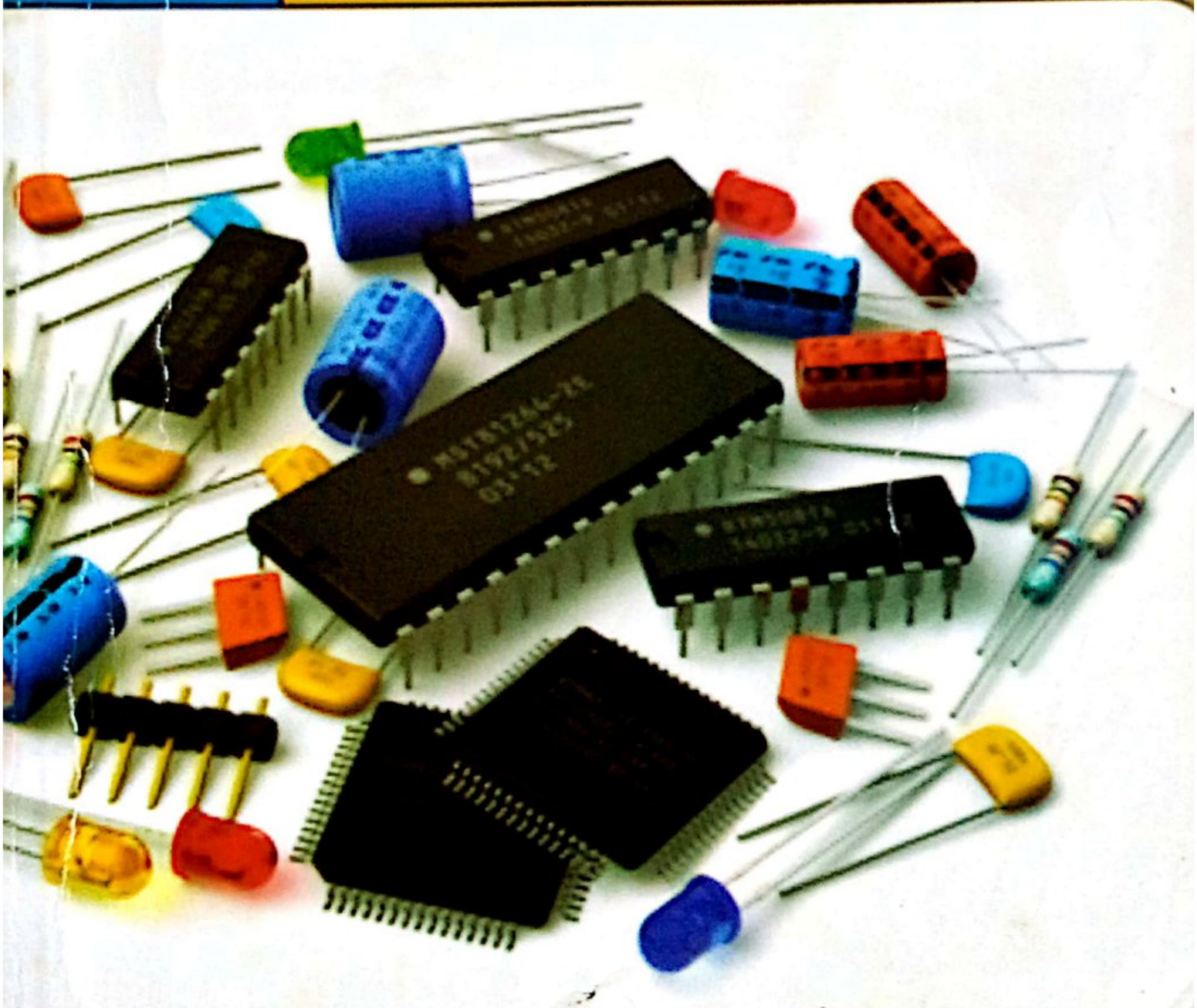
# Computer 11 Science



Salah-ud-Din Ayubi / Dr. Muhammad Shah

*Islamia*

# Computer Science

## Class 11

*According to the new syllabus –*

*"All boards of Khyber Pakhtunkhwa"*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# Contents

IN THE NAME OF

# Allah

WHO IS MOST GRACIOUS,
MOST MERCIFUL

Holy is He Who carried His servant by night from the Holy Mosque (in Makkah) to the farther Mosque (in Jerusalem) whose surroundings We have blessed that We might show him some of Our Signs. Indeed He alone is All-Hearing, All-Seeing.

