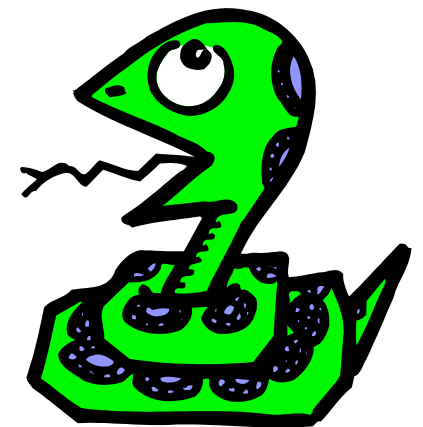

For Loops



Motivating problem

- Given the following list

- `>>> linguists = ["Amanda", "Claire", "Holly", "Luis", "Nick", "Sophia"]`

- How do I print each name on a separate line?

- `>>> print linguists[0] + '\n'`
 - `>>> print linguists[1] + '\n'`
 - `>>> print linguists[2] + '\n'`
 - `>>> print linguists[3] + '\n'`
 - `>>> print linguists[4] + '\n'`
 - `>>> print linguists[5] + '\n'`

For Loops 1

- A for-loop steps through each of the items in a list, tuple, string, or any other type of object which the language considers an "iterator."

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

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

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

For Loops 2

- The `<item>` part of the for loop can also be more complex than a single variable name.
 - When the elements of a container `<collection>` are also containers, then the `<item>` part of the for loop 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
```

Solution to our problem

- `>>> linguists = ["Amanda", "Claire", "Holly", "Luis", "Nick", "Sophia"]`
- `>>> for linguist in linguists:
print linguist`

Exercise

- How do we take the sentence "Python is a great text processing language" and print one word on each line?

For loops and range() function

- Since we often want to range a variable over some numbers, we can use the range() function which gives us 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
```

Exercise

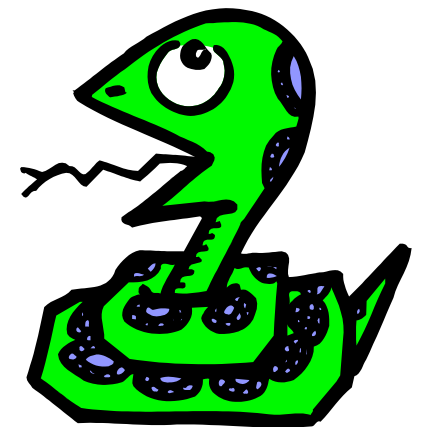
- Suppose we have a list of integers

```
>>> numbers = [1, 2, 3, 4, 5, 6]
```
- What do we need to do add 5 to each number?
- What if we want to add 5 to only the second to the fifth number?
- What if we want to add 5 to numbers with an even-numbered offsets?

Loop through multiple lists at the same time

```
>>> courses = ["syntax", "phonology",  
               "compling"]  
>>> rooms = ['232', '303', '534']  
>>> time = ['2pm', '10am', 'noon']  
>>> for (x,y,z) in zip(courses, rooms, time)  
       print x, y, z
```

files



Read from a file

```
#!/usr/local/bin/python

input_file = open("emails.txt", "r")
lines = input_file.readlines()
#use a for loop to access the lines
for line in lines
    print line
```

Open a file for reading



Read a file from command line

What if you want to read a different file each time you run your program?

```
#!/usr/local/bin/python
import sys
input_file = open(sys.argv[1], "r")
lines = input_file.readlines()
#use a for loop to access the lines
for line in lines:
    print line
```

File from command line

Writing to a file

Open a file for reading

```
#!/usr/local/bin/python
```

```
input_file = open("emails.txt", "r")
```

```
output_file = open("copy.txt", "w")
```

```
lines = input_file.readlines()
```

```
#use a for loop to access the lines
```

```
for line in lines
```

```
    output_file.write(line)
```

```
input_file.close()
```

```
output_file.close()
```

Open a file for writing

Exercise

- Find a file, open it and print its each line with its line number at the beginning