I2GIC

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HOW MUCH DO YOU KNOW ABOUT COMPUTER?

A machine that allow you to play game ?

You can calculate number quickly with computer

Computer allow to play video, audio, or … view Facebook ….

But have you ever wondered how all of these can be done by Computer?

"To understand the mystery behind computer"

The goal of learning this course

WHAT IS COMPUTER?

1. An electronic machine

2. Can process data

3. Can store data

4. Can transfer data between components (internal & external) – Input/Output data

Any machines with these characteristic can be considered as a Computer.

SO TELL US, WHAT MACHINE THAT YOU CAN THINK OF AND CAN BE CONSIDERED AS COMPUTER?
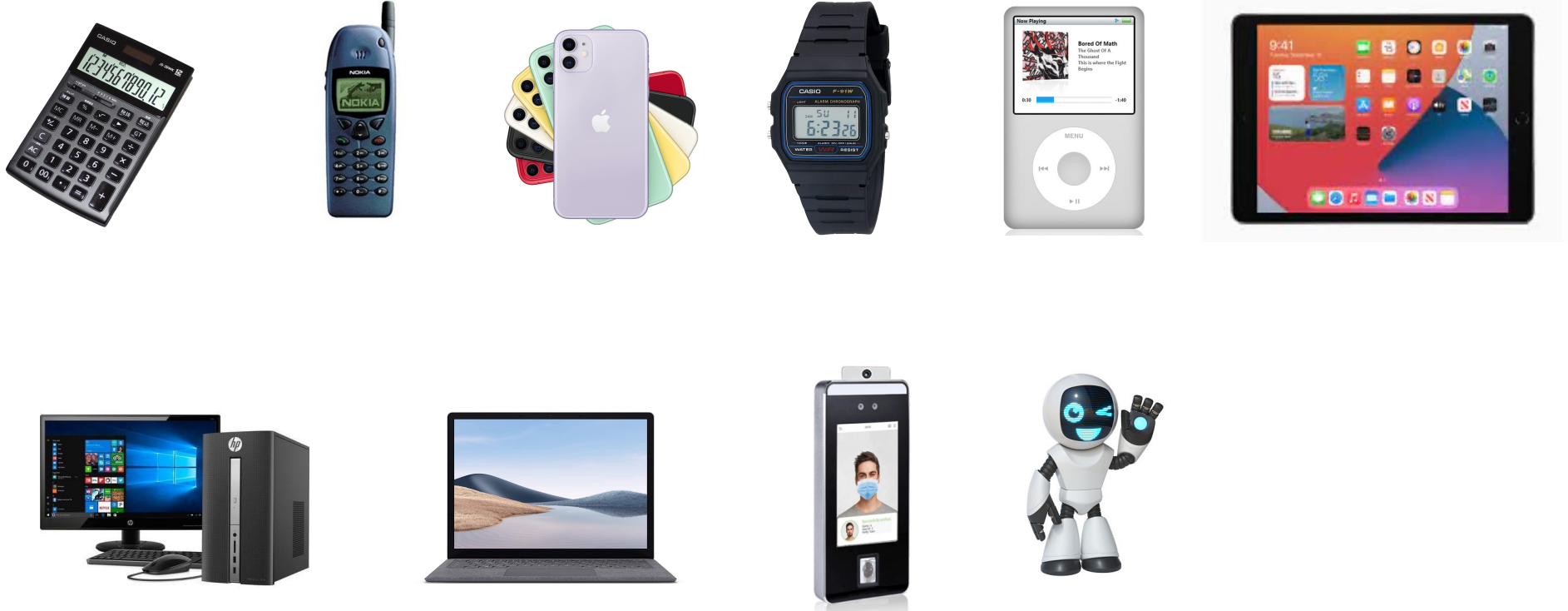
RANDOM THOUGHT

- A robot can be considered as a computer, but I can't see the screen where I can see letters or movie.

  - ➢ Monitor (screen) is an output device which it is used to display information but output information can be in any form such as sound, movement, signal …..

- Laptop or Desktop have keyboard, but smart phone which is also a computer, doesn't have one. How?

  - ➢ Keyboard is just an external component where user can use to input text data

- Calculator has a very limited functionalities, but it is also a computer ?

  - ➢ Have many functionalities or not doesn't affect the definition of a computer

COMPUTER HISTORY

Computers are divided into total of 5 generations listed below:

1. First generation computer

2. Second generation computer

3. Third generation computer

4. Fourth generation computer

5. Fifth generation computer

Generation of computer was changing due to arrival of new technology.