We gave Moses the Book, and made it a source of guidance for the Children of Israel, commanding: "Take no other Guardian beside Me."

You are the descendants of those whom We carried (in the Ark) with Noah. He was truly a thankful servant.

Then We clearly declared to the Children of Israel in the Book: "Twice you will make mischief in the land and will commit transgression."

So, when the occasion for the first of the transgressions arrived, We raised against you some of Our creatures who were full of might, and they ran over the whole of your land. This was a promise that was bound to be fulfilled.

(Surah Bani Israel 1 to 5) **(The Holy Quraan)**

Unit # 1

# Overview of Computer System

## EXERCISE

**Q1. Select the best choice for the following MCQs.**

i. **Which of the following device is considered to be the first computer?**

A. Difference Engine

**B. ABACUS**

C. Tabulating Machine

D. Mark 1

ii. **Which of the following is the process of storing the data, information and instructions?**

A. Input operation

B. Processing operation

C. Output operation

**D. Storage operation**

iii. **_____ computers are the second powerful and expensive computers than supercomputers.**

A. Microcomputers

B. Mini computers

**C. Mainframe computers**

D. Laptops

iv. **Which of the following software are set of programs that operate and control the computer system?**

A. Freeware

B. Shareware

**C. System Software**

D. Application Software

v. **_____ is not a portable computer.**

**A. Laptop**

B. PDA

C. Notebook

D. Mainframe

vi. **_____ is a program that controls a particular type of device that is attached to the computer.**

A. Operating System

**B. Device Driver**

C. Utility Software

D. Language Processor

vii. **Which software is used to analyze, configure, optimize and maintain the computer?**

A. Operating System

B. Device Driver

**C. Utility Software**

D. Language Processor

viii. **_____ translates a high level language program line-by-line.**

**A. Interpreter**

B. Compiler

C. Assembler



D. Processor

ix. **Which of the following is not an input device?**

A. Mouse

B. Scanner

C. Digital Camera

**D. Speaker**

x. **Which software is delivered to the user without payment for trial uses with limited functionality and for a specific period of time?**

A. Open source

B. Firmware

**C. Shareware**

D. Freeware

xi. **_____ is a term often used for the fixed, small programs that control various electronic devices.**

A. Open source

**B. Firmware**

C. Shareware

D. Freeware

xii. **The number of pixels (dots) per square inch area of a monitor is called _____.**

A. Size

**B. Resolution**

C. Dot Pitch

D. Refresh Rate

xiii. **The distance between the pixels on the monitor is called _____.**

A. Size

B. Resolution

**C. Dot Pitch**

D. Refresh Rate

xiv. **The output produced by printers is called_____.**

**A. Hardcopy output**

B. Softcopy output

C. Plain output

D. Rough output

xv. **_____ Printer creates an image by pressing an inked ribbon against the paper.**

A. Laser jet Printer

B. Plotter

C. Laser Printer

**D. Dot-Matrix Printer**

**Q2. Give short answers to the following questions.**

**i. What is a Computer?**

**Ans.** Computer is an electronic machine that accepts data, stores it, processes the data according to the instructions provided by the user and finally returns the results to the user in the form of output.

**ii. What is processing operation?**

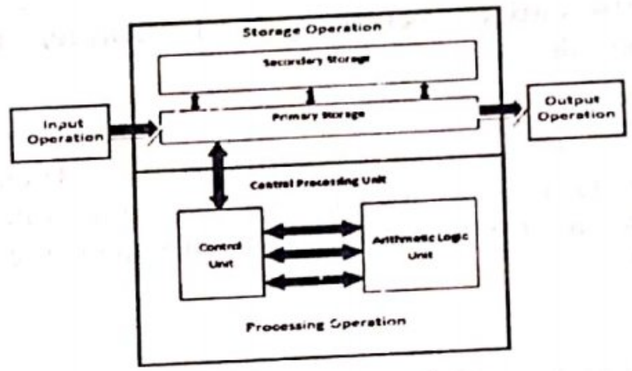
**Ans.** Processing operation is the transformation process to convert the input into output. The Central



Processing Unit (CPU) performs processing tasks under the direction of a program.

