SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE NAME : 20CS101 PROGRAMMING FOR PROBLEM SOLVING

I YEAR /I SEMESTER

Unit 1- INTRODUCTION TO PROBLEM SOLVING TECHNIQUES

Topic 1: Fundamentals - Computer Hardware

Brain Storming

1. What is Software?
2. How to develop software?

What is Computer?

- Its an electronic Device that is used for information Processing.
- Computer.. Latin word.. Compute.
- Calculation Machine.
- A computer system includes a computer, peripheral devices, and software.

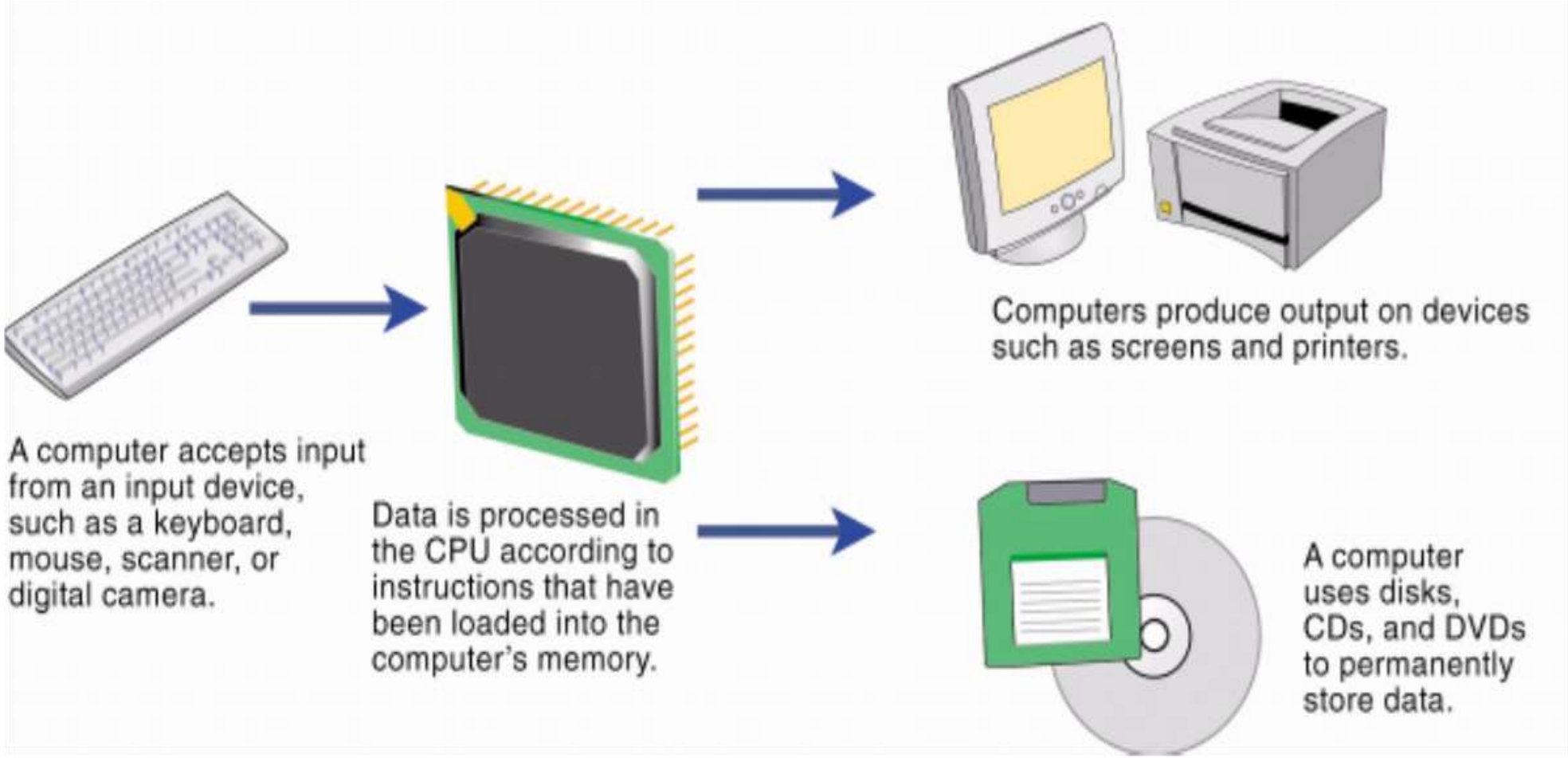
Introduction to Computer

- Accepts input, processes data, stores data, and produces output
- **Input** refers to whatever is sent to a Computer system
- **Data** refers to the symbols that represent facts, objects, and ideas
- **Processing** is the way that a computer manipulates data
- A computer processes data in a device called the **central processing unit** (CPU)

Conti...

- ***Memory*** is an area of a computer that holds data that is waiting to be processed, stored, or output
- ***Storage*** is the area where data can be left on a permanent basis
- Computer ***output*** is the result produced by the computer
- An output device displays, prints or transmits the results of processing

Conti...


A computer accepts input from an input device, such as a keyboard, mouse, scanner, or digital camera.
Data is processed in the CPU according to instructions that have been loaded into the computer's memory.
Computers produce output on devices such as screens and printers.
A computer uses disks, CDs, and DVDs to permanently store data.

Conti...

