

Introduction

History of modern computer

The computer is undoubtedly among mankind's most important inventions. The ability to compute and store data provides us with the ability to tackle problems that would likely be impossible to handle otherwise. It's hard to imagine scientists looking for the Higgs-Boson with nothing more than typewriters and legal pads. The electronic data processing does not go back more than just half a century i.e. they are in existence merely from early 1940's. In early days when our ancestor used to reside in cave the counting was a problem. Still it is stated becoming difficult. When they started using stone to count their animals or the possession they never knew that this day will lead to a computer of today. People today started following a set of procedure to perform calculation with these stones, which later led to creation of a digital counting device, which was the predecessor the first calculating device invented, was known as **ABACUS**.

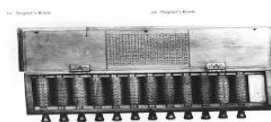
The ABACUS

Abacus is known to be the first mechanical calculating device. Which was used to be performed addition and subtraction easily? This device was a first develop Ed by the Egyptians in the 10th century B.C, but it was given it final shape in the 12th century A.D. by the Chinese educationists. Abacus is made of a wooden frame, metal rods, and wooden beads in which rod where fitted across with rounds beads sliding on the rod. It id dividing into two parts called 'Heaven' and 'Earth'. Heaven was the upper part and Earth was the lower one. Thus any number can be represented by placing the beads at proper place.



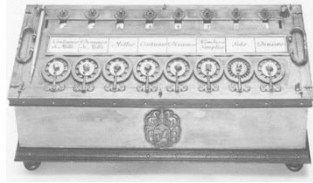
NAPIER'S BONES

John Napier's of Scotland invented a calculating device, in 1617 called the Napier Bones. It was a better calculating device. In this device, Napier's used the bone rods of the counting purpose where some number is printed on these rods. Using this machine they can do addition, multiplication, subtraction and division in efficient way.



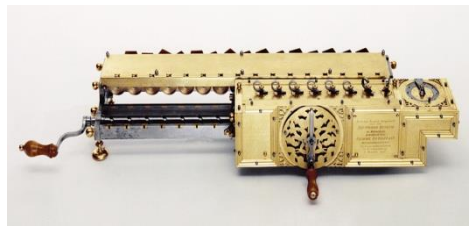
THE PASCAL'S CALCULATOR

In 1642, at the age of 19, a French mathematician name Biaise Pascal, invented the Passerine. The Passerine is the first mechanical and automatic calculator. It represents the position of digit with the help of gears in it. The machine is sometimes called adding machine or Pascal's calculator.



THE LEIBNIZ CALCULATOR

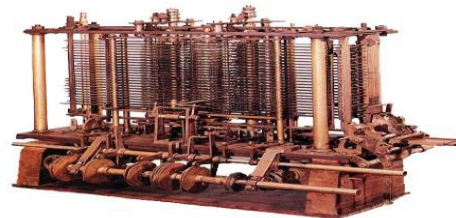
Gottfried Leibniz a German mathematical modified the Pascal calculator in 1673. He developed a machine called Liebnez Calculator which could perform various calculation based on multiplication and division as well.



ANALYTICAL ENGINE

The Analytical Engine was a mechanical computer that can solve any mathematical problem. It was invented by Charles Babbage a scientist form England invented in 1833. It uses punch-cards similar to those used by the Jacquard loom and can perform simple conditional operations.

For this great invention of the computer, Sir Charles Babbage is also known as the father of the computer.

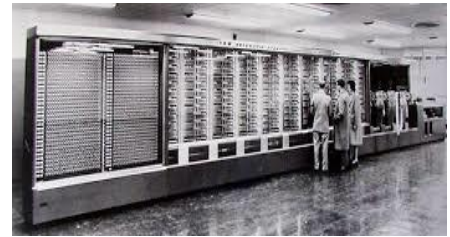


Harvard Mark I

The Harvard Mark-I completed in 1944, It was about 5-ton computer. This computers were electro-mechanical, which means they used mechanical components as part of the computing process. The Harvard Mark I was

one of many such machines, but it is unique because a team of engineers at IBM were involved in its creation.

The Harvard Mark-I read instructions via paper taper. It lacked many of the features of modern computers but inspired additional work both at Harvard (where it ended up) and at IBM (which helped to engineer it).



THE ENIAC

ENIAC was the world's first electronic general-purpose computer. It was digital, fully programmable and Turing complete. The massive computer, which weighed about twenty-seven tons, dwarfed the computational power of previous computers.

A number of improvements were made to the computer over the years, the most important of which was likely the inclusion of a stored programming mechanism in 1948. It was not, however, the first computer to have this feature.