**iii. Show basic operations of a computer with the help of a block diagram.**

**Ans.**




**iv. What is a notebook computer?**

**Ans.** A notebook computer is designed to provide mobile computing to the users with an installed battery for power.

**v. State five differences between hardware and software.**

**Ans. Differences between hardware and software**

| | Hardware | Software |
|---|---|---|
| 1 | Hardware refers to the physical components of the computer, required to store and execute the software. | Set of instructions that enables a user to interact with the computer. |
| 2 | It is physical in nature. | It is logical in nature. |
| 3 | Hardware understands only Binary Data or digits i.e. 0s and 1s in the form of voltage pulses | Software tells the Hardware everything in the form of Binary Data or digits i.e. 0s and 1s only. |

| | | |
|---|---|---|
| 4 | Types: Input, storage, processing, output and communication devices. | Types: System software and Application software. |
| 5 | Hardware faults are physical. | Software faults are logical. |

**vi. Differentiate between an Interpreter and a compiler.**

**Ans. Interpreter:**

A language translator that translates a High Level Language program line-by-line (statement-by-statement) and carries out the specified actions in sequence is called Interpreter.

**Compiler:**

Compiler is a translator program that translates source code (written by programmer in a high-level language e.g., C++) into a set of machine-language instructions that can be understood by a digital computer's CPU.

**vii. How Application software helps users?**

**Ans.** Application software is a type of software that can be used for a variety of tasks. It helps to solve problems in the real world. For example, it can help in writing applications performing calculations, creating presentations and databases etc.

**viii. Differentiate between shareware and freeware.**

**Ans. Shareware:**

Shareware is also called trial-ware and refers to licensed software that is delivered to the user without payment for trial uses with limited functionality and for a specific period after which it expires.



**Freeware:**

The term freeware refers to the meaning "free software". It is a computer software available to the user with no cost or for an optional fee, but usually with one or more restrictions to the user.

**ix. What is Licensed Software?**

**Ans.** A computer software that is licensed and user have the full rights to use it. The user is restricted from modification, distribution and re-building of the software without the permission of the copyright holder.

**x. What is firmware?**

**Ans.** It is a term often used for the fixed, small programs embeded in hardware that controls various electronic devices. These programs are written in machine languages and are permanently embedded in the hardware for which it is developed.

**Q3. Give detailed answers to the following questions.**

**i. What are computing devices? Explain early and modern computing devices.**

**Ans. Computing devices**

The term "Computing Device" is used for all such machines that can perform calculations. These calculations could be very simple, like adding two numbers to very complex, like managing the stock control system for a big shopping mall. Computer is considered to be the fastest computing device ever.

The computing devices can be classified into early and modern computing devices.

**Early computing devices**

The Abacus, which emerged about 5,000 years ago in Asia and is still in use today, may be considered as the first computer. This device is used to make computations using a system of sliding beads arranged on a rack.

In 1694, a German mathematician and philosopher, Gottfried Wilhem Von Leibniz created a Computing machine that could add, subtract and multiply. Leibniz's mechanical multiplier worked by a system of gears and dials.

The real beginnings of computers was laid by an English mathematics professor, Charles Babbage. In 1822 Babbage proposed a machine to perform differential equations, called a Difference Engine. After working on the Difference Engine for 10 years, Babbage was suddenly inspired to begin work on the first general-purpose computer, which he called the Analytical Engine.

In 1889, an American inventor, Herman Hollerith applied the Jacquard loom concept to computing and developed a tabulating machine. His first task was to find a faster way to compute the U.S. census data.

Vannevar Bush developed a Calculator for solving complex differential equations in 1931.

In 1940, John V. Atanasoff , a professor at Lowa State College and his graduate student, Clifford Berry, envisioned an All-electronic computer that applied Boolean algebra to computer circuitry.

By 1941 German engineer Konrad Zuse had developed a computer, the Z3, to design airplanes and missiles.

