CS150 - Recursion

Announcements

- HW4 grade emailed Friday
- HW8 is up - due next Monday
- Review Tuesday exam Wednesday (next week)
- No class Friday or Monday
- Get sample midterm 2 - no inheritance or Ch. 10
List Comprehension (Ch 4.5, p 148)
A short cut when working on lists
Example: \( l = [0, 1, 2, 3, 4] \)

\[
m = []
\text{for } e \text{ in } l:\n  m.\text{append}(e*e)
\]

Shorter: \( m = [e*e \text{ for } e \text{ in } l] \)

for all elements in a list
List comprehension, cont

Can also filter:

\[ m = [e * e \text{ for } e \text{ in } l \text{ if } e \% 2 == 0] \]

Multiple comprehensions:

\[ [x+y \text{ for } x \text{ in } "SPAM" \text{ for } y \text{ in } "spam"] \]

(But gets hard to read, so don't get carried away)
Program design  (Ch. 7)

Designing larger systems

Example: a library

- books
- users
- music
- games
- movies

All have id, title, location
Collection Item
- name
- id
- status
- location
- borrower

Books
- author
- year

Videos
- director

Music
- group

Patrons
- name
- address
- age
- itemsCheckedOut

who has checked what
(Ch. 11)

Back to recursion: Data structures

Designing a list:

```
# class OurList:

# empty list
head = None
rest = None
```

```
OurList
- head = 'apple'
- rest

OurList
- head = 36
- rest

OurList
- head = None
- rest = None
```

tail
Appending: `mylist.append(12)`

```
OurList
- head = 15
- rest =

→ OurList
- head = 2
- rest =

→ OurList
- head = None
- rest = None
```

```python
if self._head == None:
    self._head = value
    self._rest = OurList()
else:
    self._rest.append(value)
```
Functions

- __init__
- is Empty
- append
- count
- __contains__