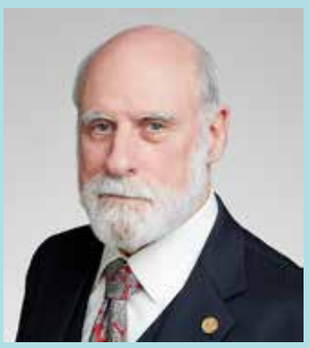
A set of computers connected together for the purpose of sharing resources is called as computer networks. At present, Internet is the most common resource shared everywhere. Some of the shared resources are file server, web camera, speakers, printer, scanner, fax machine etc., Accessing services such as WWW (World Wide Web), Digital audio, Digital video which are shared to use applications, software, and storage servers.

A Computer which is connected to a network is called as **node**. The data originates and terminates at these particular nodes is called as a source and destination. In networking, nodes are identified by its IP addresses i.e.,(network address) and can include hosts such as mobile phones , tabs , personal computers, huge servers and other networking device. Connecting more than one device is called as **network**.

DO YOU KNOW?

Vint Cerf

Vint Cerf designed the TCP/IP (Transmission Control Protocol / Internet Protocol) protocols and the Internet architecture with his co- designer Robert E.kahn. Vint Cerf is known as the father of the INTERNET



12th_Computer_Application_English version CHAPTER 10.indd 139 19-01-2023 17:06:21



Figure 10.1 Devices in Network

10.2 Evaluations of Computer Networking and the Internet

INTERNET Stands for **INTERconnected NETwork**.

Internet is simply defined as the connection of individual networks operated by academic persons, industry people, government, and private parties.

In few years, the Internet built itself as a highly powerful platform that changed our way we do business and the way we communicate. Internet promotes as the universal source of information of billions of people, at work, at home, at school.

Earlier days if we want anything, we have to go to market and purchase in person. Nowadays we order anything and everything (food, clothes, stationeries, vegetables…etc.) through online(Internet). Online service providers are Flipkart, Amazon, snap deal etc to buy products via Internet and have the product at door steps. Online payments help in sending and receiving money via payment methods using this Internet.

e-Governance has made our work easy by providing all government information online easily. As Internet provides its service 24x7 - 365 days, people around the world can access the government websites at their own place.

Merchandising via Internet helps us get good branded products at offer rates through free delivery service.

Powerful search engine can take us to imaginary concept to our hand with all as a text, audio, video, with briefly and by without moving to library, or taking advice from expert. Current affairs can be updated immediately without any

12th_Computer_Application_English version CHAPTER 10.indd 140 19-01-2023 17:06:21

The evaluation of computer networks and its development were briefly explained in the figure given below:

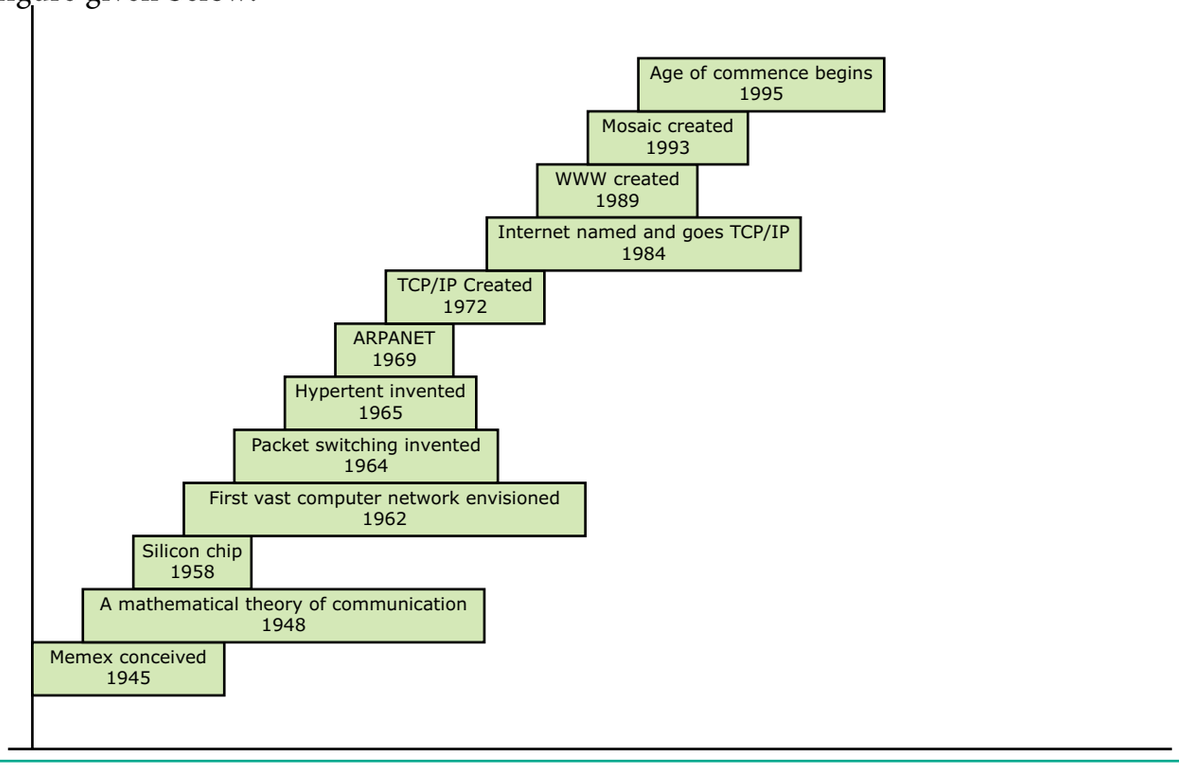


Figure 10.2 **Evolution of Internet**

delay. For example on olden days Internet Explorer, Yahoo, bing were powerful search engine. Later, Google stepped in with user friendly gmail, youtube, googledrive, google maps, etc. and are useful applications. Students, researchers can get their relevant study and research materials easily via Internet.

As Internet is growing, markable evolution has come mobile technology and social web. These two innovations have changed the life style of people. We may find many communities in social web. Mobile technology has increased the use of Internet all over the world.

10.3 Uses of the Computer Networks

The common uses of computer network are

- Communication
- Resource sharing
- Information sharing

Communication

Using computer networks, we can interact with the different people with each other all over the world. People can easily communicate at very low cost via mobile, social media, telephone, e-mail, chatting, video conferencing, SMS, MMS, groupware etc…

12th_Computer_Application_English version CHAPTER 10.indd 141 19-01-2023 17:06:21

Resource sharing

It allows all kind of programs, equipments and data to be accessed by anyone via network irrespective of the physical location of the resource. Simply resource sharing is a sharing of devices like printers, scanner, PDA, fax machine, and modems.

Information sharing

Using computer network, any application or other software can be stored at a central computer or server. The software can be shared among other computers of the network. It provides high reliability and backup can also be stored at one location for easy availability in case of crash.

10.4 Applications of the Computer Networks

The computer networks play a major role in providing information to large , small organization as well as common man. Now-a-days almost all the companies, bank and stores have implemented the computerized transactions.

10.4.1 Networks in Business

In twenty first century, communication is very important factor for successful business operations. There by with the growth of computer network and speedy Internet services, business also developed drastically.

With the development of cloud computing, global access and security issues were restricted. Internet conversation made conversation faster, quick decision making and money saving e-banking paying methods for easy transactions. Business large or small scale B2C, B2B, B2G,C2B, C2C, C2G, G2B,G2C, G2G or commercial that transfer information across the Internet can be done.

Cheap marketing price and easy selection of products through Internet with customers satisfaction can also be done. Company license, renewals, other certificates, bill payments, receipts, invoice, stock maintenance, can be done without any geographical boundaries via Internet and computer networks. Government subsidies are available for their business to promote their business by digitization.

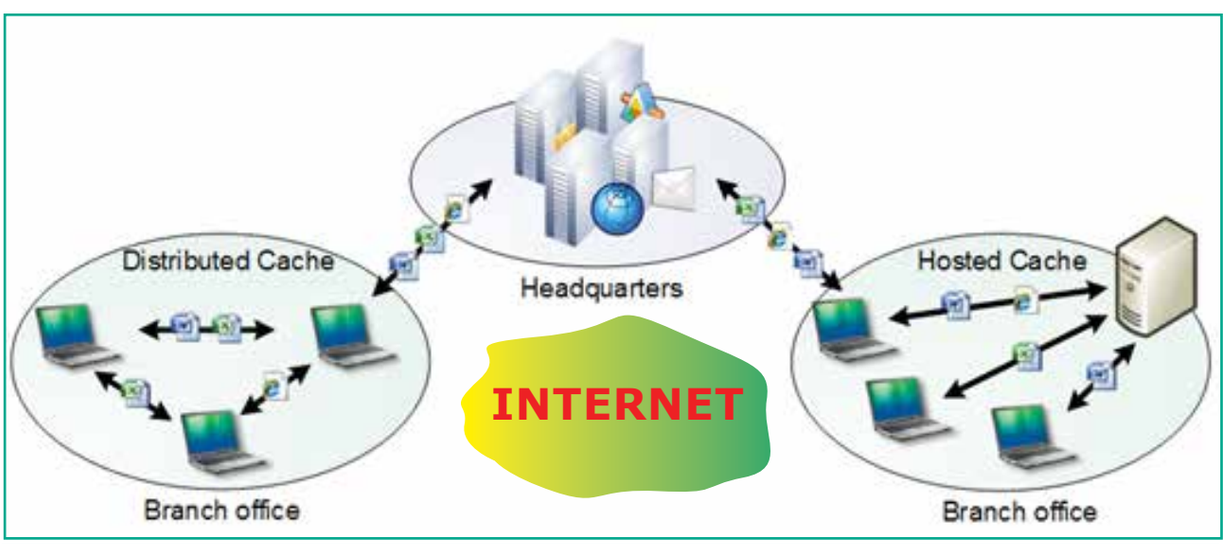


Figure 10.3 Networks in Business

12th_Computer_Application_English version CHAPTER 10.indd 142 19-01-2023 17:06:21

10.4.2 Networks at Homes

Now a day, network has become common as it facilitates communication among devices with in the close vicinity of a home. Devices in this network can be smart devices, mobile computers, network printers which are capable of interacting and thereby increase the quality of life inside home in a variety of ways like automation of repetitive tasks, increased personal productivity, enhanced home security and easier access to entertainment. Network at home helps us to perform e-banking, e-learning, e-governance, e-health, telemedicine, call centers, video conferencing, digitalization of memories, etc.

10.4.3 Mobile Networks

Mobile network is the network connecting devices without cable (wireless). Mobile computers, such as laptop, tablet, and hand held computers, were fastest growing segments. At land areas network was distributed as cells, each will be served by single – location transceiver, but generally three cell sites or a base transceiver station. This base station provides the cell with network coverage and other features that can be utilized for transmission of voice, data and other content as well. Joining together all radio coverage is called as wide geographical area. This portable transceivers used to communicate with one another with fixed transceivers and moving via more than one cell during transmission. For example mobiles, tablets, pagers, laptops, engaged with mobile broadband just like modems etc.

10.4.4 Social Application

To get connected with people around the world through social network media, applications like Whatsapp, Facebook, Twitter, Blogs, Pinterest, Classmate and so on are in full fledge use.

Through the social media we share our thoughts, ideas, files and also chats.

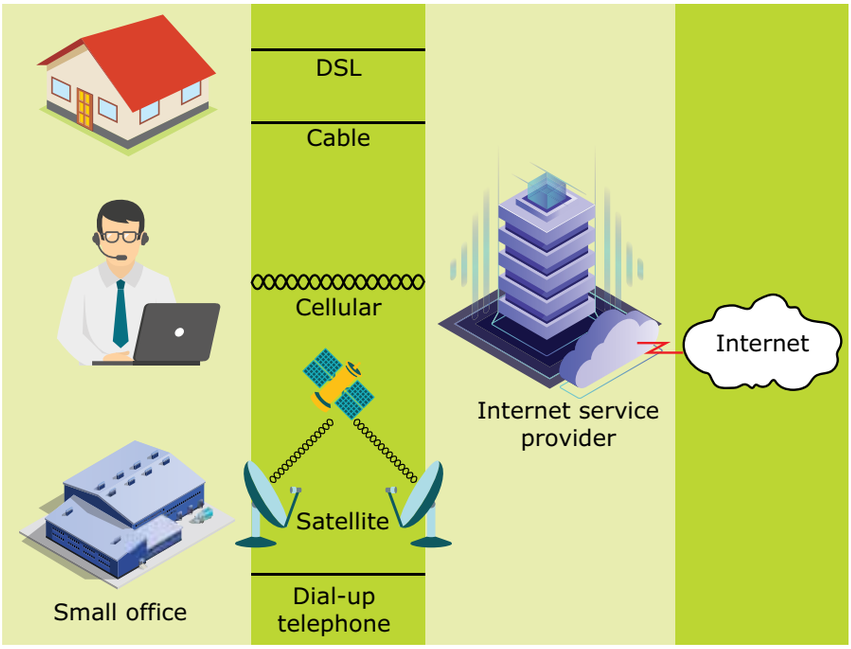


Figure 10.4 Mobile Networks

12th_Computer_Application_English version CHAPTER 10.indd 143 19-01-2023 17:06:21



Figure 10.5 Social Media Outline

These social networks share several attributes in common:

- ***Membership***. Social nets generally requires user to register names and accounts to avoid duplicate and maintain secrecy. So many public networks offer free registration and some meagre charges for their services. Private networks (such as BANK ACCOUNT HOLDERS groups) restrict registration to people who meet certain eligibility criteria.
- ***Content contribution***. These networks allow members to easily share comments, audio,video, text, animation files etc with others.
- ***Frequent visits***. Healthy social net have a group of members who check in regularly to contribute their share and also for new updates
- ***Relationship building***. The common goal of most social networks is to allow interaction among people, which create stronger connection with people of different communities.

Benefits of Social Networks

Besides being a fun place to meet and relax with people, social networking leads to some extremely useful benefits to individuals and communities:

- ***Group information sharing over long distances.*** Although friends and family members can keep in contact via mobile phone calls or by text messages, social nets provide a much richer environment for staying connected. We can also share photo albums, videos and convey daily wishes through the social network. Group discussions and Group chats go on in various groups through which people are kept in touch with each other.
- ***Broadcast announcements.*** Quick, easy way to spread informations of emergencies and natural calamities. Venues and local shops can advertise upcoming events on social networks. Business people can market their products through these networks.
- ***Fostering diversity of thought.*** Some critics of social networks say that online communities attract people by similar

12th_Computer_Application_English version CHAPTER 10.indd 144 19-01-2023 17:06:21

interests and backgrounds. Indeed, when the people with different opinions do get together on online, Many discussions in an online forum leads to personal attacks and is called **"flame wars."** The arguments goes online, healthy debate takes place and some of them become viral also.

Such arguments and talks bring out a relaxation for busy people from their regular work schedules. It also enriches with current affairs and keep in touch with people.

Disadvantages of Social Network

- Simply wasting the precious time on Internet by surfing, searching unwanted things.
- Lot of unnecessary wrong informations are sometimes posted by some people on their web pages, blog etc.
- Different types of thefts related to money and other valuables can take place through Internet as hackers and viruses are always active around.

GLOSSARY

e-Governance	This is an application of ICT for access the government services, communication transactions, of various standards system between government to citizen, government to business.
e-Banking	It was a safe, fast, easy and efficient electronic service that enables you access to bank account and to carry out online banking services, 24 hours a day, and 7 days a week.
Hackers	Hackers were skilled computer experts, some who with their technical knowledge access our accounts.
Viruses	Malware treats or computer warms that replicates it By its own is called as virus
Globalized	Developed to make international influence or operation possible.
Blogging	Add new material to or regularly update a blog.
Cloud Storage	Just a storage of data on online, access in different area no geographical limits was in need
Cloud Computing	It is based on Internet computing, to share resources, software and information.
e-Readers	E-Readers is similarly called as e-book reader these were designed for the purpose of reading via mobile electronics device to read digital e-books and periodically
Flame wars	Flame wars are nothing that lengthy exchange of angry or abusive messages between users of an online forum or other discussion area.

12th_Computer_Application_English version CHAPTER 10.indd 145 19-01-2023 17:06:22

POINTS TO REMEMBER

- A set of computers connected together for the purpose of sharing resources is called as computer network. Internet is the most common resource shared on today.
- Computer networking is a technique of digital telecommunication network that permits nodes to share its resources with one another. Computer networking exchanges the data as a main element. These link were transferred over cable media like optic cables or wire or wireless media such as Bluetooth and WIFI
- Artificial intelligence helps to predict traffic as it collects and analyzes data in real time.
- The common uses of computer networks were
  - Communication
  - Resource Sharing
  - Information sharing
- When group of people of different opinion come together online, many discussions arise which lead to personal attacks called **"flame wars."**

EVALUATION

YBE8R

Part - I

Choose the correct answer

1. A set of computers connecting together is called as ----------
   a) Network b) Server
   c) Hub d) Node
2. Many discussions in an online forum leads to personal attacks and is called
   a) Hackers b) Virus
   c) Online war d) Flame war
3. Wi-Fi is short name for
   a) Wireless Fidelity b) Wired fidelity
   c) Wired fiber optic d) Wireless fiber optic
4. Which among them was challenging to the business people on computer networking
   a) Hacking b) Viruses
   c) Both a & b d) none of this above
5. Which one of the following is not the social media
   a) Gmail b) Facebook
   c) twitter d) Linkedin

12th_Computer_Application_English version CHAPTER 10.indd 146 19-01-2023 17:06:22

6. In mobile network, land areas for network coverage was distributed as

a) Firmware b) cells

c) Range d) Service

7. Which one of the following are harmful to computer?

a) Bloggers b) Browser

c) Hackers d) twitter

Part - II

Short Answers

1. What is a Computer Network.
2. Write a short note on Internet.
3. What are the common uses of computer network?
4. What is node in Computer network.

Part - III

Explain in Brief Answer

1. Write a note on Resource sharing.
2. List out some benefits of social networks.
3. Write a note on Mobile networks.

Part - IV

Explain in detail

1. Explain uses of Computer network.
2. Explain about social applications in Computer network.

STUDENT ACTIVITIES

How social media has its memory management ?

1. Do you have a account on social media (or) create an account
2. Analyse how the social media applications transfer a huge data

12th_Computer_Application_English version CHAPTER 10.indd 147 19-01-2023 17:06:22



11
CHAPTER

Network Examples and Protocols

GOB3Z

LEARNING OBJECTIVES

- To know network examples like Internet, Intranet, Extranet
- Different types of mobile networks
- Know about wlans :802.11
- Discuss briefly about the network protocols

11.1 Introduction

A network protocol is a set of rules that determine how data is transmitted between different devices in the same network. It allows connected devices to communicate with each other, regardless of any differences in their internal processes, structure or design.

Internet protocol (IP) will discharge packets from the source host and it will deliver to the destination host via IP address in the packet header.

Network protocols are the usual procedures, rules, formal standards and policies comprised of formats. It allows communication between more than one device connected to the network. Network protocols have to do end-to-end process of secure on time and manage data or network communication.

All requirements which combine process, on network protocols so as to carry out the communication between routers, servers, computers, laptop, and other authorized networked device. Here on network protocols might be installed and routers in both sender and receiver to ensure data or network communication and apply to software and hardware nodes which communicate on a network.

Types of networking protocols:

- Network communication protocols
  It is the basic data communication protocol it includes of HTTP and TCP/IP.
- Network security protocol
  It confirms security over network communication and includes HTTPS, SFTP and SSL.
- Network management protocol
  It Provides network governance and maintenance and include ICMP and SNMP.

12th_Computer_Application_English version CHAPTER 11.indd 148 19-01-2023 17:07:14

11.2 Internet/Intranet/ Extranet

INTERNET:

The Internet is a worldwide system of computer networks. A network of networks where the users at any one computer can, get information from any other computer. The Internet is a network of global connections – comprising private, public, business, academic and government networks – connected wired by guided, wireless and fiber-optic technologies. It was developed by the Advanced Research Projects Agency (ARPA) of the U.S. government in 1969. It was first recognized as the ARPANet. The unique aim was to generate a network that would permit users of a research computer from one university to "talk to" research computers on other universities. The jargons Internet and World Wide Web are frequently used interchangeably, but they are not precisely the same. The Internet denotes to the global communication system, including infrastructure and hardware, whereas the web is one of the services interconnected over the Internet.



Figure: 11.1 INTERNET

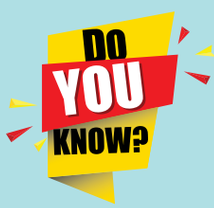
12th_Computer_Application_English version CHAPTER 11.indd 149 19-01-2023 17:07:14

INTRANET:

Intranet is a private network within an enterprise to share company data and computing resources between the employees. It may consist of many interlinked local area networks. It includes connections through one or more gateway (connects two networks using different protocols together known as protocol convertor) computers to outside Internet.



Figure 11.2 Intranet



Internet of Things refers to the digital interconnection of everyday objects (home applicances, wearable devices or automobiles) with the Internet. The 'thing' in IoT refers to objects that have been assigned an IP address and have the ability to collect and transfer data over a network without manual assistance or intervention.



12th_Computer_Application_English version CHAPTER 11.indd 150 19-01-2023 17:07:15

EXTRANET:

Extranet is a private network that uses Internet technology and the public telecommunication system to securely share business information with suppliers, vendors, partners, customers, or other business.

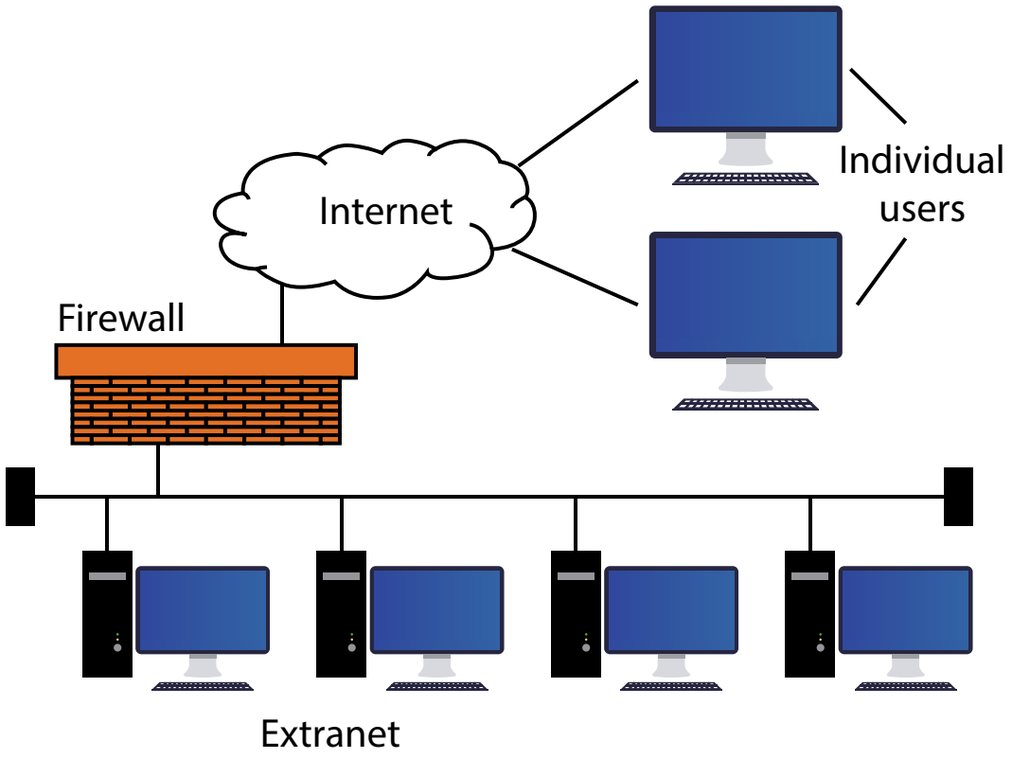


Figure 11.3 Extranet

Table 11.1 Network Applications

Application of Internet.	Application of Intranet	Application of Extranet
• Download programs and files • Social media • E-Mail • E-Banking • Audio and Video Conferencing • E-Commerce • File Sharing • E- Governance • Information browsing • Search the web addresses for access through search engine • Chatting and etc	• Sharing of company policies/rules and regulations • Access employee database • Distribution of circulars/ Office Orders • Access product and customer data • Sharing of information of common interest • Launching of personal/ departmental home pages • Submission of reports • Corporate telephone directories.	• Customer communications • Online education/ training • Account status enquiry • Inventory enquiry • Online discussion • Supply – chain managements • Order status enquiry • Warranty registration • Claims • Distributor promotions

12th_Computer_Application_English version CHAPTER 11.indd 151 19-01-2023 17:07:15

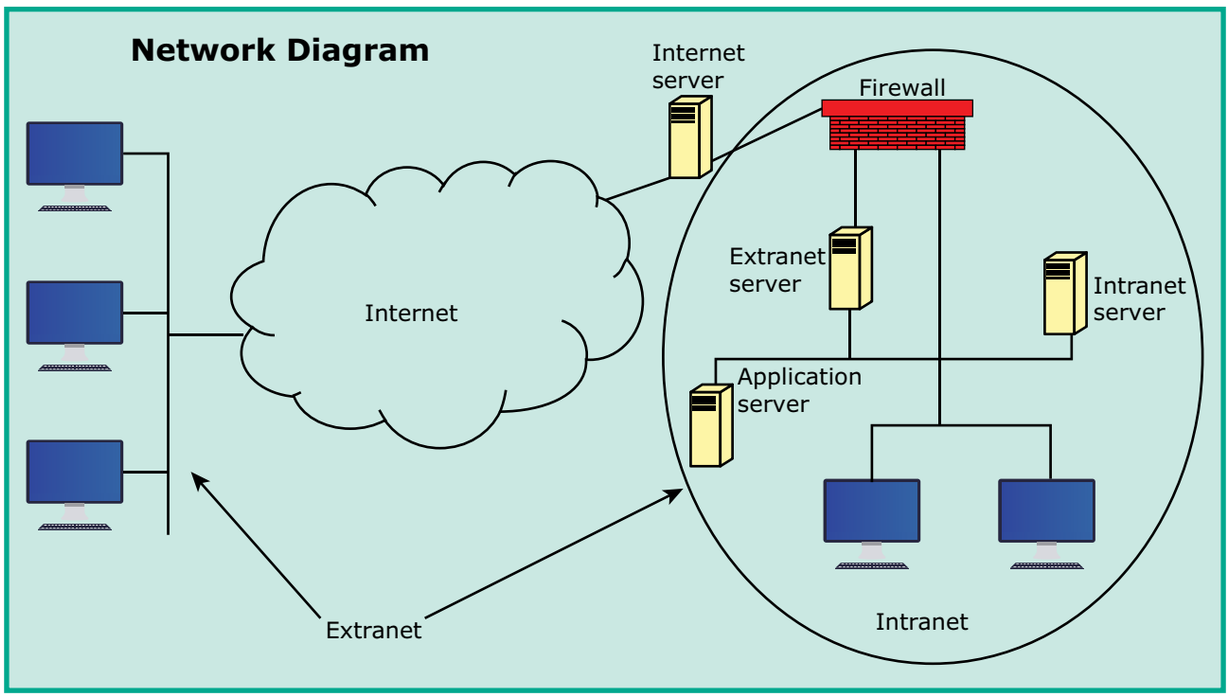


Figure 11.4 Internet, Intranet and Extranet

11.3 Mobile Networks

A mobile network or cellular network as it is made up of a large number of signal areas called cells. These cells join to form a large coverage area. Users can cross into different cells without losing their connection. Within each cell there is a base station, which sends and receives the mobile signals. A mobile device will connect to the nearest or least base station. The base stations are connected to digital exchange where the communication is sent to other telephone or data networks. Cells will often be smaller in size in large towns, as the number of users in the area is more. Communication over mobile network is made up of voice, data, images and text messages.

Mobile networking assign to the technology supports voice/data, network connectivity using via radio transmission solution. The common application of mobile networks is mobile phones, tablets, etc.. In the past, wireless communications largely used circuit switching to carry only voice over a network, but now currently both data and voice are being transmitted over both circuit via switched networks and packet-switched networks.

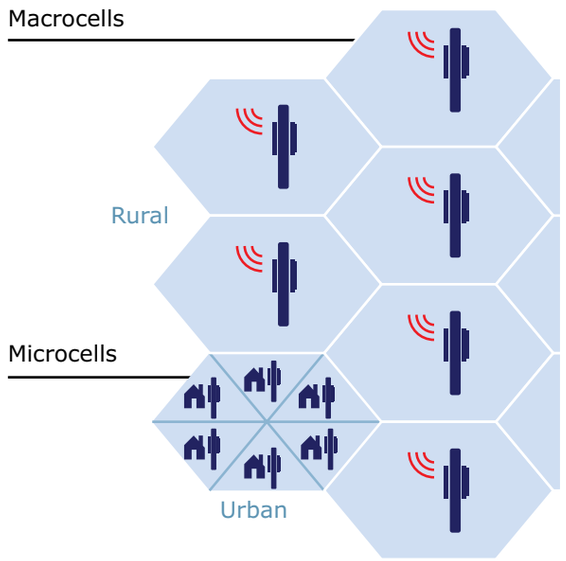


Figure 11.5 Mobile Network

12th_Computer_Application_English version CHAPTER 11.indd 152 19-01-2023 17:07:15

The generation of mobile networks are as follows.

- First Generation (1G) 1981- NMT launch
- Second Generation (2G) 1991-GSM Launch
- Second to Third Generation Bridge (2.5)2000 – GPRS launch
- Third Generation (3G) 2003
- Fourth Generation (4G) 2007
- Fifth Generation (5G) 2019+

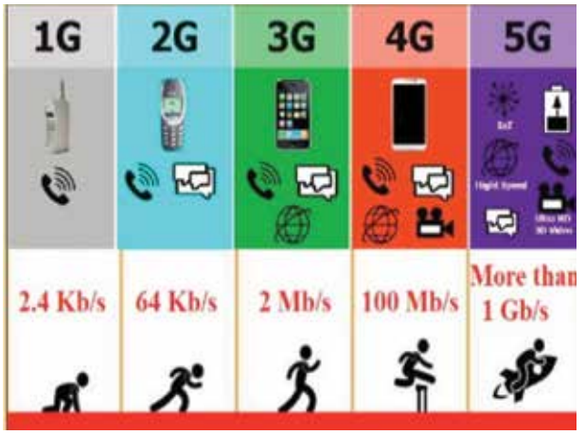


Figure 11.6 Generation of Mobile Networks

First Generation (1G) 1981 – NMT launch

During the initial periods the mobile systems were based on analog transmission. NMT stands for Nordic Mobile Telephone communication. They had a very low traffic density of one call per radio channel, and a very poor voice quality, and they used unsure and unencrypted transmission, which leads to the spoofing of its identities.

Second Generation (2G) 1991 – GSM launch

Later the second generation of mobile systems were placed on digital transmission with GSM. **GSM stands for (Global System for Mobile communication)** was most popular standard which is used in second generation, using 900MHz and 1800MHz for the frequency bands. GSM mobile systems grown digital transmission using SIM. SIM stands for (**Subscriber Identity Module)** technology to authenticate a user for identification and billing purposes, and to encrypt the data to prevent listen without permission (eavesdropping). The transmission used as TDMA. TDMA stands for (**Time Division Multiple Access**) and CDMA stands for **(Code Division Multiple Access)** method to increase the amount of information transported on the network. Mobility is supported at layer 2, which stops seamless roaming across assorted access networks and routing domains. This means that each operator must cover the entire area or have agreements in place to permit roaming.

Second to Third Generations Bridge (2.5G) 2000 – GPRS launch

GPRS was introduced here, this is the excess period of mobile networking development, between 2G and 3G. GPRS stands for (**General Packet Radio Service**). GPRS is a data service which enables mobile devices to send and receive messages, picture messages and e-mails. It allows most popular operating speeds of up to 115kbit/s, latterly maximum of 384kbit/s by usingEDGE. EDGE stands for **EDGE (Enhanced Data rates for Global Evolution)**. GSM data transmission rates typically reached 9.6kbit/s.

12th_Computer_Application_English version CHAPTER 11.indd 153 19-01-2023 17:07:15

Third Generation(3G) 2003

This generation of mobile system merges different mobile technology standards, and uses higher frequency bands for transmission and Code Division Multiple Access to deliver data rates of up to 2Mbit/s supporting multimedia services (MMS: voice, video and data). European standard is UMTS **(Universal Mobile Telecommunication Systems).** Mobile phones systems continue to use digital transmission with SIM authentication for billing systems and for data encryption. Data transmission used a WCDMA. WCDMA stands for (Wideband Code Division Multiple Access). A technique to obtain data rates between 384kbit/s and 2048kbit/s. Few 3G suppliers use for '**over the air**' network with in MPLS (Multiprotocol Label Switching) or IP for their backbone network.

Mobility still supported at layer 2, and hence like 2G it still prohibits seamless roaming beyond heterogeneous access networks and routing domains. The transmission were band frequencies between 1900 and 2200 MHz. All UMTS license holders at the UK holds a 20 year license with the condition that 80% population coverage is achieved by 31 December 2007.

Fourth Generation(4G) 2007

4G is at the research stage. 4G was based on an adhoc networking model where there was no need for a fixed infrastructure operation. Adhoc networking requires global mobility features (e.g. Mobile IP) and connectivity to a global IPv6 network to support an IP address for each mobile device. Logically roaming in assorted IP networks (for example: 802.11 WLAN, GPRS and UMTS) were possible with higher data rates, from 2Mbit/s to 10–100Mbit/s, offering reduced delays and new services. Mobile devices will not expect on a fixed infrastructure, they will require enhanced intelligence to self configure in adhoc networks and having a routing capabilities to route over a packet-switched network.

Fifth Generation (5G) 2019+

5G is the stage succeeds the 4G (LTE/ WiMAx), 3G(umts) and 2G(GSM) syetems. 5G targets to perform the high data rate, reduced latency, energy saving, cost reduction, higher system, capacity, and massive device connectivity. The two phases of 5G, First one will be complete by March 2019,Second one is expected to complete at March2020, for submission to the ITU(International Telecommunication Union) as a candidate IMT-2020 technology. The ITU IMT – 2020 provides speed up to 20 gigabits per second it has been demonstrated with millimeter waves of 15 gigahertz and higher frequency. 3 GPP standard includes any network using New Radio software. 5G New Radio can access at lower frequencies from 600 MHz to 6 GHz. Speed in the lower frequencies are only modest higher than 4G systems, estimated at 15% to 50% faster.

12th_Computer_Application_English version CHAPTER 11.indd 154 19-01-2023 17:07:15

Li-Fi is a wireless technology which uses light-emitting diodes (LEDs) for data transmission whereas Wi-Fi uses radio frequencies for data transmission. Li-Fi is the short form of Light Fidelity.

The term Li-Fi was first used by Harald Haas, Professor in Edinburgh University. The computer scientists achieved speeds of 224 gbps in the lab and research is going on. The biggest revolution in the Internet world is going to happen

11.4 WLANS 802.11(Wi-Fi)

Wi-Fi stands for Wireless Fidelity. It is a wireless network technology that permits computers and other devices to be connected to every other into a local area network and to the net without wires and cables. Wi-Fi is additionally stated as wireless local area network and 802.11, is the technical code for the protocol.

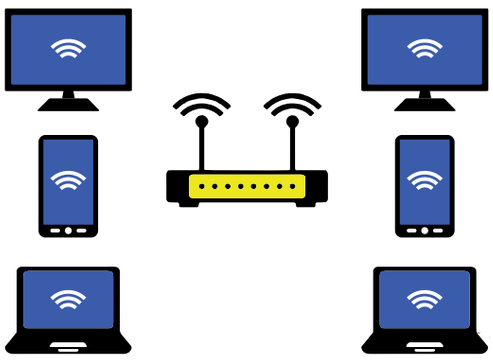


Figure 11.7 Wi-Fi

Benefits of Wi-Fi

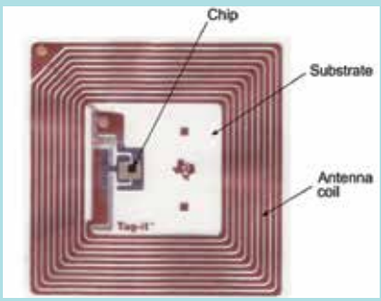
- It provides mobility.
- It provides connection to Internet.
- Flexibility of LAN.
- Ensures connectivity.
- Low cost, high benifts.

- RFID - Radio Frequency Identification.

RFID is a technology designed to locate objects (Credit cards, Passports or even livestock) using radio signals.

RFID used radio waves to read and capture information stored on a tag attached to an object. Tag can be read from several feet away and does not need to be in direct-line-of-sight of the reader to be tracked. RFID has been made up of two parts a reader and a tag or a label. RFID tags are installed with a transmitter and receiver.

Two types of RFID tags were Active RFID and Passive RFID systems.





11.5 Reference Model

11.5.1 OSI Model

Open System Interconnection (OSI) model was found in the year 1934, general framework that enables network protocols along with software and systems to be developed based on general set of guidelines. It describes the standards for the inter-computer communication.

TIPS

There are many prompts used to remember the OSI layer order:

- All Persons Should Try New Diet Plan.

12th_Computer_Application_English version CHAPTER 11.indd 155 19-01-2023 17:07:15

	OSI Layer	TCP/IP	Datagrams are called
Software	Layer 7 Application	HTTP, SMTP, IMAP, SNMP, POP3, FTP	Upper Layer Data
	Layer 6 Presentation	ASCII Characters, MPEG, SSL, TSL, Compression (Encryption & Decryption)	
	Layer 5 Session	NetBIOS, SAP, Handshaking connection	
	Layer 4 Transport	TCP, UDP	Segment
	Layer 3 Network	IPv4, IPv6, ICMP, IPSec, MPLS, ARP	Packet
Hardware	Layer 2 Data Link	Ethernet, 802.1x, PPP, ATM, Fiber Channel, MPLS, FDDI, MAC Addresses	Frame
	Layer 1 Physical	Cables, Connectors, Hubs (DLS, RS232, 10BaseT, 100BaseTX, ISDN, T1)	Bits

Figure 11.8 OSI LAYERS

OSI Layers:

1. **Physical Layer:** This is the 1st layer, it defines the electrical and physical specifications for devices.
2. **Data Link Layer:** It is the 2nd layer and it guarantees that the data transmitted are free of errors. This layer has simple protocols like "802.3 for Ethernet" and "802.11 for Wi-Fi".
3. **Network Layer:** It is the 3rd layer determining the path of the data packets. This layer is responsible for routing of data packets using **IP Addressing**.
4. **Transport Layer:** It is the 4th layer that guarantees the transportation/sending of data successfully. It includes the error checking operation.
5. **Session Layer:** It is the 5th layer, identifies the established system session between different network entities. It controls dialogues between computers .For instance, while accessing a system remotely, session is created between your computer and the remote system.
6. **Presentation Layer:** It is the 6th layer that does the translation of data to the next layer (Prepare the data to the Application Layer). Encryption and decryption protocols occur in this layer such as, Secure Socket Layer (SSL).
7. **Application Layer:** It is the 7th layer, which acts as the user interface platform comprising of software within the system.

11.5.2. TCP/IP

Transmission Control Protocol/Internet Protocol, **TCP/IP** is a set of protocols which governs communications among all computers on the Internet. TCP/IP protocol tells how information should be packaged, sent, and received, as well as how to get to its destination.

TCP WORKING: TCP/IP is a combination of two protocols: Transmission Control Protocol (TCP) and Internet Protocol (IP). The Internet Protocol typically specifies the logistics of the packets that are sent out over networks; it specifies the packets which have to go, where to go and how to get there. The Transmission Control

12th_Computer_Application_English version CHAPTER 11.indd 156 19-01-2023 17:07:15

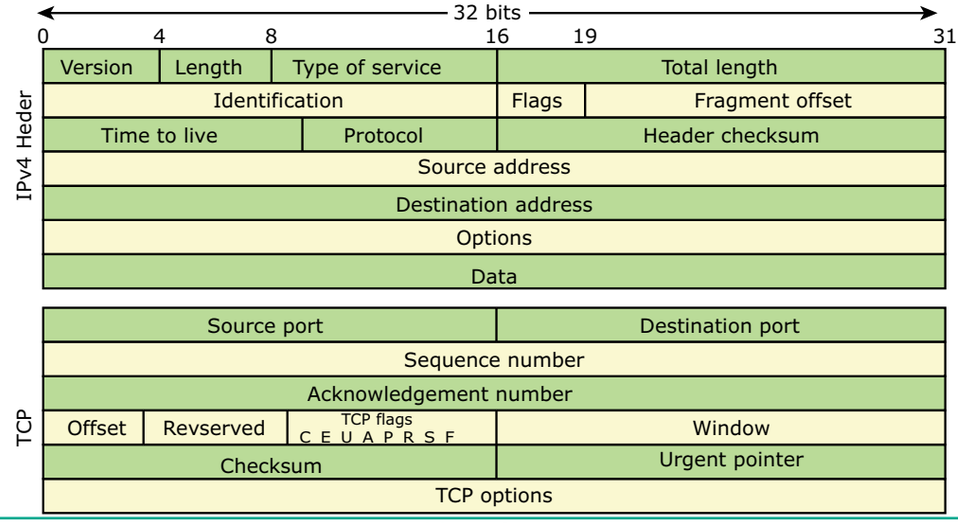


Figure 11.9 **TCP/IP Layer**

Protocol is accountable for guaranteeing the trustworthy transmission of data. It checks if any packet is not transmitted and submits it again.

Frequent TCP/IP Protocols

- **HTTP** – It is used between a web client and a web server and it guarantees non-*secure* data transmissions.
- **HTTPS** – It is used between a web client and a web server ensures *secure* data transmissions.
- **FTP** – It is used between computers for sending and receiving file.

