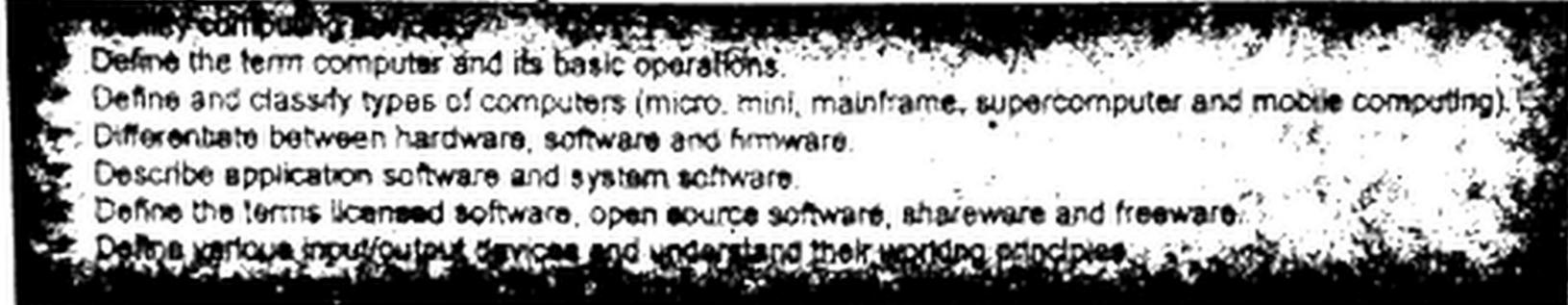


OVERVIEW OF COMPUTER SYSTEM

CHAPTER

1

After completing this lesson, you will be able to:



UNIT INTRODUCTION

Computer systems are now common place in every part of our life. This unit introduces the basic components that make up these computer systems. There are two parts to all computer systems, the hardware and the software. Hardware is the collective name given to all the devices that make up a computer system. Software is the term used for the actual programs that allow the hardware to do a useful job. Software is made up of a series of instructions that tell the computer what to do.

1.1 INTRODUCTION TO COMPUTERS

Q.1 Define computer. Describe its composition also.

Answer

Computer

A computer is an electronic device that accepts data (as Input), performs operations (as Processing) on data at very high speed and produces the results (as Output). It is a programmable machine that executes a programmed list of instructions that it is provided.

Composition of computers

Computers are composed of the Central Processing Unit (CPU), input devices, output devices, primary storage, secondary storage, and communication devices.

Main Component of Computer

The CPU is the main component of a computer that interprets and executes instructions.

Q.2 What is digital computer? Write down the parts of digital computer.

Answer

Digital Computer

A digital computer is a machine that can solve problems for people by carrying out instructions given to it.

Parts of digital computer

A digital computer consists of an interconnected system of processors, memories and input/output devices. A simple computer system is shown in Fig.1.1.

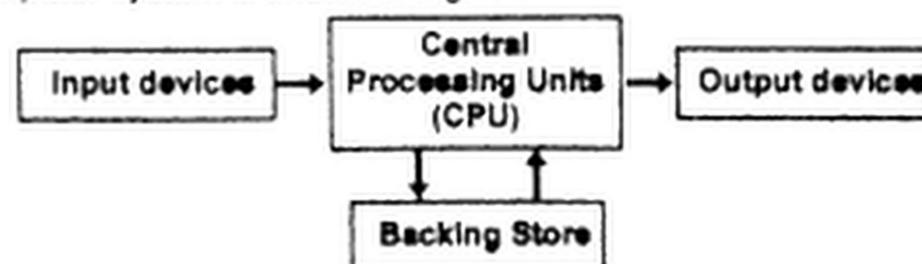


Fig. 1.1 A simple computer system

TECHNOLOGY FACT!

Although we normally think of computers as the ones we use in our everyday lives to surf the web, write documents etc., small computers are also embedded into other things such as mobile phones, toys, microwaves and MP3 players. We use computers all the time, often without even knowing it!

1.1.1 COMPUTING DEVICES

Q.3 Write a note on computing devices.

Answer

Computing Devices

All machines, components or devices that contain embedded, specialized computers are called computing devices.

Examples

Following are some computing devices:

- ATM machine
- Digital alarm clock
- Digital washing machine
- Microwave oven
- Toys
- Cell phones
- CD player

Special Computing Tasks

All the computing devices contain embedded computer chips, which allow the devices to do special computing tasks.

Examples

- The computer of ATM machine gives banking transaction facilities.
- The computer of digital alarm clock sets the time for alarm and manages calendar.
- The computer of digital washing machine can be programmed to wash clothes.

Important computing devices

Some important computing devices are shown in Fig 1.2.



