

COMPUTER

STD 9

PERSONALIZE NOTES

+

USEFUL STUDY MATERIAL

ACCORDING TO THE LATEST
PAPER PATTERN OF BOARD



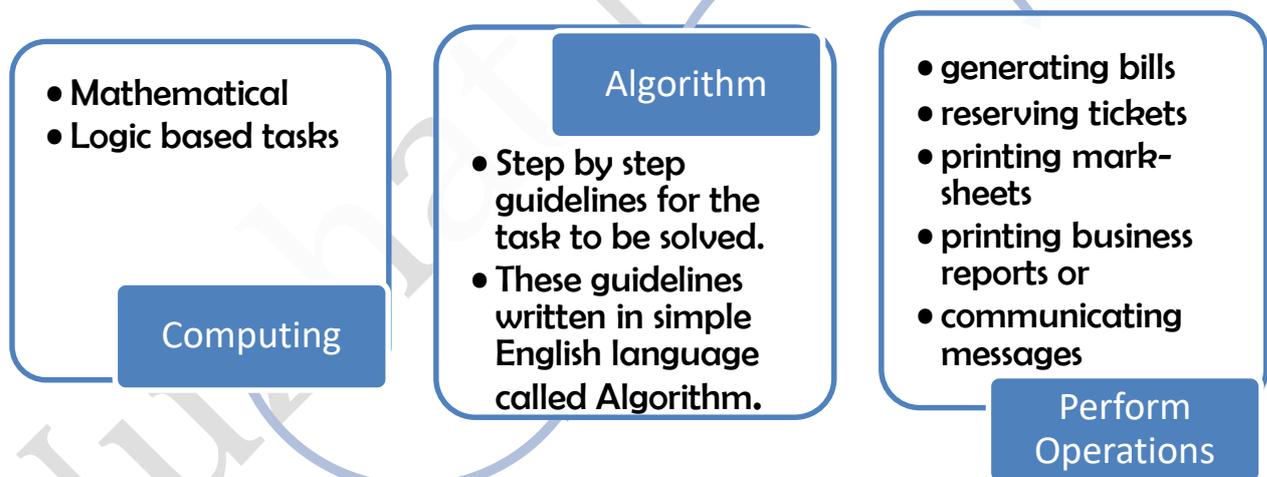
NUZHAT MEMON

Computers are multi-purpose machine

- Computer can be used to solve variety of problems in different fields.
- Computers have changed the way we live, work and communicate.
- Computers are useful in industries, government, education, research as well as entertainment sectors.
- From routine business activities in a given area to a spectacular task, computers are applicable everywhere. That is why a computer is called multi-purpose machine.

Working of a typical computer

- Just as a calculator calculates, a driver drives and a painter paints, computer computes. Computer can also deal with audio, video, graphs and animations besides texts & numb



- Once the computer is given data and step by step instructions, it then performs computations and generates result or performs an action as an output
- The set of data and instructions provided by a user to the computer is called an input.
- Computer processes this input and presents results to the user.
- The result is called an output.
- The computer can also stored the result in the memory for future use.

