Bahria University, Islamabad

Department of Software Engineering

Computer Programming Lab

(Fall-2023)

Teacher: Dr Raja Muhammad Sulaiman

Student : Abdul Moiez

Enrollment : 01-131232-002

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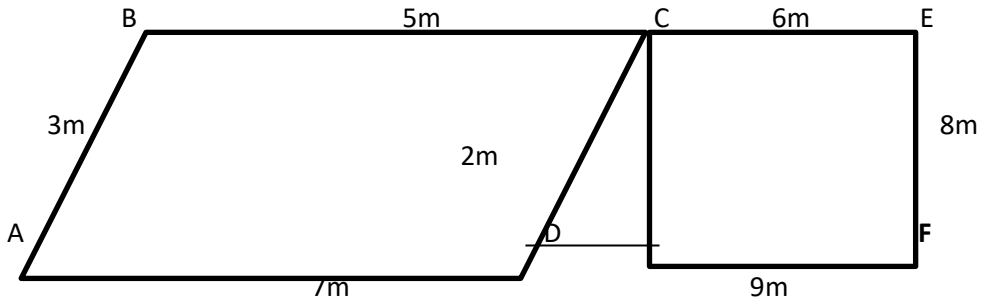
Comments:

Signature

Assignment 1: Problem Solving (CLO-2)

Question 1: Finding the Shortest Path:

Following is the map with various locations and the roads leading to them. Now, lets assume the distances between each pair of location.



Below is the table inserted to measure the shortest distance.

	A	B	C	D	E	F
A	0	**3m**	Infinity	**7m**	Infinity	Infinity
B	0	3m	**8m**	7m	**14m**	Infinity
C	0	3m	8m	7m	14m	**22m**
D	0	3m	8m	7m	14m	**16m**
E	0	3m	8m	7m	14m	16m
F	0	3m	8m	7m	14m	16m

Starting Algorithm:

Step 1: Start.

Step 2: Lets start by setting **A** to **0** and all other distances infinity.

Step 3: Select the location with the smallest distance which is **A.**

Step 4: Now update the distances considering **A** as the starting point.

Step 5: The revised distances are:

- **A** to **B** = **3m**
- **A** to **D** = **7m**

Step 6: Keep the remaining distances to infinity.

Step 7: Mark **B** & **D** as visited location considering the availability of data.

Step 8: By looking at the map, **C** and **E** location can be accessible if the **B** path is used.

Step 9: Update the distances:

- **A** to **B** to **C** = **8m**
- **A** to **B** to **E** = **14m**

Step 10: Mark **C** and **E** visited.

Step 11: Location **F is** accessible if **C** path is used.

Step 12: Update the location:

- **A** to **B** to **C** to **E** to **F** = **22m**

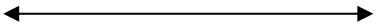
Step 13: The location **F** can be accessed via shorter path if **D** path is used.

Step 14: Update the distances:

- **A** to **D** to **F = 16m**

Step 15: The shortest path from **A** to **F** is **A** ⟶ **D** ⟶ **F.** The total distance is **16m.**

Step 16: Stop.



Question 2: Calculating Fibonacci Numbers.

Algorithm:

Step 1: Start.

Step 2: Declare the variables **a=0, b=1, i=, show.**

Step 3: Till where the user wants to print the Fibonacci series.

Step 4: The value provided by the user must be stored in **i.**

Step 5: Using loop/condition**: (Exchanging values of variables)**

Show = a + b

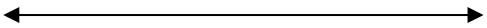
a=b

b=show

Increase the value of I every time until the condition isn't met.

Step 6: Print the value of I .

Step 7: Stop.



Question 3: Sorting a List of Numbers.

Algorithm:

Step 1: Start.

Step 2: Consider first number in list as pivot element.

Step 3: Divide the list into two portions in such a way that all the numbers less than pivot element are on left side and greater number on the right side of pivot element.

Step 4: Now start incrementing from left to right side of pivot element and stop if number is greater than pivot element.

Step 5: Similarly, start decrementing from the last digit of list and stop if number is less than pivot element.

Step 6: Swap the positions of the values where you are stopped.

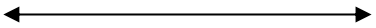
Step 7: Repeat the process until all the values less than and greater than pivot element are on left and right side respectively.

Step 8: Position of pivot element is fixed.

Step 9: Repeat the same process on left and right side of pivot element until all the values aren't sorted.

Step 10: Combine them together to create a fully sorted list.

Step 11: Stop.



Question 4: Inventory Management.

Algorithms:

Step 1: Start.

Step 2: Visit the store and carefully look at all the items.

Step 3: If the user wants to add item in his inventory mention its product id and quantity.

Step 4: Remove all those items that haven't sold from a long time and delete their product id.

Step 5: If the items are being sold start decrementing their quantity respectively.

Step 6: Show unavailable for all those items that aren't available.

Step 7: Stop.