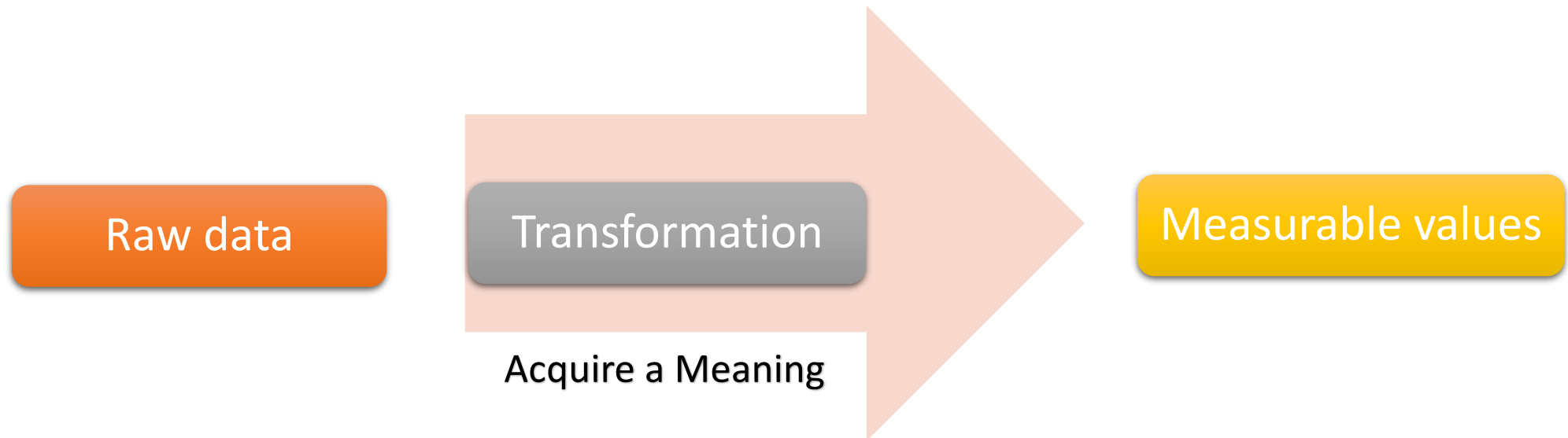


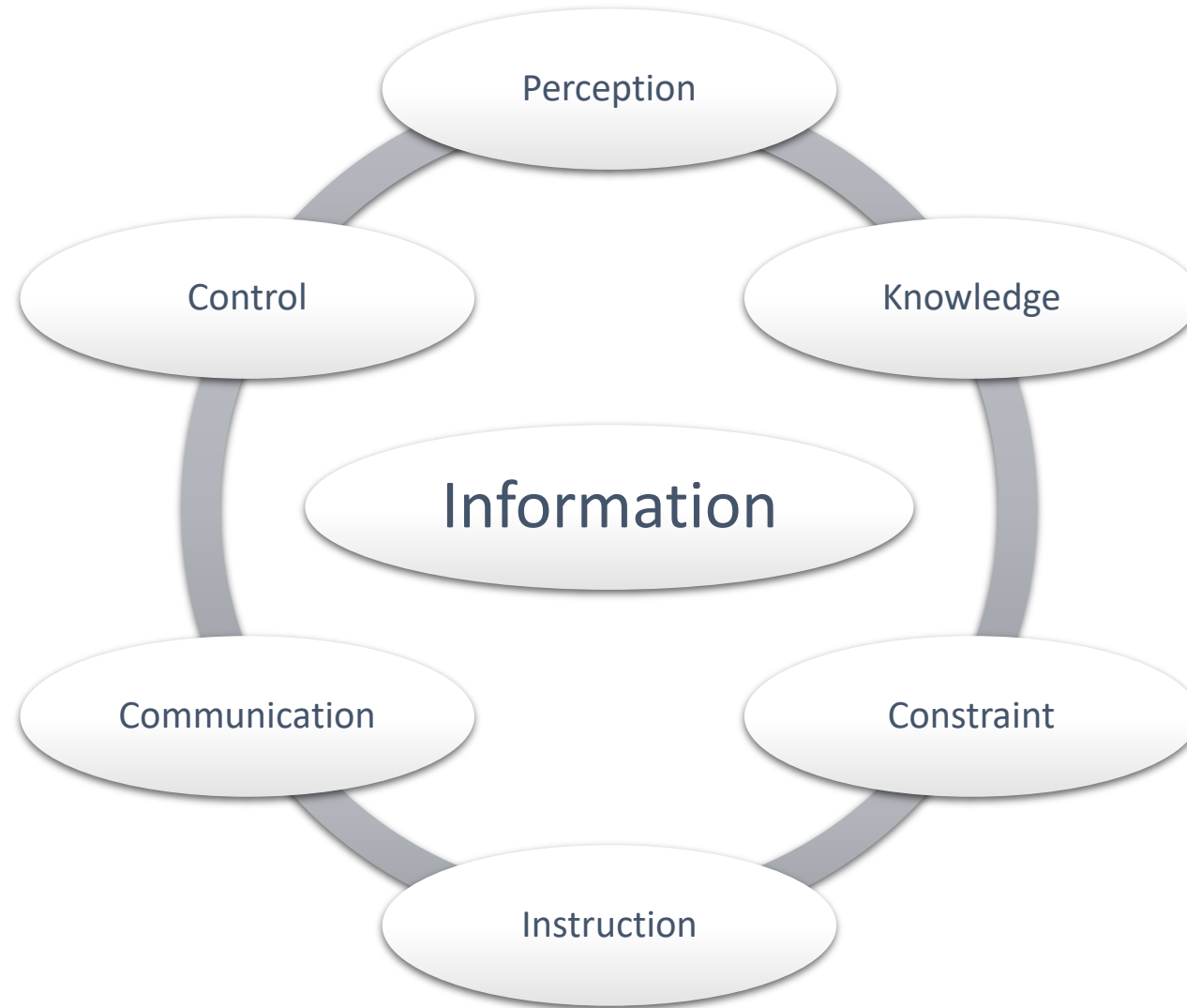
An Overview of Computers

Data