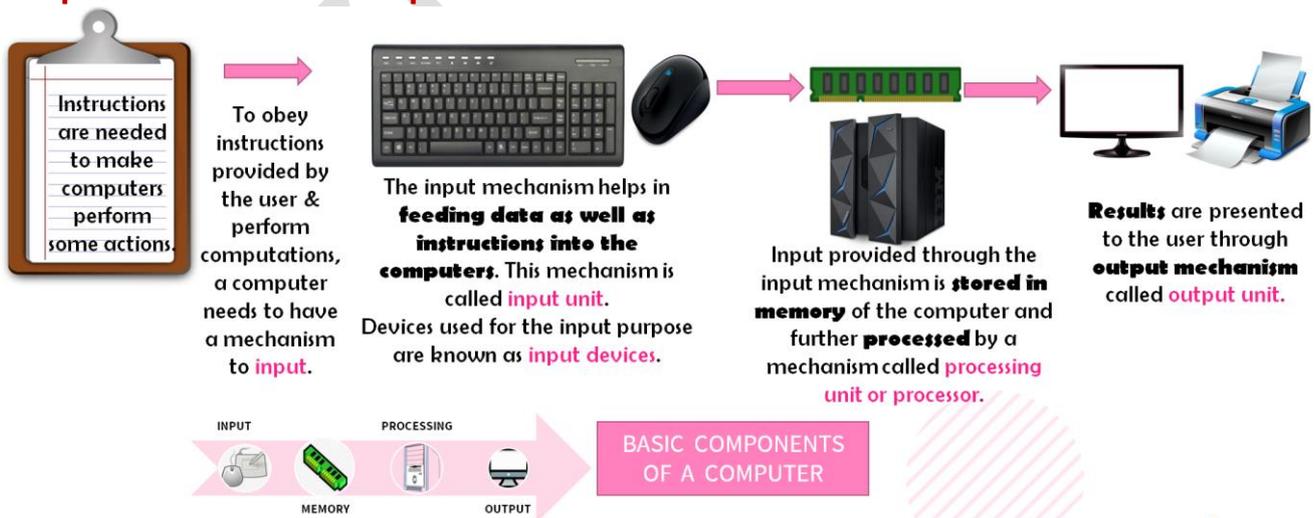
Stored Program Concept

- It is not compulsory to repeat the instructions and enter large amount of data every time we use the computer.
- We can store the data and instructions within the computer itself in such a way that it can be understood by machine; that is, in machine readable language.
- Storing such set of instructions is useful for repetitive performance of the tasks.
- Once the set of instructions in machine readable format called program is stored in the computer, it can be used many times with different sets of data. This concept is known as stored program concept.

Application of Computers



Simple Model of a Computer



Basic components of a Computer

- ❖ Input unit
- ❖ Memory and Control unit
- ❖ Output unit

Input Unit

- The input unit provides a facility to enter data and instructions into the computer.
- Input mechanism supports many devices such as keyboard, mouse, joystick, barcode reader, universal serial bus (USB) devices, hard disk and compact disks (CDs).
- Different input devices take data in different forms and send it to the computer memory.



Use of **keyboard** to enter data & instructions is very much similar to the use of a typewriter.



Another way to input data is reading through **barcode reader**. Barcode reader is normally seen at superstore. When you purchase a product, the shopkeeper uses a small device and presses a button on the device. With sound of a beep, the barcode printed on a tag of the product pack is read and copied to the computer in order to generate bill.



Mouse is also used to input data into computer. Mouse is a device that controls movement of the pointer (also known as cursor) on the display screen.

- Most of the input devices convert the data into machine readable form.

Memory Unit

- Once input is collected via input devices, the input is needed to be stored into the computer memory.
- Computer memory retains data, instructions and processed output for a while (short duration) or for a long time.
- There are two types of computer memories:
 - (1) Primary (Main) / Temporary (volatile) Memory
 - (2) Secondary/Permanent (Non-volatile) Memory

Primary Memory

(main and volatile memory)

- Some computer memories are capable of remembering the content for very short duration; say till the work is in progress and continuous supply of power is ensured. Such memory is called **volatile memory**.
- Such memory forms primary storage of a computer, hence it is known as **primary memory**. It is also called as **temporary memory** or **main memory**.
- The input from different devices goes first to the main memory and will be retained into the memory electronically. The content will remain in the main memory till the computer is switched off. When computer is switched off or reset, the content will be lost.