Domain Names and TCP/IP Addresses

The address for any website is not as easy as to remember, domain name are used instead. For example, **216.58.216.164** is one of the IP address for Google and **google.com** is the domain name.

The Different Layers of TCP/IP

There are four total layers of TCP/IP protocol, each of which is listed below with a brief description.

- **Network Access Layer** - concerned with building packets.
- **Internet Layer** - describes how packets are to be delivered.
- **Transport Layer** - ensure the proper transmission of data.
- **Application Layer** - application network processes. These processes include File Transfer Protocol (FTP), Hypertext Transfer Protocol (HTTP), and Simple Mail Transfer Protocol (SMTP).

11.5.3 Other Network Protocols

Network protocols other than OSI and TCP/IP were simply known as other network protocols which implements security over the network communication that include **HTTPs, SSL,** and **SFTP**. Other networks similarly classified in network layer are **IP, ARP, ICMP,IGMP,** at transport layer are **TCP,UDP** at Application Layer are **HTTP, FTP, Telenet, SMTP,** and **DNS.**

12th_Computer_Application_English version CHAPTER 11.indd 157 19-01-2023 17:07:16

POINTS TO REMEMBER

- The Internet is a network of global connections – comprising private, public, business, academic and government networks – linked by guided, wireless and fiber-optic technologies.
- ARPANET was Advanced Research Projects Agency (ARPA) of the U.S. government in 1969 and was first recognized
- **INTRANET:** It is a private network within an enterprise to share company data and computing resources between the employees.
- **EXTRANET:** It is a private network that uses Internet technology and the public telecommunication system to securely share business's information with suppliers, vendors, partners, customers, or other businesses.
- Communication over mobile network is be made up of voice, data, images and text messages.
- RFID –(**R**adio **F**requency **Id**entification) uses **RF** wireless technology to **identify**.
- Open System Interconnection (OSI) model is over all basis that permits network protocols along with software and schemes to be developed based on Universal guidelines.
- **Transmission Control Protocol/Internet Protocol**, **TCP/IP** is a set of protocols permitting communications among all computers on the Internet.
- **HTTP** – A protocol used between a web client and a web server protects non-*secure* data transmissions. The core protocol of the World Wide Web.
- **HTTPS** - A protocol used between a web client and a web server permits *secure* data transmissions.
- **FTP** - Used between computers for sending and receiving data. Enables a client to send and receive complete files from a server.
- **Internet Protocol (IP):** routable protocol which uses IP addresses to deliver packets. It is an unreliable protocol, does not guarantee delivery of information.
- **Address Resolution Protocol (ARP):** Resolves IP addresses to MAC (Medium Access Control) addresses.(A MAC address is a hardware identification number that uniquely identifies each device on a network.)
- **Internet Control Message Protocol (ICMP):** Used by network devices to send error messages and operational information.
- **Transmission Control Protocol (TCP):** Provides reliable connection oriented transmission between two hosts. It guarantees delivery of packets between the hosts.
- **Simple Mail Transfer Protocol (SMTP):** Provides e-mail services.
- **Domain Name System (DNS):** A method of refering to other host computers by using names rather than numbers.

12th_Computer_Application_English version CHAPTER 11.indd 158 19-01-2023 17:07:16

GLOSSARY

Internet	Several networks, small and big all over the world, are connected together to form a Global network called the Internet.
Intranet	It is a website used by organizations to provide a place where employees can access company related information.
Extranet	It is a private network using Internet technology to share part of business information with supplier's partners and customers.
APRANet	Advanced Research Projects Agency Network
TCP/IP	Transmission Control Protocol / Internet Protocol
Wi-Fi	Wireless Fidelity.
RFID	Radio Frequency Identification.
OSI	Open System Interconnection
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
FTP	File Transfer Protocol
SMTP	Simple Mail Transfer Protocol
UDP	User Datagram Protocol
SMTP	Simple Mail Transfer Protocol
DNS	Domain Name System

EVALUATION

R82X0

Part - I

Choose the correct answer

1. Which of the following system securely share business's information with suppliers, vendors, partners and customers.

   a) Extranet b) Intranet c) arpanet d) arcnet

12th_Computer_Application_English version CHAPTER 11.indd 159 19-01-2023 17:07:16

2. Match the following and choose the correct answer

i. HTTP -The core protocol of the World Wide Web.

ii. FTP- enables a client to send and receive complete files from a server.

iii. SMTP - Provide e-mail services.

iv. DNS- Refer to other host computers by using names rather than numbers.

a) i, ii, iii, iv b) ii, iii, iv, i c) iii, iv, i, ii d) iv, iii, ii, i

3. Communication over ----------is be made up of voice, data, images and text messages.

a) Social media b) mobile network c) whatsapp d) software

4. Wi-Fi stands for----------

a) Wireless Fidelity b) wired fidelity

c) wired optic fibre d) wireless optic fibre

5. A TCP/IP network with access restricted to members of an organization

a) LAN b) MAN c) WAN d) Intranet

6. RFID stands for ----------

a) Radio Free identification b) real Frequency identity

c) Radio Frequency indicators d) Radio Frequency Identification.

7. It guarantees the sending of data is successful and which checks error on operation at OSI layer is----------

a) Application layer b) Network layer

c) Transport Layer d) Physical layer

8. Which one of the following will secure data on transmissions

a) HTTPS b) HTTP c) FTP d) SMTP

9. ---------- provides e-mail service

a) DNS b) TCP c) FTP d) SMTP

10. ---------- refer to other host computers by using names rather than numbers.

a) DNS b) TCP c) FTP d) SMTP

12th_Computer_Application_English version CHAPTER 11.indd 160 19-01-2023 17:07:16

Part - II

Short Answers

1. Define Intranet
2. What is the uses of mobile networks?
3. List out the benefits of WiFi
4. Expand HTTP, HTTPS, FTP.

Part - III

Explain in Brief Answer

1. Compare Internet, Intranet and Extranet
2. Write short notes on HTTP, HTTPS, FTP.
3. What are the layers available in TCP/IP Reference Model?

Part - IV

Explain in detail

1. Explain about Internet, Intranet and Extranet.
2. Discuss about OSI model with its layers.
3. Difference between TCP/IP and OSI Reference Model.

STUDENT ACTIVITIES

List out some web address with http and https

1. Find some of the http web addresses
2. Give some example for https
3. Can you know difference between http and https.

12th_Computer_Application_English version CHAPTER 11.indd 161 19-01-2023 17:07:16



12
CHAPTER

Domain Name System (DNS)

LEARNING OBJECTIVES

- To understand the need of Domain Name System for proper functioning of Internet
- To know the importance of IP addresses
- To know the parts of URL and its types
- To know the components of Domain name system and its functions
- To know how the DNS is working

12.1 Introduction

In earlier days, websites were accessed through their IP addresses. It was difficult for an individual to remember all the IP addresses to access the websites. So, the domain names were created and mapped with IP addresses. Like phone book where all the contact numbers stored under respective names and accessed by the contact names, Domain Name System (DNS) maintains all the directories of domain names and helps us to access the websites associated with them.

12.2 Overview of DNS

In a network, an information has to pass through many layers to reach its destination. Application layer is one among these layers. There are several applications in the application layer and DNS (Domain Name System) is one among them. Internet works based on

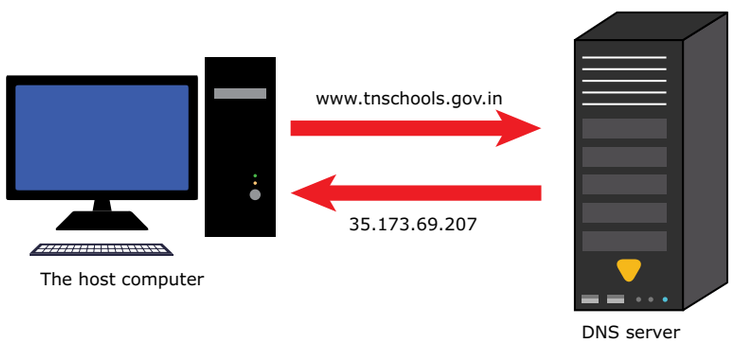


Figure 12.1 Domain Name System

12th_Computer_Application_English version CHAPTER 12.indd 162 19-01-2023 17:08:45

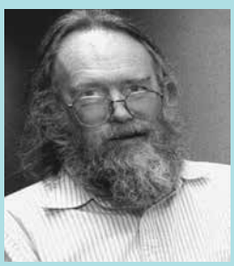
IP addresses, not domain names. But it is easy to use domain names to refer them rather than the long numbers (IP address). To enable the use of domain names in a network, the Domain Name System (DNS) is used.

DNS provides the domain name to IP address mapping through Name servers. To know more about how DNS works, First we need to know about IP address, URL and DNS components. So, let us see about each in detail.

While typing a web address, (e.g., www.tnschools.gov.in) DNS translates it into a machine friendly IP address (for example 35.173.69.207) and directs your Internet connection to the correct website.

DO YOU KNOW?

American computer scientist Paul V. Mockapetris together with Jon Postel, invented the Internet Domain Name System (DNS) Jon Postel was an administrator of the Internet Assigned Numbers Authority (IANA) until his death and he was known as "God of the Internet".



Jon Postel



Paul V. Mockapetris

12.3 IP Address

Internet Protocol (IP) address is simply the logical address in the network layer. Like how the door number is used to differentiate the individual house from others in the same apartment, IP address is also used to find the host system in the whole network. Due to increasing the number of systems in a network there is a need of more addresses. It leads to two addressing methods i.e., IPv4 and IPv6.

12.3.1 IPv4 Address

The IPv4 address is a 32-bit unique address given to a computer on the network. So, no two systems on the network can have the same IP address. If the network has p connections, then p addresses should be there.

An address space is the total number of addresses that can be made by the protocol (IP). It is determined by the number of bits that the protocol use. If the protocol uses 'n' bits, then the address space of that protocol would be '2^n' addresses. So, the number of addresses that can be formed in IPv4 is 2^{32}. There are two ways to represent the IP addresses

- Binary notation
- Dotted-decimal notation

In binary notation the address is expressed as 32-bit binary values.

For E.g. 00111001 10001001 00111000 00000111

In dotted-decimal notation the address is written in decimal format separated by dots(.).

12th_Computer_Application_English version CHAPTER 12.indd 163 19-01-2023 17:08:46

For e.g. 128.143.137.144

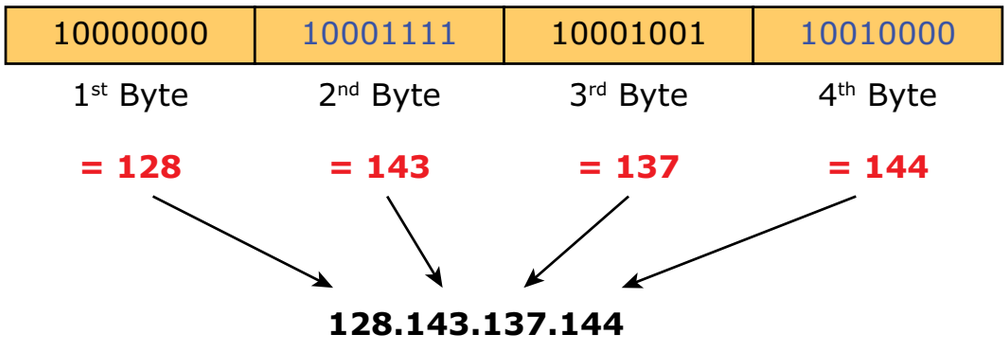


Figure 12.2 IPv4 Address

12.3.2 IPv6 Address

The IPv6 address is a 128-bit unique address given to a computer on the network. The number of addresses that can be formed in IPv6 is 2^{128}. In IPv6 address, the 128 bits are divided into eight 16-bits blocks. Each block is then changed into 4-digit Hexadecimal numbers separated by colon symbols. E.g. 2001:0000:3231:DFE1:0063:0000:0000:FEFB. Refer Figure 12.3

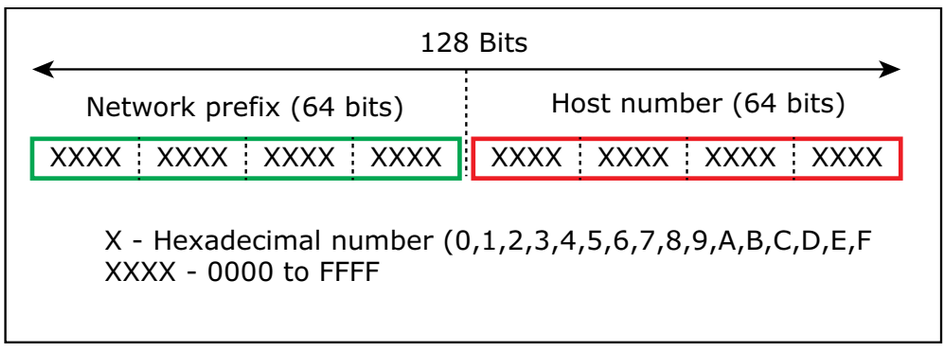


Figure 12.3 IPv6 Address

12.4 Uniform Resource Locator (URL)

URL (Uniform Resource Locator) is the address of a document on the Internet. It is made up four parts : protocols, hostname, folder name and file name. Each part has its own specific functions. Depending on the application, additional information can be added to the URL.

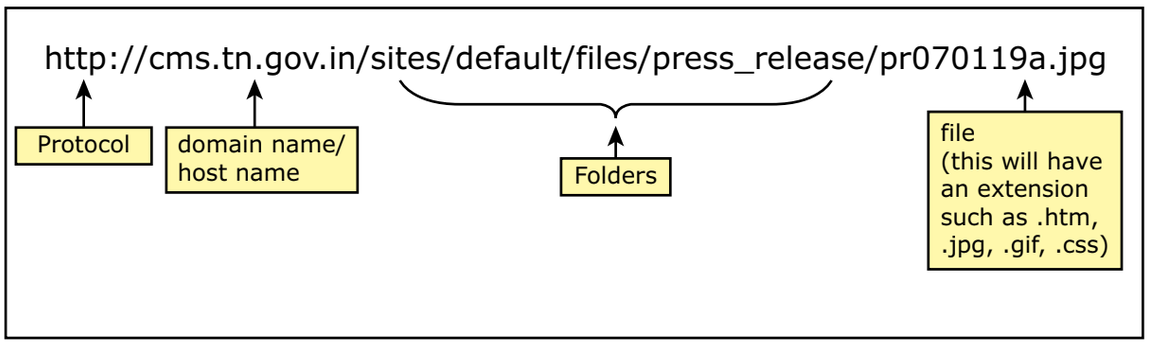


Figure 12.4 URL Parts

12th_Computer_Application_English version CHAPTER 12.indd 164 19-01-2023 17:08:46

Figure 12.4 shows the basic URL, where http is a protocol, www.cms.tn.gov.in is a domain name, sites/default/files/press_release are the folders and pr070119a.jpg is the file name. These are all the basic information that can be obtained from a URL.

URL Type

Depending on the location of the document. the URL is divided into 2 types

- Absolute URL
- Relative URL

12.4.1 Absolute URL

The absolute URL is the complete address of a document on the Internet. it contains all the information that is required to find the files on the Internet. This is similar to a postal address. If any of the information is missing, then the post will not be delivered to the right person. Similarly, if any of the four parts is missing, then the browser will not be able to link to the specific file. So, all the four parts are very important in absolute URL.

12.4.2 Relative URL

The relative URL is the partial address of a document on the Internet. Relative URL contains only a file name or a file name with folder name. We can use this type of URL when the file is on the same server related to current document.

12.5 DNS Components

There are three important components in the Domain Name System. They are,

- Namespace
- Name server
- Zone
- Resolver

12.5.1 Name Space

The domain names must be very unique and appropriate. The names should be selected from a namespace. The name space can be organised in two ways

- Flat name space
- Hierarchical name space

The flat namespace is where the name is assigned to the IP address. They do not have any specific structure. In this flat name space, some meaningful names are given to IP address for accessing. The major disadvantage of flat name space is that they cannot be used in large systems. Because they need to be accessed and controlled centrally to avoid ambiguity and redundancy. But it is difficult in a flat name system. To avoid this major disadvantage, hierarchical name space is widely used.

Hierarchical name space is where the name is made up of several parts. The first part may represent the nature of the organization, the second part may represent the name of the organization, and the third part may represent the department of the organization and so on. In this way the power to control the name space can be decentralized.

Domain Name Space

Domain name space was designed to achieve hierarchical name space. In this, The names are represented as a tree-like structure with a root element on the top. this Tree can have a maximum of 128 levels starting from the root element, taking level 0 to level 127.

12th_Computer_Application_English version CHAPTER 12.indd 165 19-01-2023 17:08:46

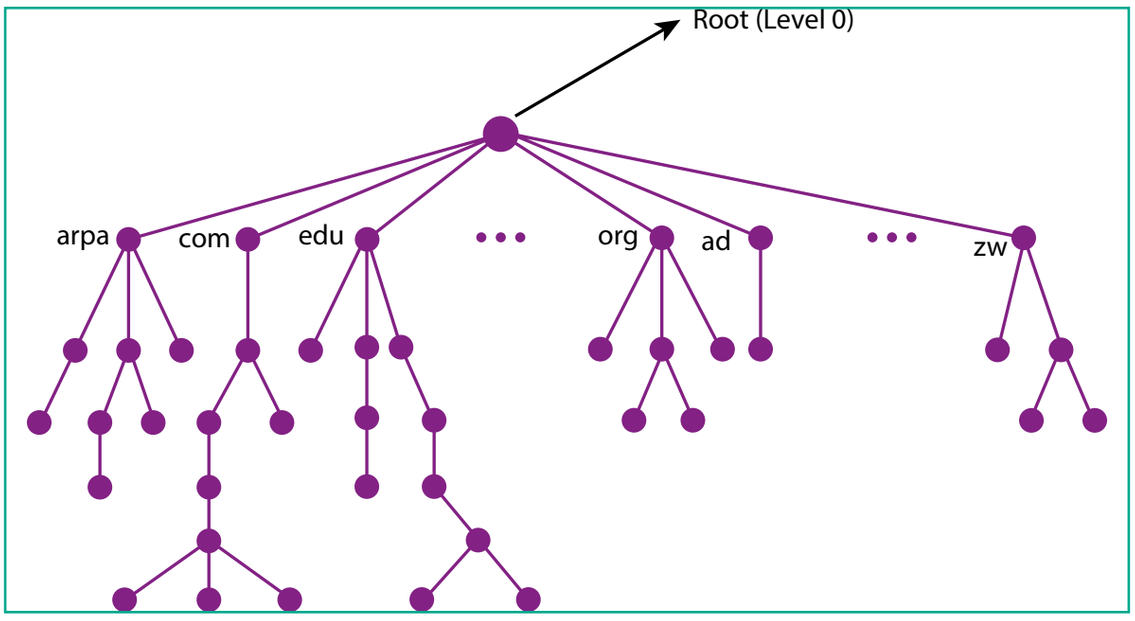


Figure 12.5 **Domain Name Space**

Figure 12.5 represents the domain name space where the root element is present at the top most level, i.e. level 0. The root element always represents the NULL string. The next level to the root element is node. Each node in the tree has a **label** and a **domain name**.

Label

Each node in the DNS tree-like structure has a name, called a label. Label is a string having a maximum of 63 characters. Each node in that level should have different labels, thereby assuring the individuality of the domain name.

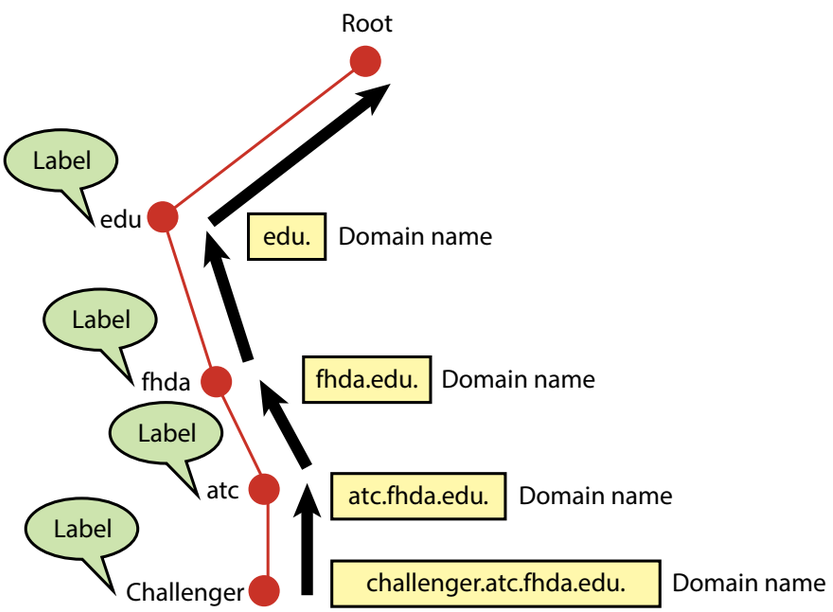


Figure 12.6 **Domain Name and Label**

12th_Computer_Application_English version CHAPTER 12.indd 166 19-01-2023 17:08:46

Domain name

It is the sequence of labels. In domain name the sequence of labels are separated by dot (.). The domain name is always read from the lower level to higher level i.e., from the leaf node to root node.

Figure 12.6 explain the domain name and label clearly. challenger.atc.fhda.edu. is the domain name which is obtained by reading the labels from bottom to top, separating each label by dot (.)

Basic rules of Domain names

- Domain name can consist of alphabets (a-z, A-Z) and the digits (0-9).
- Hyphens are allowed, but hyphens can not be used as the first character of a domain name.
- Spaces are not allowed
- Special symbols (such as !, $, &, _ and so on) are not permitted.
- The entire domain name may be at most 253 characters long.
- Domain names are not case-sensitive.

Generic Top-Level Domain names (gTLD):

Top level domain is the last part of a domain name. Generic top level domains are used for generic purpose. For example .com is used for commercial purpose and .edn is for educational purpose. It is maintained by IANA. Some gTLDs and their usages are listed below.

Table 12.1 Generic Domain Names (gTLD)

Domain Name	usage
com	Commercial Organisation
edu	Educational Institutions
gov	Government (US)
mil	Military groups
org	Non profit Organization
net	Networking organization
info	Information service providers

Country top-level domain names (cTLD)

Country domain uses 2-character country abbreviation according to country. For e.g., google.in for INDIA, google.us for US. Refer Table 12.2

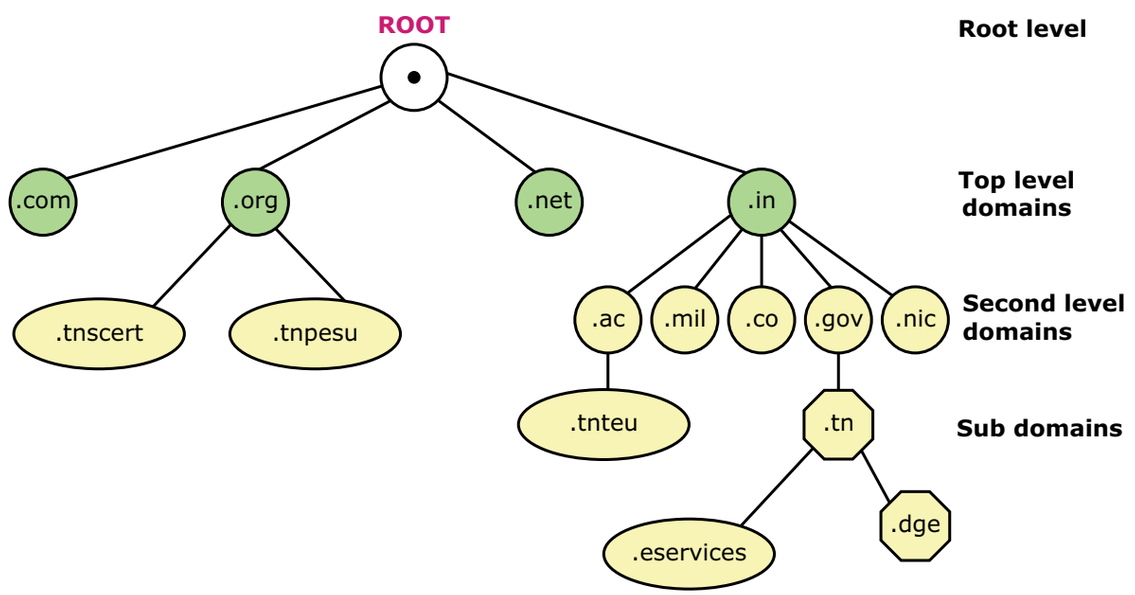


Figure 12.7 Domain representation of www.tnscert.org

12th_Computer_Application_English version CHAPTER 12.indd 167 19-01-2023 17:08:46

Table 12.2 Country domain names (cTLD)	
Domain Name	**country**
in	India
us	United States
fr	France
uk	United Kingdom
ca	Canada
au	Australia
lk	Srilanka
bd	Bangladesh
cn	China
pk	Pakistan
jp	Japan
sg	Singapore

Domain names are also used in other than English languages in UNICODE format. Tamil language is used in three country Top Level Domain names.

Domain Name	country
இந்தியா	India
சிங்கப்பூர்	Singapore
இலங்கை	Srilanka

12.5.2 Name Server

Name Server is a main part of the Domain Name System (DNS). It is a software program that run on a physical system. It has the DNS database consisting of domain names and their corresponding IP addresses. Name Server translates the domain name to IP address.

There is a need to store a large number of domain names for worldwide usage, so plenty of servers are used in the hierarchical manner. Name servers do the important task of searching the domain names. While you searching for a website, Local Nameserver (provided by ISP) asks the different name servers until one of them finds out the answer. At last it returns IP address for that domain name. Your computer is now connected to the requested webpage. Refer Figure 12.8

Inverse domain performs the opposite task of normal DNS query. It converts the IP address to domain name.

Types of Name Servers

There are three types of Name Servers which control the entire Domain Name System:

1. Root Name Server - top level server which contains entire DNS tree, maintained by ICANN. There are 13 servers.
2. Primary Name Server– contains a zone resource records. These records are updatable by domain name holders.
3. Secondary Name Server – contains a copy of primary server files. This server has no authority to update, but reduce the workload of primary server by sharing the queries.

12.5.3 Zone

The entire name space is divided into many different zones. Zone is a group of contiguous domains and sub domains. If the zone has a single domain, then zone and domain are the same.

Every zone has the server which contains a database called zone file. Using

12th_Computer_Application_English version CHAPTER 12.indd 168 19-01-2023 17:08:46

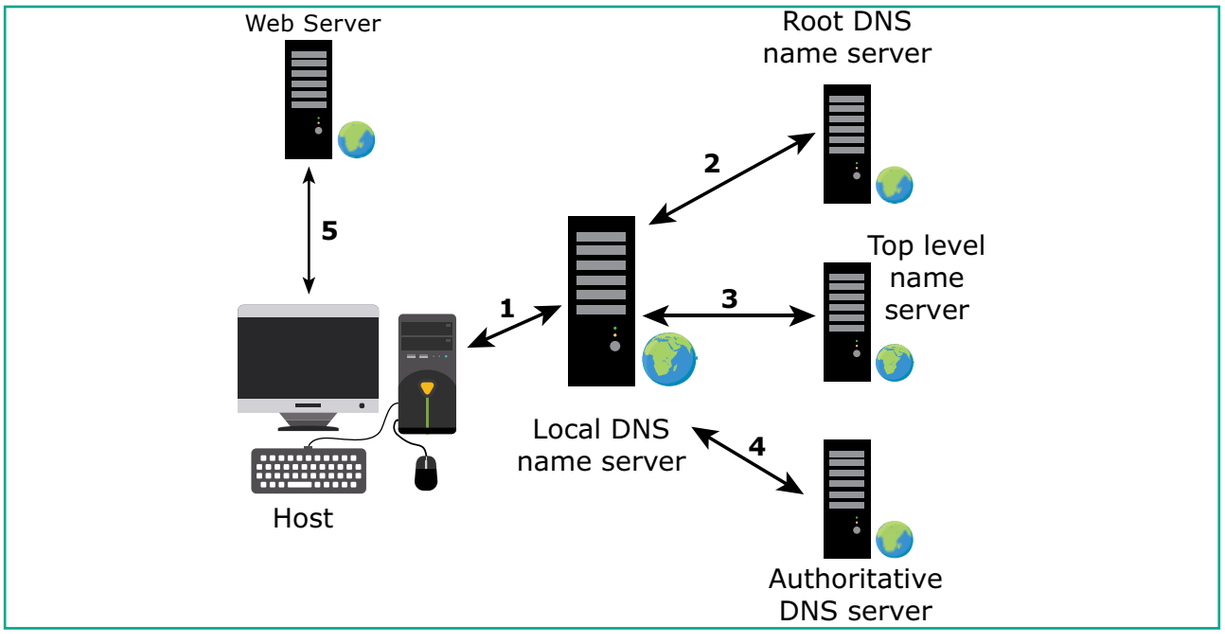


Figure 12.8 working structure of Name server

the zone file, the DNS server replies to the queries about hosts in its zone. There are two copies of zone files available, Master file and slave file. Refer Figure 12.9

LET'S RECAP

- A domain is a subtree in the DNS tree-like structure.
- A zone is a group of contiguous domains and sub domains.
- Domain Name space is an entire collection Domains, Sub domains and Zones
- Name server manages the database of domain names and corresponding IP addresses.
- A server can contain more than one zone files (Zones). A zone can contain more than one sub domains

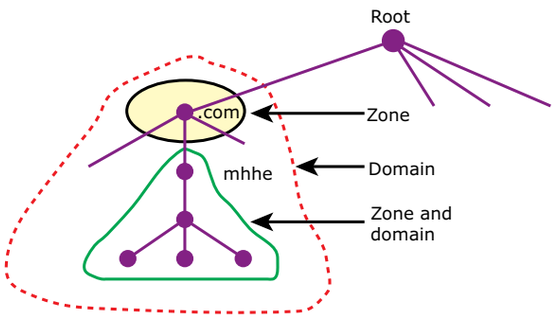


Figure 12.9 Zone and Domains

12.5.4 Resolver

The resolver is a program which is responsible for initiating the translation of a domain name into an IP address. Since a resolver is stored in the host, There is no need of any protocol to form a connection between the resolver and the user program.

DO YOU KNOW?

ICANN, Internet Corporation for Assigned Names and Numbers is the Non-profit Organization which assigns names and numbers for all Internet resources like domain names and IP addresses.

12.5.5 How DNS works?

When the user enters the URL in the browser, the system first checks its DNS cache for the corresponding IP address. If the IP address is found in the cache, then the information is retrieved from cache. If

12th_Computer_Application_English version CHAPTER 12.indd 169 19-01-2023 17:08:47

not, the system needs to query the resolver about the IP address from Internet Service Provider (ISP). Each resolver has its own cache and if it is found in that then that information is retrieved. If not, then the query is passed to next domain server i.e., TLD (Top Level Domain) which reviews the request and direct the query to name servers associated with that specific domain. Until the query is solved it is passed to next level domains. Finally, the IP address is detected and the corresponding record is sent to the resolver. Then the resolver returns the record back to the computer browser Now the user can view the webpages for the detected IP address. Refer Figure 12.10

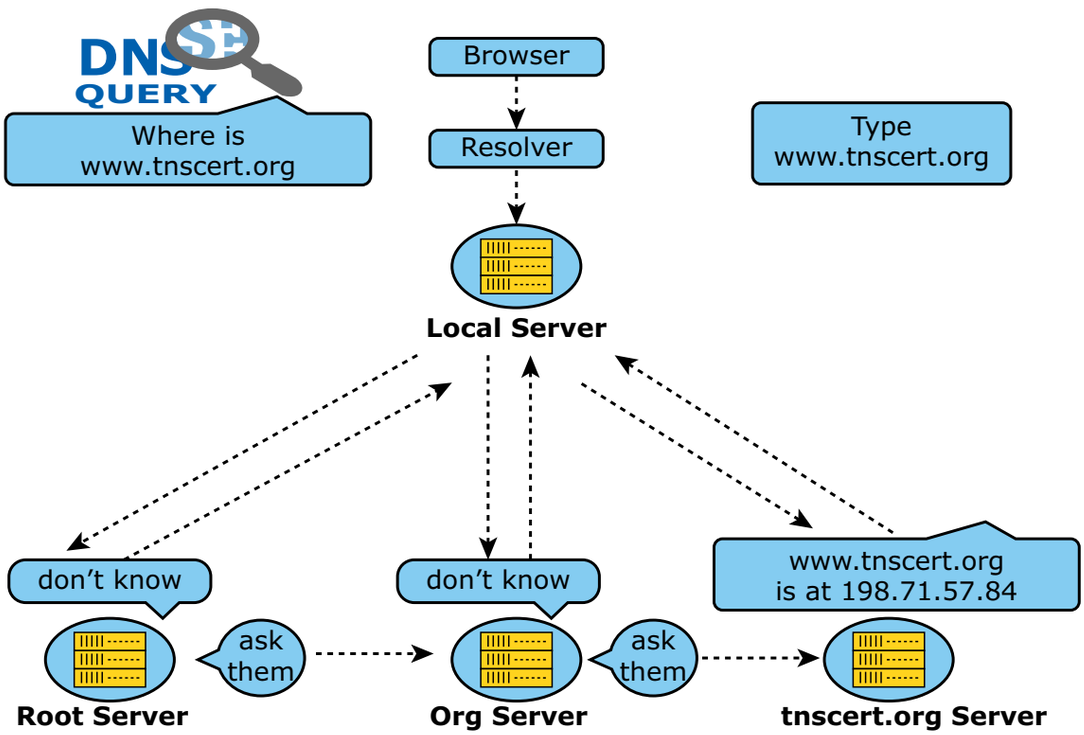


Figure 12.10 workflow of basic DNS



Web Server

Web server is a program running on dedicated machine which handle the queries of www enduser. Server is used to host the websites and to deliver the contents of websites using HTTP. While typing the URL in browser, the browser send the URL to DNS. After getting an IP address from DNS, It sends the request to the web server with IP address . Now the content of websites appear on browser.

12th_Computer_Application_English version CHAPTER 12.indd 170 19-01-2023 17:08:47



IANA (Internet Assigned Number Authority) is an affiliated authority of ICANN. IANA does the overall management of the DNS root server, IP addressing, and other Internet protocol resource handling. IANA takes care of a number of key aspects of the DNS, including the root zone, and the domains .int and .arpa.

https://www.iana.org/

The WHOIS is a service of ICANN. It is a free, publicly available directory containing the details of registered domain names and their owners (registrants). https://whois.icann.org/en

POINTS TO REMEMBER

- Domain Name System (DNS) maintains all the directory of domain names and help us to access the websites using the domain names. It translates the domain name into IP address.
- IP address is a logical address used to uniquely identify a computer over the network. There are two types: IPv4 and IPv6.
- IPv4 address is a 32 bit unique address given to a computer or a device. There are two ways to represent the IP address: Binary notation, Dotted-decimal notation.
- IPv6 address is a 128 bit unique address given to a computer or a device. It follows Hexadecimal number notation.
- URL (Uniform Resource Locator) is the address of a document on the Internet. URL is classified into two types: Absolute URL and Relative URL
- URL is made up of four parts- protocols, domain name, folder name and file name. Absolute URL contains all the four necessary and fundamental parts of URL.
- Relative URL contains file name with folder name or just the file name.
- There are 4 important components in the Domain Name System. They are Namespace, Name server, Zone and Resolver.
- **Label** is a string which can have maximum of 63 characters. Each node in that level should have unique label.
- Domain name space is a tree like structure with root element on the top. It can have a maximum of 128 levels starting from root element taking the level 0 to level 127.

12th_Computer_Application_English version CHAPTER 12.indd 171 19-01-2023 17:08:47

- Domain name is the sequence of labels separated by dot (.). The domain name is always read from the leaf node to root node. The root node always represent NULL string.
- Name Servers are programs that run on a physical system and store all the zone data. It provides to clients when queried by them.
- Zone is the contiguous part up to which the server has access. The domain assigned for the server does not divide into further sub domains then zone is same as domain.
- Resolver, a client/ server application, initiates the process of resolving the domain names.

GLOSSARY

DNS	Domain Name System an Internet service that translates domain name into IP address.
IP address	used to uniquely identify a computer over the network.
URL	Uniform Resource Locator, the address of a specific web page or file on the Internet.
Domain Name space	A naming system on which domain names are in a hierarchical and logical tree structure.
Domain Name	a symbolic name associated with an IP address
Name server	Contains the DNS database which consists of domain names and their corresponding IP addresses.
ICANN	Internet Corporation for Assigned Name and Numbers, Non-profit organization which regulates an Internet.
IANA	Internet Assigned Numbers Authority (IANA) is an affiliated authority of ICANN.
Zone	A group of contiguous domains and sub domains in the Domain Name Space.
The resolver	a program which is responsible for initiating the translation of a domain name into an IP address
TLD	Top Level Domain, domains below the root domain
IPv4 /IPv6	Internet Protocol version 4/6

12th_Computer_Application_English version CHAPTER 12.indd 172 19-01-2023 17:08:47

EVALUATION

I2XA9

Part - I

Choose the correct answer

1. Which of the following is used to maintain all the directories of domain names?
   a) Domain name system b) Domain name space
   c) Name space d) IP address
2. Which of the following notation is used to denote IPv4 addresses?
   a) Binary b) Dotted-decimal
   c) Hexadecimal d) a and b
3. How many bits are used in the IPv6 addresses?
   a) 32
   b) 64
   c) 128
   d) 16
4. Expansion of URL is
   a) Uniform Resource Location
   b) Universal Resource Location
   c) Uniform Resource Locator
   d) Universal Resource Locator
5. How many types are available in URL?
   a) 2 b) 3 c) 4 d) 5
6. Maximum characters used in the label of a node?
   a) 255 b) 128 c) 63 d) 32
7. In the domain name, the sequence of labels is separated by
   a) semicolon (;)
   b) dot (.)
   c) colon (:)
   d) NULL
8. Which of the following initiates the mapping of domain name to IP address?
   a) Zone
   b) Domain
   c) Resolver
   d) Name servers

12th_Computer_Application_English version CHAPTER 12.indd 173 19-01-2023 17:08:47

9. Which is the contiguous area up to which the server has access?

a) Zone

b) Domain

c)Resolver

d) Name servers

10. Root Name servers are maintained by

a) IANA

b) ICANN

c) WHOIS

d) DNS

Part - II

Short Answers

1. List any four domain names.
2. What is an IP address?
3. What is an URL?
4. List out four URLs you know.
5. What is a zone?
6. What is a resolver?
7. Write any four generic Top Level Domain.
8. Mention the components of DNS.

Part - III

Explain in Brief Answer

1. Write a note on URL and its types.
2. Differentiate IPv4 and IPv6.
3. What are the differences between Absolute URL and Relative URL?
4. Write a note on domain name.

Part - IV

Explain in detail

1. Classify and Explain the IP address and its classification.
2. Explain the Name server and its types.
3. Explain how the DNS is working.

12th_Computer_Application_English version CHAPTER 12.indd 174 19-01-2023 17:08:47

STUDENT ACTIVITIES

1. **Find out IP address of your system**

   i. Click start menu and type command or cmd to open command prompt

   ii. A command prompt window will be displayed. Type ipconfig and press enter.

   iii. The IP number is listed under IPv4 Address and IPv6 Address.

   iv. Find out the MAC address of the network card in the list.

   v. Find out and analyze what the other information displayed on the screen.

2. Find out IP address for the websites using command prompt

   i. Click start menu and type command or cmd to open command prompt.

   ii. A command prompt window will be displayed. Type tracert <Space> <Website address>and press enter.

   iii. From the displayed window, You'll see the IPv4 and IPv6 address.

   iv. Find out IP address for another website.

3. List out websites to find out IP address of other websites

   For example:

   https://ipinfo.info/html/ip_checker.php

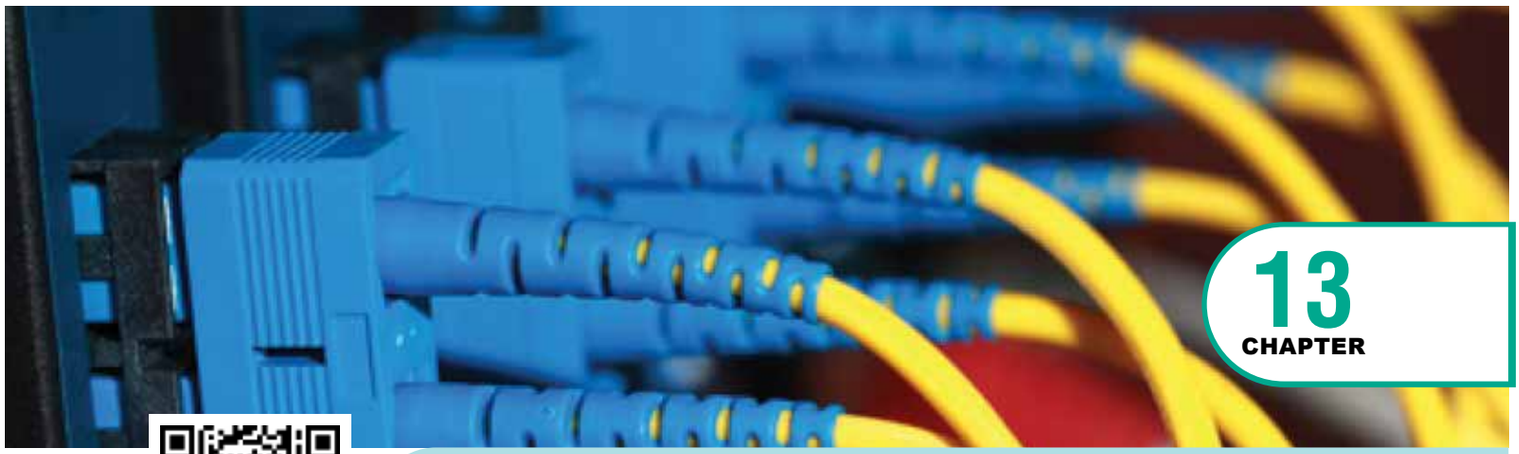
4. Use nslookup in command line and analyse what purpose it is used.

