CompSci 101
Introduction to Computer Science

February 2, 2016
Prof. Rodger

How to teach pancake Flipping

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

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 2 hours to take it during that time

- Today: FTIF
  - Problem solving: Strings, Lists
  - Looping over things: characters, words

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’

<table>
<thead>
<tr>
<th>w</th>
<th>o</th>
<th>r</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

- 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

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

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

- www.bit.ly/101sp16-0202-1

```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


```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
More Computer Science Duke Alums

Problem Solving to Code
7 Step Process
1. Work small example 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

Back to LastNameFirst APT
http://www.cs.duke.edu/csed/pythonapt/lastnamefirst.html

Answer Questions here:
bit.ly/101sp16-0202-3

Use 7 step process to solve LastName First