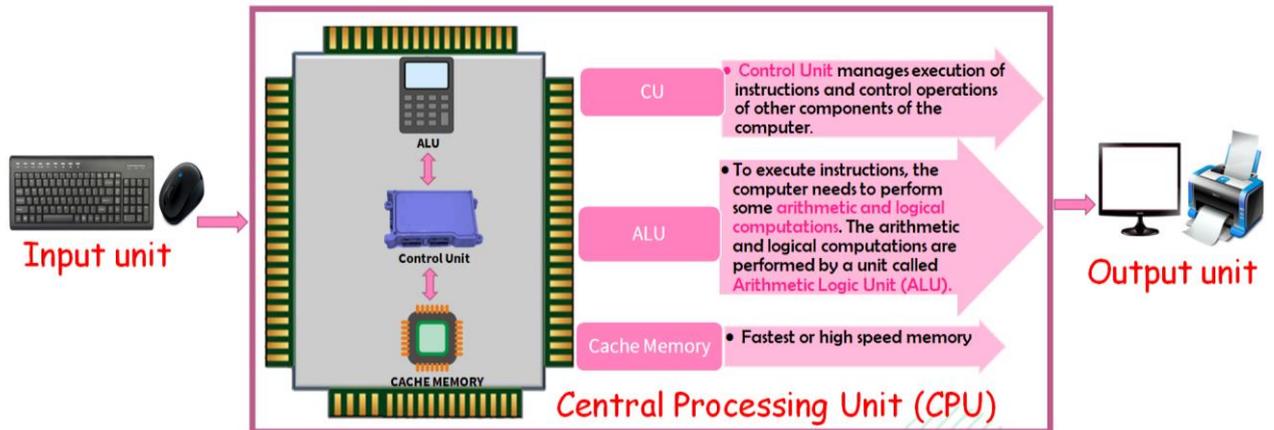
Secondary Memory

(auxiliary and non-volatile memory)

- To preserve the content for a long, we need **secondary or auxiliary storage**.
- The secondary storage memory is not volatile and content can be preserved for long time. Devices that use secondary memory are called **secondary storage devices**.
- Hard disk and compact disks are the most popular secondary storage devices.
- Unlike the primary memory, the secondary storage is **non-volatile, slow** (in comparison with primary memory), **less expensive**, and **large in capacity**.

Central Processing Unit

- Once the data and instructions are entered into the memory, instructions are executed and result is prepared.
- As per the requirement of the user, the result is preserved in the memory or sent to the output unit.
- ALU and control units together form Central Processing Unit (CPU), which is also called the brain of a computer.



Output Unit



- The output unit is normally a visual screen called **monitor**.
- The monitor actually refers to a whole box of the visual output mechanism of a computer.
- Display screen is part of the monitor. Many times we use **monitor and display screen** as synonyms.
- The older monitors used to provide black, white and grey-shade outputs, which usually was the text and numbers.
- Presently, colour monitors that are capable of presenting variety of information such as high quality graphics and animations are available.

To output sound, special devices such as **speakers & headphones** are used.

To print the output printers are used.

Characteristics and advantage of Computer

- The characteristics of computer describe the efficiency of the machine to execute the given task. Hence, these characteristics are also known as efficiency oriented characteristics.

01

Automation

Computer can automatically perform a given task. Once data and necessary instructions are stored into the computer memory, human intervention is not required. Some jobs such as searching from a large repository of data (or from Internet) are nearly impossible without such automation.

02

Accuracy

Computers are able to perform complex arithmetic & logical computations with the highest accuracy. Properly designed computers provide highly accurate results. However, it is obvious that garbage (bad) results are produced by garbage (bad) input entered knowingly or unknowingly. This is called Garbage In Garbage Out (GIGO).

03

Long term storage

Computers can store large amount of data in its secondary storage for long time. The stored content can be recalled easily on request. Unless specifically asked, the content will be preserved in the memory.

04

Ability to perform mechanical and repetitive tasks

Computers are able to perform mechanical tasks in consistent manner. They do not possess human oriented limitations such as loss of interest, likings, and physical capacity.