Computer

- Performs computations and makes logical decisions
- Millions / billions times faster than human beings

Computer programs

- Sets of instructions for which computer processes data

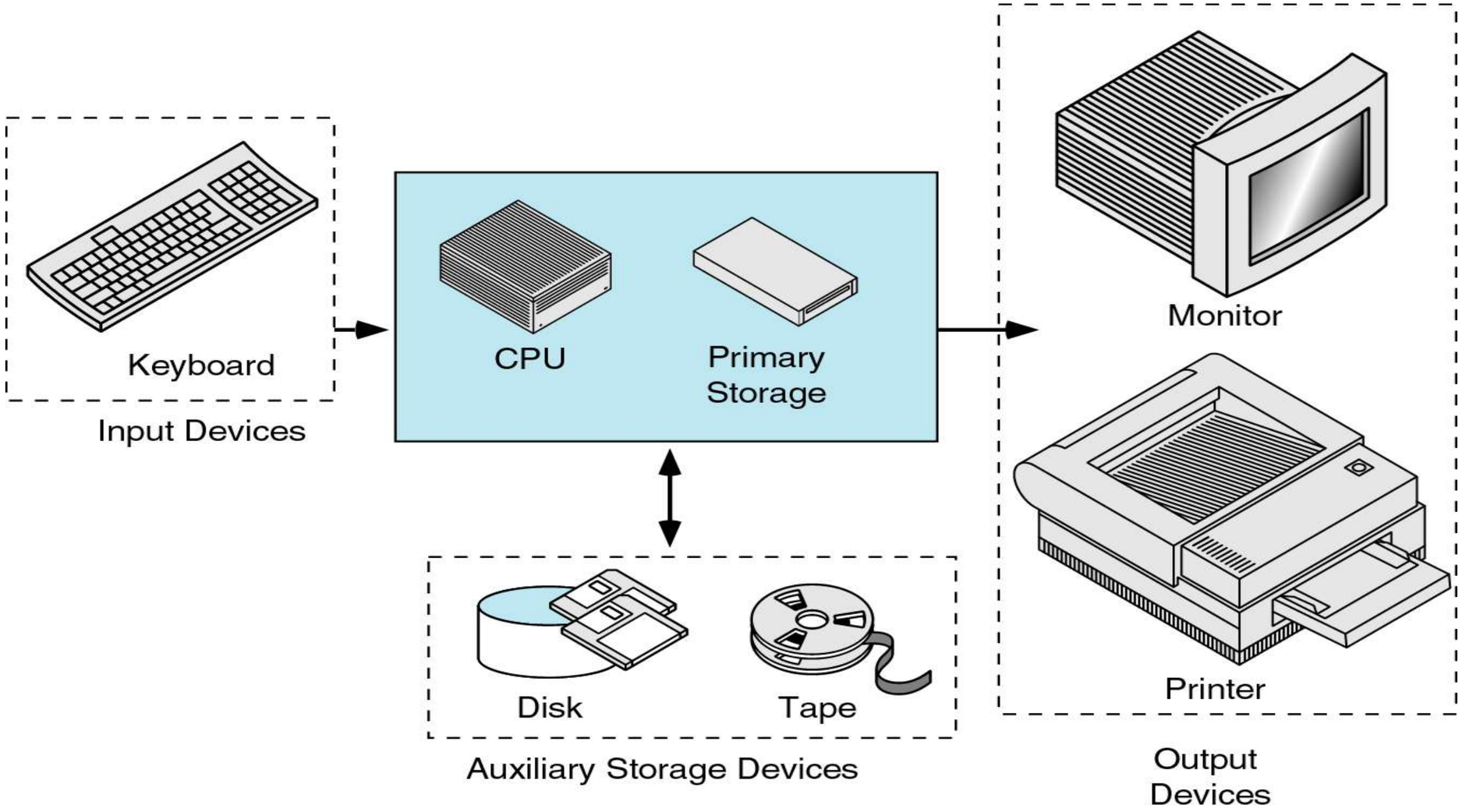
Hardware

- Physical devices of computer system

Software

- Programs that run on computers

Conti.....


Keyboard
Input Devices
CPU
Primary Storage
Monitor
Printer
Output Devices
Disk
Tape
Auxiliary Storage Devices

