BHARATHIDASAN UNIVERSITY

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Programme: B.P.Ed., Physical Education & Yoga

Course Title :Computer Application in Physical Education

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UNIT – 1

Introduction to Computers

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What is Computer ?

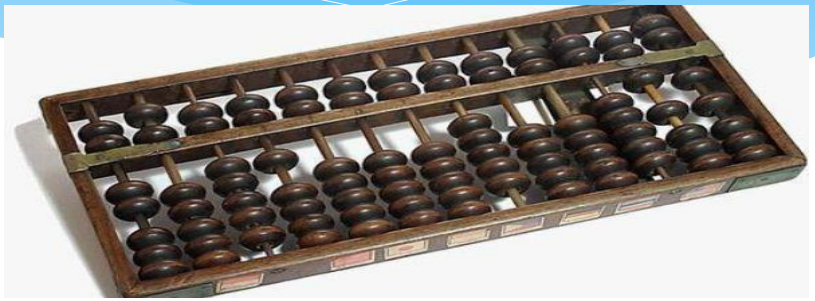
Computer is an electronic machine that can solve different problems, process data, store & retrieve data and perform calculations faster and efficiently than humans".

Meaning of the word "Computer"

Computer is derived from a **Latin** word "**compute**" which means to ***"to calculate"***, ***"to count"***, ***"to sum up"*** or ***"to think together"***. So, more precisely the word computer means a **"device that performs computation"**.

