



Bahria University, Islamabad

Department of Software Engineering

Computer Programming

(Fall-2023)

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Assignment # 1

Task No:	Task Wise Marks		Documentation Marks		Total Marks (20)
	Assigned	Obtained	Assigned	Obtained	
1	3		5		
2	3				
3	3				
4	3				
5	3				

Comments:

Signature

Algorithms:

Question 1:

Finding the Shortest Path Imagine you are developing a GPS navigation system. You are given a map with various locations and the roads connecting them. Your task is to write an algorithm to find the shortest path from one location to another. You can assume that you have a list of locations and the distance between each pair of locations. Your algorithm should output the shortest path and the total distance.

Algorithm:

1. Start
2. Input place you want to go from A-Market
3. From A-Market to H-Market
4. Long distance= 350 meter
5. Short distance= 250 meter
6. For short distance most of the distance will be covered on straight path
7. Else wrong path if you take turn.
8. No turns allowed for short path.
9. Follow the path
10. You have reached the H-Market
11. Distance covered 250 meter
12. End

Question 2:

Sorting a List of Numbers You are working on a project where you need to sort a list of numbers in ascending order. Design an algorithm to efficiently sort a list of integers. You should consider various sorting algorithms, evaluate their time complexity, and choose the most suitable one for the task.

Algorithm:

1. Start
2. Taking numbers
3. If numbers are more than 5 Divide into two boxes
4. Else no boxes
5. Take first box of 5 numbers
6. Applying selection sorting algorithm
7. Selection sorting algorithm is not the most efficient sorting algorithm for large datasets
8. Time complexity = $O(n^2)$
9. 1st value = num1
10. If 2nd value is less then num1 check the next value (3rd one) if its less then 2nd value
11. Else swap num1 with 2nd value
12. Process continuous till last value
13. Process ends
14. Swap last value with first value
15. Do the process again for second box

16. If second box have 1-4 values then use box 1 for help by removing value from box 1 and adding value in it from box 2
17. End

Question 3:

Calculating Fibonacci Numbers, The Fibonacci sequence is a series of numbers where each number is the sum of the two preceding ones (e.g., 0, 1, 1, 2, 3, 5, 8, 13, ...). Write an algorithm to calculate the nth Fibonacci number. Your algorithm should be efficient and capable of handling large values of n.

Algorithm:

1. Start
2. Input two numbers, a and b
3. $a + b = z$
4. using loop
 - a. add +1 with b on each step
 - b. on each step adding +1 to
 - c. $b+1, b+1+1, b+1+1+1, \dots$ until the steps continuous
5. output answer
6. End

Question 4:

You are tasked with creating an algorithm for a store's inventory management system. Your algorithm should be able to add and remove items from the inventory, update the quantity of existing items, and generate reports of the items and their quantities. Design an algorithm that efficiently manages the store's inventory based on these requirements.

Algorithm:

1. Start
2. Print store's inventory management system
3. Input
 - a. Adding or Removing
 - b. Updating Quantity
 - c. Report of item
4. For adding or removing
 - a. Name of product
 - b. Quantity of product
 - c. Remove or add product
 - d. Product removed or added
5. For updating quantity
 - a. Name of product
 - b. Previous quantity = num1
 - c. New quantity = num2
 - d. $\text{num2} - \text{num1} = N$
 - e. N quantity of product added or removed
 - f. Quantity updated

6. Report of item
 - a. Item name
 - b. Quantity of item
 - c. Item warranty or guarantee
 - d. Manufactured date of item
 - e. Item information
7. End