ATM Machine



Digital Washing Machine



Digital Microwave Oven



Electronic Toys



Cell Phones



Digital Clock

Fig. 1.2 Computing Devices

1.1.2 BASIC OPERATIONS OF A COMPUTER

Q.4 Describe the basic operations of a computer.

Answer

Basic Operations of a Computer

Any computer system, regardless of its size, is capable of performing the following basic operations, which are shown in Fig.1.3.

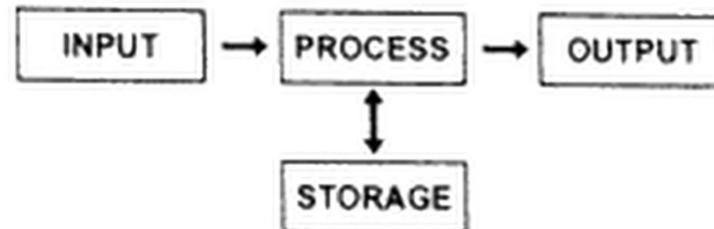


Fig.1.3 Basic operations of a computer

1. Input operation

Accepting data for processing from an input device.

2. Processing operations

Performing arithmetic and logical operations. Arithmetic operations include addition, subtraction, multiplication and division while logical operations include comparison of different values and decision making.

3. Output operation

Sending results to an output device.

4. Storage operation

Writing data to a storage device such as hard disk or USB flash drive.

Q.5 State the purpose of computer system.

Answer

Purpose of Computer System

The purpose of a computer system is to accept data, process it and as a result of processing, produce output in the form of useful information. The input unit of computer presents data to the processor for processing. The results of processing of the data are displayed on the monitor screen, printed on paper or sent to any other output or storage device.

1.1.3 CLASSIFICATION OF DIGITAL COMPUTERS

Q.6 Explain the classification of digital computers.

Answer

Classification of Digital Computers

There are several factors that make computers different from each other. These factors are physical size, cost, speed, etc.. Based on these factors, computers are classified into four categories.

- Supercomputer
- Mainframe computer
- Minicomputer
- Microcomputer

1. Supercomputer

Supercomputers are the largest, the most expensive and powerful computers.

Uses of Supercomputers

- I. Supercomputers are also used in nuclear research and weather forecasting, which requires huge amount of calculations to be performed at high speed.
- II. In Pakistan, supercomputers are used in many organizations, like Atomic Energy Research Centre.

- iii. They are used to process complex calculations as well as designing and controlling of complicated machines, such as rockets and fighter planes.

Best-known Supercomputers

The best-known supercomputers are built by Cray Inc. an American supercomputers manufacturers and IBM.

A supercomputer is shown in Fig. 1.4



Fig.1.4 Modern Supercomputer

2. Mainframe computer

Mainframe computers are larger, more expensive and powerful computers compared to minicomputer but less powerful than supercomputers

Space for Mainframes

Mainframes usually fill a large room because they include many types of peripheral devices

Instructions Execution of Mainframes

A typical mainframe can execute about trillion instructions per second (TIPS) and can support thousands of users

Uses of Mainframe computers

Mainframe computers are used in large corporations, banks, universities and scientific laboratories

Examples of Mainframes

Some examples of mainframe are IBM's Enterprise EC12, EC 196 and HP 16500 Series.

A mainframe is shown in Fig. 1.5.



Fig. 1.5 Mainframe computer

3. Minicomputer

Minicomputers are larger and more expensive than microcomputers. Minicomputer and its peripheral equipment can usually fill a small room. Minicomputers can support hundreds of users at a time. Minicomputers are faster than microcomputers

Instructions Execution of Minicomputers

Minicomputers can execute billions of instructions per second (BIPS). These computers can process more data than microcomputers.

Uses of minicomputers

Minicomputers are widely used in industrial process control, scientific research and small business applications.

Microcomputer 'vs' Minicomputer

Due to advancement of technology, the difference between the performance of microcomputer and minicomputer is gradually decreasing. As a result, modern microcomputers are replacing the more expensive minicomputers



Fig. 1.6 Minicomputer

Examples of Minicomputers

Examples of minicomputer are IBM System/36 and HP 3000.

A minicomputer is shown in Fig 1.6.

4. Microcomputers

Microcomputer, is the smallest and least expensive computer.

Technology used in Microcomputers

Its small size is a result of LSI (Large Scale Integration) and VLSI (Very large Scale Integration) technologies. A modern microcomputer can execute millions of instructions per second (MIPS).

Comparison

Although, microcomputers are very fast but they are much slower than minicomputers and mainframes.

Parts of Microcomputer

A typical microcomputer (as shown in Fig 1.7) consists of a Keyboard, a Mouse, a Monitor and System Unit.

Uses of Microcomputers

Microcomputers are used at home for personal use as well as for business applications. A large variety of software is available for use on microcomputers.

