HARDWARE AND SOFTWARE
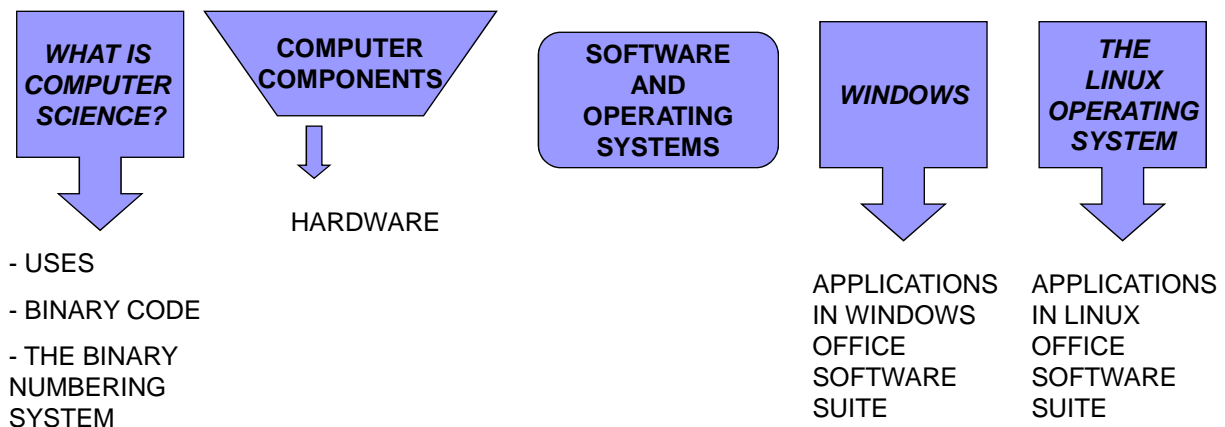
UNIT 2.
1º ESO BILINGUAL
IES MIGUEL ESPINOSA
2012/2013

SCHEME UNIT 2: HARDWARE AND SOFTWARE

WHAT IS COMPUTER SCIENCE?

COMPUTER COMPONENTS

SOFTWARE AND OPERATING SYSTEMS

WINDOWS

THE LINUX OPERATING SYSTEM

HARDWARE

- USES

- BINARY CODE

- THE BINARY NUMBERING SYSTEM

APPLICATIONS IN WINDOWS OFFICE SOFTWARE SUITE

APPLICATIONS IN LINUX OFFICE SOFTWARE SUITE

1. WHAT IS COMPUTER SCIENCE?

- Computer science is extremely useful.
- We use computers for many tasks:
- To create, store and show documents with text, pictures and sound.
- To control many processes (communication and transport systems, electricity services, security systems and so on)

1. WHAT IS COMPUTER SCIENCE?
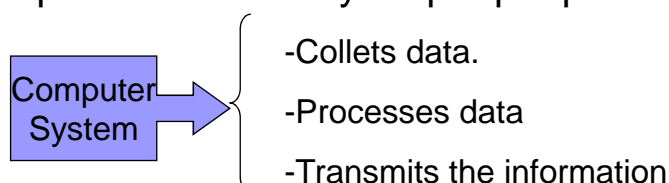
To use a computer:

First:

Enter data or information from devices or input peripheral.

Second:

Computer collects the data and then organises, saves and tranforms it → **Data processing.**

Third:

Output information by output peripheral or devices.

Computer System →
-Collets data.
-Processes data
-Transmits the information

Computer science is the techniques and knowledge necessary to automatically process information using a computer.

1. WHAT IS COMPUTER SCIENCE?

1.1. BINARY CODE

The computer encodes the information into an international language for computers…

The Binary Code.

The binary code only uses 0 and 1.

Each digit, 0 or 1, is a bit.

A bit is the smallest unit used to represent information in a computer. It corresponds to a binary digit: either 0 or 1.

ASCCI CODE is used to represent all the characters used on computers.

Each symbol or letter is encoded by a group of 8 bits.

Conversor binario/decimal.

UNIT 2. HARDWARE AND SOFTWARE

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1. WHAT IS COMPUTER SCIENCE?

UNIT	SYMBOL	MEASURE/STORAGE
Bit	b	0 or 1
Byte	B	8 bits
KiloByte	KB	1024B
MegaByte	MB	1024KB
GigaByte	GB	1024MB
TeraByte	TB	1024GB

■ What is a byte?

A group of 8 bits.

Multiples of a byte

1.2. The binary numbering system

☐ **From Binary to Decimal**: you have to multiply every digit by the power in base 2 to its position.

$$\overset{5\,4\,3\,2\,1\,0}{110101}_2 = 1\cdot2^5 + 1\cdot2^4 + 0\cdot2^3 + 1\cdot2^2 + 0\cdot2^1 + 1\cdot2^0 = 32+16+0+4+0+1 = 53$$

☐ **From Decimal to Binary**: you have to divide the number successively between 2 and to arrange the remains of the quotients from the lowest to the uppest.

