



Bahria University, Islamabad

Department of Software Engineering

Computer Programming

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Assignment: 1

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Assignment # 1- Problem Solving

ALGORITHMS

Question 1: Finding the Shortest Path Step

1: Start.

Step 2: Give names to all points/places.

Step 3: Firstly, we just know that the shortest distance of point 1 from any previous point is 0 as it has no previous point and set the shortest distance of all other points an infinity.

Step 4: These distance values can be changed overtime.

Step 5: Starting from point 1.

Step 6: Calculate the distance of point 1 to its unvisited neighbors.

Step 7: To find shortest distance from its unvisited points we will update its shortest distance and store point 1 as previous point.

Step 8: Now marks point 1 as visited.

Step 9: Then, pick a point (point 2) that have shortest distance from previous point.

Step 10: Calculate the distance of all unvisited neighbors of point 2 by adding shortest distance of point 2 in it.

Step 11: Now, marks the neighbors of point 2 as visited points.

Step 12: Compare the calculated distance with one that is previously stored as 'shortest distance' . If the new value is less than previous value than replace it with new one.

Step 13: Repeat from step 6 to 12 for other points.

Step 14: The points that are once visited are marked 'visited' and we can't go back to them else go to unvisited points.

Step 15: For finding shortest path to go from one point to another, we need to add the distances of single points and go toward shortest the path that is shortest one.

Step 16: Stop.

Question 2: Sorting a List of Numbers

Step 1: Start.

Step 2: Declare a variable i and n.

Step 3: Prompt the user to enter how many numbers he want in series(i.e. n).

Step 4: Take the series of number from user.

Step 5: Use a for loop to iterate from i=0 to i less than n.

Step 6: Apply a condition (e.g. for ascending order) that if first element will be greater than second one then do following task.

Step 7: Declare third variable.

Step 8: Assign it (Third variable) the value of first one.

Step 9: Then, assign second value to first one.

Step 10: Now, put the value of third variable in second one.

Step 11: Repeat steps 8 ,9 and 10 until the condition in step 6 gets false and loop terminates (i.e., when $i > n$).

Step 12: Print the series of number that are sorted now.

Step 13: Stop.

Question 3: Calculating Fibonacci Numbers

Step 1: Start.

Step 2: Declare first variable and assign it value 0, second variable and assign it value 1.

Step 3: Declare variables i and n.

Step 4: Print first and second variables.

Step 5: Prompt the user to enter value that how much numbers he wants in series (i.e., value of n).

Step 6: Use a for loop to iterate from $i=1$ to i less than or equal to n-2.

Step 7: Add first and second variable and store the result in another variable named next.

Step 8: Print the variable 'next'.

Step 9: Assign the value of second to first variable.

Step 10: Then, assign the value of 'next' variable to second.

Step 11: Repeat steps 7, 8, 9 and 10 until the loop terminates (i.e., when i become greater than n-2).

Step 12: Stop.

Question 4: Inventory Management

Step 1: Start.

Step 2: Make a database for store's inventory management system.

Step 3: For Adding items to the inventory ask the user for name of the item and the quantity of that particular item user want to add.

Step 4: Now, check that the item exists before in the list or not. If yes, then update its quantity otherwise add the item along with its quantity in the list.

Step 5: For Removing item from the inventory, ask the user for name of the item and the quantity of that particular item user want to remove.

Step 6: Now, check that the item exists before in the list or not. If yes, then remove particular quantity of that item or whole. If no, then display a message that 'This Item does not exists'.

Step 7: For updating the quantity of the existing item, ask the user for the item name and new quantity of that particular item. Replace new quantity with the old one.

Step 8: For generating reports of the items and quantities, we need to use formula according to the type of report we want to generate.

Step 9: Stop.