Space for A Microcomputer

A microcomputer can easily fit on a desktop or in a briefcase in the form of laptop computer.

Examples of Microcomputers

Some examples of microcomputer are IBM Thinkpad, Toshiba Satellite series, Dell XPS, HP Envy series and Apple series.

DO YOU KNOW?

The first electro-mechanical computer was developed in 1939. (Get more info from the Internet)

Answer

More Information from the Internet

The Z2 was a mechanical and relay computer created by Konrad Zuse in 1939. It was an improvement on the Z1, using the same mechanical memory but replacing the arithmetic and control logic with electrical relay circuits.

Specifications

Frequency	Ca. 5 Hertz
Arithmetic Unit	Fixed point arithmetic unit with 16 bit word length
Average Calculation Speed	0.8 sec for addition operation
Number of Relays	600
Memory	64 words
Power Consumption	1000 watts
Weight	300 kg (660 lb)



Fig. 1.7 Microcomputer

1.1.4 MODERN USE OF COMPUTERS IN TODAY'S LIFE

Q.7 Write a note on mobile computing.

Answer

Mobile Computing

Mobile Computing refers to a variety of small portable devices such as shown in Fig.1.8 that allow people to access data and information from anywhere in a wireless network system.

Mobile computing devices run on batteries and have limited functionality as compared to laptops.

Popular mobile computing devices

Following are popular mobile computing devices:

- Tablet PCs
- PDAs (Personal Digital Assistants)
- Smart phones



Fig. 1.8 Tablet PC and PDA

Q.8 Write a note on internet of things.

Answer

Internet of Things (IoT)

Internet of Things (IoT) is the interconnection between computer network and physical devices to collect and exchange data.

Devices used in daily life can be equipped with wireless connectivity, and embedded with software, sensors, actuators, cameras, microphones and other instruments that enable them to collect and share data.

Smart devices

All kinds of household items can be modified to work in an Internet of Things (IoT) system. These device are known as smart devices and they are designed in such a way that they can interact with human beings through wireless connection.

Smart Home

Smart home is a popular application of IoT.

Future of IoT

In future, IoT will allow us to switch on air conditioning before reaching home or switch off lights after leaving home.

Remotely Controlled Devices

There are homes equipped with various types of electronic devices that can be controlled remotely with smart phone or computer through IoT system.

Q.9 What is meant by cloud computing? Describe its advantage and disadvantages.

Answer

Cloud Computing

Cloud computing means instead of buying and installing your own computer system and software at your workplace, you can get it as a service provided and managed by another company. You can perform your computing tasks through access to service over the Internet. It does not matter where the hardware and software is located. It is just somewhere in the "cloud". It is a way of outsourcing your computing requirements.

Advantage of Cloud Computing

The advantage of cloud computing is that you do not have to buy and maintain a complex computer system. This cuts cost of buying computers and peripherals. Besides, you are not worried about equipment going out of date and other problems related with-system security and reliability.

Disadvantage of Cloud Computing

The disadvantage of cloud computing is that it requires a reliable high speed broadband connection

functioning the whole time you are working.

Another disadvantage of cloud computing is the privacy and security risk of having valuable data on someone else's system in an unknown location.

Q.10 What is meant by data center? Describe its parts, environment and uses.

Answer

Data Centers

Data center is a centralized location for collecting, storing, processing and distribution of vast amount of data

Parts of Data Centers

It consists of servers, routers, switches and backup equipment.

Environment for Data Centers

A data center facility usually requires air conditioning, fire suppression, smoke detection and security entry. It may be used in a room, an entire building or a group of buildings.

Use of Data Centers

Organizations such as government agencies, banks, educational institutions, telecommunication companies and social networking services use large amount of data and thus have requirement for data center. Many companies are moving their data centers to cloud services to cut the cost of running their own computing networks and servers.

1.1.5 COMPUTER HARDWARE AND SOFTWARE

Q.11 Name the parts of a computer system.

Answer

Parts of a computer system

A computer system consists of hardware and software.

Q.12 Define hardware and give examples.

Answer

Hardware

Computer hardware is what you can physically touch and see. In simple words, all tangible parts of computer system are referred as hardware.

Examples of computer hardware

All physical components of computer system, such as monitor, keyboard, hard disk, printer, alongwith the circuitry connecting them are known as computer hardware.

Q.13 Define software and state its need. Also give few examples.

Answer

Software

Software is any set of instructions, also called programs, which are given to the computer to perform any task or to do any activity. It tells the computer what to do and how to do. Programming languages are used to prepare software.

Need of software

A computer cannot do anything on its own. It must be instructed to do a desired job. Hence, it is necessary to specify a sequence of instructions, which a computer must perform to solve a problem.

Examples of software

Word-processing software, spreadsheet software and database management software may contain many programs for creating, editing, formatting and printing different types of documents.