05

Programmability

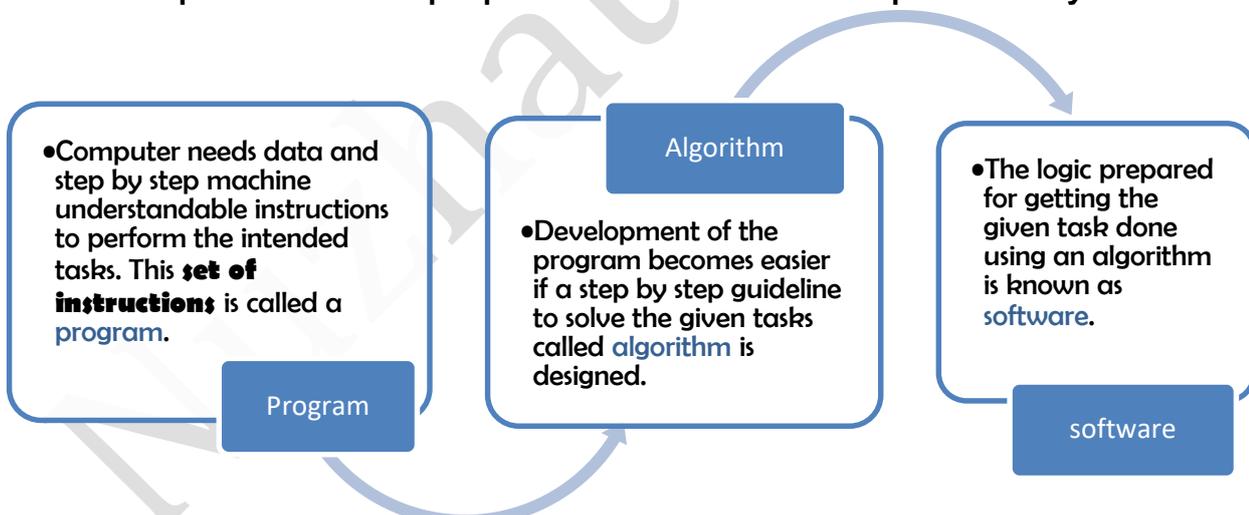
Computers can be programmed to execute predefined set of instructions. Writing program once and executing it many times saves lot of time and cost. The program once written can be modified later for the revised task. Therefore, computers are versatile to perform any activity, provided a step by step program is given.

Hardware

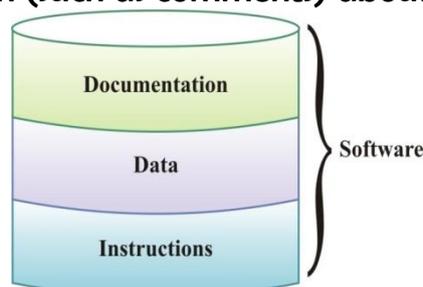
- The hard entities such as keyboard, mouse, central processing unit and other peripheral devices are considered as physical entities and hence called hardware.
- Hardware is a comprehensive term for all physical parts of a computer.

Software

- Computer is a multi-purpose machine and cannot perform any task on its own.



- Software refers to organized collection of computer programs, data and related documentation (such as comments) about the computer programs.



Firmware

- Software instructions many times comes integrated along with hardware. Since such software is closely coupled with hardware, it is known as firmware.
- The software embedded with the hardware usually facilitates use and application of the hardware.
- It also provides utility to work with other hardware and communicate data when needed.
- Usually such firmware are developed by the hardware manufacturing company and provided free when one purchases the hardware.
- For example, washing machine, traffic lights, digital camera and microwave oven have some software programs inbuilt in the devices.

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Chapter 2 History & Evolutions of Computers

Computer Class 9

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HISTORY OF COMPUTERS

ABACUS Earliest Calculation Device

Abacus with 10 beads strung into the wires attached to a frame, which was used to perform simple calculations.



1642: PASCAL Blaise Pascal

The first basic calculator which would do only limited jobs.



