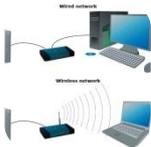


Introduction to Computer Systems

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Introducing Computer Systems

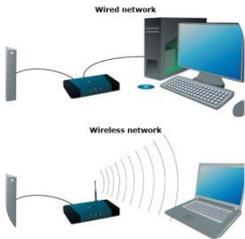


Exploring computers and uses



Looking inside the computers

Exploring Computers and Uses



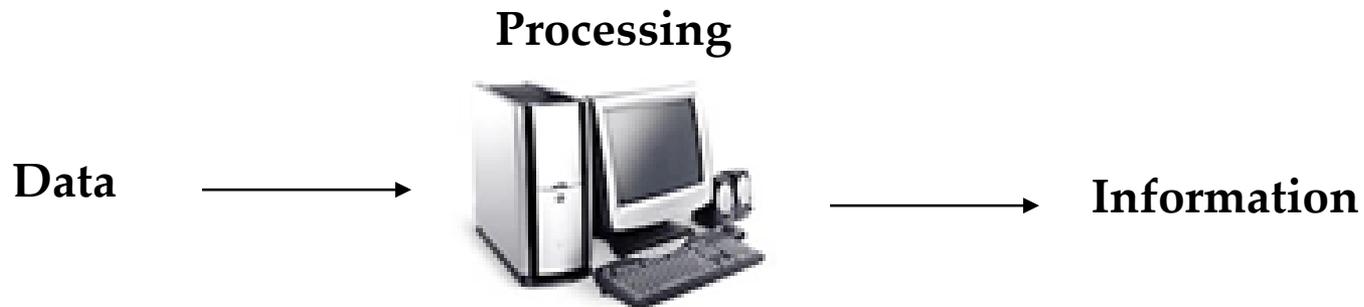
Definitions



Computer for Individual Users
Computer for Organization

Computer

- A computer is a machine that reads, stores, manipulates and displays data.
- A computer is a machine that manipulates data according to a set of instructions called a computer program.
- The program has an executable form that the computer can use directly to execute the instructions.



Computation

- "In a general way, we can define computing to mean any goal-oriented activity requiring, benefiting from, or creating computers.

Thus, computing includes:

- designing and building hardware and software systems for a wide range of purposes;
- processing, structuring, and managing various kinds of information;
- doing scientific studies using computers;
- making computer systems behave intelligently;
- creating and using communications and entertainment media;
- finding and gathering information relevant to any particular purpose, and so on.

Computation

- The term "computing" is also synonymous with counting and calculating.
- The discipline of computing is the systematic study of algorithmic processes that describe and transform information: their theory, analysis, design, efficiency, implementation, and application.
- The fundamental question underlying all computing is "What can be (efficiently) automated?"

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Digital vs Analog Computers

- **A digital computer uses distinct values to represent the data internally. All information are represented using the digits 0s and 1s**
- **Analog computer is a computer that represents data as variable across a continuous range of values.**

Characteristics of Computer systems

- **Speed:** The computer can process data very fast, at the rate of millions of instructions per second.
- **Accuracy:** Computer provides a high degree of accuracy.
- **Diligence:** Computers are capable of performing any task given to them repetitively.
- **Storage Capability:** Large volumes of data and information can be stored in the computer and also retrieved whenever required.
- **Versatility:** Computer is versatile in nature. It can perform different types of tasks with the same ease.

History of Computer systems

Two Eras:

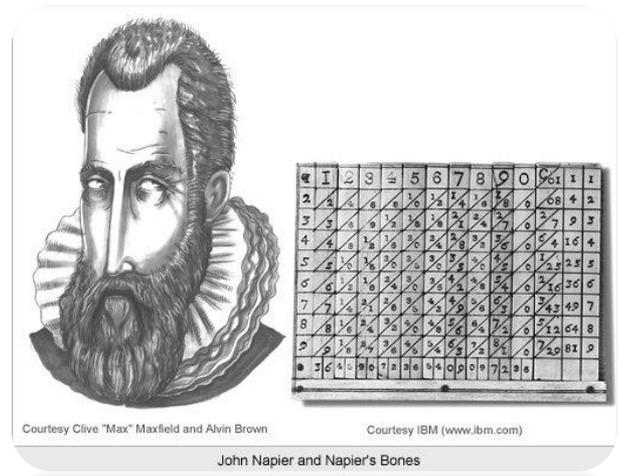
- Mechanical Age – Before 1945
- Electronic Age – After 1945

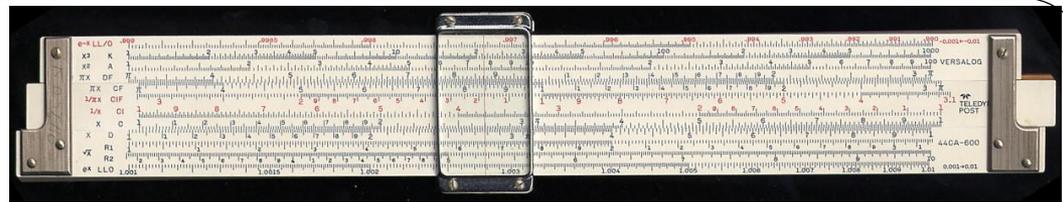
Divided into different generations:

- First Generation (1940 – 1956)
- Second Generation (1956 – 1963)
- Third Generation (1964 – 1971)
- Fourth Generation (1971 – present)
- Fifth Generation (Present – next age)

History of Computer systems

- Calculating Machines ABACUS was the first mechanical calculating device for counting of large numbers.
- Napier's Bones was a mechanical device built for the purpose of multiplication in 1617 AD. by an English mathematician John Napier.



