HSC FIRST YEAR – COMPUTER SCIENCE

CHAPTER1.

Introduction to Computers

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Learning Objectives

- To know about Computers
- To learn about various generations of computer
- To understand the basic operations of computers
- To know the components and their functions.
- To know about booting of a computer

Introduction to Computers

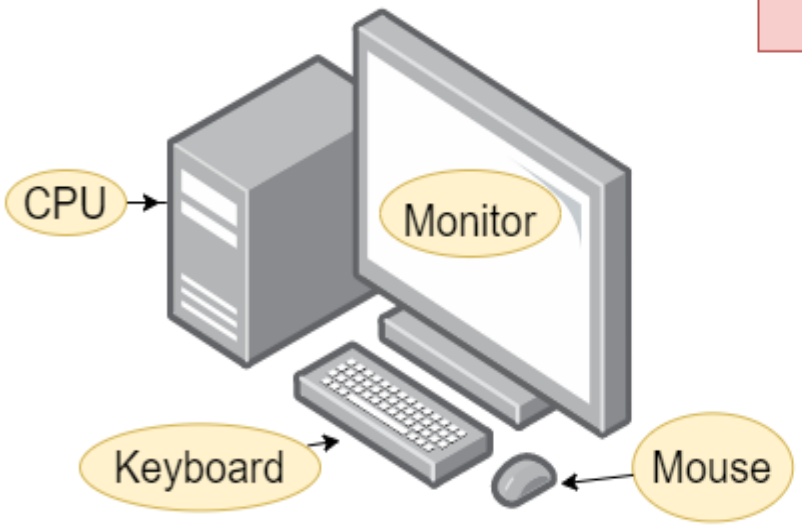
- **Computers are seen everywhere around us, in all spheres of life, in the field of education, research, travel and tourism, weather forecasting, social networking, e-commerce etc.**

Introduction to Computers

- Computers have now become an indispensable part of our lives.
- Today, no organisation can function without a computer. I
- n fact, various organisations have become paperless.

What is Computer

Input → Process → Output

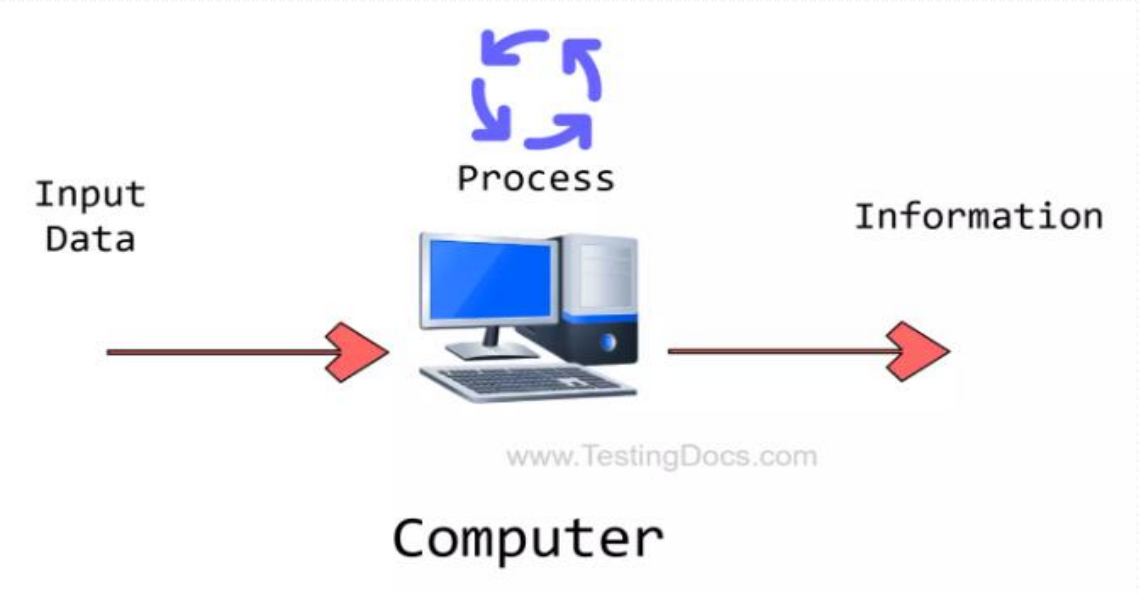


Computer Stands for

C: Common
O: Operating
M: Machine
P: Purposely
U: Used for
T: Technological
E: Educational
R: Research

What is Compuer?

