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)
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’

```
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/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]

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


```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

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
More Computer Science Duke Alums
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 respects 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
filename: LastNameFirst.py
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 name with a period after each letter. name has at least one word.
    """
    # you write code here
```
2. name = "Prince"

returns "Prince"

There is only one name.

3. name = "Thomas Narten"

returns "Narten, Thomas"

There is no middle name.

4. name = "Elizabeth Rosemond Hilton Wilding Todd Fisher Burton Warner Fortensky Taylor"

returns "Taylor, Elizabeth R. H. W. T. F. B. W. F."

All the middle names are abbreviated.
LastNameFirst APT

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

Answer Questions here:

bit.ly/101s17-0131-4
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