CompSci 101
Introduction to Computer Science

Oct. 27, 2016
Prof. Rodger
Announcements

• Next Reading and RQ due Nov 1
• Assignment 5 due today
  – Next Assignment out next week
• APT 6 due Tues

• Today:
  – Review nested loops, tuple generators
  – Focus on problem solving with sets
Review from last time: generator

```python
im.getdata(), accessing pixels
```

- Returns something *like* a list
  - Use: `for pix in im.getdata():`
  - Generates pixels on-the-fly, can't slice or index unless you use `list(im.getdata())`
  - Structure is called a Python generator!
  - Saves on storing all pixels in memory if only accessed one-at-a-time
Review from last time
Making Tuples and Generators

• Overuse and abuse of parentheses
  – To create a tuple, use parentheses
    
    ```python
    for pix in im.getdata():
        (r,g,b) = pix
        npx = (255-r,255-g,255-b)
    ```

  – To create a generator use parentheses as though creating a list comprehension!
    
    ```python
    [2*n for n in range(10000)]
    (2*n for n in range(10000))
    ```

• See this in PyDev console
Question: Which operation does the red represent?
Problems — snarf setExample.py

• Given a list of strings that have the name of a course (one word), followed by last names (one word each) of people in the course:
  1. Find total number of people taking any course
  2. Find number of people taking just one course

["econ101 Abroms Curtson Williams Smith", "history230 Black Wrigley Smith", ... ]

Process data — create lists of strings of names for each course
Data for example

[“compsci101 Smith Ye Li Lin Abroms Black“,  
“math101 Green Wei Lin Williams DeLong Noell Ye Smith”,  
“econ101 Abroms Curtson Williams Smith”,  
“french1 Wills Wrigley Olson Lee”,  
"history230 Black Wrigley Smith” ]

TO easier format to work with:


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People in CompSci 101

ECON101
-Curtson
-Williams

COMPSCI101
-Abroms
-Smith
-Black
-Li
-Ye
-Lin

MATH101
-Green
-Noell
-Wei
-Yavatkar
-Delong

HISTORY230
-Wrigley

FRENCH1
-Wills
-Lee
-Olson

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People Taking both Math And CompSci
Part 1 — processList

- Given a list of strings that have the name of a course (one word), followed by last names of people in the course:
  - Convert list into lists of strings of names for each course

"econ101 Abroms Curtson Williams Smith",
"history230 Black Wrigley Smith", ...

[['Abroms', 'Curtson', 'Williams', 'Smith'],
['Black', 'Wrigley', 'Smith', ...]]
Part 2 — peopleTakingCourses

bit.ly/101f16-1027-3

• Given a list of lists of names, each list represents the people in one course:
  – Find total number of people taking any course
  – peopleTakingCourses should return unique list of names

• Small Example

[[‘Abroms’, ‘Curtson’, ‘Williams’, ‘Smith’],
[‘Black’, ‘Wrigley’, ‘Smith’]]

Answer is 6 unique names
People taking Courses - Union

Total Number Is 17 unique names
Next, find the number of people taking just one course
Union all sets
But French1
To solve this problem

- First let’s write a helper function
Part 3 — unionAllSetsButMe
bit.ly/101f16-1027-4

• Given example, a list of sets of strings, and the index of one of the sets, return the union of all the sets but that one

example = [set(["a", "b", "c"]), set(["b", "c", "d", "g"]), set(["e", "d", "a")])

unionAllSetsButMe(example, 1) is
set(["a", "b", "c", "e", "d"])

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Part 4 — peopleTakingOnlyOneCourse

bit.ly/101f16-1027-5

• Given a list of lists of strings of names representing people from courses
  – Find number of people taking just one course

[['Abroms', 'Curtson', 'Williams', 'Smith'],
['Black', 'Wrigley', 'Smith', 'Abroms']]

4
People taking
Only one course

COMPSCI101

MATH101

FRENCH1

HISTORY230

ECON101
APT - UniqueZoo

• How do you solve this problem?
• How is it similar to the problem we just solved
Example Data for UniqueZoo

["zebra bear fox elephant", "bear crocodile fox", "rhino elephant crocodile kangaroo", "elephant bear"]
UniqueZoo – two zoos have unique animals