Howard H. Aiken, a Harvard engineer working with IBM, succeeded in producing an all-electronic calculator by 1944. The Harvard-IBM Automatic Sequence



Controlled Calculator or Mark I for short, was an electronic relay computer. It used electromagnetic signals to move mechanical parts, performed basic arithmetic as well as more complex equations.

Another computer development was the Electronic Numerical Integrator and Computer (ENIAC). It was developed by John Presper Eckert and John W. Mauchly. ENIAC was a general-purpose computer that computed at speed 1,000 times faster than Mark I.

Von Neumann designed the Electronic Discrete Variable Automatic Computer (EDVAC) in 1945 with a memory to hold both a stored program as well as data.

In 1951, the UNIVAC-I (Universal Automatic Computer), built by Remington Rand, became one of the first commercially available computer.

**Modern computing devices:**

By 1948, the invention of the transistor greatly changed the computer's development. The first large-scale machines to take advantage of this transistor technology were early supercomputers, Stretch by IBM and LARC by Sperry-Rand. These computers, both developed for atomic energy laboratories, could handle an enormous amount of data.

Throughout the early 1960's, there were a number of commercially successful computing devices used in business, universities and government. One important example was the IBM 1401 computer

The development of Integrated Circuits (ICs) in 1958 by Jack Kilby had completely revolutionized the computing devices in terms of processing speed, memory and peripheral supporting capabilities.

The Intel 4004 chip, developed in 1971, took the ICs one step further by locating all the components of a computer (CPU, memory, input and output controls) on a single chip.

In 1981, IBM introduced its Personal Computer (PC) for use in the home, office and schools. Computing devices continuously reduced its size by introducing desktop to laptop computers to palmtop or tablet PCs which can fit inside a pocket.

**ii. Explain different classifications of computers.**

**Ans. Classification of Computer:**

Based on physical size, performance and application areas, the computers are generally classified into Micro, Mainframe, Super and Mobile Computers.

**a) Microcomputers**

Microcomputers are more commonly known as Personal Computers (PCs). The microcomputer is generally the smallest and least expensive of the computer family. Originally, these computers were designed only for individual users, but nowadays they have become powerful tools for many businesses by networking them to serve more than one user.

Microcomputers include the following types:

**1. Desktop Computers**

A desktop computer is the most common type of micro computer. Many people use desktop computers at work, home, school or the library. They can be small, medium or large in size.

**2. Notebook Computers**

A notebook computer is designed to provide mobile computing that offer all the required services to the mobile users to fullfill their needs. This is easy to carry



around and preferred by students and business people to meet their assignments and other necessary tasks.

**3. Laptop Computers**

A laptop is a portable computer that a user can carry around. The biggest advantage of laptops is that they are lightweight and can be used anywhere and at any time, especially while travelling. Moreover, they do not need any external power supply because of a self-contained rechargeable battery.

**4. Handheld Computers**

Handheld computers are a unique type of portable computers that allow users to work "on the go." Since these computers can easily be placed on the top of the palm, they are also known as palmtop computers. They are lightweight also. The most popular types of handheld computers include Personal Digital Assistants (PDAs) and smartphones, iPhones etc.

**b) Mainframe Computers**

Mainframe computers are the second powerful and expensive computers than supercomputers. These computers have powerful processors and large memories to process large amounts of data at very high speed, such as Billions of Instructions Per Second (BIPS). These computers support many terminals at the same time.These are widely used as super-servers for large client/server networks and for high volume websites.

Mainly these are used by Airline companies, government departments, banks and insurance companies. Airline companies use mainframe systems for flight scheduling, reservations, ticketing and meeting a range of customer service needs.

### c) Super Computers

Supercomputers are the most powerful and the most expensive computers designed for scientific, engineering and business applications. These computers can process billions to trillions of instructions per second. Supercomputers possess extremely high computing speed, higher capacity for storage, faster primary memory and faster secondary storage as compared to other types of computers. IBM's supercomputer, Sequoia, can perform around 16 thousand trillion instructions per second. It is used in world-wide weather forecasting, weapon research, stock analysis, automobile designing, special effects for movies and used for applications requiring complex mathematical calcula-tions. NASA uses super-computers for launching and controlling space shuttles and for space exploration purpose.

