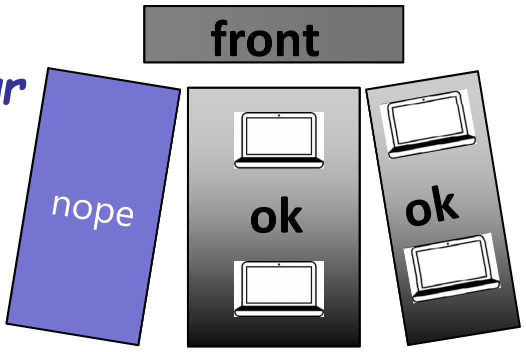
http://www.cs.cornell.edu/courses/cs1110/2020sp

CS 1110 Prelim 1 Practice/Review Session

Some extra commentary stated in class have been added to these slides in *orange*.

Announcements

No-laptop zone on your left



Pick up a handout!

- A3tests due Sat Mar 7; A3fns due Sun Mar 8
  - Remember academic integrity!!!
- Prelim 1 Tues Mar 10 at 7:30pm. Bring your own pens/pencils/erasers (bring several). *Bring Cornell ID*.

AA1-KQA1: Baker 200
KQZ1-MM4000: Baker 119
MM5000-RC799: Baker 135
RC800-TB270: Baker 219
TC1-ZZZ9999: Baker 335

Go to your assigned room!

- Read Prelim 1 Study Guide. Note spring different from fall
- Mar 10 lecture and lab time → office hours

Exam Topics

- String slicing functions
- Call frames and the call stack
- Functions on mutable objects
- Testing and debugging
- Conditionals
- Lists and simple iteration

Today:

- *Start with lists and iteration—not in posted old review slides*
- *Testing and debugging*
- *Other topics if time allows*

Lists, Iteration, Strings

```
def count_non_space_chars(myList):
    """Returns: number of non-space characters in the strings in myList.
    Example:  count_non_space_chars(['U ', 'r', '', ' gr8'])  returns 5
    Precondition: myList is a list of strings.  Each string in myList can
    contain only spaces, letters, digits."""
```

You don't need nested loops to solve this problem, but it's ok to use them if you want.

For Prelim 1 you should be able to read and understand nested loops, but you won't need to write them.

Useful String Methods

Method	Result
s.find(s1)	Returns first position of s1 in s; -1 if not there.
s.rfind(s1)	Returns LAST position of s1 in s; -1 if not there.
s.count(s1)	Returns number of times s1 occurs in s
s.lower()	Returns copy of s with all letters lower case
s.upper()	Returns copy of s with all letters upper case

- ~~We will give you any methods you need~~
- But you must know how to slice strings!

As stated during class, you *should know* the methods that we actually have used in assignments and labs. We will give you the less-frequently used methods on the exam.

```
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def count_non_space_chars(myList):
    """Returns: number of non-space charac
    Example:  count_non_space_chars(['U ', 'r
    Precondition: myList is a list of strings.  
    contain only spaces, letters, digits."""
     count= 0
     for s in myList:
         numSp= s.count(' ')
         numNonSp= len(s)-numSp
         count = count + numNonSp
     return count
```

<u>Remember:</u>

- Be goal oriented—start with return statement (if it is needed). Work your way back up. Be flexible.
- Name a variable for any value you need but don't know yet
- For-loop
- Accumulation pattern
- How to call string methods

Lists, Iteration, Types

```
def inflate(myList, p_percent):
    """Inflate each number in myList by p_percent while maintaining the
    type (int or float).  For any int in myList, round down the inflation.
    Precondition: myList is a list of positive numbers (int and/or float).
    Precondition: p_percent is a positive number (int or float)."""
```

An example:

```
>>> L= [100, 100.0, 1, 1.0]
>>> p= 1.6
>>> inflate(L,p)
>>> L
[101, 101.6, 1, 1.016]
```

```
def inflate(myList, p_percent):
    """Inflate each number in myList by p_percent while maintaining the
    type (int or float).  For any int in myList, round down the inflation.
    Precondition: myList is a list of positive numbers (int and/or float).
    Precondition: p_percent is a positive number (int or float)."""
```

```
def inflate(myList, p_percent):
    """Inflate each number in myList by p_
    type (int or float).  For any int in myLis
    Precondition: myList is a list of positiv
    Precondition: p_percent is a positive n
     p_frac= p_percent/100
     for k in range(len(myList)):
         delta= myList[k]*p_frac
         if type(myList[k])==int:
             delta= int(delta)
         myList[k] += delta
```

Remember:

- Give yourself an example if question doesn't provide one
- Using for-loop on list: do you need to modify list? If so you need the indices—use `range`
- List syntax
- How to work with types (ops, checking, casting)
- In general, read specs again after finishing code. Did you really solve problem asked?

