Local and Global Variables

FEB 24TH, 2012

Global variables

- The mental model 1.0 explains why variables defined inside a function cannot be used in the main program.
- What about variables defined in the main program? Can they be used inside a function?

```
def foo(x):
    var1 = "hello"
    return var1 + x + y

y = "good"
print foo("bye")
```

y is a *global* variable that is defined in the main program, but can be used in the function that is called after it is defined.

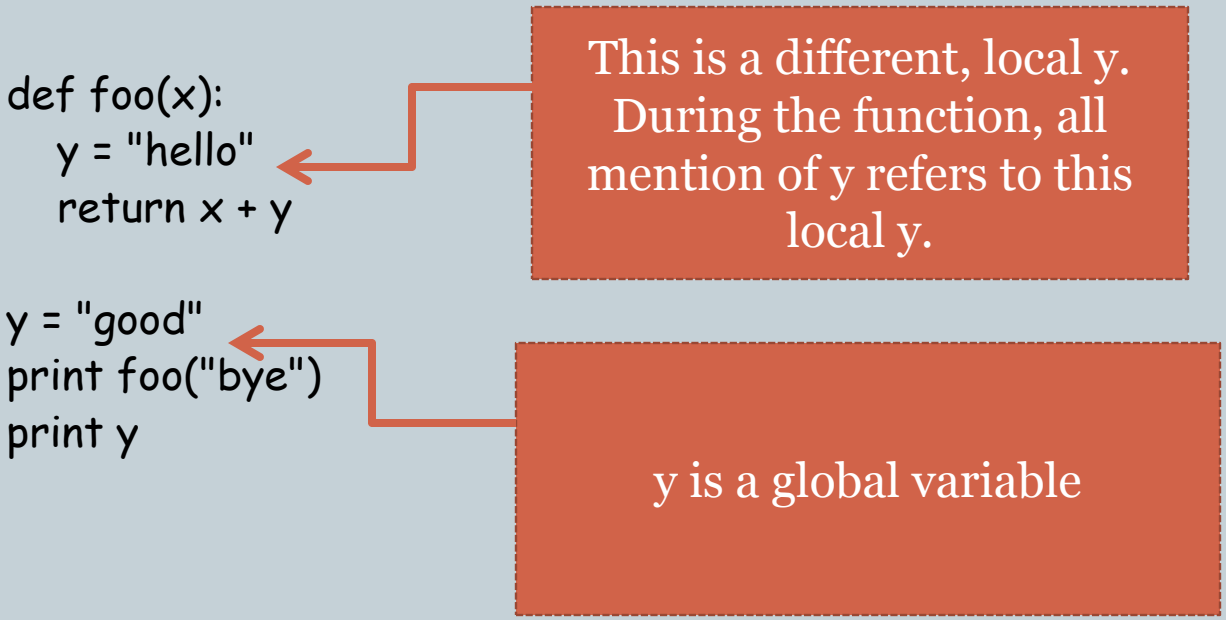
Mental model: version 1.1

- Here is a “more correct” version of item (4)

  Whenever we access a variable inside `foo`, `foo`’s dictionary is looked up. If a variable is not found in `foo`’s dictionary, then Python looks up the dictionary of the main (calling) program.

- This allows a function access to “global” variables.

Local variables override global variables



- This mechanism also gives local variables precedence.
- In the above example, the variable `y` is found in `foo`'s dictionary and that is the variable that is accessed in `foo`.

Explicit global variables

```
def foo(x):
    global y
    y = "hello"
    return x + y

y = "good"
print foo("bye")
Print y
```

We are now explicitly declaring that the y we want to access inside foo() is the global variable y

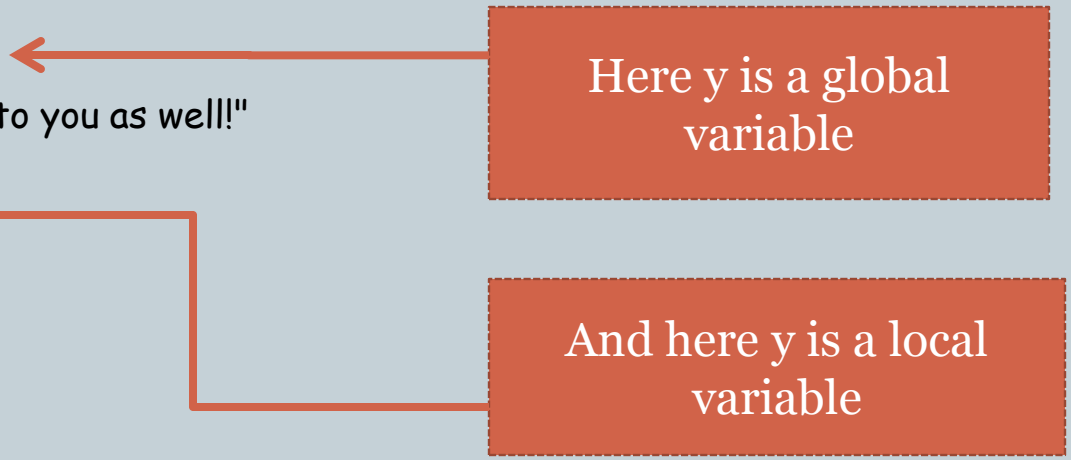
- global is a Python keyword.
- If it were not for the global y statement, the variable y being mentioned inside foo would have been defined in foo's dictionary and would be local to foo.

A variable cannot be both local and global in the same function

```
def foo():
    if y == "hello":
        print "Hello to you as well!"

    y = "hi"
    print y

y = "hello"
foo()
```



- We need yet another version of our mental model!

Mental model: version 1.2

- Here is an “even more correct” version of item (4)

When Python starts executing a function, the statements of the function are first examined to get the names of variables that might be assigned a value in the function. If a variably `x` might be assigned in the function, but is not explicitly `global`, then it is local. If a variable is not local by this criterion, then by default it is global.

WARNING!!

- I would discourage the use of global variables, both implicit and explicit.
- Communication between functions or between the main program and a function should be explicit – via parameters/arguments and returned values.