5. Buy your own domain name or create free sub-domain and connect free hosting servers.

   For example:

   www.goDaddy.com, www.webs.com

12th_Computer_Application_English version CHAPTER 12.indd 175 19-01-2023 17:08:47



13
CHAPTER

Network Cabling

LEARNING OBJECTIVES

- To know the necessity of cabling in computer networking.
- To know the different types of cables used in networking.
- To know the components involved in making of Ethernet cable.
- To know the various types of Registered Jacks and its functions
- To know the wiring and colour coding techniques used in Ethernet cabling.

13.1 Introduction

Computer Networking is a group of interconnected computers or other devices for sharing the data and resources among them. Computers can be connected on the network with the help of wired media (Unshielded Twisted pair, shielded Twisted pair, Co-axial cables and Optical fibre) or wireless media (Infra Red, Bluetooth, WiFi)

Wireless networks enable more devices including mobile sharing the resources and Internet connections remotely. But Compared to wireless networks, wired networks maintain a faster Internet speed and more secure. Wired networks for larger area are more expensive. Wired networks are still widely used in the offices where increased speed and secure connections need.

Internet is a global network that connects billons of computers across the world with each other. The essential service of Internet is WWW (World Wide Web) which was invented by Tim Berners Lee. Internet can be accessed easiliy from anywhere but the setting up of the network is a big nightmare. Still network cables are being used worldwide to produce a faster Internet to the people.

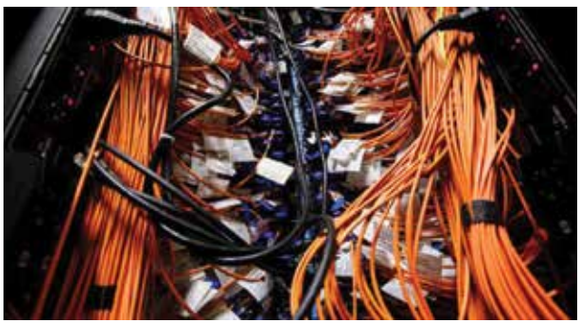


Figure 13.1 Network cables
Source: Data center knowledge

12th_Computer_Application_English version CHAPTER 13.indd 176 19-01-2023 17:10:05

In the figure 13.1 huge and huge cables are used during network cabling. This Causes lot of confusion which cable to be connected and therefore alternatives to replace this are in process.

13.2 Types of Network Cables

There are many types of cables available in the networking. Here we are going to discuss about some types of cables.

1. **Coaxial Cable:** This cable is used to connect the television sets to home antennas. It has a copper wire inside and insulation is covered on the top of the copper wire to provide protection to the cable. It is very difficult to install and maintain, because they are too big to carry and replace. This cable is used to transfer the information at 10 mbps speed. The cable is classified into thinnet and thicknet cables.



Figure13.2 Coaxial cables for connecting television sets

2. **Twisted Pair Cable:** It is a type of cable with two or more insulated wires twisted together. This twisted cable has 8 wires which are twisted to ignore electromagnetic interference.

There are two types of twisted pair cables, Unshielded Twisted Pair (UTP) and Shielded Twisted pair (STP). The UTP is used nowadays as modern cables for Internet and they are lower in cost and installation and maintenance is easy compared to the coaxial cables. STP is similar to UTP, but it is covered by an additional jacket to protect the wires from External interference.

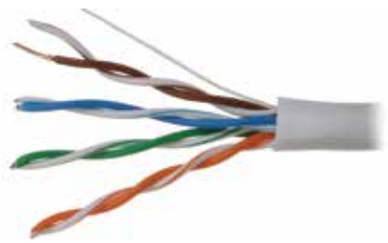


Figure13.3 Twisted pair cables

3. **Fiber Optic cable:** This cable is made by using strands of glass. It uses pulses of light to send the information. They are mainly used in Wide Area Network (WAN). These cables are placed in deep underground to avoid any damage to the cables.

There are two types of fiber optic cables available, One is single-mode another one is Multimode. Single-mode cables are used for long distance transmission and at a high cost whereas the multimode cables are used for short distance transmission at a very low cost. The optic cables are easy to maintain and install.

12th_Computer_Application_English version CHAPTER 13.indd 177 19-01-2023 17:10:05



Figure 13.4 Fiber optic cable with 4 cores combined with one cable.

4. **USB Cables:** The Universal Serial Bus are used to connect keyboard, mouse and other peripheral devices. Micro USB is a miniaturized version of the USB used for connecting mobile devices such as smart phones, GPS devices and digital cameras. The latest version of USB is USB 3.0 which has the data transfer rate 4.85 Gbps.



Figure 13.5 Types of USB Cables



There are some special network devices used to connect the Internet through the USB called dongles. The dongle is a small peripheral device which has a compatible of mobile broadband with a sim slot in it and connects the Internet and acts as a modem to the computer.



5. **Serial and Parallel cables:** Before Ethernet cable was invented, the Serial and Parallel interface cables were used to connect the system to the Internet. They were sometime used for PC to PC networking. E.g. RS232 cable. The serial cable send 1 bit at time whereas the parallel port send 8 bit at a time.



Figure 13.6 The serial cable at the left and parallel cable at the right.

6. **Ethernet Cables:** This is a type of twisted pair cable. It is the most common type of network cable mainly used for connecting the computers or devices at home or office. This cable connects wired devices within the local area network (LAN) for sharing the resources and accessing Internet.



Figure 13.7 The Ethernet cables.

12th_Computer_Application_English version CHAPTER 13.indd 178 19-01-2023 17:10:05

Just like the crossover cable, RS-232 cable is also used for interconnecting two computers without modem. So it is also a null modem cable. A cable interconnecting two devices directly is known as a null modem cable.



13.3 Ethernet Cabling Components

Ethernet cabling is the process of connecting the computers with other devices using Ethernet cables. The four main components used in the Ethernet cabling components are

1. Patch Cable (Twisted pair)
2. RJ45 Connector
3. Ethernet Ports
4. Crimping Tool

13.3.1 Patch Cable (Twisted Pair)

These Cables are generally made up of 8 wires in different colors. Four of them are solid colours, and the others are striped. The following figure 13.8 shows the patch cable.

Ethernet cables are normally manufactured in several industrial standards such as Cat 3, Cat 5, Cat 6, Cat 6e and cat 7. "Cat" simply stands for "Category," and the following number indicates the version. Latest version denotes faster and higher frequencies, measured in Mhz. Increasing the size of the cable also lead to slower transmission speed.

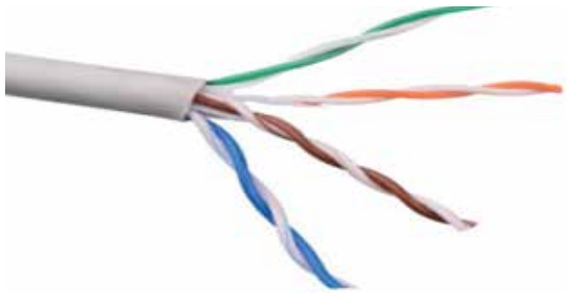


Figure 13.8 Patch cable (Twisted pair)

13.3.2 RJ45 Connector

The RJ45 connector looks similar like a telephone jack but it looks a slightly wider. In RJ45 the "RJ" stands for the Registered Jack and the "45" simply refers to the interface standard.



Figure 13.9 RJ45 Connector

The RJ45 connector is a small plastic cube. It has eight pins. It is connected to each end of the Ethernet cable. It is also known as 8P8C connector. These plugs (connector) are inserted into Ethernet port of the network card.

Wiring schemes and colour codes of the connector

Wiring schemes specifies how the wires to be connected with RJ45 connector. There are two types of wiring schemes available, T-568A and T-568B.

12th_Computer_Application_English version CHAPTER 13.indd 179 19-01-2023 17:10:05

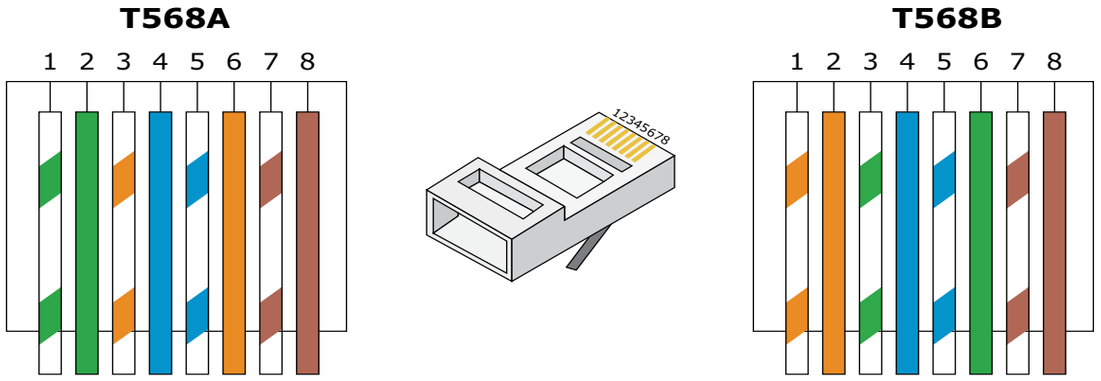


Figure 13.10 The Ethernet wiring schemes (T568A & T568B)

The Table 13.1 describes the pinouts and colour coding of these schemes.

Table 13.1 Wiring schemes with colour codes

Pin	T-568A	Pin	T-568B
1	white / green stripe (Tx+)	1	white / orange stripe (Tx+)
2	green (Tx-)	2	orange (Tx-)
3	white / orange stripe (Rx+)	3	White / green stripe (Rx+)
4	blue	4	blue
5	white / blue stripe	5	white / blue stripce
6	orange (Rx-)	6	green (Rx-)
7	white / brown stripe	7	white / brown stripe
8	brown	8	brown

Although four pairs of wires are available in the cable, Ethernet uses only two pairs: Orange and Green. The other two colors (blue and brown) can be used ISDN or phone connections.

Let's take a look at the pin details of the Ethernet connector. It has two main signals. One is TX (to transmit data) and Rx (to receive data).

1. The first pin is the positive terminal used to transmit data (TX+).
2. The second pin is the negative terminal used to transmit data (Tx-).
3. The third pin is the positive terminal (Rx+) used to receive data.

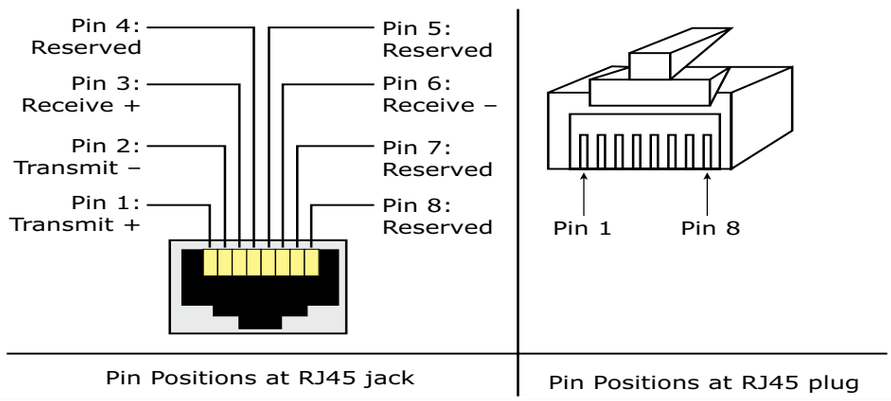
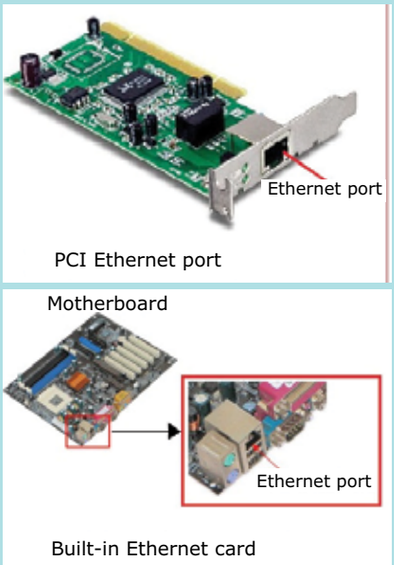


Figure 13.11 The Ethernet port and plug - pin details

12th_Computer_Application_English version CHAPTER 13.indd 180 19-01-2023 17:10:05

DO YOU KNOW?

Ethernet card is a Network Interface Card (NIC) that allows computers to connect and transmit data to the devices on the network. It may be an expansion card or built-in type. Expansion card is a separate circuit board also called as PCI Ethernet card which is inserted into PCI slot on motherboard of a computer. Now a days most of the computers come with built-in Ethernet cards which resides on motherboard. Wireless Ethernet cards are also available, which uses radio waves to transmit data.



4. The fourth and fifth pins are left for later use.

5. The sixth pin is the negative terminal used to receive data (Rx-).

6. The seventh and eighth pins are left for later use.

7. All these pins are bidirectional.

13.3.3 Ethernet Port

Ethernet port is an opening which is a part of an Ethernet card. It accepts RJ45 connector with Ethernet cable. IIt is found on personal computers, laptops, routers, switches, hubs and modems.

Once you inject the plug into the port the two led lights will glow in the computer, one is green and another one is orange. The orange light will start blinking which indicates that the Internet is connected.

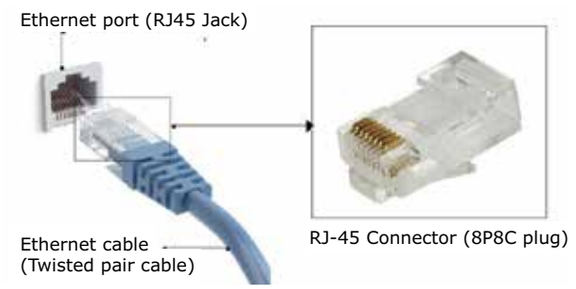


Figure 13.12 **Ethernet cable with Port**

TIPS

Devices/Technology	Alternative Names
Ethernet Technology	RJ45, 802.3 (according to IEEE)
RJ45 Connector (male)	RJ45 plug, Ethernet connector, 8P8C connector
RJ45 socket (female)	Rj45 jack, Ethernet Port
RJ45 Cable	Ethernet cable,

13.3.4 Crimping Tool

Crimping is the process of joining two or more pieces of wire to hold each other. Joining RJ45 connector together with

12th_Computer_Application_English version CHAPTER 13.indd 181 19-01-2023 17:10:06

twisted pair cable at each end is an essential process in Ethernet cabling which lead the cable to function properly.

The crimping tool is a physical tool which is used to connect the patch wire and the Ethernet connector. The crimping tool looks like a small cutting handle with two mould of Ethernet port.



Figure 13.13 Crimping Tool for RJ-11 (6 pin) and RJ-45 (13 pin)

Crimping process for making Ethernet cables

1. Cut the cable with desired length
2. Strip the insulation sheath about 1 inch from both end of the cable and expose the Twisted pair wires
3. After stripping the wire, untwist the smaller wires and arrange them into the proper wiring scheme, T568B preferred generally.
4. Bring the wires tighter together and cut them down so that they all have the same length (½ inch).
5. Insert all the 8 coloured wires into the eight grooves in the connector. The wires should be inserted until the plastic sheath is also inside the connector.
6. Use the crimping tool to lock the RJ45 connector on the cable. It should be strong enough to handle manual traction. Now it is ready for data transmission.
7. Use a cable tester to verify the proper connectivity of the cable. See Figure 13.14

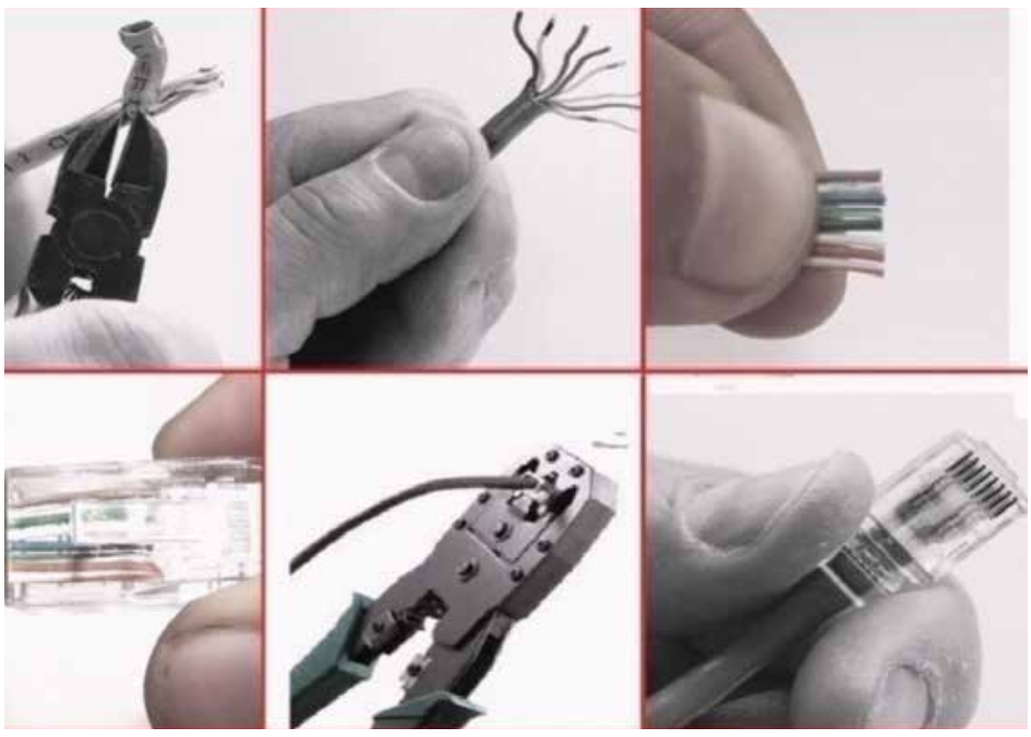


Figure 13.14 Crimping process using crimping tool

12th_Computer_Application_English version CHAPTER 13.indd 182 19-01-2023 17:10:06

13.4 Other types of Jacks

Registered Jack: A Registered Jack commonly known as RJ is a network interface used for network cabling, wiring and jack construction. The primary function of the registered jack is to connect different data equipment and telecommunication devices. The commonly known registered jacks are RJ-11, RJ-45, RJ-21, and RJ-28. The registered jack refers to the male physical connector (Plug), a female physical connector (Jack) and it's wiring. Let us discuss some of the variety of registered jacks

1. **RJ-11:** It is the most popular modern form of registered jack. It is found in home and office used for landline phones. There are 6 pins where the two pins give the transmission configuration, the two pins give the receiver configuration and the other two pins will be kept for reserved.

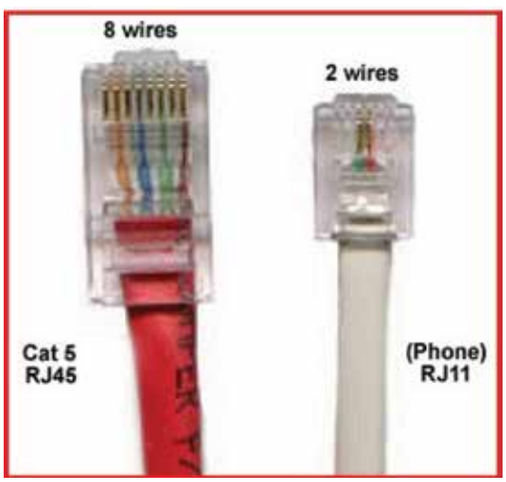


Figure 13.15 comparison of RJ-45 with RJ-11

2. **RJ-14 and RJ-61:** The RJ-14 is also used in telephone lines like RJ-11. It has 6 pins whereas the RJ-61 has 8 pins. RJ-61 uses the twisted pair cable to connect the network devices.



Figure 13.16 RJ-14 Ethernet Connector

3. **RJ-21:** The RJ-21 connector has 50 pins with 25 pins at one end and 25 pins at the other end. It is also called as champ connector or Amphenol connector. The Amphenol is a connector manufacturer. The RJ-21 interface is typically used for data communication trunking applications.



Figure 13.17 The RJ-21 Ethernet port wire with many other ports on the other end.

13.5 Ethernet Cable Color Coding Techniques

There are three types of wiring techniques to construct the Ethernet cable. It is also known as color coding techniques. They are

- Straight-Through Wiring
- Cross-over Wiring
- Roll-over Wiring

13.5.1 Straight-Through Wiring

In general, the cables used for Ethernet connections are "straight-through cables". These cable wires are in the same

12th_Computer_Application_English version CHAPTER 13.indd 183 19-01-2023 17:10:06

sequence at both ends of the cable. It means that pin 1 of the plug on one end is connected to pin 1 of the plug on the other end (for both standard – T568A & T568B). the straight through wiring cables are mostly used for connecting PC / NIC card to a hub. This is a simple physical connection used in printers, computers and other network interfaces.

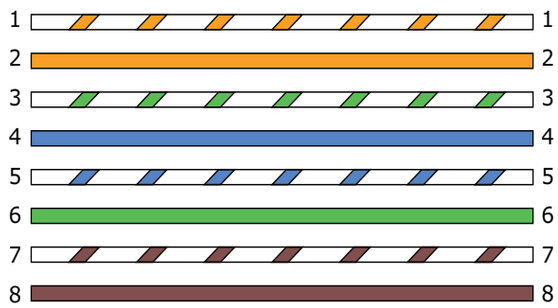


Figure 13.18 Straight through wiring connection

13.5.2 Cross-over Wiring

If you require a cable to connect two computers or Ethernet devices directly together without a hub, then you will need to use a Crossover cable instead. Here, the pairs of Tx and Rx lines are crossed. It means pin 1 & 2 of the plug on one end are connected with pin 3 & 6 of the plug on other end, and vice versa (3 & 6 to pin 1 & 2).

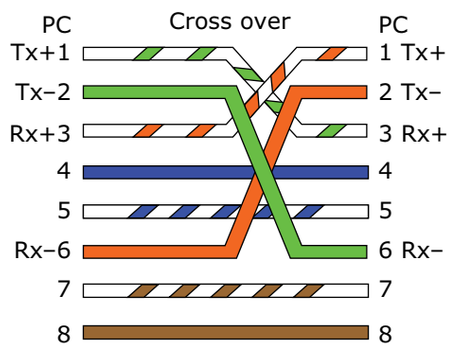


Figure 13.19 Cross over wiring

The easiest way to make a crossover cable is to make one end to T568A colour coding and the other end to T568B.

13.5.3 Roll-over Wiring

Rollover cable is a type of null-modem cable that is often used to connect a device console port to make programming changes to the device. The roll over wiring have opposite pin arrangements, all the cables are rolled over to different arrangements. In the rollover cable, The coloured wires are reversed on other end i.e. The pins on one end are connected with other end in reverse order (i.e. pin 1 to 8, 2 to 7, 3 to 6, 4 to 5, 5 to 4, 6 to 3, 7 to 2, 8 to 1).

Rollover cable is also known as Console cable. It is typically flat (and light blue color) to distinguish it from other types of network cabling.

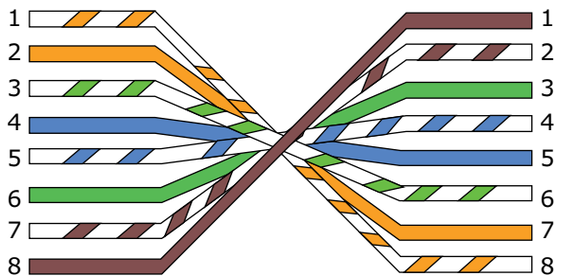


Figure 13.20 Roll over Wiring

These three arrangements are used to perform an interface change. But, all the three arrangements transmits the data at the same speed only.

12th_Computer_Application_English version CHAPTER 13.indd 184 19-01-2023 17:10:06

How to determine the type of Ethernet cables?

Straight-through: The coloured wires are in the same sequence at both ends of the cable.

Cross-over: The first coloured wire at one end of the cable is the third coloured wire at the other end of the cable.

Roll-over: The coloured wires are in the opposite sequence at either end of the cable.

HISTORY OF ETHERNET

Bob Metcalfe **invented Ethernet** in 1973 while at Xerox PARC (Palo Alto Research Center in California, USA) and the company patented it in 1975. It was used for interconnecting advanced computer workstations, making it possible to send data to one another and to high-speed laser printers. Metcalfe and others then finalized an open **Ethernet** standard in 1980, and by 1985 it had become an IEEE standard. An industry was born, and **Ethernet** was ready for its meteoric rise.

There have been a number of networking standards published in the 802 branch of the IEEE, including the 802.3 Ethernet and 802.5 Token Ring standards. The IEEE standard was first published in 1985 with the title *IEEE 802.3 Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications* . The IEEE standard does not use "Ethernet" in the title, even though Xerox relinquished their trademark on the Ethernet name. That's because open standards committees are quite sensitive about using commercial names that might imply endorsement of a particular company. As a result, the IEEE calls this technology *802.3 CSMA/CD* or just *802.3*. However, most people still use the Ethernet name when referring to the network system described in the 802.3 standard.

Source : www.wikipedia.org

12th_Computer_Application_English version CHAPTER 13.indd 185 19-01-2023 17:10:06

POINTS TO REMEMBER

- By using World Wide Web, now people can access the network from different parts of the world.
- The Network cables are used to transfer the data and information to another computer.
- Coaxial cables are used for connecting the television with setup box.
- Twisted cable has 8 wires which are twisted to ignore electromagnetic interference
- Two types of twisted pair cables are Unshielded Twisted Pair (UTP) and Shielded Twisted pair (STP).
- The optic cable uses light to transmit the information from one place to another. They are mainly used in Wide Area Network (WAN).
- There are two types of fibre optic cables are available are Single-mode (100BaseBx) and Multimode (100BaseSX).
- Single-mode cables are used for long distance transmission and at a high cost whereas the multimode cables are used for short distance transmission at a very low cost.
- USB cables are used connect keyboard, mouse and other peripheral devices
- The serial port will send 1 bit at one time whereas the parallel port will send 8 bit at one time.
- The parallel cables are used to connect to the printer and other disk drivers.
- Cross over cable is used to join two network devices of the same type like example two PCs or two network devices. The Null modem Cables are the example of the crossover cables.
- The Ethernet cable is the basic component of the Local Area Network (LAN)
- The RJ45 Ethernet connector is a small plastic cup which will be used to connect the wire inside the connector and ready to use to connect the Internet.
- The RJ45 connector has eight small pins inside to connect eight small wires in the patch cable. The eight cables has eight different colours
- The Ethernet port is the jack where the Ethernet cable is to be connected. This port will be there in both the computers and the LAN port.
- The crimping tool is a physical tool which is used to connect the patch wire and the Ethernet connector(RJ45).
- A Registered Jack (RJ) is a network interface used for connecting different data equipment and telecommunication devices.
- RJ11 jack is mainly used in telephone and landlines
- There are three wiring techniques available in Ethernet cables: Straight through Wiring, Cross over Wiring and Roll over Wiring.

12th_Computer_Application_English version CHAPTER 13.indd 186 19-01-2023 17:10:06

GLOSSARY

ARPANET	Advanced Research Project Agency Network, predecessor to the modern Internet
WWW	World Wide Web, Definition comes from the World Wide Web Consortium (W3C): "The World Wide Web is the universe of network-accessible information, an embodiment of human knowledge."
10BASE-T / 100BASE-TX / 100BASE-FX/ 100BASE-BX/ 100BASE-SX	10 Mbps / 100 Mbps Mbps stands for Mega bits per second T stands for Twisted pair X stands for number of paired copper wires F, B, S – Fibre optic cables
WAN	Wide Area Network, WAN is the network that spans large geographical area
USB	Universal Serial Bus, connects all the peripheral devices with the computers
Null modem cables	A communication method directly connects two computers without modem or any equipment.
LAN	Local Area Network in which the devices used in home or office interconnected for sharing the resources.
TX / RX	Transmit / Receive signals used in connectors
Dongles	The dongle is a small peripheral device with a sim slot in it and connects the Internet and acts as an Ethernet port to the computer.

12th_Computer_Application_English version CHAPTER 13.indd 187 19-01-2023 17:10:06

EVALUATION

JZKQ2

Part - I

Choose the correct answer

1. ARPANET stands for

   a) American Research Project Agency Network
   b) Advanced Research Project Area Network
   c) Advanced Research Project Agency Network
   d) American Research Programs And Network

2. WWW was invented by

   a) Tim Berners Lee b) Charles Babbage
   c) Blaise Pascal d) John Napier

3. Which cable is used in cable TV?

   a) UTP cable b) Fibre optics
   c) Coaxial cable d)USB cable

4. Expansion of UTP is

   a) Uninterrupted Twisted Pair b) Uninterrupted Twisted Protocol
   c) Unshielded Twisted Pair d) Universal Twisted Protocol

5. Which medium is used in the optical fibre cables to transmit data?

   a) Microwave b)infra red c)light d)sound

6. Which of the following is a small peripheral device with a sim slot to connect the computers to Internet?

   a) USB b) Dongles c) Memory card d) Mobiles

7. Which connector is used in the Ethernet cables?

   a) RJ11 b) RJ21 c) RJ61 d) RJ45

8. Which of the following connector is called as champ connector?

   a) RJ11 b) RJ21 c) RJ61 d) RJ45

9. How many pins are used in RJ45 cables?

   a) 8 b) 6 c) 50 d) 25

10. Which wiring standard is used for connecting two computers directly?

    a) straight Through wiring b) Cross Over wiring
    c) Rollover wiring d) None

12th_Computer_Application_English version CHAPTER 13.indd 188 19-01-2023 17:10:06

Part - II

Short Answers

1. Write a note on co-axial cable.
2. What are the uses of USB cables?
3. What is an Ethernet port?
4. What is the use of Crimping tool?
5. What are the types of twisted pair cables?
6. What is meant by champ connector?

Part - III

Explain in Brief Answer

1. Write a note on crossover cables.
2. Write a short note on RJ45 connector.
3. What is meant by null modem cable? Give the examples.
4. What are the components involved in Ethernet cabling?
5. What are the types of Fibre optic cables?

Part - IV

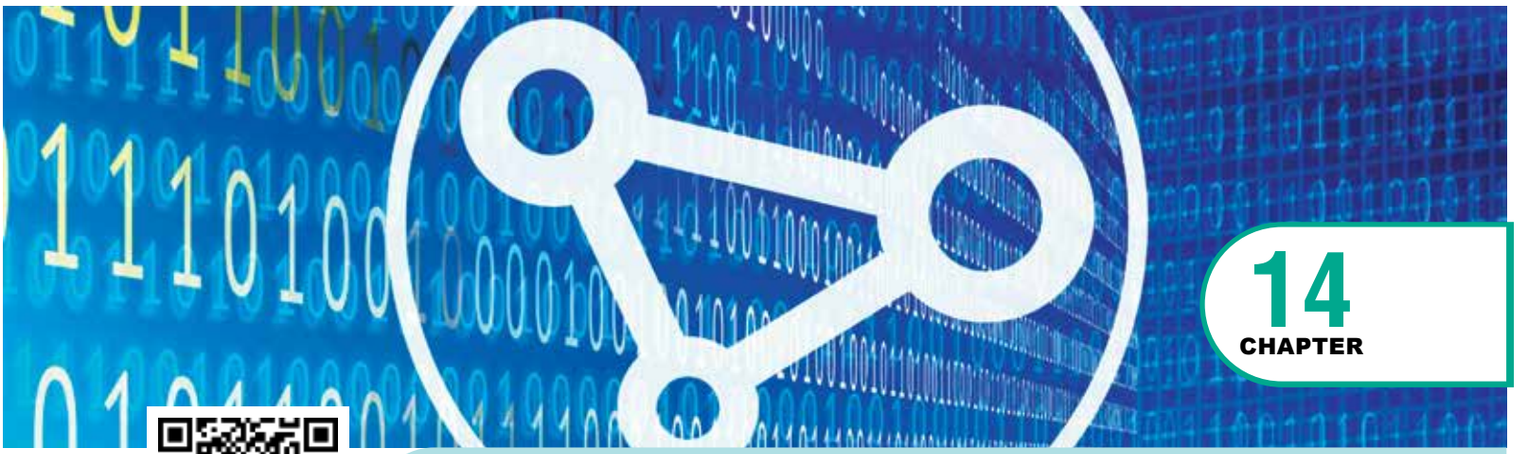
Explain in detail

1. What is meant by Registered Jack? Explain briefly the types of Jacks.
2. Explain the components used in Ethernet cabling.
3. Explain the types of network cables

STUDENT ACTIVITIES

1. Make your own Crossover cable.
   - A Purchase the following
     - i. a patch cable(UTP cat 5e / 6) with desired length
     - ii. RJ45 connector(8P8C modular plug) of both wiring schemes(T568A and T568B)
     - iii. Crimping Tool
   - B. Construct the cable using the method described in the text book, with the help of crimping tool
2. Connect two computers using Crossover cable for sharing resources

12th_Computer_Application_English version CHAPTER 13.indd 189 19-01-2023 17:10:07



14
CHAPTER

Open Source Concepts

LEARNING OBJECTIVES

To know the

- Need of Open Source Software.
- NS2 and its Use
- OpenNMS and Group which created OpenNMS
- OpenSource Hardware

14.1 Introduction

Free software and compilers were provided with early computer hardware. With these human understandable code the user can modify, add new code and identify the errors.

Can anyone change the codes in Open Source Software?

Open Source Software has been developed by a variety of programmers. However, to add a new change to the software,the modified code will be submitted to a group of dedicated programmers. These programmers then test the modified codes and if it satisfies the appropriate rules, it will then be distributed to all.

Why it is called open source?

Open Source simply refers to making the source code of the software freely available for users or other developers to use and make changes into the original repository or fork the project into and build a new one. Open Source Software is usually created and updated by many programmers around the world and made freely accessible. Proprietary software is owned by an organization or individual. The makers of proprietary software have not allowed the users or other developers to view or edit the source code. But the advantage of the proprietary software is that it gives more control, support, training, security and stability for user making the software reliable to the users

Need for Network Open Source Software

In a network it is not easy to find problems. Especially when there are more systems are connected, the complexity is more, so we need Network Software to Control, Analyse the Server, System, protocol, Network, Traffic flow and reports about ups and downs of network parts.

12th_Computer_Application_English version CHAPTER 14.indd 190 19-01-2023 17:11:02



NRCFOSS

National Resource Centre for Free and Open Source Software is an Institution of Government of India. It helps in development of FOSS (Free Open Source Software) in India.

Organizations related to Open Source

- Apache Software Foundation
- Free Software Foundation
- Linux Foundation
- Open Source Initiative

BOSS

BOSS (Bharat Operating System Solutions) Operating System Developed in India by C-DAC (Centre for Development of Advanced Computing) helps to prompt the use of Open Source Software in India. It supports many Indian Languges.

Types of open source license

- Apache License 2.0
- BSD 3-Clause "New" or "Revised" license
- BSD 2-Clause "Simplified" or "FreeBSD" license
- GNU General Public License (GPL)

When you change the source code, OSS requires the inclusion of what you altered as well as your methods. The software created after code modifications may or may not be made available for free.

Open-Source Software vs. Free Software

Although the terms are often used interchangeably, OSS is slightly different from free software. Both deal with the ability to download and use software without restriction or charge. However, free software is a concept developed in the 1980s by an MIT computer science researcher, Richard Stallman who defined four conditions - as outlined by the nonprofit Free Software Foundation. These "four freedoms" emphasize the ability of users to use and enjoy software as they see fit.

In contrast, the OSS criteria, which the Open Source Initiative developed a decade later, place more emphasis on the modification of software, and the consequences of altering source code, licensing, and distribution.

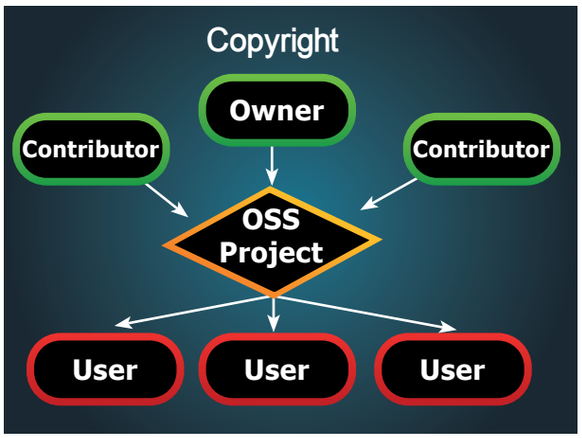
Obviously, the two overlap; some would say the differences between OSS and free software are more philosophical than practical. However, neither should be confused with freeware. Freeware usually refers to proprietary software that users can download at no cost, but whose source code cannot be changed.

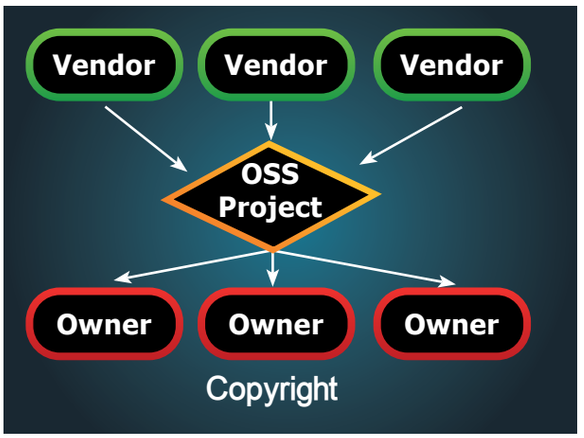
Benefits of Open-Source Software

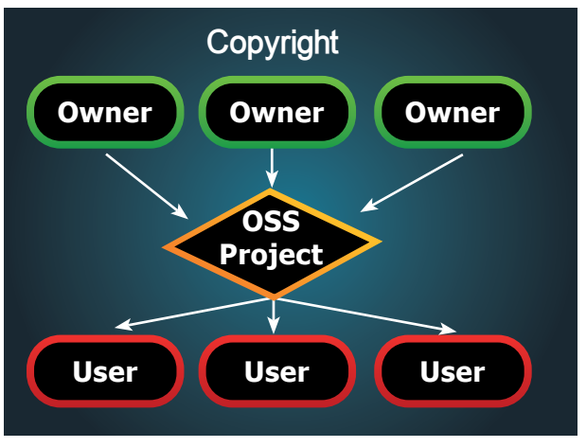
OSS projects are collaboration opportunities that improve skills and build connections in the field. Domains that developers can contribute to the open source community include:

- **Communication tools.**
- **Distributed revision control systems.**
- **Bug trackers and task lists.**
- **Testing and debugging tools.**

12th_Computer_Application_English version CHAPTER 14.indd 191 19-01-2023 17:11:02

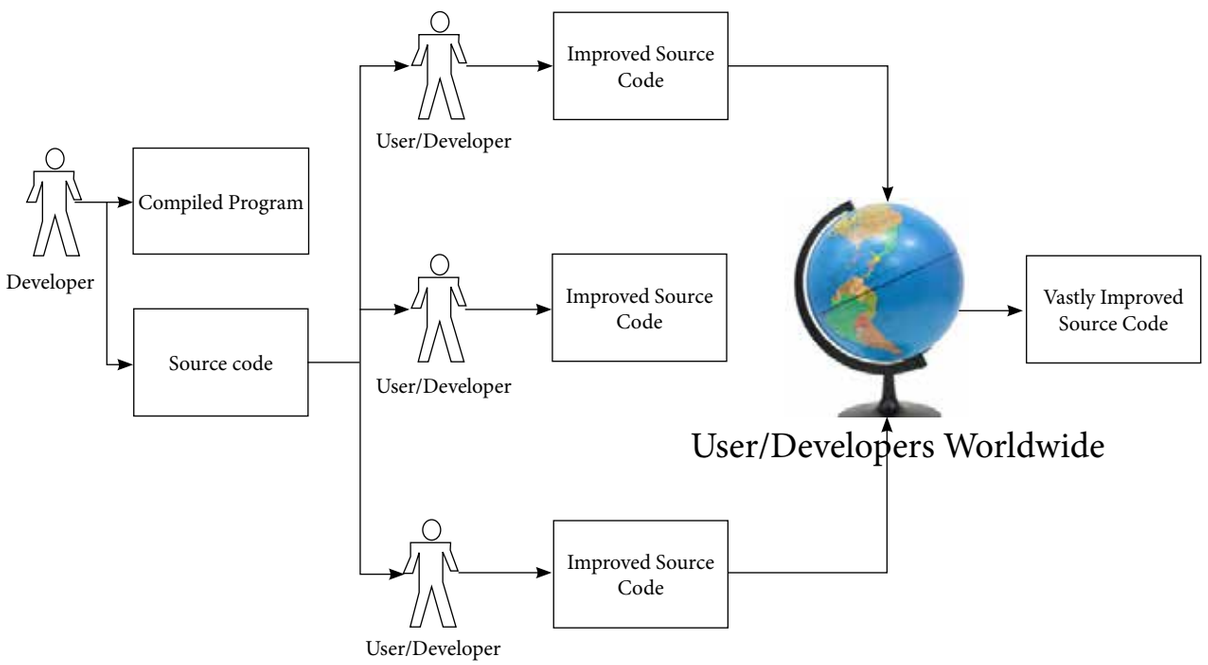






- There are many Open Source Softwares. so, we can select and use any software that suits our needs.
- The complete options of the software can be used without any cost and restrictions.
- We can share our ideas with the team, write the required code and share it with many.
- As we can identify the programming techniques of group members, we can learn many ideas and make our program writing skills more efficient.

How Open Source work



12th_Computer_Application_English version CHAPTER 14.indd 192 19-01-2023 17:11:02

- The coding in Open Source Softwares are being groomed by many enthusiastical members of the group. So if we report problems that we have in the program they are quickly mended by the group's effort.
- As we can make changes to the Open Source Softwares, we can add the most required features in the software
- Many Open Source Software are very user friendly.