FIRST GENERATION COMPUTERS (1942 TO 1955)

- The beginning of commercial computer age is from UNIVAC (Universal automatic computer). It was developed by two scientists Mauchly and Echert at the Census Department of United States in 1947.

- The first generation computers were used during 1942 to 1955. They were based on vacuum tubes.

- The first computer machine named UNIVAC-1 was launched in 1951. This computer machine used magnetic medium for input/output of data.

- This computer worked successfully till the year 1963.

- The technology used for those computers was valve Technology.

- The main limitation of this technology was heavy power consumption and not very high reliability.

- Examples of first generation computers are ENIVAC and UNIVAC-1.

FIRST GENERATION COMPUTERS (1942 TO 1955)

Advantages of first generation computers

- Vacuum tubes were the only electronic component available during those days.

- Vacuum tube Technology made possible to make electronic digital computers.

- These computers could calculate data in milliseconds.

Disadvantages of first generation computers

- The computers were very large in size

- They consume a large amount of energy

- They heated very soon due to thousands of vacuum tubes

- They were not very reliable

- Air conditioning was required

- Constant maintenance was required

- Costly commercial productions

- Limited commercial use

- Very slow speed

SECOND GENERATION COMPUTER (1955 TO 1964)

- A new technology came into existence and therefore a new generation of computer that is second generation computer also came into existence.

- The name of the technology was transistor Technology.

- The second generation computers used transistors.

- The scientists at Bell Laboratories developed transistor in 1947. These scientists include John barden, William Brattain and William Shockley.

- The size of the computers was decreased by replacing vacuum tubes with transistors.

- Computers made on transistor Technology were: Smaller in size, More reliable, Highly efficient in compare to first generation computer.

- At that time, the computer named IBM-1401 was the most popular.

- This generation of computer, that is second generation computer was in the existence from 1956 to 1963.

- The examples of second generation computers are IBM 7094 series, IBM 1400 series and CDC 164 etc.

SECOND GENERATION COMPUTER (1955 TO 1964)

Advantages of second generation computers

- Smaller in size as compared to the first generation computers

- The second generation computers were more reliable

- Used less energy and were not heated

- Wider commercial use

- Better portability as compared to the first generation computers

- Beta speed and could calculate data in microseconds

- Used faster peripherals like tape drives, magnetic disks, printer etc.

Disadvantages of second generation computers

- Cooling system was required

- Constant maintenance was required

- Commercial production was difficult

- Only used for specific purposes

- Punch cards used for inputs

THIRD GENERATION COMPUTER (1964 TO 1975)

- Now another new technology named integrated circuits that is ICs came into existence and therefore the third generation computer was also came into existence.

- Jack kilby developed the concept of integrated circuits in 1958. It was an important invention in the computer field.

- The first IC was invented and used in 1961. The size of an IC is about 1/4 square inch. a single IC chip main contain thousands of transistors.

- The computer became smaller in size, faster, more reliable and less expensive.

- Benefits of using all those computers that was made up on the third generation over second generation:
  - Less costly
  - Small in size
  - Consume less power
  - Highly reliable

Examples of third generation computers are IBM 370, IBM system/360, UNIVAC 1108 and UNIVAC AC 9000 etc.

THIRD GENERATION COMPUTER (1964 TO 1975)

Advantages of third generation computers

- Smaller in size as compared to previous generation

- More reliable

- Used less energy

- Better speed and could calculate data in nanoseconds

- Used fan for heat discharge to prevent damage

Disadvantages of third generation computers

- Air conditioning was required

- Highly sophisticated Technology was required for the manufacturing of IC chips

FOURTH GENERATION COMPUTER (1975 TO PRESENT)

- Fourth generation computer starts from the year, 1971. At that time there was an invention of microprocessor chip that has created a revolution in the computer world.

- The fourth generation computers started with the invention of microprocessor. The microprocessor contains thousands of ICs.

- Ted Hoff produced the first microprocessor in 1971 for Intel. It was known as Intel 4004. The technology of integrated circuits improved rapidly. The LSI (Large Scale Integration) circuit and VLSI (Very large Scale Integration) circuit was designed. It greatly reduced the size of computer.

- The size of modern microprocessors is usually 1 square inch. It can contain millions of electronic circuits.

- We are using microprocessor chip from that time (1971) to present or you can says that fourth generation computer are from 1971 to present time.

