

 Learning Objectives

This Unit will help the students to,

- Understand the importance of the computer
- Know the history of computer
- Know the generations of computer
- Distinguish data and information



(Kayalvizhi and Amuthan had a discussion with their mother on computer).

Kayalvizhi : Mom! I received an SMS about a computer course in summer holidays.

Mother : Is it Kayal? Do you wish to join the course?

Kayalvizhi : Yes mom. Yesterday, our teacher told us that computers play a vital role in our day-today life. So it is a need of the hour to learn computer.

(Kayalvizhi's younger brother Amuthan interrupts)

Amuthan : What are you saying Kayal? Do we use computer in our daily life?

Kayalvizhi : Yes of course. Have you not noticed?

Amuthan : Sister, I have seen it in a few places. Can you say where do we use computer in day-today life?

Kayalvizhi : Do you remember, yesterday our dad used ATM card to withdraw money, when he was running out of cash?

Amuthan : Yes sister, I do remember.

Kayalvizhi : That ATM machine works with the help of a computer only.

Amuthan : Oh! Is it so sister?

Kayalvizhi : Not only that. Most of the bills of our daily purchases are computer generated ones.

Amuthan : Do we have these two usages only?

Kayalvizhi : No Amuthan. We use computers either directly or indirectly in our life. For example, we can see them at use in banks, hospitals, post offices, transport, market, media, defence sector, education, space research and so many other fields as well. Computer plays an important role in our life. So we should learn to operate a computer.

We come to know about the uses of computer from the above conversation. Now let us know about computer in detail.

9.1.1 Computer

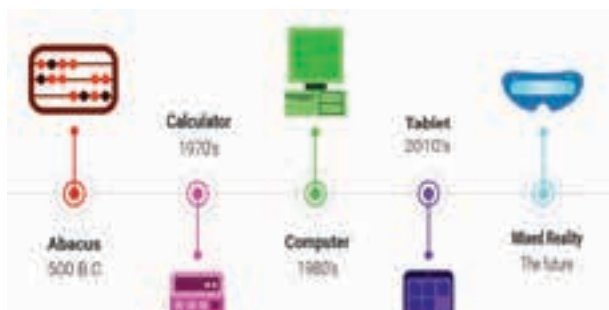
Computer is an electronic device, which manipulates and stores data and information through commands or program codes.

The computer that was designed in the year 1946 was equivalent to the size of a huge class room. When compared to the computers of earlier stages with today, the size is minimized but the efficiency and speed has increased infinitely. Not only in the speed but also it can be used according to our convenience as desktops, laptops and mobile devices. The size and shape of the computer has been modified on the basis of our need.

Generally, the computer operates by the exchange of commands between the hardware and software. Hardware can be touched and felt, but the software cannot be.

9.1.2 History of computer

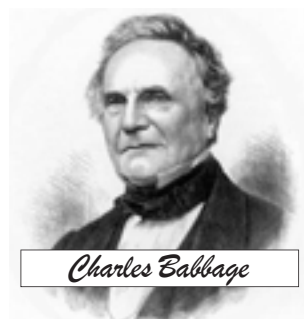
Now a days, we can find computer in many forms like desktop, laptop, palmtop, tablet etc. This kind of transformation in data handling and processing has happened over a long period of time. Let us know about the advancement of computer here.



ENIAC- A computer had approximately 18,000 vacuum tubes. The size occupied by the ENIAC could be equivalent to a class room.

Around 2000 years ago, the people of China used Abacus. This was considered as the most basic model of a computer. Nineteenth century was considered as the birth of the computer when Charles Babbage designed the basic construction of a computer.

ENIAC, which was used by the American Military in 1946 to predict the trajectory of artillery shells, recognized as the world's first general purpose computer. Lady Augusta Ada Lovelace was honored as the first programmer as she gave the first programming to do arithmetic operations.



Charles Babbage



Augusta Ada Lovelace
1815-1852

9.1.3 Generations of computer

The history of computer has been classified into many stages. The main difference between the generations is the speed and efficiency of the computer. On the basis of performance and speed, the generations of the computer was categorised.



