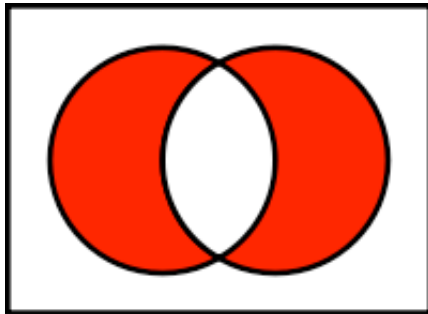


CompSci 101

Introduction to Computer Science



October 9, 2014

Prof. Rodger

Thanks to Prof. Azhar and Yossra Hamid for
giving this lecture!

Announcements

- Reading for next time on calendar page
 - RQ
- APT 4 is due today
 - APT 5 is out today
- Exam 1 was handed out Tuesday, grades are on Sakai, you will need to see Prof. Rodger next week to get your test back
- Today Sets
- Prof. Rodger is at a conference this week

Python Sets

- Set – unordered collection of distinct items
 - Unordered – can look at them one at a time, but cannot count on any order
 - Distinct - one copy of each
- Operations on sets:
 - Modify: add, clear, remove
 - Create a new set: difference(-), intersection(&), union (|), symmetric_difference(^)
 - Boolean: issubset <=, issuperset >=
- Can convert list to set, set to list

Creating and changing a set

```
colorList = ['red', 'blue', 'red', 'red', 'green']  
colorSet = set(colorList)  
smallList = list(colorSet)  
colorSet.clear()  
colorSet.add("yellow")  
colorSet.add("red")  
colorSet.add("blue")  
colorSet.add("yellow")  
colorSet.add("purple")  
colorSet.remove("yellow")
```

- See setsEasy.py

Set Operations

```
UScolors = set(["red", "white", "blue"])
dukeColors = set(["blue", "white"])
print dukeColors.union(UScolors)
print dukeColors | UScolors
print dukeColors.intersection(UScolors)
print dukeColors & UScolors
print dukeColors.difference(UScolors)
print dukeColors - UScolors
print UScolors - dukeColors
print dukeColors ^ UScolors
print UScolors ^ dukeColors
```

- See setsEasy.py

Set Examples

bit.ly/101fall14-1009-01

```
poloClub = set(['Mary', 'Laura', 'Dell'])
```

```
rugbyClub = set(['Fred', 'Sue', 'Mary'])
```

Question 1:

```
print [w for w in poloClub.intersection(rugbyClub)]
```

Question 2:

```
print [w for w in poloClub.union(rugbyClub)]
```

More Set Examples

bit.ly/101fall14-1009-02

```
lista = ['apple', 'pear', 'fig', 'orange', 'strawberry']
```

```
listb = ['pear', 'lemon', 'grapefruit', 'orange']
```

```
listc = [x for x in lista if x in listb]
```

```
listd = list(set(lista)|set(listb))
```

Question 3:

```
print listc
```

Question 4:

```
print listd
```

More Set Examples

```
s = set(lista)
```

```
t = set(listb)
```

```
problem1 = (s-t) | (t-s)
```

```
print problem1
```

```
problem2 = (s|t) - (s&t)
```

```
print problem2
```

```
problem3 = (s|t|(s&t))
```

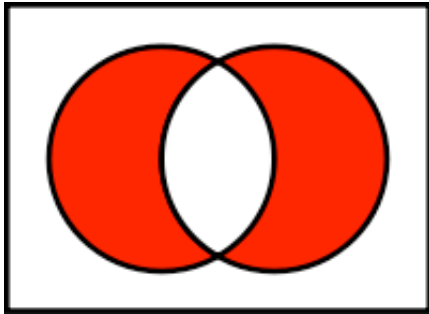
```
print problem3
```


Set Operations from pictures

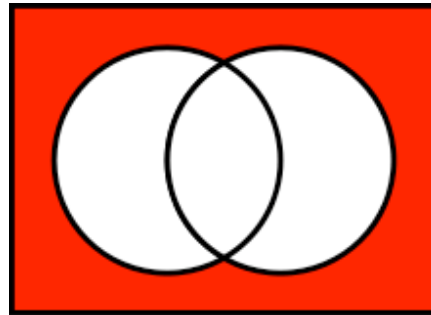
bit.ly/101fall14-1009-03

Question: Which picture is which operation?

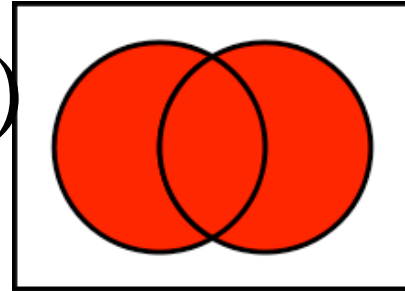
A)



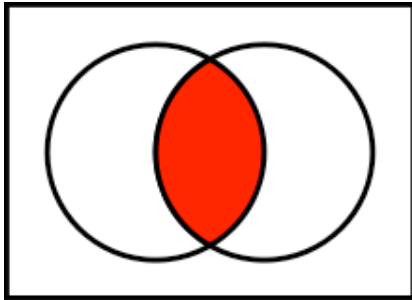
C)



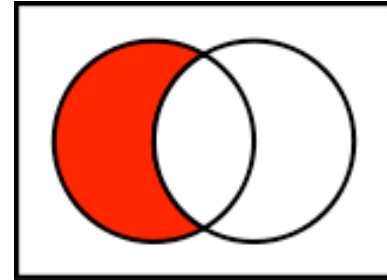
D)



B)



E)



Problems — snarf setExample.py

- 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
 - Find total number of people taking any course
 - Find number of people taking just one course

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

Part 1 — processList

bit.ly/101fall14-1009-04

- 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", ...]*

Part 2 — peopleTakingCourses

bit.ly/101fall14-1009-05

- Given a list of strings that have the name of a course (one word), followed by last names of people in the course:
 - Find total number of people taking any course

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

Part 3 — unionAllSetsButMe

bit.ly/101fall14-1009-06

- Given a list of strings that have the name of a course (one word), followed by last names of people in the course:
 - Find number of people taking just one course
 - BUT FIRST, lets write this helper method

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

Part 4 — peopleTakingOnlyOneCourse

bit.ly/101fall14-1009-07

- Given a list of strings that have the name of a course (one word), followed by last names of people in the course:
 - Find number of people taking just one course

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

APT - UniqueZoo

- How do you solve this problem?
- How is it similar to the problem we just solved