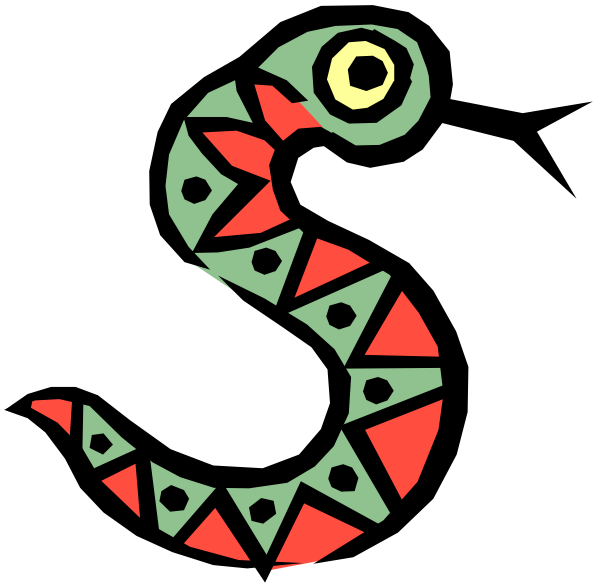
Python Control of Flow



if Statements

```
if x == 3:
    print "X equals 3."
elif x == 2:
    print "X equals 2."
else:
    print "X equals something else."
print "This is outside the 'if'."
```

Be careful! The keyword *if* is also used in the syntax of filtered *list comprehensions*. Note:

- Use of indentation for blocks
- Colon (*:*) after boolean expression

Another if form

- An alternative if form returns a value
- This can simplify your code
- Example:
  - return x+1 if x < 0 else x -1
  - return ‘hold’ if delta==0 else sell if delta < 0 else ‘buy’
- Added in Python v 2.6 (?)

while Loops

```
>>> x = 3
>>> while x < 5:
        print x, "still in the loop"
        x = x + 1
3 still in the loop
4 still in the loop
>>> x = 6
>>> while x < 5:
        print x, "still in the loop"


>>>
```

break and *continue*

- You can use the keyword *break* inside a loop to leave the *while* loop entirely.

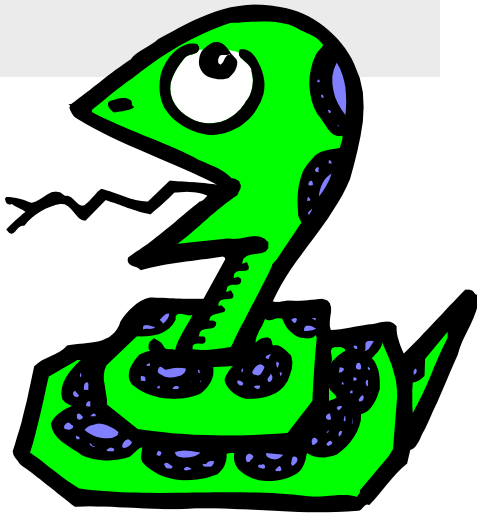
- You can use the keyword *continue* inside a loop to stop processing the current iteration of the loop and to immediately go on to the next one.

assert

- An *assert* statement will check to make sure that something is true during the course of a program.
  - If the condition if false, the program stops
    - —(more accurately: the program throws an exception)

```
assert(number_of_players < 5)
```

For Loops



For Loops / List Comprehensions

- Python's list comprehensions provide a natural idiom that usually requires a for-loop in other programming languages.
  - As a result, Python code uses many fewer for-loops
  - Nevertheless, it's important to learn about for-loops.

- *Take care*! The keywords *for* and *in* are also used in the syntax of list comprehensions, but this is a totally different construction.

For Loops 1

- A for-loop steps through each of the items in a collection type, or any other type of object which is "iterable"

```
for <item> in <collection>:
  <statements>
```

- If <collection> is a list or a tuple, then the loop steps through each element of the sequence
- If <collection> is a string, then the loop steps through each character of the string

```
for someChar in "Hello World":
    print someChar
```

For Loops 2

```
for <item> in <collection>:
  <statements>
```

- <item> can be more than a single variable name
- When the <collection> elements are themselves sequences, then <item> can match the structure of the elements.
- This multiple assignment can make it easier to access the individual parts of each element

```
for (x,y) in [(a,1),(b,2),(c,3),(d,4)]:
  print x
```

For loops & the *range()* function

- Since a variable often ranges over some sequence of numbers, the *range()* function returns a list of numbers from 0 up to but not including the number we pass to it.
- range(5) returns [0,1,2,3,4]
- So we could say:

```
for x in range(5):
    print x
```

- (There are more complex forms of *range()* that provide richer functionality…)

For Loops and Dictionaries

```
>>> ages = { "Sam" : 4, "Mary" : 3, "Bill" : 2 }
>>> ages
{'Bill': 2, 'Mary': 3, 'Sam': 4}
>>> for name in ages.keys():
        print name, ages[name]
Bill 2
Mary 3
Sam 4
>>>
```