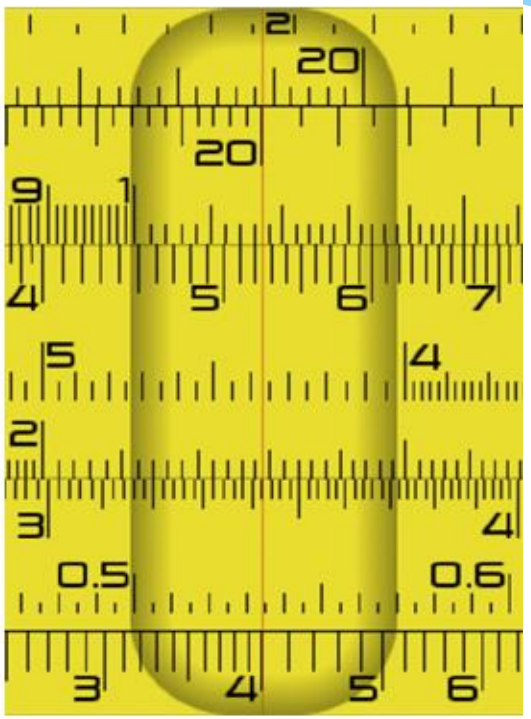
Definition of Computer

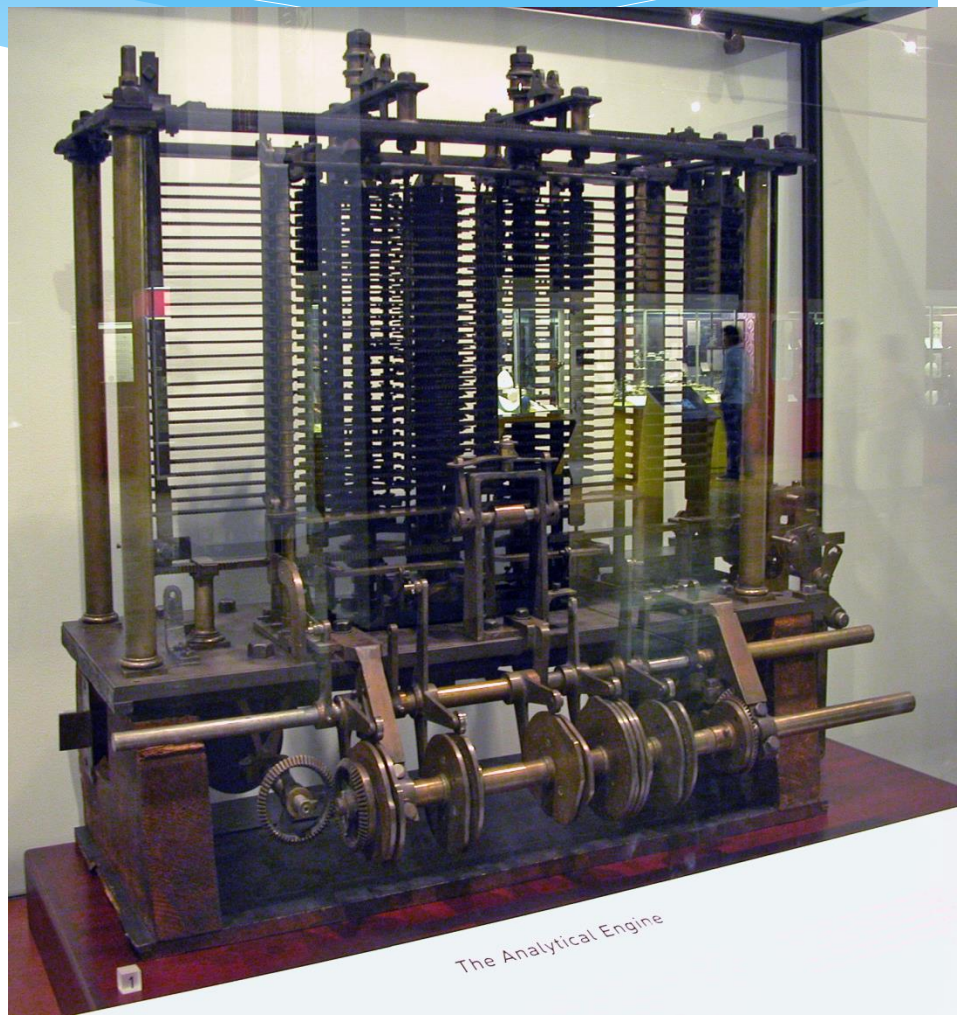
A Computer is programmed device with a set of instructions to perform specific tasks and generate results at a very high speed.



History of computer:

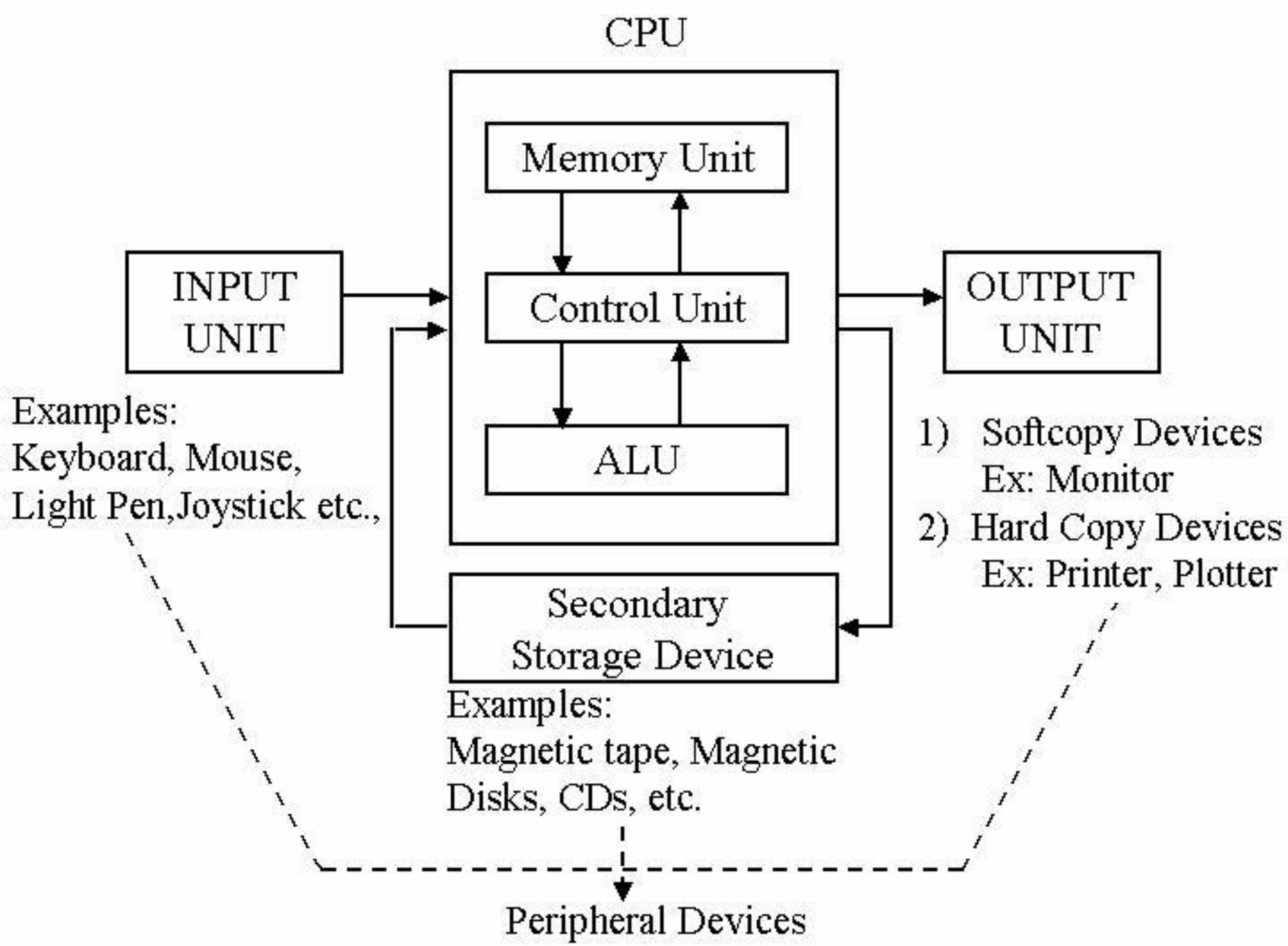
- The first computer was the abacus or its descendant, the slide rule, invented by **William Oughtred** in 1622.
- In 1833 and 1871 **Prof. Charles Babbage** the father of the computer, developed a machine called analytical engine which was the base for the modern digital computer




