COMP 10280
Programming I (Conversion)
Practical Sheet 13
Tuesday, 20 October 2020

For each of the following questions, write an algorithm in pseudocode first before writing a Python program. Submit your algorithms in psuedocode as well as your Python programs.

When writing functions, use one-line or multi-line docstrings, as appropriate, to document your functions.

1. Implement the programs that illustrate the definition and use of functions in Python from the lectures (Pages 4 and 5 of the notes on Lecture 15, the section on "Function Definition and Function Use").

   Save these programs as `p13p1.py` and `p13p2.py`, respectively.

2. Implement the program that uses the `print_max` function from the lectures (Page 9 of the notes on Lecture 15, the section on "Functions within functions"). Ensure that you understand what is going on and how it works.

   Save this program as `p13p3.py`.

3. In the program in the previous question, what happens in each of the following cases:

   (a) If you include the line `print(print_max())`?
   (b) If you omit the brackets after `print_max()`, ie just have `print_max`?
   (c) If you include the line `print(print_max)`?

   Report your findings and your explanations for them in `p13q3.txt` (or `p13q3.odt` or `p13q3.doc`).

4. Implement the program that illustrates scoping in Python from the lectures (Page 12 of the notes on Lecture 15, the section on "Scoping").

   Save this program as `p13p4.py`.

5. Add some extra variables and operations on those variables in the program from the previous question to ensure that you understand what is going on and how it works.

   Save this program as `p13p5.py`.

6. (a) Write a recursive function that takes as its single argument a non-negative integer and returns the factorial of the number.
   (b) Write a program that prompts the user for an integer and checks that the number entered is non-negative. If it is, it calls the function defined in part (a) and prints out the result; if not, it prints out an appropriate error message.
   (c) In your function, include some print statements that allow you to see the operation of the recursion and its progress towards the base case.

   Save this program as `p13p6.py`.

Please upload your work to the Brightspace site before Sunday evening.

You should keep a copy of your programs for your portfolio.