Lecture 6: Introduction to Computer Programming Course - CS1010

DEPARTMENT OF COMPUTER SCIENCE | 01/31/2019

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Announcements

- Exam 1 will be on February 14 in class
- All from in-class material
- Material covered until the week of February 4
- You will be asked to write algorithms and programs on paper
- This is a closed book, closed notes exam.
- You can bring one sheet (hand written for important keywords etc).

Goals for Today

- Functions
  - Scope
  - Global and Local Variables
- Practice Problems

Homework 3: Problem 2 (Hard Problem)

- Write a Python function to check whether a string is pangram or not.
- Note : Pangrams are words or sentences containing every letter of the alphabet at least once. For example : "The quick brown fox jumps over the lazy dog"
- Hint: Look at the string module
- Will cover this in Sets!
- If you did it its fine but I have an alternate problem for you so you can attempt that.

Statements and Scope

When you create a variable name in Python the name is stored in a *name-space*.

Variable names also have a *scope*, the scope determines the visibility of that variable name to other parts of your code.

Try the following:

```
y = 20
def printingnum():
    y = 30
    return y

print(y)
print(printingnum())
```

Scope

- How does Python know which **y** you're referring to when you write your code?
- This is why the idea of ‘scope’ is important.
- Python has a set of pre-defined rules to decide what variables (such as **y** in this case) you are referring to in your code.

Scope Continued

- In simple terms, the idea of scope can be described by 3 general rules:
  1. Local names will be changed when you assign names to some variable.
  2. Each assigned name references/belongs to four scopes, defined as:
     1. local
     2. enclosing functions
     3. global
     4. built-in
  3. Names declared as global map assigned names to enclosing module and function scopes.

Rule Number 2

- **LEGB Rule:**
- L: Local — Names assigned in any way within a function (def), and not declared global in that function.
- E: Enclosing function locals — Names in the local scope of any and all enclosing functions (def), from inner to outer.
- G: Global (module) — Names assigned at the top-level of a module file, or declared global in a def within the file.
- B: Built-in (Python) — Names preassigned in the built-in names module : open, range, SyntaxError,...

More about Local and Global Variables

- Variable names are local to the function definition.
- Scope of the variable: Once declared within a function it can be referenced/used within the function only. It has nothing to do with variables that have the same name and are outside the function.
- All variables have the scope of the block they are declared in starting from the point where they are defined.
- Let’s look at an example.
- Add the keyword **global** within the function if you want to use a global variable inside a function.

Operators and Expressions (from Lecture 2)

Operators	Expressions	Example
==	If the two operands are equal then the condition will be true	x=3, y=5; (x==y) is not true.
!=	If the two operands are not equal then the condition is true	(x!=y) is true
>	If the value on the left is greater than that on the right, then the condition is true	(x>y) is not true.
<	If the value on the right is greater than that on the left, then the condition is true	(x<y) is true
>=	If the value on the left is greater than or equal to the one on the right, then the condition is true	(x>=y) is false
<=	If the value on the right is greater than or equal to the one on the left, then the condition is true	(x<=y) is true

Problem 1

- We need to write a function that is called into the ‘Main Code’ of an application that requires ‘lesser of two evens’ and ‘greater of one or more odds’?
- **Another way of thinking about this is:** Write a function that returns the lesser of two given numbers *if* both numbers are even, but returns the greater one if one or both numbers are odd

Problem 2

- Write a function that compares two strings and returns True if the first letter of each string does not match, otherwise it returns False.
  - Take two input parameters for two strings.

Problem 3

- Write a function that capitalizes the 2^{nd} and the 5^{th} letter of a given string.

Problem 4

- Create a function that calculates the following for a given number:
  - Factorial
  - Floor
  - Ceiling
  - Exponential

Problem 5

- Write a function (calc_circle) that takes input as radius and calculates area of a circle.
- Create another function (calc_cone) that takes input as radius and height and calculates volume of a cone. The second function must call the function created before (calc_circle).

Exercise to submit in class

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Next Week

- Decision and Logic
  - Build on what we already know
  - If Statements
  - Boolean Logic