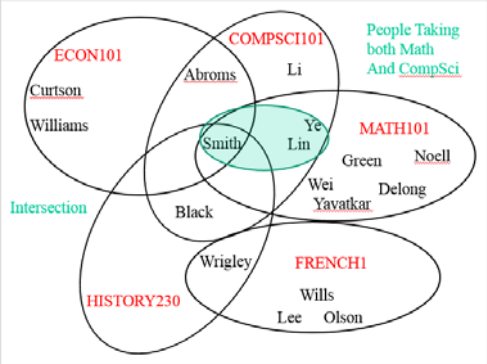
CompSci 101
Introduction to Computer Science



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 `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

```
for pix in im.getdata():
  (r,g,b) = pix
  npx = (255-r,255-g,255-b)
```

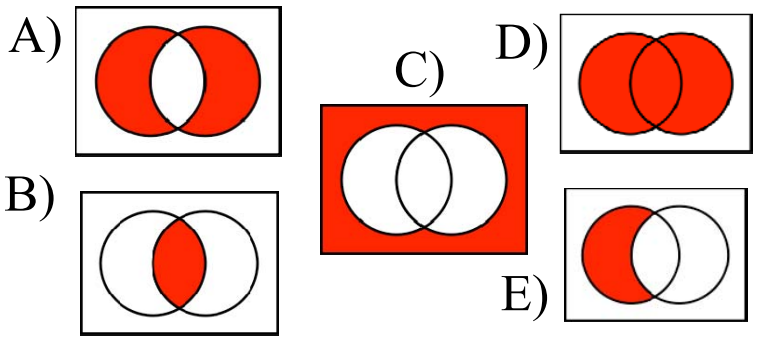
  - To create a generator use parentheses as though creating a list comprehension!

```
[2*n for n in range(10000)]
(2*n for n in range(10000))
```

- See this in PyDev console

Set Operations from pictures
bit.ly/101f16-1027-1

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", …]

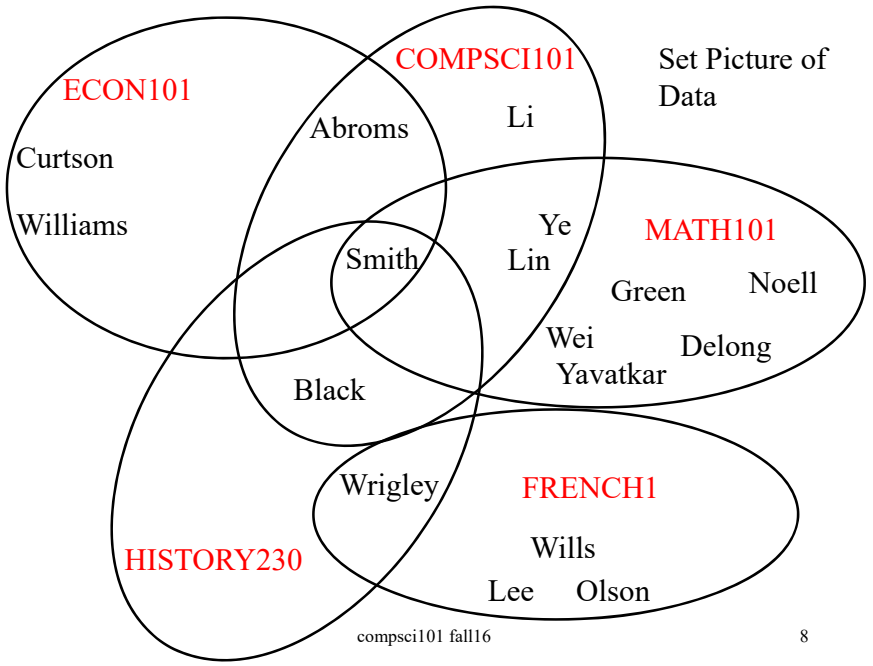
Process data – create lists of strings of names for each course

