Announcements

- Reading and RQ due next time
- APT 6 due Thursday
- Next Assignment out Thursday
- Lab this week!

- FTASB:
  - Review Tuples/generators
  - Enumerate
  - Processing data – how to organize it?

Registration time…

- What CS courses can you take next?
  - CompSci 201
  - CompSci 230

- CompSci 230 is prereq for CompSci 330
- CompSci 201 is prereq for many electives

Lab this week! - Odds with poker!
Review Tuples and generators

```python
def makeGray(pixel):
    (r, g, b) = pixel
    gray = (r + g + b) / 3
    return (gray, gray, gray)
```

```python
def grayIt2(picname):
    im = Image.open(picname)
    im.show()
    pixels = [makeGray(pix) for pix in im.getdata()]
    nim = Image.new("RGB", im.size)
    nim.putdata(pixels)
    nim.show()
    nim.save("gray" + picname)
```

Review: 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

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

Problem: Longest Name

Given a list of names (one word only) and a letter (assume names start with capital letter, and letter is capital)

```python
names = ['Helen', 'Bob', 'Bart', 'Hugh']
```

Find the longest name that starts with that letter
Code for longest name

def longestName(alist, letter):
    longest = ''
    for name in alist:
        if letter == name[0] and len(name) > len(longest):
            longest = name
    return longest

How do you modify to find the location (position) of the longest name?

Enumerate

• An iterator, generates a sequence
• Generates tuples of (index, item)
• Used with for loop to get both index and item
• for (index,item) in enumerate(somelist):
  – You get both at the same time!

Problem: Find the position in alist of the longest name that starts with that letter

bitly/101s17-0321-1

Solve previous problem with enumerate
Problem: Popular Name

• Given a list of names, determine the most popular first name and print that name with all of its last names.
• Input: Names are always two words, names are in a file. If multiple names are on the same line they are separated by a “:”
• Output: Most popular first name, followed by a “:”, followed by corresponding last names separated by a blank

Example Input File with 5 lines

Susan Smith:Jackie Long:Mary White
Susan Brandt
Jackie Johnson:Susan Rodger:Mary Rodger
Eric Long:Susan Crackers:Mary Velios
Jack Frost:Eric Lund

Corresponding Output

Susan: Smith Brandt Rodger Crackers

What do you need to solve this problem?
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How might one organize the data to solve this problem?

How many different ways to solve this problem?
One way to solve

- Create a list of unique first names
- Create a list of lists of last names that are associated with each first name

Example – two lists

<table>
<thead>
<tr>
<th>Unique First names</th>
<th>Corresponding Last names</th>
</tr>
</thead>
<tbody>
<tr>
<td>0: 'Susan'</td>
<td>0: ['Smith', 'Brandt', 'Rodger', 'Crackers']</td>
</tr>
<tr>
<td>1: 'Jackie'</td>
<td>1: ['Long', 'Johnson']</td>
</tr>
<tr>
<td>2: 'Mary'</td>
<td>2: ['White', 'Rodger', 'Velios']</td>
</tr>
<tr>
<td>3: 'Eric'</td>
<td>3: ['Long', 'Lund']</td>
</tr>
<tr>
<td>4: 'Jack'</td>
<td>4: ['Frost']</td>
</tr>
</tbody>
</table>

Now can we solve the problem?

- Compute those two lists that are associated with each other
  - List of unique first names
  - List of corresponding last names
- Compute the max list of last names
- Now easy to print the answer.
- See popular.py
Look at the code for popular.py

- Which datafile is read in?
- What format is namelist in?
- Write the code for uniqueFirstNames

Write the code:
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- allLastNames
- correspondingLastNames
- printFirstWithLasts

Finishing code:

maxnum = max([len(item) for item in lastNames])
print(maxnum)
lastIndex = [index for (index, v) in enumerate(lastNames) if len(v) == maxnum]
print("first name with most last names is:")

Another way – list of lists

First word in each list is a first name
The rest are last names.

```
1  [‘Jackie’, ‘Long’, ‘Johnson’]
3  [‘Eric’, ‘Long’, ‘Lund’]
4  [‘Jack’, ‘Frost’]
```
Expanding the Problem

• Suppose we want to read from multiple data files
  names1.txt, names2.txt, names3.txt

See processFiles in popular.py