1690

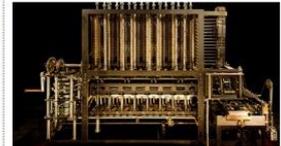
Leibnitz

Calculating machine that could perform addition, subtraction, multiplication, division and calculate square roots. However, the instructions were hardcoded into the machine and could not be changed



1822: Difference Engine Charles Babbage

His invention could perform calculations without human intervention



1823: Analytical Engine Charles Babbage

Technology of the analytic engine provided base to the technology of modern computers. The analytic engine had an arithmetic unit to perform calculations and mechanism to store results and instructions. Babbage is known as the father of the modern day computers.



1940

Jon Von Neumann

To encode instructions in the language. He was the force behind the development of the first stored-program computer.



1946 ENIAC

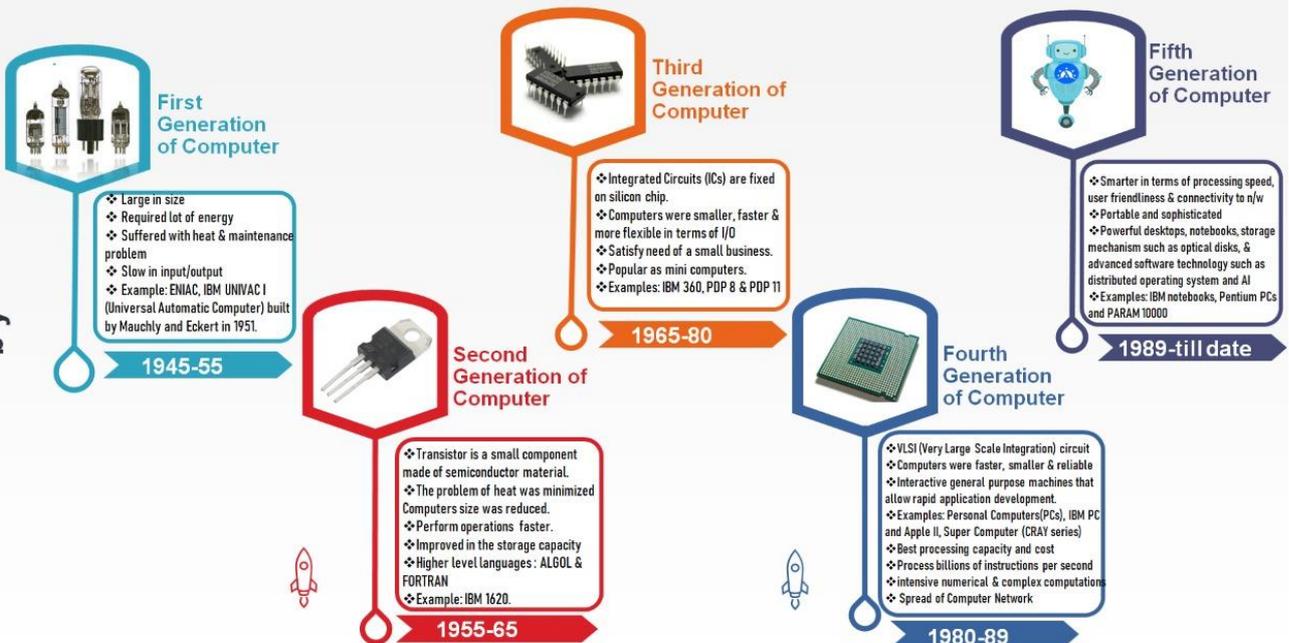
J. Presper Eckert and John W. Mauchly

Invented giant ENIAC machine at the University of Pennsylvania. ENIAC (Electrical Numerical Integrator and Calculator) was the first machine to use large number of vacuum tubes. The machinery required a big space and lot of energy to keep it cool. Further, it had punched-card input and output. The instructions had to be fed into the machine by way of switches because there was no internal memory within the machine.