Used primarily to help the United States military with artillery calculations, the first problem assigned to it was related to the design of the hydrogen bomb.



UNIVAC I (UNIVersal Automatic Computer)

In 1951, Eckert and Mauchly designed another computer called the UNIVAC (UNIVersal Automatic Computer). It was the first computer to be sold to businesses. UNIVAC contained 5,400 vacuum tubes and used magnetic tapes to give instructions to the computer. The UNIVAC was used to predict the presidential election of Dwight Eisenhower. No one believed the machine's prediction at first, but it was very accurate.



IBM System 360

The IBM System/360 mainframe computer sought to change that. It could be ordered in a variety of models with different processing power, but each machine was compatible with the others, which meant applications developed for any one machine would work on any variant. This development contributed to IBM's financial success and inspired the adoption of this approach in future computers.



Dynabook

Most computers that have changed history were not mere prototypes, but the Dynabook is the exception. Shown in 1968 by Alan Kay, this concept computer featured a display and keyboard attached on a single slate. It was small enough to carry with one hand but contained the two major user interface elements of the day – a display and keyboard.

There was no way to make the Dynabook with technology from that era, but its design was a major influence on Steve Jobs, who admired the prototype's simplicity. Every tablet computer designed since 1968 has some debt to pay to this design.



IBM 5150

The 1980s were the era of the IBM-Compatible PC. It all started with the IBM 5150, the first product introduced to the IBM-Compatible platform. The IBM 5150 was not a particularly revolutionary computer on its own, but it did feature everything that was needed from PCs at the time, such as a powerful 8088 CPU and an available floppy disk drive.

It was followed by a number of additional IBM products throughout the 1980s and a hoard of IBM-compatible models made by other manufacturers. The 5150 pioneered the PC as we know it today – a platform that can run common software despite differences in hardware.



Apple Macintosh

Apple's release of the Macintosh was announced by the famous "1984" advertisement. This gained major press attention and made the original Mac hugely influential, however, it was troubled by the fact that software from the era was programmed to run in a command-line interface.

Apple reached out to some developers to solve this problem, one of which was Microsoft. Redmond made a fair bit of money by porting its productivity software to the Mac.



General Introduction

Through the long history of human life, man's constant and urgent need to manufacture many devices and machines that help him accomplish tasks and make his life more comfortable is evident. If we take any period of time represented by several decades of years, we see that there are many devices in a person's life, some of which have become essential for life after it has gone through many stages of development, and another section is still in the development phase according to the benefit of people and as a result of the constant need for new devices that enter Human life, there are ideas for innovation and manufacture of such devices.

Phases of the computer life cycle

The computer is a device like the rest of the devices. It has three phases through which it reaches the shape present in our day and it is as follows:-

1- Develop the theoretical foundations

It includes the stage of laying the theoretical foundations by scientists (mathematics, physics, chemistry and engineering) for all phenomena related to the scientific field of the device. And developing theories and building mathematical models for them and this phase extended for the computer for the period 1900 - 1946. The most important achievement of the computer is the manufacture of the first digital computer ENIAC

2- In development

In which engineering designers (as a result of society's need) create new devices, as a simple initial version of the device is built using theoretical foundations and mathematical models in the first phase. Usually the initial version is expensive, incomplete goals and difficult to use, and during this phase the device goes through flying stations as a result of availability new capabilities and technologies, as advanced copies of the initial version are generated to obtain an integrated device that performs all the required tasks. This phase extended for computers to the period 1946-1970 and witnessed the emergence of a wide range of advanced large or mainframe computers.

3- Marketing developed

Designers' efforts at this stage focus on increasing the scope of the device's use so that it includes the general public by achieving the following goals:

1- Clarity of the purpose of using the device, which is done by finding different applications in the areas of community service.

2- Cheap Price: Finding suitable material and technical alternatives in which the price is cheaply achieved while maintaining the performance level of the device.

3- Ease of use: finding technical ways to hide the complex details of the device from the user, so that the device can be dealt with transparency and ease. This phase extended for the computer from 1970 to 2000 and witnessed the emergence of

- Personal computer
- Windows operating system
- computer networks
- The internet
- Middleware

After the third phase, the device becomes one of the necessities of human life, so it continues until the need for a mechanism is satisfied or after another device is invented that performs the job better, as the computer has become one of the necessary devices that are used in almost all fields, and the digital computer has faced some problems in this phase, including.

