|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **FIRST GENERATION** | **SECOND GENERATION** | **THIRD GENERATION** | **FOURTH GENERATION** |
| Main Circuitry / Component / Technology | **Vacuum Tubes** | **Transistors** | **Integrated Circuits** | **Microprocessors** |
| Summary of capabilities | It used for calculations storage and control | Increasing the performance and speed and also decreasing the electricity consumption | More reliable, faster, energy efficient powerful than the transistors. | The processing speed is more powerful than the past 3 generations |
| Typical Transaction Speed | Average access time of 300 microseconds | 58 kHz | 300 GHz | 3.5 giga hertz – 4 giga hertz |
| Maximum Main Memory | 1024 words of 36 bits each | 4 bits per transistor | 64 bits per IC | billions of operations per seconds |
| I/O Capability | Used punch cards, paper tape, and magnetic tape | An input signal will pass through an emitter to transistor while the output signal pass from the base to the collector terminal | Same capabilities of the transistors | It processes the input and outputs to show the results. |
| Function Summary: Data Processing | Stored numerical values as binary (1s, 0s) numbers in a revolving mechanical drum. | The transistor serves as a switch in an electronic circuit to manipulate the signal | Composition of both function as active and passive devices | Process the binary input then after being process in the memory the result is the output |
| Function Summary: Data Storage | Junction 2 pico farad | The binary data is being stored in a memory cells that consist of several transistor | Data are stored within metal oxide semiconductor also known as MOS memory | Data are stored in a storage(hard disk or solid stare drive) |
| Function Summary: Data Movement | Control data by making the data to pass or block | Data pass through emitter to base to collector | It changes the voltages to control the data movement from its base and onto the collector | Can transfer data to new location |
| Function Summary: Control | It controls the flow of electrons as a switch | Same as vacuum tubes but more effective and efficient | Composing of passive and active devices making it more effective and efficient than a transistor | It function as the brain of a computer that has more complex than the previous generation of computer |