GENERATION OF COMPUTERS BASED ON HARDWARE

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First Generation Computers (1945-55)

- The first generation of computers started with ENIAC. It was then followed by the IBM UNIVAC I (Universal Automatic Computer) built by Mauchly and Eckert in 1951. This machine could perform business data processing.
- The first generation computers used vacuum tubes.
- Because of vacuum tubes, the first generation computers were very large, required lot of energy, slow in input/output, and suffered with heat and maintenance problems. Further, the vacuum tubes needed to be replaced often as they had short life span.

Second Generation Computers (1955-65)

- To overcome difficulties faced in the first generation computers due to the use of vacuum tubes, **transistors** were used in the **second generation computers**.
- **Transistor is a small component made** of semiconductor material.
- With transistors, the problem of heat was minimized and computers size **was** reduced. The computers now could perform operations comparatively faster.
- The storage capacity **was also** improved.
- Instead of working with machine language now the machine could work with higher level languages such as ALGOL and and FORTRAN.
- An example of a second generation computer is IBM 1620

Third Generation Computers (1965-80)

- Third generation computers used Integrated Circuits (ICs) instead of transistors.
- These circuits are fixed on silicon chip.
- A silicon chip consumes less than one-eighth of an inch square on which many electronic components like diodes, transistors, capacitors etc. can be fixed.
- As the wired interconnections about the circuit components are minimised, these computers were smaller, faster, and more flexible in terms of input and output.
- Third generation computers satisfy need of a small business. These computers soon became popular as mini computers.
- Example of third generation computer is IBM 360, PDP 8 and PDP 11 machines.

Fourth Generation Computers (1980-89)

- Fourth generation computers used large scale ICs called VLSI (Very Large Scale Integration).
- Because of this, these computers were faster, smaller, and reliable.
- The fourth generation computers soon evolved as interactive general purpose machines that allow rapid application development.
- These generation computers became more user-friendly (easier to use) and can be used widely for personal applications. Hence such machines were called Personal Computers (PCs). Examples are IBM PC and Apple II.
- The fourth generation computers also include super computers such as CRAY series computers.
- Super computers are the best in terms of processing capacity and cost. These computers can process billions of instructions per second.
- They are used for applications which require intensive numerical computations such as stock analysis, weather forecasting and other similar complex applications. The spread of computer network was also observed during this time period.

Fifth Generation Computers (1989-till date)

- Fifth generation computers are further made smarter in terms of processing speed, user friendliness and connectivity to network.
- These computers are portable and sophisticated. Powerful desktops, notebooks, variety of storage mechanism such as optical disks, and advanced software technology such as distributed operating system and artificial intelligence are key features of the fifth generation computers.
- IBM notebooks, Pentium PCs and PARAM 10000 are example of the fifth generation computers.

GENERATION OF COMPUTERS BASED ON SOFTWARE

FIRST GENERATION LANGUAGE

- Relies on **Machine level language** or **Machine language**.
- Two state language having symbols **0 and 1**. This is also called **binary language**.
- Computer being mainly an electronic device understands this language

SECOND GENERATION LANGUAGE

- To avoid difficulties working with the machine level language, **assembly language** was introduced.
- Assembly language uses '**mnemonic code**' or '**symbol**'
- The assembly language considered as second generation computer language

THIRD GENERATION LANGUAGE

- The third generation languages as a **subset of English** language.
- These third generation language are also known as **higher level languages**.
- To make machine automatically translate the content written in higher level language, special utility called **translator** (such as **compiler and interpreter**) is used.
- The translator written in machine understandable form converts data and instructions provided into the **English like higher level language** into **machine understandable form**.
- Examples of such higher level languages are **C, COBOL, and Java** programming languages.

GENERATION OF COMPUTERS BASED ON SOFTWARE

FOURTH GENERATION LANGUAGE

- More sophisticated programming environments
- The fourth generation programming languages reduce programming effort by just specifying **what to do** instead of how to do.
- **Structured Query Language (SQL)** is an example of the fourth generation programming language.

