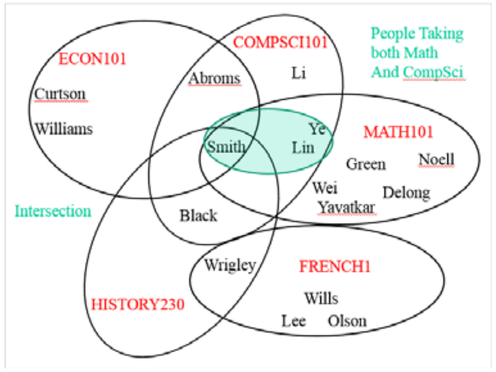
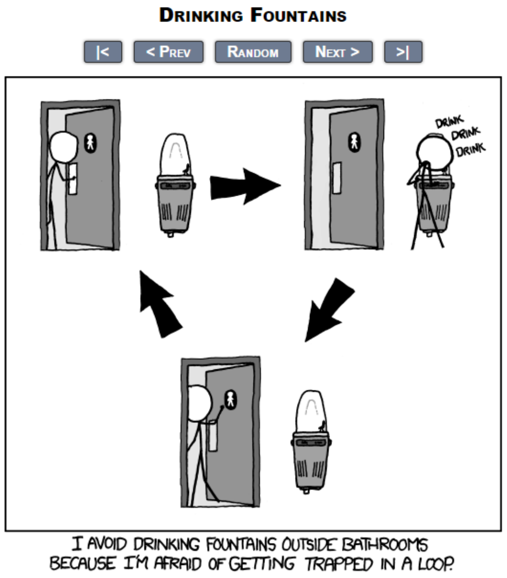
CompSci 101
Introduction to Computer Science



Oct 26, 2017

Prof. Rodger

from xkcd

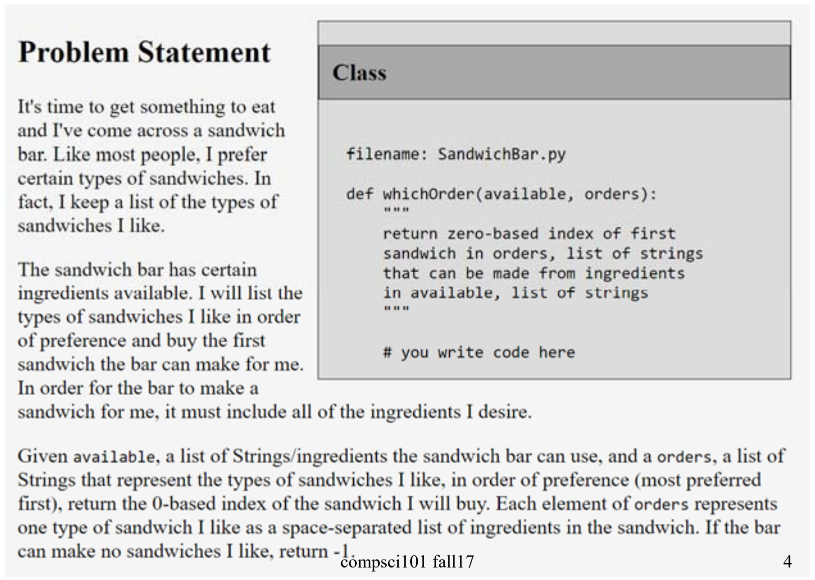

DRINKING FOUNTAINS
|<
< PREV
RANDOM
NEXT >
>|
DRINK DRINK DRINK
I AVOID DRINKING FOUNTAINS OUTSIDE BATHROOMS BECAUSE I'M AFRAID OF GETTING TRAPPED IN A LOOP.

Announcements

- Reading and RQ15 due next time
- Assignment 5 due today, Assign 6 out
- APT 5 due Tuesday

- Today:
  – Problem solving using set operations

APT SandwichBar



Problem Statement

It's time to get something to eat and I've come across a sandwich bar. Like most people, I prefer certain types of sandwiches. In fact, I keep a list of the types of sandwiches I like.

