Generation of Computer	First Generation	Second Generation	Third Generation	Fourth Generation	Fifth Generation
Year	1945 – 1955	1955 – 1965	1965 – 1975	1975 – 1989	1989 to present
Processors	Vacuum tubes	Transistors	Integrated Circuit (IC) chips	Microprocessors/ single chip	Superscalar processors, Vector processors, SIMD processors, 32 bit micro controllers and embedded processors, Digital Signal Processors (DSP).
Manufacturers	ENIAC - Electronic Numerical Integrator And Calculator EDSAC – Electronic Delay Storage Automatic Calculator EDVAC – Electronic Discrete Variable Automatic Computer UNIVAC – Universal Automatic Computer IBM 701)	Manufacturers – IBM 7030, Digital Data Corporation's PDP 1/5/8 Honeywell 400	Small Scale Integration and Medium Scale Integration technology CPU, I/O processors System 360 Mainframe from IBM, PDP-8 Mini Computer from Digital Equipment Corporation	Intel's 8088,80286,80386,80486 .., Motorola's 68000, 68030, 68040, Apple II, CRAY I/2/X/MP etc	IBM notebooks, Pentium PCs-Pentium 1/2/3/4/Dual core/Quad core.. SUN work stations, Origin 2000, PARAM 10000, IBM SP/2 ULSI (Ultra Large Scale Integration) technology
Power	Consume more power with limited performance	Lesser power consumption and better performance	Low	Less	Very less
Cost	High cost, Very expensive	Lower cost	Comparatively lesser cost	Low cost	Very low
Language	assembly language	High level languages such as FORTRAN, COBOL	High level languages ANSI FORTRAN, ANSI COBOL etc	(LSI) Large-scale Integration,(VLSI) Very Large Scale Integration technology	language like JAVA, Super Large Scale Integrated (SLSI) chips
Memory	Mercury delay line memories and Electrostatic memories were used	Magnetic ferrite core memories random-access nonvolatile memory	magnetic core memories/ semiconductor memories (RAM & ROM)	Semiconductor memory chips	

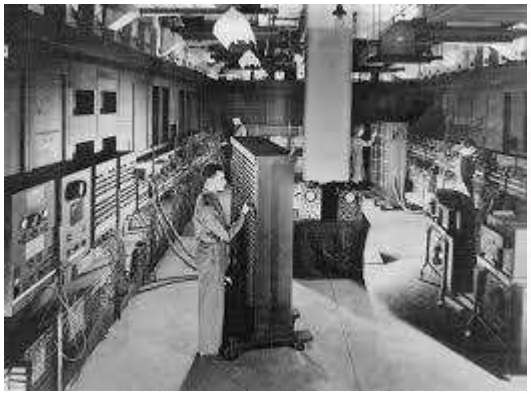
Input	Punched cards and paper tape were invented to feed programs	Punched cards continued during this period	keyboard and monitor were used	keyboard and monitor were used & External devices	keyboard and monitor were used
Secondary memory	Magnetic tape / magnetic drum	Magnetic tapes and magnetic disks	Cache and virtual memories	hard disks – Floppy disks & magnetic tapes	
Uses	scientific computations	Increasingly used in business, industry and commercial organizations for preparation of payroll, inventory control, marketing, production planning, research, scientific & engineering analysis and design	Database management, multi-user application, online systems like closed loop process control, airline reservation, interactive query systems, automatic industrial control	used in business, industry and commercial organizations, online systems etc	Quantum mechanism and nanotechnology will radically change the phase of computers
Size	Very large/ enormous in size and required a large room for installation	Large	Smaller & better performance	quite small	Tiny
Speed	Very slow	1000 fold increase in speed	Faster processors increased the speed and the efficiency	nanoseconds	nanoseconds
Operating system	-	-	Operating system software were introduced	Introduced C language and Unix OS/ Graphical User Interface, MS-DOS and MS-Windows	Windows 95/98/XP/…, LINUX, etc
LAN/WAN	-	-	-	LAN and WANS were developed	E-mail, e Commerce, Virtual libraries/Classrooms, multimedia applications

Maintenance	frequent malfunctioning and required constant maintenance	frequent maintenance	Lesser maintenance	Lesser maintenance	Artificial Intelligence includes areas like Expert System (ES), Natural Language Processing (NLP), speech recognition, voice recognition, robotics, etc. Scientists are working hard on the 5th generation computers with quite a few breakthroughs. It is based on the technique of Artificial Intelligence (AI). Computers can understand spoken words & imitate human reasoning. Can respond to its surroundings using different types of sensors. Scientists 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 technologies. IBM Watson computer is one example that outsmarts Harvard University Students. The advancement in modern technologies will revolutionize the computer in future.
Electricity	great deal of electricity	cheaper, energy efficient and reliable	Consumed lesser electricity	lesser electricity	
Work speed	milliseconds	microseconds	Nanoseconds	picoseconds	
Heat production	generated a lot of heat	great deal of heat	Generate less heat		
Outputs	displayed on printouts	printouts	Monitor, Printer, Scanner, etc	Monitor, Printer, Scanner, VDU etc	
Reliable	Unreliable	Reliable as compared to First generation computers	More reliable	Portable and reliable	
AC	Larger AC needed	AC needed	AC needed	No need	

Generation of Computer

The computer has evolved from a large-sized simple calculating machine to a smaller but much more powerful machine. The evolution of computer to the current state is defined in terms of the generations of computer. Each generation of computer is designed based on a new technological development, resulting in better, cheaper and smaller computers that are more powerful, faster and efficient than their predecessors. Currently, there are five generations of computer. In the following subsections, we will discuss the generations of computer in terms of—

i. the technology used by them (hardware and software),
ii. computing characteristics (speed, i.e., number of instructions executed per second),
iii. physical appearance, and
iv. their applications.



First Generation

Second Generation

Third Generation

Fourth Generation

Fifth Generation

Ma