FIFTH GENERATION LANGUAGE

- Fifth generation languages are designed to make the **computer solve a given problem without the programmer**.
- Some examples of applications that require such support is **fault finding, voice recognition and intrusion detection**.
- Such tasks are carried out in transparent fashion from users in order to avoid complexity and to facilitate user friendly interactions with the systems.
- Fifth generation programming languages use **artificial intelligence** techniques to meet their goal.
- The **Artificial Intelligence (AI)** techniques can handle imprecision and supports human like self learning and problem solving. These characteristics help putting the AI based applications a step ahead with added intelligence in comparison with the application developed in other programming languages or tools.

Software

- Create a bridge between the computer hardware and computer users.
- Computer software can be considered as soul of computer, without which computer cannot work.
- Software is organized collection of data and instructions given to computers in order to perform a given task.
- Software refers to organized collection of computer data, instructions and documentation / description (such as comments) of software.
- The set of instruction is also called computer program.
- The process of writing (or coding) programs is called programming.
- The individuals who perform this task are called programmers.

TYPES OF SOFTWARE



- Systems software manages computer hardware.
- Act as an interface between computer hardware & software.
- Systems software provides important functionalities like booting computers properly, managing memory, channeling data from secondary memory to primary memory, managing printers and other resources.

- Special software need to be developed for this type of application specific support. Such software is known as application software.
- Application software is a set of computer instructions that provide application specific functionalities to a user.

Types of system software

Operating System

Compiler

- Some translator programs transform whole source code written in a programming language (the source language) into another computer language (the target language, mainly machine/binary language) at once.
- The transformed (translated) code is later executed to obtain the desired results.

Interpreter

- Some translator programs transform the source code into the target code in line by line fashion and produce the result simultaneously.
- Convert the source program line by line, they can concentrate on a single line, hence it is not possible to analyze the source code fully.
- Further, the interpreters are generally slow in comparison with the compilers.

Types of application software

Business Applications

- Printing reports from data stored, calculating bills, generating pay-slips, marking attendance, printing students' mark-sheets, etc.

General Purpose

- Word processing (that every business need)

Payroll Program

- An organization's payroll program that generates pay-slips in company's format, on company's preprinted stationery.

Popular Computers

- So far we have discussed that the computers operate on binary digits 0 and 1.
- Even if the instructions are given in any generation programming language, ultimately they are to be represented into sequence of digits 0's and 1's. Hence, the computers are also known as digital computers.
- Analog computers use linear combinations of voltage amplitude (or currents or frequencies or phases) instead of digits. That is why they are called analog computers.
- Some computers use mixture of these technologies and hence known as hybrid computers.

Personal or Desktop Computers

- These computers are the most popular computer systems.
- They are easier to use and more affordable.
- They are normally used by individuals for their routine business activities.
- Desktop computer is used for regular computing operation from a specified place such as an office.
- Modern desktop are accompanied with monitor, key board and a mouse along with a system box.

Laptop Computers

- Laptop computers are portable and lightweight computers with a thin screen.
- They are also called notebook computers because of their small size.
- They can operate on batteries and hence are very popular with travelers.
- A laptop computer is actually a personal computer for mobile use.
- A laptop has most of the same components as a desktop computer, including a display, a keyboard, a pointing device such as a touchpad (also known as a trackpad) and/or a pointing stick, and speakers into a single unit.
- Now a day's thin version of laptop called ultrabook is becoming popular. The ultrabook size and weights are thinner in comparison with the typical laptops. Ultrabook computing technology use high-powered low-voltage processors with long battery life.

Handheld Computers

- Handheld computers are also known as Personal Digital Assistants (PDAs).
- They are small in comparison with laptop and can be carried anywhere.
- They use a pen like stylus and accept handwritten input directly on the screen.
- The screen is generally a touch screen.
- They are useful in applications like scheduling appointments, storing contacts and addresses and playing games.