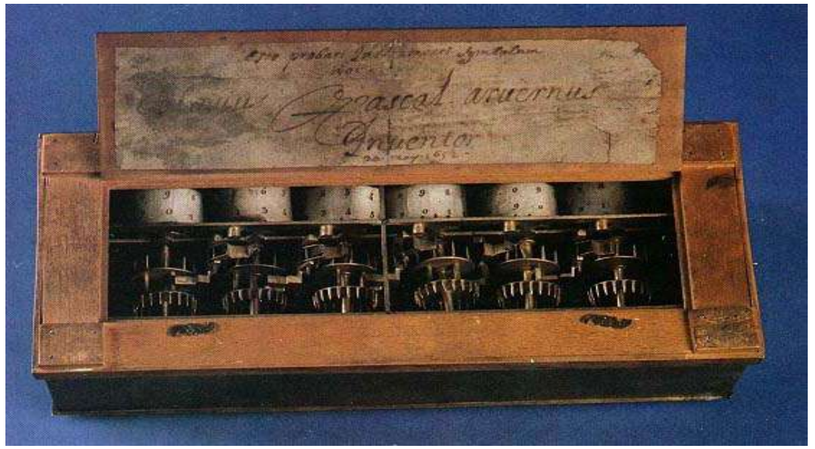
Characteristics of Computers

- High Processing Speed
- Accuracy
- Reliability
- Versatility
- Diligence

History of Computers

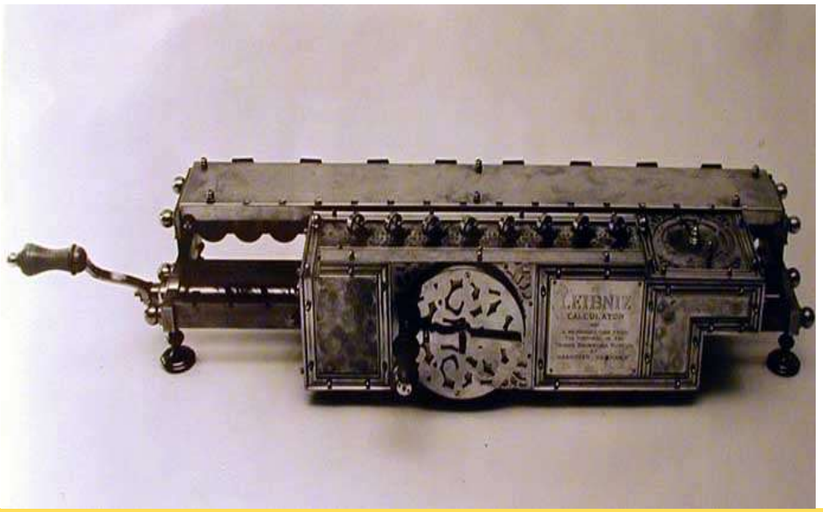
- Before the 1500s, in Europe, calculations were made with an abacus

Invented around 500BC, available in many cultures (China, Mesopotamia, Japan, Greece, Rome, etc.)



- In 1642, Blaise Pascal (French mathematician, physicist, philosopher) invented a mechanical calculator called the Pascaline

- In 1671, Gottfried von Leibniz (German mathematician, philosopher) extended the Pascaline to do multiplications, divisions, square roots: the Stepped Reckoner



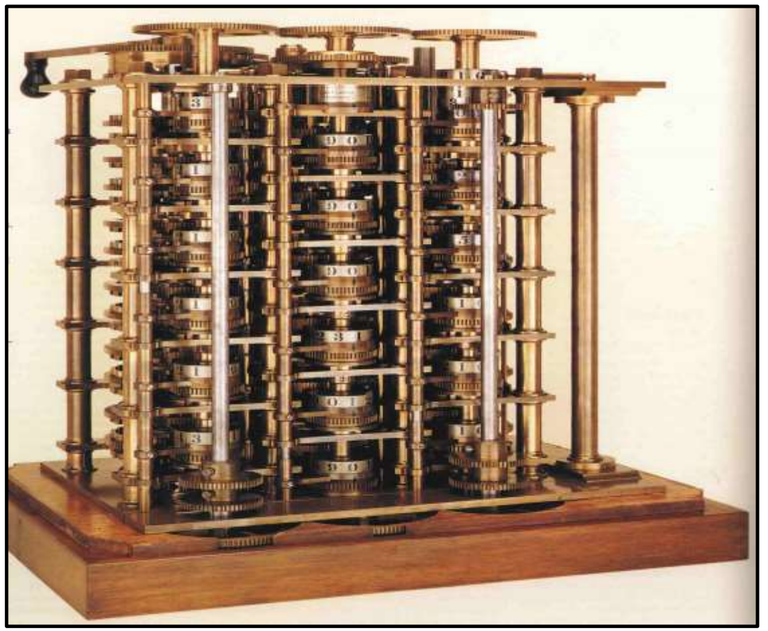
None of these machines had memory, and they required human intervention at each step

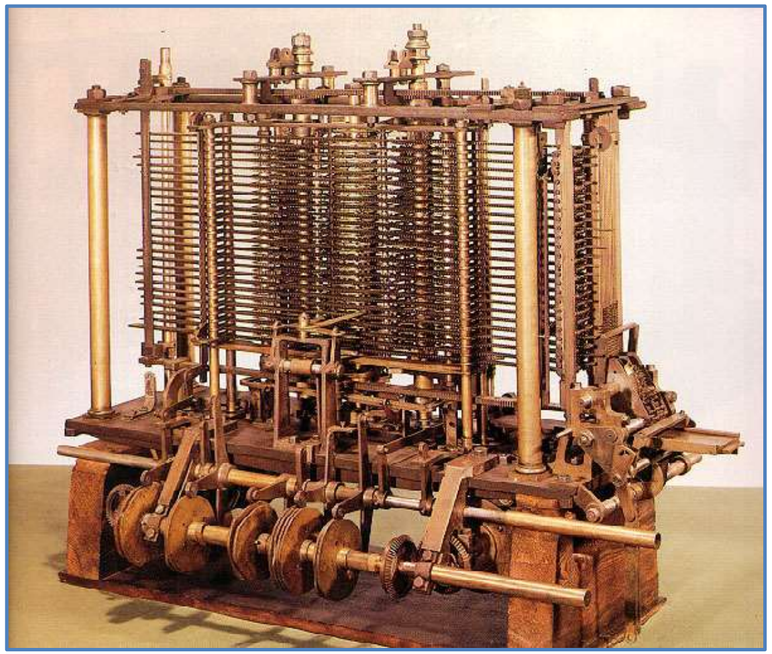
Conti...

- In 1822 Charles Babbage (English mathematician, philosopher), sometimes called the “father of computing” built the Difference Engine

- Machine designed to automate the computation (tabulation) of polynomial functions (which are known to be good approximations of many useful functions)
  - Based on the “method of finite difference”
  - Implements some storage

- In 1833 Babbage designed the Analytical Engine, but he died before he could build it
  - It was built after his death, powered by steam





Generations of Computer

- Generation in computer terminology is a change in technology a computer is/was being used.
- Initially, the generation term was used to distinguish between varying hardware technologies.
- Nowadays, generation includes both hardware and software, which together make up an entire computer system.