### d) Mobile Computing

Mobile Computing is a technology that allows processing and transmission of data, voice and video via a computer or any other wireless enabled device without any connection to a fixed physical link. The devices used for mobile computing are Laptops, Smartphones, Tablet Pc's and Personal Digital Assistants.

These devices can communicate wirelessly by receiving and sending signals on a wireless link.

Every mobile device has a spcialized software called Mobile software. This software facilitates the hardware to perform mobile computing.

**iii. What is software? Explain its two main types with examples.**

**Ans.** Computer software is set of instructions that direct the computer what to do and how to do.



A computer needs instruction for doing a job because it is a machine and cannot do anything on its own. Set of instructions that is developed using some computer language to instruct the computer is called computer program. Computer program is also a software.

The computer software are broadly divided into two categories.

a. System Software

b. Application Software

### a. System Software

System software are set of programs that operate and control the computer system. System software can do one or more of the following jobs:

- Supports the execution of other application software.
- Supports the development of other application software.
- Monitors the efficient use of various hardware resources.
- Communicate with and controls the operation of peripheral devices.
- Operating system, device drivers and language processors are some examples of System software.

### b. Application Software

Application software is a type of software that can be used for a variety of tasks. Application Software performs some specified tasks and we cannot use them as a general purpose software. For example a media player can only play audio or video and cannot be used for writing applications.This software helps to solve

problems in the real world. Examples include enterprise software, accounting software, office suites, graphics software and media players.

**iv. Explain different types of General Purpose Application Software.**

**Ans. General Purpose Application Software**

General-purpose application software are programs that perform common information processing jobs for end users. These are called packages or commercial software. A single software package can be applied to a wide variety of tasks. By using such software a user can fulfill his or her general needs.

These are divided into the following main categories.

**i. Productivity software**

The productivity software is a type of Application software that is used to produce documents, presentations, databases, charts and graphs.

Some common types of productivity software are:

**a. Database Software:**

This software allows creating a database and to retrieve, manipulate and update the data that we store in the database. e.g. MySQL, Microsoft SQL Server and Oracle.

**b. Multimedia Software:**

They allow the users to create and play audio and video. They are capable of playing media files. Examples of this type of software include Real Player and Media Player.



**c. Word processors:**

Word processing software is used to create, edit and format text documents . The most popular examples of this type of software are MS-Word, WordPad and Notepad.

**d. Spreadsheet Software:**

Spreadsheet software are used to work with numbers and formulae. User enters numbers in the grid of rows and columns on the worksheet and computer performs the calculations. MS Excel and Lotus 1-2-3 are examples of Spreadsheet software.

**e. Presentation software:**

Presentation software is designed for creating on-screen presentations, reports and slideshows. It allows to combine both text and graphics in a single document. Microsoft PowerPoint is the best example of presentation software.

**ii. Business Software**

Any software that helps business to increase or measure its productivity, is called business software. Business software can be used for small, medium and large businesses. Some common types of business software include Marketing software, Payroll system, Inventory control system, Communication software and Accounting software, etc.

**iii. Entertainment software**

Entertainment software allows a computer system to be used as an entertainment tool. Some examples of entertainment software are Media Player, Video Game, etc.

**iv. Educational software**

Education software allows a computer system to be used as a teaching and learning tool. Some examples of education software are:

**a. Computer Based Training (CBT):**

These Application software are used for the purpose of training.

**Example:**

A training software for pilots how to fly an aeroplane and also for doctors to train them surgeries.

**Encyclopedia:**

Encyclopedia software contains entries like dictionary and provides complete linguistic information about them. The main aim of the encyclopedia software is to preserve the knowledge of present time to the new generation for their use. Encarta and Britannica are popular encyclopedia software.

**b. Computer Aided Learning (CAL):**

The term Computer Aided Learning (CAL) covers a range of computer-based packages, which aim to provide interactive instruction usually in a specific subject area. These can range from sophisticated and expensive commercial packages to applications developed by individuals.

Teachers can use audio video software aids through computer to prepare lesson plans. They can use Power Point to prepare electronic presentations about their lectures. These electronic presentations can be displayed on multimedia projectors in class rooms.



**v. Write short note on any five input devices.**

**Ans.** Input devices are the external hardware components that are used to enter data and instructions into computer for processing.