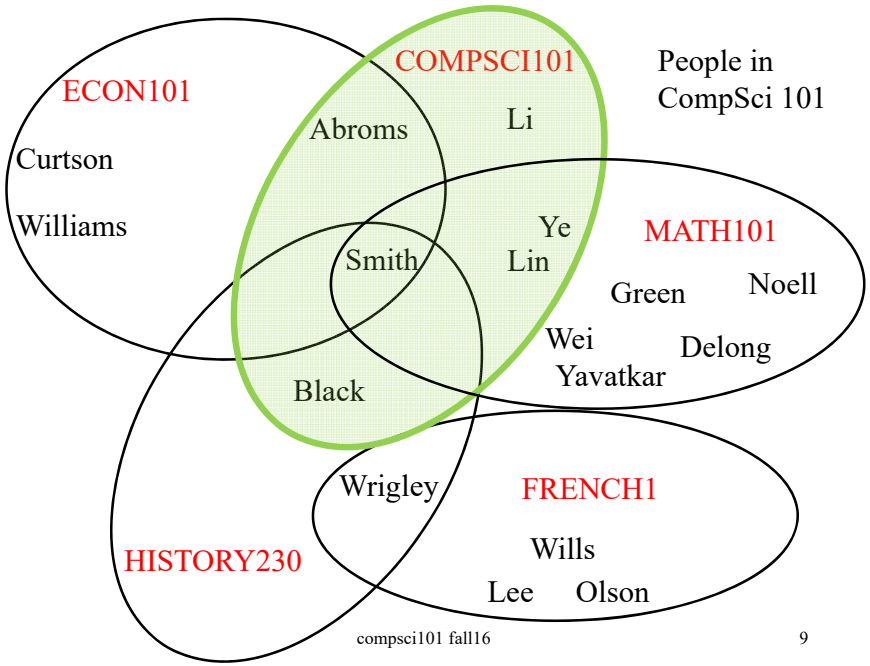
Data for example

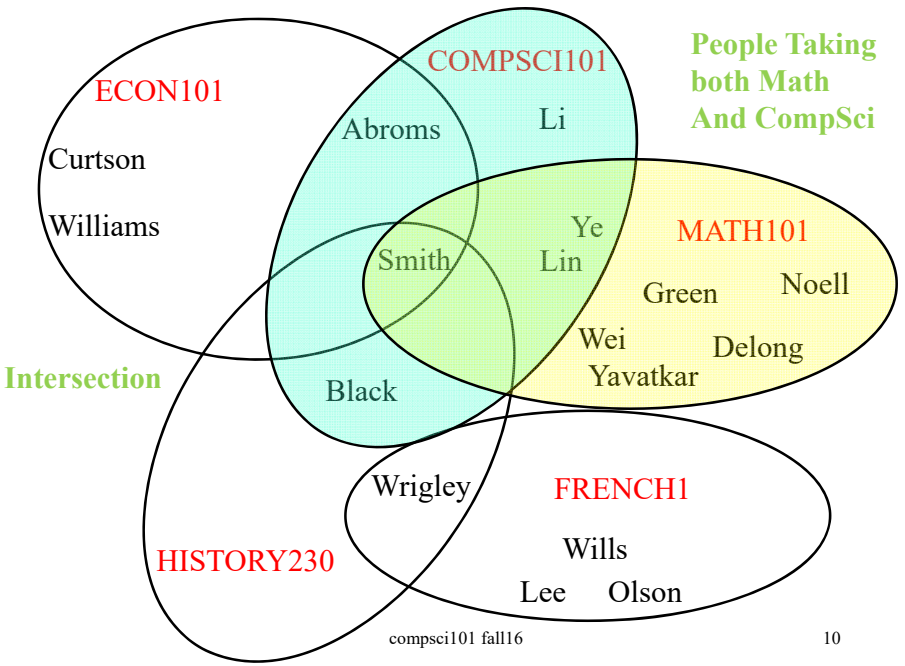
[“compsci101 Smith Ye Li Lin Abroms Black“,
“math101 Green Wei Lin Williams DeLong Noell Ye Smith”,
“econ101 Abroms Curtson Williams Smith”,
“french1 Wills Wrigley Olson Lee”,
"history230 Black Wrigley Smith”]