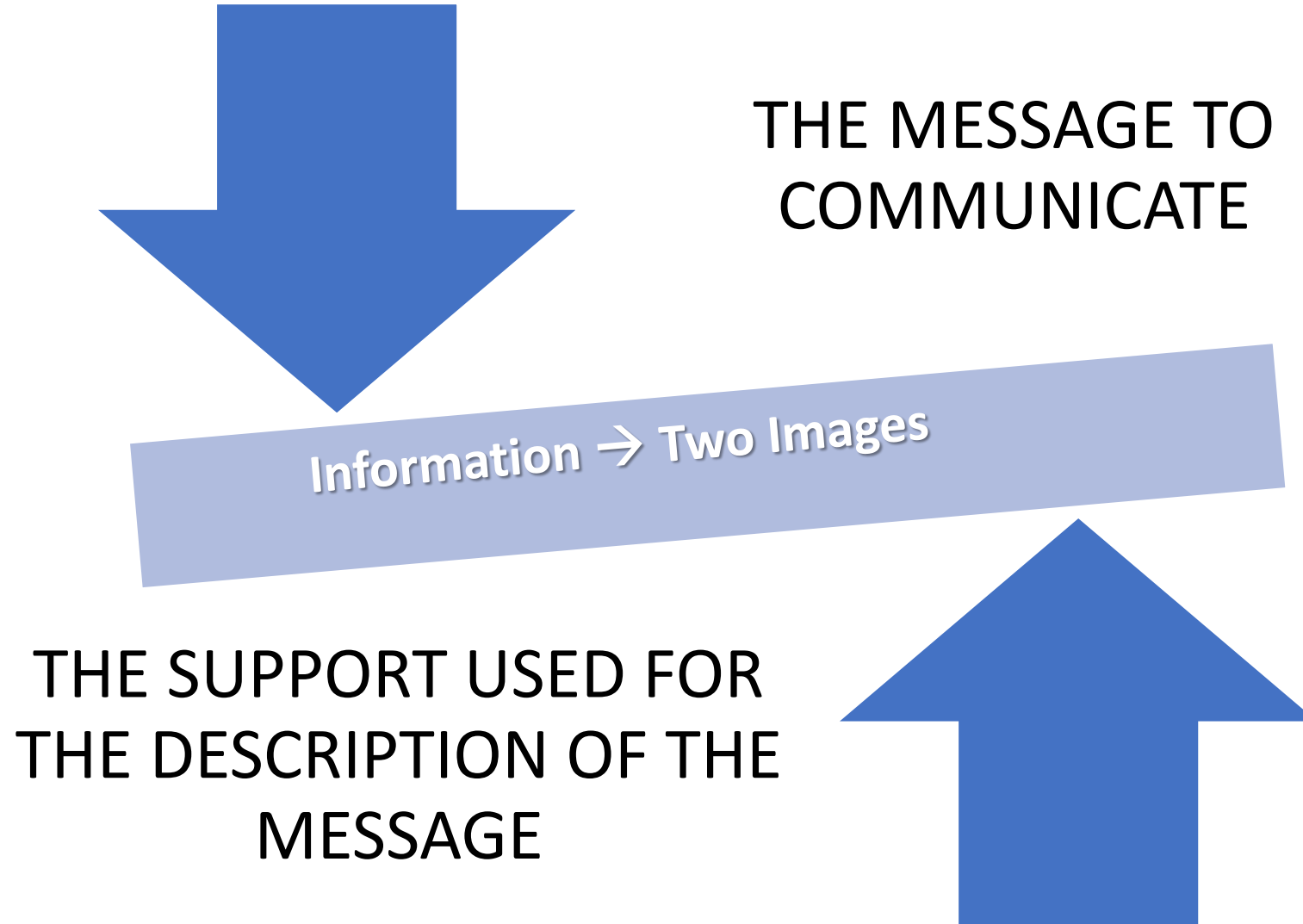
- The word 'data' represents an elementary description of a reality devoid of any reasoning