1.2 TYPES OF COMPUTER SOFTWARE

Q.14 Name the types of computer software.

Answer

Types of Computer Software

Computer software can be classified into the following types:

- System Software
- Application Software
- Internet Applications

Licensed Software, Open Source Software, Shareware and Freeware

1.2.1 SYSTEM SOFTWARE

Q.15 Define system software. Write its purpose and give examples of system software.

Answer

System Software

System software is a collection of system programs that control and coordinate the activities of a computer system. System software consists of a collection of operative programs required to control computer hardware and also to execute application software.

Purpose of System Software

The purpose of system software is to make the use of computer more effective and efficient. A computer without some kind of system software would be ineffective and impossible to operate.

Examples of System Software

Some examples of system software are:

- Operating system
- Device Drivers
- Utility Software
- Language Processors/Translators

Q.16 Define operating system and give its examples. Also state the tasks which are performed by operating system.

Answer

Operating System

Operating system manages the hardware and software resources of a computer system, such as CPU, storage devices and all the input/output devices.

Examples of Operating system

Some commonly used operating systems are Windows, Linux, Mac OS and Android.

Tasks of Operating System

Operating system performs the following tasks:

- Allocates system resources.
- Manages files by maintaining a proper file and folder system.
- Loads and executes application software.
- Controls the operation of all the input/output devices.
- Maintains security.
- Controls network operations.
- Provides user interface.

Q.17 Write a note on device drivers.

Answer

Device Drivers

Device drivers are system software that control the operation of hardware devices.

Installation of Device Drivers

When we attach any type of device, such as printer, scanner, network card, or digital camera to a computer, it will not work without a device driver. We have to first install the driver of a device in our computer before using it. Device manufacturers provide device drivers.

Plug n Play Devices

Some devices like Mouse, Keyboard, Monitor, USB Flash drive, etc. are "**Plug n Play**" devices. Their software is preinstalled with Windows. When attached, the computer system automatically recognizes them.

Q.18 Define utility software and name few important utility software.

Answer

Utility Software

Utility software (or simply utilities) provides additional facilities to carry out tasks, which are beyond the capabilities of the operating system.

Important Utility Software

A few important utilities are disk defragmenter, disk cleaner, file compression utilities, antivirus utility, file manager, network utilities and utilities to configure hardware devices.

Q.19 What is meant by language processor? Describe its types also.

Answer

Language Processors/Translators

The computer can only understand machine language, which consists of 0's and 1's. Therefore, any program written in assembly language or high-level language must be translated to machine language before execution by the computer. Language processors are used to translate computer programs into machine language.

Types of Language Processors

The types of language processors are as follows:

- Assembler
- Compiler
- Interpreter

1. Assembler

Assembler is software that translates assembly language program into machine language.

Assembly language consists of symbolic abbreviations called **mnemonics**, which must be translated into machine language before execution by the computer. Each computer has its own assembly language.

2. Compiler

Compiler is software that translates a program written in a high-level language into machine language. It converts the entire program into machine language before execution by the computer.

3. Interpreter

Interpreter is software that translates high-level language into machine language but it translates one instruction at a time and executes it immediately before the translation of the next instruction.

1.2.2 APPLICATION SOFTWARE

Q.20 Define and explain application software.

Answer

Application software

Application software is a set of programs designed to perform a specific task.

Example

Application software for payroll processing produces pay slips and application software for processing examination results produces mark sheets along with some other statistical reports.

Types of Application Software

Some types of application software are:

- Productivity Software
- Business Software
- Entertainment Software
- Educational Software

1. Productivity Software

Productivity software is used to improve the way people do their work. It speeds up the daily routine tasks performed by individuals and teams by eliminating the repetitive tasks.

Examples

Productivity software includes word-processing, spreadsheet, database management and graphics software.

2. Business Software

Business software is used to run business activities. It helps in efficiently running business functions of a company.

Examples

Examples of business software are payroll, accounting, inventory and retail software.

3. Entertainment Software

Entertainment software is used to entertain people. It includes games, audio video player, etc..

Examples

Examples of entertainment software are VLC player, EA cricket, Windows Media Player, etc..

4. Educational Software

Educational software is used for learning purpose.

Examples

Examples of educational software are programs that teach about human body, working of an engine, solar system, typing, foreign language, music and subjects like Mathematics, Physics, Chemistry, etc..

1.2.3 INTERNET APPLICATIONS

Q.21 What are important internet applications? Explain.

Answer

Internet Applications

Following are the important internet applications:

- Web Applications
- Cloud Computing Applications
- Social Media Network Applications

1. Web Applications

A web application is a program that runs on a remote server while its users interact with it through a web browser.

Common Web Applications

Some common web applications include web-based email programs (such as Gmail, Hotmail), online ticketing service, online banking service, online auction, online retail sales, instant messaging services, etc..