1- The philosophy of the digital computer is to build an information processing center whose core is the main computer, which is characterized by the ability of super-high information processing and needs operating persons to prepare the computer so that users can use and implement their programs. With the increase in the number of users, the issue has become more complex, in addition to the fact that the prices of main computers are very expensive, and it is difficult for small enterprises and people to purchase them, so in the marketing phase, the conversion has been made to the philosophy of producing a computer with limited capabilities.

2- With the advent of the personal computer, the operating person was dispensed with and was replaced by the DOS disk operating system, which requires the user to have a level of skill in using and writing commands and following his instructions, and this matter is not easy. A small graphic called the icon is linked to the DOS system commands, making it easy for the user to deal with the operating system commands without them.

- 3- The personal computer is characterized by limited capabilities in terms of performance speed and memory size relative to the main computers, which made it weak in front of some tasks or the loss of some applications that were performed by the main computer. The idea of a computer network came from the need to share the information on the dispersed computers and the inability of the available transmission media at the time. From its transfer and after a long period and due to the progress of ideas, the possibility of applying engineering models and the development of technology, the sharing of resources was possible.
- 4- The user needs some special skills in how to deal with the computer network system, such as: knowing the location of the information he needs within the group of connected computers with some access to the required information by writing path commands and to facilitate the task for the user and not needing these skills. It allowed the user to deal with computers connected to some in an easy way, as the idea of connecting computers for the purpose of transferring and sharing data came, and after a long time came the possibility of sharing resources between computers to accomplish a specific task.

After the year 2000, the computer was included in the necessary equipment for human life, so it cannot be dispensed with in all aspects of daily life. It is present at home in home appliances and in elevators, and it is found in the office to run administrative matters, write letters, browse newspapers and magazines, and follow daily news. And it has an important role in the hospital, as most medical devices are used in computers and are located on mobile phones, cars, and so on.

Generation of modern computer Introduction

Computer is one of the marvelous inventions of the recent times. Necessity is the mother of invention. Man always wanted to do some counting or computing. Modern man can count or calculate small numbers with ease, but his requirement for data processing is so enormous that he needs a machine that can instantly process the data captured from source and provide real time response. The early devices such as **abacus** and slide rule cannot keep pace with his needs. The progress of man from pebbles to Personal Computer is a great march in technological history of mankind. The **history of computers** dates back to the age when man started using tools for computations. The whole history of computing can be divided into two periods based on the technology used in computing devices such as mechanical era and electronic era.

Following are the main five generation of the computer system:

1- First Generation of modern computer (1951 - 1958)

The period of first generation was 1951 - 1958. Computers of first generation used vacuum tubes as the basic components for memory and circuitry for Central Processing Unit. The first electronic computer, ENIAC (Electronic Numerical Integrator and calculator) was developed in 1947 at the University of Pennsylvania, USA. This machine had vacuum tubes as switching devices. Von Neumann introduced the concept of stored program by around the same time and the first digital computer using program, EDSAC (Electronic Delay Storage Automatic Calculator), was announced in 1949.

They were very large in size, consumed lot of power and emitted too much of heat. They required to be housed in large air-conditioned rooms.

During this period, computer programming was mainly done in machine language. The user had to be both an electronics expert and a programmer to use the computer for any task.



Advantages of First Generation of Computer:

- » These computers fast and could calculate data in millisecond.
- » Vacuum tubes were the only electronic component available during those days.
- » Vacuum tube technology made possible to make electronic digital computers.
- » Easily available and inexpensive.
- » Tactile sensitivity is preserved.

Disadvantages of First Generation of Computer:

- » The computers were very large in size.
- » They consumed a large amount of energy.
- » Air conditioning was required.
- » Constant maintenance was required.
- » Costly commercial production.
- » Very slow speed.
- » Limited programming capabilities.
- » Used machine language only.
- » Used magnetic drums which provide very less data storage.

Example of First Generation of Computer:

1. ENIAC (1946) ,
2. UNIVAC-1 (1951)

2- Second Generation of modern computer (1959 - 1964)

The period of second generation was 1959-1964. In second generation of computer transistors were used. The transistors were highly reliable and easier to handle and maintain than the vacuum tubes. They required much less power. These transistors replaced vacuum tubes in computers during this period. The magnetic cores were used to construct large random access memories. Magnetic disk storage was also developed during this period. Commercial applications rapidly developed during this period and dominated computer use by mid 1960s. This period also witnessed development of high level languages (like FORTRAN, COBOL, ALGOL, and SNOWBOL) and operating systems. The computers used multiprogramming and batch processing operating system.