FOURTH GENERATION COMPUTER (1975 TO PRESENT)

Advantages of fourth generation computers

- Much faster, Less expensive, Small in size

- More powerful and reliable than previous generations

- Uses advanced techniques

- Have greater data processing capacity than equivalent size previous generation computer that is third generation computers

- Fast processing power with less power consumption

- Fan for heat discharging and thus to keep cold

- No air conditioning required

- Uses advance application software package like process controller, relational database management, electronic spreadsheet, CAD (Computer aided design).

- All types of high level languages can be used in this type of computer
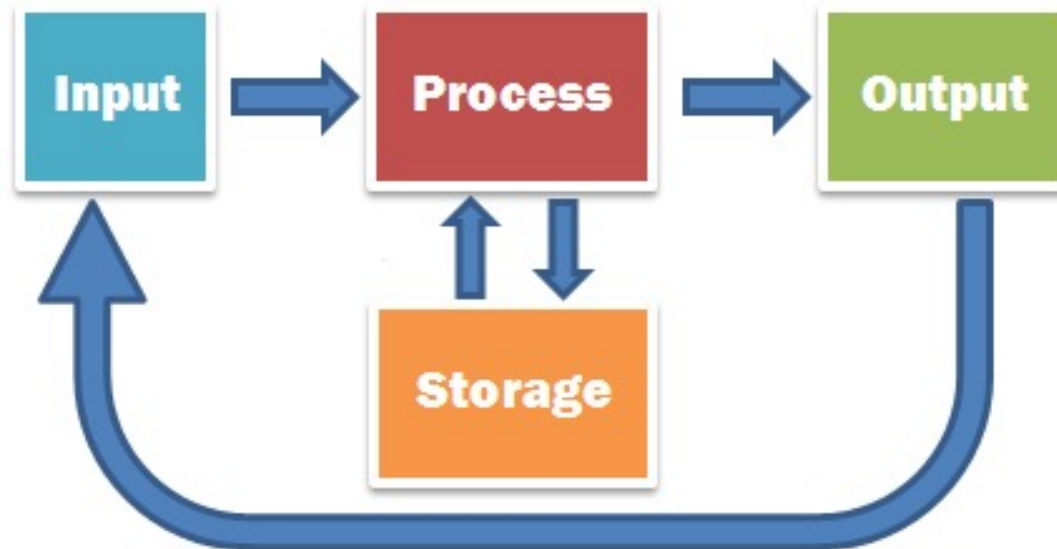
Disadvantages of fourth generation computers

- The latest technology is required for manufacturing of microprocessors
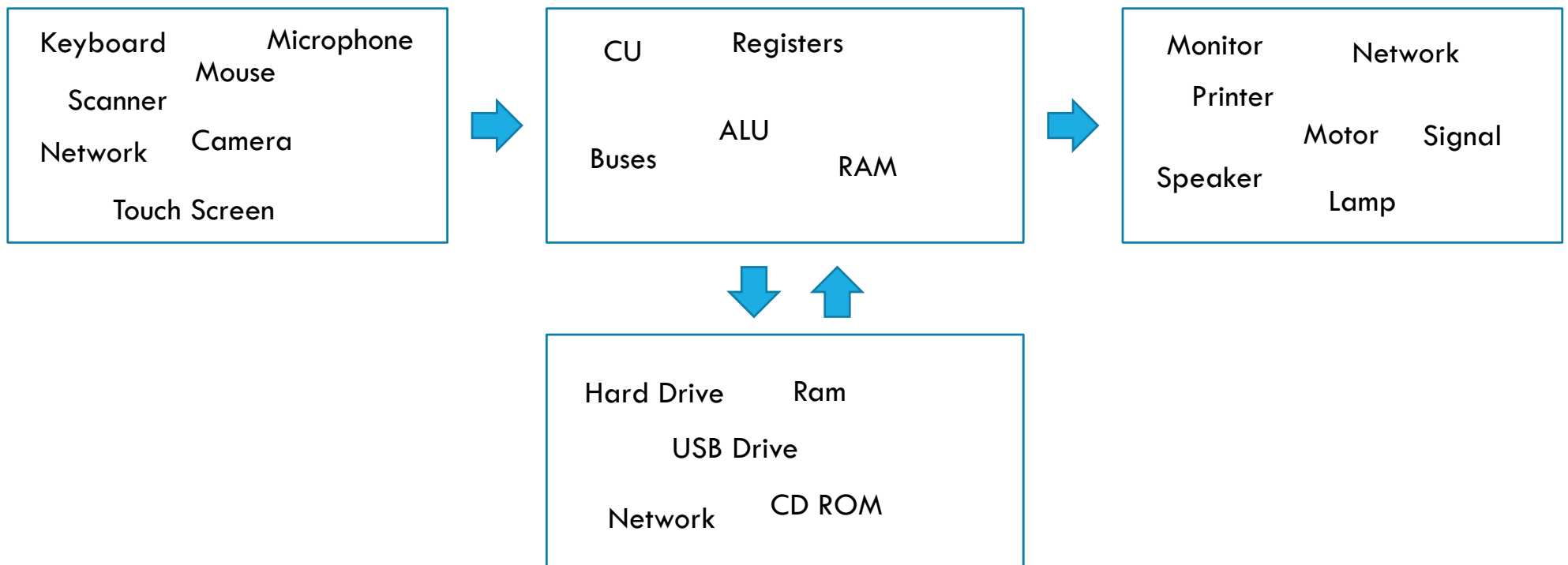
FIFTH GENERATION COMPUTER (PRESENT TO BEYOND)