2. Cloud Computing Applications

Cloud application is a program that supports cloud computing. A cloud application is entirely stored

on a remote server and is delivered over the Internet through a web browser. Users of a cloud application need a computer with a high-speed Internet connection.

3. Social Media Network Applications

Social media is an Internet-based communication system that allows the creation and exchange of information, ideas, common interests and other forms of expression. Social media websites connect users with their friends, family and colleagues using Internet.

Q.22 Explain the popular examples of social media.

Answer

Popular Examples of Social Media

Some popular examples of social media are Facebook, Twitter and WhatsApp.

1. Facebook

Facebook is one of the fastest growing free social networking services used by millions of people all over the world. It allows registered users to create profile and exchange messages, photos, videos and links with other users. It helps users stay updated with what is happening around the world. It provides a platform by which users can create groups and pages based on their common interests and share views and ideas.

2. Twitter

Twitter is an online news and social networking service which allows subscribers to broadcast short messages to other subscribers of the service. The short messages known as "tweets" are restricted to 140 characters. It is free to join service. It is very different from email and more like a news broadcast. Users of Twitter service type short statements about what is going on in their life, what they are doing and what their thoughts and opinions are on specific topics or current affairs. People all over the world are continually broadcasting tweets, which can be viewed by anyone.

3. WhatsApp

WhatsApp is a free instant messaging service for smart phone users to exchange text, photos, videos and audio messages through Internet. It has become the largest messaging service around the world. WhatsApp is very popular among teenagers because of features like group chatting, voice messages and location sharing. It was started for Android mobile devices but now it is available for iPhone, BlackBerry, Windows Phone and Nokia smart phone also.

1.2.4 LICENSED SOFTWARE, OPEN SOURCE SOFTWARE, SHAREWARE AND FREWARE

Q.23 Write a note on licensed software.

Answer

Licensed Software

A software license is a legal agreement that specifies the terms of use for a computer program. It defines the rights of the software developer and the user. When a person purchases software, he is allowed to use the software, which means he is not the owner of the software. Generally all the system software and application software is licensed.

Copyright Law

The software license deals with the Copyright Law. Copyright law prevents illegal copying of computer software. It allows creators of computer software to benefit financially from their software and to retain some control over how it is used.

Violation of Copyright

When the software is given away free, it makes it difficult for the software creators to stay in business. This makes it improper to make copies of software and sell it. Software that is copied and sold without the permission of the owner is known as pirated software and it is violation of copyright.

Examples of Licensed Software

Examples of licensed software are Microsoft Windows and Microsoft Office.

Q.24 Define open source software. Also give examples.

Answer

Open Source Software

Open Source Software is computer software that is available in the form of source code that allows users to study, change and improve it. It is free for inspection, modification and distribution. It allows certain rights, which are normally protected by Copyright Law.

Example

Linux operating system is open source software.

Q.25 Write a note on:

- i) Shareware ii) Freeware

Answer

Shareware

Shareware is given to people free of charge for a limited time period. After the expiry time, this software should be purchased for further usage. Shareware is a trial version and its functionality is limited. There are some types of shareware, which are available as full version but they stop working at the end of trial period. The trial period is usually 30 or 60 days. Some shareware can be downloaded from Internet.

Examples

Some antivirus software are shareware.

Freeware

Freeware is available for use, free of cost. It is usually full version of the software for an unlimited period. This software may have restrictions in term of use. For example, it may be allowed for personal or academic use only or for non-profit use.

Examples

Some examples of freeware are:

- > Skype
- > Viber
- > Mozilla Web browser

1.2.5 FIRMWARE

Q.26 Define firmware.

Answer

Firmware

Firmware is an intermediate form between hardware and software. It consists of software embedded in electronic devices during their manufacturing. Firmware is used when the programs are rarely or never expected to be changed, for example, in toys, appliances and ROM. Firmware is also used when the programs must not be lost when the power is off.

1.2.6 INTERNET APPLICATION SECURITY

Q.27 Briefly explain internet application security and its parts.

Answer

Internet Application Security

Internet application security refers to preventive measures against threats that can harm the Internet applications. Internet applications are available 24/7 and offer access to many people leading to high risk of intrusion. Internet applications are vulnerable to a wide variety of threats. Hackers can steal, modify or delete sensitive data. To ensure application security, it is essential to continuously monitor the activity of server on which the application is running and block hackers trying to obtain sensitive data.

Parts of Internet application security system

Internet application security system consists of following programs:

- Firewalls
- Anti-Virus Programs
- Spyware Detection
- Removal Programs
- Encryption/Decryption Programs

1.3 COMPUTER HARDWARE

Q.28 Define hardware and name parts of computer system.

Answer

Hardware

The physical components of a computer that we can see, touch and feel are called hardware.