$100_{10} = 1100100_2$
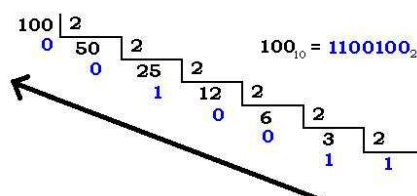
UNIT 2. HARDWARE AND SOFTWARE

2. COMPUTER COMPONENTS

- In a computer system the input data is processed and transformed into output information. We use a computer for this automatic information processing.

- The components that make up, compose or form a computer are called hardware and software:

- **Hardware:** the physical components of the computer.

- **Software:** the programs or systems instructions that make it possible to operate and use a computer.

UNIT 2. HARDWARE AND SOFTWARE

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2. COMPUTER COMPONENTS

2.1. Hardware

a) **CPU (Central Process Unit)**

b) **Memories**

c) **Storage devices**

d) **Peripherial devices**

a) **Central Process Unit (CPU)**

The main component in a computer, its brain.

It interprets instructions from programs and process data, as well as managing and controlling the entire system.

The CPU is a microprocessor.

2. COMPUTER COMPONENTS

b) Memories

The memory is where we store the data and instructions that form part of the programs.

There are two different types of memory:

- **ROM (Read Only Memory).** This memory stores the data that enables and makes possible the computer to operate when turn it on and lets the CPU communicate with other components. It is never erased.

- **RAM (Random Access Memory).** Its contents can be changed. It is erased when we turn off the computer. RAM temporarily stores the programs and data that are being used on the computer.

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2. COMPUTER COMPONENTS

c) Storage devices

Three types of devices are used to store information:

- **Magnetic**: information is stored through the magnetic **arrangement** of the particles on the device. *Hard disk.*

- **Optical:** information is encoded by means of microscopic **grooves** on the surface. *CD, DVD, BD.*

- **Solid-state:** these storages devices are manufactured in the form of small components called transistors. *Pen drive, flash memory, SD…*

On all these devices (or drives), information is stored indefinitely until the user deletes it.

- **arrangement: the placement of things into a specific order.**
- **Groove: a long, narrow recess in a hard or solid material.**

2. COMPUTER COMPONENTS

■ **Magnetic storage devices**

The capacity of **hard drives** or hard disk increases → 1 TB

These drives are installed inside the computer.

Portable hard drives: external storage units with a large capacity and a fast transfer speed.

■ **Optical storage devices**

CD-ROMs, DVDs and Blu-ray Discs (BD) are compact discs that are read by laser beams.

Storages: CD-ROM → 700 MB

                          DVD → between 4.7 GB and 17 GB

                          BD → 25 GB

The computer needs a drive that can read them!

*Beams: ray or column of light

* Storages: space for saving and storing something

2. COMPUTER COMPONENTS

■ **Solid-state storage devices**

Flash memory (used on memory sticks and memory cards) is very compact and has a large storage capacity of up to several gigabytes.

These drivers are connected by several slots in the front and back.

Buscar el significado de CD, DVD, BD y HDMI.

¿En cuántas capas graba un CD? ¿Y un DVD? ¿Y un BD? ¿Estará relacionado con su capacidad de memoria? ¿Por qué?

2. COMPUTER COMPONENTS

■ **Peripheral devices**

Peripheral devices are used to communicate what is inside the computer to the outside world (people, computers, others devices and so on) and vice versa.

Peripheral devices may be used to **input, output and input/output.**

They are connected to **ports** (slots and bays) found on the computer case.

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2. COMPUTER COMPONENTS

■ **Peripheral INPUT devices**

- Keyboard

- Mouse

- Scanner

- Web camera

- Barcode reader

- Touch screen

- joystick

2. COMPUTER COMPONENTS

- **Peripheral OUTPUT devices**
- - Monitor or screen
- - Printer
- - Loudspeakers

- **Peripheral INPUT/OUTPUT devices**
- - Modem
- - PDA 'personal digital assistant'
- - Mobile telephone and smartphones
- - Digital cameras

3. SOFTWARE AND OPERATING SYSTEMS

- Software enables the hardware to work.
- Software is the set of programs or instructions that start up the computer and process data so that we can use it.
- The instructions in the programs are written in programming languages.
- There are several types of programs, but also three types of software:
1. Applications and multimedia programs
2. Operating Systems
3. Programming Languages

3. SOFTWARE AND OPERATING SYSTEMS

1. **Applications and multimedia programs**

Applications are usually designed to meet the most common needs of most users:

- Word processors.

- Spreadsheets

- Programs for presentations

- Database programs

- Tools for procesing graphics, drawing, etc.

Multimedia programs make use of peripheral devices to process text, images, sound, animation and video.

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3. SOFTWARE AND OPERATING SYSTEMS

2. Operating system

This is the core program that tells the computer how it should perform all its basic functions.

It enable communication between the hardware and the programs.

It´s impossible to run a program or a computer without an operating system.

The operating system is loaded from the hard drive and stored in the RAM memory, where it remains until the computer turned off.

The most popular operating systems for PC:

Windows   Linux   Mac OS

3. SOFTWARE AND OPERATING SYSTEMS

3. Programming Languages

Programming Languages are software or programs that generate other programs or Operating Systems.

The most popular Programming Languages are:

-Visual basic

-C++

-Java

-php