Tablet Computer

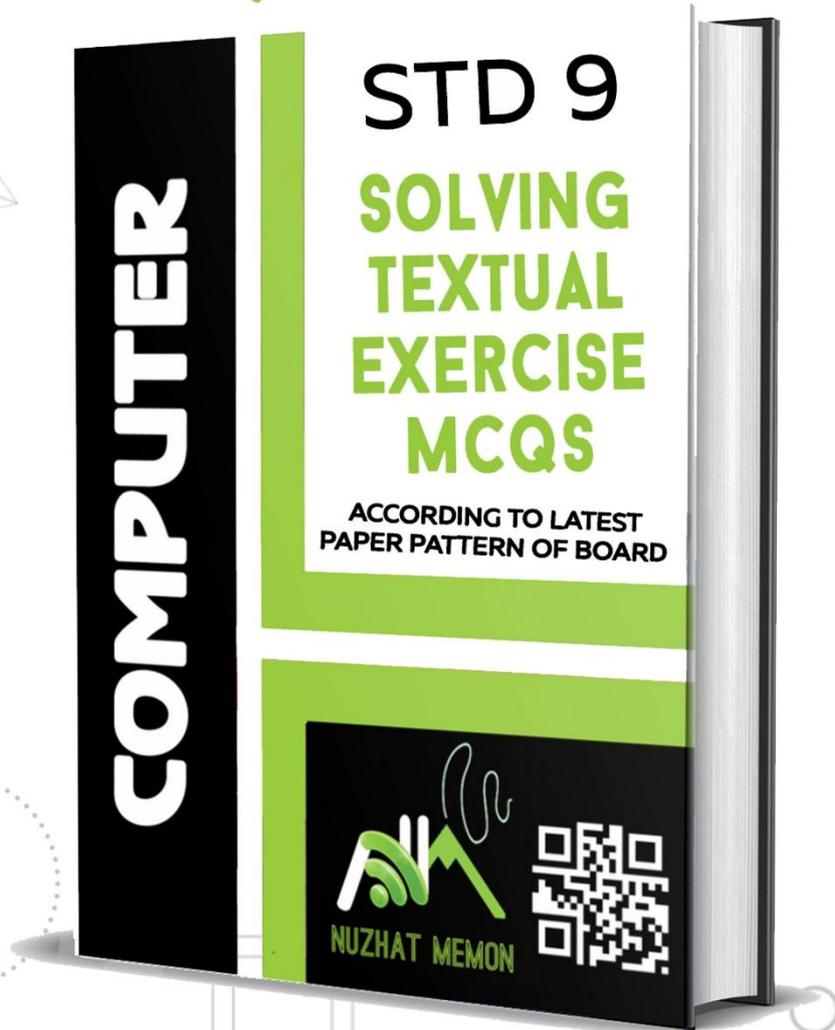
- A tablet computer is a portable and mobile computing tool.
- It is a mobile computer like a bigger mobile phone with a touch screen facility.

- It generally uses onscreen virtual keyboard, a passive stylus pen, or a digital pen. Typically, such tablet computers do not require keyboard.
- There are two popular categories of the tablet PCs. These categories are (i) a slate tablet PC and (ii) a convertible tablet PC.
- The slate tablet is a type of tablet where keyboard is not attached. However, on demand, the keyboard can be added.
- A convertible tablet PC is basically a laptop computer with a screen that can swivel and fold onto the keyboard to create the tablet.

Wearable Computers

- Wearable computers are also known as body-borne computers.
- These are tiny computing devices that are worn by the bearer.
- The wearable computers are small and light weight as they need to be carried on human body.
- The wearable computers come in the form of bracelet, pendent, spectacles and rings. Wearing such devices enables constant interaction with the computing system.
- There is less need to turn the device on or off. Further, such devices are multi-tasking. You may do other routine job in parallel. Often such device is considered as an extension of the user's mind and/ or body.
- Variation of wearable computers such as a small programmed chip, is used for monitoring animal movement.
- A pre-programmed light weight micro-processor chip is stapled on animal's body part like ears. Such a chip monitors movement of animal in a given region.

FOR STD 9 QUESTION



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