Introduction to Programming

Assignment 10

You must solve the questions using Recursion function. You must answer Question 1 and 2. You program should handle any exceptions that may arise during runtime.

- **Question 1 – 8 Marks**
- **Question 2 – 12 Marks**

Question 1: Choose anyone question given below(A/B):

Question 1(A):

Factorials

A factorial of a number is the result of multiplying that number by all the positive integer values from that number down to 1

For example, the factorial of 4 would be 4 X 3 X 2 X 1 = 24

Program Implementation:

1. Get a number as user input
2. Implement a recursive function to find the factorial of number received form user.

Example Input and Output:

(Input) Enter a positive integer: 3

(Output) The factorial of 3 is: 6

Question 1(B):

Fibonacci Sequence

In math, this sequence is 0 then 1, then the sum of the previous two numbers 1, then the sum of the previous two numbers (1, 1) 2, then the sum of the previous two numbers (1,2) 3 etc.

Example: 0, 1, 1, 2,3, 5, 8,13, 21, 34,….

Create a python program that uses recursive function to display the Fibonacci sequence until it reaches n numbers in series.

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Program Implementation :

1. Get a number as user input 'n'
2. Implement a recursive function to find the print the Fibonacci sequence. You should have n numbers in your sequence.

Example Input and Output:

(Input) Enter the number (>0): 10

(Output) Fibonacci sequence: 0 1 1 2 3 5 8 13 21 34

Question 2: Bubble Sort

- The bubble sort will sort an array by comparing two elements – and swapping them
- The greater value is always placed on the right of the element
- The first pass through the array will make sure that the largest value is located on the far right/ end of the array
- The largest value bubbles to the top
- You will the work your way through the array moving the second highest value to the second last position, then the third highest value to the third highest position… etc.

Program Implementation:

1. Get a list with numbers as user input
2. Implement a recursive function to perform bubble sort
3. Print the sorted list.

Example Input and Output:

Enter the array elements separated by comma: 1,6,3,6

Sorted array: [1, 3, 6, 6]

Submission:

- **You must submit a .py file.**
- **Mention the question number in the comments.**
- **Do your own work!** A mark of 0 will be assigned to the entire assignment for work that is not your own and will be handled as per the **Code of Student Rights and Responsibilities**

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- **All work must be run and validated to ensure that it is free of errors**. Any assignment that is submitted showing errors that prevent it from running will receive a mark of 0**.**
- **Only apply the knowledge that we have learned in class to this point.** Answers using any syntax or knowledge that we have not covered yet will receive a mark of 0 for that question.
- **Any assignment submitted past the posted due date and time will receive a mark of 0**. Do not wait until the last minute to complete and submit your work.