Informations



Informations



Informations

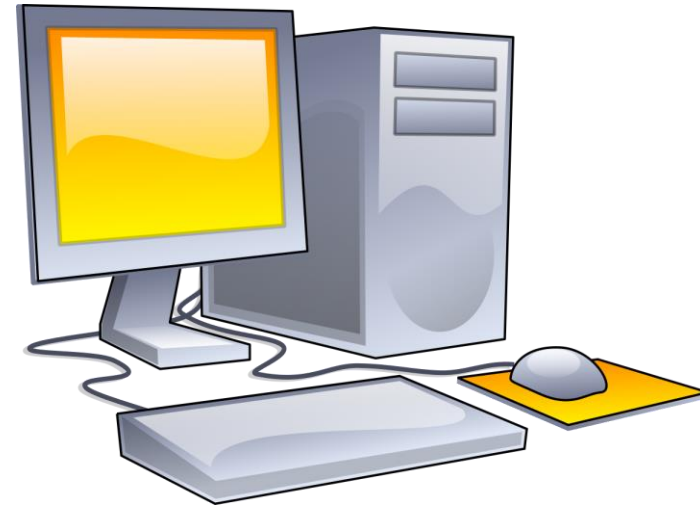
- At the computer level, the concept of information is completely ambiguous.
- The computer is not able of understanding the meaning of information, it simply manipulates the codes that represent it.

Informations

Exemple :



قط = CHAT = Cat



قط ≠ CHAT ≠ Cat

Computer science

Computer science is the study and discipline that deals with:

- The theoretical foundations,
- Design,
- Development,
- Application

Computer science

It encompasses a wide range of topics, including

- Algorithms,
- Programming languages,
- Data structures,
- Computer hardware,
- Artificial intelligence,
- Software engineering

Computer science

Definition: A science that refers to any process involving an automatic and rational information processing mechanism using a specialized machine called a “Computer”.

Computer Science = Automatic information processing by a
computer

Computer science

- Most people imagine that computer machines understand the meaning of the information they process
- Computers themselves do not possess intelligence; they process instructions and data based on codes and algorithms designed by humans to represent knowledge and perform tasks.