The Analytical Engine

COMPUTER SYSTEM

- A computer system is a basic, complete and functional computer, including all the hardware and software required to make it functional for a user.
- It should have the ability to receive user input, process data, and with the processed data, create information for storage and/or output.


CPU
Memory Unit
Control Unit
ALU
INPUT UNIT
OUTPUT UNIT
Examples:
Keyboard, Mouse,
Light Pen,Joystick etc.,
1) Softcopy Devices
Ex: Monitor
2) Hard Copy Devices
Ex: Printer, Plotter
Secondary Storage Device
Examples:
Magnetic tape, Magnetic
Disks, CDs, etc.
Peripheral Devices

The computer consists of mainly three types that are central processing unit (CPU),Input Devices, and Output Devices .The Central processing unit (CPU) again consists of ALU (Arithmetic Logic Unit) and Control Unit. The set of instruction is presented to the computer in the form of raw data which is entered through input devices such as keyboard or mouse.

Later this set of instruction is processed with the help of CPU, and the computer system Produce an Output with the help of Output Devices mainly Printers and monitors. Large amount of data is stored in the computer memory with the help of primary and secondary storage devices temporarily and permanently. This are called as storage devices

The CPU is the heart | Brian of a computer because without the necessary action taken by the CPU the user cannot get the desired output. The central Processing unit [CPU] is responsible for processing all the Instruction which is given to computer system or PC. Below Block Diagram of Computer and Its Components are mentioned For Better Understanding

The Basic components & parts of computer system are

- Input Devices
- Output Devices
- CPU (Central Processing Unit)
- Storage Unit
- ALU(Arithmetic Logic Unit)
- Control Unit

Input device

In computing, an input device is a piece of computer hardware equipment used to provide data and control signals to an information processing system such as a computer or information appliance. ***Examples*** of input devices include keyboards, mouse, scanners, digital cameras and joysticks. Audio input devices may be used for purposes including speech recognition.

Output device

An output device is any device used to send data from a computer to another device or user. Most computer data output that is meant for humans is in the form of audio or video. Thus, most output devices used by humans are in these categories. ***Examples*** include monitors, projectors, speakers, headphones and printers.

Central Processing Unit (CPU) mean?