- A Computer is an electronic device that processes the input according to the set of instructions provided to it and gives the desired output at a very fast rate.



Characteristics of a computer

- Speed
- Reliability
- Multi Processing
- * Accuracy
- * Diligence
- * Memory
- **Computers have revolutionised our lives with their accuracy and speed of performing a job, it is truly remarkable.**
- **It is a simple calculating device to high speed portable computers.**

Applications of computer

- **Computers are very versatile as they do a lot of different tasks such as**
  - storing data,
  - weather forecasting,
  - booking airlines,
  - railway or movie tickets
  - and even playing games.

Generations of Computers

- Based on various stages of development, computers can be categroised into different generations.

First Generation (1940-1956) - **Vacuum tubes**

- Big in size.
- Consumed more power.
- Machine Language was used.

First Generation Computers - ENIAC , EDVAC , UNIVAC 1

Second Generation (1956-1964) - **Transistors**

- Smaller in size.
- Generated Less Heat.
- Consumed less power.
- Punched cards were used.
- First operating system was developed.
- Machine language as well as Assembly language was used.

Second Generation Computers **IBM 1401, IBM 1620, UNIVAC 1108**

Third Generation (1964 -1971) - Integrated Circuits (IC)

- Computers were smaller, faster and more reliable.
- Consumed less power.
- High Level Languages were used

Third Generation Computers **IBM 360 series, Honeywell 6000 series**

Fourth Generation (1971-1980) – Microprocessor - Very Large Scale Integrated Circuits (VLSI)

- Smaller and Faster.
- Microcomputer series such as IBM and APPLE were developed.
- Portable Computers were introduced.

Fifth Generation (1980 - till date) - **Ultra Large Scale Integration (ULSI)**

- Parallel Processing.
- Computers size was drastically reduced.
- Can recognise Images and Graphics.
- Introduction of Artificial Intelligence and Expert Systems.

Sixth Generation - In future

- Parallel and Distributed computing.
- Computers have become smarter, faster and smaller.
- Development of robotics.

Sixth Generation Computing

- In the Sixth Generation, computers could be defined as the era of intelligent computers, based on Artificial Neural Networks.
- One of the most dramatic changes in the sixth generation will be the explosive growth of Wide Area Networking. Natural Language Processing (NLP) is a component of Artificial Intelligence (AI).
- It provides the ability to develop the computer program to understand human language.

Data and Information

Data

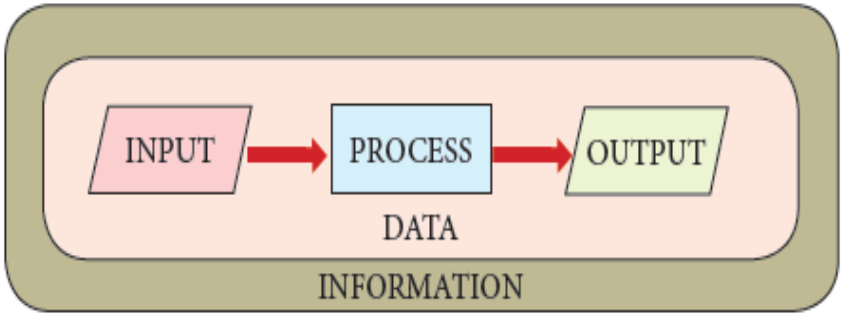
- Data is defined as an un-processed collection of raw facts, suitable for communication, interpretation or processing.

