CompSci 101
Introduction to Computer Science

Feb 2, 2017
Prof. Rodger

Announcements

• Reading and RQ7 due next time
• Assignment 3 due Tuesday
• APT 2 due today, APT 3 out
• APT Quiz 1 – Sunday night-Tuesday night
  – Up for two days, you pick 3 hours to do it
  – Practice quiz out late today or tomorrow
• Today
  – Designing programs to draw with turtles
  – Calculating info about earthquake data
  – Really doing? (Functions, if, strings, lists)

Given a string of words, this function should return a new string with ‘s’ removed at the end of every word
bit.ly/101s17-0202-1

```python
def removePlurals(phrase):
    answer = ""
    alist = phrase.split()
    for word in alist:
        if word[-1] == "s":
            answer = word[:-1] + " "
        else:
            answer = word + " "
    return answer.strip()
```

Lynn Conway

See Wikipedia and lynnconway.com

• Joined Xerox Parc in 1973
  – Revolutionized VLSI design with Carver Mead
• Joined U. Michigan 1985
  – Professor and Dean, retired '98
• NAE '89, IEEE Pioneer '09
• Helped invent dynamic scheduling early '60s IBM
• Transgender, fired in '68
Assignment 3

• Turtles
  – Creative

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


```
import turtle
wn = turtle.Screen()

def square (alex):
    alex.forward(100)
    alex.left(90)
    alex.forward(100)
    alex.left(90)
    alex.forward(100)
    alex.left(90)
    alex.forward(100)
    alex.left(90)

if __name__ == '__main__':
    timmy = turtle.Turtle()
    square(timmy)
    wn.exitonclick()
```

• Run in eclipse
• Make square with different sizes?
• Make a rectangle?
• Where is the repetition?
• New commands:
  • up(), down(), position(), goto()

EarthQuake
bit.ly/101s17-0202-3

```
def quakesMystery(letter, quakes):
    loclist = []
    for item in quakes:
        if letter in item:
            loclist = loclist + [item]
    return loclist

eqList = ['2.4, 14km WSW of Willow, Alaska',
          '0.9, 4km NNW of The Geysers, California',
          '2.1, 13km ESE of Coalinga, California',
          '4.1, 8km E of Maltignano, Italy',
          '1.4, 17km N of Meadow Lakes, Alaska',
          '0.7, 28km SW of Hawthorne, Nevada',
          '1.8, 41km W of Anchorage, Alaska']
```

EarthQuake (cont)

```
def quakesMystery2(quakes):
    temp = ""
    for item in quakes:
        if len(item) > len(temp):
            temp = item
    return temp

eqList = ['2.4, 14km WSW of Willow, Alaska',
          '0.9, 4km NNW of The Geysers, California',
          '2.1, 13km ESE of Coalinga, California',
          '4.1, 8km E of Maltignano, Italy',
          '1.4, 17km N of Meadow Lakes, Alaska',
          '0.7, 28km SW of Hawthorne, Nevada',
          '1.8, 41km W of Anchorage, Alaska']
```
Functions you will write

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 magnitude equal or greater than the parameter number.

Write a function named `locationQuakes`. This method has two parameters. One is a String representing a place, and one is a list of earthquake strings in the format above. This method should return a list of earthquake strings whose earthquakes were in this location. Assume the location is the last word in the description of the earthquake location.

Calling your Earthquake functions

Assume `eqList` is a list of all the earthquakes, each earthquake is a string in the correct format.

```python
quakes1 = bigQuakes(1.8, eqList)
quakes2 = locationQuakes("Alaska", quakes1)
```

What can you say about `quakes2`?

Type, value

Python if statements and Booleans

- In python we have if: else: elif:
  - Used to guard or select block of code
  - If guard is True then code block, else other

- What type of expression used in if/elif tests?
  - ==, <=, <, >, >=, !=, and, or, not, in
  - Value of expression must be either True or False
  - Type is bool - George Boole, Boolean,

- Examples with if
  - String starts with vowel
    (useful for APT Emphasize)

Four versions of isVowel?

```python
def isVowel(ch):
    if ch == 'e':
        return True
    if ch == 'a':
        return True
    if ch == 'i':
        return True
    if ch == 'o':
        return True
    if ch == 'u':
        return True
    return False
```

A

```python
def isVowel(ch):
    c = "aeiou".count(ch)
    if c > 0:
        return True
```

B

```python
def isVowel(ch):
    if ch in "aeiou":
        return True
    else:
        return False
```

C

```python
def isVowel(ch):
    if ch == 'a':
        return True
    if ch == 'i':
        return True
    if ch == 'o':
        return True
    return False
```

D
Anatomy of a Python String

- String is a sequence of characters
  - Functions we can apply to sequences: len, slice [:], others
  - Methods applied to strings [specific to strings]
    - st.split(), st.startswith(), st.strip(), st.lower(), …
    - st.find(), st.count()

- Strings are immutable sequences
  - Characters are actually length-one strings
  - Cannot change a string, can only create new one
  - What does upper do?
  - See resources for functions/methods on strings

- Iterable: Can loop over it, Indexable: can slice it

Counting vowels in a string

- Accumulating a count in an int is similar to accumulating characters in a string

```
def vowelCount(word):
    value = 0
    for ch in word:
        if isVowel(ch):
            value = value + 1
    return value
```

- Alternative version of adding:
  
  ```
  value += 1
  ```

Incremental + : numbers and strings

- Wht vwls cn y still rd ths sntnc?
  - Create a no-vowel version of word
  - Examine each character, if it's not a vowel …
  - Pattern of building a string

```
def noVowels(word):
    ret = ""
    for ch in word:
        if not isVowel(ch):
            ret = ret + ch
    return ret
```