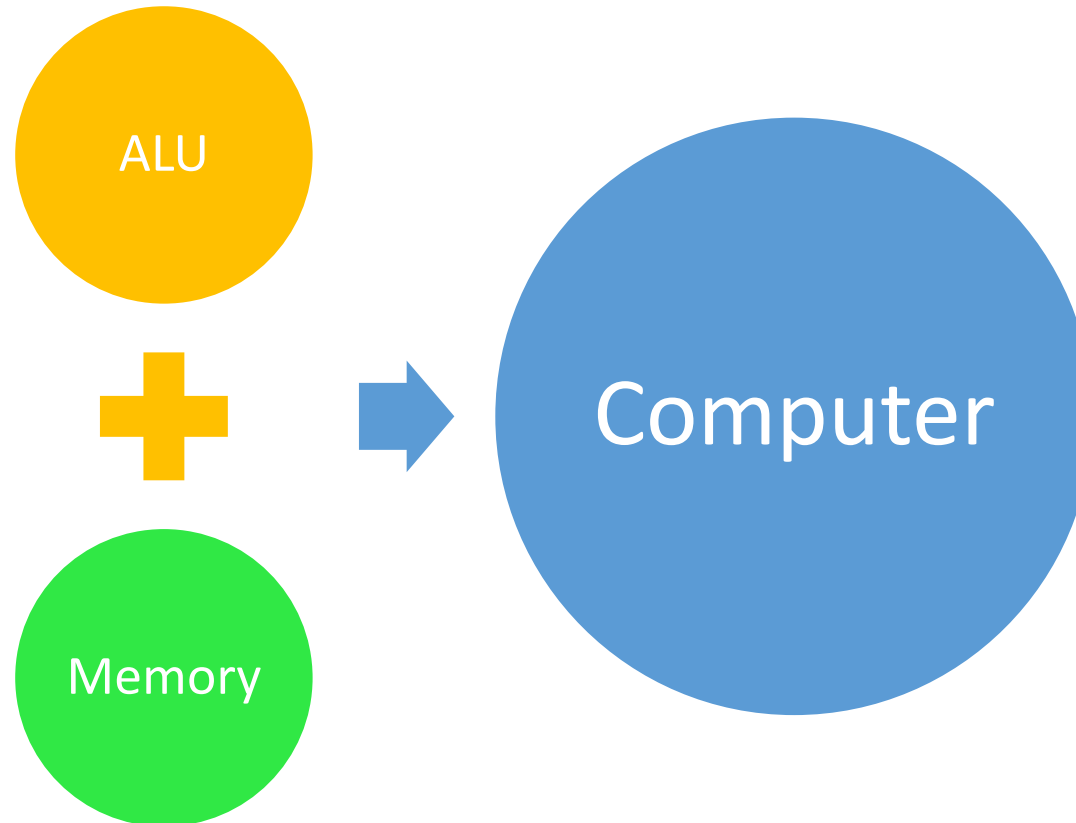
Computer science

Example :

A calculator is an electronic system that, when asked to perform the addition of 7 and 2, has mechanisms such as the codes 7 and 2 being manipulated by the addition mechanism to yield the code 9, which to us is indeed the code representing the sum.

Computer science

- We exclusively use computers that operate according to the principles of the Von Neumann machine.



Computer science

The arithmetic and logic unit (ALU)

- The role of this unit is to sequentially execute a program.
- The difference between Von Neumann's vision and older machines is that this unit is built without any a priori knowledge of its domain of use.
- When it is constructed, we do not know what it will be used for."

Computer science

Memory

- Memory is the component responsible for both storing and subsequently retrieving data in the Von Neumann architecture.
- Programs and data are treated equally in memory.
- Additionally, a computer must have supplementary components to enable users to input their information into memory and retrieve it after the machine has processed it through input and output operations.

Computer

- Computers are tools that assist us in solving problems.
- These problems typically involve symbols or signs such as:

→ The letters of the alphabet,

→ The numbers,

→ Punctuation marks

→ Special characters

Computer types

Supercomputers

Also called mainframes

Extremely high performance

Huge input-output capabilities

A high level of reliability

A computing speed equal to several thousand simple computers

Very large storage capacity.

Computer types

Supercomputers

- Supercomputers are used for performing heavy calculations or processing large volumes of data.
- Among the sectors that may use this technology, we find:
 - Weather forecasting,
 - Astronomy,
 - Molecular modeling,
 - Physical simulations,
 - Cryptanalysis,

Computer types

Supercomputers



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Computer types

Desktop computers

- Desktop computers are stationary computers designed to be used on a desk or table.
- They can be larger and more powerful than other types of personal computers, but require space due to the box.

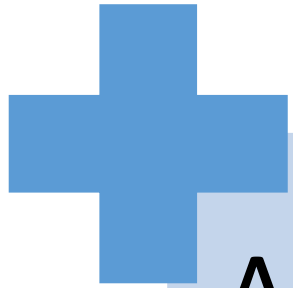
Computer types

Desktop computers



Computer types

Desktop computers



Advantages

- Scalability
- Focused on image processing, 3D modeling and video games.