Parts of computer hardware

Computer hardware consists of input/output devices, storage devices, central processing unit (CPU) and the electronic circuitry that links these devices for communicating with each other.

1.3.1 INPUT DEVICES

Q.29 Describe the use of input devices. Also make a list of input devices.

Answer

Use of Input Devices

The input devices are used to communicate with the computer. They consist of devices that accept data and convert it into machine-readable form. These devices are often referred to as peripherals because they are physically separated from the system unit.

List of Input Devices

Some input devices are as follows:

- Keyboard
- Mouse
- Joystick
- Microphone
- Image Scanners

Q.30 Write a note on keyboard.

Answer

Keyboard

Keyboard is the primary input device for the input of data to a computer, though voice input devices may ultimately supersede it. It operates by converting key presses to electronic signals in digital form. Keyboard has the standard character keys together with numeric keys and special keys.

Q.31 What is meant by pointing device? Explain some commonly used pointing devices.

Answer

Pointing Devices

Pointing devices are used to control the movement of the pointer (cursor) to select items on a screen or open computer programs or files.

List of Pointing Devices

Commonly used pointing devices are as follows:

- Mouse
- Trackball
- Joystick

- Touch Screen
- Light Pen
- Touch Pad

1. Mouse

Mouse is a pointing device. As we move the mouse over the surface of desk, the movements of the ball are detected by the internal mechanism. At the front of the mouse's casing are two or three buttons. These buttons are used to perform tasks, such as picking options displayed on the screen. A mouse is shown in Fig. 1.9.

Mouse is an essential part of the hardware on almost all the microcomputers running Windows and other application software.



Fig. 1.9 Mouse

2. Optical mouse

Optical mouse is becoming very popular and it is replacing the mechanical mouse. An optical mouse uses a light-emitting diode and photodiodes to detect movement relative to the underlying surface, rather than internal moving parts (mouse ball and rollers) as in mechanical mouse.

DO YOU KNOW?

The First Computer Mouse was invented by Doug Engelbart in around 1964 and was made of wood.

3. Trackball

Trackball remains stationary on the surface. The ball, at the top, is rolled with fingers. It has buttons that are used to perform operations similar to those performed by a mouse. A trackball is shown in Fig. 1.10.



Fig. 1.10 Trackball

4. Joystick

Joystick is commonly used for playing computer games. It is fixed on the table and has a stick in the centre that can be tilted in any direction. The stick is held by hand and when it is tilted in any direction, the movement is translated into the movement of an object on the screen. The buttons are used to perform actions such as firing guns and lasers. A joystick is shown in Fig. 1.11.



Fig. 1.11 Joystick

5. Touch Screen

A touch screen is a computer display screen. It is an input as well as output device. The screen is sensitive to pressure. User interacts with the computer by touching pictures or words on the screen as shown in Fig. 1.12.



Fig. 1.12 Touch Screen Monitor

Instead of using a pointing device user can use finger to point directly to objects on the screen. Touch screens are generally attached to computers but they are also popular in other devices such as mobile phones, satellite navigators and Personal Digital Assistants (PDAs).

6. Light Pen

Light Pen looks like a pen with a photocell at its tip as shown in Fig. 1.13.

Light Pen is used to point to an object or draw on the screen. It gives more accuracy than pointing with our finger on the touch screen. It is mainly used in engineering for designing purpose.



Fig. 1.13 Light Pen

7. Touch Pad

Touch pad is used in laptop computers as shown in Fig. 1.14. Touch pad is a pointing device that can sense the movement and position of finger on the pad. They are commonly used as an alternate to computer mouse in a laptop computer. There are two buttons located above or below the pad and their function is the same as the buttons on the mouse.



Fig. 1.14 Touch Pad

Q.32 Describe the purpose of microphone.

Answer

Microphone

Microphone is used to convert the spoken words to digital signals for computer input. It converts audio signals to electrical waves and these are converted by electronic circuitry in the computer to digital form. A microphone is shown in Fig. 1.15



Fig. 1.15 Microphone

Q.33 Write a note on digital camera.

Answer

Digital Camera

Digital Camera is a camera that captures pictures and stores them in digital form. Pictures taken by a digital camera can be downloaded to a computer for viewing and editing.

Digital cameras have a LCD for viewing both images in the viewfinder and those in the camera's memory. It is an input as well as output device. A digital camera is shown in Fig. 1.16.



Fig. 1.16 Digital Camera

Q.34 Define scanner. Describe its uses and types.

Answer

Scanners

Scanner is an optical input device that optically scans printed or handwritten text and images and stores them in computer memory in digital form.

Uses of Scanners

Nowadays, scanners are widely used to get drawings, diagrams and photographs into computer systems for incorporation into documents and books which are made up electronically prior to printing.