The central processing unit (CPU) is the unit which performs most of the processing inside a computer. To control instructions and data flow to and from other parts of the computer, the CPU relies heavily on a chipset, which is a group of microchips located on the motherboard.

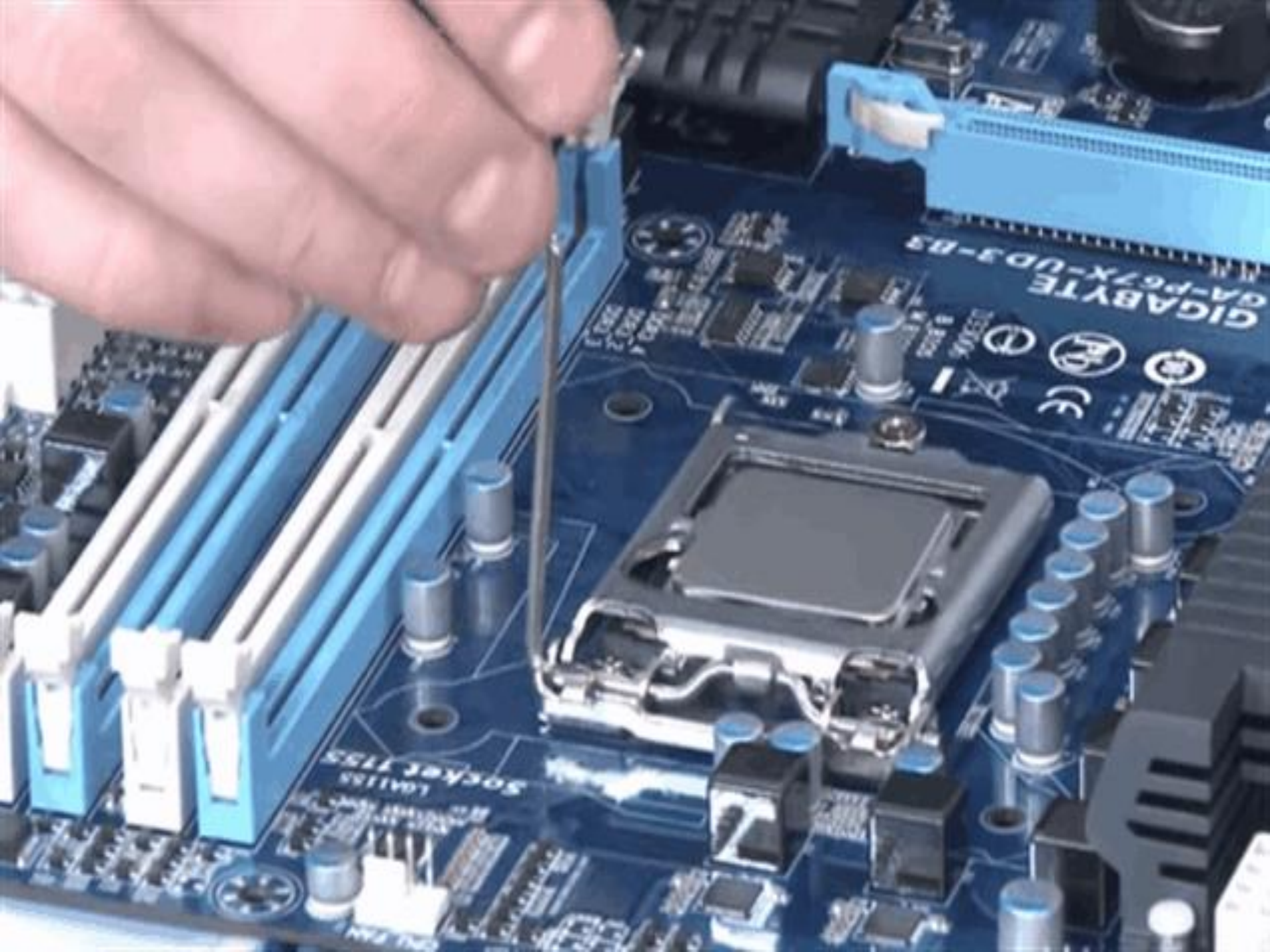
The CPU has two components:

Control Unit: extracts instructions from memory and decodes and executes them

Arithmetic Logic Unit (ALU): handles arithmetic and logical operations

To function properly, the CPU relies on the system clock, memory, secondary storage, and data and address buses.

