Unit-4

Problem Solving

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EXERCISE

Q1. Tick the correct choice for the following questions.

i. How many elements a problem has?

a. 1 b. 2
c. 3 d. 4

ii. What is the solution to a problem called?

a. Problem Solving
b. Problem Statement
c. Identifying Problem
d. Ignoring Problem

iii. A _____ is an obstacle, hurdle, difficulty or challenge, or any situation that needs to be removed or solved.

a. Answer b. Solution
c. Situation d. Problem

iv. What is the name of the problem statement element that we give to the computer as raw material to solve the problem?

a. Input b. Output
c. Process d. Ideas

v. ____ is the result which is obtained by processing the input data.

a. Input b. Output
c. Process d. Algorithm

vi. Which symbol is used to show decision process in the flowchart?

a. Oval b. Rectangle
c. Diamond d. Parallelogram

vii. In flowchart which symbol uses only one flow line?

a. Terminal b. Processing
c. Decision d. Input

viii. Which symbol is used to represent a process in the flowchart?

a. Oval b. Rectangle
c. Diamond d. Parallelogram

Answers:

(i) 3 **(ii)** Problem Solving
(iii) Problem **(iv)** Input
(v) Output **(vi)** Diamond
(vii) Terminal **(viii)** Rectangle

Q2. Fill in the blanks.

i. _____ techniques are helpful in solving problems.

ii. A _____ is a concise description of the problem to be solved.

iii. _____ involve performing actions or operations on input data to achieve the desired goals and find the solution to the problem.

iv. ____ is a process of pictorial illustration for solving a problem.

v. The input / output in a flowchart is represented by a _____ shop.

Answers:

i. Problem-solving **ii.** Problem statement
iii. Processing requirements
iv. Flowcharting **v.** Parallelogram

Q3.Match Column A with Column B.

Column(A)	Column(B)	Column(C)
A problem	What is given	A hurdle
A problem statement	Diagram to represent a process	A concise description of the problem
The Input	What is required	What is given
Flowchart	A hurdle	Diagram to represent a process
The Output	A concise description of the problem	What is required

Q.4. Give brief answers to the following questions.

i. What are the key features of a problem statement?

Ans.:-A problem statement is a concise description of the problem to be solved. A problem statement should have the following features:

- Clarity and precision
- Identification of what would be studied
- Identification of key factors or variables
- Identification of key concepts and terms

ii. What is flowchart?

Ans.:-A flowchart is a type of diagram that represents a process, showing the steps as symbols of various kinds, and their order by connecting them with arrows. This diagrammatic representation can give a step-by-step solution to a given problem.

iii. What are the uses of flowchart?

Ans.:-Flowchart helps in finding the solution of a problem and facilitate in showing the input, process and output of the problem.

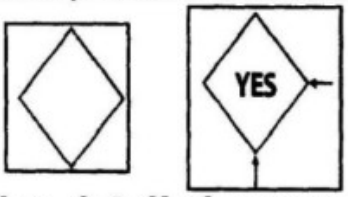
iv. What are the advantages of drawing flowchart?

Ans.:-The following are some advantages of flowchart.

- It helps in understanding the logic of the problem solving processes.
- It gives the pictorial representation of the processes involved in the problem solution.
- It shows the flow processes in a sequential manner.

v. What is the use of decision symbol?

Ans.:- Diamond symbol is used to show decision process in a flowchart.



Q5. Give detailed answers to the following questions.

i. Explain the elements of a problem statement.

Ans.:- Elements of a Problem Statement

A problem statement has the following three elements.

- What is given - the Input
- The Processing requirements
- What is required - the Output

a) What is given - the Input

Input is such element of the problem statement that we give to the computer as raw material to solve the problem. It is also called **data** or known facts. It can be extracted from the present situation of the problem statement. The following examples explain the concept of the Input.

Problem 1: Preparing Tea

In the above problem the input material would be an Electric Kettle, Water, Tea bag, Milk and Sugar.

Problem 2: To Find the Average of Five Subjects Marks

In Problem 2 the input is the marks in the five subjects, For Example

English	= 80
Urdu	= 87
Mathematics	= 90
Science	= 83
Computer Education	= 95

b) The Processing Requirements

This involves performing actions or operations on input data to achieve the desired goals and find the solution to the problem. In **Problem 1** the processing requirements are:

- Boiling water by plugging in the Kettle
- Adding sugar, Tea bag and Milk

In **Problem 2** the processing requirements are:

- Finding the sum of marks using the formula:

  SUM = English + Urdu + Mathematics + Science + Compute Education

= 80 + 87 + 90 + 83 + 95 = 435

Finding the Average, using the formula:

AVERAGE = SUM / 5

= 435/5

= 87

c) What is required - the Output:

Output is the result which is obtained by processing the input data. It is also called the solution. It is the change or improvement in the situation or behaviour and the target or goal one is aiming for the problem solution.

In **Problem 1** the output required is "The prepared tea, served in a cup".

In Problem 2 the output requirements are:

- The SUM = 435
- The AVERAGE = 87

ii. What is flowcharting? How flowcharts help in problem solving?

Ans.:- Flowcharting

Flowcharting is a process of pictorial illustration for solving a problem. Flowcharting is a tool for analyzing processes. Flowcharting can be used in computer systems design, programming, engineering, and science, etc.

Flowchart:

A flowchart is a type of diagram that represents a process, showing the steps as symbols of various kinds, and their order by connecting them with arrows. This diagrammatic representation can give a step-by-step solution to a given problem. Flowchart helps in finding the solution of a problem and facilitate in showing the input, process and output of the problem.

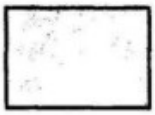
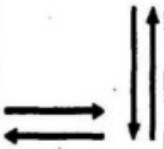
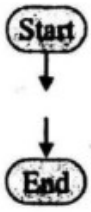
The following are some benefits of flowchart.

- It helps in understanding the logic of the problem solving processes.
- It gives the pictorial representation of the processes involved in the problem solution.
- It shows the flow processes in a sequential manner.

iii. Explain different symbols used to draw flowcharts with examples.

Ans.:- Standard Flowchart Symbols

Flowcharting use standardized sets of symbols. Flowchart Symbols with their description and examples are given in the following table.

Description	Symbol	Example
Start/End symbol: An oval shape symbol that represents the Start or End of a flowchart.		
Input/Output symbol The input/ output in a flowchart is represented by a parallelogram shape.		
Processing symbol: Rectangle shape symbol is used to represent the process or action taken.		Sum = A + B X = 15
Flow lines: Arrow head with line is used to show the flow of any process in a flowchart. These symbols show the flow of data, information or process in the flowchart.		

Decision symbol: Diamond symbol is used to show decision process in a flowchart.