Announcements

- Reading for next time on calendar page
  - RQ 9
- Nothing due today!
- APT 4 out today - due on Thursday, Oct 8

Creating a list

- Given a list of numbers, create a second list of every number squared.

```python
nums = [8, 3, 5, 4, 1]
sqnums = []
for v in nums:
    sqnums.append(v*v)
print sqnums
```

[64, 9, 25, 16, 1]
More on List operations

- See list operations on next page
- Mutator vs hybrid vs return
  - Mutator changes the list (no return value)
  - Hybrid changes list and returns value
  - Return – returns value, no change to list

Problem

- Remove all negative numbers from list
- Two ways
  1) return a new list with all negative numbers removed
  2) Modify a list to remove negative numbers

```python
def removeNegatives(numberlist):
    # return a new list without negatives
    answer = []
    for num in numberlist:
        if num >= 0:
            answer.append(num)
    return answer

somenums = [3, -1, 8, -5, -2, 6, 7]
nonegs = removeNegatives(somenums)
```
Richard Stallman

- MacArthur Fellowship (Genious grant)
- ACM Grace Murray Hopper award
- Started GNU – Free Software Foundation (1983)
  - GNU Compiler Collection
  - GNU Emacs

List Comprehension

- Take advantage of patterns, make a new list based on per element calculations of another list

- Format:
  
  \[
  \{<expression with variable>\text{ for } <variable> \text{ in }<old list>\}
  \]

- Example:
  
  \[
  \text{nums = [8, 3, 5, 4, 1]}
  \]
  \[
  \text{sqnums = [v*v for v in nums]}
  \]
Examples of List Comprehensions

[v for v in nums]
[2 for v in nums]
[v*2 for v in nums]

Creating a list with just the even numbers

ums = [8, 3, 5, 4, 1]
evennums = []
for v in nums:
    if v % 2 == 0:
        evennums.append(v)
print evennums

[8, 4]

List Comprehension with Filtering

- Create list and use “if” to filter out elements to the list
- Format:
- [<expression with variable> for <variable> in <old list> if <filter with variable> ]

- Example: nums = [8, 3, 5, 4, 1]
evennums =
    [v for v in nums if v%2==0]

More on List Comprehensions

www.bit.ly/101fall14-1002-03

- What is the list for the following:
  1) [j+1 for j in range(20) if (j%3) == 0]
  2) [i*2 for i in [j+1 for j in range(20) if j%3 == 0] if i*i > 19]

- Problem: Given a list of strings, return the longest string. If there are more than one of that length, return the first such one.
  ['kiwi', 'plum', 'orange', 'lemon', 'banana']
Write a list comprehension for this problem