Like benefits Open Source Software also have Some Problems Like Difficult to work for beginners, Exchange of files to other softwares, Some times Lack of Responsibility, service and problems related to hardware compatibility.

Example of open source Application software

NS2 , OPEN NMS, Ubuntu , MySQL, PDF Creator, Open Office, 7zip GNUCASH, GIMP, BLENDER, AUDACITY, VLC, MOZILA FIREFOX, MAGENTO, ANDROID, PHP

14.2 Network simulation tool – NS_2

In computer **network**, **network simulation** is a method where a **software program** models the activities of a **network** by calculating the communication between the different **network** objects such as(routers, nodes, switches, access points, links etc.). A **network** simulator is a software program that replicates the functioning of a **computer network**. In simulators, the computer network is typically demonstrated with devices, traffic etc. and the performance is evaluated. Normally, users can then adapt the simulator to accomplish their precise analysis needs. The network parameters that define the state of the network (node placement, existing links) and the events (data transmissions, link failures, etc.). A significant output of simulation is the trace files. Trace files can document every incident that happened in the simulation and are used for examination.

NS2 is the abbreviation of NETWORK SIMULATOR version 2. It was considered explicitly for exploration in network communication and event-driven open-source simulator in computer.

OTCL and c++ are used to create and run NS2. NS2 works on Windows and Linux platforms, that supports wired or wireless network and also use the command line interface as a user interface, API is a pure event base software tool with super simulation design, it has more models which help the user to get desired output easily.

14.3 Open NMS

Open NMS (Network Management System) is a free and open-source initiative grade network monitoring and management platform. It is established and maintained by a community of users ,developers and by the Open NMS Group, it offering services, training and support. The goal is for Open NMS to be actually distributed, scalable management application platform for all features of the FCAPS (Fault, configuration, accounting, performance, security) network

12th_Computer_Application_English version CHAPTER 14.indd 193 19-01-2023 17:11:02

management model. Presently the emphasis is on Fault and Performance Management.

It was intended to cope tens of thousands of devices from a single server as well as achieve unlimited devices using a cluster of servers. OpenNMS comprises of a discovery engine to routinely configure and manage network devices without operator intervention. It is written in Java and is issued under the GNU (General Public License.)

OpenNMS is the Worlds first software for Network monitor and management with opensource options. There are two types of Open NMS - Meridian and Horizon. When we need stability and long term support choose Meridian which is best for Enterprises as well as businesses. Horizon used where innovation occurs frequently. It is Best for IT-ecosystem, new technologie monitoring. OpenNMS was Released in 1999.

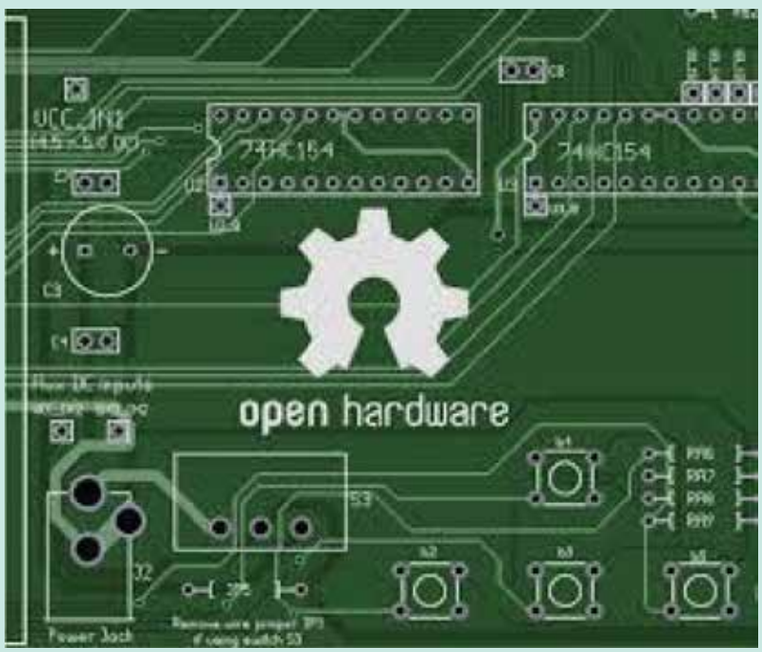
In 2004 OpenNMS Group was created. It is written in Java and can run on all type of platform. It gives us Event management & Notification, Discovery & Provisioning, service monitoring and Data Collection. It has won lot of awards for best Open Source Software.

14.4 Open Source Hardware

In this period of increased competition and cyber crimes, the computers used by indivudals or business organisations may have spy hardwares of rivals. Open source hardware technology helps in such threats. In this technique we get the components of the hardware and its circuit diagram, so that we can remove suspicious spyware if found.

Open Source Hardware

- Remix
- Remake
- Remanufacture
- Redistribute
- Resell
- Study and Learn



12th_Computer_Application_English version CHAPTER 14.indd 194 19-01-2023 17:11:02

POINTS TO REMEMBER

- Open Source denotes to some program whose source code is made available for usage or reform as users or other developers see appropriate
- In simulators, the computer network is typically demonstrated with devices, traffic etc. and the performance are evaluated.
- A significant output of simulation is the trace files. Trace files can document every incident that happened in the simulation and are used for examination.
- NS2 has C++ and Object-oriented Tool Command Language (OTcl) of languages 2.
- It link together for C++ and the OTcl using TclCL.
- Open NMS (Network Management System) is a free and open-source initiative grade network monitoring and network management platform.
- Network monitoring software notifications help the user/administrator for fixed errors.

A-Z GLOSSARY

NS2	Network Simulation 2
OpenNMS	First Open Source Network Management Software
Trace File	A document file, consists of every incident happens in a simulation
OTCL	Object-oriented Tool Command Language
FCAPS	Fault, configuration, accounting, performance, security
GNU - GPL	GNU - General Public License
SSFNet	Scalable Simulation Framework Net Models
API	APPLICATION PROGRAM INTERFACE
SOURCE CODE	Set of Instructions that decide, how the software should work
BOSS	Bharat Operating System Solutions
C-DAC	Centre for Development of Advanced Computing
FOSS	Free Open Source Software

12th_Computer_Application_English version CHAPTER 14.indd 195 19-01-2023 17:11:02

EVALUATION

2U7NG

Part - I

Choose the correct answer

1. If the source code of a software is freely accessible by the public, then it is known as

   a) freeware b) Firmware c) Open source d) Public source

2. Which of the following is a software program that replicates the functioning of a computer network?

   a) Network software b) Network simulation

   c) Network testing d) Network calculator

3. Which of the following can document every incident that happened in the simulation and are used for examination?

   a) Net Exam b) Network hardware

   c) Trace file d) Net document

4. Which is an example of network simulator?

   a) simulator b) TCL c) Ns2 d) C++

5. Choose the Correct Pair from the following to build NS2

   a) UNIX & TCL b) UNIX & a. C++

   c) C++ & OTcl d) C++ & NS2

6. Which of the following is not a network simulation software?

   a) Ns2 b) OPNET c) SSFNet d) C++

7. Which of the following is a open source network monitoring software?

   a) C++ b) OPNET c) Open NMS d) OMNet++

8. Open NMS was released in .....

   a) 1999 b) 2000 c) 2003 d) 2004

12th_Computer_Application_English version CHAPTER 14.indd 196 19-01-2023 17:11:03

Part - II

Short Answers

1. What is Open Source Software?
2. What is meant by network simulator?
3. What is trace file?
4. Write short notes on NS2.
5. Write short note on Open NMS?

Part - III

Explain in Brief Answer

1. What are the uses of Open source Network Software?
2. Explain Free software.
3. List out the Popular Open Source Software.
4. Write note on open source hardware.
5. Explain Types of Organisations related to Open Source.

Part - IV

Explain in detail

1. Differentiate Proprietary and Open Source Software.
2. List out the Benefits of Open Source Software

STUDENT ACTIVITIES

1 Mention Open Source Software and free software names that not explain in this chapter.
2. Mention Software that are accounts related.
3. Mention Open Source Developing and maintaining companies

12th_Computer_Application_English version CHAPTER 14.indd 197 19-01-2023 17:11:03



15
CHAPTER

E-Commerce

LEARNING OBJECTIVES

- To learn the concept of E-Commerce.
- To know the brief history of E-Commerce.
- To analyze different types of E-Commerce business models and revenue models.
- To distinguish between E-Commerce and Traditional commerce.
- To understand the advantages and disadvantages of E-Commerce.

15.1 Introduction

"The wise possess all". Anyone who is quick to identify and adopt innovation will be successful. Commerce always profits from innovations. Successful businesses quickly identify developing opportunities in emerging new technology, and expand their commercial capabilities.

The customer goes to the market, checking out a variety of products, choosing required stuff, purchasing them and then paying the specific amount is traditional commerce. However, recent ways of buying or selling goods and services have come up with technology innovations.

In near future commercial activities such as buying or selling of goods between merchant and consumer in a traditional setting will be forgotten like barter system.

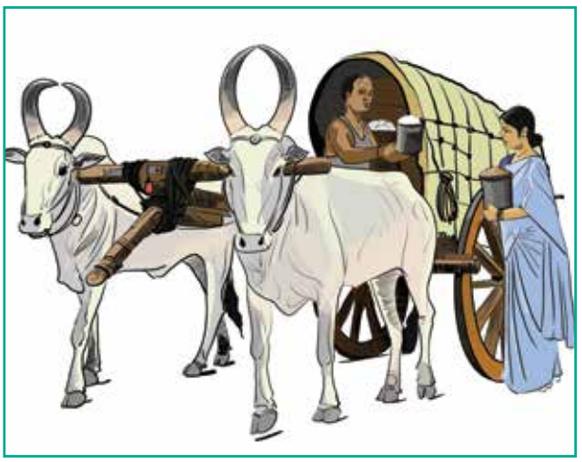


Figure 15.1 Conventional commodities exchanging System

As growth in technology and vast usage of internet, our style of living has changed and this has also modified the working of commercial trade.

12th_Computer_Application_English version CHAPTER 15.indd 198 19-01-2023 17:19:47

E-Bussiness

In 1996, IBM coined the term E-Business. Just, as business is broader than commerce, E-Commerce is a subset of E-Business.

E-Commerce is commercial transaction through Internet, but E-Business entirely depends on the Internet for its every intra-company and inter-company activities such as procurement of raw materials, marketing, finance, manufacturing, selling and negotiation.

While, E-Commerce is limited with monetary transactions using Internet E-Business is grounded on technologies such as Network Infrastructures (like Internet, Intranet, Extranet), Multimedia content & network publishing infrastructures (like HTML, Online Marketing), Messaging & information distribution infrastructures (like EDI, e-mail, http, Computerized Inventory Management Systems) and other Common business service infrastructures (like electronic payments gateways, globalized Supply Chain Management (SCM), Online Transaction Processing).

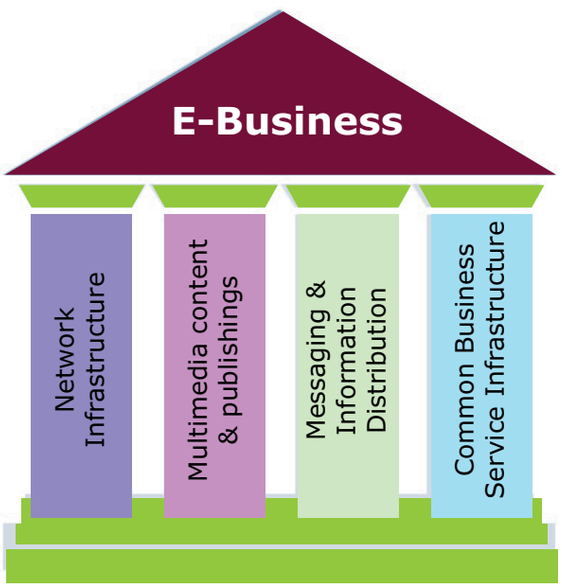


Figure 15.2 E-Business building block

A company can be called E-Business if and only if

- It has the ability to conduct business electronically over Internet.
- It manages payment transaction through Internet.
- It has a platform for selling products & services via Internet.

E-Commerce

E-Commerce is currently one of the most important aspects of the Internet era. Just like the words e-mail, e-book with the prefix 'e' ('e' stands for electronic) Commerce and Internet makes E-Commerce. It also allows the consumers to exchange goods and services with no barrier of time or distance. Electronic commerce has expanded rapidly over the past few years and is predicted to accelerate.

> E-Commerce can be described as the process of buying or selling products, services or information via computer networks.

E-Commerce could be a consumer based retail site or auction site or trade between large business organizations. The commodity could be a laptop or a wrist watch or it could be an operating system or a simple browser plugin.

These commodities are classified into tangible and intangible products.

Tangibles products may be like printed books, CD's and DVD's, lamp etc., Intangible products may be like digital files, downloaded video games, music files are movies which can not be physically touch.

12th_Computer_Application_English version CHAPTER 15.indd 199 19-01-2023 17:19:47



Figure 15.3 Tangible and intangible goods.

15.2 The Evolution of Electronic Commerce

E-Commerce is not a completely new type of commerce. The dawn of E-Commerce started few decades ago and continues to grow exponentially. It first emerged on private networks in 1970s. Electronic Data Interchanges and teleshopping together paved the way for the E-Commerce.

The history of modern E-Commerce is closely twisted together with the history of the Internet. E-Commerce became really possible when the Internet was opened to commercial use. Online shopping started to grow when National Science Foundation opened the Internet to the public in 1991. Since then businesses have reached websites.

With the progress of the Internet technology and vastly developed global Internet community, large number of Dotcoms, FinTech and Internet Startups have appeared and a strong foundation of electronic commerce continues to build.

The Internet has provided new commercial potential not only for large organizations, but also provided a sustainable entry point for Small and Medium-sized Enterprises (SMEs) of E-Commerce. Today, E-Commerce is no longer an exclusive domain of large organizations or private networks.

Even though E-Commerce has been existing since few decades, it has recently sustained significant growth. It is because the Internet has transformed from an auxiliary communication medium of academics and large organizations to an entrenched communication medium that extends nearly to all parts of mainstream society. Integrated with commercialization of the Internet, personal computers and electronic payment systems together made E-Commerce flourish.

The growth of E-Commerce is also related to the socio-technological changes. The more, the medium becomes deep-rooted, the more, are the users drawn towards it. Increase of users, increases the markets. As the markets expand, more business organizations are attracted. The more businesses accumulate it create competition. The competition leads to innovation; innovation in turn drives the development of technology; technology facilitates E-Commerce's growth.



In 1979, Michael Aldrich, an English entrepreneur, proposed a technique that enables online transaction processing between consumers and businesses, or between businesses. It was later proficiently called as E-Commerce. In 1980 he invented a multi-purpose home infotainment device called Teleputer, which was a fusion of Television, Computer and Telecom networking technologies.



12th_Computer_Application_English version CHAPTER 15.indd 200 19-01-2023 17:19:47

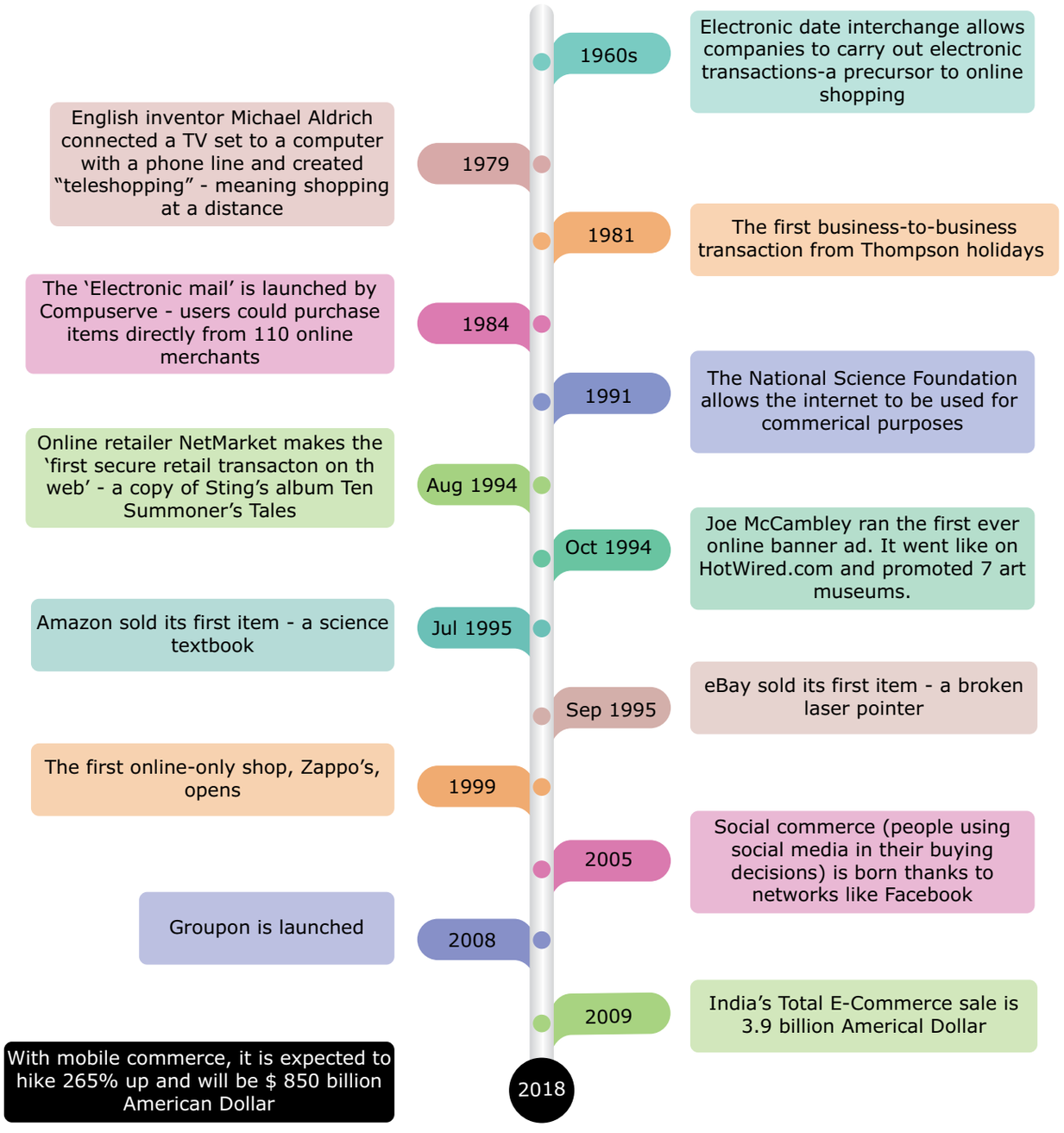


Figure 15.4 **Timeline describing various events in E-Commerce**



In August 11, 1994 by noon of the day, Phil Brandenberger of Philadelphia (U.S.A), bought a music CD (Sting's "Ten Summoners' Tales") from Kohn of Nashua (U.S.A) and paid $12.48 plus shipping charges using his credit card through online. This is marked as the first true E-Commerce transaction.

12th_Computer_Application_English version CHAPTER 15.indd 201 19-01-2023 17:19:47

15.3 The Development and Growth of Electronic Commerce

Economists describe four distinct waves (or phases) that occurred in the Industrial Revolution. In each wave, different business strategies were successful. Electronic commerce and the information revolution brought about by the Internet likely go through such series of waves.

The First Wave of Electronic Commerce: 1995 -2003

The Dotcom companies of first wave are mostly American companies. Thereby their websites were only in English. The Dotcom bubble had attracted huge investments to first wave companies.

As the Internet was mere read-only web (web 1.0) and network technology was in its beginning stage, the bandwidth and network security was very low. Only EDI and unstructured E-mail remained as a mode of information exchange between businesses. But the first wave companies enjoyed the first-move advantage and customers were left with no option.

The Second Wave of Electronic Commerce: 2004 – 2009

The second wave is the rebirth of E-Commerce after the dotcom burst. The second wave is considered as the global wave, with sellers doing business in many countries and in many languages. Language translation and currency conversion were focused in the second wave websites. The second wave companies used their own internal funds and gradually expanded their E-Commerce opportunities. As a result E-Commerce growth was slow and steady. The rapid development of network technologies and interactive web (web 2.0, a period of social media) offered the consumers more choices of buying. The increased web users nourished E-Commerce companies (mostly B2C companies) during the second wave.

The Third Wave of Electronic Commerce: 2010 – Present

The third wave is brought on by the mobile technologies. It connects users for real-time and on-demand transactions via mobile technologies. The term Web 3.0, summarize the various characteristics of the future Internet which include Artificial Intelligence, Semantic Web, Generic Database etc.

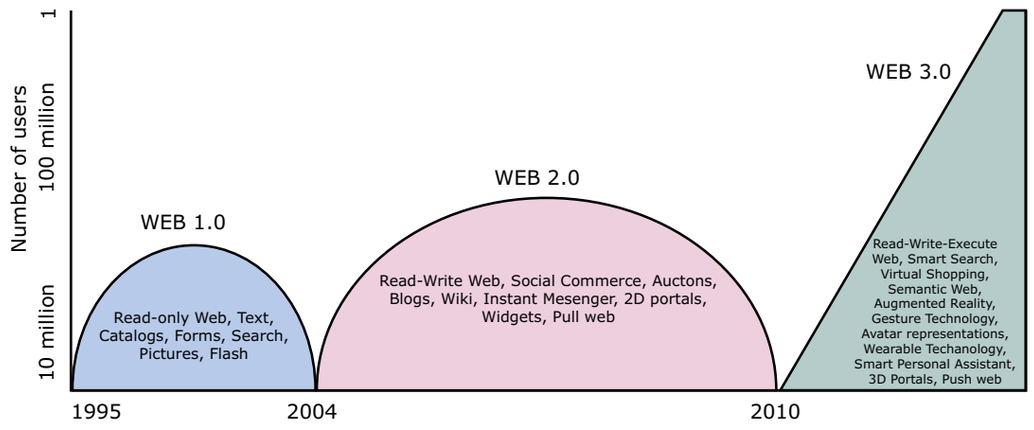


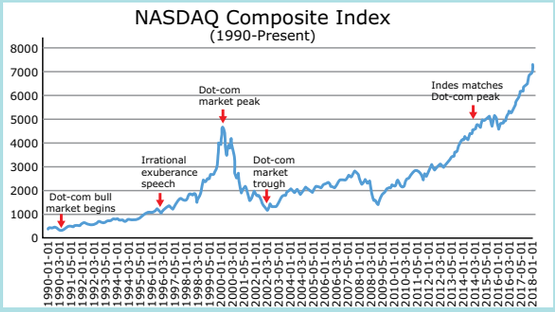
Figure: 15.5 Evolution of Electronic Commerce

12th_Computer_Application_English version CHAPTER 15.indd 202 19-01-2023 17:19:47

Dotcom Bubble

The Dotcom Bubble was a historic excessive growth (excessive assumption) of economy that occurred roughly between 1995 and 2000. It was also a period of extreme growth in the usage and adaptation of the Internet as well.

In the late 1995, there was a tremendous development in US equity investments in Internet-based companies. During the dotcom bubble, the value of equity markets grew exponentially with the NASDAQ composite index of US stock market rising from under 1000 points to more than 5000 points.



Dotcom Burst

The Nasdaq-Composite stock market index, fell from 5046.86 to 1114.11. This is infamously, known as the Dotcom Crash or Dotcom Burst. This began on March 11, 2000 and lasted until October 9, 2002. During the crash, thousands of online shopping companies, like as Pets.com failed and shut down. Some companies like Cisco, lost a large portion of their market capitalization but survived, and some companies, like Amazon declined in value but recovered quickly.

15.4 Classification of E-Commerce Business models

Business organizations, Consumers and Government (also called as Administrations) are the major parties in the E-Commerce. Sometimes Employees (Informal workers) also indulge in this system. Based upon the entities involved in transaction, E-Commerce is classified into the following categories. The model in which the government plays as an entity is termed as e- Governance.

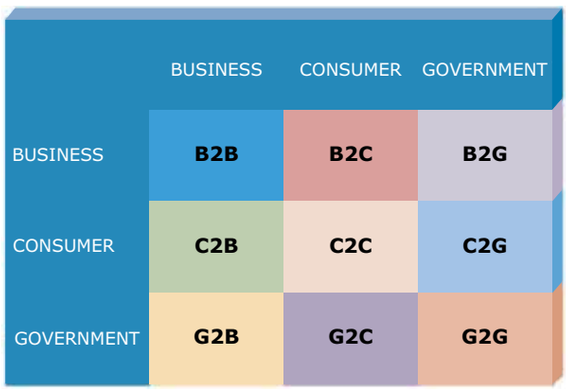


Figure 15.6 E-Commerce business models

1. Business to Business (B2B)
2. Business to Consumer (B2C)
3. Business to Government (B2G)
4. Consumer to Business (C2B)
5. Consumer to Consumer (C2C)
6. Consumer to Government (C2G)
7. Government to Business (G2B)
8. Government to Consumer (G2C)
9. Government to Government (G2G)

Business to Business (B2B)

In B2B E-Commerce, commercial transactions take place between different business organizations, through the Internet. For example, a cycle company may buy tyres from another company for

12th_Computer_Application_English version CHAPTER 15.indd 203 19-01-2023 17:19:47

their cycles. When compared to other models, the value per transaction in B2B transaction is high, because of bulk purchase. The company also might get the advantage of discounts on bulk purchases.

Out-sourcing and Off-shoring are generally associated with B2B E-Commerce.

- If a company's work is hired to another company, it would be termed as out-sourcing.
- If the work is outsourced to a company, which is outside its own country, it is called as off-shoring.



Figure 15.7 Business to Business

- **Business to Consumer (B2C)**

In B2C E-Commerce, commercial transactions take place between business firms and their consumers. It is the direct trade between companies and end-consumers via the Internet. B2C companies sell goods, information or services to customers through online in a more personalized dynamic environment and is considered as real competitor for a traditional storekeeper. An example of B2C transaction is a book company selling books to customers. This mode is intended to benefit the consumer and can say B2C E-Commerce works as 'retail store' over Internet.



Figure 15.8 Business to Consumer

- **Business to Government (B2G)**

B2G is a business model that refers to business organizations sells products, services or information to Governments or to its administrations. In other words, when a company get paid for its goods, services by the Government through Internet it is called as B2G model. e.g. The Government or its administration buys laptops for students.

12th_Computer_Application_English version CHAPTER 15.indd 204 19-01-2023 17:19:48



Figure 15.9 Business to Government

- **Consumer to Business (C2B)**

C2B can be described as a form of E-Commerce where, the transaction is originated by the consumers. The consumers will fix a requirement or specific price for a service or a commodity. C2B model, is also called as reverse auction model. Here, customer bid his price for a service or a product. Then E-Commerce business entity will match the requirement of the consumer to the best possible extent.

For instance, in a travel website (eg.yatra.com) a consumer may specify his dates of travel, his source and destination, number of tickets required and range of hotel etc. The website then finds out the various options for him which best meets his requirements. These websites generate revenue through affiliate links, sponsored advertisement or even a small commission in every booking. e.g. Name-your-own-price websites.



Figure 15.10 Consumer to Business

- **Consumer to Consumer (C2C)**

C2C in E-Commerce provides opportunity for trading of products or services among consumers who are connected through the Internet. In brief when something is bought and sold between two consumers using Internet it is called C2C E-Commerce. Here the websites act as a platform to facilitate the transaction. The electronic tools and Internet infrastructure are employed to support transactions between individuals. Typically, this type of E-Commerce works as Consumer to Business to Consumer (C2B2C). It means that a consumer would contact a business in search of a suitable customer. Most of the auction websites and matrimonial websites are working on this methodology.

For example, a consumer who wants to sell his property can post an advertisement on the website (eg:timesclassifieds.com). Another person who is interested in buying a property can browse the property, advertisement posted on this site. Thus, the two consumers can get in touch with each other for sale/purchase of property through another business' website.

12th_Computer_Application_English version CHAPTER 15.indd 205 19-01-2023 17:19:48



Figure 15.11 Consumer to Consumer

- **Consumer to Government (C2G)**

Citizens as Consumers and Government engage in C2G E-Commerce. Here an individual consumer interacts with the Government. C2G models usually include income tax or house tax payments, fees for issue of certificates or other documents. People paying for renewal of license online may also fall under this category.



Figure 15.12 Consumer to Government

- **Government to Business (G2B)**

G2B is closely related to B2G. G2B in E-Commerce refers to a business model where Government providing services or information to business organization. It may be a formal offer such as a takeover bid for a road project.



Figure 15.13 Government to Business

G2B is a part of e-governance. The Government provides information about business rules, requirement and permission needed for starting a new business, and other specifications in its portal. The objective of G2B is to reduce burdens on business, provide one-stop access to information thereby boost the economy. e.g. ebiz.gov.in



Figure 15.14 ebiz.gov.in

12th_Computer_Application_English version CHAPTER 15.indd 206 19-01-2023 17:19:48

- **Government to Consumer (G2C)**

G2C in E-Commerce is very similar to C2G. Here the Government provides platform for its citizens to avail its services and information through the Internet. The services may be issue of certificates through online.e.g. https://csc.gov.in/governmenttocitizen.



Figure 15.15 Government to Consumer

- **Government to Government (G2G)**

G2G is the online (usually non-commercial) interaction between Government organizations or departments. G2G's principle objective is to implement e-governance rather than commerce. G2G model in e-governance involves distributing data or information between its agencies/departments. G2G systems can be classified into two types

- Internal facing or local level - joining up a single Government's bureaucracy. e.g. https://www.nic.in/
- External facing or international level - joining up multiple Governments' bureaucracy.



Figure 15.16 Government to Government

15.5 E-Commerce Revenue Models

Apart from regular selling of commodities, today there are many other ways by which companies can make money from the Internet. The other forms of E-Commerce activities are:

1. Affiliate website is a form of third party marketing in which the website owner gets paid based on the performance. The affiliate website may be a price comparison service or shopping directories or review website or blogs that contain a link to a normal retailing website and are paid when a customer makes a purchase through it. The affiliate website usually attracts visitors by offering more information and tutorials on some specific product or a topic.

12th_Computer_Application_English version CHAPTER 15.indd 207 19-01-2023 17:19:48

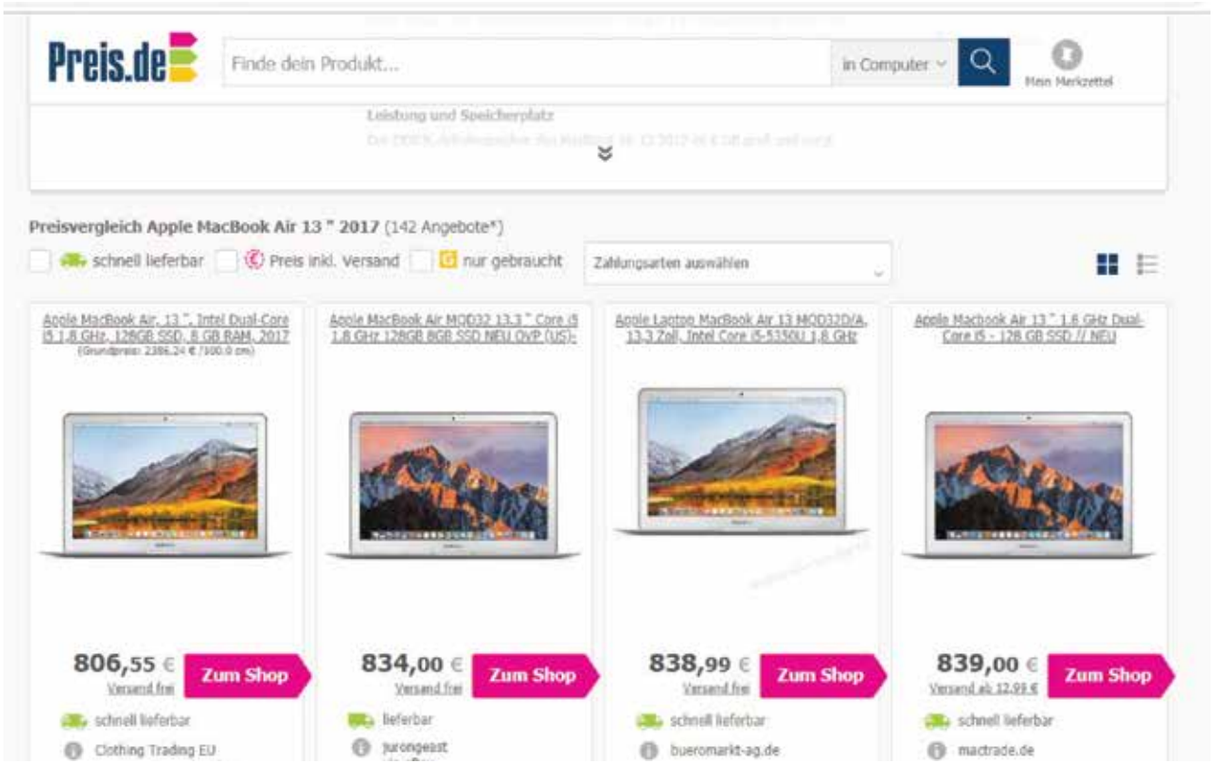


Figure 15.17 **Affiliate site (price comparation website)**

2. Auction website is a kind of website, that auctions items on the Internet and levies some commission from the sales. e.g. https://www.ebay.com/

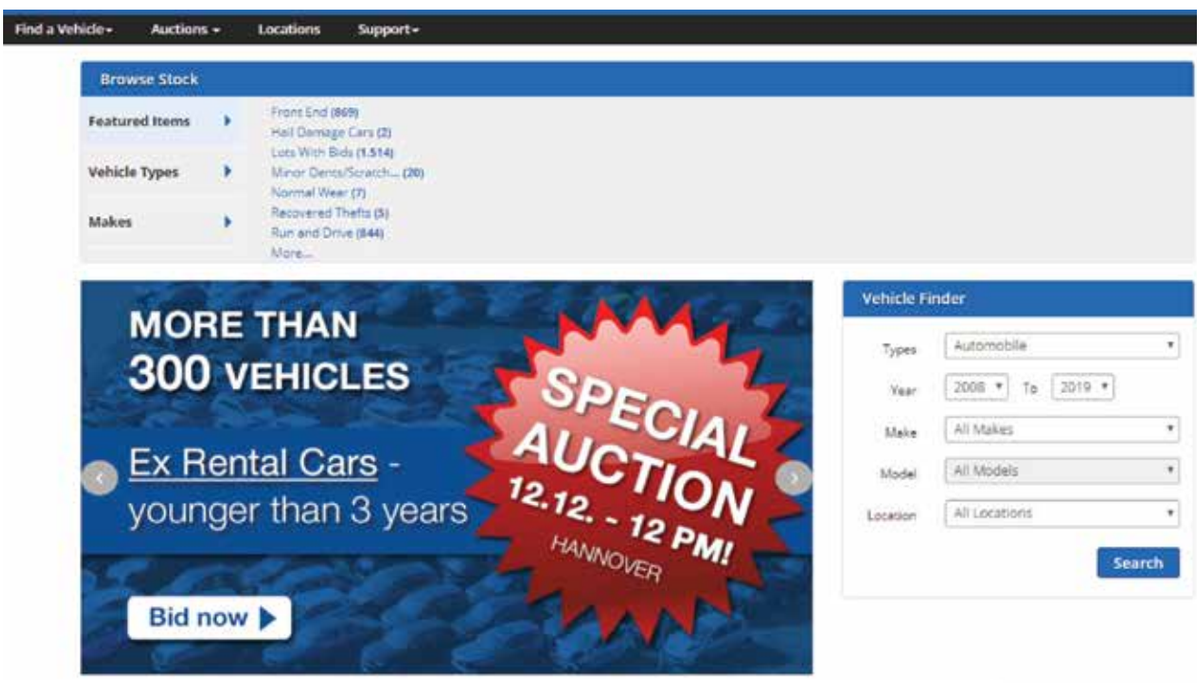


Figure 15.18 **E-Auction website**

12th_Computer_Application_English version CHAPTER 15.indd 208 19-01-2023 17:19:48

3. Banner advertisement website displays advertisements of other companies in its websites and thereby earns revenue.

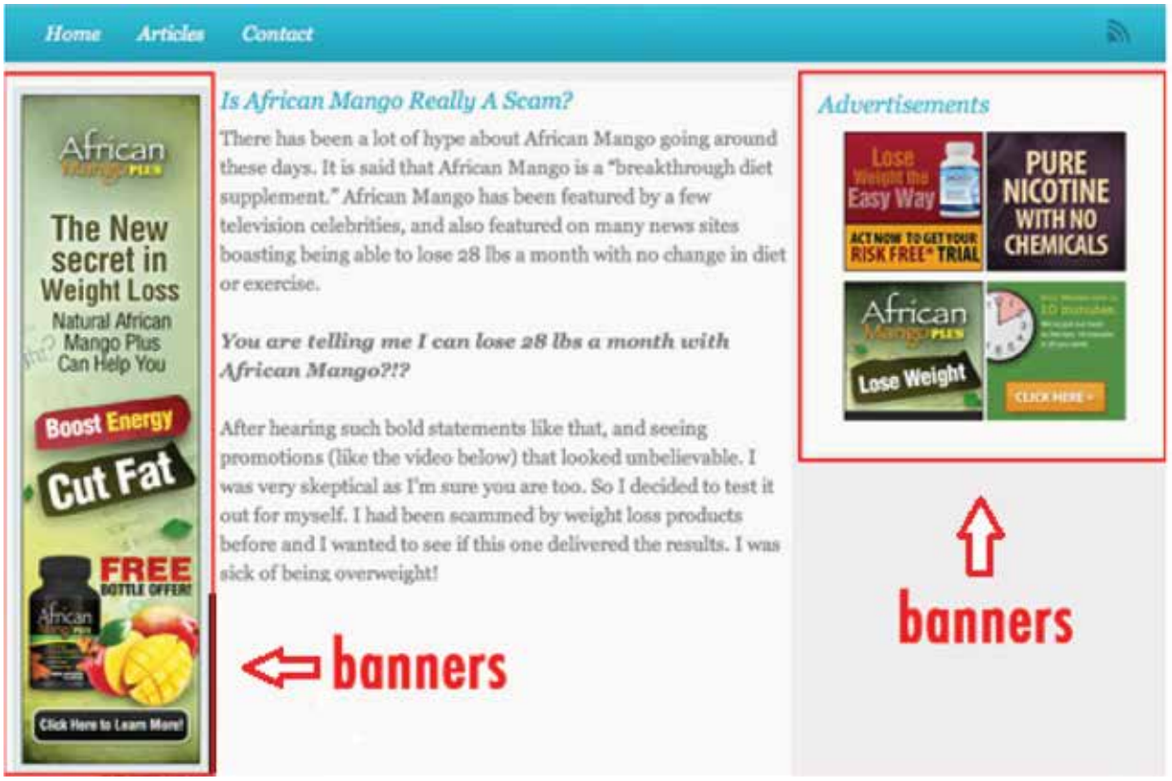


Figure 15.19 Banner advertisement website

4. Bulk-buying website collect a number of users together where every one wants to buy similar items - the site negotiates a discount with the supplier and takes commission. e.g. https://www.alibaba.com/

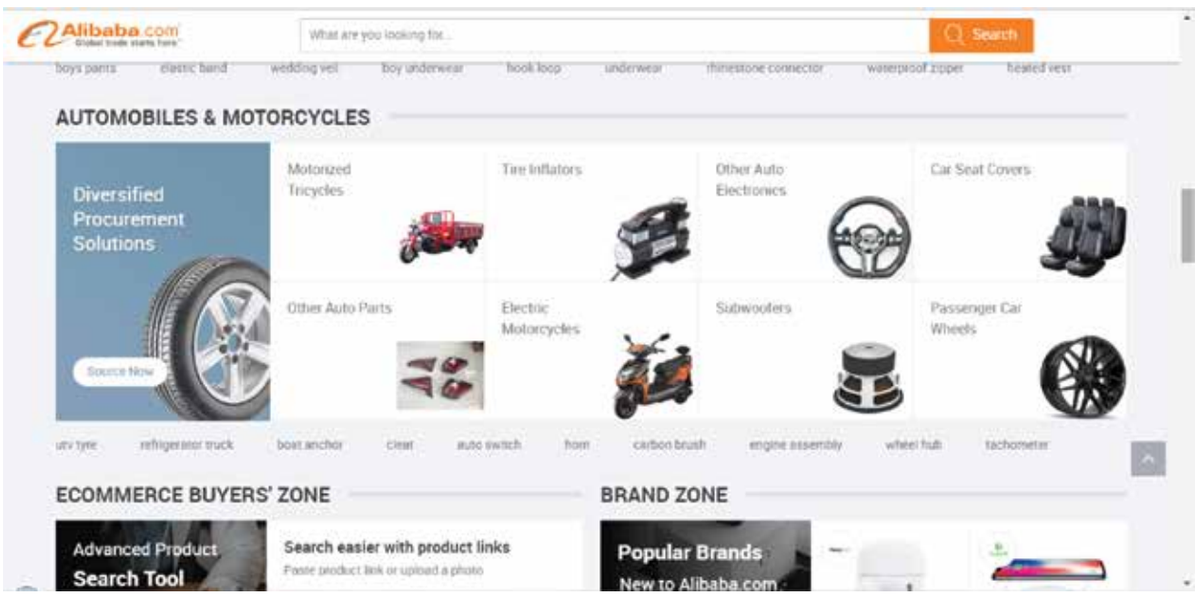


Figure 15.20 Bulk-buying website

12th_Computer_Application_English version CHAPTER 15.indd 209 19-01-2023 17:19:48

5. Digital publishing sites effectively host the e-books or magazines on the web. They make profits in a number of ways such as advertising, selling etc., https://wordpress.org/



Figure 15.21 Digital Publishing website

6. Licensing sites allow other websites to make use of their software. For example, the search engines which allow a visitor of the site to search within the website more easily.