Constructing test cases

```
def before_space(s):
    """Returns: the substring before the first space character in string s.
    Precondition: string s contains at least one space."""
```

Come up with at least three *distinct* test cases. Write the test input, expected output, and rationale.

Constructing test cases

```
def before_space(s):
    """Returns: the substring before the first space character in string s.
    Precondition: string s contains at least one space."""
```

- First think about the pre-condition to see what we know about the string s
  - It has at least one space char → it can have more than one
    → adjacent? non-adjacent?
  - No precondition on where the space char appears in s
    → can be anywhere
    → start? middle? end?
- With these ideas, can construct distinct test cases with rationales for each one

Constructing test cases

```
def before_space(s):
    """Returns: the substring before the first space character in string s.
    Precondition: string s contains at least one space."""
```

Examples:

- `" abc"` – single space char at the start
- `"abc "` – single space char at the end
- `"a bc"` – single space char in the "middle" (not start or end)
- `"   abc"` – many space chars at the start
- `"abc   "` – many space chars at the end
- `"ab    c"` – many space chars in the middle
- `"a b  c"` – many non-adjacent space chars

You should write the expected output as well

What should I be testing?

Common Cases: typical usage

Edge Cases: live at the boundaries

- Target location in list: first, middle, last elements
- Input size: 0,1,2, many (length of lists, strings, etc.)
- Input Orders: max(big, small), max(small, big)…
- Element values: negative/positive, zero, odd/even
- Element types: int, float, str, *etc.*
- Expected results: negative, 0, 1, 2, many

Not all categories/cases apply to all functions.

Use your judgement!

Functions on Objects

- Class: **Rect**
  - Constructor function: **Rect(x,y,width,height)**
  - Remember constructor is just a function that gives us an object of that type and returns its identifier
  -

Attribute	Description
x	float, x coord of lower left corner
y	float, y coord of lower left corner
width	float, > 0, width of rectangle
height	float, > 0, height of rectangle

```
def move(r, xc, yc):
    """Set the attributes of Rect `r` such that its center lies on the x- and
    y-coordinates `xc` and `yc`, respectively.
    Precondition:  r is a Rect object.
    Precondition:  xc, yc are each a float."""
```

```python
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    """Set the attributes of Rect `r` such that its center lies on the x- and
    y-coordinates `xc` and `yc`, respectively.
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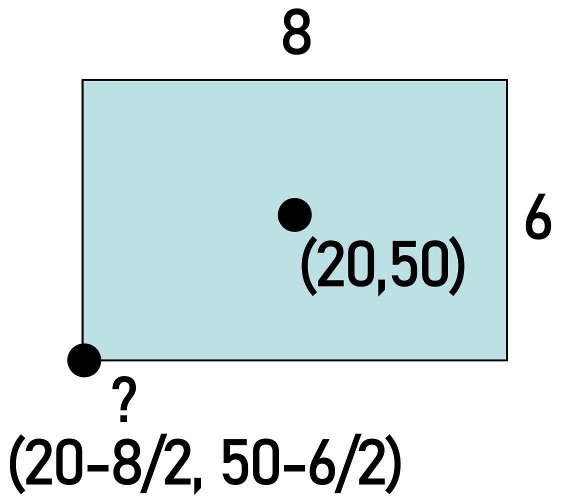

```
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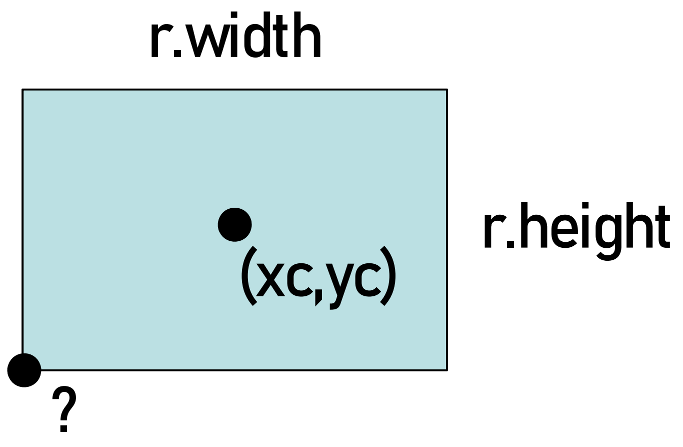
    """Set the attributes of Rect `r` su
    y-coordinates `xc` and `yc`, respe
    Precondition:  r is a Rect object.
    Precondition:  xc, yc are each a fl
     r.x = xc - r.width/2
     r.y = yc - r.height/2
```



Remember:

- Draw a diagram to help yourself think
- Label the diagram with example/known values. Then generalize labels using parameter and attribute names.

Important problem solving step! First use example values to understand the problem and figure out relationships among knowns and unknowns.

- Dot-notation for accessing attributes of an object

Good Luck!