Conti...

Sr. No.	Generation & Description
1	**First Generation** The period of first generation: 1946-1959. Vacuum tube based.
2	**Second Generation** The period of second generation: 1959-1965. Transistor based.
3	**Third Generation** The period of third generation: 1965-1971. Integrated Circuit based.
4	**Fourth Generation** The period of fourth generation: 1971-1980. VLSI microprocessor based.
5	**Fifth Generation** The period of fifth generation: 1980-onwards. ULSI microprocessor based.

First Generation Computers

- The period of first generation was from 1946-1959. The computers of first generation used vacuum tubes as the basic components for memory and circuitry for CPU (Central Processing Unit).
- These tubes, like electric bulbs, produced a lot of heat and the installations used to fuse frequently. Therefore, they were very expensive and only large organizations were able to afford it.

Types of Practice

- In this generation, mainly batch processing operating system was used.
- Punch cards, paper tape, and magnetic tape was used as input and output devices.
- The computers in this generation used machine code as the programming language.

Conti...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Conti...

The main features of the first generation are:

- Vacuum tube technology
- Unreliable
- Supported machine language only
- Very costly
- Generated a lot of heat
- Slow input and output devices
- Huge size
- Need of AC
- Non-portable
- Consumed a lot of electricity

Conti.....

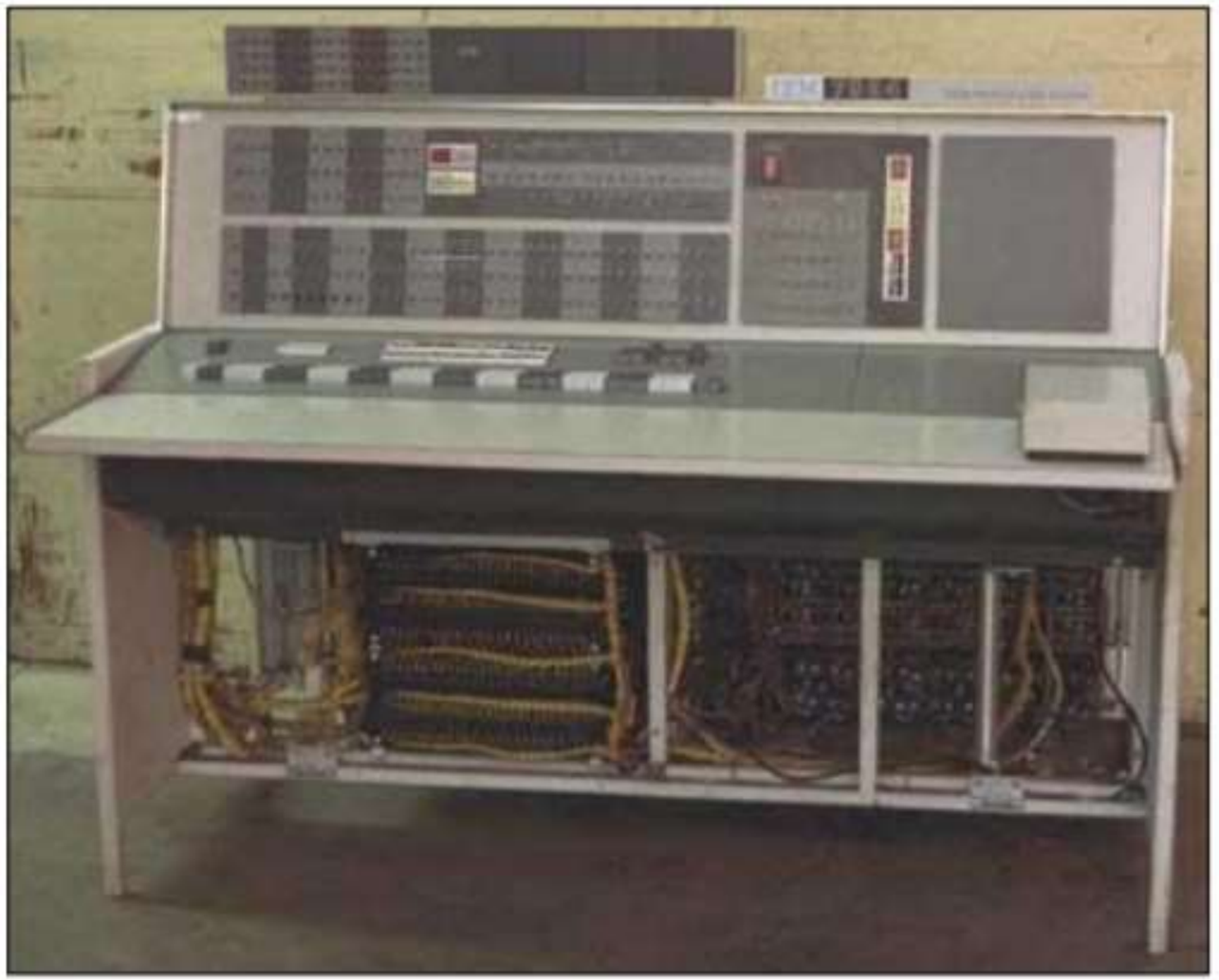
Some computers of this generation were:

- ENIAC
- EDVAC
- UNIVAC
- IBM-701
- IBM-650

Second Generation Computers

- The period of second generation was from 1959-1965.
- In this generation, transistors were used that were cheaper, consumed less power, more compact in size, more reliable and faster than the first generation machines made of vacuum tubes.
- In this generation, magnetic cores were used as the primary memory and magnetic tape and magnetic disks as secondary storage devices.
- In this generation, assembly language and high-level programming languages like FORTRAN, COBOL were used.
- The computers used batch processing and multiprogramming operating system.

