Generations of Computers

The term “computer generation “is widely used particularly by the sales personnel of computer manufacturers. Most often it is used in relation to the hardware of computers.

There are 5computer generations. They are the following

1st Generation - (1942-1955)

2nd Generation - (1955-1964)

3rd Generation - (1965-1975)

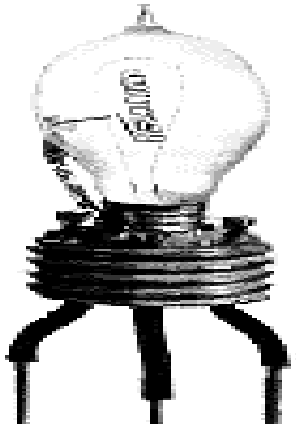
4th Generation - 1st decade (1976-1985)

2nd decade (1986-2000)

5th Generation - 2000 onwards

First Generation Computers:

- These computers were vacuum tube based machines.
- They used magnetic drums for memory.
- Input were fed into the computer using Punched cards
- The size of these computers were very large and it produce more heat.
- They lacked in versatility and speed.They were more expensive.



vacuum tube from the early 1900's

- In this Generation ENIAC, EDVAC, UNIVAC 1 is included.In 1st generation the main component is vacuum tube.Vacuum tube computers are referred to as 1st Generation computers.

Advantages:

- Vacuum tubes are the only available component. Vacuum tube technology made possible the advent of electronic digital computers. These computers are the fastest calculating device of their time.

Disadvantage

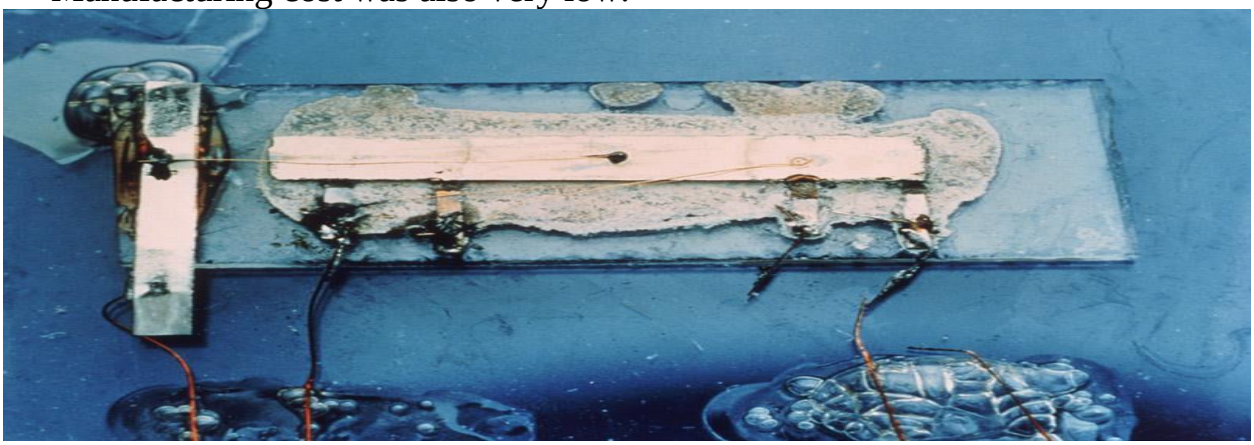
- Too bulky in size
- Unreliable
- Thousands of vacuum tubes that were used emitted large amount of heat and burnt out frequently
- Air conditioning required
- Prone to frequent hardware failure
- Constant maintenance required.
- Non- portable

Commercial production was difficult and costly.

Limited commercial use.

Second Generation Computers

- Here the ***Transistor*** replaced the bulky vacuum tubes.
- Transistors are smaller than vacuum tubes and have higher operating speed.
- Thus the size of the computer got reduced considerably.
- Manufacturing cost was also very low.



- In this generation germanium transistor is used instead of vacuum tubes. Second generation emerged with transistors being the brain of the computer. They occupied less space and used only a tenth of the power required by tubes.
  Another major event during this period was the Invention of magnetic cores storage.
- Memory capacity in the second generation was about 100 KB.
- Magnetic disk storage was also developed during this period.
- High level languages such as FORTRAN,
- COBOL, Algol and SNOBOL were developed during this generation

ADVANTAGE:

- Smaller in size as compared to first generation computers
- More reliable
- Less heat is generated.
- These computers are able to reduce computational times.
- Less prone to hardware failure.
- Better portability.