- This generation is in under development.

- Scientists are working hard on the fifth generation computers with quick of few breakthroughs. It is based on the technique of artificial intelligence (AI).

- All those computer machines that will made on the basis of 5th generation computer will use parallel processing techniques and artificial intelligence. Parallel processing techniques and artificial intelligence are basically similar to the one used by our brain that is human brain. Therefore all those computers that will made on 5th generation techniques are being designed to think as the brain of human beings do.

- Computers can understand spoken words and imitate human reasoning. Can respond to its surroundings using different types of sensors.

- Scientist are constantly working to increase the processing power of computers. They are trying to create a computer with real IQ with the help of advanced programming and technology.
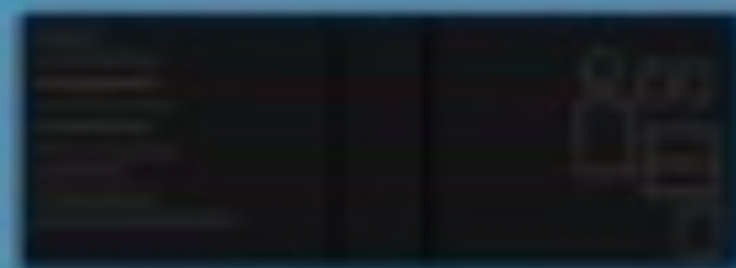
HOW DOES A COMPUTER OPERATE?
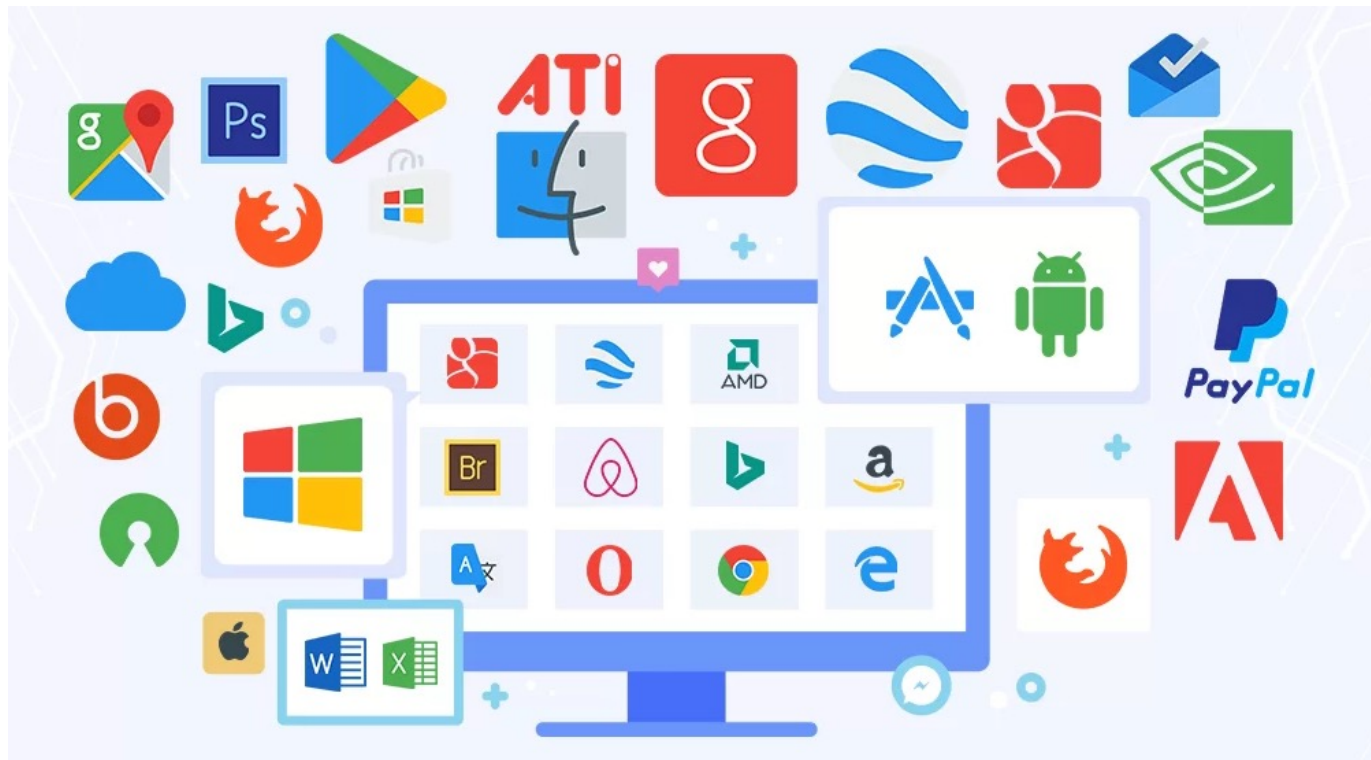
TO DO ALL THESE, IT NEEDS COMPONENTS!