Types of Scanners

There are different types of scanners like:

- Hand-Held Scanner
- Flatbed Scanner
- Barcode Reader

1. Hand-held Scanner

To scan an image, the hand-held scanner is dragged over the image to be scanned. The hand-held scanner should be moved, carefully with uniform speed because uneven scanning rate would produce distorted image.

Uses of Hand-held Scanners

Hand-held scanners are very useful for scanning articles from magazine, newspapers and books



Fig. 1.18 Hand-held Scanner

A hand-held scanner is shown in Fig. 1.18

2. Flatbed Scanner

In a flatbed scanner, the image to be scanned is placed face down on the glass and a cover is lowered over it to exclude light. The camera moves across glass pane reading the entire area. A flatbed scanner is shown in Fig. 1.19.



Fig. 1.19 Flatbed Scanner

3. Barcode Reader

Barcode reader is also a type of scanner, which is used to scan barcode, also called *UPC* (Universal Product Code), available on various products. These barcodes contain information about the product like name of the product, company, manufacturing date, expiry date, etc. This information is provided to the computer for further processing like generating bills at checkouts in shopping malls. Prices are normally not included in barcodes because prices are not constant and may change frequently. A Barcode with reader is shown in Fig. 1.20.



Fig. 1.20 Barcode with Reader

Q.35 What are magnetic stripe cards? Give some examples.

Answer

Magnetic Stripe Cards

Magnetic stripe card has a magnetic stripe, which is used to store data in the form of tiny magnetized and non-magnetized particles of magnetic material. The information on the card is read by swiping the card past a magnetic reading head.

Examples

Examples of these cards include credit cards, ATM cards, VISA and MasterCard, driver's license and membership cards. A magnetic stripe card is shown in Fig. 1.21.



Fig. 1.21 Magnetic Stripe Card

1.3.2 OUTPUT DEVICES

Q.36 Write a note on output devices.

Answer

Output Devices

Output devices consist of computer components such as monitor, printer, speaker and plotter that transfer information from computer memory to the outside world. They display or print text, graphics or pictures.

Q.37 What is meant by hardcopy and softcopy?

Answer

Hardcopy

The output generated on paper by an output device such as printer or plotter is called Hardcopy output.

Softcopy

The output in the form of data or information stored on a storage device or displayed on a monitor is called **Softcopy** output.

Q.38 What are monitors? Describe their features.**Answer****Monitors**

A monitor, sometimes called a VDU (Visual display unit), is an electronic output device for computers. It displays the results of the user activities. The output produced by monitors is called softcopy output.

Features of Monitors

There are different types and sizes of monitors, each can be distinguished on the basis of the following features:

1. Size

The size of the monitor is measured diagonally. Standard size of monitor is from 15 to 22 inches.

2. Color

The monitor can be either black and white or color.

3. Pixel

Pixel is a small/tiny dot on the monitor, which forms the image.

4. Resolution

The number of pixels (or dots) per square inch is called the resolution of the monitor.

5. Dot Pitch

The distance between the pixels on the monitor is called dot pitch. The lesser the dot pitch more will be resolution of the monitor.

Q.39 Explain the types of monitors.**Answer****Types of Monitors**

The common types of monitors are as follows:

- CRT (Cathode Ray Tube)
- LCD (Liquid Crystal Display)
- LED (Light Emitting Diodes)

1. Cathode Ray Tubes (CRT) Monitors

CRT monitors are similar to the standard television sets because they contain Cathode Ray Tube. The Cathode Ray Tube (CRT) is a vacuum tube containing an electron gun and a phosphors coated screen. The electron gun, fires a beam of electrons, which falls repeatedly on the phosphors coated screen and it glows for a fraction of a second. In color CRT monitors, there are three electron guns while the phosphors atoms are in three different colors i.e. Red, Green, Blue (RGB). The combinations of these three colors produce other colors.

2. Liquid Crystal Display (LCD) Monitors

Liquid Crystal Display (LCD) is a thin and lightweight monitor. It contains a substance called liquid crystal between two sheets. The molecules of this substance are lined up in such a way that the light behind the screen is blocked or allowed to create an image on the screen. LCDs provide a sharper image than CRT monitors and emit less radiation. They are used in a wide range of applications, including computer monitors, televisions, and clocks. They are usually more compact, lightweight, portable, less expensive, more reliable, and easier on the eyes than CRT monitors are.

3. Light emitting diode (LED) Monitor

LED monitor is a lightweight flat panel display unit, which uses LEDs (light-emitting diodes) as pixels for display. In contrast to LCDs, these monitors produce bright images and emit fewer radiations. LEDs run at lower temperatures and consume less power as compare to



Fig. 1.22 CRT Monitor



Fig. 1.23 LCD Monitor

LCDs Their lifespan is also longer than other types of monitors. The only drawback is that these monitors are expensive than other types of monitors.