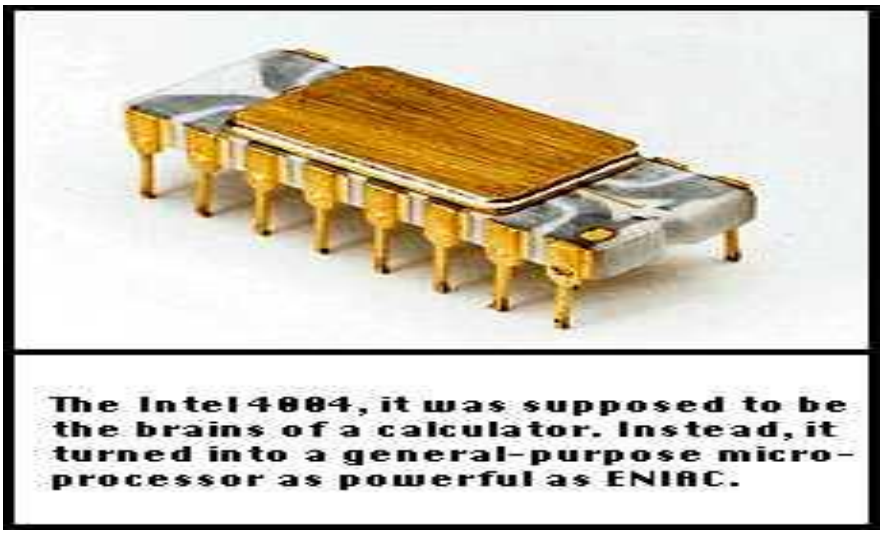
- Wider commercial use.

Disadvantages:

- Air conditioning required.
- Frequent maintenance required
- Manual assembly of individual components into a functioning unit was required.
- Commercial production was difficult and costly.

Third Generation Computers

- These computers were based on ***Integrated Circuits*** (ICs) Technology.
- A single IC has many transistors, registers and capacitors built on a single thin slice of silicon.
- So that the size of the computer got further reduced.
- These Computers were small in size, low cost, large memory and processing speed is very high.



- In 3rd generation germanium transistors being replaced by silicon transistors. The third generation was based on IC technology.
- Integrated circuits, consist of transistors, resistors and capacitors grow on a single chip of silicon –eliminating wired interconnection between components, emerged.

- Small scale integrated circuits which had about 10 transistors per chip and medium scale integrated circuits with 100 transistors per chip.
- There were significant improvements in the design of magnetic core memories. The size of main memories reached about 4 MB. Magnetic disk technology improved rapidly.

Advantage

- Smaller in size as compared with previous generation computers.
- More reliable than second generation.
- Lower heat is generated than 2nd generation.
- Able to reduce computational times from micro seconds to nano seconds
- Maintenance cost is low because hardware failure are rare
- Easily portable
- Totally general purpose. widely used for various commercial applications all over the world.
- Less power is required.
- Manual assembly of individual components into a functioning unit not required. So a human labour and cost involved at assembly stage reduced drastically
- Commercial production was easier and cheaper.

Disadvantage

- Air conditioning is required in many cases.
- Highly sophisticated technology required for the manufacture of IC chips.

Fourth Generation Computers

- It uses large scale Integrated Circuits **(LSIC)** built on a single silicon chip called microprocessors .
- Later *very large scale Integrated Circuits* (VLSIC) replaced LSICs
- These computers are called microcomputers.
- Thus the size of the computer got reduced.
- The personal computer (PC) are comes under the Fourth Generation.

Fifth Generation Computer

- The speed is extremely high in fifth generation computer.
- The concept of *Artificial intelligence* has been introduced to allow the computer to take its own decision.
- It is still in a developmental stage .
- It is based on ultra scale integration. It involves the principles of artificial intelligence and robotics.
- The major outcome in this generation was the emergence the variety of parallel computers using several hundred to thousand processors.
- Processor architecture called Very Large Instruction World (VLIW) processor which has an instruction size of 128 to 256 bits and has several parallel instructions within it is emerging.
- This generation will involve major deviation from the technology, architecture know how computer programming used in the first four generations

Classification of Computer

Classification of Computer

- Microcomputer
- Mini Computer
- Mainframes
- Supercomputer

Classification of Computer

Microcomputer

- Microcomputer is at the lowest end of the computer range in terms of speed and storage capacity.
  Eg: Desktop, Laptop, Tablet PC, Smart Phones.

Mini Computer

- This is designed to support more than one user at a time.
- It possesses large storage capacity and operates at a higher speed.
- This type of computer is generally used for processing large volume of data in an organisation.
- Eg:Servers in Local Area Networks (LAN).

Mainframes

- They operate at very high speed, having very large storage capacity and can handle the work load of many users.
- They are generally used in centralised databases.

Supercomputer

- They are the fastest and most expensive machines.
- They have high processing speed compared to other computers.
- They have also multiprocessing technique.
- Supercomputers are mainly being used for whether forecasting, biomedical research, and other areas of science and technology

- The computers can also classified based on the hardware design as follows

  — Analog computer.

  — Digital computer.

  — Hybrid computer.