Examples include:

Keyboard, Mouse, Joy stick, Touch Screen, Touchpad.

**i. Keyboard**

Keyboard is the most commonly used input device to enter data and instructions into the computer directly. Keyboards are almost compulsory part of every computer system. Keyboard has a set of keys like a typewriter. A keyboard has over 100 keys on it. When we press a key a predefined value (code) in the form of electrical signal is sent to the computer to tell it which key is pressed. The keys are arranged in different groups.

**ii. Mouse**

Mouse is an input device with two or more buttons used to open and close files, navigate the screen or web sites. It is very user-friendly device. As we move the mouse, the mouse pointer (a little arrow on the screen) moves in the same direction. It controls the motion of pointer on screen. A mouse has two or three buttons called Left, Right and Middle button. Buttons are used to perform different functions. Old mouse has a rubber coated metal ball inside its body. Mouse is rolled over a flat surface called mouse pad. The movement of ball is detected by internal circuits of mouse. These circuits convert this movement into digital signals, which are sent to computer. The optical mouse uses an LED to detect the movement by scanning a surface. A lasermouse is a type of mouse that uses a laser beam

rather than a ball to track the movement of the user's hand. Mouse is used in many graphical applications.

**iii. Joystick**

A joystick is an input device consisting of a lever fixed on a base and reports its angle or direction to the device. It has one or more push-buttons whose state can also be read by the computer. Joysticks are often used to play video games.

**iv. Touch Screen**

A Touch screen is an electronic visual display that can detect the presence and location of a touch within the display area with the help of pressure sensitive sensors. It can be touched with a finger or stylus (also called a pointing stick).

**v. Touchpad**

It is also called track-pad It is a pointing device consisting of specialized surface that can translate the motion and position of a user's fingers to a relative position on screen. They are commonly used in laptop computers. They can also be found on PDAs.

**vi. What is output? Briefly explain softcopy output devices.**

**Ans. Output:**

Any information that has been processed by and sent out from a computer or similar device is considered as output. A simple example of output is anything you view on your computer monitor.

**Monitors**

Monitor is a softcopy output device. It is also called display or Visual Display Unit. It displays the results of



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

**Size:**

The size of the monitor is measured diagonlay. Standard size is 15 to 19 inches.

**Color:**

The monitor can be either monochrom (one color) or colored monitor.

**Resolution:**

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

**Refresh Rate:**

It is the speed with which the monitor redraws the screen in per unit time.

**Dot Pitch:**

The distance between the pixels on the monitor is called dot pitch. Lesser, the dot pitch of monitor, sharper the image will be.

CRT (Cathode Ray Tube) and LCD (Liquid Crystal Display) are the two common types of monitors.

**a. 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 phosphorus 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). Other colors are produced by the combinations of these three colors.

**b. Liquid crystal display (LCD) Monitors**

Liquid Crystal Display (LCD) is a thin and light weight 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 behined 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 usually more compact, lightweight, portable, less expensive, more reliable and easier on eyes than CRT monitors. They are also used in televisions and clocks.

**vii. What is the importance of magnetic cards/devices based systems? Explain different types of magnetic cards.**

**Ans. Importance of magnetic cards/devices based systems**

Magnetic cards/devices based systems are widely used by many different organizations to provide both convenience and security. Hotels use them for room access, credit card companies use them for handling purchases and college campuses use magnetic cards for both building access and electronic payments. The following are some common types of magnetic cards.

**a. Magnetic Ink Character Recognition (MICR)**

MICR system reads characters printed in a special magnetic ink and input them into the computer. The main users of MICR are banks. They use it to read information from cheques and input it into their computers so that the cheques can be cashed.



**b. Magnetic Strip Card**

Magnetic stripes are built into many plastic cards such as credit cards. The strip can contain up to 60 characters (numbers or digits) of information which is stored magnetically. Usually the information is put onto the strip when the card is made and is never changed. To read the card it is swiped through a Magnetic strip reader, which quickly and accurately reads the pattern of magnetism. The information stored on the card can be destroyed by exposure to magnetic fields, by scratching or by coming into contact with some liquids.

**c. Smart card**

A smart card contains a small RAM chip. When the card is put into a Smart card reader data can be read from the card or written onto it. A smart card can store much more data than a magnetic strip. It is more secure than Magnetic stripes but more expensive to produce.