TO easier format to work with:

[[‘Smith’, ‘Ye’, ‘Li’, ‘Lin’, ‘Abroms’, ‘Black’],
[‘Green’, ‘Wei’, ‘Lin’, ‘Williams’, ‘DeLong’, ‘Noell’, ‘Ye’, ‘Smith’], [‘Abroms’, ‘Curtson’, ‘Williams’, ‘Smith’], ….]







Part 1 – processList

bit.ly/101f16-1027-2

- 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’, …]]

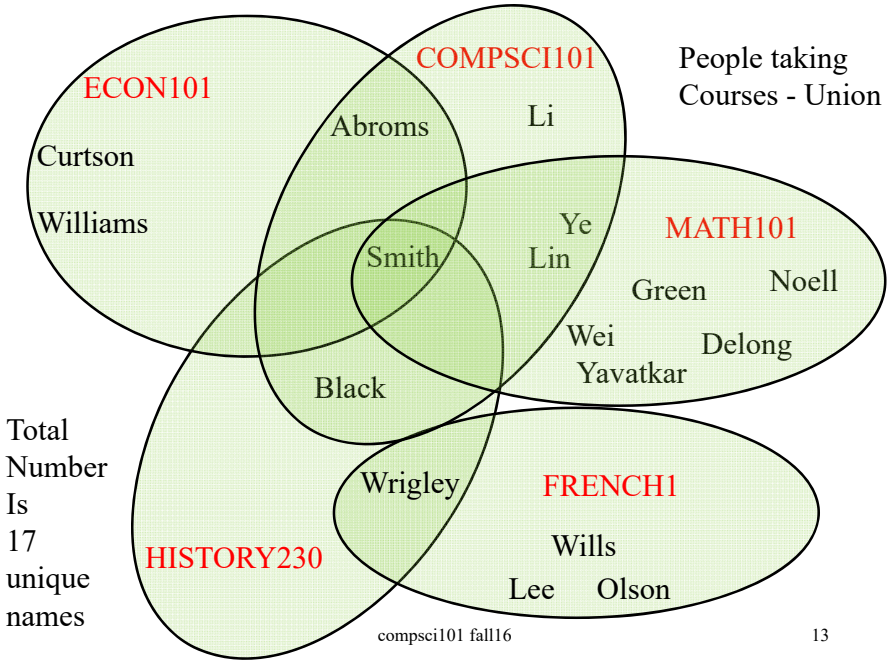
Part 2 – peopleTakingCourses

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’]]

