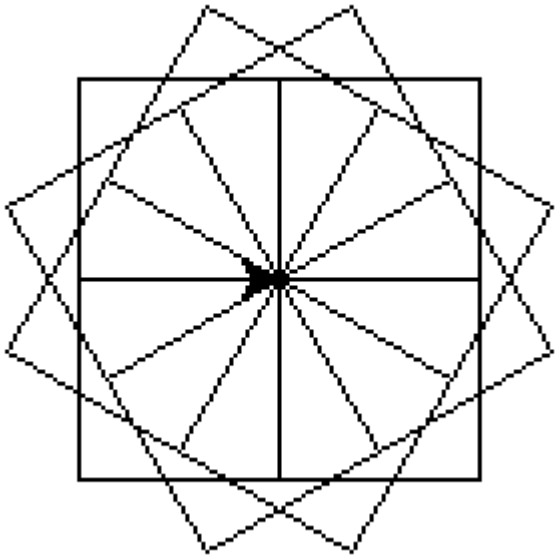
CompSci 101
Introduction to Computer Science



Sept 15 , 2016

Prof. Rodger

How to teach pancake Flipping

- http://www.youtube.com/watch?v=W_gxLKSsSIE
  - Is this computer science? http://bit.ly/zykOrh
  - For longer, more complex robotic tasks
    - http://www.youtube.com/watch?v=4usoE981e7I

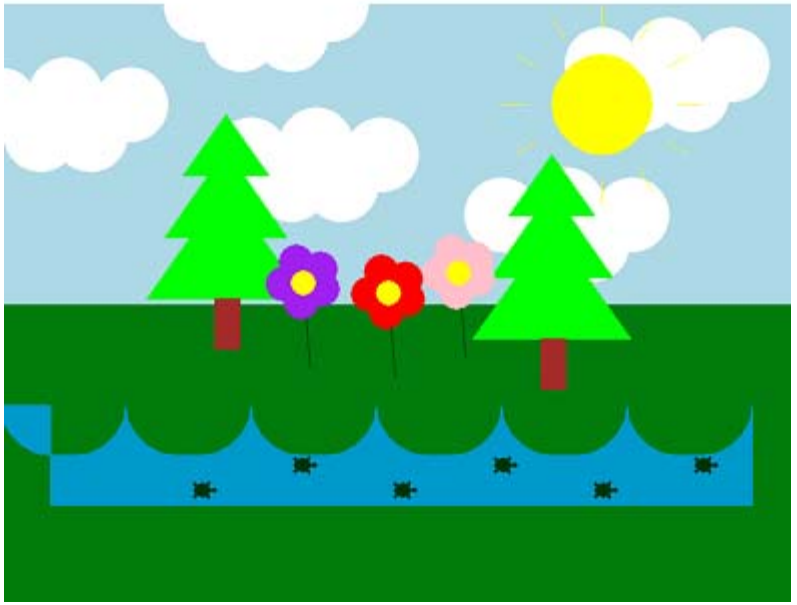
Announcements

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

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

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

LastNameFirst APT

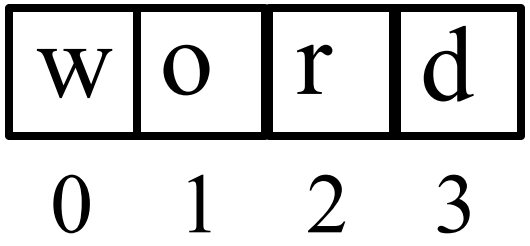
http://www.cs.duke.edu/csed/pythonapt/lastnamefirst.html

Answer Questions here:

bit.ly/101f16-0915-1

More on Strings

- Strings are indexed starting at 0
- Example: `'word'`



- 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()
```

String fun
Crazy import

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

- www.bit.ly/101f16-0915-2

```
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

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

Loop over words

- www.bit.ly/101f16-0915-3

```
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

More Computer Science Duke Alums

Back to LastNameFirst APT

http://www.cs.duke.edu/csed/pythonapt/lastnamefirst.html

Answer Questions here:

bit.ly/101f16-0915-4

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