Generations of Computer

Period	Generation	Digital devices
1940-1956	I Generation	Vacuum tubes
1956-1963	II Generation	Transistor

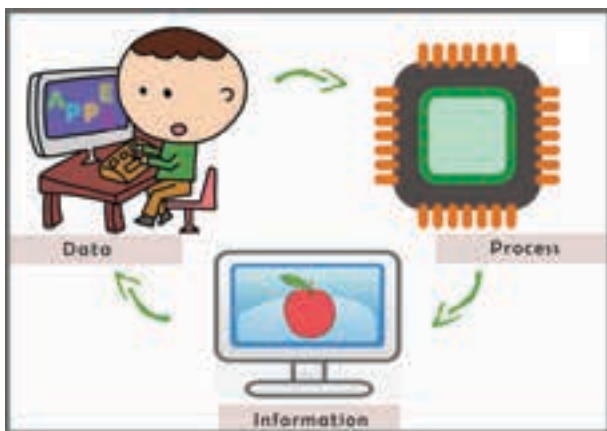
1964-1971	III Generation	Integrated circuits
1972-2010	IV Generation	Micro processors
After 2010	V Generation	Artificial Intelligence

9.1.4 Data

Data is the set of values of qualitative and quantitative variables. The data that is fed to the computer can be text, number or statistics. These data stored in computer memory cannot be used directly. It has to be processed.

Data processing

The data processing in a computer is collecting data and converting it into information according to our needs and requirements.



The first 1 GB disk drive weighed around 250 kilograms and its cost was approximately 25 lakhs.

The steps in Data Processing

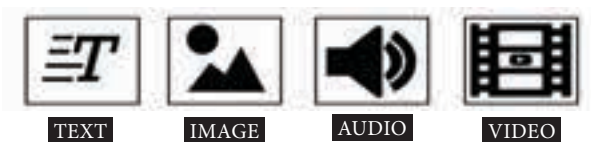
Data processing has six steps. They are:

- Data collection
- Data storage

- data sorting
- the data processing
- Data analysis
- Data presentation and conclusions

9.1.5 Information

The information we get or obtain or receive using the data from the computer can be used directly.



EXERCISE

I. Choose the correct answer

1. _____ is an electronic device which stores data and information.
 - a) Telescope
 - b) Television
 - c) Computer
 - d) Radio
2. _____ belongs to the generation IV of the computer
 - a) Microprocessor
 - b) Artificial intelligence
 - c) Transistor
 - d) Vacuum Tubes
3. Data processing involves _____ steps.

a) seven	b) four
c) six	d) eight
4. 1. Abacus belongs to the first generation of the computer.

2. ENIAC was used in the American military.

- Both the statements are correct
- Statement 1 is wrong but 2 is correct
- Statement 1 is correct but 2 is wrong
- Both the statements are wrong.

II. Match the following

- | | | |
|----------------------------|---|--------------------|
| 1. III generation computer | - | Integrated circuit |
| 2. Text, number | - | Information |
| 3. Transistor | - | Father of computer |
| 4. Directly used | - | Data |
| 5. Charles Babbage | - | II generation |

III. Answer the following in brief:

- Define computer.
- Differentiate data and information.
- What is data processing?

IV. Answer the following in detail

- What are the different steps involved in data processing?
- List out the generations of computer.

PRACTICAL - TABLE OF CONTENTS

Sl. No.	Name of the Experiment	Time
1.	To Find the diameter of a spherical body	40 minutes
2.	To Find the thickness of given iron nail	40 minutes
3.	Refraction of light through a rectangular slab	40 minutes
4.	Measurement of volume of liquids	40 minutes
5.	Adaptations in plants	40 minutes
6.	Adaptations in animals	40 minutes
7.	To detect the adulterants in food samples	40 minutes

I. TO FIND THE DIAMETER OF A SPHERICAL BODY



Aim:

To determine the diameter of a spherical body using Vernier Caliper

Apparatus required:

Vernier Caliper, given spherical body (cricket ball)

Formula: (i) Least count (LC) = 1 Main scale division - 1 Vernier scale division

$$LC = 1\text{mm} - 0.9\text{ mm}$$

$$LC = 0.1\text{ mm (or) } 0.01\text{ cm}$$

(ii) Diameter of the spherical object (d) = M.S.R. + (VC × LC) ± ZC cm

where, MSR - Main Scale Reading

VC = Vernier Coincide

LC - Least Count. (0.01 cm)

ZC - Zero Correction.

