Data Structures and Algorithms IT2070

Year two Semester two 2020

Online Examination

Sri Lanka Institute of Information Technology

Time: 30 minutes

Paper Number 8 (20 marks)

The function $sum(n)$ is defined as the sum of integers from 1 to *n*.

$$sum(n) = 1 + 2 + 3 + 4 ..... + n$$

The recursive relation for $sum(n)$ where *n* is a non-negative integer is given by

$$sum(n) = sum(n-1) + n$$

[Hint: $sum(n-1) = 1 + 2 + 3 + 4 ..... + (n-1)$]

The sum of n is given here:

$$\sum_{i=1}^{n} i = 1 + 2 + \cdots + n$$

A recursive algorithm for the sum of sum of n calculation is given below:

Algorithm 1 Algorithm $S(n)$

```
1: //Input: A positive integer n
2: //Output: The sum of the first n
3: if n = 1 then
4:     return 1
5: else
6:     return [S(n − 1) + n        ]
```

a) Write a program in Python to read an integer from the keyboard for *n.*
b) Develop a function in python named as sum and implement the above recursive algorithm.
c) Pass the input numbers as parameter to the function developed and get the sum of number as output.
d) Use the loop to run the program and display the correct output until user inputs -1.

Upload your answer using given template to the course web link "Paper Number 8"

Grading Sheet:

1) Program is compiling. **2 marks**
2) Program is running successfully. **2 marks**
3) Program takes the input number as integer. **2 marks**
4) Correct implementation sum function. 6 **marks**
5) Display the output correctly **2 marks**

6) Use of loop correctly **4 marks**
7) Include comments and properly indented. **2 marks**
8) Plagiarism testing tool results:……..