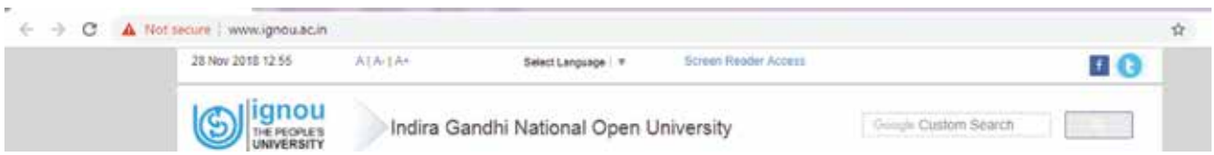


Figure 15.22 Google Search in IGNOU website

7. Name-your-own-price website are just like normal retail sites. In contrast, the buyer negotiates with the retailer for a particular product or service. https://in.hotels.com/

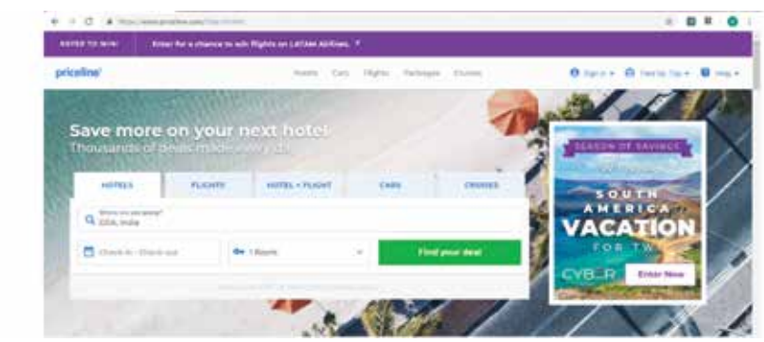


Figure 15.23 Name-your-own-price website

8. Online Shopping mall website allows multi E-Commerce traders to assemble together on a single website. Often these sellers would be related to each other, for example they may all sell luxury goods. This site would take a percentage of their profit.

12th_Computer_Application_English version CHAPTER 15.indd 210 19-01-2023 17:19:48

15.6 Comparison between Traditional Commerce and E-Commerce

E-Commerce isn't just commerce anymore. Even though they share the primary principle of buying and selling goods and services, there is a difference between traditional commerce and E-Commerce.

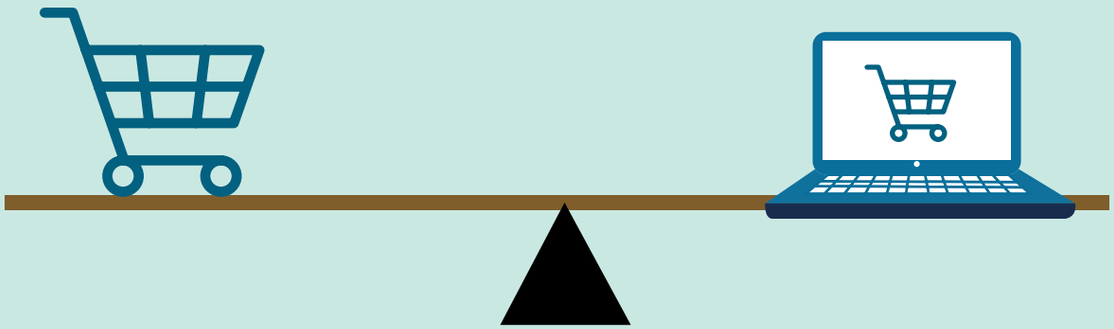


Figure 15.24 Traditional vs E-Commerce

Table 15.1 Traditional vs E-Commerce

Traditional Commerce	E-Commerce
Traditional commerce is buying or selling of products and services physically.	E-Commerce carries out commercial transactions electronically on the Internet.
Customer can face to face identify, authenticate and talk to the merchant.	Neither customer nor merchant see the other.
Physical stores are not feasible to be open at all times.	It is always available on all time and all days of the year.
Products can be inspected physically before purchase.	Products can't be inspected physically before purchase.
Scope of business is limited to particular area.	Scope of business is global. Vendors can expand their business Worldwide.
Resource focus Supply side.	Resource focus Demand side.
Business Relationship is Linear.	Business Relationship is End-to-end.
Marketing is one way marketing.	One-to-one marketing.
Payment is made by cash, cheque, cards etc.	Payment system is mostly through credit card, debit card or fund transfer.
Most goods are delivered instantly.	It takes time to transport goods.

12th_Computer_Application_English version CHAPTER 15.indd 211 19-01-2023 17:19:49

15.7 Advantages and Disadvantages of E-Commerce

The pros and cons of E-Commerce affect three major stakeholders: consumers business organisations, and society.

The following are the advantages and disadvantages of E-Commerce for a consumer.

Advantages

- E-Commerce system is operated on all days and all the day 24 x 7. Neither consumer nor suppliers need physical store to be opened to do business electronically. People can interact with businesses at the time of their convenience.
- Speed is a major advantage in E-Commerce. Advanced Electronic communications systems allow messages to reach across the world instantaneously. There is no need to wait days for a catalogue to arrive by post. Communication delay is not a part of the Internet or E-Commerce world.
- The Internet is too easy to 'shop around' for products and services that may be more cheaper and effective than left to buy only in a Brick and Mortar shop. It provides an opportunity to buy at reduced costs. It is possible to, explore the Internet, identify original manufacturers, thereby bypass wholesalers and achieve a cheaper price.
- The whole world becomes a shop for today's customers. They can have wide choice by comparing and evaluating the same product at different websites before making a purchase decision.
- Customers can shop from home or anywhere at their convenience. They don't need a long wait to talk to a salesman. They can read the details regarding model numbers, prices, features etc. of the product from the website and buy at their own convenience. Payments can also be made through online.

Disadvantages

- E-Commerce is often used to buy goods that are not available locally but from businesses all over the world. Physical goods need to be transported, which takes time and costs money. In traditional commerce, when we walk out of a shop with an item, it's ours, we have it. We know what it is, where it is and how it looks. But in E-Commerce we should wait to get the product in hand. Some E-Commerce companies handle this by engaging their customer updating status of their shipments.
- Unlike returning goods to a traditional shop returning goods through online is believed to be an area of difficulty. The doubts about the period of returning will the returned goods reach source in time, refunds, exchange and postage make one tiresome.
- Privacy issues are serious in E-Commerce. In E-Commerce generating consumer information is inevitable. Not all the companies use the personal information they obtained to improve services to consumers. Many companies misuse the information and

12th_Computer_Application_English version CHAPTER 15.indd 212 19-01-2023 17:19:49

make money out of it. It is true that privacy concerns are a critical reason why people get cold feet about online shopping.

- Physical product disputes are a major disadvantage in E-Commerce. E-Commerce purchases are often made on trust. This is because, we do not have physical access to the product. Though Internet is an effective channel for visual and auditory information it does not allow full scope for our senses. We can see pictures of the perfumes, but can not smell their fragrance, we can see pictures of a cloth, but not its quality. If we want to inspect something, we choose what we look at and how we look at it. But in online shopping, we would see only the pictures the seller had chosen for us. People are often much more comfortable in buying the generic goods (that they have seen or experienced before and in which there is little ambiguity) rather than unique or complex things via the Internet.
- We couldn't think of ordering a single ice cream or a coffee from a shop in Paris. Though specialized and refrigerated transport can be used, goods bought and sold via the Internet need to survive the trip from the supplier to the consumer. This makes the customers turn back towards traditional supply chain arrangements for perishable and non-durable goods.
- Delivery ambiguity. Since supplying businesses can be conducted across the world, it can be uncertain whether they are indeed genuine businesses or just going to take our money. It is pretty hard to knock on their door to complain or seek legal recourse. Further, even if the item is sent, it is easy to start bothering whether or not it will ever arrive on time.



Disruptive innovations in E-commerce

The innovations which replace the existing technologies are called as disruptive innovations. Disruptive innovation creates a new market. Not all innovations are near disruptive. The first automobiles in the late nineteenth century were a great innovation. But it didn't affect existing animal-based road transport market until 1908 when Henry Ford introduced affordable motor cars. The term disruptive innovation was first coined by Clayton M in his book "The Innovator's Dilemma".

Example: Film cameras market is disrupted by digital camera innovations, floppy disk market is interrupted by CD and USB innovations. E-Commerce itself is a disruptive innovation.

12th_Computer_Application_English version CHAPTER 15.indd 213 19-01-2023 17:19:49

CASE STUDY

Steps to Start an E- Business

The following are the initial steps involved in the process to start an online business and start selling items instantly:

- **Business structure and Registration**

Operating an E-Commerce or E-Business does not exclude from requiring certain business licenses and permits. The company must be registered before starting the trade. Registration includes business name, trade name, type of company. (e.g., Private Ltd, Public Ltd, Partnership or Sole Proprietor, LLP - limited liability partnership etc.) The company must be registered to get the bank account opened in the company name and obtaining GST registration documents easily. Any one is allowed to enroll in an online platform and start selling immediately, but there will be no limited liability protection provided to litigation. Thus, if one need to sustain and grow it is best to start with an LLP or a company. http://www.mca.gov.in/



Home page of Ministry of Corporate Affairs to register a Business organization online

12th_Computer_Application_English version CHAPTER 15.indd 214 19-01-2023 17:19:49

- **Tax Registration**

Taxation is unavoidable in any country. A company must have registered with tax department of the concerned nation. In India registration with GST and other tax norms is a necessary to begin selling online, it does not matter whether we are starting our own online business website or selling on a others' portal. https://services.gst.gov.in, https://ctd.tn.gov.in/home

- **Business Bank Account**

Bank account facilitate payment systems. Once the company or LLP is registered successfully, the next step is to apply for a bank account in the name of the online venture. GST certificate is necessary to open a bank account for a business firm.

- **Payment Gateway**

The next important step is to implement a payment gateways integrated with E-Commerce website to allow customers make their payments through credit card, debit card, Internet banking, etc. With digital payment gateway, the customers can make the payment online which automatically gets transferred to business's bank account.

- **Shipment Solution**

Once the above steps are accomplished and start receiving the order, the next step is to set up the logistics section. Logistics is a major part of the E-Commerce. Third party logistics companies may help us to deliver sold products to the customers at their mentioned destination.

- **Identifying suppliers**

Global market space comes along with competition in selling products online. so finding the best quality and best prices for the products we sell is very important. We should shop around until we find a supplier we find a suitable supplier.

- **Marketing**

Marketing plays a significant role in any business. Using Internet and social media effectively will take out product worldwide. Marketing could be started as early as it could be. Catchy captions and logos attract more new customers. It's a good idea to set up social media profiles and writing content for blogs from very first day because we do not want to wait when it is ready to serve.

- **Right technologies**

Updating our technical knowledge will give hand in E-Commerce. Technology makes so much of our work easier. So before we start our E-Commerce business, we should be familiar with some of the basic entities like customer relationship management, accounting, project management, email and marketing etc. The deeper we learn, the greater we grow.

12th_Computer_Application_English version CHAPTER 15.indd 215 19-01-2023 17:19:49

POINTS TO REMEMBER

- E-Commerce can be described as the process of buying or selling products, services or information via Internet.
- FinTech Financial technology is a collective term for technologically advanced financial innovations. In simple words Fintech is a new finance industry that uses technology to improve financial activity.
- The dotcom bubble was a rapid rise in U.S. equity market of Internet-based companies during 1990s.
- Web 1.0 (Web of Content) is the early web that contained text, images and hyperlinks and allowed users only to search for information and read it. There was a very little in the way of user interaction or content generation.
- Web 2.0 (Web of Communication) is a read-write web that allowed users to interact with each other.
- Web 3.0 (Web of Context) is termed as the semantic web or executable web with dynamic applications, interactive services, and "machine-to-machine" interaction.

GLOSSARY

Affiliate	Business who promotes the products of another business for a commission.
Blog	An online platform for writing articles about a topic.
Brick and mortar	The term that refers to a business that has a physical store; opposite of online store.
Dotcom	Common name for Internet based companies.
Mobile commerce	Businesses that are conducted through the Internet using mobile phones or other wireless hand-held devices.
Nascent stage	Initial stage of growth.
Off-shoring	Company's work is given to overseas (another country) company
Out-sourcing	Hiring third party service providers to handle business on behalf.
Social media	In terms of E-Commerce, a platform for advertising products to targeted consumers e.g. Facebook, twitter.
Tangible form	Physical goods we receive.
Teleputer	Fusion of television, computer and telecom networking technologies.
Wordpress	A free, open source online blogging platform.

12th_Computer_Application_English version CHAPTER 15.indd 216 19-01-2023 17:19:49

EVALUATION

Part I
Objective Questions

1. A company involved in E-Business if
   a) it has many branches across the world.
   b) it conduct business electronically over the Internet.
   c) it sells commodities to a foreign country.
   d) it has many employees.
2. Which of the following is not a tangible good?
   a) Mobile Phone
   b) Mobile Apps
   c) Medicine
   d) Flower bouquet
3. SME stands for
   a) Small and medium sized enterprises
   b) Simple and medium enterprises
   c) Sound messaging enterprises
   d) Short messaging enterprises
4. The dotcom phenomenon deals with _____
   a) Textile industries
   b) Mobile phone companies
   c) Internet based companies
   d) All the above
5. Which of the following is not correctly matched
   a) The First Wave of Electronic Commerce: 1985 -1990
   b) The Second Wave of Electronic Commerce: 2004 – 2009
   c) The Third Wave of Electronic Commerce: 2010 – Present
   d) Dotcom burst: 2000 – 2002
6. **Assertion (A):** The websites of first wave dotcom companies were only in English
   Reason (R): The dotcom companies of first wave are mostly American companies.
   a) Both (A) and (R) are correct and (R) is the correct explanation of (A)
   b) Both (A) and (R) are correct, but (R) is not the correct explanation of (A)
   c) (A) is true and (R) is false
   d) (A) is false and (R) is true
7. Off-shoring means
   a) Work outsourced to a branch of its own company
   b) Work outsourced to new employees
   c) Work outsourced to a third party locally
   d) Work outsourced to a third party outside its own country

12th_Computer_Application_English version CHAPTER 15.indd 217 19-01-2023 17:19:49

8. G2G systems are classified into
   a) Internal facing and External facing
   b) Internet and Extranet
   c) First wave and Second wave
   d) Left facing and Right facing
9. _____ host the e-books on their websites.
   a) Bulk-buying websites
   b) Community websites
   c) Digital publishing websites
   d) Licensing websites
10. Which of the following is a characteristics of E-Commerce
   a) Products can be inspected physically before purchase.
   b) Goods are delivered instantly.
   c) Resource focus supply side
   d) Scope of business is global.

Part - II

Short Answers

1. Define E-Commerce.
2. Distinguish between E-Business and E-Commerce
3. Differentiate tangible goods and intangible goods with example of your own.
4. What is dotcom bubble and dotcom burst?
5. Write a short note on out-sourcing.

Part - III

Explain in Brief Answer

1. Describe how E-Commerce is related to socio-technological changes.
2. Write a short note on the third wave of E-Commerce.
3. Explain B2B module in E-Commerce.
4. Write a note on name-your-own-price websites.
5. Write a note on physical product dispute of E-Commerce.

Part - IV

Explain in detail

1. List all the E-Commerce business models and explain any four briefly.
2. Explain any five E-Commerce revenue models.
3. How would you differentiate a traditional commerce and E-Commerce?

STUDENT ACTIVITIES

- Draw a timeline describing various developments in E-Commerce.
- List the business around your society and sort it according to business modules.
- Interview a consumer who recently bought a product online and write his experience.

12th_Computer_Application_English version CHAPTER 15.indd 218 19-01-2023 17:19:49



16
CHAPTER

Electronic Payment Systems

LEARNING OBJECTIVES

- To understand what is Electronic payment systems
- To know the various types of E-payment methods
- To learn the basics of
  - Card Based Payment Systems
  - Electronic Account Transfer
  - Electronic Cash Payment Systems
  - Mobile Payment and Internet Payment Systems

16.1 Introduction

Everyday people buy or sell goods and services for money. Money becomes the major medium of exchange. Later some payment systems were developed out of a need to facilitate the growth of commerce and economic development.

The media used for transferring the value of money is very diversified, ranging from the use of simple payment instruments (e.g. cash) to the use of complex systems (e.g. cryptocurrency). Physical money (cash), is the traditional and most widely used payment instrument that consumers use, in their daily lives to buy goods and services.

As the volume and variety of transactions expands, the volume of money also expand. Using cash for each of large transactions is neither feasible nor practically possible. Security and transportation problems arise in cases where large amounts of cash transactions are involved.

Banks would support in such cases by offering other payment methods. The cashless society has been discussed for long time. The demise of cash and cheques could not be sudden. Though old habits hardly die, people do not hesitate adapting new things.

12th_Computer_Application_English version CHAPTER 16.indd 219 19-01-2023 17:21:22

Modern payment systems may be physical or electronic and each has its own procedures and protocols that guide the financial institution with payment mechanisms and legal systems. Standardization has allowed some of these systems to grow globally.

The term electronic payment refers to a payment made from one bank account to another bank account using electronic methods forgoing the direct intervention of bank employees.

Payment system is an essential part of a company's financial operations. But it becomes complex, when many different payment systems are used. Further challenges come from the continuous introduction of newer payment systems such as paytm, UPI, bitcoin and various mobile payment options. As a result there are more than 750 payment systems throughout the world.



Figure 16.1 Electronic Payment Systems

16.2 Classification of Electronic Payment systems

Many electronic payment systems have been developed with the advancements in the Internet technologies. Based on the value of money transactions, processing time, processing requirements, security issues and usability, electronic Payment systems are generally classified into two types. They are

- Micro electronic Payment Systems
- Macro electronic Payment Systems

16.2.1 Micro electronic Payment Systems

It is an on-line payment system designed to allow efficient and frequent payments of small amounts. In order to keep transaction costs very low, the communication and computational costs are minimized here. Unlike macro electronic payments, which use expensive public key cryptography, micro electronic payment are relaxed by using light weight cryptographic primitives and off-line payment verifications.

As the security of micro electronic payment systems is comparatively low it can be tampered but, the cost of fraud is much higher than the possible value to be gained by fraud itself. So the security in micro electronic payment methods is considered to be adequate. The majority of micro electronic payment systems are designed to pay for simple goods on the Internet. e.g., subscriptions of online games, read journals, listen to a song or watch a movie online etc.

12th_Computer_Application_English version CHAPTER 16.indd 220 19-01-2023 17:21:22

In general, the parties involved in the micro on-line payments are Customer, Service Provider and Payment processor. The Micro electronic payment transactions can be explained in the following way.

Step 1 Customer proves his authentication and the payment processor issues micro payments.

Step 2: Customer pays the micro payments to the online service provider and gets the requested goods or services from them.

Step 3: Service provider deposit micro payments received from the customer to the payment processor and gets the money.

16.2.2 Macro electronic payment systems

Macro electronic payment systems support payments of higher value. The security requirements are more rigorous in macro payment systems because of huge money transactions. Banks will impose a minimum transaction overhead on macro payment systems. These transactional over heads for the usage of computationally expensive cryptographic operations prevent these payment systems to be used for the payment of small amounts. Some of the popular macro on-line payment systems are mentioned below

- Card based payment systems
- Electronic account transfer
- Electronic cash payment systems
- Mobile payment systems and internet payment systems

16.3 Card Based Payments Systems

Payment cards are plastic cards that enable cashless payments. They are simple embossed plastic card that authenticates the card holder on behalf of card issuing company, which allows the user to make use of various financial services. More than 90% of online payments are card based payments, at the same time other e-payment methods are also gaining importance now-a-days.

Based on the transaction settlement method there are three widely used card based payment systems. They are

1. Credit card based payment systems (pay later)
2. Debit card based payment systems (pay now)
3. Stored value card based payment systems (pay before)

16.3.1 Credit Card

Credit card is an electronic payment system normally used for retail transactions. A credit card enables the bearer to buy goods or services from a vendor, based on the cardholder's promise to the card issuer to payback the value later with an agreed interest. Every credit card account has a purchase limit set by the issuing bank or the firm. A credit card is different from a debit card where the credit card issuer lends money to customer instead of deducting it from customer's bank account instantly.

The term credit card was first mentioned in 1887 in the sci-fi novel "Looking Backward" by Edward Bellamy. The modern credit cards concept was

12th_Computer_Application_English version CHAPTER 16.indd 221 19-01-2023 17:21:22

born in the U.S.A, in the 1920s, when private companies began to issue cards to enable their customers to purchase goods on credit within their own premises.

DO YOU KNOW?

In February 1950, Frank McNamara and Ralph Schneider created The Diners Club card which was made of paper-cardboard. Initially The card was accepted in only 27 restaurants and was used only by friends and acquaintances of the two founders (approximately 200 people). Later it was enhanced and accepted worldwide. From 1955, the card was made of plastic. The Diners Club still exists today under the name Diners Club International.





Advantages of credit card

- Most credit cards are accepted worldwide.
- It is not necessary to pay physical money at the time of purchase. The customer gets an extra period to pay the purchase.
- Depending on the card, there is no need to pay annuity.
- Allows purchases over the Internet in installments.
- Some issuers allows "round up" the purchase price and pay the difference in cash to make the transactions easy.

Key players in operations of credit card

1. Bearer: The holder of the credit card account who is responsible for payment of invoices in full (transactor) or a portion of the balance (revolver) the rest accrues interest and carried forward.
2. Merchant: Storekeeper or vendor who sell or providing service, receiving payment made by its customers through the credit card.
3. Acquirer: Merchant's bank that is responsible for receiving payment on behalf of merchant send authorization requests to the issuing bank through the appropriate channels.
4. Credit Card Network: It acts as the intermediate between the banks. The Company responsible for communicating the transaction between the acquirer and the credit card issuer. These entities operate the networks that process credit card payments worldwide and levy interchange fees. E.g. Visa, MasterCard, Rupay
5. Issuer: Bearer's bank, that issue the credit card, set limit of purchases, decides the approval of transactions, issue invoices for payment, charges the holders in case of default and offer card-linked products such as insurance, additional cards and rewards plan.

12th_Computer_Application_English version CHAPTER 16.indd 222 19-01-2023 17:21:22

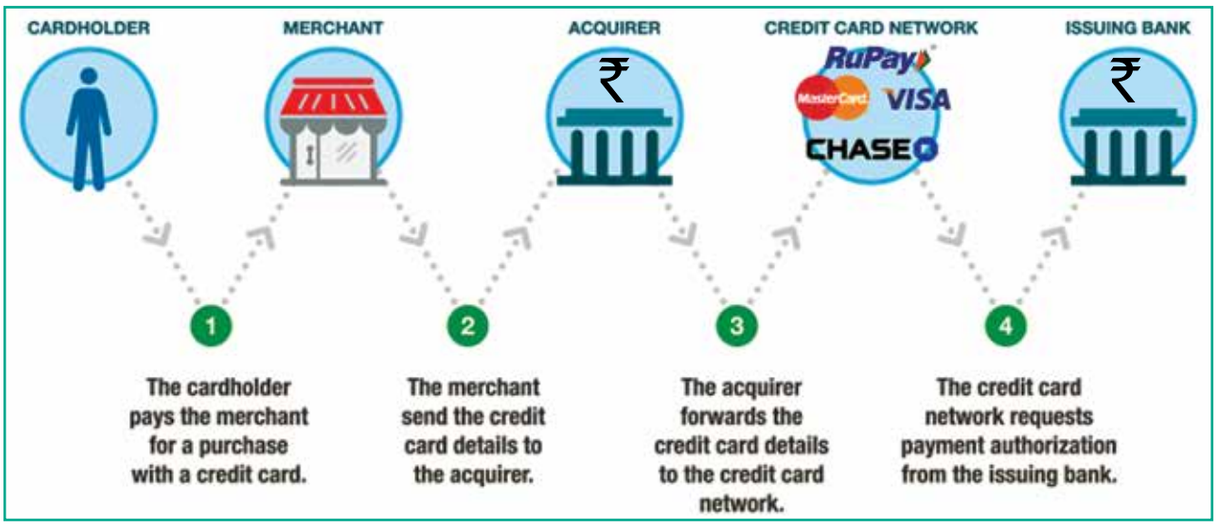


Figure 16.2 Key players of Credit card transaction

Anatomy of a credit card

1. Publisher: Emblem of the issuing bank.
2. Credit card number: The modern credit card number has 16-digit unique identification number.
3. Name of the cardholder: It is visibly embossed on the front side of the card.
4. EMV chip: It is integrated chip in addition to magnetic stripe to store cardholder's information.
5. RFID symbol: It indicates that it is a contactless smartcard.
6. Expiration month and year: The card is valid until the last day of the month printed on it.
7. Card brand logo: It is the name of the credit card network company. Eg: Visa, MasterCard and Rupay
8. Magnetic stripe: It is a magnetic material containing encrypted data about the card holder and account number.
9. Hologram: Hologram is a security feature that prevents duplication.
10. Signature: It is cardholder's signature at the back of the card.
11. CVC/CVV: Card Verification code/ value is a 3 digit code usually printed to the left of signature pane validates the card.

Apart from the these mentioned each credit card may also holds issuer's disclaimer, address and phone number.

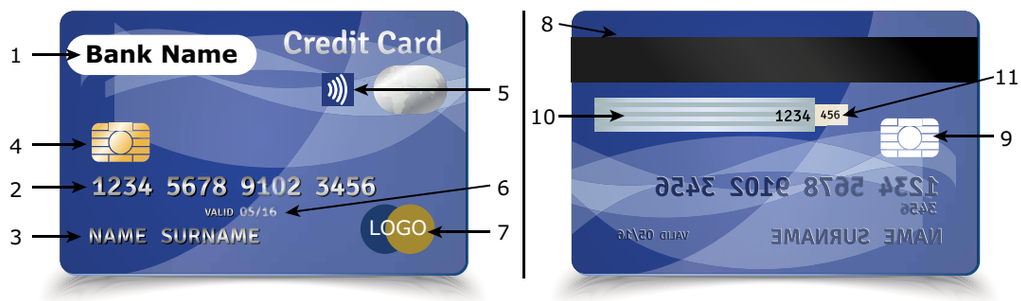


Figure 16.3 Credit Card

12th_Computer_Application_English version CHAPTER 16.indd 223 19-01-2023 17:21:23

DO YOU KNOW?

All Payment cards (including debit card) are usually plastic cards of size 85.60 mm width × 53.98 mm height, rounded corners with a radius of 2.88 mm to 3.48 mm and thickness of 0.76 mm. These standards dimensions are maintained universally in accordance with ISO/IEC 7810#ID-1.

- The first digit of the credit card number is Major Industry Identifier (MII). It identifies the issuer category. e.g. 1 – Airlines, 4 – Banks
- The next 5 digits uniquely identifies the issuing organization.
- The first 6 digits together called as Issuer Identifier number (IIN) or Bank Identification number (BIN)
- The next 9 digits are the account number.
- The last digit is a check digit (based to the Luhn algorithm).

16.3.2 Debit Card

Debit Card is an electronic payment card where the transaction amount is deducted directly from the card holder's bank account upon authorization. Generally, debit cards function as ATM cards and act as a substitute for cash

The way of using debit cards and credit cards is generally the same but unlike credit cards, payments using a debit card are immediately transferred from the cardholder's designated bank account, instead of them paying the money back at a later with added interest. In modern era the use of debit cards has become so widespread.

The debit card and credit card are identical in their physical properties. It is difficult to differentiate two by their appearance unless they have the term credit or debit imprinted.

16.3.3 Stored value cards

Stored value card is a type of debit card that is pre-loaded with certain amount(value), with which a payment is made. It is a card that has default monetary value onto it. The card may be disposed when the value is used, or recharged to use it again. The major advantage of stored value card is that customers don't need to have a bank account to get prepaid cards.



Figure 16.4 Stored value card

Like a credit card or debit card it is a plastic and has a magnetic strip on its back. The magnetic strip stores the monetary value of the card. Stored value cards may not have the card holder's name always. It is also indistinguishable from a regular credit or debit card in appearance. What look like a credit card or debit card act like a credit or debit card. It is used to make purchases offline

12th_Computer_Application_English version CHAPTER 16.indd 224 19-01-2023 17:21:23

and online in the same way as in credit card or debit card.

There are two varieties for stored value card.

1. **Closed loop (single purpose):** e.g. chennai metro rail travel card.
2. **Open loop (multipurpose):** e.g. Visa gift cards



In some countries it is legal for anyone to enter or leave the country with money that is stored on cards, unlike carrying cash in high amounts which is believed a form of money laundering.

16.3.4 Smart card

The modern version of card based payment is smart cards. Smart cards along with the regular features of any card based payment system holds a EMV chip. This chip is similar to well-known sim card in appearance but differ in its functionalities. The advantage of Smart cards is that it can provide identification, authentication, data storage and application processing. Smart cards can be classified into Contact smart cards and Contactless smart cards.



Figure 16.5 Contact Smart card & POS

16.4 Electronic Account Transfer

Apart from card based payment systems there are many alternative electronic payment systems. With the advent of computers, network technologies and electronic communications a large number of alternative electronic payment systems have emerged. These include ECS (Electronic Clearing Services), EFT (Electronic funds transfers), Real Time Gross Settlement system (RTGS) etc. These Electronic Payment systems are used in lieu of tendering cash in domestic and international transactions.

16. 4.1 Electronic Clearing Services (ECS)

Electronic Clearing Service can be defined as repeated transfer of funds from one bank account to multiple bank accounts or vice versa using computer and Internet technology. The payer instructs the bank to debit from his bank account and credit it to one or more payee bank account provided amounts and dates of the payments earlier. This system provides the convenience of paperless payments.

Advantages of this system are bulk payments, guaranteed payments and no need to remember payment dates. It can be used by institutions for making payments such as disbursing of salary, pension or dividend interest among shareholders. Similarly, individual bank customers also can make small value repetitive payments such as paying EMI of a loan, electricity bills, telephone bills, insurance premium, as well as SIP investments.

12th_Computer_Application_English version CHAPTER 16.indd 225 19-01-2023 17:21:23

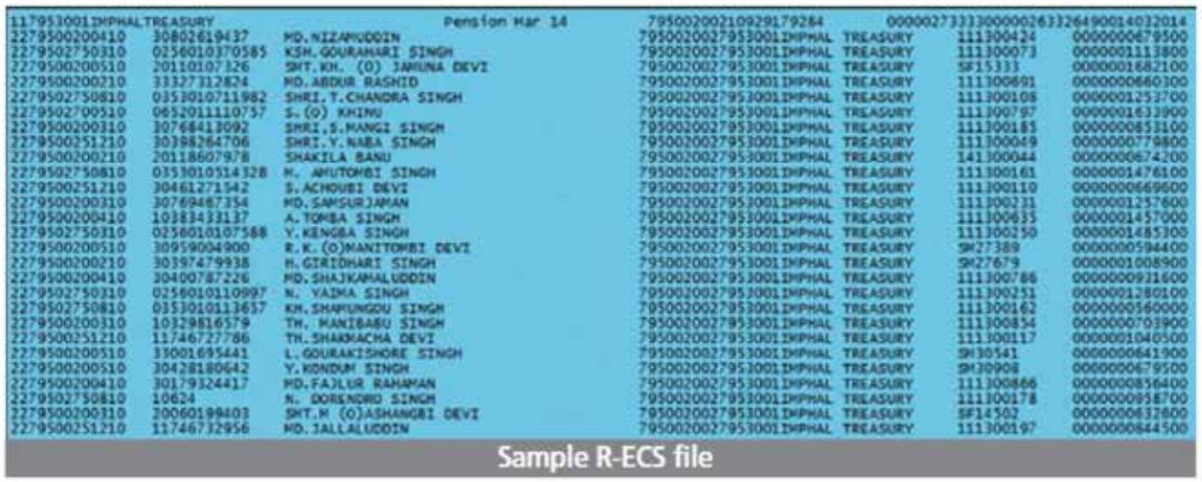


Figure 16.6 **ECS**

ECS can be used for both credit and debit purposes i.e. for making bulk payments or bulk collection of amounts.

DO YOU KNOW?

EFT is known by a number of names across countries. In India, it is called as N-EFT (National Electronic Fund Transfer), in the United States, they may be referred to as "electronic cheques" or "e-cheques". National Electronic Funds Transfer (NEFT) is an electronic funds transfer system initiated by the Reserve Bank of India (RBI) in November 2005. It is established and maintained by Institute for Development and Research in Banking Technology (IDRBT). NEFT enables a bank customer to transfer funds between any two NEFT-enabled bank accounts on a one-to-one basis. It is done via electronic messages. Unlike RTGS, fund transfers through the NEFT do not occur in real-time basis.



16.4.2 Electronic Funds Transfer

Electronic Funds Transfer (EFT) is the "electronic transfer" of money over an online network. The amount sent from the sender's bank branch is credited to the receiver's bank branch on the same day in batches. Unlike traditional processes, EFT saves the effort of sending a demand draft through post and the inherent delay in reaching the money to the receiver. Banks may charge commission for using this service. EFT is a widely used method for moving funds from one account to another in B2B business models.

16.4.3 Real Time Gross Settlement:

Real Time Gross Settlement system (RTGS) is a payment system particularly used for the settlement of transactions between financial institutions, especially banks. As name indicates, RTGS transactions are processed at the real-time. RTGS payments are also called as push payments that are initiated ("triggered") by the payer. RTGS payments are generally large-value payments, i.e. high-volume transactions.

12th_Computer_Application_English version CHAPTER 16.indd 226 19-01-2023 17:21:23

DO YOU KNOW?

The development and maintenance of NEFT or RTGS systems worldwide is driven primarily by the central bank of a country. (RBI in India)

16.5 Electronic Case Payment System

Eletronic case is (E-Cash) is a currency that flows in the form of data. It converts the case value into a series of encrypted sequence numbers, and uses the serial numbers to represent the market value of various currencies in reality.

16.5.1 Cryptocurrency

A cryptocurrency is a unique virtual (digital) asset designed to work as a medium of exchange using cryptographic algorithm. This algorithm secures the transactions by recording it in blockchain and controls the creation of additional units of the currency. The state of ownership of a cryptocurrency is related to individual system blocks called "portfolios". Only the holder of the corresponding private key would have control over a given portfolio

The function of cryptocurrency is based on technologies such as Mining, Blockchain, Directed Acyclic Graph, Distributed register (ledger), etc.

16.5.2 Electronic wallets

Electronic wallets (e-wallets) or electronic purses allow users to make electronic transactions quickly and securely over the Internet through smartphones or computers. The electronic wallet functions almost the same as a physical wallet in term that it holds our money. Electronic wallets were first recognized as a method for storing money in electronic form, and became popular because it provides a convenient way for online shopping.

With the development of advanced Internet, the use of electronic wallets turned out as an efficient transaction tool. This is evidenced by the many E-Commerce websites that use electronic wallets as a transaction tool. There are several electronic wallet services that are now widely used. e.g. :PayPal, SBI Buddy.

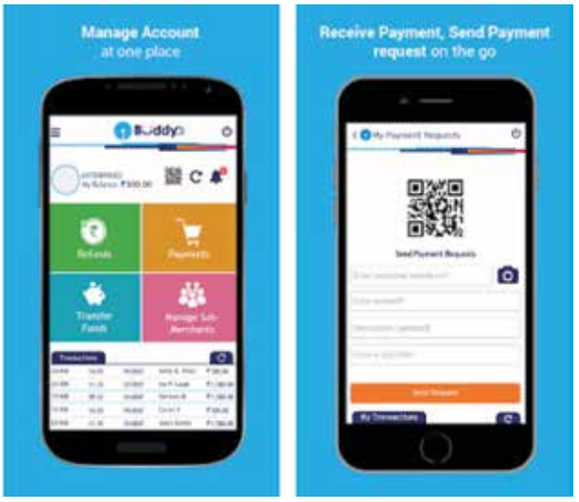


Figure 16.7 e-wallets

16.6 Mobile Banking and Internet Banking

As smartphones have already usurped the place of digital camera and voice recorders, soon it will double up as virtual debit cards. It enables to send or receive money instantly without any plastic cards.

16.6.1 Mobile Banking

Mobile banking is another form of net banking. The term mobile banking (also called m-banking) refers to the services provided by the bank to the customer to conduct banking transactions with the

12th_Computer_Application_English version CHAPTER 16.indd 227 19-01-2023 17:21:24



Figure 16.8 mobile banking through smartphone application

aid of mobile phones. These transactions include balance checking, account transfers, payments, purchases, etc. Transactions can be done at anytime and anywhere.



Some of the latest mobile banking applications even have a cash withdrawal menu. The menu will create a specific code that can be used instead of an ATM card to operate an ATM. However, this can only be done at a special ATM (ATM with no card service).

The WAP protocol installed on a mobile phone qualifies the device through an appropriate application for mobile session establishment with the bank's website. In this way, the user has the option of permanent control over the account and remote management of his own finances.

Mobile Banking operations can be implemented in the following ways:

- contacting the call center.
- automatic IVR telephone service.
- using a mobile phone via SMS.
- WAP technology.
- Using smartphone applications.

16.6.2 Internet banking

Internet banking is a collective term for E-banking, online banking, virtual banking (operates only on the Internet with no physical branches), direct banks, web banking and remote banking.

Internet banking allows customers of a financial institution to conduct various financial transactions on a secure website operated by the banking institutions. This is a very fast and convenient way of performing any banking transactions. It enables customers of a bank to conduct a wide range of financial transactions through its website. In fact, it is like a branch exclusively operating of an individual customer. The online banking system will typically connect to the core banking system operated by customers themselves (Self-service banking).

Advantages:

- The advantages of Internet banking are that the payments are made at the convenience of the account holder and are secured by user name and password. i.e. with Internet access it can be used from anywhere in the world and at any time.
- Any standard browser (e.g. Google Chrome) is adequate. Internet banking does not need installing any additional software.
- Apart from regular transactions, Internet banking portal provides complete control over all banking demands such as available balance, transaction statements, recent transactions, bill payment, blocking a card in case of theft or loss, information about other bank products like payment cards, deposits, loans etc.

12th_Computer_Application_English version CHAPTER 16.indd 228 19-01-2023 17:21:24

The following are the steps to transfer fund using net banking.

Step 1: Login to net banking account using unique user name and password provided by the bank earlier.

Step 2: Add the beneficiary as a payee to enable transfer of fund. The following details like Account Number, Name, IFSC about the beneficiary are to be filled in the 'Add New Payee' section.

Step 3: Once the beneficiary is added, choose RTGS / NEFT / IMPS as mode of Fund Transfer.

Step 4: Select the account to transfer money from, select the payee, enter the amount to be transfered and add remarks (optional).

Step 5: Click on submit.

Step 6: Enter the OTP received to mobile number linked to the corresponding account to complete the transaction.

Modern Electronic funds transfers are secured by a personal identification number (PIN), one-time password (OTP) etc. An automated clearing house (ACH) processes the payment then.



Indian Financial System Code (IFSC) is an 11 digit alpha-numeric code issued by Reserve Bank of India to uniquely identify individual bank's branch in India. It is used for domestic e-payments. SWIFT code is used for international bank transactions.

16.7 Unified Payments Interface

Unified Payments Interface (UPI) is a real-time payment system developed by National Payments Corporation of India (NCPI) to facilitate inter-bank transactions. It is simple, secure and instant payment facility. This interface is regulated by the Reserve Bank of India and used for transferring funds instantly between two bank accounts through mobile (platform) devices. http://www.npci.org.in/

Unlike traditional e-wallets, which take a specified amount of money from user and store it in its own account, UPI withdraws and deposits funds directly from

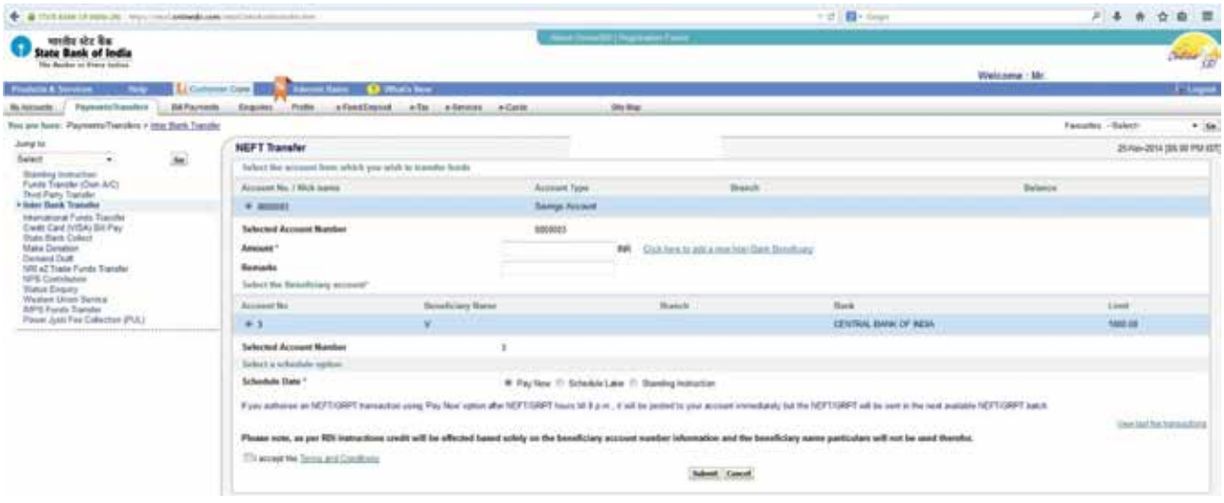


Figure 16.9 Home page of SBI Internet banking

12th_Computer_Application_English version CHAPTER 16.indd 229 19-01-2023 17:21:24

the bank account whenever a transaction is requested. It also provides the "peer to peer" collect request which can be scheduled and paid as per requirement and convenience.

UPI is developed on the basis of Immediate Payment Service (IMPS). To initiate a transaction, UPI applications use two types of address - global and local.

- Global address includes bank account numbers and IFSC.
- Local address is a virtual payment address.