Conti.....



TRANSISTOR COMPUTER

Conti...

The main features of second generation are:

- Use of transistors
- Reliable in comparison to first generation computers
- Smaller size as compared to first generation computers
- Generated less heat as compared to first generation computers
- Consumed less electricity as compared to first generation computers
- Faster than first generation computers
- Still very costly
- AC required
- Supported machine and assembly languages

Conti.....

Some computers of this generation were:

- IBM 1620
- IBM 7094
- CDC 1604
- CDC 3600
- UNIVAC 1108

Third Generation Computers

- The period of third generation was from 1965-1971.
- The computers of third generation used Integrated Circuits (ICs) in place of transistors.
- A single IC has many transistors, resistors, and capacitors along with the associated circuitry.

Conti.....

- The IC was invented by Jack Kilby. This development made computers smaller in size, reliable, and efficient.
- In this generation remote processing, time-sharing, multi-programming operating system were used.
- High-level languages (FORTRAN-II TO IV, COBOL, PASCAL PL/1, BASIC, ALGOL-68 etc.) were used during this generation.

Conti...

The main features of third generation are:

- IC used
- More reliable in comparison to previous two generations
- Smaller size
- Generated less heat
- Faster
- Lesser maintenance
- Costly
- AC required
- Consumed lesser electricity
- Supported high-level language

IC

Conti.....

Some computers of this generation were:

- IBM-360 series
- Honeywell-6000 series
- PDP (Personal Data Processor)
- IBM-370/168
- TDC-316

Fourth Generation Computers

- The period of fourth generation was from 1971-1980.
- Computers of fourth generation used Very Large Scale Integrated (VLSI) circuits.
- VLSI circuits having about 5000 transistors and other circuit elements with their associated circuits on a single chip made it possible to have microcomputers of fourth generation.
- Fourth generation computers became more powerful, compact, reliable, and affordable.
- As a result, it gave rise to Personal Computer (PC) revolution.
- In this generation, time sharing, real time networks, distributed operating system were used. All the high-level languages like C, C++, DBASE etc., were used in this generation.

Conti.....

The main features of fourth generation are:

- VLSI technology used
- Very cheap
- Portable and reliable
- Use of PCs
- Very small size
- Pipeline processing
- No AC required
- Concept of internet was introduced
- Great developments in the fields of networks
- Computers became easily available

Example: VLSI

Conti...

Some computers of this generation were:

- DEC 10
- STAR 1000
- PDP 11
- CRAY-1(Super Computer)
- CRAY-X-MP(Super Computer)

Fifth Generation Computers

- The period of fifth generation is 1980-till date. In the fifth generation, VLSI technology became ULSI (Ultra Large Scale Integration) technology, resulting in the production of microprocessor chips having ten million electronic components.
- This generation is based on parallel processing hardware and AI (Artificial Intelligence) software. AI is an emerging branch in computer science, which interprets the means and method of making computers think like human beings. All the high-level languages like C and C++, Java, .Net etc., are used in this generation.

Conti...

AI includes:

- Robotics
- Neural Networks
- Game Playing
- Development of expert systems to make decisions in real-life situations
- Natural language understanding and generation

Conti...

The main features of fifth generation are:

- ULSI technology
- Development of true artificial intelligence
- Development of Natural language processing
- Advancement in Parallel Processing
- Advancement in Superconductor technology
- More user-friendly interfaces with multimedia features
- Availability of very powerful and compact computers at cheaper rates

Conti...

Some computer types of this generation are:

- Desktop
- Laptop
- NoteBook
- UltraBook
- ChromeBook

Types of Computer

Sr. No.	Type	Specifications
1	PC (Personal Computer)	It is a single user computer system having moderately powerful microprocessor
2	Workstation	It is also a single user computer system, similar to personal computer however has a more powerful microprocessor
3	Mini Computer	It is a multi-user computer system, capable of supporting hundreds of users simultaneously.
4	Main Frame	It is a multi-user computer system, capable of supporting hundreds of users simultaneously. Software technology is different from minicomputer.
5	Supercomputer	It is an extremely fast computer, which can execute hundreds of millions of instructions per second.

Basic Computer Hardware

The basic parts without which a computer cannot work are as follows:

Processor: It executes instructions from software and hardware.

Memory: It is the primary memory for data transfer between the CPU and storage.