Keyboard   Microphone
                  Mouse
Scanner
Network   Camera
        Touch Screen

CU   Registers
                ALU
Buses   RAM

Monitor   Network
Printer
                Motor   Signal
Speaker
              Lamp

Hard Drive   Ram
        USB Drive
Network   CD ROM

INSIDE A COMPUTER

## COMPUTER BASICS

BUT COMPONENTS ALONE IS NOT ENOUGH

Components need a partern to follow, as well as, instructions to produce result.

Different combination of actions of componets can produce infinite result.

THE VERY FIRST FUNDAMENTAL FOR COMPONENTS TO WORK TOGETHER - THE CPU ARCHITECTURE

Before anything, each components can interact with each other only if there a logical pattern. This pattern is defined by CPU which is the brain of Computer.

This Pattern is called The Cpu Architecture.
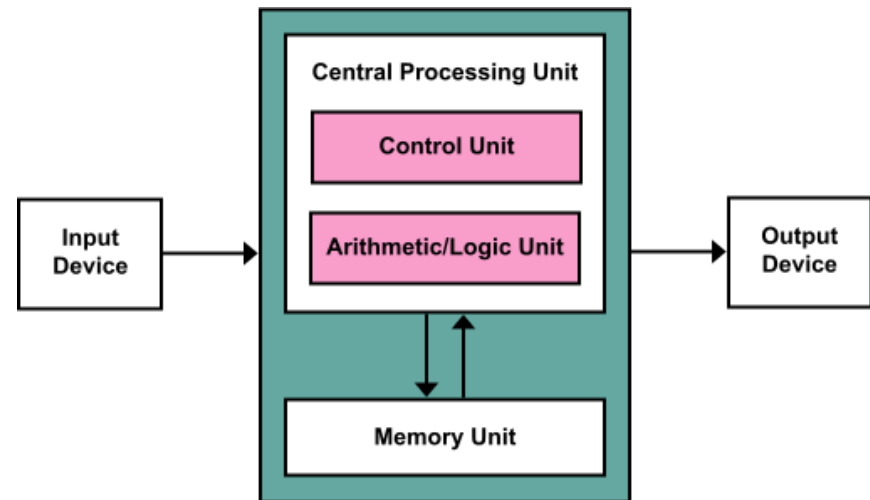
THE CPU ARCHITECTURE

After having defined the CPU Architecture, each component must following this rule:

1. Data size

2. Communication pattern

3. Response time

4. The amount of components required.

WHAT IS MORE?

Each device need to have an internal instruction for them to operate. This is called **Firmware**

Firmware is a very specific, low-level program for the hardware that allows it to accomplish some specific task. Firmware programs are (relatively) permanent, i.e., difficult or impossible to change. From the higher-level view of software, firmware is just part of the hardware, although it provides some functionality beyond that of simple hardware.

BEYOND THIS, WE REQUIRE **SOFTWARE**

Software is capable of performing many tasks, as opposed to hardware which can only perform mechanical tasks that they are designed for. Software provides the means for accomplishing many different tasks with the same basic hardware.

System software: Helps run the computer hardware and computer system itself. System software includes operating systems, device drivers, diagnostic tools and more. System software is almost always pre-installed on your computer.

Application software: Allows users to accomplish one or more tasks. It includes word processing, web browsing and almost any other task for which you might install software. (Some application software is pre-installed on most computer systems.)