Example: 134, 16 'Kavitha', 'C'

Information

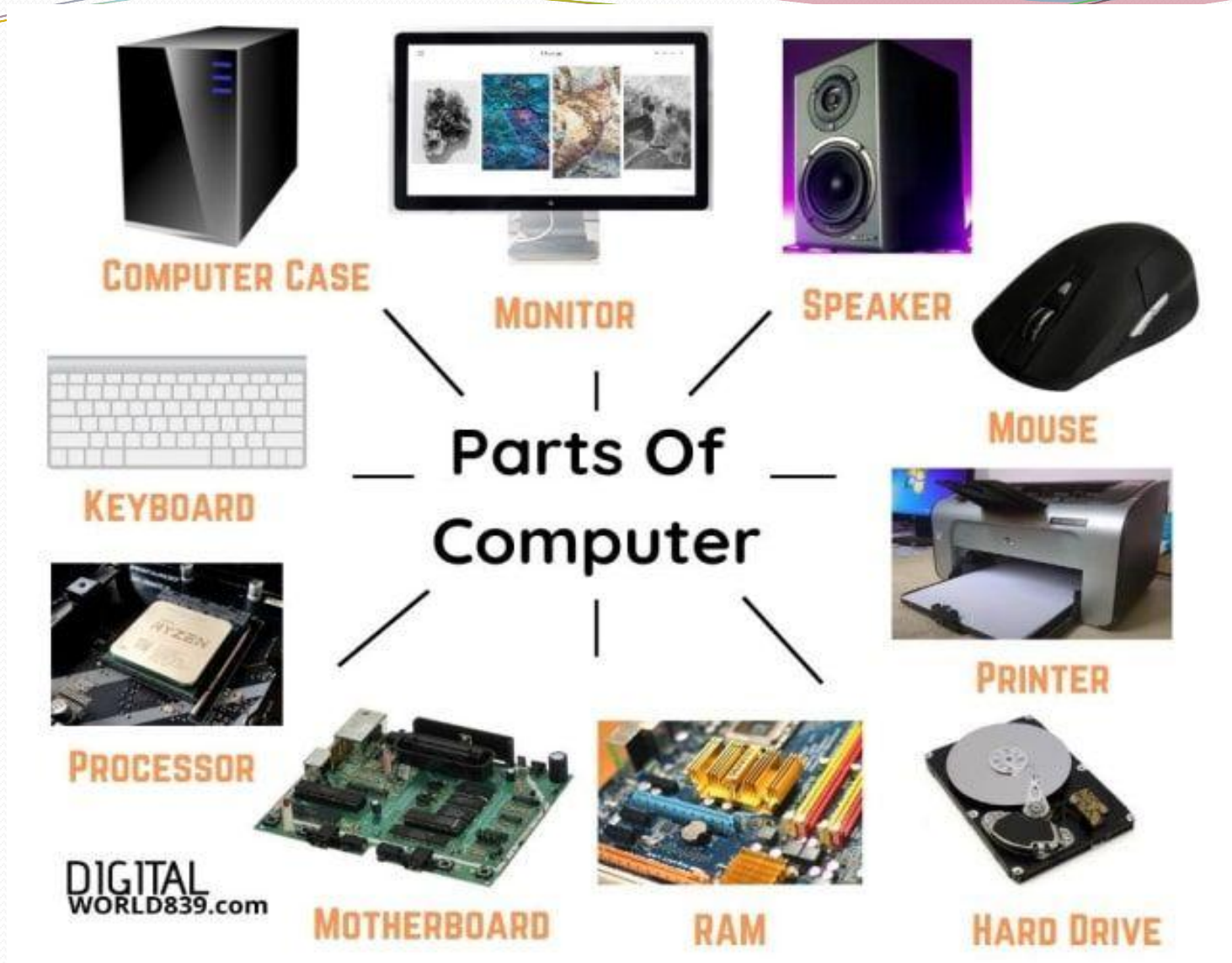
- Information is a collection of facts from which conclusions may be drawn.

Example: Kavitha is 16 years old.