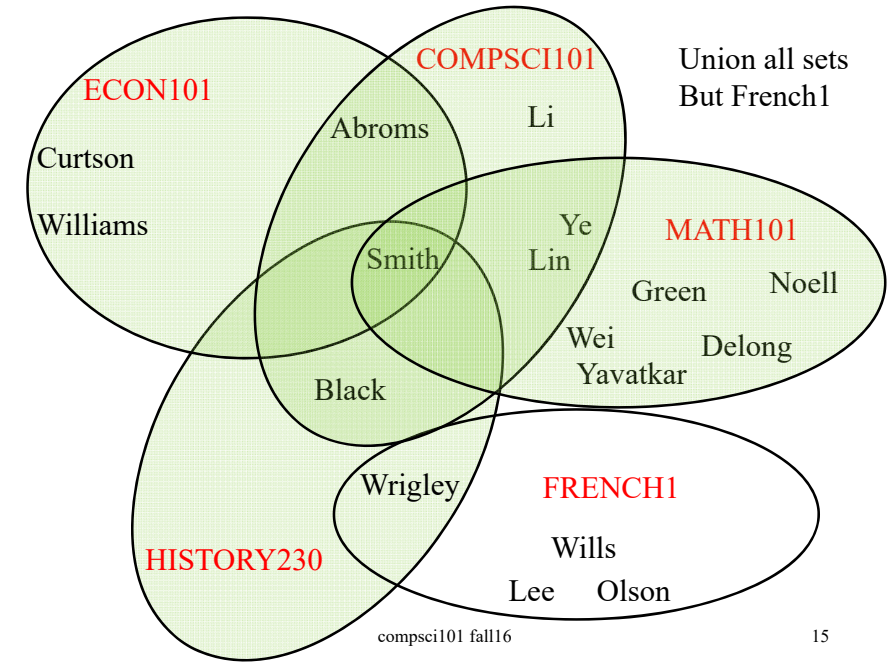
Answer is 6 unique names



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

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- 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"])*

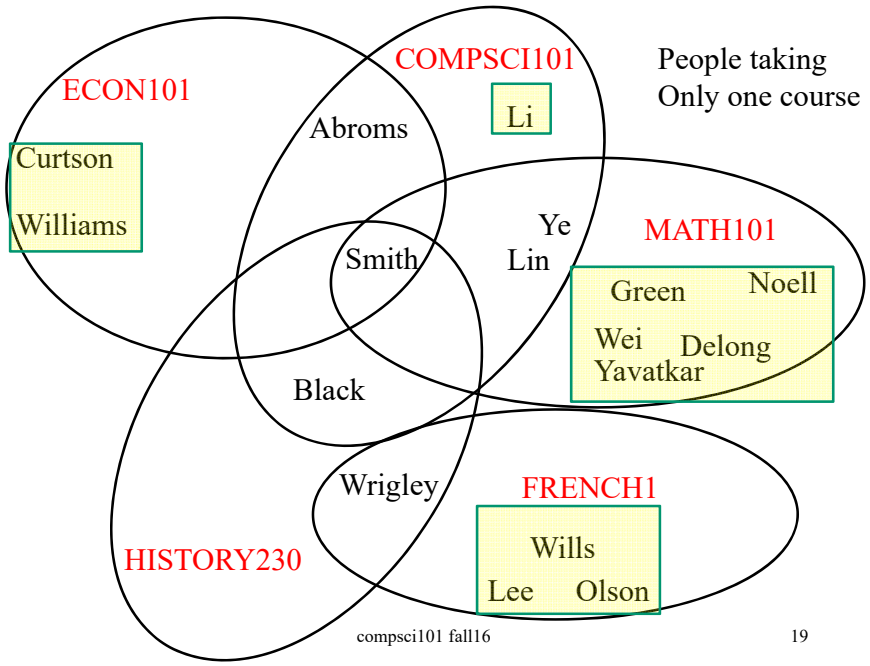
Part 4 – peopleTakingOnlyOneCourse

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

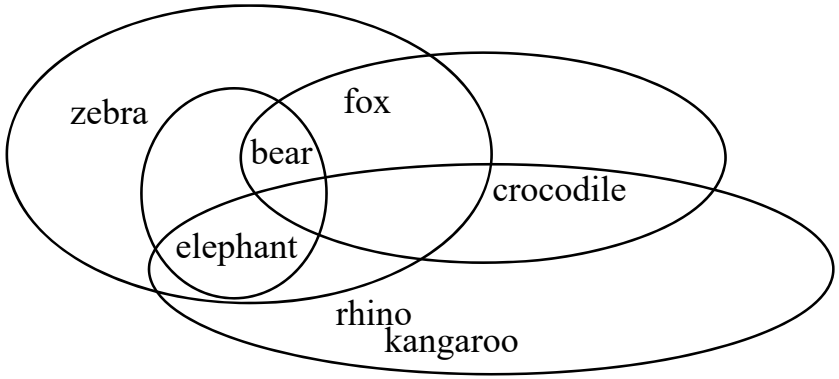


APT - UniqueZoo

- 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