This term is also known as a central processor, microprocessor or chip.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Computer data **storage**, often called **storage** or memory, is a technology consisting of computer components and recording media that are used to retain digital data. ... The central processing unit (CPU) of a computer is what manipulates data by performing computations.

Storage device

A **storage device** is any **computing** hardware that is used for storing, porting and extracting data files and objects. It can hold and store information both temporarily and permanently, and can be internal or external to a **computer**, server or any similar **computing device**.

There are two type of storage:

- Primary Storage
- Secondary Storage

Primary Storage

It is known as main memory. Main memory is directly or indirectly connected to the central processing unit via a memory bus. The CPU continuously reads instructions stored there and executes them as required. ***Example: – RAM – ROM .***

RAM

It is called Random Access Memory because any of the data in RAM can be accessed just as fast as any of the other data.

There are two types of RAM: –

DRAM (Dynamic Random Access Memory)

SRAM (Static Random Access Memory)

(a) **DRAM:**

It only consists of one transistor and one capacitor which are used to store data in from of charges and because of using only one transistor it accesses time as compared to SRAM is more because it requires refreshment of data after a particular period of time.

(b) **SRAM**

It consists of five to six transistor which is used to store data into form of bits *i.e*, 0's and 1's. it also provides fast access with less density and the data is represented and store in form of bits and doesn't require to refresh the data periodically.

(ii) ROM (read only memory)

It is read only memory used for the permanent storage of information.

The data is placed in the ROM at the time of its manufacture and cannot be changed thereafter by the users/ programmers.

The CPU can only read instruction from read only memory.

ROM memory is used for storing special sets of instruction which the computer needs when it start up.

When we switch the computer off, the contents of the ROM does not become erased but remains stored permanently.

(II) Secondary storage

Its like primary memory, many secondary memory devices are capable of storing information, as well as retrieving it. It is also called auxiliary memory or mass storage, consists of devices not directly accessible by the CPU. Hard drive, floppy disks, tapes and optical disks are widely used for secondary storage.

COMPUTER HARDWARE :

computer hardware refers to the physical parts of a computer and related devices. These are the executors of the commands provided by software application. Internal hardware devices include ***mother board, hard drives and RAM.*** The external hardware devices include ***monitor, keyboards, mice, printers, and scanners.***

SOFTWARE:

Software is the collection of computer programme, procedures and documentation that performs different tasks on a computer system. Software or programme, enables a computer to perform specific tasks as opposed to the physical components the systems.(hardware)

COMPONENTS OF COMPUTER SYSTEMS

1. Computer case
2. Mother board
3. Power supply
4. CPU
5. RAM
6. Hard drive
7. Disk drive
8. Human interface devices (HID)
9. Operating system

PRIMARY STORAGE

Static RAM

- Faster
- More expensive
- More power consumption
- does not need to be refreshed

Dynamic RAM

- Slower
- Less expensive
- Less power consumption
- needs to be refreshed thousands of times per second

INPUT DEVICES

Key board :

The key board is the most popular input device for a computer. It translate numbers, symbols, letters and control keys into a signals that can be interpreted by the PC. The latest version windows key board is available with 104 keys.

Mouse:

A mouse is used to manipulate objects and text etc.. On the computer screen. This device can be plugged to the computer, the back of a keyboard, or can ever be cordless, mouse is non keyboard input device.

Touch pad:

Touchpad were originally known as track pad. Touchpad can have multiple mouse button by either tapping in a special corner of the pad, or tapping with two or more fingers.

Digital scanner :

input device that translate images such as picture or documents into digital from for scanner

Computer Output Devices

Monitor: screen that display information such as text, numbers, and pictures- softcopy.

Printer: gives you information from the computer in printed form – hardcopy.

Speakers: allow you to hear voice, music, and other sounds from your computer.

Modem: allows you to use your computer to communicate with other computers.