The sandwich bar has certain ingredients available. I will list the types of sandwiches I like in order of preference and buy the first sandwich the bar can make for me. In order for the bar to make a sandwich for me, it must include all of the ingredients I desire.

Given `available`, a list of Strings/ingredients the sandwich bar can use, and a `orders`, a list of Strings that represent the types of sandwiches I like, in order of preference (most preferred first), return the 0-based index of the sandwich I will buy. Each element of `orders` represents one type of sandwich I like as a space-separated list of ingredients in the sandwich. If the bar can make no sandwiches I like, return -1.

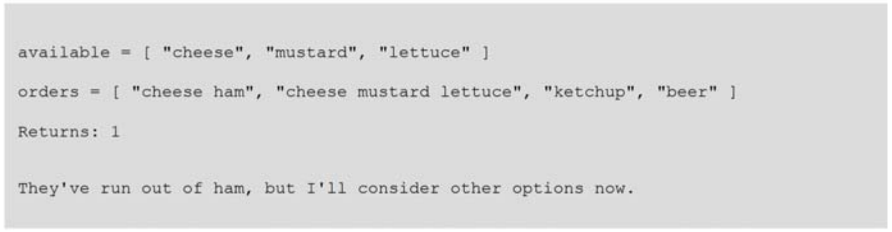
Class

```
filename: SandwichBar.py

def whichOrder(available, orders):
    """
    return zero-based index of first
    sandwich in orders, list of strings
    that can be made from ingredients
    in available, list of strings
    """

    # you write code here
```

APT SandwichBar

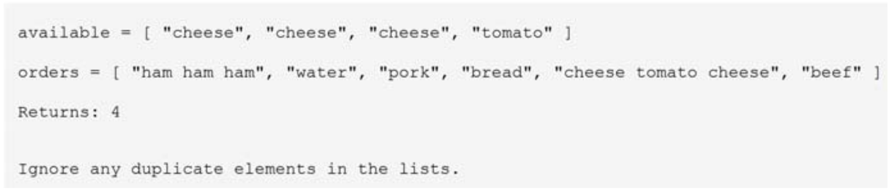


```
available = [ "cheese", "mustard", "lettuce" ]

orders = [ "cheese ham", "cheese mustard lettuce", "ketchup", "beer" ]

Returns: 1

They've run out of ham, but I'll consider other options now.
```



```
available = [ "cheese", "cheese", "cheese", "tomato" ]

orders = [ "ham ham ham", "water", "pork", "bread", "cheese tomato cheese", "beef" ]

Returns: 4

Ignore any duplicate elements in the lists.
```

APT SandwichBar
bit.ly/101f17-1026-1

Step 1: work an example by hand

available = ["cheese", "cheese", "cheese", "tomato"]
orders = ["ham ham ham", "water", "pork", "bread", "cheese tomato cheese", "beef"]

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", …]

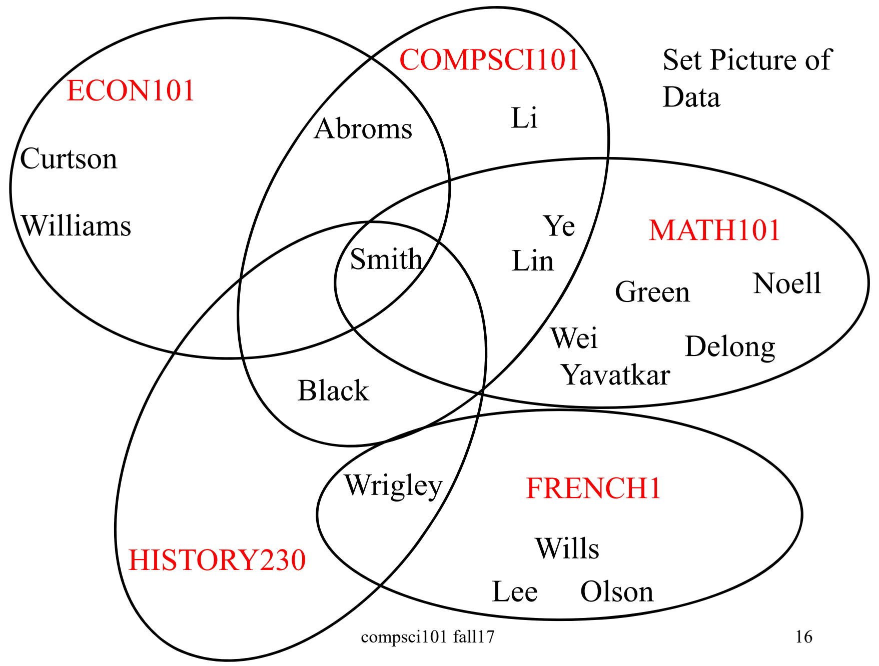
Process data – create lists of strings of names for each course

