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| Lab 12 - Scope | Name:  Date: |

A ***function call*** sends the flow of execution from one block of statements to another block of statements. So far we have seen the flow go from the main program to a function and back. In general, functions call other functions which call other functions, ..., so the flow of execution can get quite complicated. As you send your program from function to function it is critical to know which variables are available to be used in statements and expressions. The set of all locations where a **variable name** can be used without incurring an error is called the **scope** of that variable name.

**1.** Open the file exploring\_scope.py from Canvas, and run it to see what happens. After you have studied (and fiddled with) this program, answer the following questions.

**a.** Does changing the value of the parameter inside a function effect that value of the corresponding variable passed as an argument? How do you know?

**b.** Are variable names defined in the main program accessible in the function? How do you know?

**c.** After completion of a function call, are names of parameters used in the function still accessible in the main program? How do you know?

**d.** After completion of a function call, are names of variables defined inside the function still accessible in the main program? Make a conjecture and then add to the program to test it. Describe what you did and what you found

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**e.** Can the value of a parameter used in a function be altered by a statement inside of the function? How do you know?

**f.** Can the value of a variable defined in the main program be altered by a statement inside of a function? Make a conjecture and then add to the program to test it. Describe what you did and what you found in the space below. Then add the line "global message\_in\_main" at the top of the function and try running the code again. What do you notice?

**2. Duplicating names.** Create a program with a function called shadowing to test the following questions:

1. What happens if the parameter value in the function has the same name as a variable within main?
2. Do you change the value in the main part of the program if you alter it within the function?
3. What if you create a variable in the function with the same name as a variable in main?
4. Which value takes precedence within the function and outside of it?

Write both your code and the answers to the questions below.