Virtual payment address (VPA) also called as UPI-ID, is a unique ID similar to email id (e.g. name@bankname) enable us to send and receive money from banks. The bank or the financial institution allows the customer to generate VPA using phone number associated with Aadhaar number and bank account number. VPA replaces bank account details thereby completely hides critical information.

DO YOU KNOW?

UPI is also available as an Unstructured Supplementary Service Data (USSD) service. Users who don't have Internet can dial *99# and get UPI services within India. The financial services like transferring fund, payment request and non-financial services like changing MPIN and balance check are currently available through the USSD.



The MPIN (Mobile banking Personal Identification number) is required to confirm each payment. UPI allows operating multiple bank accounts in a single mobile application. Some UPI application also allows customers to initiate the transaction using only Aadhaar number in absence VPA.

Advantages

- Immediate money transfers through mobile device round the clock 24 x 7.
- Can use single mobile application for accessing multiple bank accounts.
- Single Click Authentication for transferring of fund.
- It is not required to enter the details such as Card no, Account number, IFSC etc. for every transaction.
- Electronic payments will become much easier without requiring a digital wallet or credit or debit card.

16.8 Cash on delivery

Cash on delivery (COD) also called as collection on delivery, describes a mode of payment in which the payment is made only on receipt of goods rather in advance. Originally, the term applies only to cash payment, but since other forms of payment have become more common, the word "cash" has sometimes been replaced by the word "collect" to transactions with checks, credit cards or debit cards.

COD is often used as an additional payment option in E-Commerce. It offers the recipient the advantage of paying only when commodity is handed over that is likely similar to traditional system. If the goods are not paid, they are returned to the retailer.

12th_Computer_Application_English version CHAPTER 16.indd 230 19-01-2023 17:21:24

POINTS TO REMEMBER

- Payments are the financial instruments used globally to transfer value in the form of money or its substitutes and are constantly changing due to new technology and Government regulations.
- Payment system can also be divided into two types, namely the cash payment system and the non-cash payment system based on the instruments used. In the cash payment system, the instruments used are in the form of currency (paper money and coins) while in the non-cash payment system the instruments used are card-based payment, Cheques or electronic money.
- A Credit card plays a major role in electronic payment system worldwide.
- ECS is treated as a electronic cheques by the bank. The advantages and disadvantages of the physical cheque is also extended to ECS. In electronic clearing services, bank process the instructions from the customer to debit his account and pay another automatically without much human interference.
- (POS) Point of Sale Terminal- It enables customers to make payment for purchase of goods and services by means of credit and debit cards. To facilitate customer convenience some banks also cash withdrawal using debit cards at POS terminals.

GLOSSARY

BIN	Bank Identification Number. The first six-digits of credit card number to uniquely identify financial institutions.
Brick and mortar	The term that refers to a business that has a physical store; opposite of online store.
(CVC2/CVV2)	Card Verification Code and Card Verification Value : A three digit code printed on the cardholder signature panel allows e-payments when the card is not physically accessible.
Credit card network / processor	Company responsible for communicating the transaction between the acquirer and the credit card issuer. E.g. MasterCard, Visa, Rupay
Double spend	A type of fraud where same cryptocurrency is spent in more than one transactions.
E-wallets	Electronic purses allow users to make electronic transactions quickly and securely
Gift cards	A magnetic stripe or chip card that holds the value of money to offer as a gift by a E-business
Internet banking	Is the activity of buying or selling of commodities through online services or over the Internet
PIN	Personal Identification Number. A static number that is assigned to consumers to secure card based payments.
Point of sale (POS)	Merchant's electronic device that enables the e-payments. It reads the card information from EMV or magnetic strip

12th_Computer_Application_English version CHAPTER 16.indd 231 19-01-2023 17:21:24

EVALUATION

DJALW

Part - I

Choose the correct answer

1. Based on the monetary value e payment system can be classified into
   a) Mirco and Macro
   b) Micro and Nano
   c) Maximum and Minimum
   d) Maximum and Macro

2. _____ refers to a payment made from one bank account to another bank account using eletronic methods.
   a) Electronic payment
   b) Direct payment
   c) Indirect payment
   d) None of the above

3. **Assertion (A):** Macro electronic payment systems support higher value payments.
   Reason (R): Expensive cryptographic operations are included in macro payments
   a) Both (A) and (R) are correct and (R) is the correct explanation of (A)
   b) Both (A) and (R) are correct, but (R) is not the correct explanation of (A)
   c) (A) is true and (R) is false
   d) (A) is false and (R) is true

4. Which of the following is correctly matched
   a) Credit Cards - pay before
   b) Debit Cards - pay now
   c) Stored Value Card - pay later
   d) Smart card – pay anytime

5. ECS stands for
   a) Electronic Clearing Services
   b) Electronic Cloning Services
   c) Electronic Clearing Station
   d) Electronic Cloning Station

6. Which of the following is a online payment system for small payments.
   a) Card based payment
   b) Micro electronic payment
   c) Macro electronic payment
   d) Credit card payment

7. Which of the following is true about Virtual payment address (VPA)
   a) Customers can use their e-mail id as VPA
   b) VPA does not includes numbers
   c) VPA is a unique ID
   d) Multiple bank accounts cannot have single VPA

8. Pick the odd one in the credit card transaction
   a) card holder
   b) merchant
   c) marketing manager
   d) acquirer

12th_Computer_Application_English version CHAPTER 16.indd 232 19-01-2023 17:21:24

9. Which of the following is true about debit card

i. debit cards cannot be used in ATMs

ii. debit cards cannot be used in online transactions

iii. debit cards do not need bank accounts

iv. debit cards and credit cards are identical in physical properties

a) i, ii, iii b) ii, iii, iv

c) iii alone d) iv alone

10. Match the following

List A	List B
A1) First Digit	B1) Account number
A2) 9th to 15th Digit	B2) MII Code
A3) First 6 Digits	B3) BIN Code
A4) Last Digit	B4) Check digit

	A1	A2	A3	A4
a)	B4	B3	B2	B1
b)	B2	B1	B3	B4
c)	B2	B3	B4	B1
d)	B2	B4	B3	B1

Part - II

Short Answers

1. Define electronic payment system
2. Distinguish micro electronic payment and macro electronic payment
3. Explain the concept of e-wallet
4. Write a short note on credit card?
5. What is smart card?

Part - III

Explain in Brief Answer

1. Define micro electronic payment and its role in E-Commerce.
2. Compare and contrast the credit card and debit card.
3. Explain briefly Anatomy of a credit card.
4. Briefly explain the stored value card and its types.
5. What is electronic fund transfer?

Part - IV

Explain in detail

1. Explain the key players of a credit card payment system.
2. Write a note on
   a. Internet banking
   b. Mobile banking
3. Explain in detail : Unified payments interface

STUDENT ACTIVITIES

Presentation about various payment systems

- Choose any presentation tool (e.g. Open office impress)
- Create a slide describing a payment method.
- List the futures of the particular payment method.
- List the advantages and disadvantages of the same.
- Repeat the steps for other payment methods.

12th_Computer_Application_English version CHAPTER 16.indd 233 19-01-2023 17:21:24



17
CHAPTER

EL729

E-Commerce Security Systems

LEARNING OBJECTIVES

- To know basics of E-Commerce Security Systems
- To understand various types of E-Commerce threats
- To learn about dimensions of E-Commerce security
- To know about security technologies in E-Commerce transaction

17.1 Introduction

With the rapid development of the Internet, online transactions have increasingly become a new business model. E-Commerce transactions based on network resources have been accepted by the public. While enjoying the convenience brought by online transactions, the security of transactions has attracted much attention. The inherent openness and resource sharing of the network have seriously threatened the security of online transactions. To an E-Business security threats not only result in loss of revenue but also in reputation.

E-Commerce security is a set of protocols that safely guide E-Commerce transactions through the Internet.

Security has become a critical factor and core issue in the emerging E-business. Solving the security problems in transactions is the basis for ensuring the smooth development of E-business.

17.2 Types of E-Commerce Threats

Since E-Commerce is based on information technology and computer networks, it inevitably faces a series of security issues compared with traditional businesses. E-Commerce security threats can be accidental (caused by a human error) or intentional.

Foreign or domestic, internal or external, group or individual, business rivals or disgruntled employees, terrorists or hackers anyone with the capability, technology, opportunity, and intent to do harm can be a potential threat to E-Commerce. Though every business has pitfalls E-Commerce business would face the following specific threats.

12th_Computer_Application_English version CHAPTER 17.indd 234 19-01-2023 17:21:57

DO YOU KNOW?

Viruses cause harm to the computers thereby harms the efficient and smooth functioning of E-Commerce. Some viruses destroy all the information stored in a computer and cause huge loss of revenue and time. The emergence of computer viruses and their variants has rapidly increased over the past decade. The Internet has turned to be the best medium for the spread of viruses. Many new viruses directly use the Internet as their mode of transmission causing huge economic losses to E-businesses.

1. Information leakage: The leakage of trade secrets in E-Commerce mainly includes two aspects: (a) the content of the transaction between the vendor and customer is stolen by the third party; (b) the documents provided by the merchant to the customer or vice versa are illegally used by the other. This intercepting and stealing of online documents is called information leakage.
2. Tampering: E-Commerce has the problem of the authenticity and integrity of business information. When hackers grasp the data transmitted on the network, it can be falsified in the middle through various technical means, and then sent to the destination, thereby destroying the authenticity and integrity of the data.
3. Payment frauds: Payment frauds have subsets like Friendly fraud (when customer demands false reclaim or refund), Clean fraud (when a stolen credit card is used to make a purchase) Triangulation fraud (fake online shops offering cheapest price and collect credit card data) etc.
4. Malicious code threats: Within an E-Commerce site, there are multiple vulnerable areas that can serve as an intrusion point for a hacker to gain payment and user information. Using malware, Cross Site Scripting or SQL Injection, an attacker will extract the credit card information and sell the acquired data on black markets. Fraud is then committed to extract the greatest value possible through E-Commerce transactions or ATM withdrawals, etc.
5. Distributed Denial of Service (DDoS) Attacks: It is a process of taking down an E-Commerce site by sending continious overwhelming request to its server. This attack will be conducted from numerous unidentified computers using botnet. This attack will slow down and make the server inoperative. DDoS attacks is also called as network flooding.

DO YOU KNOW?

Phishing is also a E-Commerce threat in which a target is contacted by e-mail, telephone or text message by someone who pretend himself as a genuine authority. They try to trap individuals to provide sensitive data such as, banking and credit card details, OTP, PIN or passwords. Once they succeed, the results would lead to devastating acts such as identity theft and financial loss.



12th_Computer_Application_English version CHAPTER 17.indd 235 19-01-2023 17:21:57

6. Cyber Squatting: Cybersquatting is the illegal practice of registering an Internet domain name that might be wanted by another person in an intention to sell it later for a profit. It involves the registering of popular trademarks and trade names as domain names before the particular company do. Cyber squatters also involve in trading on the reputation and goodwill of such third parties by inducing a customer to believe that it is an official web page.

DO YOU KNOW? In September 2015, the domain google.com was bought for 12 American dollars by a former Google employee which he later sold it for 6006.13 American dollars.

7. Typopiracy: Typopiracy is a variant of Cyber Squatting. Some fake websites try to take advantage of users' common typographical errors in typing a website address and direct users to a different website. Such people try to take advantage of some popular websites to generate accidental traffic for their websites. e.g. www.goggle.com, www.faceblook.com

DO YOU KNOW? Hacking refers to unauthorized intrusion into a computer or a network. That is to say breaking security to gain access to a website illegally and intercept confidential information. They would then misuse such information to their advantage or modify and even destroy its contents to harm the competitors.

17.3 Dimensions of E-Commerce security

As the security issue is the most worrying issue for E-Business, ensuring the security of E-Commerce activities has become the core research field of E-Commerce. The following are some of the security elements involved in E-Commerce.

- Authenticity: conforming genuineness of data shared.
- Availability: prevention against data delay or removal.
- Completeness: unification of all business information.
- Confidentiality: protecting data against unauthorized disclosure.
- Effectiveness: effective handling of hardware, software and data.
- Integrity: prevention of the data being unaltered.
- Non-repudiation: prevention against violation agreement after the deal.
- Privacy: prevention of customers' personal data being used by others.
- Reliability: providing a reliable identification of the individuals or businesses.
- Review ability: capability of monitoring activities to audit and track the operations.

DO YOU KNOW? Ransomware: Ransomware is a type of malware that usually encrypt all the files in a target's computer and threatens to publish the critical data unless a ransom (money) is paid.



12th_Computer_Application_English version CHAPTER 17.indd 236 19-01-2023 17:21:57

17.4 Security technologies in E-Commerce transaction

Since a large amount of confidential information are involved in E-Commerce activities it must be transmitted through safe and secured network. Sophisticated security technologies are required to ensure the security of E-Commerce transactions. At present, the security technologies in E-Commerce transactions are roughly classified into

- Encryption technology
- Authentication technology
- Authentication protocols

17.4.1 Encryption technology

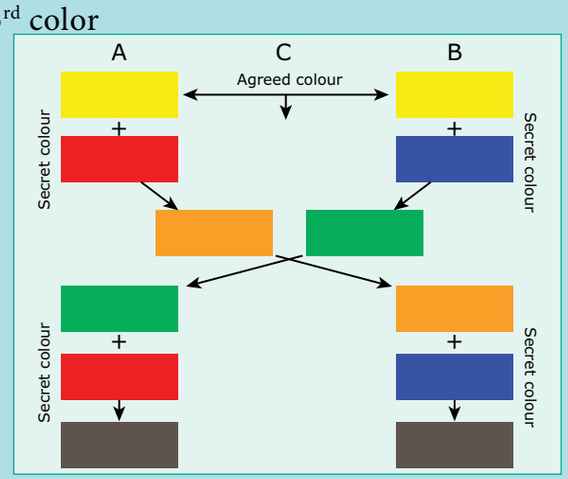
Encryption technology is an effective information security protection. It is defined as converting a Plaintext into meaningless Ciphertext using encryption algorithm thus ensuring the confidentiality of the data. The encryption or decryption process uses a key to encrypt or decrypt the data. At present, two encryption technologies are widely used. They are

- Symmetric key encryption system
- Asymmetric key encryption system.

DO YOU KNOW?

In 1976, Whitfield Diffie and Martin e. Hellman, devised an algorithm called public key encryption. The algorithm can be understood using color game. This how could "A" and "B" get a secret key without letting "C" finding it out. The trick is based on 2 facts

- It is easy to mix 2 colors together to get 3rd color
- Given a mixed color it's hard to reverse it in order to find the exact original colors



1. First A and B agree publicly on a starting color (yellow)
2. Now A select a random colour (red) mix it with yellow and send new color (yellow+red=orange) to B.
3. Similarly B selects a random colour (blue) mix it with yellow and send new colour (yellow+blue=green) to A.
4. Hacker "C" may have two new colours (orange) and (green) but not the A's (red) or B's (blue) private colours.
5. After interchanging colors, A adds his own private (red) to B's mixture (green) and arrive at a third secret colour(black).
6. Also B adds his own private (blue) to A's mixture (orange) and arrive at a same third secret color (black).
7. C is unable to have the exact color (black), since C needs one of the private color to do so.

12th_Computer_Application_English version CHAPTER 17.indd 237 19-01-2023 17:21:57

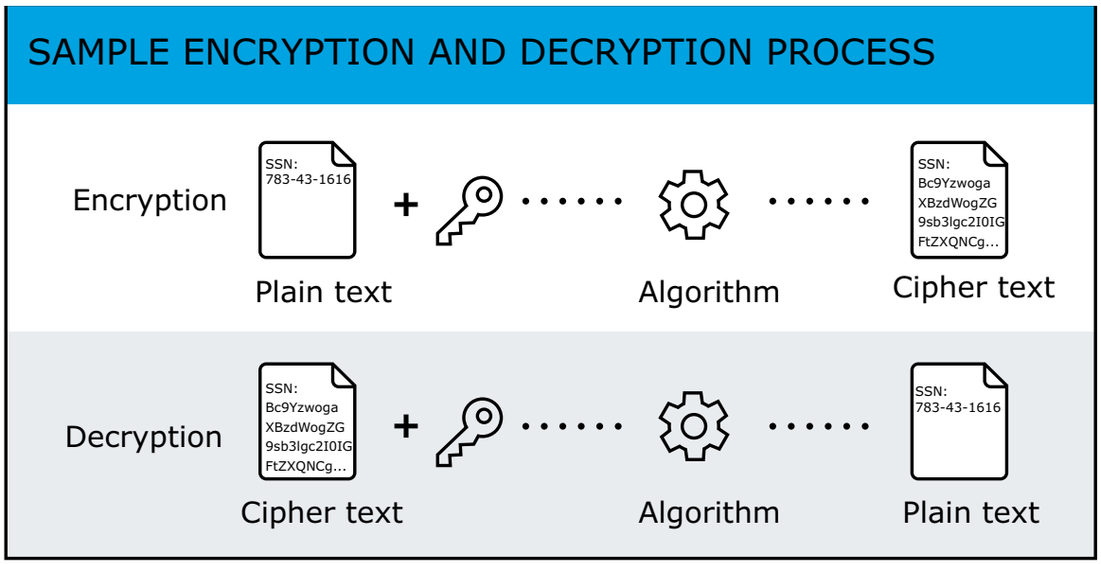
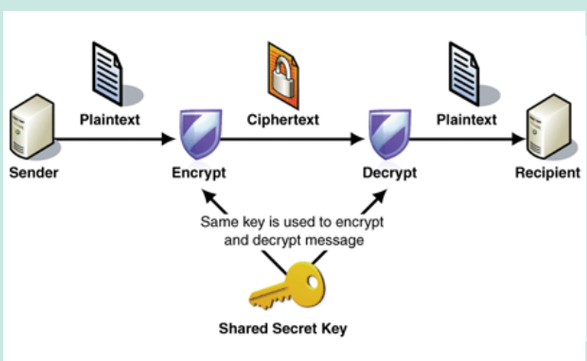
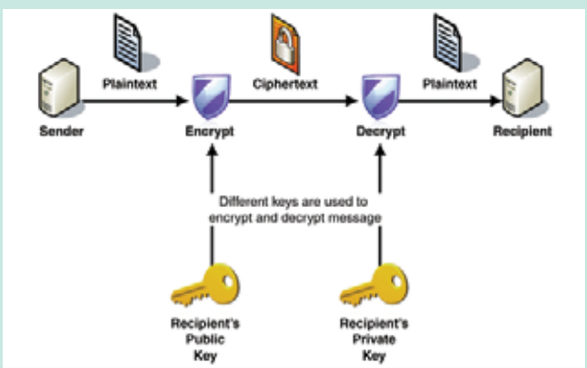


Figure 17.1 Data Encryption and Decryption process

Symmetric Key Encryption	Asymmetric Key Encryption
Same key is used for both encryption and decryption	Different keys are used for encryption and decryption
Speed of encryption or decryption is very fast	Speed of encryption or decryption is comparatively slow
Plain text and cipher text are of same size	The size of cipher text is always greater than plain text.
Algorithms like DES, AES, RC4 uses symmetric key encryption	Algorithms like RSA, ECC, DSA use asymmetric key encryption
Provides confidentiality	Provides confidentiality, authenticity and non-repudiation
The number of key used grows exponentially with the number of users	The number of key used grows linearly with the number of users
	

12th_Computer_Application_English version CHAPTER 17.indd 238 19-01-2023 17:21:57

17.4.2 Authentication Technology

The main role of security certification is to ensure Authentication, Integrity and Non-repudiation. This can be achieved through digital signatures and digital certificates.

Digital certificates

A digital certificate is an electronic document used to prove the ownership of a public key. This certificate includes the information about the sender's identity, digital signature and a public key.

A digital certificate function is similar to the function of identification cards such as passports and driving licenses. Digital certificates are issued by recognized Certification Authorities (CA).



Figure 17.2 Digital Certificates

Common digital certificate systems are X.509 and PGP (Pretty Good Privacy).

DO YOU KNOW?

The digital certificate are being issued by a licensed Certifying Authority (CA). NIC, Safescript, TCS, MTNL, e-Mudhra are some of the authorized Certifying Authorities under Government of India.

Digital signature

A digital signature is a mechanism that is used to verify that a particular digital document, message or transaction is authentic.

It provides the receiver the guarantee that the message was actually generated by the sender. It also confirms that the information originated from the signer and has not been altered by a cracker in the middle. Digital signatures can provide the added assurances of evidence to the origin, identity and status, as well as acknowledging the consent of the sender.

DO YOU KNOW?

A security token is a hardware component that are used to identify and authenticate users.



12th_Computer_Application_English version CHAPTER 17.indd 239 19-01-2023 17:21:58

Digital signature	Digital certificate
A digital signature is a mechanism that is used to verify that a particular digital document, message or transaction is authentic.	A digital certificate is a computer file which officially approves the relation between the holder of the certificate and a particular public key.
Digital signatures are used to verify the trustworthiness of the data being sent	Digital certificates are used to verify the trustworthiness of the sender.
Digital signature is to ensure that a data remain secure from the point it was issuedand it was not modified by a third party.	Digital certificate binds a digital signature to an entity
It provides authentication, non-repudiation and integrity	It provides authentication and security.
A digital signature is created using a Digital Signature Standard (DSS). It uses a SHA-1 or SHA-2 algorithm for encrypting and decrypting the message.	A digital certificate works on the principles of public key cryptography standards (PKCS). It creates certificate in the X.509 or PGP format.
The document is encrypted at the sending end and decrypted at the receiving end using asymmetric keys.	A digital certificate consist of certificate's owner name and public key, expiration date, a Certificate Authority 's name , a Certificate Authority's digital signature

17.4.3 Authentication protocols

At present, there are two kinds of security authentication protocols widely used in E-Commerce, namely Secure Electronic Transaction (SET) and Secure Sockets Layer (SSL).

Secure Electronic Transaction

Secure Electronic Transaction (SET) is a security protocol for electronic payments with credit cards, in particular via the Internet. SET was developed in 1996 by VISA and MasterCard, with the participation of GTE, IBM, Microsoft and Netscape.

The implementation of SET is based on the use of digital signatures and the encryption of transmitted data with asymmetric and symmetric encryption algorithms. SET also use dual signatures to ensure the privacy.

Secure Sockets Layers

The most common Cryptographic protocol is Secure Sockets Layers (SSL). SSL is a hybrid encryption protocol for securing transactions over the Internet. The SSL standard was developed by Netscape in collaboration with MasterCard, Bank of America, MCI and Silicon Graphics.

It is based on a public key cryptography process to ensure the security of data transmission over the internet. Its principle is to establish a secure communication channel (encrypted) between a client and a server after an authentication step.

12th_Computer_Application_English version CHAPTER 17.indd 240 19-01-2023 17:21:58



Figure 17.3 Difference between http and https

Today, all browsers in the market support SSL, and most of the secure communications are proceeded through this protocol. SSL works completely hidden for the user, who does not have to intervene in the protocol. The only thing the user has to do is make sure the URL starts with https:// instead of http:// where the "s" obviously means secured. It is also preceded by a green padlock.

3D Secure

"3-D Secure is a secure payment protocol on the Internet. It was developed by Visa to increase the level of transaction security, and it has been adapted by MasterCard. It gives a better authentication of the holder of the payment card, during purchases made on websites. The basic concept of this (XML-based) protocol is to link the financial authorization process with an online authentication system. This authentication model comprise 3 domains (hence the name 3D) which are:

1. The Acquirer Domain
2. The Issuer Domain
3. The interoperability Domain

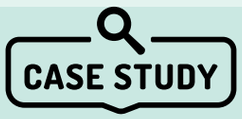
POINTS TO REMEMBER

- Phishing: Phishing is acquiring critical data like login credentials through telephone, sms, e-mail or any social media by the crackers disguising as authentic.
- Authentication: Information of the entity sending the document is often included in the document, but the information may be inaccurate. A digital signature can be used to authenticate the source of a document.
- Integrity: In many scenarios, the sender and receiver of the document will require confidence that the document has not been tampered with during the transfer. If the document was digitally signed, any modification of the document will invalidate the signature.
- Non-repudiation: Repudiation refers to any act of relinquishing responsibility for a message. Non-repudiation ensures that the signer who digitally signed the document cannot deny having signed it. The digitally signed documents strengthen

12th_Computer_Application_English version CHAPTER 17.indd 241 19-01-2023 17:21:58

its recipient integrity claims. Therefore, the recipient can strongly insist on the signature of the sender so as not to be easily denied at a later time.

- The difference between a digital signature and digital certificate is that a digital certificate binds a digital signature to an entity; whereas a digital signature ensures that a data remain secure from the point it was sent. In other words: digital certificates are used to verify the trustworthiness of the sender, while digital signatures are used to verify the trustworthiness of the data being sent.
- The certificate authority maintains a database of public keys called repository so that it can verify the user with digital signatures. Expired certificates are usually deleted from the database by the certificate authority.
- Brute-force attacks is the simplest attack method for breaking any encryption; that is, trying all the possible keys one by one.



The operating principle of SSL using public key encryption could be easily understood with the following scenario "kumar orders a mobile phone from an online store (abc.com)."

1. Kumar connects to abc.com website through a secure connection, from his computer browser.
2. The abc.com website sends Kumar an digital certificate and a public key (P). This digital certificate issued by a certification authority (CA) proves the identity of abc.com.
3. Kumar's browser checks the certificate. It (browser) then agrees with the remote server on a symmetric cryptographic system to use. Then it randomly choose a key for this algorithm (session key K).
4. Kumar's browser sends P (K) to abc.com. Using its secret key S, the abc.com server calculates S (P (K)) = K. Thus, Kumar's browser and abc.com server are in possession of the same key.
5. Kumar enters his credit card number and other data. They constitute the "information". The browser sends these "information" to abc.com, encrypted using the key K. It also sends a summary of this "information", using a mathematical function called hash function.
6. With the K key, the abc.com server can dencrypt the "information". It also calculates the summary of information, and compares with the summary sent by Kumar's browser. If they coincide, it is assumed that the data has been correctly transmitted.

12th_Computer_Application_English version CHAPTER 17.indd 242 19-01-2023 17:21:58

GLOSSARY

3-D Secure	An additional security layer for online credit and debit card transactions.
Ciphertext	It is the encrypted data usually the output of an encryption algorithm
Cracker	A person who breaks computer network's security maliciously to gain access to critical data.
Cryptanalysis	Analyzing a suspecting document for hidden data or chiphertext
Cyber Squatting	Is the illegal practice of registering an Internet domain name that might be wanted by another person in an intention to sell it later for a profit
Decipher	A standard algorithm for decrypting data
Domain name	The website address of an online store, e.g.www.amazon.com
Encryption	A method of scrambling data using an algorithm to protect / hide from unauthorized access.
Friendly Fraud	Is an intentional falsely claim of a costumer that they really didn't buy(after receiving the goods)
Hacking	Unauthorized intrusion into a computer or a network. That is to say breaking security to gain access to a website illegally and intercept confidential information
Message digest (MD)	Is a representation of data in a form of single string of digits using one-way hashing formula.
One-Time Password (OTP)	A dynamic password that is valid for one login session or transaction provides a potential security for a e-payment transaction.
PIN (Personal Identification Number)	A static number that is assigned to consumers to secure card based payments.
Plaintext/ cleartext	It is the unencrypted information also called as input chip
Traffic	An indicator that marks the number of visitors for a particular site.

STUDENT ACTIVITY

Identifying the security protocols used in the particular payment gateway.

- Create a chart for a payment process.
- Describe the security technology used in that payment method.
- Repeat the process for few other payment process.

12th_Computer_Application_English version CHAPTER 17.indd 243 19-01-2023 17:21:58

EVALUATION

2HCOW

Part - I

Choose the correct answer

1. In E-Commerce, when a stolen credit card is used to make a purchase it is termed as

   a) Friendly fraud
   b) Clean fraud
   c) Triangulation fraud
   d) Cyber squatting

2. Which of the following is not a security element involved in E-Commerce?

   a) Authenticity
   b) Confidentiality
   c) Fishing
   d) Privacy

3. Asymmetric encryption use _____ keys for encryption and decryption

   a) Same
   b) Different
   c) Positive
   d) Negative

4. The security authentication technology includeS

   i) Digital Signatures
   ii) Digital Currency
   iii) Digital Image
   iv) Digital Certificates

   a) i & iv
   b) ii & iii
   c) i, ii & iii
   d) all the above

5. PGP stands for

   a) Pretty Good Privacy
   b) Pretty Good Person
   c) Private Good Privacy
   d) Private Good Person

6. _____ protocol is used for securing credit cards transactions via the Internet

   a) Secure Electronic Transaction (SET)
   b) Credit Card Verification
   c) Symmetric Key Encryption
   d) Public Key Encryption

12th_Computer_Application_English version CHAPTER 17.indd 244 19-01-2023 17:21:58

7. Secure Electronic Transaction (SET) was developed in

   a) 1999 b) 1996

   c) 1969 d) 1997

8. The websites secured by Secure Socket Layer protocols can be identified using

   a) html:// b) http://

   c) htmls:// d) https://

9. _____ is the process of converting plain text into meaningless cipher text

   a) Encryption b) Decryption

   c) Digital certificate d) Digital signature

10. Which of the following is true about Ransomware

    a) Ransomware is not a subset of malware

    b) Ransomware deletes the file instantly

    c) Typopiracy is a form of ransomware

    d) Hackers demand ransom from the victim

Part - II

Short Answers

1. Write about information leakage in E-Commerce.
2. Write a short note on typopiracy.
3. Write about phishing
4. List the different types of security technologies in E-Commerce
5. What is Digital signature?

Part - III

Explain in Brief Answer

1. What is E-Commerce Security system?
2. List any two E-Commerce Security Threats?
3. Write a note on asymmetric key encryption.
4. Write a note on digital certificate.
5. Write about plain text and cipher text.

Part - IV

Explain in detail

1. Write about dimensions of E-Commerce Security.
2. Differentiate symmetric key and asymmetric key encryption.
3. Explain authentication protocols .

12th_Computer_Application_English version CHAPTER 17.indd 245 19-01-2023 17:21:58



18
CHAPTER

Electronic Data Interchange- EDI

LEARNING OBJECTIVES

- To acquire basic knowledge on EDI
- To know the brief history of EDI
- To understand the types of EDI
- To learn the advantages of EDI
- To know about the layers of EDI
- To study about UN/EDIFACT

18.1 Introduction

With the popularity of computers, many companies and organizations use computers to store and process data. However, different organizations use different application systems, and the format of the data generated is not the same. When organizations need to communicate with other organizations for their business needs they have to rekey. This was time consuming and a major obstacle in the business operations. In order to solve this problem, some enterprises have agreed a specific standard format, which can be regarded as the origin of the EDI application concept.

Soon, businesses began to realize that using EDI will smoothen the business transactions and increase the profit. These standardizations made ordering and shipping faster, more organized, and less expensive. Earlier, EDI documents were transmitted electronically by the use of Radio teletype, telex messages, or telephone.

EDI is "Paperless Trade" and EFT (Electronic Transfer) is "Paperless Payment"

Before the popularization of Internet-based E-Commerce, it was a major E-Commerce model. EDI includes



Figure: 18.1 Electronic Document Exchange

data exchange between buyers and sellers, trade partners, and also internal data exchange within departments of a company. There are many internationally accepted EDI standard e.g. EDIFACT, XML, ANSI ASC X12, etc.

The Electronic Data Interchange (EDI) is the exchange of business documents between one trade partner and another electronically. It is transferred through a dedicated channel or through the Internet in a predefined format without much human intervention.

It is used to transfer documents such as delivery notes, invoices, purchase orders, advance ship notice, functional acknowledgements etc. These documents are transferred directly from the computer of the issuing company to that of the receiving company, with great time saving and avoiding many errors of traditional "on paper" communications.

18.2 History of EDI

In late 1960s, shipping line, railroads, airlines, and truck companies of USA were exchanging electronic messages for their businesses. These messages were in different formats, and it resulted in problems in transfer of goods. In 1968, these companies grouped together among themselves and formed the Transportation Data Coordinating Committee (TDCC) to develop EDI standard formats.

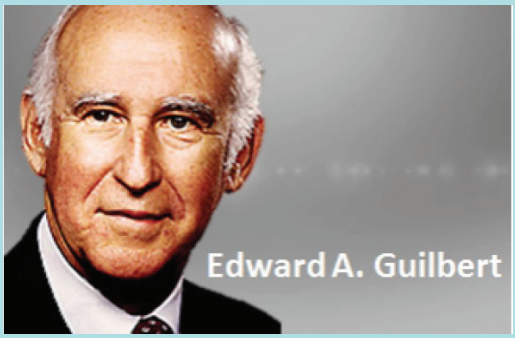
In 1975, first EDI standards were released by TDCC, of which Ed Guilbert was a major contributor.

In 1977, a group of supermarket companies and their business partners begin drafting and using an EDI project. The TDCC is renamed as Electronic Data Interchange Association (EDIA) in 1978. Later in that year, the EDIA was undertaken by the American National Standards Institute and becomes the ANSIX12 committee. Since then this committee is responsible for the publication of EDI standards.

Later in 1985, UN created the EDIFACT to assist with the global reach of technology in E-Commerce. EDIFACT is the most widely used EDI.



Like many other early information technologies, EDI was also inspired by developments in Defense Research Organization. **Ed Guilbert**, is called as the father of EDI. He manifested shipping standardized format (much like the 856, or ASN) during the 1948 Berlin airlift. Guilbert with his team developed the first standardized system for business documents, that later influenced how documents would be passed from computer to computer. This standard helped to track "what was contained in the shipment", "who was delivering the cargo", while not allowing language barriers or confusing formats to delay the shipment.



DO YOU KNOW?

The first EDI messages was sent in 1965 from the Holland-American steamship line to Trans-Atlantic shipping company using telex messages. The computer had sent a full page of information in roughly 2 minutes. These messages were then written on the magnetic tapes that could be loaded onto another computer.

18.3 EDI Types

The types of EDI were constructed based on how EDI communication connections and the conversion were organized. Thus based on the medium used for transmitting EDI documents the following are the major EDI types.

- Direct EDI
- EDI via VAN
- EDI via FTP/VPN, SFTP, FTPS
- Web EDI
- Mobile EDI

Direct EDI/Point-to-Point

It is also called as Point-to-Point EDI. It establishes a direct connection between various business stakeholders and partners individually. This type of EDI suits to larger businesses with a lot of day to day business transactions.

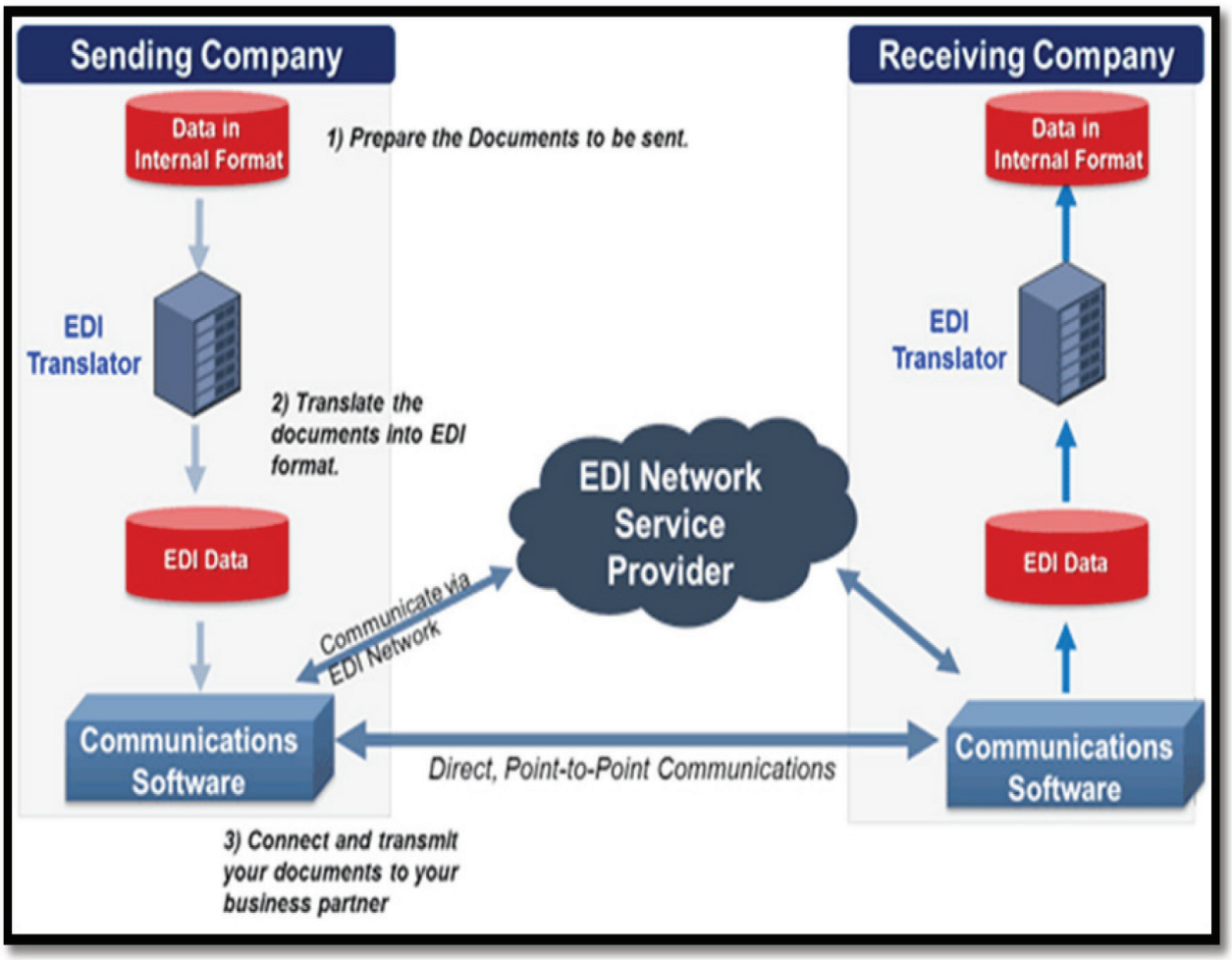


Figure: 18.2 EDI via VAN

EDI via VAN

EDI via VAN (Value Added Network) is where EDI documents are transferred with the support of third party network service providers. Many businesses prefer this network model to protect them from the updating ongoing complexities of network technologies.



A value-added network is a company, that is based on its own network, offering EDI services to other businesses. A value-added network acts as an intermediary between trading partners. The principle operations of value-added networks are the allocation of access rights and providing high data security.

EDI via FTP/VPN, SFTP, FTPS

When protocols like FTP/VPN, SFTP and FTPS are used for exchange of EDI based documents through the Internet or Intranet it is called as EDI via FTP/VPN, SFTP, FTPS.

Web EDI

Web based EDI conducts EDI using an web browser via the Internet. Here the businesses are allowed to use any browser to transfer data to their business partners. Web based EDI is easy and convenient for small and medium organizations.

Mobile EDI

When smartphones or other such handheld devices are used to transfer EDI documents it is called as mobile EDI. Mobile EDI applications considerably increase the speed of EDI transactions.

18.4 Advantages of EDI

EDI was developed to solve the problems inherent in paper-based transaction processing and in other forms of electronic communication. Implementing EDI system offers a company greater control over its supply chain and allow it to trade more effectively. It also increases productivity and promotes operational efficiency. The following are the other advantages of EDI.

- Improving service to end users
- Increasing productivity
- Minimizing errors
- Slashing response times
- Automation of operations
- Cutting costs
- Integrating all business and trading partners
- Providing information on process status
- Optimizing financial ratios

18.5 EDI Layers

Electronic data interchange architecture specifies four different layers namely

1. Semantic layer
2. Standard translation layer
3. Transport layer
4. Physical layer

These EDI layers describes how data flows from one computer to another.

EDI Semantic layer	Application level services	
EDI Standard translation layer	EDIFACT business form standards	
	ANSI X 12 business form standards	
EDI Transport layer	Electronic mail	X.435, MIME
	Point to point	FTP. TELNET
	World Wide Web	HTTP
Physical layer	Dial-up line, internet, I-way	

Figure: 18.3 EDI Layers

18.6 EDI Standards

The standard is the most critical part of the entire EDI. Since EDI is the data transmission and information exchange in the form of an agreed message format, it is important to develop a unified EDI standard. The EDI standard is mainly divided into the following aspects: basic standards, code standards, message standards, document standards, management standards, application standards, communication standards and security standards.

The first industry-specific EDI standard was the TDCC published by the Transportation Data coordinating Committee in 1975. Then other industries started developing unique standards based on their individual needs. E.g. WINS in the warehousing industry.

The most widely used EDI message standards are the United Nations EDIFACT and the ANSI X12.

18.6.1 UN/EDIFACT

United Nations / Electronic Data Interchange for Administration, Commerce and Transport (UN / EDIFACT) is an international EDI - standard developed under the supervision of the United Nations. In 1987, the UN / EDIFACT syntax rules were approved as ISO: ISO9735 standard by the International Organization for Standardization.

EDIFACT includes a set of internationally agreed standards, catalogs and guidelines for electronic exchange of structured data between independent computer systems.



Figure: 18.4 UN/EDIFACT

It is a cross-industry, standard data format of electronic data for commercial transactions. Maintenance and further development of this standard goes through the United Nations Center for Trade Facilitation and Electronic Business (UN/CEFACT), which is affiliated to the UN Economic Commission for Europe (UNECE).