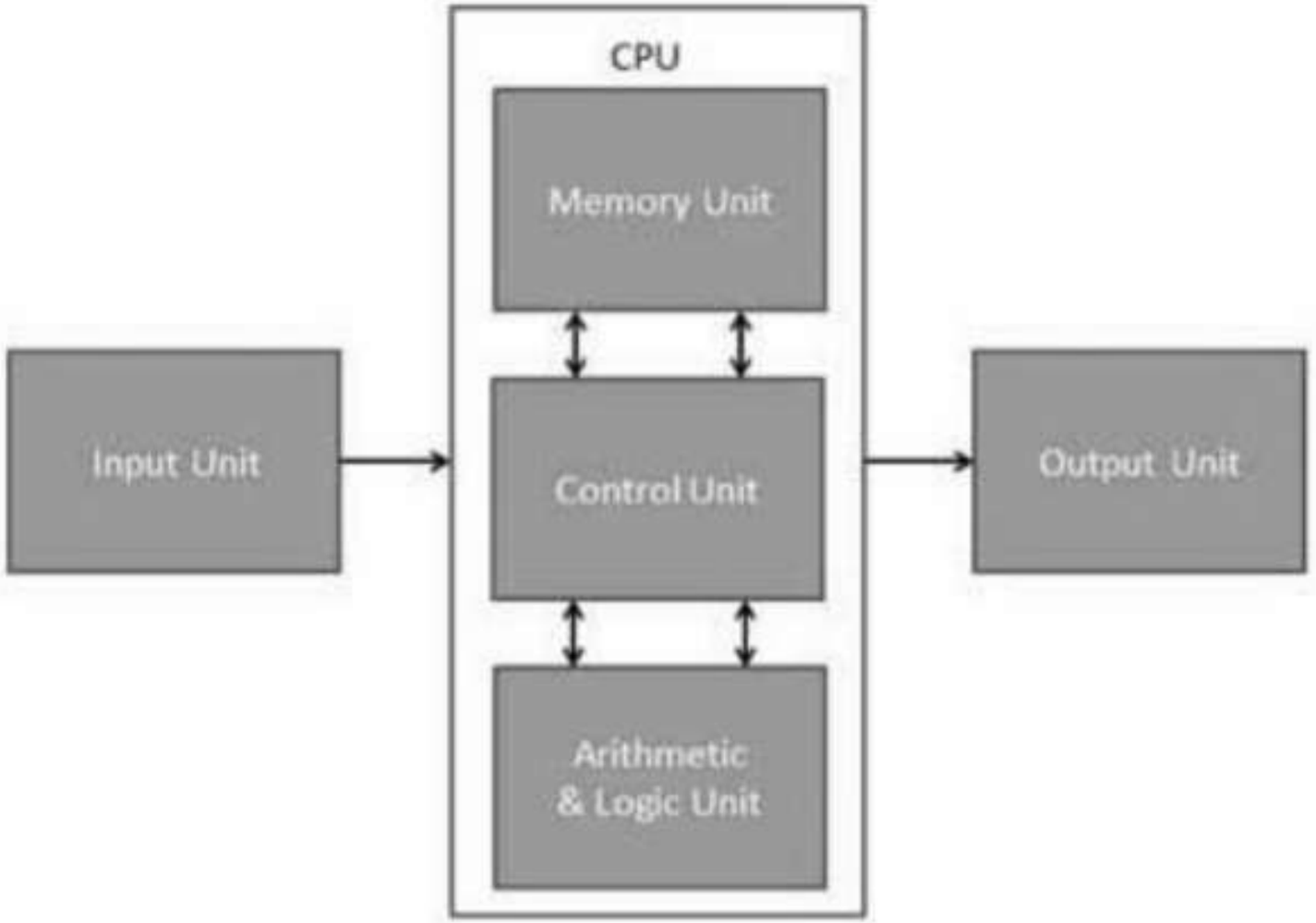
Motherboard: It is the part that connects all other parts or components of a computer.

Storage Device: It permanently stores the data, e.g., hard drive.

Input Device: It allows you to communicate with the computer or to input data, e.g., a keyboard.

Output Device: It enables you to see the output, e.g., monitor.

Conti.....


CPU
Memory Unit
Input Unit
Control Unit
Output Unit
Arithmetic
& Logic Unit

Conti...

Sr. No.	Operation	Description
1	Take Input	The process of entering data and instructions into the computer system.
2	Store Data	Saving data and instructions so that they are available for processing as and when required.
3	Processing Data	Performing arithmetic, and logical operations on data in order to convert them into useful information.
4	Output Information	The process of producing useful information or results for the user, such as a printed report or visual display.
5	Control the workflow	Directs the manner and sequence in which all of the above operations are performed.

Conti.....

1. Inside of a desktop casing

2. Powe supply box

Conti.....

3. Motherboard

4. CPU (Intel pentium)

Conti.....

5. Memory modules

6. PCI card

Conti.....

7. CD/DVD drive

8. Floppy disk drive

Conti.....

9. Hard drive

10. Cables

Conti.....

