

COMP 10280 Programming I (Conversion)

Practical Sheet 13 Dé Máirt, 12 Deireadh Fómhair 2023

For each of the following questions, write an algorithm in pseudocode first before writing a Python program. Submit your algorithms in pseudocode 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 Wednesday
evening.**

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