A new generation of smart cards is now appearing which contain a small microchip as well as memory.

**viii. What are impact and non-impact printers? Explain any two types of printers in each category.**

**Ans. Impact Printers**

An Impact printer creates an image by pressing an inked ribbon against the paper, using pins or hammers to shape the character. It works like a typewriter, which uses small hammers to strike the ribbon. Each hammer is embossed with the shape of an alphanumeric character; that shape is transferred through the inked ribbon onto the paper, resulting in a printed character. Common types of impact printers are Dot Matrix printer and Drum printer.

**i. Dot-Matrix Printer**

A type of impact printer that produces text and graphics by striking pins against an ink ribbon to print closely spaced dots in the appropriate shape. Different characters are printed by using different pin combinations. The printer receives the data from the computer and translates it to identify which character is to be printed and the printing head prints dots on the paper.

The number of pins used for printing, vary between 9 to 24, determines the quality of the print. These printers are used for low cost printing like invoices, purchase orders, shipping forms and labels.

**ii. Drum Printer**

In these printers a fixed font character set is engraved onto a number of print wheels. The wheels, joined to form a large drum, spin at high speed. As the desired character for each column passes the print position, a hammer strikes the paper from the rear, which presses the paper against the ribbon and the drum, causing the desired character to be printed on the continuous paper. A full set of hammers delivers ( 600 Lines-Per-Minute of output) and a half set of hammers delivers (300 LPM).

**Non-impact printers**

Non-impact printers print characters and graphics on the paper with Laser or with sprayed ink or with heat and pressure without striking the paper. These printers are faster, less noisy and have high quality of print but



costly as compared to impact printers. Inkjet and Laser jet or Laser printers are common types of non-impact printers.

**i. Inkjet or Laser jet Printer**

Inkjet or Laser jet Printer is the most popular printer. It sprays tiny drops of ink onto a page to create an image. This is achieved by using magnetized plates which direct the ink's path onto the paper in the desired pattern. Ink-jet printers are capable of producing high quality print which almost matches the quality of a laser printer. A typical ink-jet printer has a resolution of 300 to 600 dots per inch (dpi).

**ii. Laser Printer**

Laser printer utilizes a laser beam to produce an image on a drum. The drum is then rolled through a toner (containing dry ink) and the electrically charged portions of the drum picks up ink. Finally, using a combination of heat and pressure, the ink on the drum is transferred onto the page. Laser printers print very fast and produce very high-quality print. Laser printers are sometimes called page printers.

Laser printers have very high resolution, it ranges from 300 dpi to 1200 dpi.

**ix. How a plotter is different from a printer? Explain different types of plotters.**

**Ans.** Plotters are hardcopy output devices. They are mainly used by architects, engineers and others who need to generate high-precision graphical output of large sizes on papers. While printers are

output devices which are used to produce output on physical media such as paper. Plotters have drawing pins to generate the print while the printers don't have any such drawing pins. Plotters are more expensive than printers.

**i. Drum Plotter**

In the drum plotter the paper, on which the design has to be made is placed over the drum, which can rotate in both clockwise and anti-clockwise direction. The drawing pens are mounted on the drum. During rotation of the drum the pens move left and right and create the desired image on the paper. The advantage of drum plotter is that the length of the plot is almost unlimited and the width of the image depends on the width of the drum.

**ii. Flatbed Plotter**

A flatbed plotter plots a design on a sheet in such a way that the sheet is spread and fixed over a rectangular flatbed table. In such plotters the pen holding mechanism is designed to provide all types of motions under the computer control, necessary to draw a design or graph. Most flatbed plotters have one or more pens of different colors and width.



Unit # 2

# Computer Memory

## EXERCISE

**Q1. Select the best choice for the following MCQs.**

**i. _____ memory holds data and programs not currently in use and provides long-term storage.**

A. Primary

**B. Secondary**

C. Main

D. Internal

**ii. _____ is the smallest amount of memory a computer can hold?**

A. Byte

B. KB

**C. Bit**

D. MB

**iii. Which of the following is the fastest memory?**

A. RAM

B.ROM

**C. Cache memory**

D. PROM