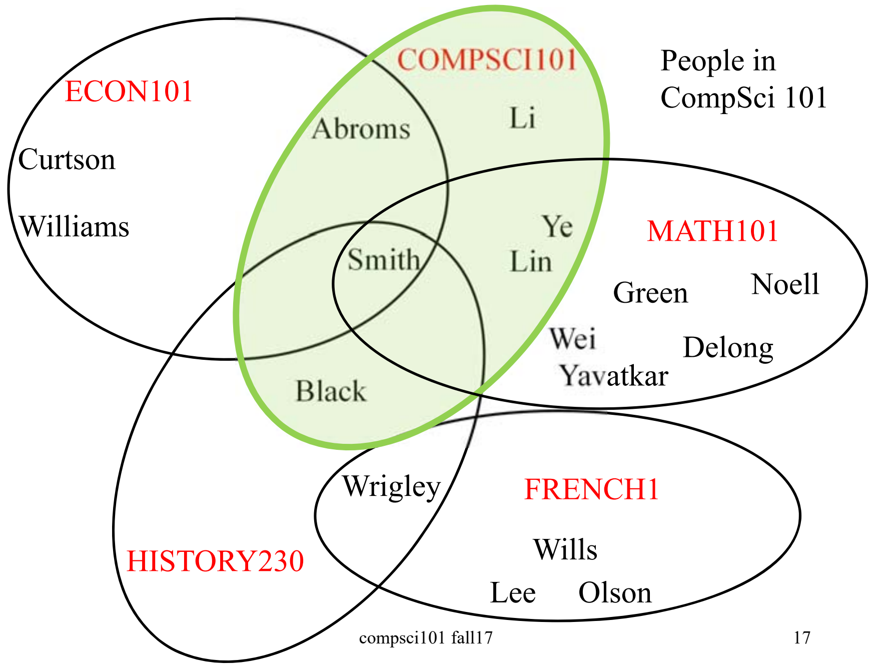
Data for example

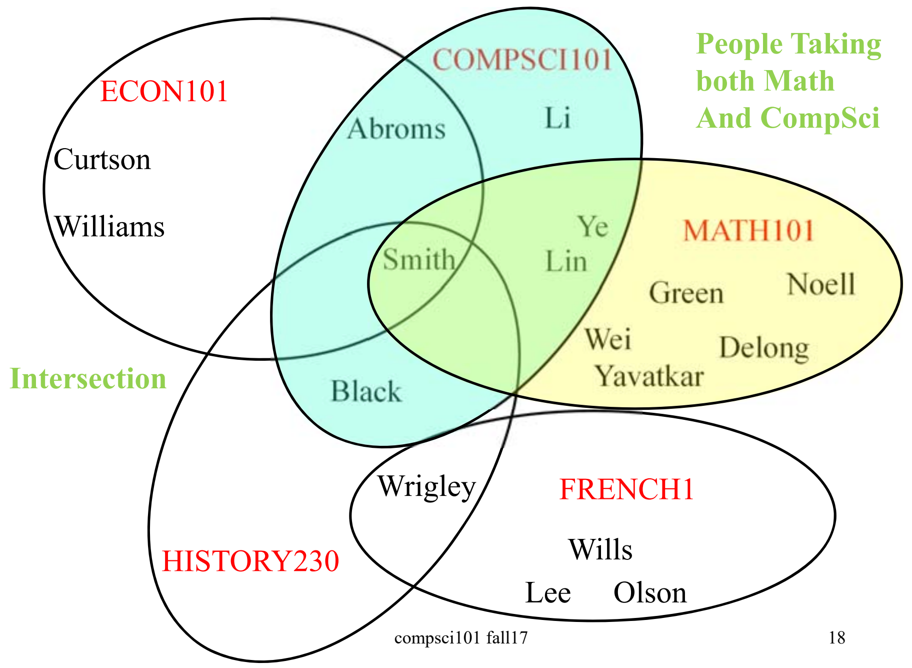
[“compsci101 Smith Ye Li Lin Abroms Black“,
“math101 Green Wei Lin Williams DeLong Noell Ye Smith”,
“econ101 Abroms Curtson Williams Smith”,
“french1 Wills Wrigley Olson Lee”,
"history230 Black Wrigley Smith”]