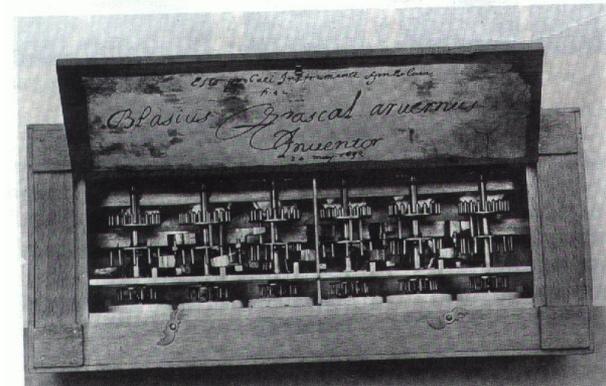


- Slide Rule was developed by an English mathematician Edmund Gunter in the 16th century.

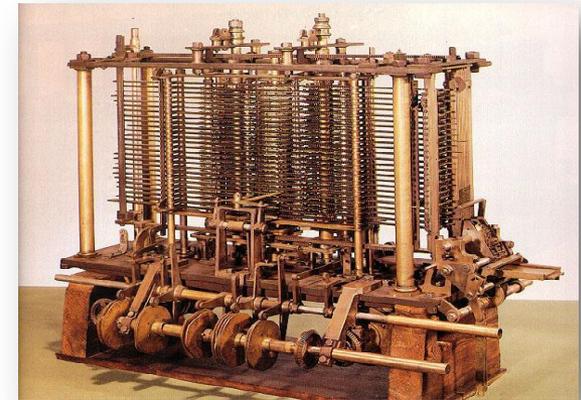
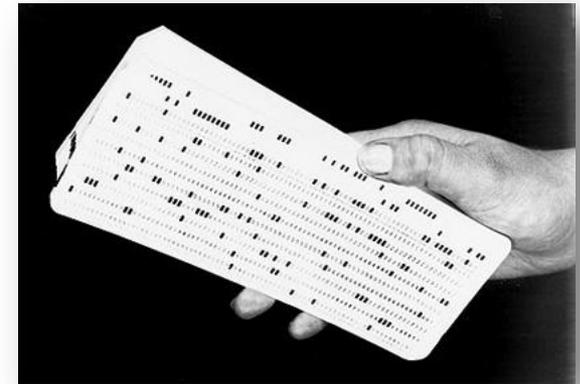
- Pascal's Adding and Subtraction Machine was developed by Blaise Pascal. It could add and subtract. The machine consisted of wheels, gears and cylinders.

- Leibniz's Multiplication and Dividing Machine was a mechanical device that could both multiply and divide. The German philosopher and mathematician Gottfried Leibniz built it around 1673.

Figure 12-3 Pascal's Adding Machine



- Punch Card System was developed by Jacquard to control the power loom in 1801. He invented the punched card reader that could recognize the presence of hole in the punched card as binary one and the absence of the hole as binary zero.
- Babbage's Analytical Engine An English man Charles Babbage built a mechanical machine to do complex mathematical calculations, in the year 1823. The machine was called as difference engine.
- Hollerith's Punched Card Tabulating Machine was invented by Herman Hollerith. The machine could read the information from a punched card and process it electronically.



Computer for individual user

- **Desktop computers**
- **Workstations**
- **Notebook computers**
- **Tablet computers**
- **Handheld computers**
- **Smartphones**

Computer for organizations

- **Network server**
- **Mainframe computers**
- **Minicomputers**
- **Super computers**

Components of Computer Systems

- Hardware
- Software
- Data
- User



Hardware

- Hardware consists of the mechanical parts that make up the computer as a machine.
- The hardware consists of physical devices of the computer.
- The devices are required for input, output, storage and processing of the data. Keyboard, monitor, hard disk drive, floppy disk drive, printer, processor and motherboard are some of the hardware devices.

Software

- Software is a set of instructions that tells the computer about the tasks to be performed and how these tasks are to be performed.
- Program is a set of instructions, written in a language understood by the computer, to perform a specific task.
- A set of programs and documents are collectively called software.

Data

- Data are isolated values or raw facts, which by themselves have no much significance.
- The data is provided as input to the computer, which is processed to generate some meaningful information.

User

- Users are people who write computer programs or interact with the computer.
- They are also known as skinware, liveware, humanware or peopleware.
- Programmers, data entry operators, system analyst and computer hardware engineers fall into this category.

Input-Process-Output Concept

- **Input**
- **Process**
- **Output**
- **Storage**



Application of Computers

- Education
- Entertainment
- Sports
- Science and Engineering
- Medical
- Organization/Management
- Home

