

Data Structures and Algorithms IT2070

Year two Semester two 2020

Online Examination

Sri Lanka Institute of Information Technology

Time: 30 minutes

Paper Number 4 (20 marks)

The power function can be defined as $pow(x, n) = x^n$. This can be evaluated using the multiplication as $x^n = x \times x^{n-1}$ where x is any real number and n is a non-negative integer. [Hint: $pow(x, n-1) = x^{n-1}$]

A recursive algorithm for the power calculation is given below:

Power $x^N = x * x^{N-1}$ for $N > 0$
 $x^0 = 1$

```
1 function Power returns a Num(base, exp)
2 // Computes the value of Baseexp
3 // Pre: exp is a non-negative integer
4 if (exp = 0) then
5     returns 1
6 else
7     returns base * Power(base, exp-1)
8 endif
9 endfunction
```

- Write a program in Python to read an integers from the keyboard for x and n .
- Develop a function in python named as power and implement the above recursive algorithm.
- Pass the input numbers as parameter to the function developed and get the power of number as output.
- 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 4”

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 power 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:.....