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/101f17-1026-2

- 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", …]

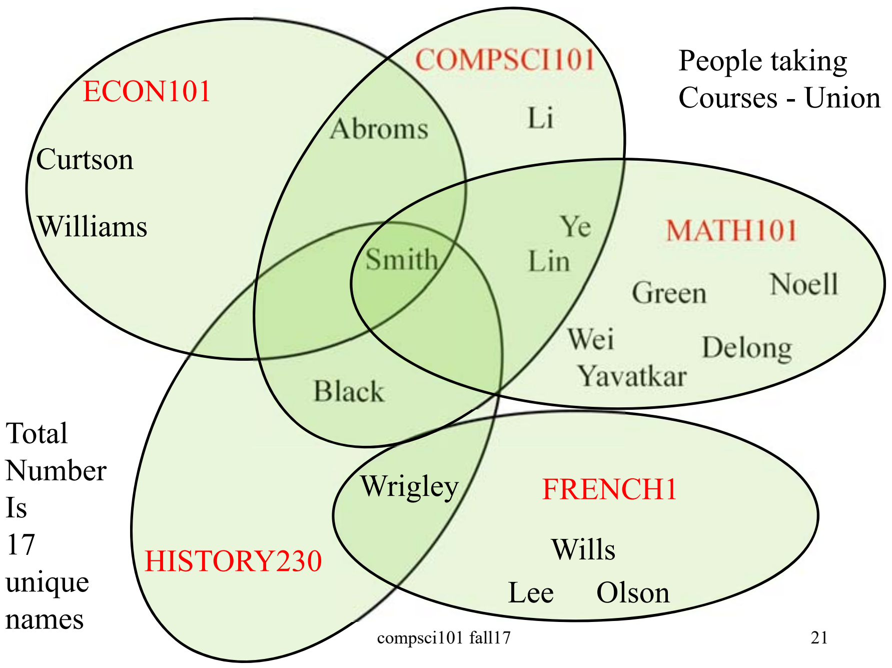
[['Abroms', 'Curtson', 'Williams', 'Smith'],
['Black', 'Wrigley', 'Smith', …]]

Part 2 – peopleTakingCourses
bit.ly/101f17-1026-3

- 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']]