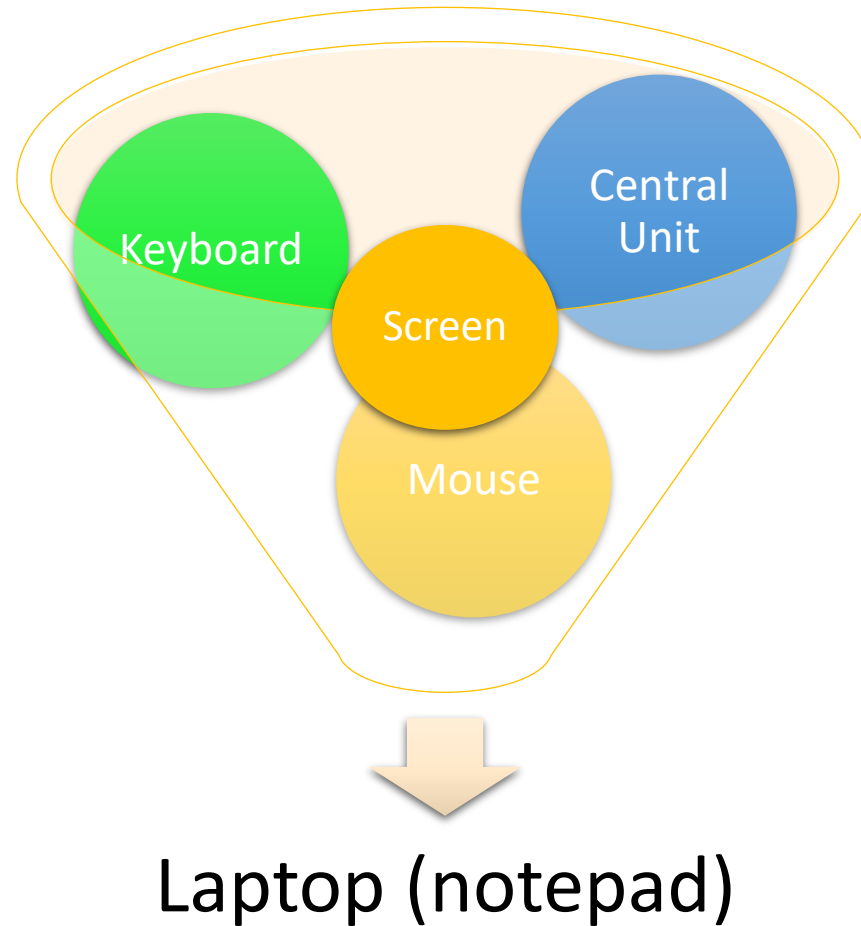
Drawbacks

- Very high power consumption
- Size



Computer types

Laptop



Computer types

Laptop



Advantages

- Portable
- Lightweight
- Thin screen
- Reduced consumption (Battery)



Drawbacks

- Reduced scalability

Computer types

Handhelds

Also called personal digital assistants, are battery-powered computers with reduced size.

➤ Features offered:

- Address storage
- Storage of telephone numbers
- Web browsing
- Games

Computer types

Tablet

- Tablets are computers that combine the functionality of laptops and handheld computers.
- They are made up of a box integrating a touch screen as well as a certain number of incorporated peripherals.
- Tablets became very popular after the introduction of the iPad in 2010.

Computer types

Multimedia Centers

- Also called a minicomputer, the multimedia center is a small box which does not have a screen or keyboard and which is located between a desktop computer and a laptop.
- Minicomputers feature laptop-like power with low power consumption.

Computer types

Multimedia Centers

- They represent a hardware platform, intended for use in the living room for controlling hi-fi elements.
- They can be connected to a television to serve as media