Q.40 What is a printer? Write down its characteristics and explain its types.

Answer

Printers

Printers are used to produce hardcopy of output. In the past, printers were connected to the computer through parallel port but now they are connected through USB port.

Characteristics of Printers

Printers vary in their capabilities based on the following characteristics:

- The quality of output
- The ability to print graphics
- The printing speed

Main Categories of Printers

There are two main categories of printers:

- Impact printers
- Non-impact printers

1. Impact Printer

Impact printers are those printers, which work like typewriters. Impact printers use electromechanical mechanism, which causes the character shape to strike against the paper and leave an image of character on the paper.

Examples of Impact Printers

Examples of impact printers are dot matrix and chain printers. Their print quality is low and they produce noise.

i. Dot Matrix Printers

Dot matrix printers have 9 or 24 pins arranged in a matrix to print shapes of characters. A dot matrix printer is shown in Fig. 1.24.



Fig. 1.24 Dot Matrix Printer

ii. Chain Printer

Chain printer is very old type of line printer. It contains characters in a chain. The chain moves rapidly by two geared pulleys while printing. IBM 1403 Chain printer is shown in Fig 1.25



Fig. 1.25 IBM 1403 Chain Printer

2. Non-Impact Printers

Non-impact printers produce a printed image without striking the paper. The printing quality and speed of these printers is better than impact printers are. These printers produce very little noise while printing.

Types of Non-Impact Printers

Commonly used non-impact printers are inkjet and laser printers.

i. Inkjet Printers

Inkjet printers are character printers. They form characters and all kinds of images by spraying small drops of ink on the paper. Inkjet printers are cheap.



Fig. 1.26 Inkjet Printer

quiet in operations and can print in multicolour but the printing quality and speed is slower than laser printers. An inkjet printer is shown in Fig. 1.26.

2. Laser printers

Laser printers are page printers, meaning that they print an entire page at a time. Their printing technology is very similar to photocopiers. They are very fast and silent in operation. The print quality of laser printer is very high and they can print graphics in multicolour. A laser printer is shown in Fig. 1.27.



Fig 1.27 Laser Printer

Q.41 What are plotters? Explain its types.

Answer

Plotters

Plotters are output device used to produce large size hardcopy output. Plotters are used for a variety of applications, which include drawing graphs, making maps, plotting civil engineering drawings/machine components and producing large size panaflexes.

Types of plotters

Plotters are of two types, which are as follows:

- Flatbed Plotter
- Drum Plotter

1. Flatbed Plotter

Flatbed plotter plots on paper that is spread and fixed over a rectangular flatbed as shown in Fig. 1.28.



Fig.1.28 Flatbed plotter

Pens of different colours are mounted in the pen holding mechanism that moves on the surface to draw the image

2. Drum Plotter

In drum plotter, paper/sheet is fed from one side and drum of the plotter rotates to move the paper to the other side. These plotters are used to print large size of panaflexes as shown in Fig. 1.29.



Fig. 1.29 Drum Plotter

Q.42 Write a note on speakers.

Answer

Speakers

Speakers are audio output devices that are attached to the sound card on motherboard. Speakers produce softcopy output in the form of voice. Speakers are available in different shapes and sizes as shown in Fig 1.30



Fig 1.30 Speakers

KEY POINTS

- A computer is a device, which takes instructions and data in the form of input, performs computations according to the given instructions and provides output as a result. All machines, components or devices that mediate in the processing of a computer system are called computer devices.
- Computers are classified into Microcomputer, Minicomputer, Mainframe and supercomputer. Microcomputers are the smallest and the least expensive computers, whereas, Supercomputers are the largest, the most expensive and powerful computers.
- The physical components of a computer such as monitor, keyboard and hard disk are known as hardware.
- System software is a collection of programs to make the use of computer easy, efficient and effective.
- Application software is a set of programs designed to perform a particular task.
- Firmware is an intermediate form between hardware and software which consists of software embedded in electronic devices during their manufacture
- Input devices are used to communicate with the computer. They accept data and instructions from the user and convert them into machine readable form before storing in the computer memory.
- Output devices consist of peripheral devices that transfer information from the main memory to the outside world in human readable form
- Hardcopy is the output generated on paper by an output device such as printer or plotter.
- Softcopy is data or information stored on a storage device or displayed on a monitor.

EXERCISE

Q.1 Select the best answer for the following MC Qs.

- i. _____ of the following is the smallest computer.
A. Mainframe B. Minicomputer C. Microcomputer D. Supercomputer
- ii. How many instructions per second a minicomputer can execute?
A. Thousands of instructions B. Millions of instructions
C. Billions of instructions D. Above trillion instructions
- iii. What type of software MS Word is?
A. System software B. Application software
C. Utility software D. Language processor