Procedure:

- Find the least count of the Vernier caliper.
- Find the zero correction of the Vernier caliper.
- Fix the object firmly in between the two lower jaws of the Vernier.
- Measure the main scale reading and the Vernier scale Coincidence.
- Repeat the experiment by placing the jaws of the Vernier at different position of the object.
- Using formula find the diameter of the object.

Least Count : 0.01cm
(LC)

Zero Correction :-----
(ZC)

Sl. No.	Main Scale Reading (MSR) cm	Vernier coincidence (VC)	Diameter of object d = MSR + (VC x LC) ± ZC (cm)
1			
2			
3			

Average _____ cm

Result: The diameter of the given spherical object (Cricket ball) is _____ cm

II. TO FIND THE THICKNESS OF GIVEN IRON NAIL

Aim:

To find the thickness of the given iron nail



Apparatus required:

Screw gauge and iron nail

Formula:

(i) Least Count (LC) = $\frac{\text{Pitch scale Reading}}{\text{No of divisions in the Head scale}}$

(ii) Thickness (t) = Pitch scale Reading (PSR) + [Head scale coincidence (HSC) x Least Count (LC)] ± zero correction
 $t = \text{PSR} + (\text{HSC} \times \text{LC}) \pm \text{ZC}$

Error:

(i) Positive error: If positive error is 5 points, for zero correction subtracts 5 points.

$$t = \text{PSR} + (\text{HSC} \times \text{LC}) - \text{ZC}$$

$$t = \text{PSR} + (\text{HSC} \times \text{LC}) - 5$$

(ii) Negative error: Negative error is 95 points, so (100 - 95) = 5 points, for zero correction add 5 points

$$t = \text{PSR} + (\text{HSC} \times \text{LC}) + \text{ZC}$$

$$t = \text{PSR} + (\text{HSC} \times \text{LC}) + 5$$

(iii) No correction is needed $t = \text{PSR} + (\text{HSC} \times 0.01) \pm 0$

Procedure:

- The Least count of screw gauge is 0.01 mm
- The zero error is to be found when the two faces of the screw gauge touches each other.
- Then place the iron nail between the two faces of the screw gauge. The pitch scale reading (PSR) and head scale coincidence (HSC) are to be noted.
- Repeat the process by placing others parts of the iron nail in the screw gauge
- Tabulate the readings as.

	Zero corection:		Least count: 0.01 mm
Sl. No.	Pitch Scale Reading PSR (mm)	Head Scale Coincidence (HSC)	Thickness of the iron nail $t = \text{PSR} + (\text{HSC} \times \text{LC}) \pm \text{ZC}$ (mm)
1			
2			
3			

Average _____ cm

Result: The (Thickness) diameter of the iron nail is -----mm.

III. REFRACTION OF LIGHT THROUGH A RECTANGULAR SLAB

Aim:

- I. To study the path of light through a rectangular slab
- II. To measure the angle of incidence, angle of refraction and angle of emergence and interpret the result.



Materials required:

Glass slab, drawing board, white paper, protractor, a measuring scale, pins and drawing pins.

Procedure:

Fix a white sheet of paper on a drawing board. Place the rectangular glass slab in the middle of the paper and mark its boundary as ABCD with the pencil. Remove the rectangular slab. Draw a thin line PQ directing towards Q and inclined to the face AD of the glass slab at any angle preferably between 30° and 60° . Replace the glass slab exactly over the boundary marked on the paper.

