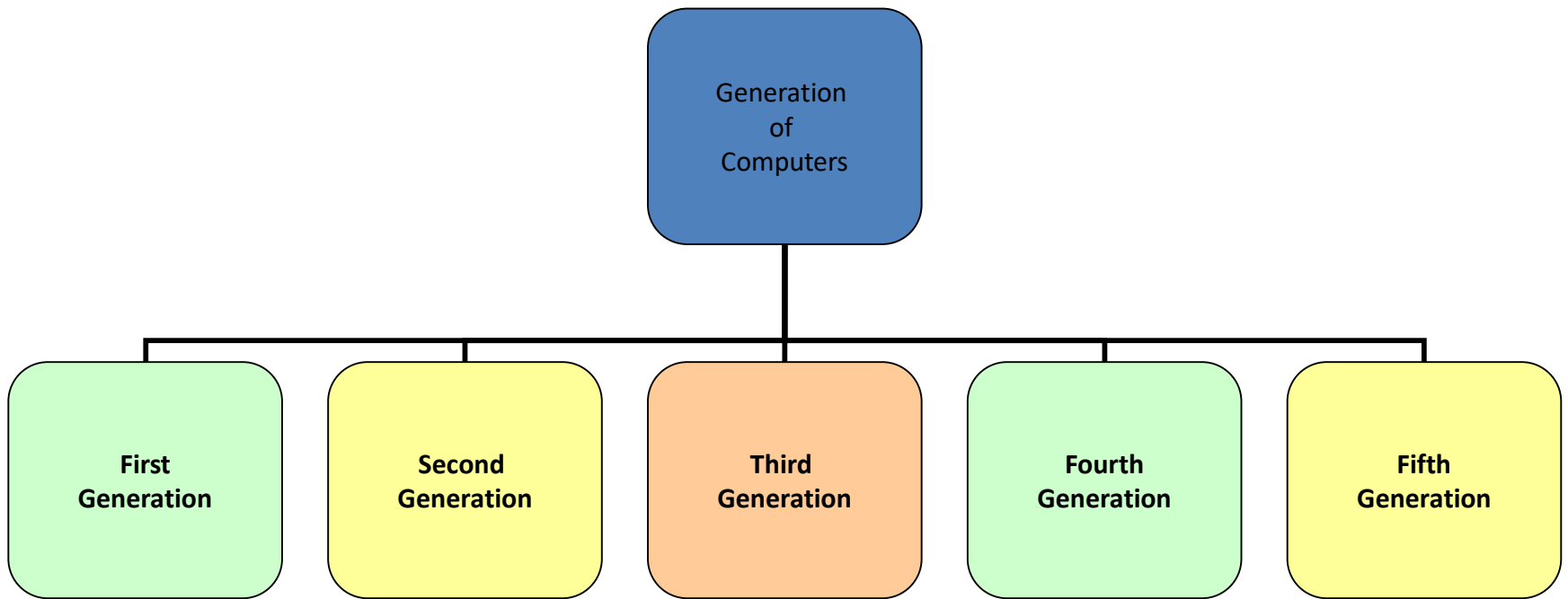# Generations of Computer

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Generation of Computers

Based on the characteristics of various computers developed from time to time, they are categorized as generation of computers.

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                    ┌─────────────┐
                    │ Generation  │
                    │     of      │
                    │  Computers  │
                    └──────┬──────┘
        ┌────────┬─────────┼─────────┬─────────┐
   ┌────┴───┐ ┌──┴─────┐ ┌─┴──────┐ ┌┴───────┐ ┌┴───────┐
   │ First  │ │ Second │ │ Third  │ │ Fourth │ │ Fifth  │
   │Genera- │ │Genera- │ │Genera- │ │Genera- │ │Genera- │
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First Generation of Computer
(1940 - 1956)

- **First Generation of the computer** invented between the years 1940 to 1956.
- During the Second World War different countries had started developing computer to work fast.
- The First generation electronic computer Mark – 1 and other of this time were made possible by the invention of **Vacuum Tubes** which was the triangle glass device that could control and amplify electronic signals.
- First generation computers were very large in size, they needed room to keep them.

Vacuum Tube

Advantage of First Generation

- These computers were the fastest calculating device of that time they could perform a calculation in milliseconds.

- First-generation of computer runs on the batch processing operating system.

- This generation used Punch Cards, Paper tape and Magnetic tape.

