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**CHAPTER  
1**

**BASIC CONCEPTS OF COMPUTING**



**Data and Information** are two basic concepts in the field of Computers.

**DATA**

They are the elements of a problem that are considered to be **standard** and undoubtable. Processing is carried out based on data.



Data consists of : *numbers, words, pictures, sounds, symbols.*

**INFORMATION**

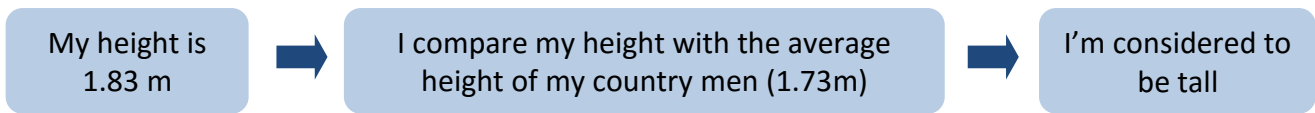
Information includes the elements of a problem that are the **results of data processing**. These elements give us a new knowledge.



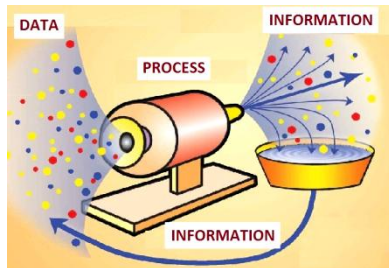
**PROCESSING**

This is a **procedure** in which a **mechanism** (human brain or microprocessor) accepts some data, it processes it in an appropriate way and produces pieces of information that provide solutions to a problem.

Data on its own has no meaning. The meaning is found in information that comes from processing.



**DATA PROCESSING CYCLE**



Information that comes from data processing, can be used again by itself or in combination with other data in order to produce new pieces of information.

e.g. in an arithmetic equation  $8 + 9 + 14 = 31$  there are two processes:

$$\begin{array}{cccc}
 8 & + & 9 & = & 17 \\
 \text{D} & & \text{P} & & \text{I}
 \end{array}
 \qquad
 \begin{array}{cccc}
 17 & + & 14 & = & 31 \\
 \text{D} & & \text{P} & & \text{I}
 \end{array}$$

**EXAMPLE**

Kostas: Maria, how much money did our teacher tell us that our trip will cost?  
 Maria : The bus rental costs 200 € . However, I think that we should ask other students how many are going to come.  
 Kostas: Of course, when we know we'll have all the necessary elements in order to calculate how much money we will need from each student.  
 Maria : Let's go and ask them and let's talk again during the break.

Data	Process	Information
200 € Bus rental 25 number of participants	200 € : 25 students = 8 € per student	The amount of money each student must pay 8 €.
<b>Data</b>	<b>Process</b>	<b>Information</b>
Cost per student is 8 €. Money in my money box 15 €	I compare the money I have 15 € with the cost of the trip 8 € I have to pay	The money I have allows me to go to the trip!

## COMPUTER IN DATA PROCESS

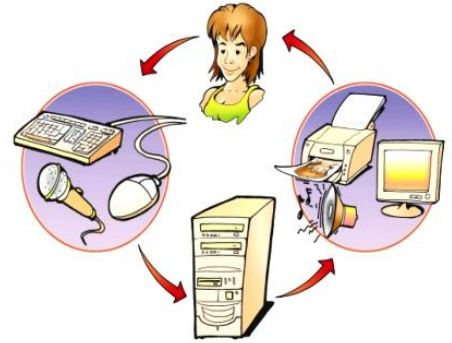
A **computer** is a programmable machine designed to automatically carry out a sequence of arithmetic or logical operations. The particular sequence of operations can be changed, allowing the computer to solve more than one kind of problem.

A computer is a machine that processes data according to the user's commands allowing him to gather useful information.

The **input** of computer data is performed with the help of some devices (e.g. keyboard, mouse, scanner, microphone etc).

The data **processing** is carried out through the user's commands (programs). A computer can carry out arithmetic or logical operations.

The **output** of computer (information) is performed with the help of some other devices (e.g. monitor, printer, speakers etc).



Data as well as information **can be saved** on computer memory to be re-used in the future.

In addition to computers, there are many other common devices which process data in order to produce the final result e.g.

### A laundry machine

**Data** : stained clothes, detergent, washing program

**Processing** : Clothes washing according to a certain program

**Information** : Clean clothes

### A coffee machine

**Data** : solid coffee, water, boiling program

**Processing** : Boiling coffee according to a certain program

**Information** : Hot coffee

Man can also be compared to a machine that processes data in order to produce information.

He is **superior in quality** (he is smarter) when compared to a computer because he can perform complex reasoning.

However, a **computer** is **superior in quantity** (it is faster) compared to human beings because of the great speed with which it processes a huge amount of data and run complicated operations.

## COMPUTERS IN SCIENCE

The term "**Informatique**" is a French word that comes from the merging of two words: **Information** + **Automatique**

Computer science is a relatively new kind of science, which started as a branch of Mathematics in 1930.

The first official departments of Computer Science were established in the American universities **Stanford** and **Purdue** in 1962.

The **aim** of computer science is the **research of information** and more specifically for :

- collection
  - storage
  - process
  - transmission
- } of information