Fix two pins X_1 and X_2 vertically about 5 cm apart by gently pressing their heads with thumb or the line PQ

Diagram:

Observe the images of pins X_1 and X_2 through the face BC of the rectangular glass slab. Now Fix two more pins X_3 and X_4 such that Feet of all the pins appear to be in a straight line. In other words the pins X_3 and X_4 are collinear with the images of Pins X_1 and X_2

Remove the pins and glass slab and mark the position of the Feet of all the four pins. Join points that mark the position of the pins X_3 and X_4 and extend the line up to point R where it meets the face BC Join Q and R as given in figure.

Draw the normal NQM to the face AD, at the point Q and similarly the normal N_1RM_1 to the face BC at the point R. Measure the angle of incidence $\angle PQN$ ($\angle i$), angle of refraction $\angle MQR$ ($\angle r$) and angle of emergence ($\angle M'RS$ ($\angle e$)) Record the value in the table.

Repeat the experiment for three more angle of incidence in the angle between 30° and 60° and record your observations.

Sl. No.	Angle of incidence $\angle i$	Angle of refraction $\angle r$	Angle of emergence $\angle e$
1			
2			
3			
4.			

Result: The path of the light through a rectangular slab is drawn. The angle of refraction and angle of emergence for various angle of incidence are obtained.

IV. MEASUREMENT OF VOLUME OF LIQUIDS

Aim:

To measure the volume of given colourless and coloured liquids.

Materials required:

Pipette (20ml), sample liquids and beakers



Procedure:

Take a 20 ml pipette. Wash it thoroughly with water and then rinse it with the given liquid. Insert the lower end of the pipette into the given liquid and suck the solution slowly till the solution rises well above the circular mark on the stem. Take the pipette out of the mouth and quickly close it with the fore finger. Take the pipette out the liquid and keep it such a way that the circular mark on the stem is at the level of the eyes. Now slowly release the fore finger to let the liquid drop out until the lower meniscus touches the circular mark on the stem. The liquid in the pipette is exactly 20 ml and this can be transferred to an empty beaker by removing the fore finger.

Tabulation

Sl. No.	Name of the liquid	Colour of the liquid	Nature of the meniscus	Volume of the liquid
1				
2				
3				
4.				

Report:

Exactly 20 ml of various liquids are measured using a standard 20 ml pipette.

Note:

1. Keeping the circular mark on the stem of the pipette above or below the level of the eyes will lead to error.
2. When colored liquids are measured, the upper meniscus should be taken into account.
3. Never suck strong acids or strong alkalis using a pipette.

V. ADAPTATIONS IN PLANTS

Aim:

To identify the given plant specimen and list out its adaptations

1. Mesophytic plant – Tomato or Brinjal plant
2. Xerophytic plant – *Opuntia*
3. Aquatic plant – *Eichhornia sp*
4. Insectivorous plant – *Nepenthes*



Observation:

The given plants are identified and the following adaptations are noted.

- 1.
- 2.
- 3.
- 4.
- 5.

VI. IDENTIFICATION OF THE ADAPTATIONS IN ANIMALS

Aim:

To identify the given vertebrate (chordate) animal and list out the following adaptations seen in them.

Required specimens:

1. Pisces (Fishes), 2. Amphibian (Frog), 3. Reptiles (Calotes), 4. Aves (Dove), 5. Mammals (Rat)

The given specimen is identified and the following adaptations are noted



Sl. No.	Name of the animal	Habitat	Body structure	Body covering	Locomotory organs
1	Fish				
2	Frog				
3	Calotes				
4.	Dove				
5.	Rat				

VII. TO DETECT THE ADULTERANTS IN FOOD SAMPLES



Aim:

To detect the adulterants in the given samples

Requirements:

Beakers, glass bowl, spoon, match box

Materials required:

Given sample, pepper (A), honey (B), Sugar (C), chilli powder (D), green peas (E), water.

Procedure:

- Take 5 beakers with water and name it us A, B, C, D, E.
- Take samples A, B, C, D, E and add to the respective beaker.
- Observe the changes in each beaker.
- Record your observations.

Observation:

Sl. No.	Sample	Observation	Indication
1.	A		
2.	B		
3.	C		
4.	D		
5.	E		