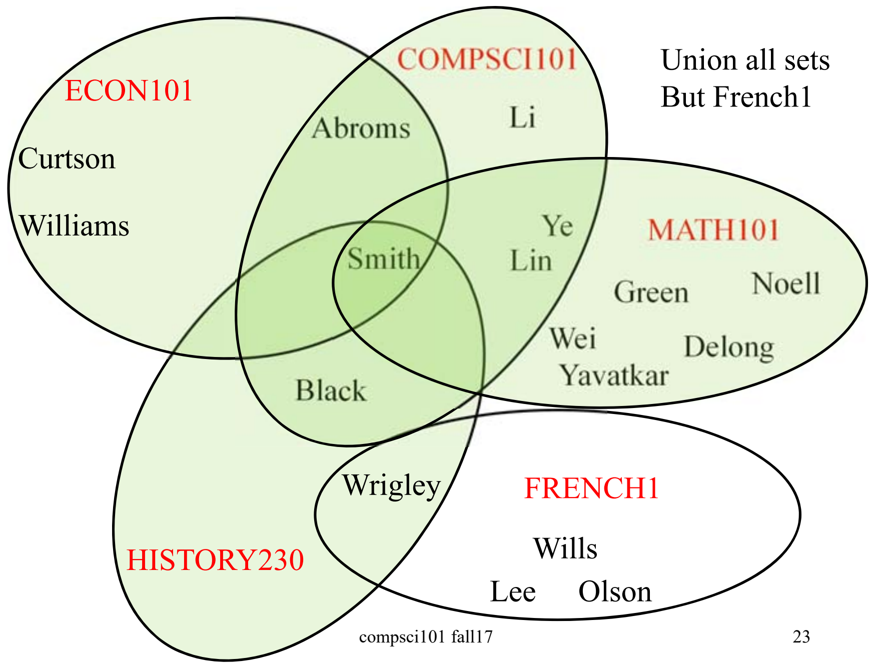
Answer is 6 unique names



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/101f17-1026-4

- 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

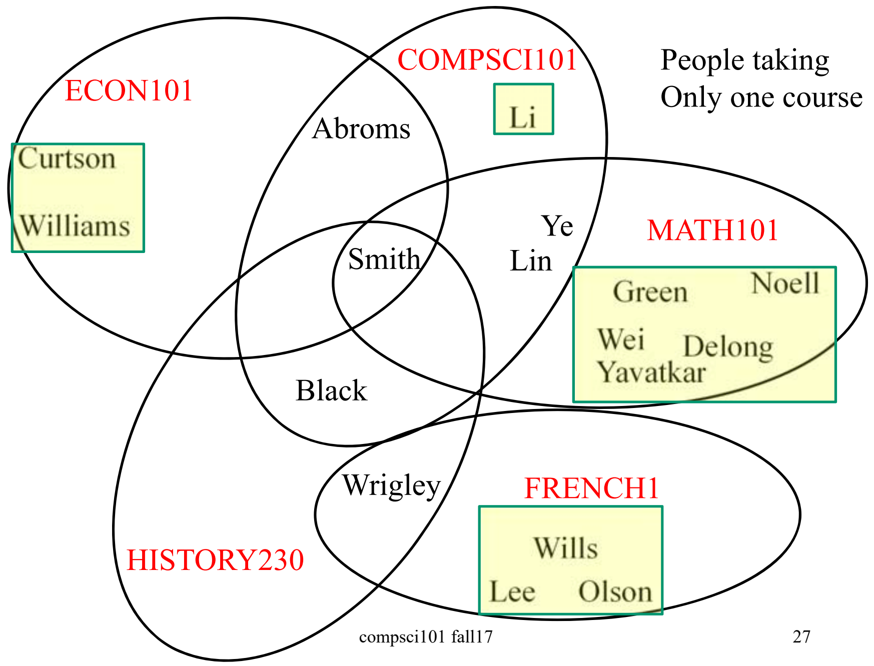
set([*"a", "b", "c", "e", "d"])*

Part 4 – peopleTakingOnlyOneCourse
bit.ly/101f17-1026-5

- 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


ECON101
COMPSCI101
MATH101
FRENCH1
HISTORY230
Curtson
Williams
Abroms
Li
Smith
Ye
Lin
Green
Noell
Wei
Delong
Yavatkar
Black
Wrigley
Wills
Lee
Olson
People taking
Only one course