Learning to Program With Python – Part 4

Logic and Control Flow

Based on the book:
Snake Wrangling for Kids, Learning to Program with Python
by Jason R. Briggs
(Version 0.7.7-python2.7, modified by SJL)

Presented by
Steve Arnold, Principal Scientist VCT Labs
Stephanie Lockwood-Childs, President VCT Labs
(we are also open source Gentoo Linux / Yocto developers)

Decisions, Decisions

In the programs we have seen till now, there has always been a series of statements faithfully executed by Python in exact top-down order. What if you wanted to change the flow of how it works? For example, what if you want the program to take some decisions and do different things depending on different situations, such as printing Good Morning or Good Evening depending on the time of the day?

As you might have guessed, this is achieved using control flow statements. There are three control flow statements in Python - if, for, and while. - *A Byte of Python*

==	Equal to
!=	Not equal to
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than or equal to

CS Terminology:

Control Flow

Relational Operators

Note assignment "=" is not the same as the conditional "==" above.

If This, Then That

In programming terms, a question usually means we want to do either one thing, or another, depending on the answer to the question. This usually involves an if statement.

An if statement is made up of an ‘if’ followed by what is called a ‘condition’, followed by a colon (:). Note the condition will often include one or more of the relational operators.

Making a choice:

"If you're hungry, let's eat lunch. Or else we can eat in an hour.”
"If there's mint ice cream, I'll have a scoop. Or else I'll take vanilla."

Making a choice in our code with the *else clause*:

```
>>> if name == "Katie":
        print "Hi Katie!"
    else:
        print “Impostor!”
```

But What If... ?

Making many choices:

"If there’s mint ice cream, I'll have a scoop.

Or else if we have vanilla, I'll have 2!

Or else if there’s chocolate, give me 3!

Or I’ll just have a donut.”

Making more choices in our code with the *elif clause*:

```
>>> if name == "Katie":
        print "Hi Katie!"
   elif name == "Barbara":
        print "Hi Barbara!"
   else:
        print "Who are you?"
```

Loopty-Loop

Loops are sections of code that repeat a task over and over again.

A *“for”* loop usually repeats a certain number of times

A *“while”* loop usually keeps going until a certain thing happens (or as long as some condition is True).

Loops that Count

- A *for* loop repeats a certain number of times – it will keep going until it gets to the end of a count.
    - Can you think of a way this could go wrong?

```
>>> for mynum in [1, 2, 3, 4, 5]:
        print "Hello", mynum


Hello 1
Hello 2
Hello 3
Hello 4
Hello 5
```

Loops That Wait for a Condition

- A *while* loop will repeat until something happens (or as long as some condition is True).

```
>>> count = 0
>>> while (count < 4):
        print 'The count is:', count
        count = count + 1

The count is: 0
The count is: 1
The count is: 2
The count is: 3
```