- This generation used Machine code as the programming language.
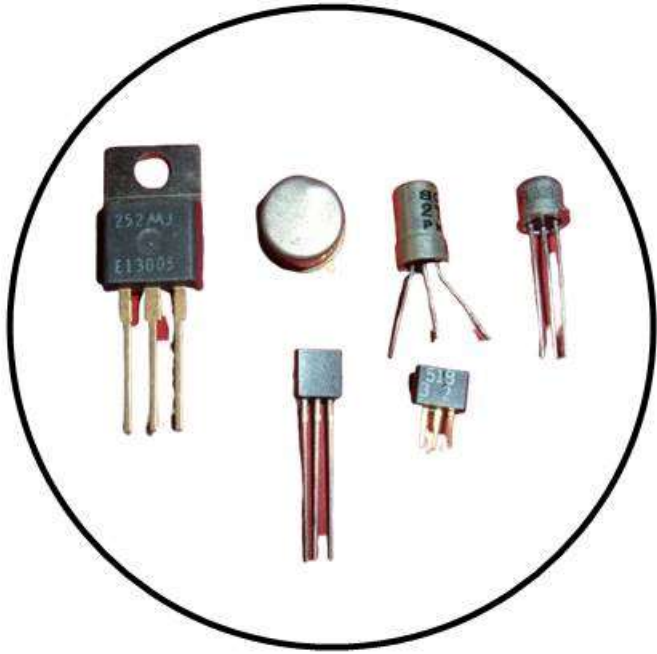
Disadvantage of First Generation

- No portable.

- Limited field used.

- Slow input and output devices.

- Consumed a large amount of electricity.

- These generations of computer were very costly.

- Commercial production was difficult and costly.

- First generation computers were very large in size, and weight approx. 30 tons.

- Thousands of vacuum tubes that were used emitted a large amount of heat and burn out frequency. Need AC.
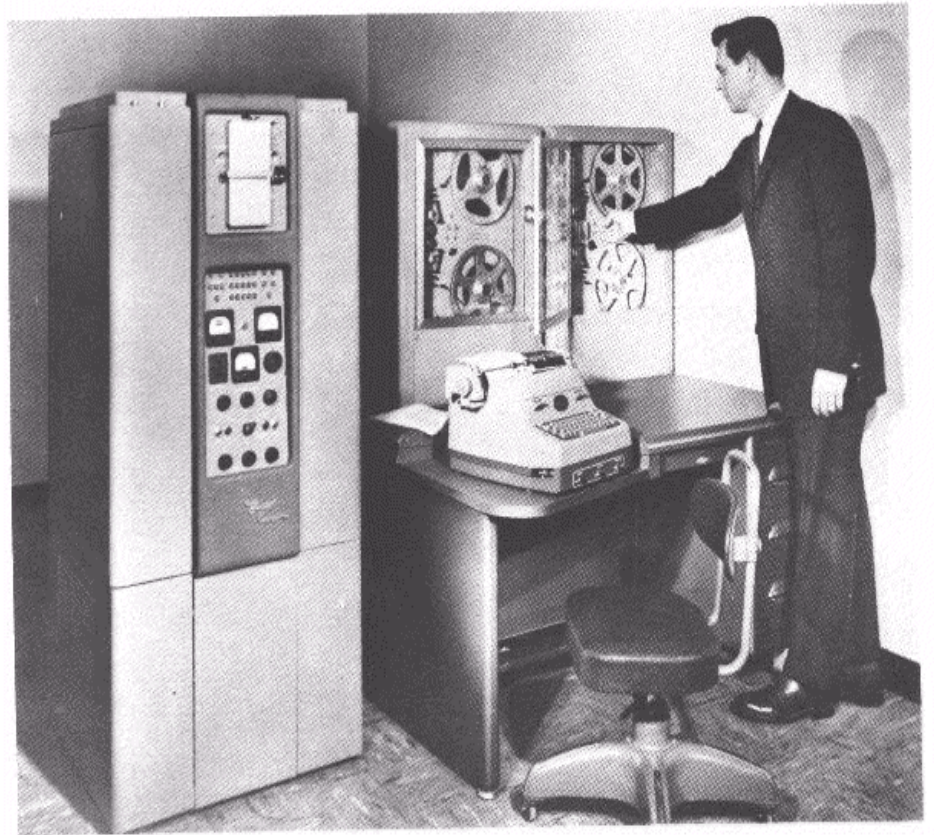
Example of First Generation of Computer

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

Second Generation of Computer (1956 - 1963)

- The second generation of computer was manufactured in using a **Transistor** instead of vacuum tubes.
- The second generations of computer were more powerful, more reliable, and less expensive smaller true operated then the first-generation computer.
- The memory of the second generation computer was more compared to first-generation computer.
- Magnetic disk and magnetic tape were the main memory storage media used in secondary memory.
- The **Transistors** were smaller than the vacuum tube, and the Transistors were much faster than the vacuum tube in speed.
- The computers used batch processing and multi programming operating system.