Servers

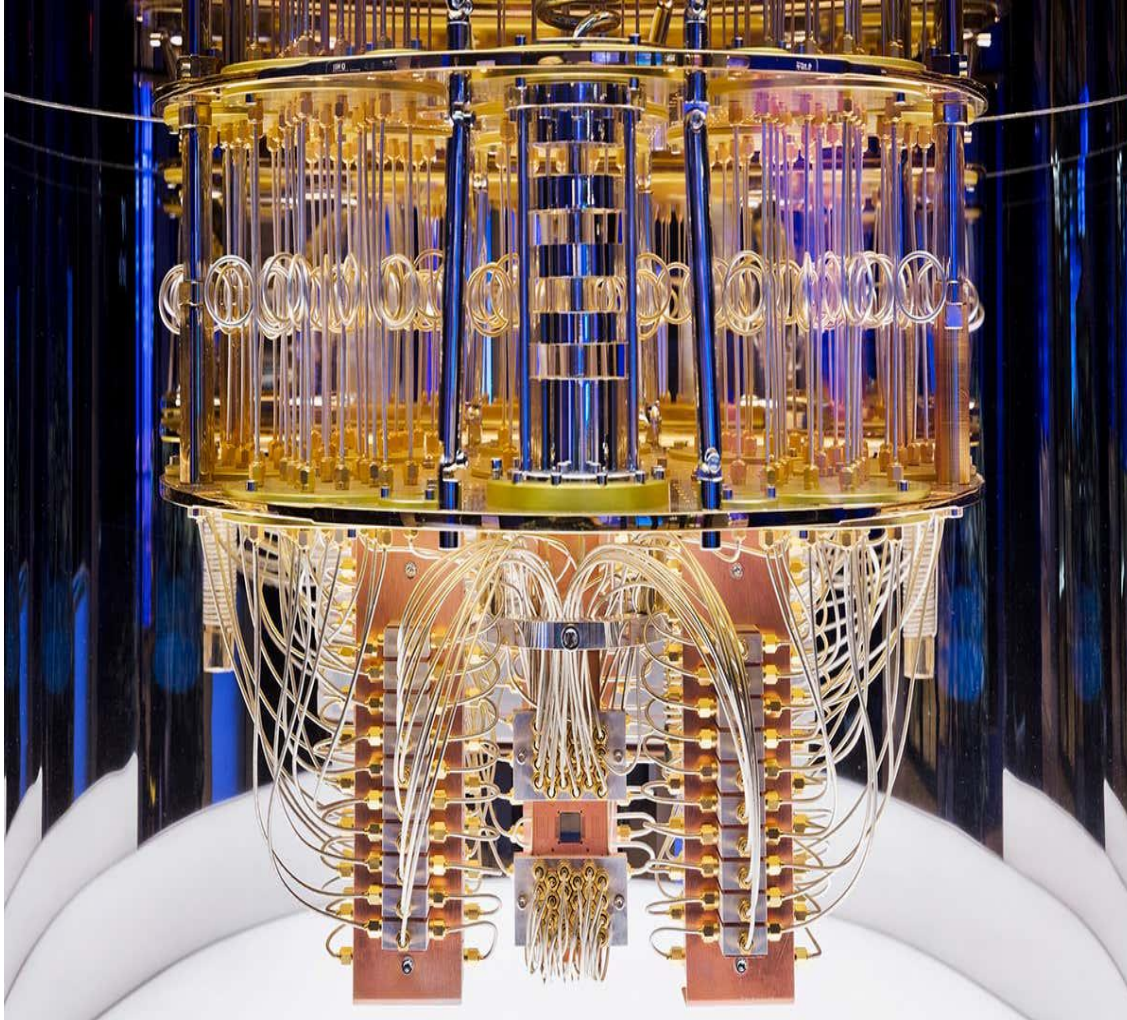
Servers are computers that help other computers by providing services, such as hosting websites or managing databases.



Quantum Computers

- A quantum computer is a new type of computer that uses the science of quantum mechanics.
- Traditional computers use bits (0 or 1), but quantum computers use qubits, which can be 0, 1, or both at the same time!
- Quantum computers can solve certain problems faster than regular computers, like cracking codes or discovering new medicines.

Quantum Computers



Comparison of Computer Types

Type	Use	Speed
Desktop & Laptop	Everyday tasks	Moderate
Tablet & Smartphone	Browsing, apps, communication	Moderate to fast
Multimedia Computer	Media creation and gaming	Fast
Supercomputer	Large-scale scientific tasks	Extremely fast
Server	Serving multiple computers in a network	Depends on tasks
Quantum Computer	Solving specific complex problems	Potentially much faster

