CompSci 101
Introduction to Computer Science

Jan 31, 2017
Prof. Rodger

How to teach pancake Flipping

- http://www.youtube.com/watch?v=W_gxLKSsSIE
  - For longer, more complex robotic tasks
    - http://www.youtube.com/watch?v=4usoE981e7I

Lab 3 this week

- String splicing
  - word = ”go duke”
  - print word[3:5] + word[0]
- Making decisions – if
- Lists – [”orange”, ”kiwi”, ”lemon” ]

Announcements

- Reading and RQ6 due next time
- Assignment 2 due today, Assignment 3 out
- APT 2 due on Thursday
- APT Quiz 1 next Sunday 6pm-Tuesday 10pm
  - You pick 3 hours to take it during that time

- Today:
  - Problem solving: Strings, Lists
  - Looping over structures (characters, words) and building something
Assignment 3

- Turtles
  - Creative

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

How to solve problems with different cases?

- Keep score in a video game?
  - Different points for different tasks?

- Translate a book from English to Spanish?
  - Different words, different rules

- Identify proteins in strands of DNA?
  - Start codon: atg Stop Codon: tag

- Different cases with Pancake APT?

- In Python use: if, else, elif

More on Strings

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

  \[
  \begin{array}{cccc}
  \text{w} & \text{o} & \text{r} & \text{d} \\
  0 & 1 & 2 & 3 \\
  \end{array}
  \]

- 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/101s17-0131-1

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

```python
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

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

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

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

Apply now for a scholarship to go to GHC 2017

**2017 Grace Hopper Celebration of Women in Computing**

**APT: Last Name First**

**Problem Statement**

Sabrina needs to be able to reorganize names into the last name first and she wants to abbreviate any middle names with the first letter and a period. She resists middle names that are a single letter and does not abbreviate them.

Write function `modify` that given a name returns the name with the last name first, followed by a comma, followed by the first name (if any), followed by the first letter of each remaining/middle name with a period after each letter. If a middle name is a single letter, do not abbreviate it; follow it by a period.

```python
def modify(name):
    return the name with the last name first, followed by a comma, followed by the first name (if any), followed by the first letter of each remaining/middle name with a period after each letter. If a middle name is a single letter, do not abbreviate it; follow it by a period.
```
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