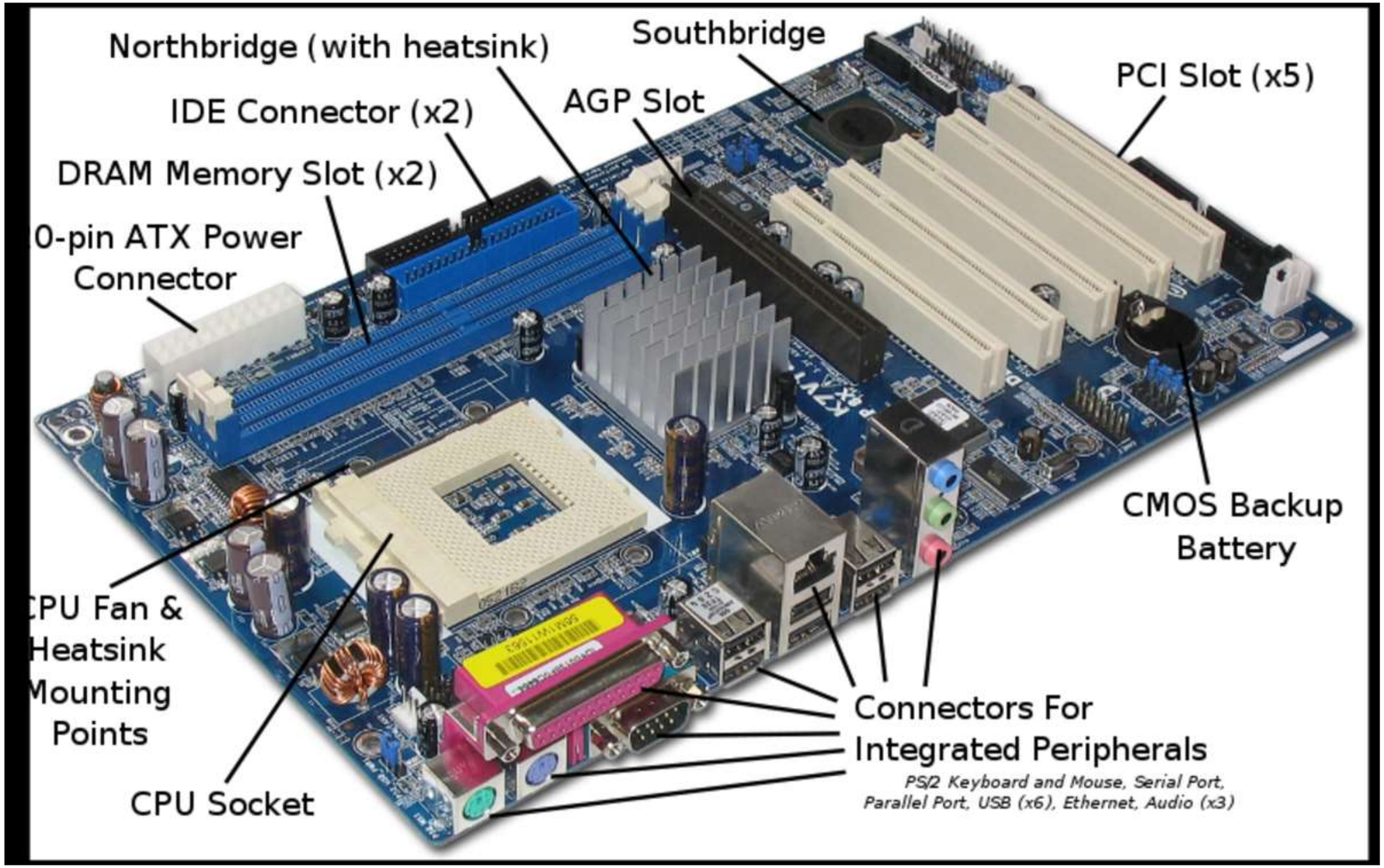
11. Heat sink with fan

12. Connnectors

Conti.....