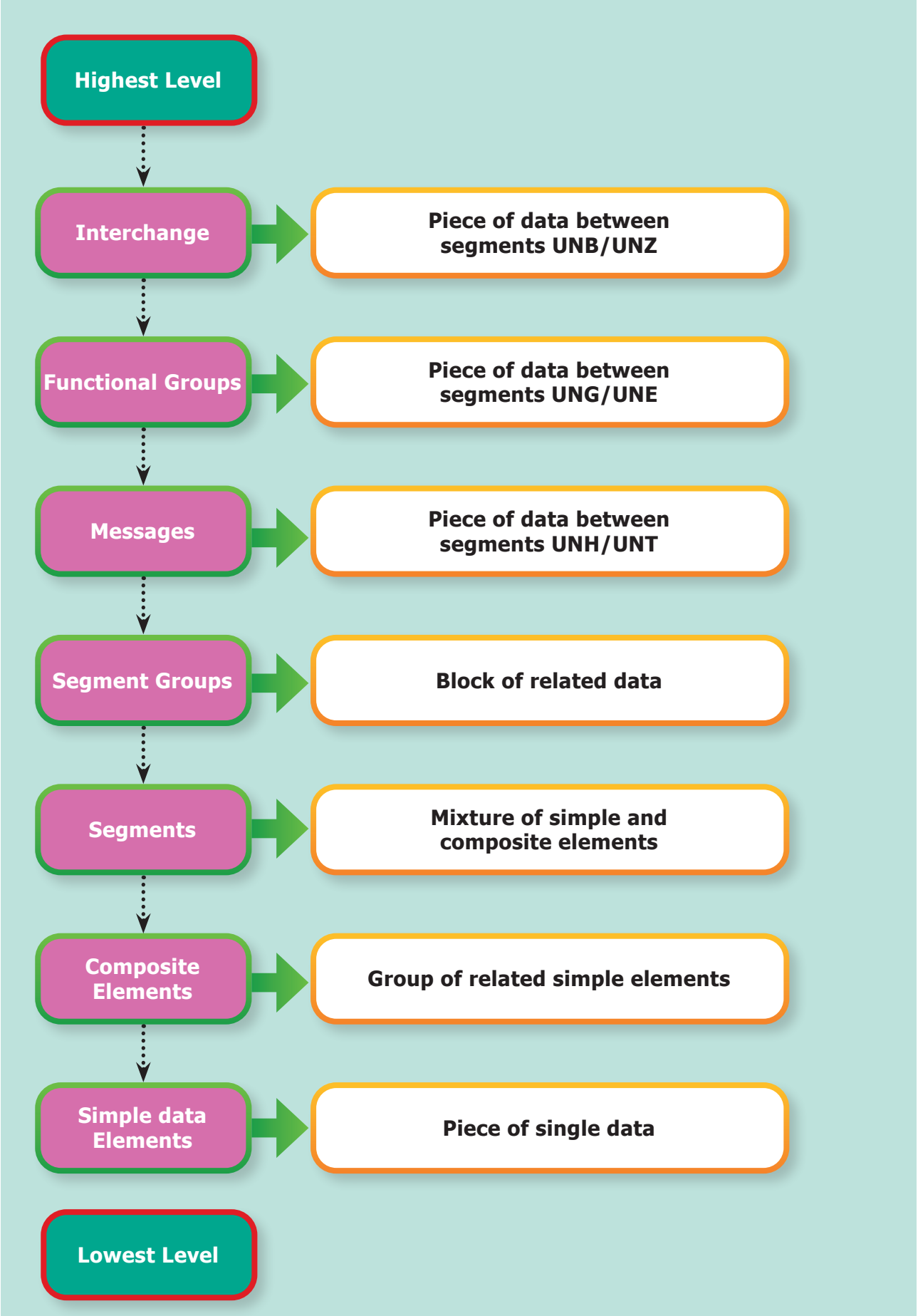


Figure: 18.5 UN/EDIFACT Message structure

POINTS TO REMEMBER

- According to the National Institute of Standards and Technology, EDI is "the computer-to-computer interchange of strictly formatted messages that represent documents other than monetary instruments."
- EDI is "Paperless Trade" and EFT (Electronic Transfer) is "Paperless Payment"
- **Ed Guilbert**, is called as the father of EDI
- In 1985, UN created the EDIFACT to assist with the global reach of technology in E-Commerce.
- Direct EDI is also called as Point-to-Point EDI
- Every EDI message consist of six uppercase English Alphabets

GLOSSARY

HTML	HTML stands for Hyper Text Markup Language. This language is designed for creating websites.
PHP	PHP is server-side scripting language.
ECHO	Echo statement is used to display output in PHP.
WAMP	WAMP is abbreviation for "Windows, Apache, MySQL, and PHP".

STUDENT ACTIVITY

- Prepare a chart explaining various types of EDI standards. (e.g. web EDI)

EVALUATION

Part - I

Choose the correct answer

1. EDI stands for
   a) Electronic Details Information
   b) Electronic Data Information
   c) Electronic Data Interchange
   d) Electronic Details Interchange
2. Which of the following is an internationally recognized standard format for EDI?
   a) TSLFACT b) SETFACT c) FTPFACT d) EDIFACT
3. Which is the first industry-specific EDI standard?
   a) TDCC b) VISA c) Master d) ANSI
4. Which of the following is a type of EDI?
   a) Direct EDI b) Indirect EDI c) Collective EDI d) Unique EDI
5. Who is called as the father of EDI?
   a) Charles Babbage
   b) Ed Guilbert
   c) Pascal
   d) None of the above

Part - II

Short Answers

1. Define EDI.
2. List few types of business documents that are transmitted through EDI.
3. Write any two EDI Standards.

Part - III

Explain in Brief Answer

1. Write a short note on EDI via VAN.
2. List the various layers of EDI .
3. Write a note on UN/EDIFACT.

Part - IV

Explain in detail

1. Briefly explain types of EDI.
2. What are the advantages of EDI?

01
EXERCISE

Page Formatting using PageMaker

Question

1. Open PageMaker 7.0 and create a new document layout which includes the following setup options:
   - Page size – A4.
   - Number of Pages – 4.
   - Margins 1.25 inches- top, and .75 inches - all other sides.

2. Type the following text:

   HAPPINESS

   Happiness is often confused with fun, good living, and riches. Sometimes fun is equated with happiness. Fun is what we experience while doing an activity, whereas happiness is a residual and long-lasting feeling. The path to happiness is long and full of challenges. Happiness requires life-long pursuit.

3. Set the heading 'HAPPINESS' in 18 points, Arial font, bold and alignment centre.

4. Format the paragraph as follows:

   (a) Font – Arial

   (b) Font size – 12

   (c) Alignment – Justified

   (d) Leading – 20

5. Save the document as 'happiness'.

AIM

To create a new document using the default given options.

12th_Computer_Application_English version Practical.indd 254 19-01-2023 17:25:52

Procedure

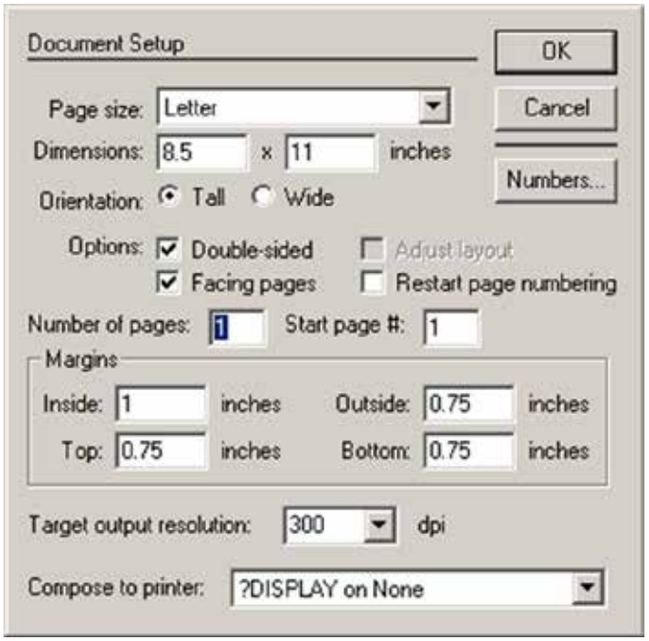
1. Start the PageMaker using the following commands.

   Start → All Programs → Adobe → PageMaker 7.0 → Adobe PageMaker 7.0. The Adobe PageMaker window will be opened as shown in Figure.



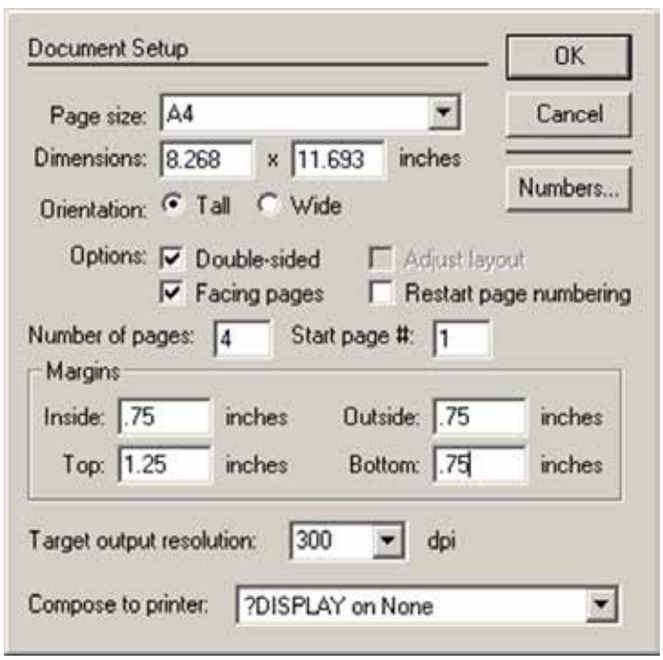
12th_Computer_Application_English version Practical.indd 255 19-01-2023 17:25:52

2. Choose File → New in the menu bar. (or) Press Ctrl + N in the keyboard. This opens the Document Setup dialog box.



- Click the Page Size drop down list box and select A4 size.
- In the Number of pages text box, type 4.
- Set the values in the Margins sections as follows :

Inside	–	– 0.75 inches
Outside	–	0.75 inches
Top	–	1.25 inches
Bottom	–	0.75 inches



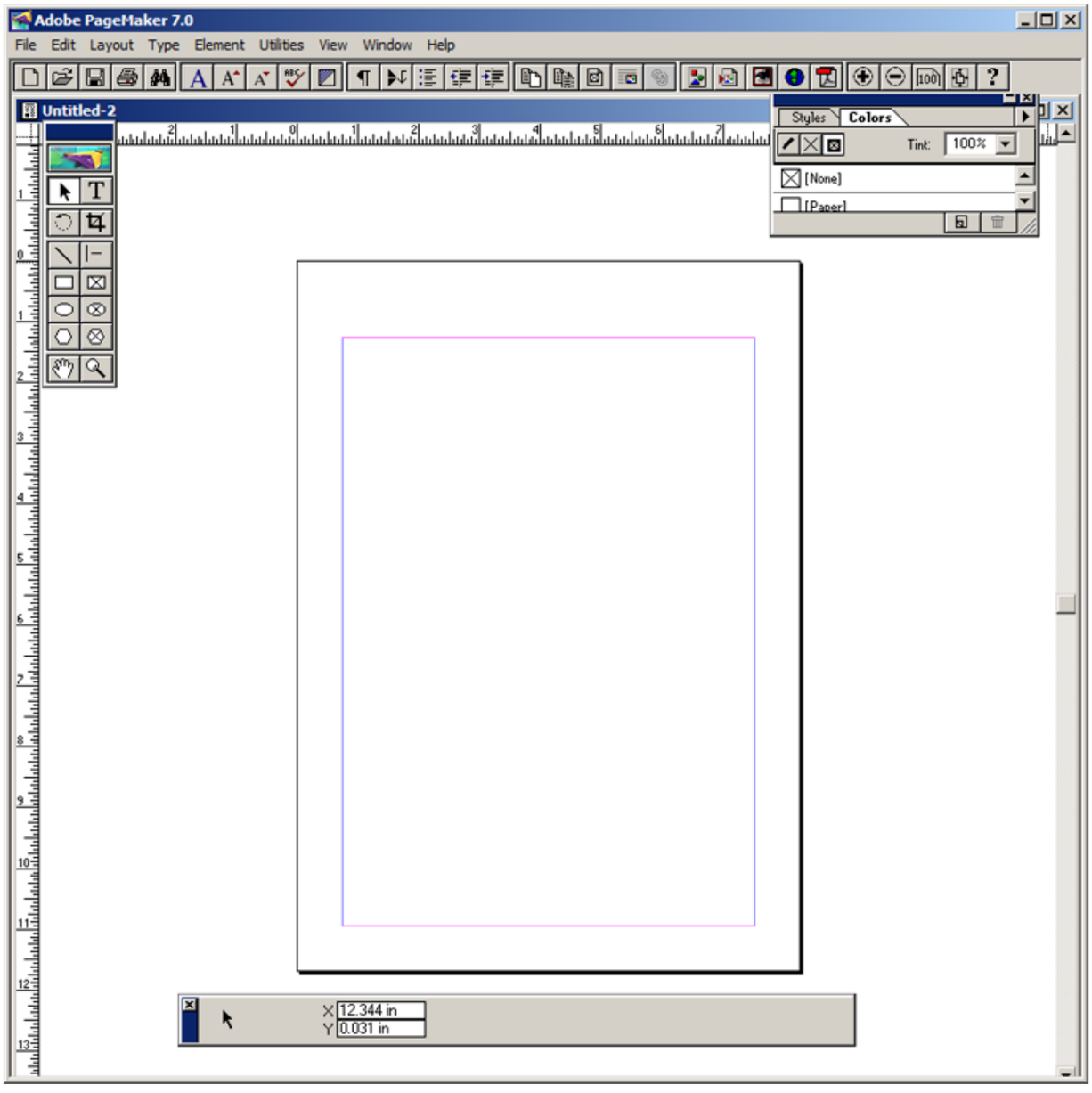
Note

To change Measuring Units from Inches to Millimeters

- Choose File > Preferences > general (or) Press Ctrl + K. Now Preferences dialogue box appears.
- Change the unit of Measurements and Vertical ruler to Millimeters.

12th_Computer_Application_English version Practical.indd 256 19-01-2023 17:25:52

3. Click on OK. Now a new document called Untitled – 1 will appear on the screen as shown in Figure.



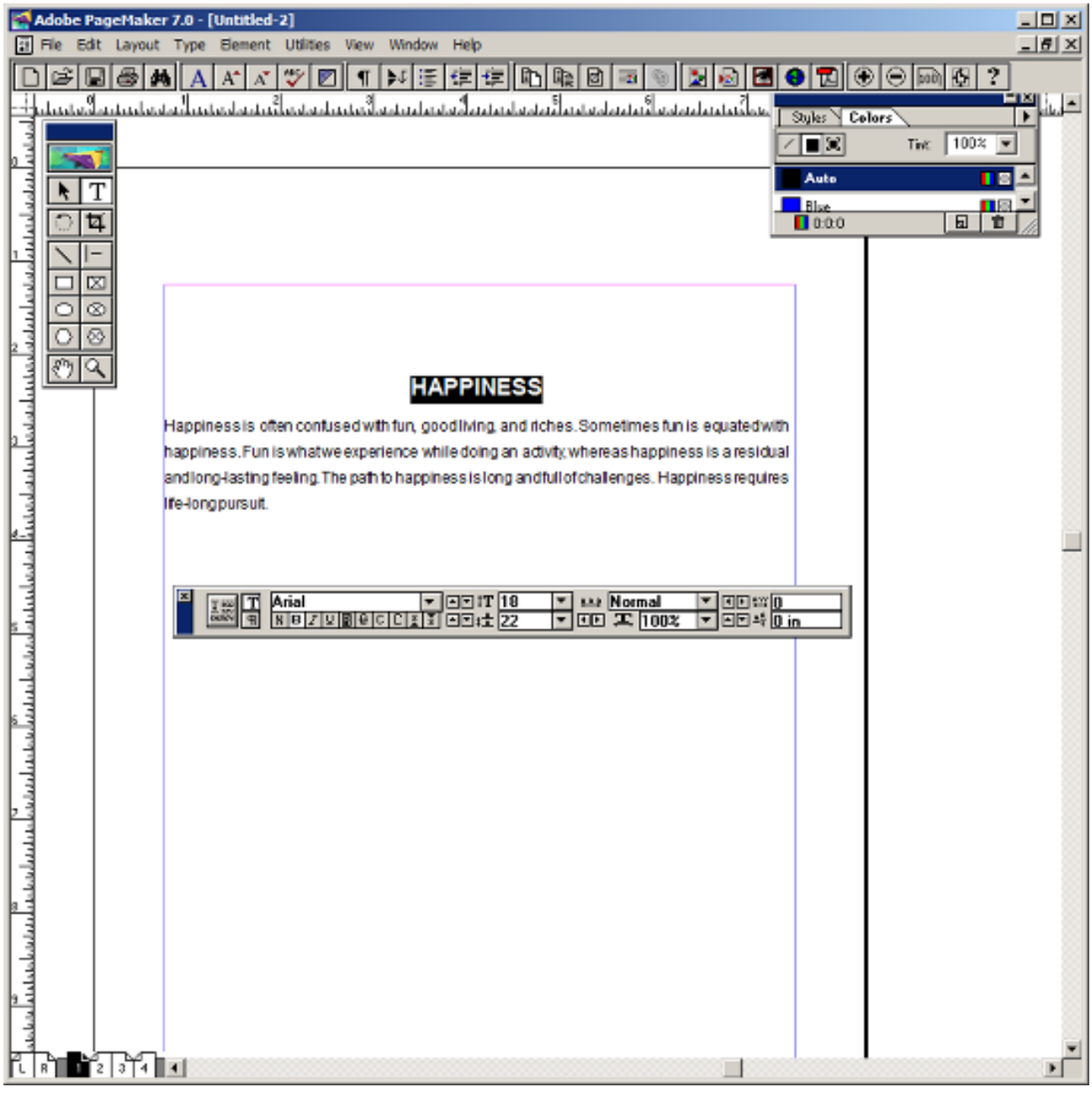
4. Click on the Text tool and create a text block. Then type the following text in the text block.

HAPPINESS

Happiness is often confused with fun, good living, and riches. Sometimes fun is equated with happiness. Fun is what we experience while doing an activity, whereas happiness is a residual and long-lasting feeling. The path to happiness is long and full of challenges. Happiness requires life-long pursuit.

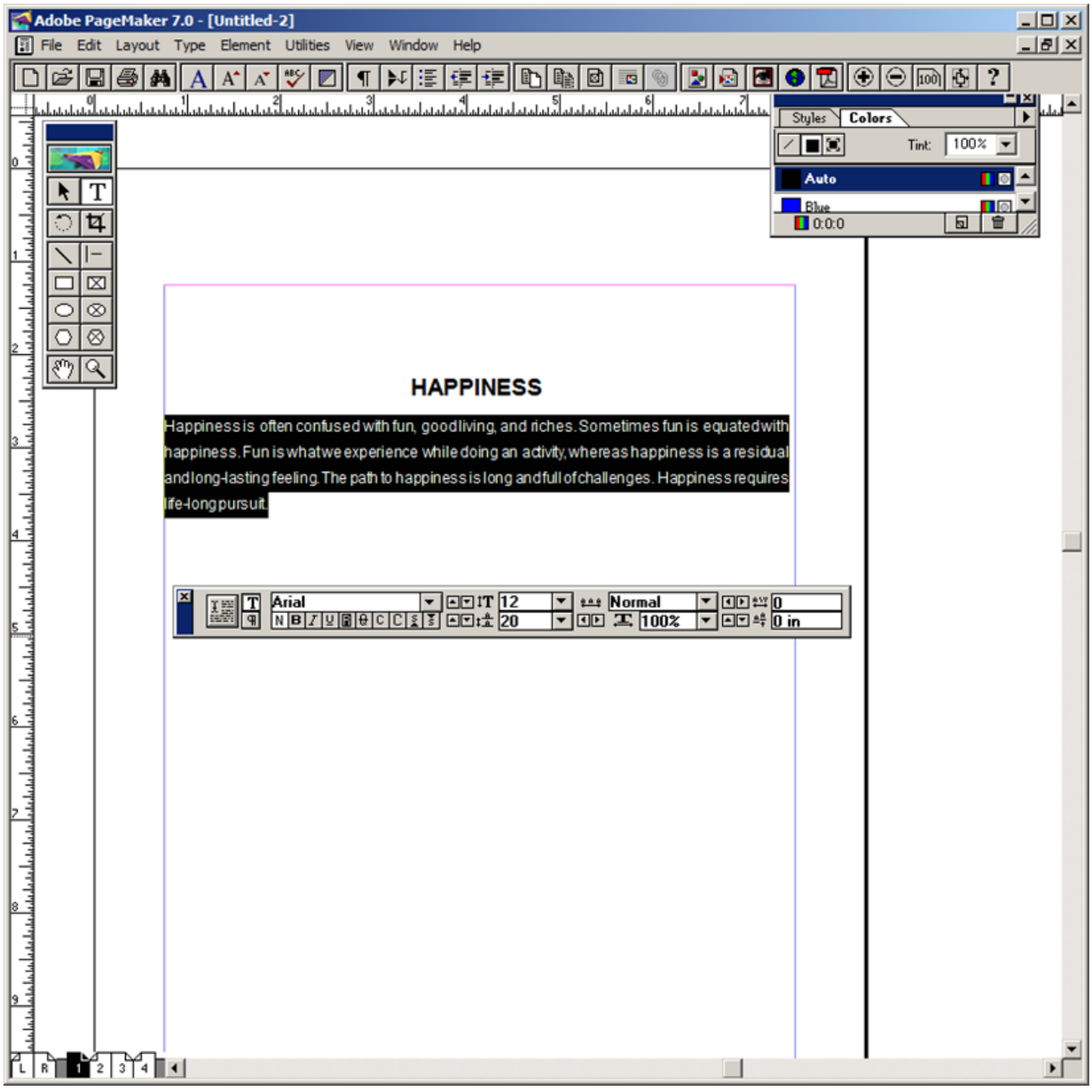
12th_Computer_Application_English version Practical.indd 257 19-01-2023 17:25:52

5. Select the word '**HAPPINESS**' with Text tool. Using **Character Control Palette**, change the font to Arial, font size to 18, and Leading 22. Then click on **Bold** button. Then press **Shift + Ctrl + C** for centre alignment.



12th_Computer_Application_English version Practical.indd 258 19-01-2023 17:25:52

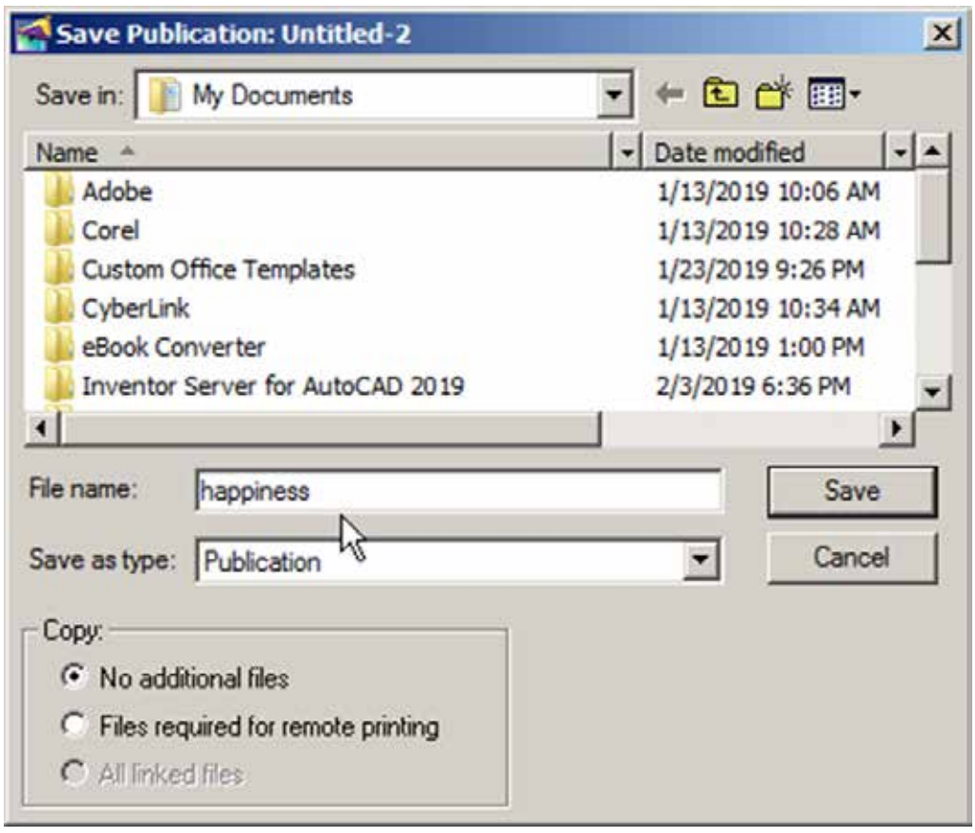
6. Select the paragraph with Text tool. Using **Character Control Palette**, change the font to Arial, font size to 12, and Leading 20. Then press **Shift + Ctrl + J** for Justify.



12th_Computer_Application_English version Practical.indd 259 19-01-2023 17:25:53

7. To save the document as 'happiness'

(a) Press Ctrl + S (or) Choose File → Save in the menu bar. Save publication dialogue box appears. Type 'happiness' in the File name text box and press Save button.



Output

HAPPINESS

Happiness is often confused with fun, good living, and riches. Sometimes fun is equated with happiness. Fun is what we experience while doing an activity, whereas happiness is a residual and long-lasting feeling. The path to happiness is long and full of challenges. Happiness requires life-long pursuit.

Conclusion

The expected output is achieved.

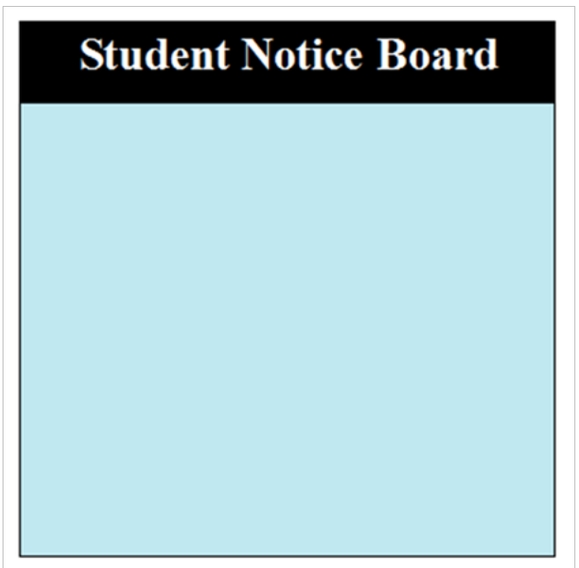
12th_Computer_Application_English version Practical.indd 260 19-01-2023 17:25:53

02
EXERCISE

Creating Notice Board using PageMaker

Question

Create a Student Notice Board using PageMaker.



AIM

To create a Student Notice Board.

Procedure

1. Start the PageMaker using the following commands.

   Start → All Programs → Adobe → PageMaker 7.0 → Adobe PageMaker 7.0. The Adobe PageMaker window will be opened.

2. Choose File → New in the menu bar (or) Press Ctrl + N in the keyboard.

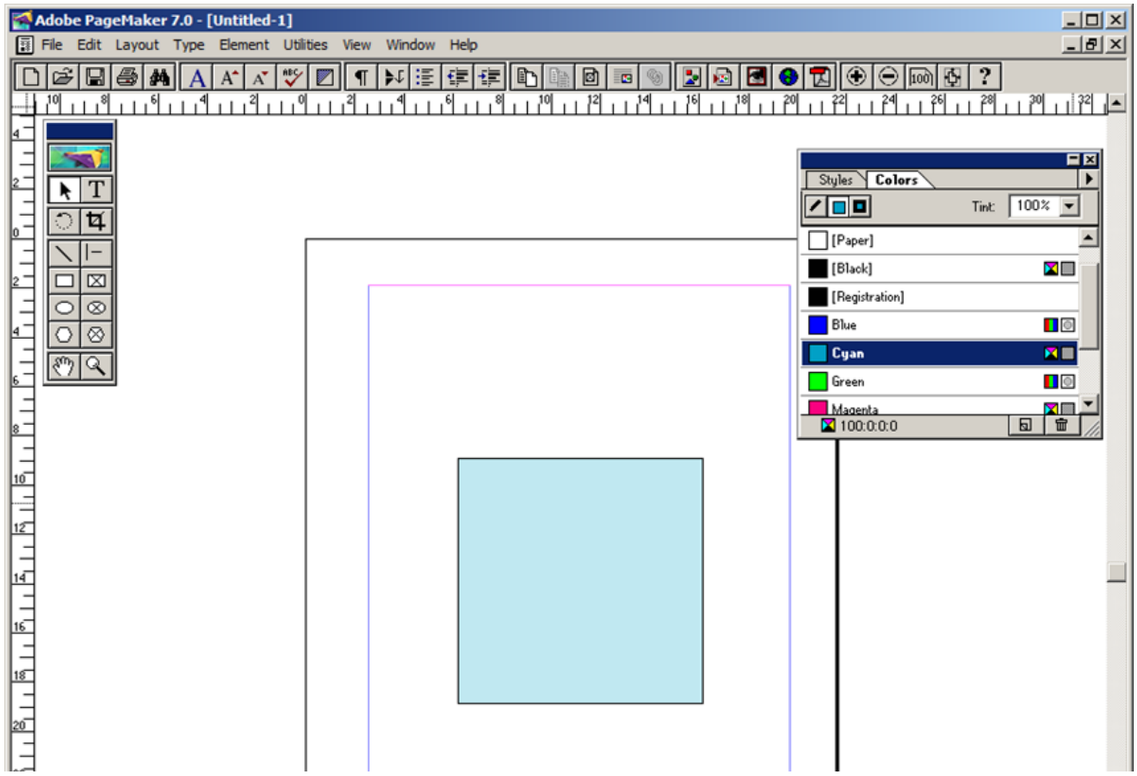
   This opens the Document Setup dialog box.

3. Click on OK button.

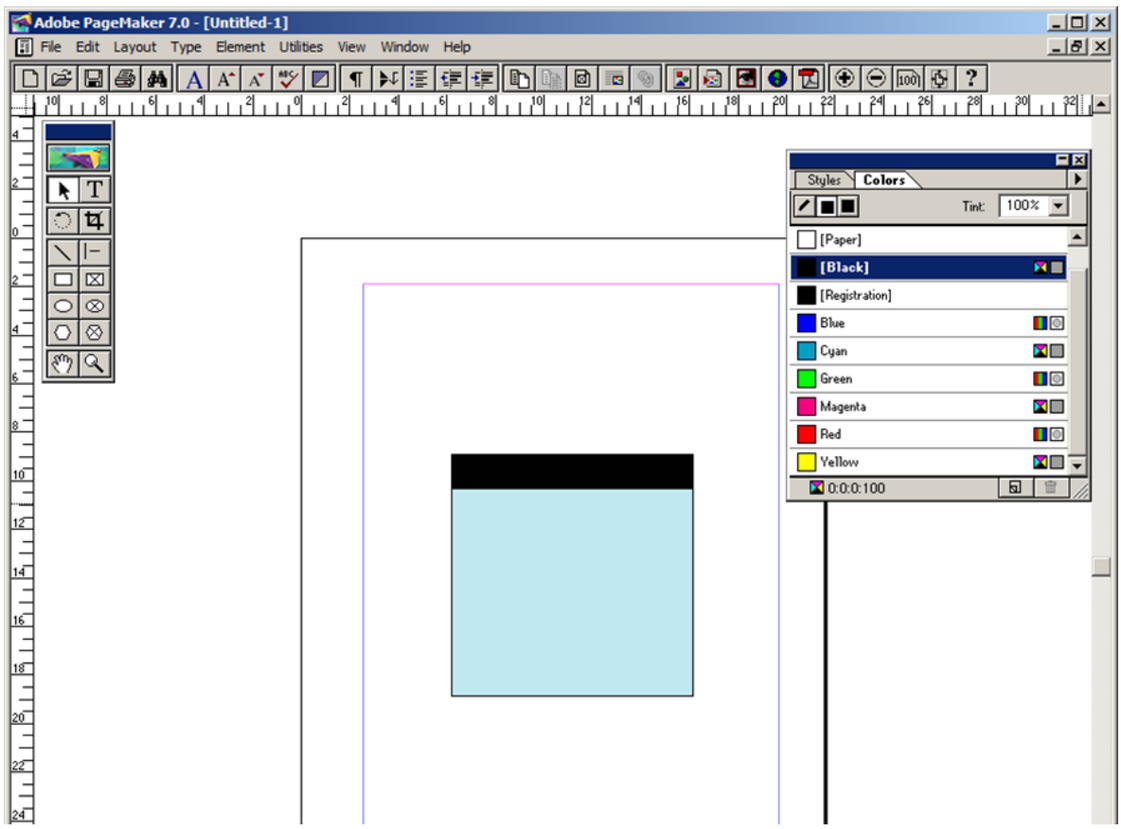
   Now a new document called Untitled – 1 will appear on the screen.

4. Create a box with dimension 100 mm x 100 mm using the Rectangle tool. Fill it with cyan colour and change the percentage value of tint to 25%. The resulting box is as shown in Figure.

12th_Computer_Application_English version Practical.indd 261 19-01-2023 17:25:53



5. Similarly create another box with dimension 100 mm x 15 mm. Fill it with black colour and place it on the top portion of the cyan filled box as shown in figure.

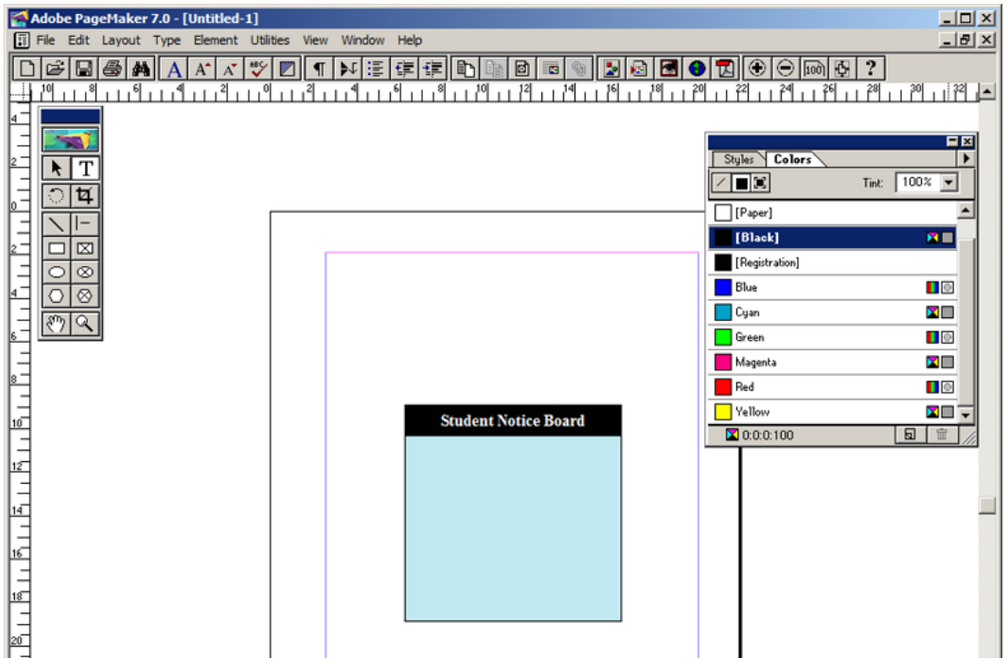


12th_Computer_Application_English version Practical.indd 262 19-01-2023 17:25:53

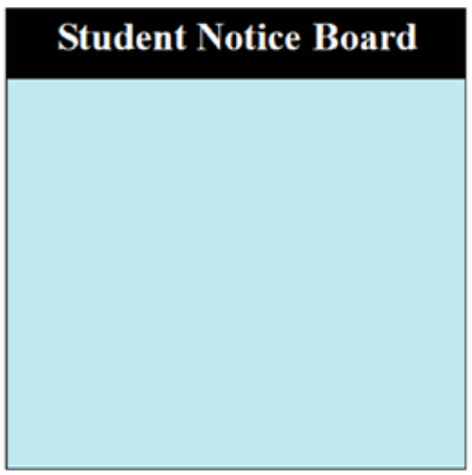
6. With the text tool click and drag the mouse from the left corner to the right corner of the black filled box and type the following words "Student Notice Board".

   The colour of the text and the colour of the box will be same black colour. As soon as you finish typing press Ctrl + A in the keyboard which will select the entire text.

   Using Character Control palette change the font size to 20 points and click on the Bold button. Then click on the Reverse button which will change the colour of the text to white and press Shift + Ctrl + C for centre alignment. The result is as shown in Figure.



Output



Conclusion

The expected output is achieved.

12th_Computer_Application_English version Practical.indd 263 19-01-2023 17:25:53

03
EXERCISE

Creating Visiting Card using PageMaker

Question

Create the following Visiting Card using PageMaker.



AIM

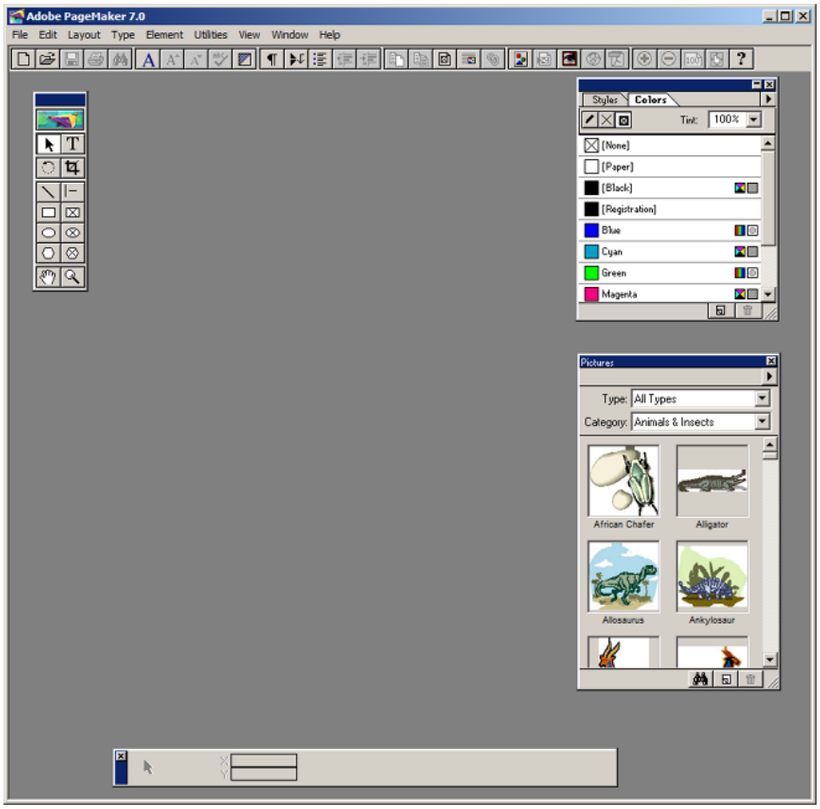
To create a Visiting Card using PageMaker software.

Procedure

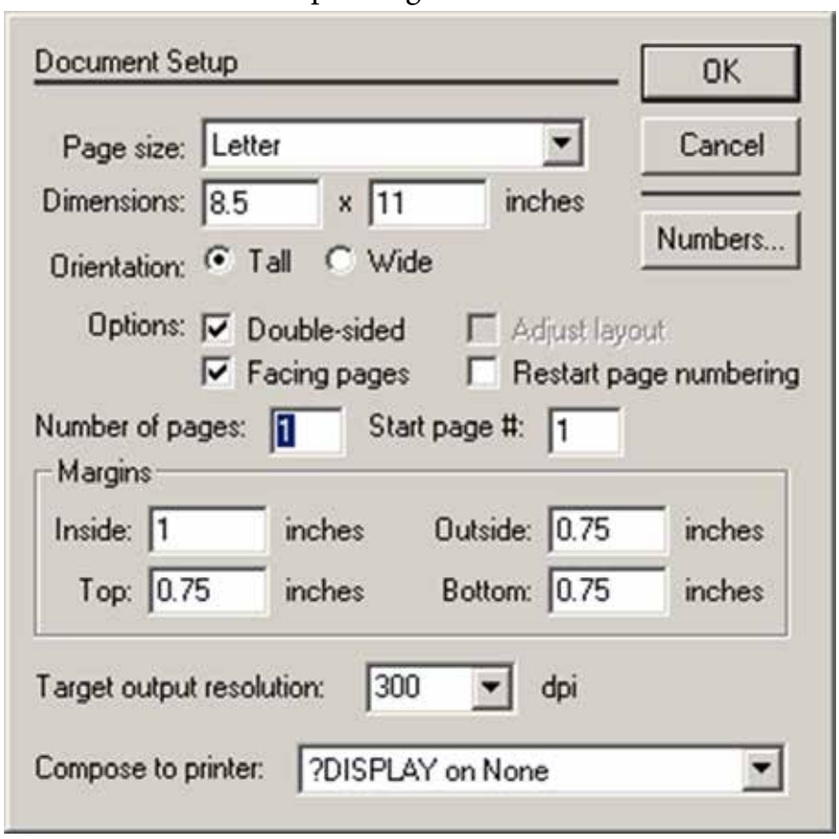
1. Start the PageMaker using the following commands.

   Start → All Programs → Adobe →PageMaker 7.0 → Adobe PageMaker 7.0. The Adobe PageMaker window will be opened as shown in Figure 1.1.