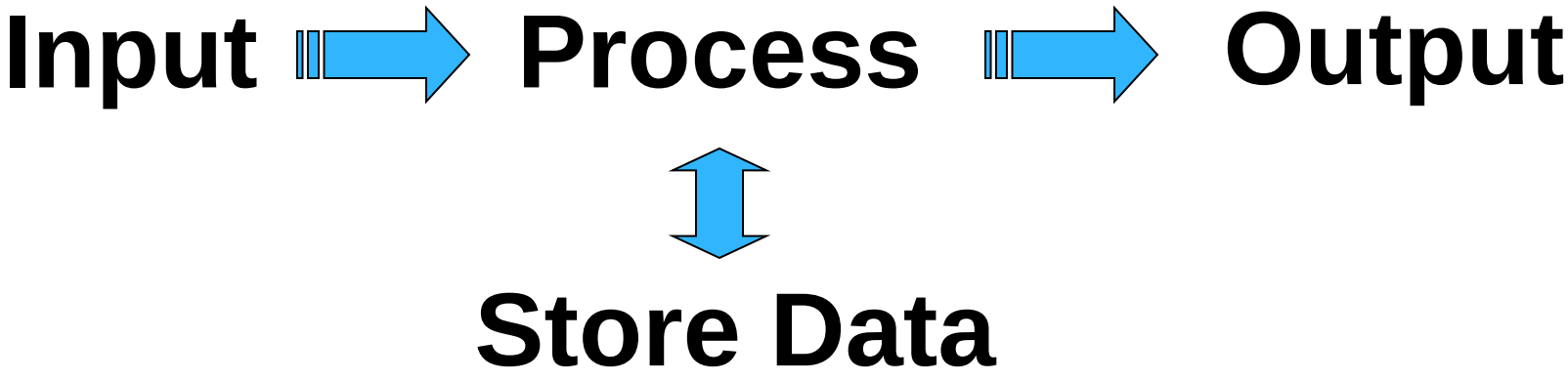
What Does A Computer Do?

Computers can perform four general operations, which comprise the information processing cycle.

- Input
- Process
- Output
- Storage

What Do Computers Do?

Input, Process, Output, & Store data



What Are The Primary Components Of A Computer ?

* Input devices.
* Central Processing Unit (containing the control unit and the arithmetic/logic unit).
* Memory.
* Output devices.
* Storage devices.

TYPES OF COMPUTERS

1. Analog Computer
2. Digital Computer
3. Hybrid Computer (Analog + Digital)
4. Super Computer
5. Mainframe Computer
6. Mini Computer
7. Micro Computer or Personal Computer

1. Analog Computer

An analog computer (spelt analogue in British English) is a form of computer that uses *continuous* physical phenomena such as electrical, mechanical, or hydraulic quantities to model the problem being solved.

2. Digital Computer

Digital computer is the most commonly used type of computer and is used to process information with quantities using digits, usually using the binary number system. An example of a digital computer is a MacBook.

3. HYBRID COMPUTER (ANALOG + DIGITAL)

The hybrid computer is different **type of computer** that has both features of digital and analog computer. Main objective of designing of this computer is to perform very complicated calculations. Hybrid computers can be used in the large scale organizations to solve logical and technical calculations as well as offer great processing of differential equations.

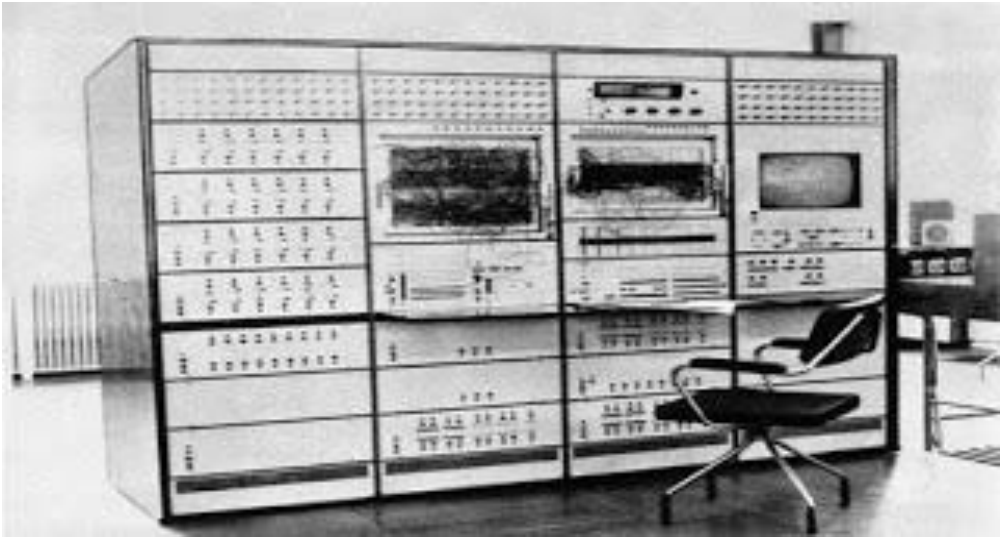
Petrol pump – Measurement convert fuel flow into currency rate