Parts of a computer

Hardware

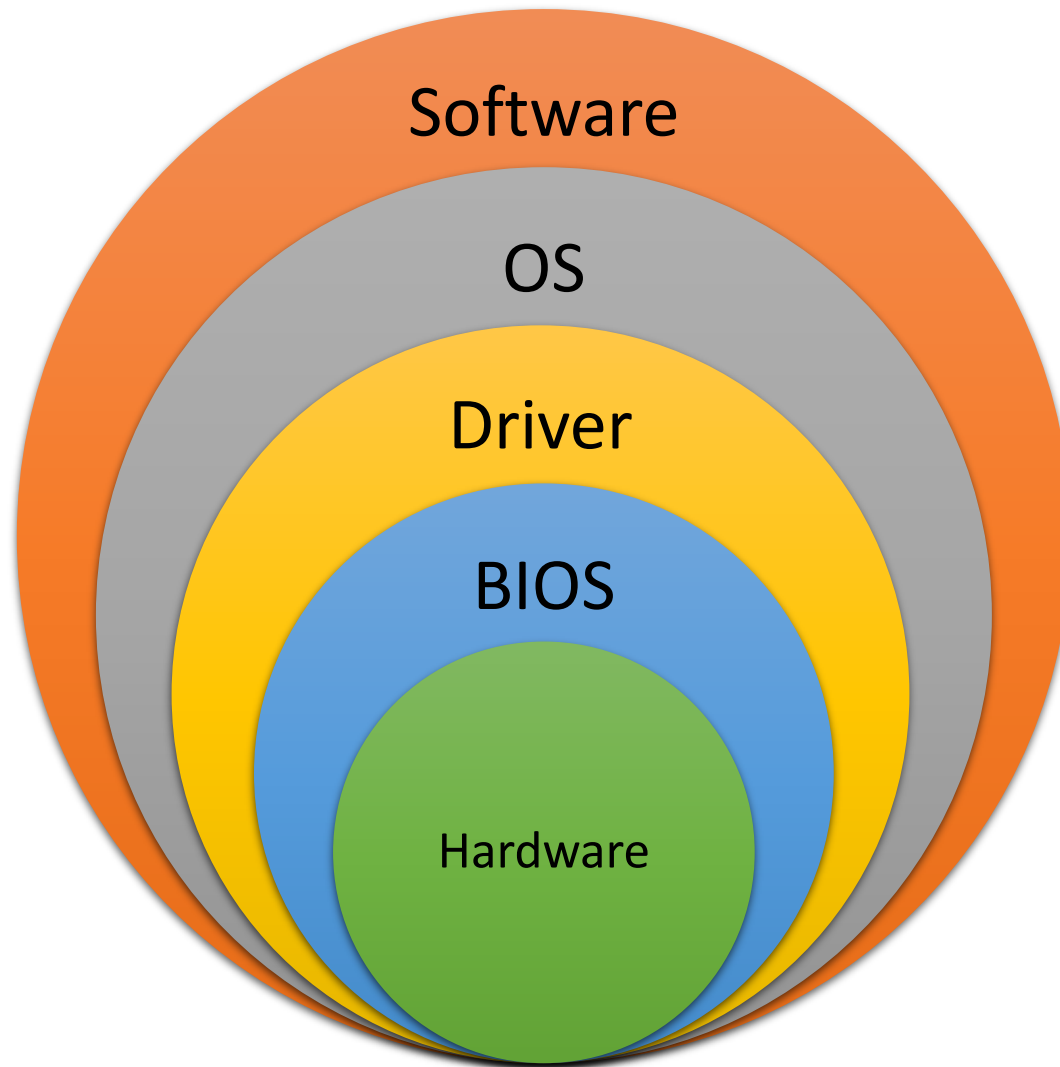
This part brings together all the electronic components that can be broken down and offer the possibility of replacing them with other components in order to improve the performance of the computer.

Parts of a computer

Software

- A set of programs with different tasks in the same context of use.
- Can be classified as application, standard or specific system.
- May be free or commercialized.
- Software is a set of programs ensuring the management and control of the hardware part of the computer.