Processor

Mother board



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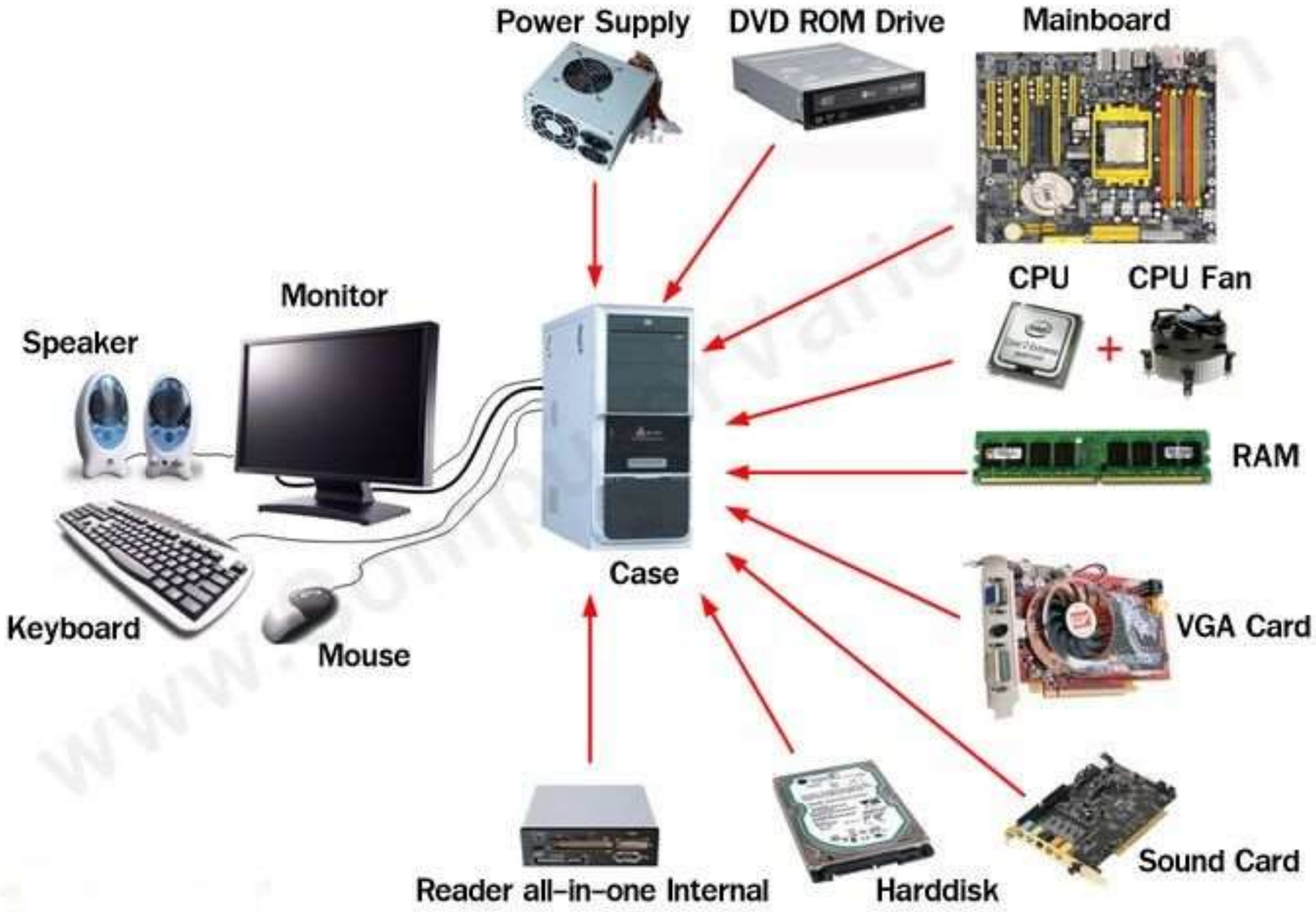
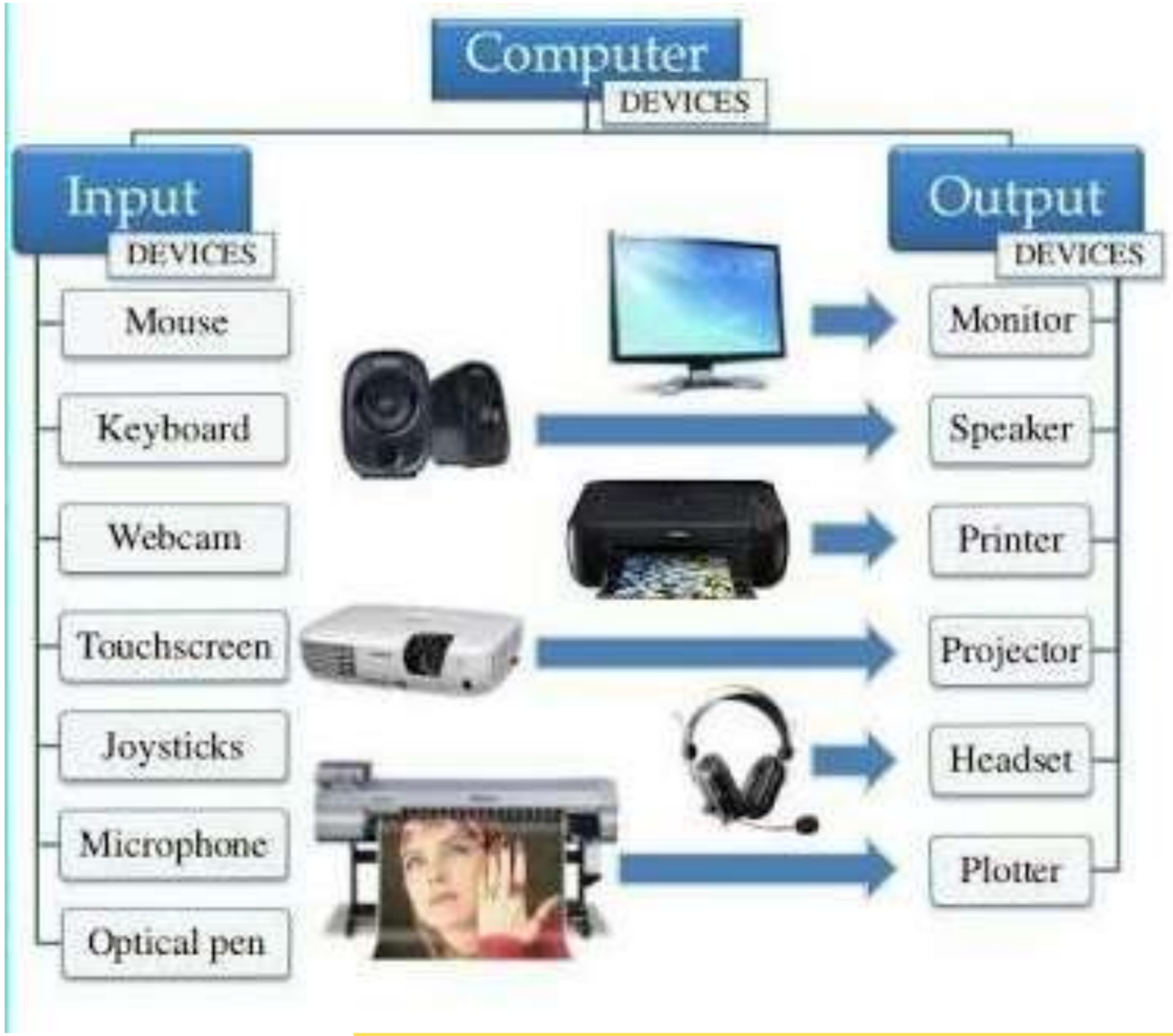

Power Supply
DVD ROM Drive
Mainboard
CPU
CPU Fan
Monitor
Speaker
RAM
Case
VGA Card
Keyboard
Mouse
Sound Card
Reader all-in-one Internal
Harddisk

I/O Devices


Computer
DEVICES
Input
DEVICES
Mouse
Keyboard
Webcam
Touchscreen
Joysticks
Microphone
Optical pen
Output
DEVICES
Monitor
Speaker
Printer
Projector
Headset
Plotter

Assessment 1

1. Write about generations of computer?

Ans : _____

2. List out hardware components of computer?

Ans : _____

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Thank You