Monitoring and controlling nuclear reactor

Weather system computation

ATM machine

Ultrasound machine



ON THE BASIS OF SIZE: TYPE OF COMPUTER

1) **Supercomputer**

Supercomputers are the ***biggest and fastest computers***. They are designed to process huge amount of data. A supercomputer can ***process trillions of instructions in a second***. It has thousands of interconnected processors.

Supercomputers are particularly used in ***scientific and engineering applications*** such as weather forecasting, scientific simulations and nuclear energy research. The first supercomputer was developed by ***Roger Cray in 1976***.

Main frame computers:

Mainframe computers are designed to ***support hundreds or thousands of users simultaneously***. They can ***support multiple programs*** at the same time. It means they can execute different processes simultaneously. These features of mainframe computers make them ideal for big organizations like banking and telecom sectors, which need to manage and process a high volume of data that requires integer operations such as indexing, comparisons, etc.

Mini frame or Minicomputer

It is a ***midsize multiprocessing computer***. It consists of two or more processors and can support ***4 to 200 users at one time***. Mini frame computers are used in institutes and departments for tasks such as billing, accounting and inventory management. A minicomputer ***lies between the mainframe and microcomputer*** as it is smaller than mainframe but larger than a microcomputer.

MICRO COMPUTER or PERSONAL COMPUTER

- **Desktop Computer:** a personal or micro-mini computer sufficient to fit on a desk.
- **Laptop Computer:** a portable computer complete with an integrated screen and keyboard. It is generally smaller in size than a desktop computer and larger than a notebook computer.
- **Palmtop Computer/Digital Diary /Notebook /PDAs:** a hand-sized computer. Palmtops have no keyboard but the screen serves both as an input and output device.

Advantages of computer

1. It helps to do various tasks automate.
2. It helps to organize data and information in a better way.
3. It has much more computing and calculating power than an ordinary human.
4. It may be the storage of your important data and files.
5. It may be a handy book.
6. It may help you solve problems faster than an ordinary human being can do.
7. It has speed, storage, reliability, consistency and communications.
8. It helps you to find useful information using the internet.
9. It helps in business, factories, offices, schools and homes.
10. It can storage large amount of facts, instruction, and information.
11. It can process data with accuracy at a very high speed.
12. It can repeat operations in exactly the same way over a long period of time

Disadvantages of computer

1. It destroys your social life and interaction with humans if you do not maintain the balance.
2. It may effect to the destruction of your eyesight due to radiation.
3. It may damaged your studies and life's. Too much time in front of monitor may adversely effect your eyesight and can also make you fat.
4. The way it distracts and can deviate our thoughts and activities towards unproductive activities.
5. A computer can only perform operation programmed or instructed by a person
6. It cannot correct wrong instruction by itself. Its capability to perform logical operation depends on the choice prepared by the programmer.

APPLICATION OF COMPUTERS

Computers are employed in scientific application and research it is natural that a large body of computer application serve the scientist. They were extensively employed in many research projects.

- To solve scientific problems researchers must deal with the language of science, mathematics.
- To understand more deeply complex natural phenomena.
- Scientists must use complex mathematical relationships and volumes of data too impossible to manage without the aid of computers.