Advantages of Second Generation of Computer:

- » Smaller in size compared to the first generation of computer.
- » The second generations computers were more reliable.
- » Used less energy and were not heated as much as the first one.
- » Better speed and could calculate data in microseconds.
- » Used faster peripherals.
- » Better portability as compared to the first generation.
- » Accuracy improved.
- » Used assembly language as well.

Disadvantages of First Generation of Computer:

- » Cooling system was required.
- » Only used for specific purposes
- » Constant maintenance was required
- » Commercial production was difficult
- » Puch cards were used for input.

Example of Second Generation of Computer:

Honeywell 400 , IBM 7094 , CDC 1604 , CDC 3600 ,UNIVAC 1108, IBM 7030

3- Third Generation of modern computer (1965 - 1970)

The period of third generation was 1965-1970. In this generation silicon transistors replaced germanium transistors. Integrated circuits were developed by interconnecting transistors, resistors and capacitors grown on a single chip of silicon. Integrated Circuit (IC) chips were used in computers. ICs were small in size, less power consuming and less expensive than the previous switching technology. Advances in storage technologies resulted in creating large capacity magnetic disks and tapes and large magnetic core based random access memory. On software front, high level languages were improved. Fortran IV and optimizing Fortran compilers were developed. Standardizations of COBOL (COBOL 68) was another major development during this period.



Advantages of Third Generation of Computer:

- » Smaller in size as compared to previous generations.
- » More reliable as compared to previous generations.
- » Used less energy as compared to previous generations.
- » Produced less heat as compared to the previous two generations of computers.
- » Maintenance cost was low because hardware failure is area .
- » Better speed and could calculate data in nanoseconds.
- » Totally general purpose
- » Could be used for high-level languages.
- » Less expensive and Better accuracy
- » Used mouse and keyboard for input.

Disadvantages of First Generation of Computer:

- » Air conditioning was required.
- » Highly sophisticated technology required for the manufacturing of IC chips.
- » Tactile sensitivity is decreased

Example of Third Generation of Computer:

IBM 360/370, CDC 6600, Honeywell-6000 series, PDP(Personal Data Processor), TDC-316 , IBM-370/168

4- Forth Generation of modern computer (1971 - 1989)

The period of fourth generation was 1971-1989. The fourth generation computers were made using very large scale integration technology. Tens of thousands of components were packed on a single chip, the size of a fingernail. It led to the development of microprocessor. Magnetic core memories were replaced by semiconductor memories. Personal computer operating systems were developed during this period.

Graphic User Interface (GUI) technology was exploited to offer more comfort to users. PCs became more affordable and widespread during this period.

A significant development in software was the development of concurrent programming languages like ADA. Another notable development was the introduction of interactive graphic devices and language interfaces to graphic systems



Advantages of Fourth Generation of Computer:

- » More powerful and reliable than previous generations.
- » Small in size
- » Fan for heat discharging and thus to keep cold.
- » Fast processing power with less power consumption
- » No air conditioning required.
- » Totally general purpose
- » Less need of repair.
- » Commercial production
- » All types of High level languages can be used in this type of computers
- » Cheapest among all generations

Disadvantages of Fourth Generation of Computer:

- » The latest technology is required for manufacturing of Microprocessors.

Example of Third Generation of Computer:

IBM PC, Apple II, VAX 9000, CRAY, DEC 10 , STAR 1000

5- Fifth Generation of modern computer (1990 onwards)

Very Large Scale Integration (VLSI) technology gave way to Ultra Large Scale Integration that led to the development of microprocessor chip with several million electronic components on each. Powerful laptops, notebook PCs and desktops were the other developments during this period.

The fifth generation is essentially about a new super-breed of computers. These computers will be able to think and take decisions. Artificial Intelligence is being built into the computer. The revolutionary parallel processing is being used in the new breed of computers in place of conventional Von Neumann architecture.

On the software front, effort is being directed at developing languages to cope with such new generation computers. Languages known as functional languages and object-oriented languages such as C++ have been developed during this generation. Development of more user-friendly operating systems like MS Windows and Linux, and Linux based software products are the other developments during this period.



A advantage of Fifth Generation of Computer:

- » These computers are much faster than other generation computers.
- » It is easier to repair these computers.
- » These computers are much smaller in size than other generation computers
- » They are portable and easy to handle and Development of true artificial intelligence.
- » Advancement in Parallel Processing.
- » Advancement in Superconductor technology.

Disadvantages of Fifth Generation of Computer:

- » They tend to be sophisticated and complex tools.
- » They can give more power to companies to watch what you are doing and even allow them to infect your computer.

Example of Third Generation of Computer:

Desktop, , Laptop, Notebooks, Ultra Book, Chrome Book