COMPUTERS

1. **DEFINITION** = programmable device that can store, retrieve and process data.
   - Unlike previous inventions → they helped us with the THINKING PROBLEMS/WORK, in order to manipulate INFORMATION
     - VS manual work, to move or manipulate physical things, such as stones or heavy objects

2. **COMMON FEATURES** = any device can be considered a computer if it perform 4 different tasks
   - TAKE AN INPUT = ways of getting information into the computer
   - STORE INFORMATION
   - PROCESS INFORMATION = manipulating or changing info using a series of commands (algorithms)
   - OUTPUT THE RESULTS = the type of input depends on what the computer is designed to do.

3. **EVOLUTION AND SHAPE**
   - the first computers were made up of wood and metal, with mechanical levers and gears
   - By the 20th century, electical components appeared. Computers were big and as large as a room, quite slow, in fact they used to take hours to solve basic math problems. They worked as basic calculators and could manipulate numbers.
   - Nowadays computers look very different and can perform very complex tasks.

   The evolution of computers also depended on the needs for information people used to have and the social needs and life requirements
   - ORIGINS → the need for numbers emerged when people began trading goods

   Some important steps:
   - 1642: BLAISE PASCAL invented the "Pascaline", which is considered the first mechanical adding machine and could perform calculations manually
   - 1800: CHARLES BABBAGE brought the concept of a programmable computer. that's the reason why he is considered the father

④ INSIDE THE COMPUTER

→ electric wires and circuits carry all the information in a computer

↓ there may be one or more wires with electricity flowing through them, which change the type of signal

↳ ex. 1 wire: ON/OFF; T/F; 0,1 (only two options are represented)

↳ ex. more wires: more complex info, more options represented

↓ Memory, CPU, Hardware and Software

⑤ BINARY NUMBER SYSTEM → definition

↓ using the binary system you can represent any number you like, but you can also represent:

- text → letters of the alphabet can be identified by numbers
- images → each pixel has a colour; each colour can be represented by numbers
- music → vibrations can be represented graphically as a wave form. Each point in the wave form can be represented by numbers

of the computer.

→ which problem could he solve? Data calculated manually had a lot of errors

→ which need? To find a way to perform calculations quickly and without error.

He created the "Analytical Engine", which:

- could make decisions such as sequential control, branching and looping
- contained a store for numeric data (=> integrated memory)
- contained an arithmetic logic unit

• Historical events:

- late 1700s the Industrial revolution brought mechanization of labour and a lot of devices operating manually became mechanized
- 1890: USA: increasing population, which generated the need for national census statistics

HOLLERITH developed an

electric tabulating system of machines that coued compile the censes mechanically and which operated on the principle of "punched cards".

- WWII provided new demands for information procelling

New Generations of computers characterized by electrical current flowing through the following procesing mechanisms:

- within vacuum tubes
- within transistors
- within integrated circuits
- within microprocessor chips
- smart devices capable of AI

"FIRST GENERATION" computers
- written in machine language, which required deep technical knowledge
- difficult to use
- coued run one program at a time
- used magnetic drums for data storage and relied on vacuum tubes as their primary processing components
- huge and generated a big amount of heat
- very expensive to run

"SECOND GENERATION" computers
- programmed with assembly language, which allowed programmers to specify instructions in words
- computers: smaller, faster, cheaper, more energy-efficient, more reliable
- great deal of heat that subjected the computer to damage

"THIRD GENERATION" computers
- programmed with high-level languages, which resembled human languages
- sophisticated operating systems

"FOURTH GENERATION" computers, called microcomputers
- computers for home use

"FIFTH GENERATION" computers: this is the present and the future of the computer world