Announcements

- Reading and RQ6 due next time
- Assignment 2 due today, Assignment 3 out
- APT 2 due on Tuesday

Today:
- Problem solving: Strings, Lists
- Looping over structures (characters, words) and building something

Review Functions


```
def duplicate(word, num):
    answer = word * num
    return answer

def duplicate2(word, num):
    answer = word * num
    print answer

def duplicate3(word,num):
    answer = word * num
```

How many ways can I run Python in this course?

- Eclipse
  - Complete program
  - Interactive Console
  - APT
- Online textbook
  - We are using Python 2.7
    ‘/’ (2.7) vs ‘//' (3)
- Python Tutor
Use Python Tutor

- Debug/trace your code
- Doesn’t work with input files

More on Strings

- Strings are indexed starting at 0
- Example: ‘word’

```
word
0 1 2 3
```

- Use [x] – to refer to a particular character in word
- Use [x:y] to refer to a slice of the string starting at position x and up to but not including position y. Can leave out x or y.

Examples

bit.ly/101f17-0914-1

```
phrase = "Duke Blue Devils"
1) phrase[0] + phrase[-3] + phrase[-2]*2
2) phrase[5:10] + phrase[:4]
3) (phrase[phrase.find('ev'):]).upper()
4) phrase[-5::2] + phrase[:4:-1]
```

Loop over all characters in a String

```
def mystery(word):
    answer = ""
    for ch in word:
        if ch.lower() != 'e':
            answer = answer + ch
    return answer
```
Loop over string


```python
def mystery2(word):
    count = 0
    for ch in word:
        count = count + 1
    return count
```

```python
def mystery3(word):
    answer = 0
    for ch in word:
        if ch.lower() != 'e':
            answer = answer + 1
    return answer
```

Loop over all words in a list

```python
def mysteryList(phrase):
    for word in phrase.split():
        print word
```

Loop over words

• www.bit.ly/101f17-0914-3

```python
def mystery4(phrase):
    count = 0
    for word in phrase.split():
        count = count + 1
    return count
```

```python
def mystery5(phrase):
    hold = phrase.split()
    answer = hold[0]
    for word in hold[1:]:
        if word[0].lower() != 'b':
            answer = answer + " " + word
    return answer
```

Computer Science Alum

• Biology and CS
• Undergraduate Research - JFLAP
• Epic
• Now in Med School at Vanderbilt
Assignment 3
snarf to use starter files

• Turtles
  – Creative

• Earthquakes
  – Data from last 30 days around the world
  – Example - Find the largest earthquake

Getting Started with Earthquake part
• Read lines of data into a list of strings

```python
def fileToList(url):
    """This function reads a file from a given url
    returns a list of strings where each string
    represents one line from the file"

    print "FIX: NEED TO PUT STRINGS IN CORRECT"
    alist = []
    source = urllib2.urlopen(url)
    for line in source:
        items = line.strip()
        alist.append(items)
    return alist
```

Getting Started with Earthquake part
• Here is first few lines of the small file:
  1.3%earthquake$81km SSW of Kobuk, Alaska
  1.92%earthquake$37km SW of Challis, Idaho
  1.5%earthquake$74km NNW of Ester, Alaska
  2.3%earthquake$30km SE of Yerington, Nevada

• Read into a list, reformatting the lines

```python
["earthquake, 1.3, 81km SSW of Kobuk, Alaska",
 "earthquake, 1.9, 37km SW of Challis, Idaho",
 "earthquake, 1.5, 74km NNW of Ester, Alaska",
 ...]
```

• Write function getParts to get parts of a line

```python
[1.3, "earthquake", "81km SSW of Kobuk"]
```

Use the list to calculate facts about earthquakes

Write a function named `bigQuakes`. This method has two parameters. One is a decimal number and one is a list of earthquake strings in the format above. This method should return a list of earthquake strings whose earthquakes have magnitude equal or greater than the parameter number.

First five earthquakes in Alaska 3.0 or greater are earthquake, 3.2, 70km WNW of Skagway, Alaska
earthquake, 3.0, 94km NE of Chirikof Island, Alaska
earthquake, 4.2, 246km ESE of Chirikof Island, Alaska
Problem Solving to Code
7 Step Process

1. Work small examples by hand
2. Write down what you did in words (algorithm)
3. Find Patterns (generalize algorithm)
4. Work another example by hand (does your algorithm work? If not, go back to 2)
5. Translate to code
6. Test several cases
7. Debug failed test cases
Use 7 step process to solve
LastName First