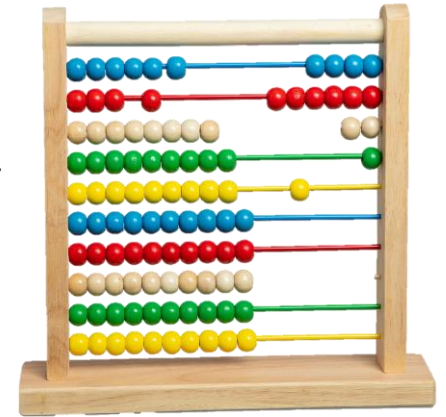
Parts of a computer



Historical

Ancient and Pre-Modern Era

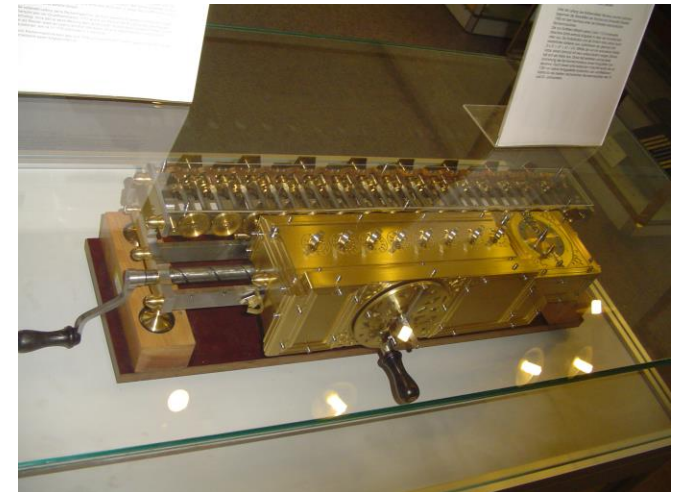
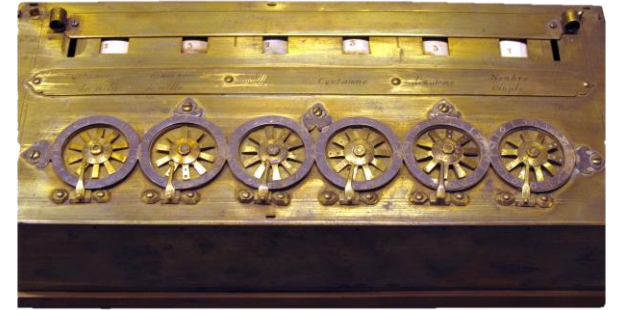
- Abacus (3000 BC): Considered the first counting device, the abacus is a simple counting tool used by ancient civilizations.
- Antikythera Mechanism (1st or 2nd century BC): An ancient Greek analog computer used for astronomical calculations.



Historical

Mechanical Calculators (17th - 19th Century)

- Blaise Pascal's Pascaline (1642): A mechanical calculator invented by Blaise Pascal for addition and subtraction.
- Gottfried Wilhelm Leibniz's Step Reckoner (1671): A more advanced calculator capable of multiplication and division.



Historical

Industrial Revolution and Analytical Engine (19th Century):

- Charles Babbage's Analytical Engine (1837): Designed but never built, it is considered the first general-purpose mechanical computer, featuring an arithmetic logic unit and memory.



Historical

Electromechanical Era (Late 19th - Early 20th Century):

- Herman Hollerith's Tabulating Machine (1887): Used punched cards to tabulate and process data, notably for the U.S. Census.
- Alan Turing's Turing Machine (1936): A theoretical model of computation, laying the foundation for modern computer science.



Historical

Electronic Computers (Mid-20th Century):

- ENIAC (1946): Considered the first general-purpose electronic digital computer, capable of solving a wide range of numerical problems.
- UNIVAC I (1951): The first commercially available computer in the United States.
- IBM 360 Series (1964): Introduced a family of computers, making compatibility and software interchangeability possible.
- Microprocessors (1970s): The invention of microprocessors by Intel and others led to the development of personal computers and the microcomputer revolution.

Historical

Personal Computers and Modern Era (1970s - Present):

- Apple II (1977): A popular early personal computer, bringing computing to homes and schools.
- IBM PC (1981): Standardized personal computing, leading to the widespread adoption of PCs.
- Graphical User Interface (1980s - 1990s): Apple Macintosh and Microsoft Windows popularized user-friendly interfaces.

Historical

Personal Computers and Modern Era (1970s - Present):

- Internet and World Wide Web (1990s): The internet transformed communication, commerce, and information sharing globally.
- Smartphones and Tablets (2000s - Present): Mobile devices like iPhones and Android smartphones revolutionized personal computing and communication.
- Cloud Computing and Artificial Intelligence (2010s - Present): Advancements in cloud technology and AI have reshaped computing, enabling powerful data processing and machine learning applications.