Components of a Computer

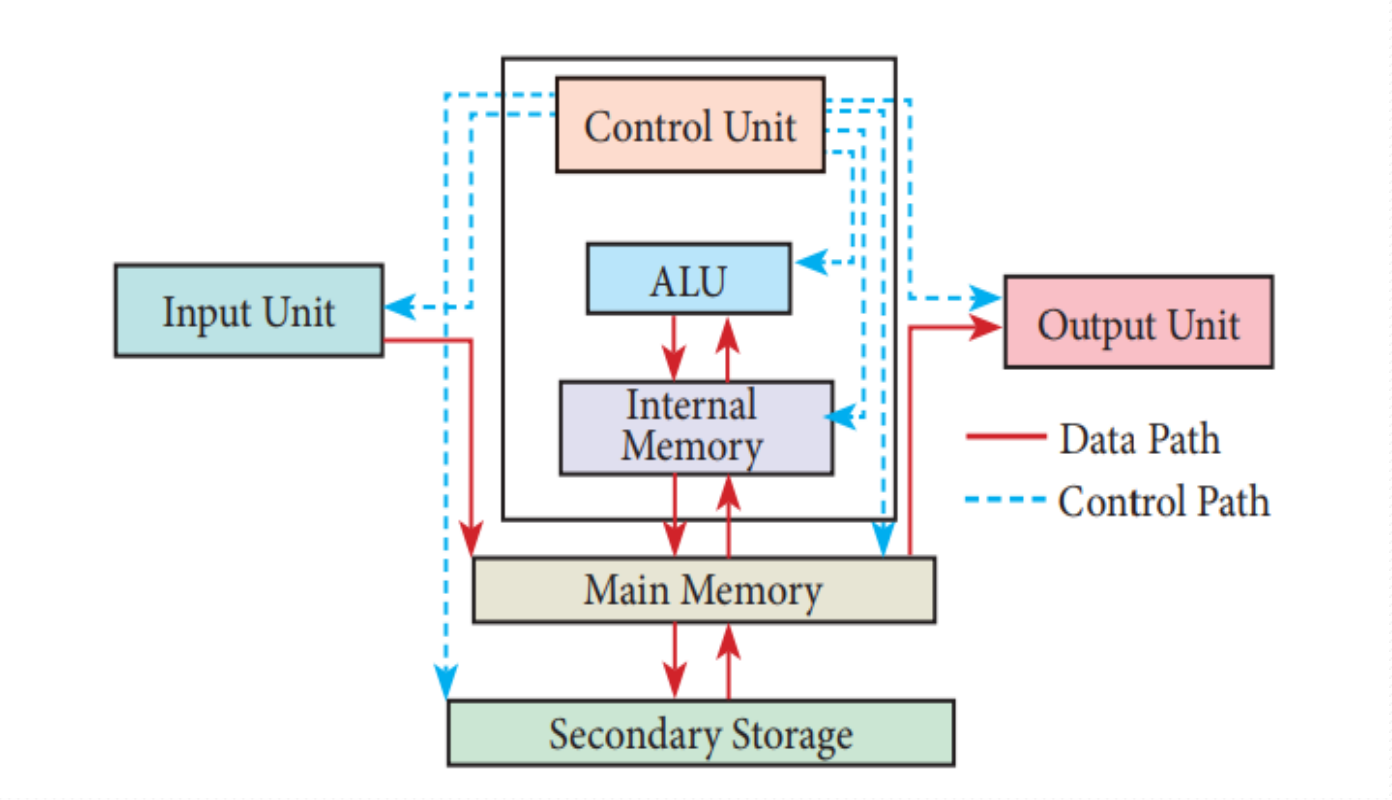
- The computer is the combination of hardware and software.
- Hardware is the physical component of a computer like motherboard, memory devices, monitor, keyboard etc.,
- while software is the set of programs or instructions.
- Both hardware and software together make the computer system to function.


Parts Of Computer
COMPUTER CASE
MONITOR
SPEAKER
MOUSE
KEYBOARD
PRINTER
PROCESSOR
MOTHERBOARD
RAM
HARD DRIVE
DIGITAL WORLD839.com


Hardware and Software
Microsoft
Google
Hardware
Software

Functional components of a computer

- Every task given to a computer follows an Input- Process-Output Cycle (IPO cycle).



Input Unit:

