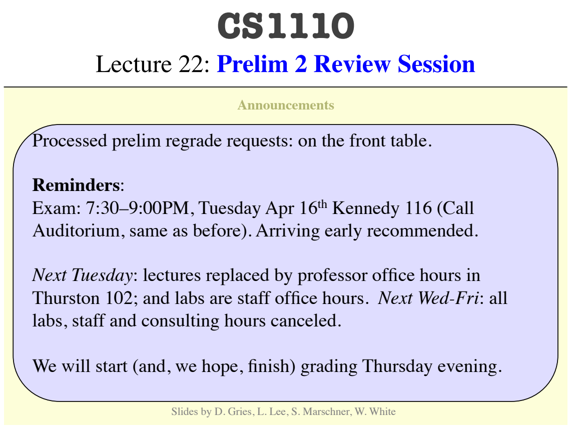


CS1110

Lecture 22: **Prelim 2 Review Session**

Announcements

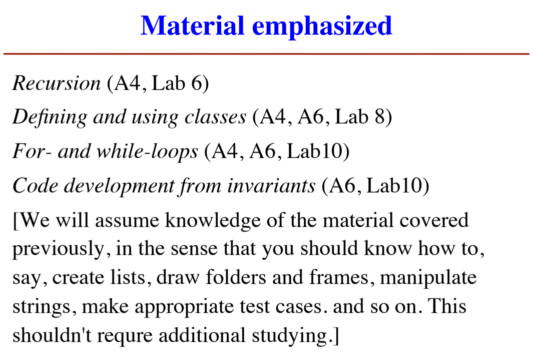
Processed prelim regrade requests: on the front table.

Reminders:
Exam: 7:30–9:00PM, Tuesday Apr 16th Kennedy 116 (Call Auditorium, same as before). Arriving early recommended.

Next Tuesday: lectures replaced by professor office hours in Thurston 102; and labs are staff office hours. *Next Wed-Fri*: all labs, staff and consulting hours canceled.

We will start (and, we hope, finish) grading Thursday evening.

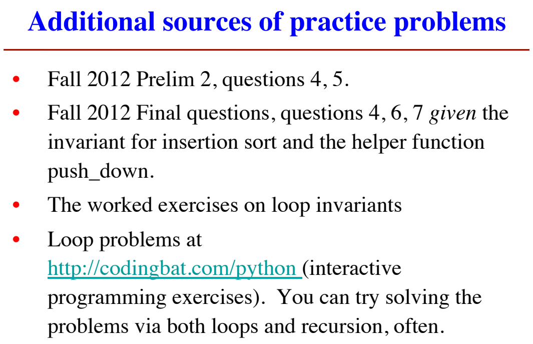
Slides by D. Gries, L. Lee, S. Marschner, W. White



Material emphasized

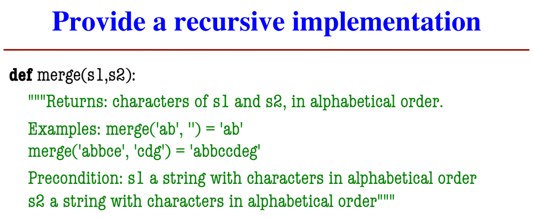
Recursion (A4, Lab 6)
Defining and using classes (A4, A6, Lab 8)
For- and while-loops (A4, A6, Lab10)
Code development from invariants (A6, Lab10)

[We will assume knowledge of the material covered previously, in the sense that you should know how to, say, create lists, draw folders and frames, manipulate strings, make appropriate test cases. and so on. This shouldn't requre additional studying.]



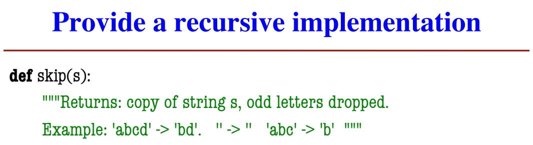
Additional sources of practice problems

- Fall 2012 Prelim 2, questions 4, 5.
- Fall 2012 Final questions, questions 4, 6, 7 *given* the invariant for insertion sort and the helper function push_down.
- The worked exercises on loop invariants
- Loop problems at http://codingbat.com/python (interactive programming exercises). You can try solving the problems via both loops and recursion, often.



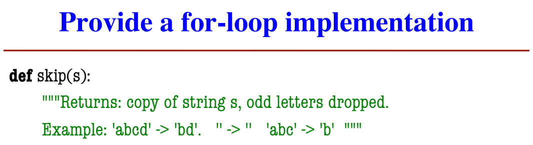
Provide a recursive implementation

```
def merge(s1,s2):
    """Returns: characters of s1 and s2, in alphabetical order.
    Examples: merge('ab', '') = 'ab'
    merge('abbce', 'cdg') = 'abbccdeg'
    Precondition: s1 a string with characters in alphabetical order
    s2 a string with characters in alphabetical order"""
```



Provide a recursive implementation

```
def skip(s):
    """Returns: copy of string s, odd letters dropped.
    Example: 'abcd' -> 'bd'.   '' -> ''   'abc' -> 'b'  """
```



Provide a for-loop implementation

```
def skip(s):
    """Returns: copy of string s, odd letters dropped.
    Example: 'abcd' -> 'bd'.   '' -> ''   'abc' -> 'b'  """
```

CS1110 Lecture 22 (review session): 4/11/13

Provide a while-loop implementation

```
def skip(s):
    """Returns: copy of string s, odd letters dropped.
    Example: 'abcd' -> 'bd'.   '' -> ''   'abc' -> 'b'  """
```

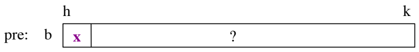
Defining a class

```
class Paper(object):
   """An instance is a  scientific paper.
   Class variables:
   number [int]: number of papers that have been created. >= 0

   Instance variables:
   title [string]: title of this paper.  At least one char long.
   cites [list of Papers]: papers that this book cites
   cited_by [list of Papers]: papers that this paper is cited by
   """

   number = 0  # initial value is 0
```

```
def __init__(self, title, cites=None):
 """Initializer.  A new paper with title <title>,  citing the papers in list
<cites> (set to [] if <citess> is None), and with cited_by set to []. Unlike
in A4, this initializer should also update the  relevant attributes of any
papers in the list <cites>.
 Don't forget to update the class variable. """
```

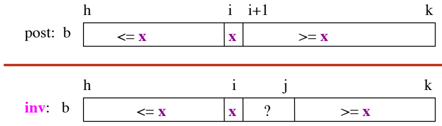
Implement according to invariant

- Given a sequence b[h..k] with some value x in b[h]:



	h		k
pre: b	x	?	

- Swap elements of b[h..k] and store in i to truthify post:



	h	i	i+1	k
post: b	<= x	x	>= x	

	h	i	j	k
inv: b	<= x	x	?	>= x

```
def evaluate(p, x): """Returns: The evaluated polynomial p(x).
We represent polynomials as a list of floats:
        [1.5, −2.2, 3.1, 0, −1.0] is 1.5 − 2.2x + 3.1x**2 + 0x**3 − x**4
We evaluate by substituting in for the value x.  For example
  evaluate([1.5,−2.2,3.1,0,−1.0], 2) = 1.5−2.2(2)+3.1(4)−1(16) = −6.5
   evaluate([2], 4) = 2
 Precondition: p is a list (len > 0) of floats, x is a float"""
```