Announcements

• Next Reading and RQ due Thurs March 24
• Assignment 5 due today
  – Next Assignment out after Spring Break
• APT 6 due Tues March 22 (only one from lab)
• APT 7 due Thurs March 24

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

Alice programming language
alice.org, Alice version 2.4

Nested Loop

[Images of nested loop diagrams and Alice programming language examples]
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
    ```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
**Set Operations from pictures**

bit.ly/101sp16-0310-1

Question: Which operation does the red represent?

A) ![Venn diagram A]

B) ![Venn diagram B]

C) ![Venn diagram C]

D) ![Venn diagram D]

E) ![Venn diagram E]

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**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:
  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

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**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

Part 1 — processList
bit.ly/101sp16-0310-2
• 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', ...]]
Next, find the number of people taking just one course

To solve this problem

• First let’s write a helper function
Part 3 — unionAllSetsButMe

bit.ly/101sp16-0310-4

• 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/101sp16-0310-5

• 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’],

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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