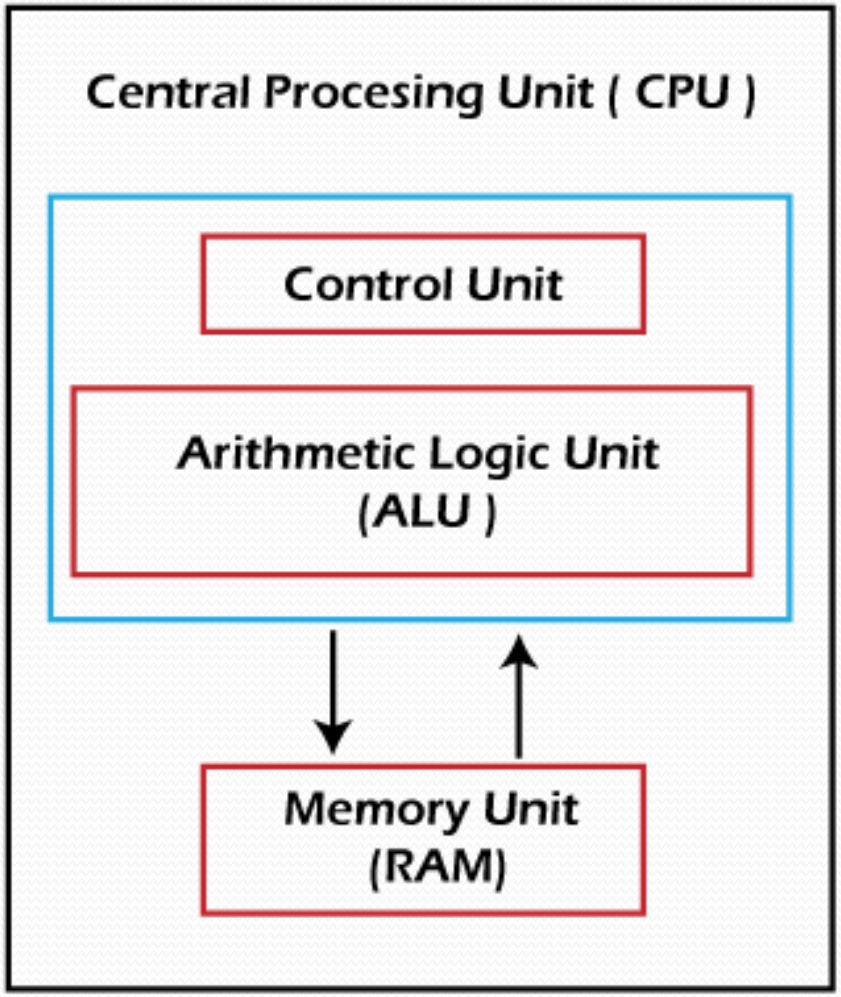
- Input unit is used to feed any form of data to the computer, which can be stored in the memory unit for further processing.

Example: Keyboard, mouse, etc.

Central Processing Unit:

- CPU is the major component which interprets and executes software instructions. It also control the operation of all other components such as memory, input and output units.
- The CPU has three components which are,
  - Control unit,
  - Arithmetic and logic unit (ALU) and
  - Memory unit.

Components of the CPU



Components of the CPU

Arithmetic and Logic Unit :

- The ALU performs arithmetic operations such as addition, subtraction, multiplication, division and logical operations.

Control unit :

- The control unit controls the flow of data between the CPU, memory and I/O devices. It also controls the entire operation of a computer.

Memory unit:

- The memory unit holds the data and instructions during the processing.

Output Unit:

- An Output Unit is any hardware component that conveys information to users in an understandable form.

Example: Monitor, Printer etc.

Memory Unit:

- The Memory Unit is of two types which are primary memory and secondary memory.

Primary Memory

- The primary memory is used to temporarily store the programs and data when the instructions are ready to execute.

Example: Random Access Memory (RAM)

Secondary memory

- The secondary memory is used to store the data permanently.

Example: Hard disk, CD-ROM and DVD

Input Devices

Keyboard:

- **Keyboard (wired / wireless, virtual) is the most common input device used today.**
- **The individual keys for letters, numbers and special characters are collectively known as character keys.**
- **This keyboard layout is derived from the keyboard of original typewriter. The data and instructions are given as input to the computer by typing on the keyboard. Apart from alphabet and numeric keys, it also has Function keys for performing different functions.**

Mouse:

- **Mouse (wired/wireless)** is a pointing device used to control the movement of the cursor on the display screen.
- It can be used to select icons, menus, command buttons or activate something on a computer. **Some mouse actions are** move, click, double click, right click, drag and drop.
- **Different types of mouse available are:** Mechanical Mouse, Optical, Laser Mouse, Air Mouse, 3D Mouse, Tactile Mouse, Ergonomic Mouse and Gaming Mouse.