Transistors

Advantage of Second Generation

- Used Transistors instead of the vacuum tube.

- Smaller in size and use less power.

- Has less heat production rate.

- Comparatively faster.

- Cheaper than the first generation of computer.

Disadvantage of Second Generation

- Air conditioning is required.

- Maintenance was always required.

- Commercial production was difficult and costly.

- This computer was used in a particular purpose.

Examples of second generations of a computer of the, which are given below:

IBM 7094

IBM 1620

CDC 1604

CDC 3600

Third Generation of Computer (1964 - 1971)

- Third generation computers were Incorporated many transistors & electronic circuits on a single chip
- This new technology was called the **Integrated Circuit (IC).**
- The third generation computer were smaller in size than the second generation of computer, and faster than the second generation compared to the speed.
- Integrated circuits are also used in today's computers.
- **Integrated circuits** (IC) was invented by Robert Noyce and Jack Kilby Scientist.

Advantages of Third Generation

- Use the integrated circuit.
- Cheaper than the older computer.
- Can be easily maintained.
- A decrease in size and weight.
- The mouse and keyboard were used for input.
- This generation of computer Very fast
- These Generation of computer consumed less electricity.
- These generation of computer supports the high-level language.
- The generation of this computer had the capacity to store large data.
- This generation's computer was much faster than the first and second generation computers.
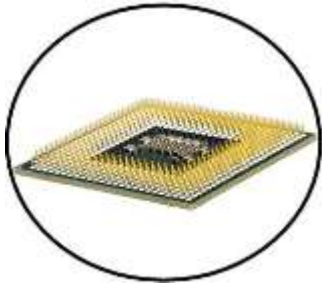
Disadvantage of Third Generation

- Air conditioning is required.
- Integrated Circuit (IC) Chips are difficult to maintain.
- Still very costly computer.

Examples of Third generations of a computer :
- IBM-360 series
- Honeywell-6000 series
- PDP (personal data processor)
- IBM 370/168

Fourth Generation of Computer
(1972 - Current)

Technology   : VLSI (Very Large Scale Integration)

Incorporated many millions of transistors & electronic circuits on a single chip

Microprocessor

In a Microprocessor, many transistors, resistors, and diodes work together.

Size   : Small as compared to first generation computer

Processing   : Faster then first generation computer

This generation used time-sharing, real-time networks, distributed operating system.

This Generation of a computer used high level language like C, C++, java and DBASE and etc.

Advantages of Fourth Generation

- Work with great speed.
- Increase memory capacity.
- A decrease in size and weight.
- Very little maintenance is required.
- Low in cost affordable to the common man.
- No AC is required when we use the computer.
- These generation of a computer were portable and reliable.
- These generations of computer produce too low amount of heat.
- All types of high-level languages support this type of computer.
- Efficiently increased due to operating system and programming language.

Disadvantage of Fourth Generation

- Advanced technology is required to make the IC.

- Design and manufacturing of microprocessors are very difficult.

Examples:
i.   IBM system 3090, IBM RISC6000, IBM RT.
ii.   ILLIAC IV.
iii. Cray 2 XMP.
iv. HP 9000.
v.   Apple Computers

Fifth Generation of Computer (Present and Beyond)

- This generation uses **Ultra Large Scale Integration** (ULSI) technology.
- Fifth generations computing devices, based on artificial intelligence (AI) are still in development, although there are some application such as voice recognition, facial face detector and thumb print that are used today.
- This technology works on a **parallel processing system**, Google search engine also uses this technology.
- This Generation of a computer used high level language like - c, c++, java and .Net and etc.
- This Generation made than a very useful of multimedia applications (Text, graphics, audio, video and animation).

Advantage of Fifth Generation

- It is available in different sizes and more features.
- They are the fastest and powerful computers to date.
- This technology works on a parallel processing system.
- This generation of computer available at a cheaper price.
- They are versatile for communications and resource sharing.
- **Artificial Intelligence (AI)** technology is used in the fifth generation.
- Ability of computers to mimic human intelligence, e.g. voice recognition, facial face detector, thumb print

Disadvantages:
- Needs Expertise
- Replacing humans in some works
- More security is needed

Examples:
i. Super computers
ii. Robots
iii. Facial face detector