SOME BASIC APPLICATION

- EDUCATION
- SPORTS
- MUSIC
- TRAVEL and TOURISM
- REAL TIME APPLICATION

COMPUTER IN EDUCATION

computer is also a tool for learning. Instruction materials can be prepared and stored within the computer in the form of program to teach any subjects. The student could sit at a terminal, call the program and participate in the lesson. Thus computer can be an aid to teaching which we call as ***Computer based teaching (CBT)***.

The **CBT** for various subjects are commercially available. constant efforts are being made for the development of new teaching aids. Besides, existing areas in the field of molecular physics, biology, space science etc.., have been restructured and broadened by the use of computers, which is an excellent tool for simulation exercises.

COMPUTER IN SPORTS

In most sport, computers compile statistics, sell tickets, create training programme and diets for athletes and suggests game plan strategies based on the competitor's past performance. Much of the graphic art displays flashed on score boards are generated by computers.

well, television networks use computers in the control room to bring you play – by – play action. With the help of a computer, a technicians inserts the commercial breaks on schedule. If that is not enough the sports shoes you wear were probably designed using computers that fixed points of stress and then created the style and shape that offer maximum support for the foot.

MUSIC

- computer-generated art gives freedom to designers so that sets special effects, and even imaginary characters can play a part in making movies, videos and commercials.
- creatures, spaceships, and entire galaxies are created and manipulated by computers, then photographed by computer-driven cameras.
- when computer- controlled lighting systems are used on sound stages are in theaters, a dramatic range of atmospheres can be produced.

TRAVEL AND TOURISM

Computer will help prepare the tickets, monitor the train's route, or guide the plane to a safe landing. They will even confirmed hotel room and rental car reservation.

REAL TIME APPLICATIONS

using communication networks booking offices all over the world are hooked to a computer of large capacity working real time when a customer enquires at a booking office about reservation in a particular flight, the clerk there hooks onto the main computer from this his terminal regarding availability to book the ticket and also allots the seat number then the there.

CHARACTERISTICS OF COMPUTER

1. CELERITY (speed)

2. AUTHENTICITY (accuracy and reliability)

3. SPONTANEOUS (automatic)

4. PERTINACITY (Endurance)

5. ADAPTABILITY (Versatile)

6. STOREHOUSE (Memory)

7. CHEAPER (Reduction of cost)

CHARACTERISTICS OF COMPUTER

The characteristics of a computer which make them an essential part of every emerging technology and such a desirable tool in human development are as follows

1. **CELERITY (speed)**

Celerity denotes the speed of a computer. A computer is a very fast device that can perform hug amount of work in few seconds. The speed of a computer is calculated in MHz(megahertz), that is one million instruction per second and it increase progressively as the computer develops. The latest computer's can perform billions of operation in just one seconds.

2. AUTHENTICITY (accuracy and reliability)

It's denotes the accuracy and reliability of the computer. They are reliable and robust. The computer quite accurate and reliable in their calculations. It never makes a mistake. Most probably the error occurs due to the user rather than the computer.

3. SPONTANEOUS (automatic)

The computers are automatic. Once the process has been initiated, computer is quite capable of functioning automatically. It does not require a promptness from an operator at each stage of the process. It works by itself without human intervention, but according to the human instruction fed into.

4. **PERTINACITY (Endurance)**

Pertinacity denotes the endurance of the computer. Computers never get tired as the humans do. Surplus amount of execution is done at the same duration. It is free from tiredness, lack of concentration, fatigue, etc… it can work for hours without any creating error and perform the assigned task without taking any refreshment.

5. **ADAPTABILITY (Versatile)**

It means flexible. It is the capacity to perform different kind of tasks simultaneously. They can be used as personal computers, for home uses, for business orientated tasks, weather forecasting, space explorations, teaching, railways, banking, medicine etc… the user can listen songs, work with word and excel file and can play games simultaneously in the separate window in the same computer.

6. STOREHOUSE (Memory)

The computer can store large amount of data and it can recall the required information almost instantaneously. The main memory of the computers is relatively small and it can hold only certain amount of data, therefore the data is stored on secondary storage devices like magnetic tapes and disks.

7. CHEAPER (Reduction of cost)

computers are short-term investment in order to achieve along term gain. Though the investment is high they reduce the cost of each and every transaction. They reduce manpower and leads to an elegant and efficient way for computing various task.