Scanner:

- Scanners are used to enter the information directly into the computer's memory. This device works like a Xerox machine. The scanner converts any type of printed or written information including photographs into a digital format, which can be manipulated by the computer.

Bar Code / QR Code Reader:

- **A Bar code** is a pattern printed in lines of different thickness. The Bar code reader scans the information on the bar codes transmits to the Computer for further processing.
- **The QR (Quick response) code** is the two dimension bar code which can be read by a camera and processed to interpret the image.

Output Devices

Monitor:

- **Monitor is the most commonly used output device to display the information. It looks like a TV.**
- **Pictures on a monitor are formed with picture elements called PIXELS.**
- **Monitors may either be Monochrome which display text or images in Black and White or can be color, which display results in multiple colors.**
- **There are many types of monitors available such as CRT (Cathode Ray Tube), LCD (Liquid Crystal Display) and LED (Light Emitting Diodes).**
- **The monitor works with the VGA (Video Graphics Array) card.**

Printers:

- Printers are used to print the information on papers.

Printers are divided into two main categories:

- **Impact Printers :** These printers print with striking of hammers or pins on ribbon. These printers can print on multi-part (using carbon papers) by using mechanical pressure.
- **Non Impact printers:** These printers do not use striking mechanism for printing. They use electrostatic or laser technology. Quality and speed of these printers are better than Impact printers.

Plotter:

- Plotter is an output device that is used to produce graphical output on papers. It uses single color or multi color pens to draw pictures.

Multimedia Projectors:

- Multimedia projectors are used to produce computer output on a big screen. These are used to display presentations in meeting halls or in classrooms.

Booting of computer

- An Operating system (OS) is a basic software that makes the computer to work.
- When a computer is switched on, there is no information in its RAM. At the same time, in ROM, the pre-written program called POST (Power on Self Test) will be executed first.
- This program checks if the devices like RAM, keyboard, etc., are connected properly and ready to operate.
- If these devices are ready, then the BIOS (Basic Input Output System) gets executed. This process is called Booting.

Booting process

Booting process is of two types:

Cold Booting:

- When the system starts from initial state i.e. it is switched on, we call it cold booting or Hard Booting.
- When the user presses the Power button, the instructions are read from the ROM to initiate the booting process.

Booting process

Warm Booting:

- When the system restarts or when Reset button is pressed, we call it Warm Booting or Soft Booting.
- The system does not start from initial state and so all diagnostic tests need not be carried out in this case.
- There are chances of data loss and system damage as the data might not have been stored properly.

Thank you!

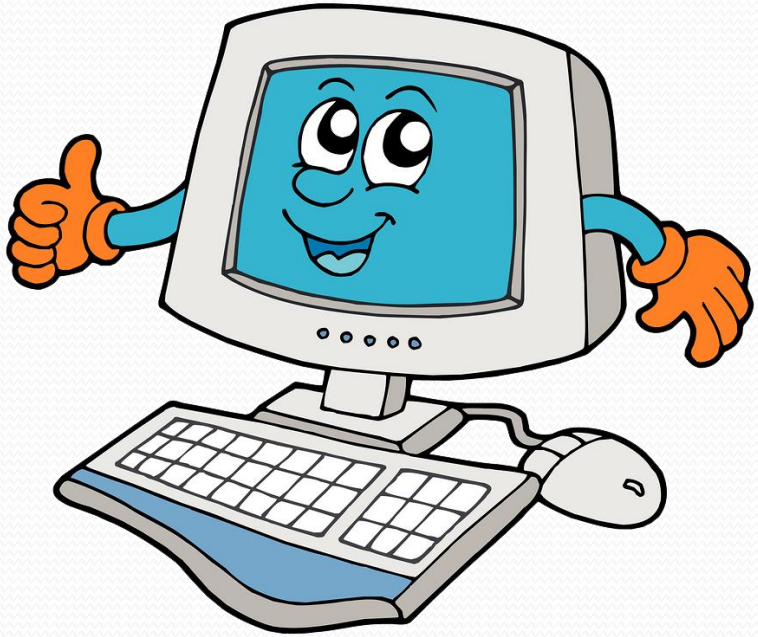
Education Is The

Most Powerful Weapon

Which You Can Use

To Change The World.

ALL THE BEST



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