12th_Computer_Application_English version Practical.indd 264 19-01-2023 17:25:53



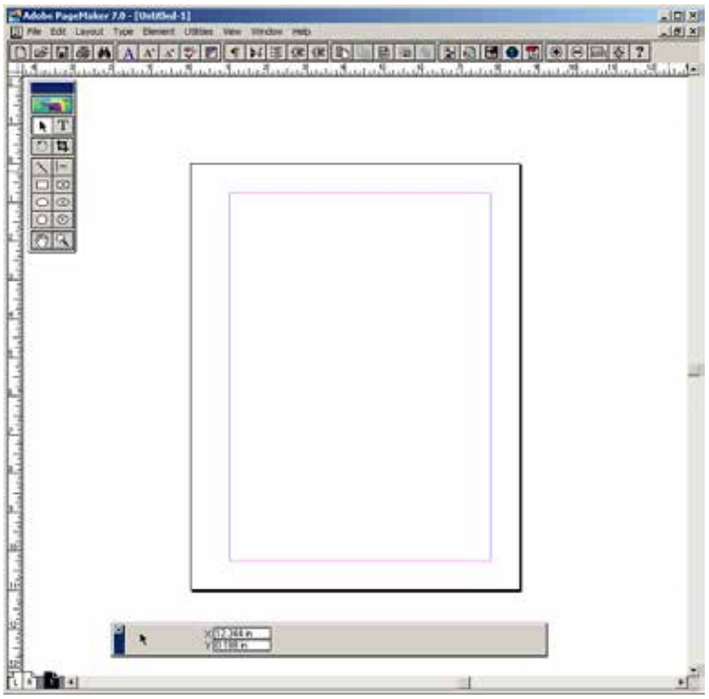
2. Choose File → New in the menu bar (or) Press Ctrl + N in the keyboard. This opens the Document Setup dialog box.



12th_Computer_Application_English version Practical.indd 265 19-01-2023 17:25:53

3. Click on OK.

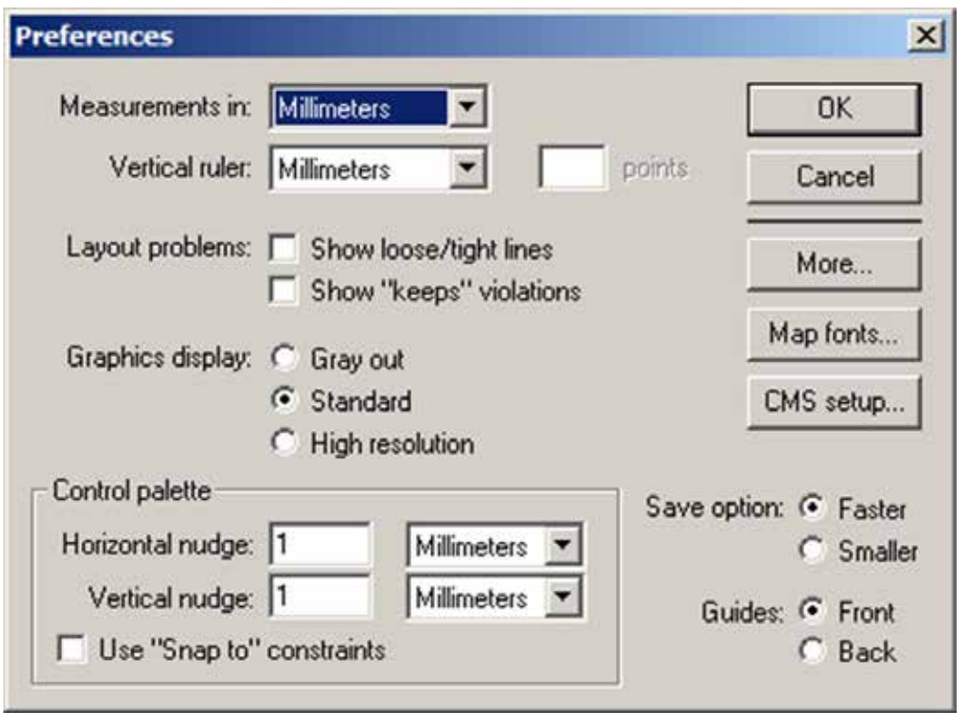
Now a new document called Untitled – 1 will appear on the screen as shown in Figure.



4. Now you can change Measuring Units from Inches to Millimeters.

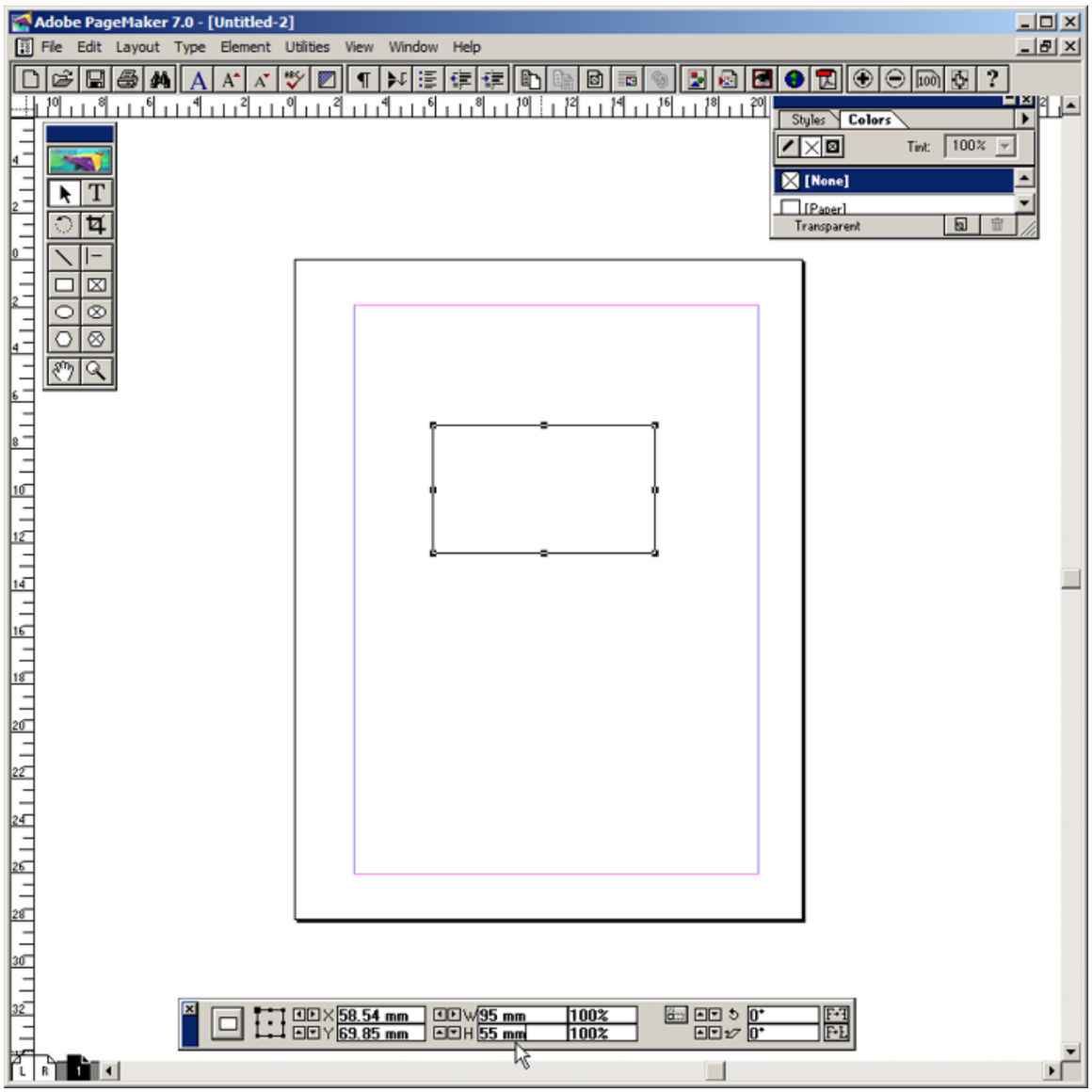
Choose File → Preferences → general (or) Press Ctrl + K. Now Preferences dialogue box appears.

Change the unit of Measurements and Vertical ruler to Millimeters.



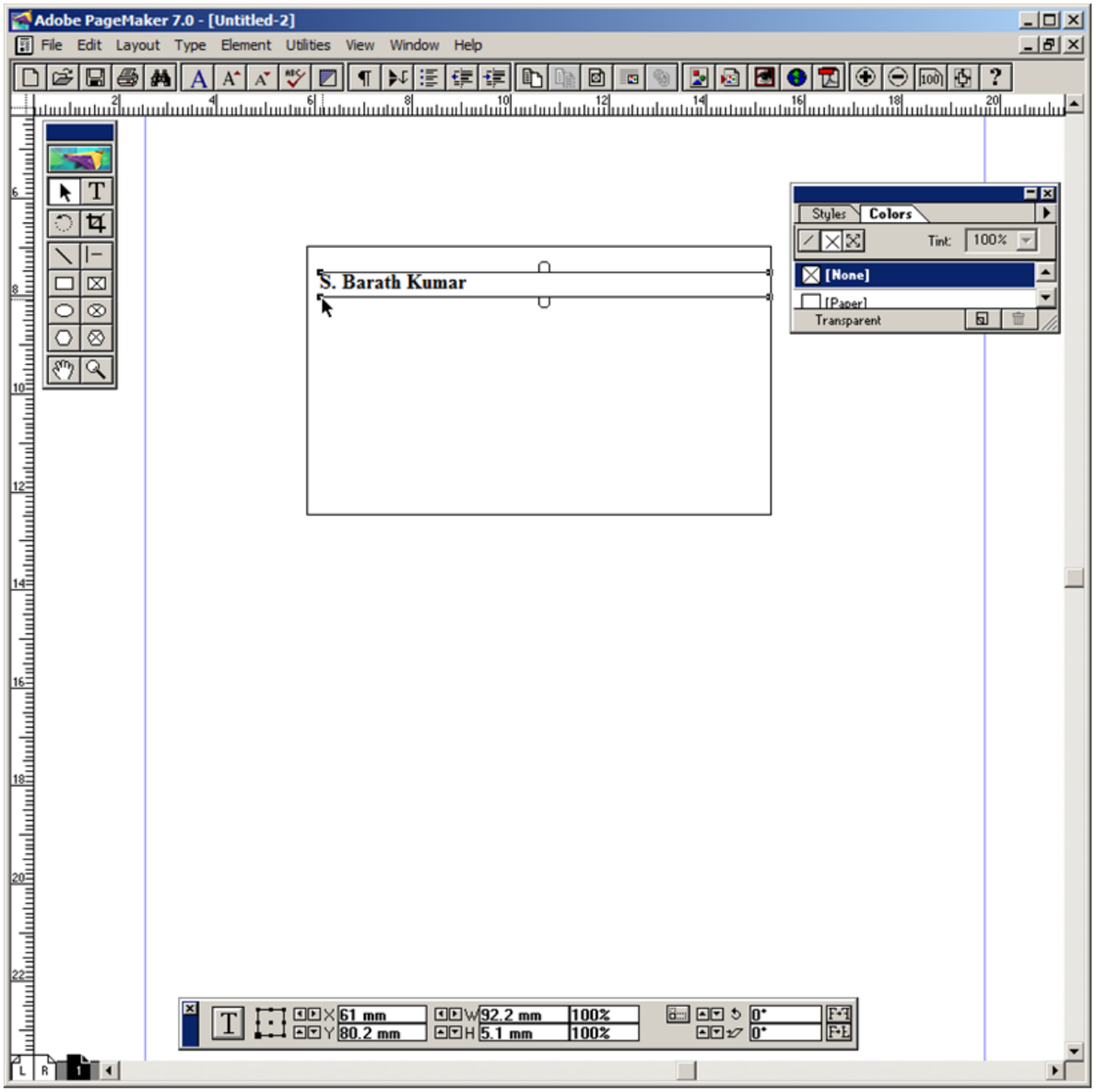
12th_Computer_Application_English version Practical.indd 266 19-01-2023 17:25:54

5. Select the Rectangle Tool from the Tool box and draw a rectangle.
6. Using Control Palette, the width and height value of the rectangle has to be set to 95 mm and 55 mm respectively.



12th_Computer_Application_English version Practical.indd 267 19-01-2023 17:25:54

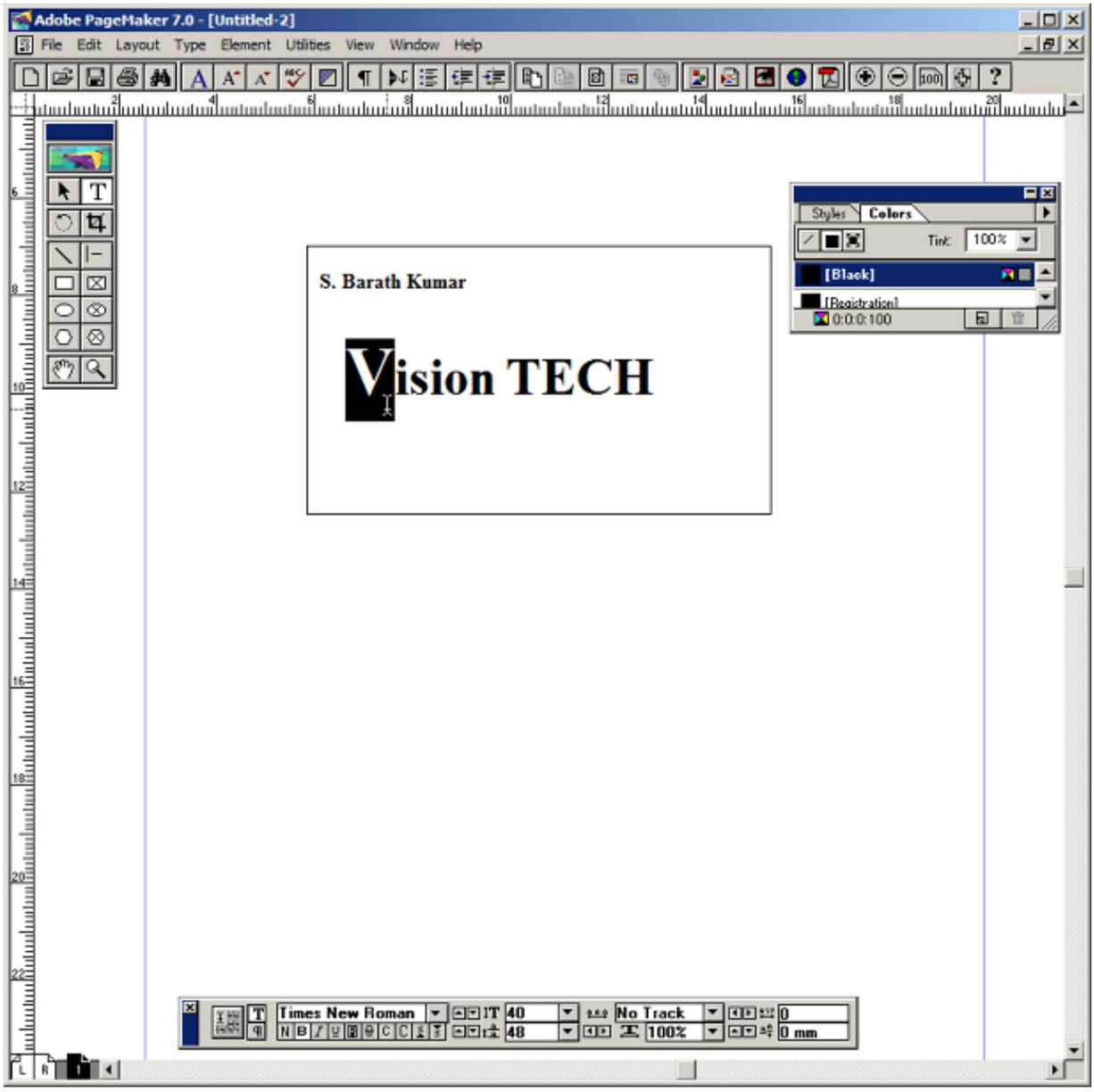
7. Select the Text Tool in the Tool box. Then drag from the left corner of the rectangle box to the right corner to specify the boundary of the text that is to be typed.
8. Type the Name of the person and select it using Text tool. Choose suitable Font and Font Size from the Control Palette. Then move it a little bit towards right side.



12th_Computer_Application_English version Practical.indd 268 19-01-2023 17:25:54

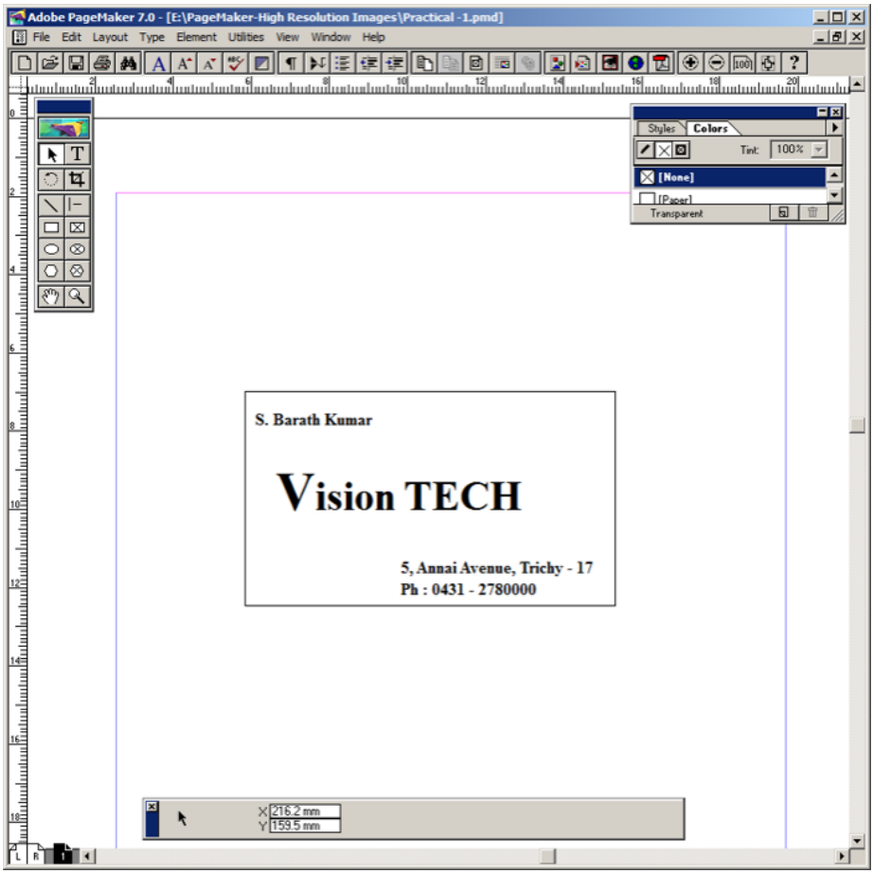
9. Repeat the step 7. Then type the Company name and select it using Text tool. Choose suitable Font and Font Size from the Control Palette. Then move it a little bit towards right side.

   Select the First character using the Text tool and increase the font size.



12th_Computer_Application_English version Practical.indd 269 19-01-2023 17:25:54

10. Repeat the step 7. Then type the Company Address and select it using Text tool. Choose suitable Font and Font Size from the Control Palette. Then move it towards right side.



Output



Conclusion

The expected output is achieved.

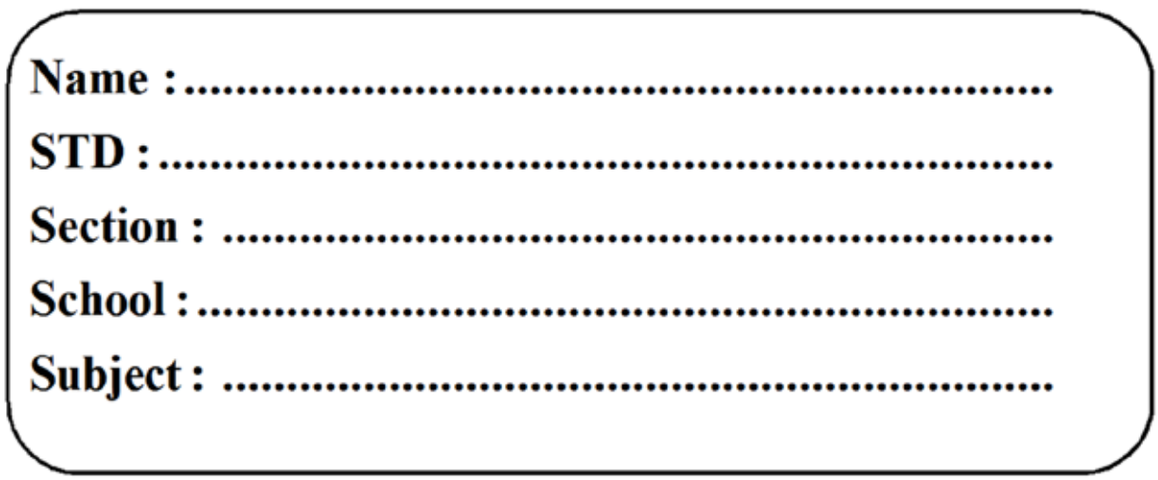
12th_Computer_Application_English version Practical.indd 270 19-01-2023 17:25:54

04
EXERCISE

Creating Notice Board using PageMaker

Question

Create the following Label using PageMaker.



AIM

To create a Label using PageMaker software.

Procedure

1. Start the PageMaker using the following commands.
   Start → All Programs → Adobe → PageMaker 7.0 → Adobe PageMaker 7.0.
2. Choose File → New in the menu bar (or) Press Ctrl + N in the keyboard.
   This opens the Document Setup dialog box.
3. Click on OK.
   Now a new document called Untitled – 1 will appear on the screen.
4. Now you can change Measuring Units from Inches to Millimeters.
   Choose File → Preferences → general (or) Press Ctrl + K. Now Preferences dialogue box appears.
   Change the unit of Measurements and Vertical ruler to Millimeters.

12th_Computer_Application_English version Practical.indd 271 19-01-2023 17:25:54

5. Select the Rectangle Tool from the Tool box and draw a rectangle.

6. Using Control Palette, the width and height value of the rectangle has to be set to 100 mm and 40 mm respectively.

7. Choose Element → Rounded corners from the menu bar.

8. Choose the required shape from the rounded corners dialog box. Now the rectangle appears with the rounded corners.

9. Select the Text Tool in the Tool box and create a text block within the rectangle.

10. Type **Name :** and press a Tab key and then press Enter key.

    Type **STD :** and press a Tab key and then press Enter key.

    Type **Section :** and press a Tab key and then press Enter key.

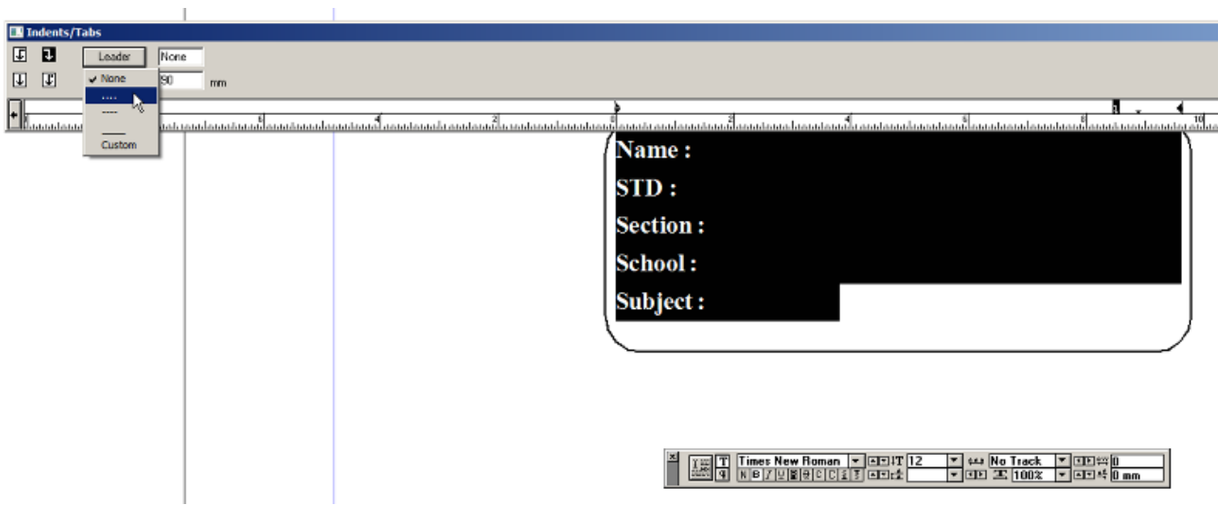
    Type **School :** and press a Tab key and then press Enter key.

    Type **Subject :** and press a Tab key.

11. Select all the text using Text tool.

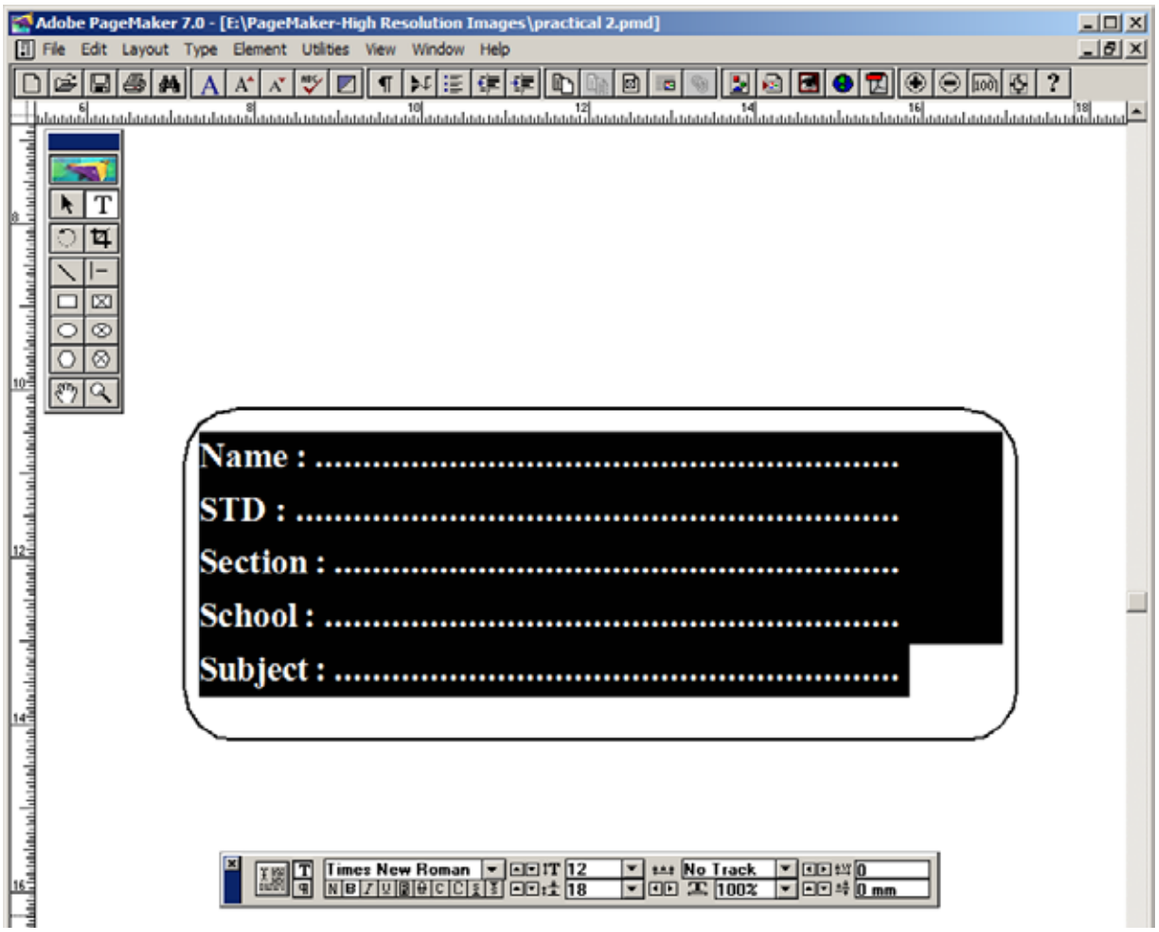
12. Choose Type → Indents / Tabs (or) press Ctrl + I.

13. Set a right tab at the value 90 mm and choose the dotted line style from the leader option then choose Position → Add tab Press Apply button then Press OK button.



12th_Computer_Application_English version Practical.indd 272 19-01-2023 17:25:54

14. Now the required label is created.



Output

Name : .....

STD : .....

Section : .....

School : .....

Subject : .....

Conclusion

The expected output is achieved.

12th_Computer_Application_English version Practical.indd 273 19-01-2023 17:25:54

05
EXERCISE

Performing Arithmetic Operations using PHP

Write a PHP script to do the operations including addition, subtraction, multiplication, division, modulus on 2 variables with values 10 and 5. The script should output the results of each operation on a separate line.

AIM

To perform various arithmetic operations on two variables and output the results.

Procedure

1. Open a new file in your text editor (Notepad).
2. Type the following PHP script.
3. Save the file in the following format "filename.php".
   Let us take **pl.php** for an example.
4. Save the file **pl.php** in the file **saving** path - **c:\wamp64\www**
5. Make sure Apache is started in **Wampserver.**
6. Go to the browser and type:- **http://localhost/pl.php**
   In your web browser, you should see the results of your script.

PHP SCRIPT

```
<?php
    $num1 = 10;
    $num2 = 5;
    $sum = $num1 + $num2;
    $sub= $num1 - $num2;
    $mul = $num1 * $num2;
    $div = $num1 / $num2;
    $mod = $num1 % $num2;
    echo "The sum of $num1 and $num2 is: $sum";
    echo "The subtraction of $num1 and $num2 is: $sub";
    echo "The multiplication of $num1 and $num2 is: $mul";
    echo "The division of $num1 and $num2 is: $div";
    echo "The modulus of $num1 and $num2 is: $mod";
?>
```


12th_Computer_Application_English version Practical.indd 274 19-01-2023 17:25:54

Output

The sum of 10 and 5 is: 15

The subtraction of 10 and 5 is: 5

The multiplication of 10 and 5 is: 50

The division of 10 and 5 is: 2

The modulus of 10 and 5 is: 0

Conclusion

The expected output is achieved.

12th_Computer_Application_English version Practical.indd 275 19-01-2023 17:25:55

06
EXERCISE

Using a if ...else if...else statement in PH

Write a PHP script that stores a value in a variable and then checksif it is less than, equal to or greater than 5?

AIM

To check if a variable is less than, equal to, or greater than 5 and output the corresponding message.

Procedure

1. Open a new file in your text editor (Notepad).
2. Type the following PHP script.
3. Save the file in the following format "filename.php".
   Let us take **p2.php** for an example.
4. Save the file **p2.php** in the file **saving** path - **c:\wamp64\www**
5. Make sure Apache is started in **Wampserver.**
6. Go to the browser and type:- **http://localhost/p2.php**
   In your web browser, you should see the results of your script.

PHP SCRIPT

```
<?php

$num = 10;
if ($num < 5)
{
    echo "The number is less than 5.";
}
elseif ($num > 5)
{
    echo "The number is greater than 5.";
}
else
{
    echo "The number is equal to 5.";
}

?>
```


12th_Computer_Application_English version Practical.indd 276 19-01-2023 17:25:55

Output

The number is greater than 5.

Conclusion

The expected output is achieved.

12th_Computer_Application_English version Practical.indd 277 19-01-2023 17:25:55

07
EXERCISE

Using a switch statement in PHP

Write a PHP script that takes a number and outputs the corresponding text for the number using switch statement.

AIM

To output the corresponding text for a number using a switch statement.

Procedure

1. Open a new file in your text editor (Notepad).
2. Type the following PHP script.
3. Save the file in the following format "filename.php".
   Let us take **p3.php** for an example.
4. Save the file **p3.php** in the file **saving** path -
   c:\wamp64\www
5. Make sure Apache is started in **Wampserver.**
6. Go to the browser and type:-
   http://localhost/p3.php
   In your web browser, you should see the results of your script.

12th_Computer_Application_English version Practical.indd 278 19-01-2023 17:25:55

PHP SCRIPT

```
<?php
$num = 3;
switch ($num)
{
  case 1:
     echo "One";
     break;
  case 2:
     echo "Two";
     break;
  case 3:
     echo "Three";
     break;
  case 4:
      echo "Four";
      break;
  case 5:
      echo "Five";
      break;
default:
     echo "Number is not between 1 to 5.";
     break;
}
?>
```

Output

Three

Conclusion

The expected output is achieved.

12th_Computer_Application_English version Practical.indd 279 19-01-2023 17:25:55

08
EXERCISE

Using a while Loop in PHP

Write a PHP script to print 1 to 10 number in separate line using while loop.

AIM

To print the numbers from 1 to 10 on separate lines using a while loop.

Procedure

1. Open a new file in your text editor (Notepad).
2. Type the following PHP script.
3. Save the file in the following format "filename.php".
   Let us take **p4.php** for an example.
4. Save the file **p4.php** in the file **saving** path - **c:\wamp64\www**
5. Make sure Apache is started in **Wampserver.**
6. Go to the browser and type:- **http://localhost/p4.php**
   In your web browser, you should see the results of your script.

PHP SCRIPT

```
<?php
$number = 1;
while ($number <= 10)
{
  echo "$number  <br>";
  $number++;
}
?>
```


12th_Computer_Application_English version Practical.indd 280 19-01-2023 17:25:55

Output

1

2

3

4

5

6

7

8

9

10

Conclusion

The expected output is achieved.

12th_Computer_Application_English version Practical.indd 281 19-01-2023 17:25:55

09
EXERCISE

Using a for Loop in PHP

Write a PHP script that calculates the sum and product of the numbers from 1 to 10 using for loop.

AIM

To write a PHP script that calculates the sum and product of the numbers from 1 to 10 using for loop.

Procedure

1. Open a new file in your text editor (Notepad).
2. Type the following PHP script.
3. Save the file in the following format "filename.php".
   Let us take **p5.php** for an example.
4. Save the file **p5.php** in the file **saving** path - **c:\wamp64\www**
5. Make sure Apache is started in **Wampserver.**
6. Go to the browser and type:- **http://localhost/p5.php**
   In your web browser, you should see the results of your script.

PHP SCRIPT

```
<?php
$sum = 0;
$product = 1;

for ($i = 1; $i <= 10; $i++)
{
  $sum += $i;
  $product *= $i;
}
echo "The sum of the numbers from 1 to 10 is: $sum <br>";
echo "The product of the numbers from 1 to 10 is: $product
<br>";
?>
```


12th_Computer_Application_English version Practical.indd 282 19-01-2023 17:25:55

Output

The sum of the numbers from 1 to 10 is: 55

The product of the numbers from 1 to 10 is: 362880

Conclusion

The expected output is achieved.

12th_Computer_Application_English version Practical.indd 283 19-01-2023 17:25:55

10
EXERCISE

Using a foreach Loopin PHP

Write a PHP script that loops through an array of names, prints each name and its length, and counts the total number of names using 'foreach'.

AIM

To use a foreach loop to iterate through an array in PHP and access its elements.

Procedure

1. Open a new file in your text editor (Notepad).
2. Type the following PHP script.
3. Save the file in the following format "filename.php".
   Let us take **p6.php** for an example.
4. Save the file **p6.php** in the file **saving** path - **c:\wamp64\www**
5. Make sure Apache is started in **Wampserver.**
6. Go to the browser and type:- **http://localhost/p6.php**
   In your web browser, you should see the results of your script.

PHP SCRIPT

```
<?php
$names = array('Ram', 'Ravi', 'Kumar', 'Barath', 'Lavanya');
foreach ($names as $name)
{
  echo "Name: $name<br>";
  echo "Length: " . strlen($name) . "<br><br>";
}
$count = count($names);
echo "Total number of names: $count <br>";
?>
```


12th_Computer_Application_English version Practical.indd 284 19-01-2023 17:25:55

Output

Name: Ram
Length: 3

Name: Ravi
Length: 4

Name: Kumar
Length: 5

Name: Barath
Length: 6

Name: Lavanya
Length: 7

Total number of names: 5

Conclusion

The expected output is achieved.

12th_Computer_Application_English version Practical.indd 285 19-01-2023 17:25:55

REFERENCES

1. COMPUTER NETWORKS FIFTH EDITION ANDREW S. TANENBAUM Vrije Universiteit Amsterdam, The Netherlands DAVID J. WETHERALL University of Washington Seattle, WA
2. DATA AND COMPUTER COMMUNICATIONS Eighth Edition William Stallings
3. Data Communications and Computer Networks for Computer Scientists and Engineers Second Edition Michael Duck and Richard Read
4. *Domain Names - Concepts and Facilities*, P. Mockapetris, The Internet Society (November 1987)
5. "Name space specifications and terminology". *Domain Names - Domain Concepts and Facilities* Paul Mockapetris (November 1987).
6. DNS Security: Defending the Domain Name Systemby Allan Liska and Geoffrey Stowe .
7. DNS and BIND, 3rd Edition by Paul Albitz and Cricket Liu, 1998, O'Reilley & Associates, Inc..
8. Cabling: The Complete Guide to Network Wiring, Third Edition, by David Barnett, David Groth and Jim McBee
9. LAN wiring (3rd ed. By Trulove and James, McGraw-Hill Professional
10. Electronic Commerce – A Manager's Guide by Kalakota, Ravi and Whinston, Andrew B. Pearson Education, Inc.(ISBN: 9788177583922)
11. E-Commerce – Cutting Edge of Business, Kamlesh K Bajaj, Debjani Nag, Tata McGraw Hill. (ISBN: 9780070585560)
12. E-Commerce Concepts, Models, Strategies, C S V Moorthy, Himalaya Publications. (ISBN: 9788178662763)
13. Electronic Payment Systems for E-Commerce by Donal O'Mahony (ISBN: 9781580532686)
14. Payment System Technologies and Functions: Innovations and Developments 1st Edition by Masashi Nakajima (ISBN: 978161520645)
15. E-Commerce Security: Weak Links, Best Defenses by Anup K. Ghosh (ISBN: 9780471192237)
16. Practical Internet Security by John R. Vacca (ISBN: 9780387405339)
17. Cyber Security and IT Infrastructure Protection by John R. Vacca (ISBN: 9780124166813)
18. Architecting EDI with SAP IDocs: The Comprehensive Guide by Emmanuel Hadzipetros (ISBN:9781592298716)
19. Demystifying EDI: A Practical Guide to Electronic Data Interchange by Russel Allen Stultz (ISBN:9781556227080)

12th_Computer_Application_English version Practical.indd 286 19-01-2023 17:25:55

INTERNET RESOURCES



Internet resources

1. https://whois.icann.org/en
2. https://www.iana.org/
3. https://en.wikipedia.org/wiki/Networking_cables
4. https://www.lifewire.com/
5. https://www.tutorialspoint.com/computer_fundamentals/computer_networking.htm
6. http://www.groundcontrol.com/galileo/ch5-ethernet.htm
7. https://www.tutorialsweb.com
8. https://opensource.com
9. https://www.oshwa.org/
10. https://www.unece.org/cefact/edifact/welcome.html

12th_Computer_Application_English version Practical.indd 287 19-01-2023 17:25:55

Higher Secondary Second Year
Computer Applications - Theory & Practicals
List of Authors and Reviewers

ADVISER & EXPERT

DR. P. KUMAR,
Joint Director (Syllabus)
State Council of Education Research and Training Tamilnadu
Chennai 600 006

Domain Experts

Mrs. P. Bagyalakshmi,
Prof & Head, Dept of computer Applications,
Queen Mary's College,
Chennai.

Mr. Amuthan,
Professor & Associate Dean (Automomy & Accreditation),
Dept. of Computer Science & Engineering,
Pondicherry Engineering College,
Pillaichavady, Pudhucherry.

Reviewers

Mr.Saravanan,
Vice principal,
Apollo Arts & Science College.
Chennai.

Mr. M. Murali,
Technology Consultant,
Cognizent Technology,
Thuraippakam,
Chennai.

Academic Co-ordinator

U. Aarthi,
B.T.Assistant,
Govt. Girls Higher Secondary School,
Madurantagam,
Kanchipuram

Layout

Mathan R
Santhiyavu Stephen
Daniel A
Ashok kumar S
Manik
Petchimuthu

In-House QC

Yogesh B
Rajesh Thangappan
Srithar

Wrapper Design

Kathir Arumugam

Coordination

Ramesh Munisamy

Content Writers

Mrs. Subashini,
Professor & HOD, Dept of Information Technology,
Sathyabama Institute of Science & Technology,
Chennai

Mrs. A. Arthi
Associate Professor, Dept. of Information Technology
R. M. K Engineering Collage, Kavaraipettai, Thiruvallur.

Mrs. Sandhya Alagarsamy,
Assistant Professor,
Dept. of Information Technology,
Jeppiaar SRR Engineering College, Chennai.

Mr. R. Sethuraman,
Assistant Professor,
Dept. of CS & Engineering Sathyabama,
Institute of Science & Technology, Chennai.

Ms.A.Sangeetha, PG Asst. (Computer Science)
Govt.Hr.Sec.School,
Rajanthangal, Thiruvannamalai.

Mr. M. Sivakumar, PG Asst. (Computer Science)
Govt.Hr.Sec.School, Sirugambur, Trichy.

Mr. J. Sundar, PG Asst. (Computer Science)
SGR Govt.Hr.Sec.School,
Kosavanpudur, Vellore.

Mr. G. Suresh kumar, PG Asst. (Computer Science)
Govt.Boys Hr.Sec.School,
Thirumangalam, Madurai.

Mr. M. Ganesh, PG Asst. (Computer Science)
Govt.Girls Hr.Sec.School, Mathur, Krishnagiri.

Mr. S. Venkatachala Perumal, PG Asst. (Computer Science)
Govt.Hr.Sec.School, Manur, Tirunelveli.

EMIS Technology Team

R.M. Satheesh
State Coordinator Technical,
TN EMIS, Samagra Shiksha.

K.P. Sathya Narayana
IT Consultant,
TN EMIS, Samagra Shikaha

R. Arun Maruthi Selvan
Technical Project Consultant,
TN EMIS, Samagra Shiksha

This book has been printed on 80 G.S.M.
Elegant Maplitho paper.

Printed by offset at:

12th_Computer_Application_English version Practical.indd 288 19-01-2023 17:25:55

Notes

12th_Computer_Application_English version Practical.indd 289 19-01-2023 17:25:55

Notes

12th_Computer_Application_English version Practical.indd 290 19-01-2023 17:25:55