CS 1110

Prelim 1 Review
Fall 2021
Exam Info

• **Prelim 1**: Tuesday, October 19th at 7:30 pm
  ▪ Last name **A – C** in Ives 305
  ▪ Last name **D – Z** in Bailey 101
  ▪ SDS Students will get an e-mail

• Exceptions ONLY if you filed a conflict
  ▪ We expect you at the time and room assigned
  ▪ Missing the exam is a big hit to final grade

• Grades promised 8am Thursday, October 21st
Studying for the Exam

• Read study guides, review slides online
  - Solution to review posted after review

• Review all labs and assignments
  - Solutions to Assignment 2 are in CMS
  - No solutions to code, but talk to TAs

• Look at exams from past years
  - Exams with solutions on course web page
  - Only look at the fall exams; spring is different
Grading

• We will announce _approximate_ letter grades
  ▪ We adjust letter grades based on all exams
  ▪ But no hard guidelines (e.g. mean = grade X)
  ▪ May adjust borderline grades again at final grades

• Use this to determine whether you want to drop
  ▪ _Drop deadline_ is Thursday, October 21st
  ▪ Professor White will hold _office hours all day_
  ▪ Will reach out to students of concern (C or lower)
What is on the Exam?

• **Five** Questions on the following topics:
  - String slicing functions (A1)
  - Call frames and the call stack (A2)
  - Functions on mutable objects (A3)
  - Testing and debugging (Labs 6 and 10)
  - Short Answer (Terminology)

• + 2 pts for writing your name and net-id
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What about lists?
What is on the Exam?

• **Five** Questions on the following topics:
  - String slicing functions
  - Call frames and the call stack
  - Functions on mutable objects
  - Testing and debugging
  - Short Answer

• + 2 pts for writing your name and net-id
What is on the Exam?

• String slicing functions (A1)
  § Will be given a function specification
  § Implement it using string methods, slicing

• Call frames and the call stack (A2)

• Functions on mutable objects (A3)

• Testing and debugging (Labs 6 and 10)

• Short Answer (Terminology)
def make_netid(name,n):

    """**Returns**: a netid for name with suffix n

    Netid is either two letters and a number (if the student has no
    middle name) or three letters and a number (if the student has
    a middle name). Letters in netid are lowercase.

    **Example**: make_netid('Walker McMillan White',2) is 'wmw2'
    **Example**: make_netid('Walker White',4) is 'ww4'

    **Parameter** name: the student name
    **Precondition**: name is a string either with format 'first last'
    or 'first middle last'

    **Parameter** n: the netid suffix
    **Precondition**: n > 0 is an int."""
Useful String Methods

<table>
<thead>
<tr>
<th>Method</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>s.find(s1)</td>
<td>Returns first position of s1 in s; -1 if not there.</td>
</tr>
<tr>
<td>s.rfind(s1)</td>
<td>Returns LAST position of s1 in s; -1 if not there.</td>
</tr>
<tr>
<td>s.lower()</td>
<td>Returns copy of s with all letters lower case</td>
</tr>
<tr>
<td>s.upper()</td>
<td>Returns copy of s with all letters upper case</td>
</tr>
</tbody>
</table>

- We will give you any methods you need
- But you must know how to slice strings!
What is on the Exam?

• String slicing functions (A1)
• Call frames and the call stack (A2)
  ▪ Very similar to A2 (see solution in CMS)
  ▪ May have to draw a full call stack
  ▪ See lectures 4 and 10 (for call stack)
• Functions on mutable objects (A3)
• Testing and debugging (Labs 6 and 10)
• Short Answer (Terminology)
Call Stack Example

- Given functions to right
  - Function fname() is not important for problem
  - Use the numbers given
- Execute the call:
  `lname_first('John Doe')`
- Draw **entire** call stack when helper function `lname` completes line 10
  - Draw nothing else

```python
1. def lname_first(s):
2.     '''Pre: s in the form
3.         'first-name last-name' '''
4.     first = fname(s)
5.     last = lname(s)
6.     return last + ',' + first

7. def lname(s):
8.     '''Pre: same as above'''
9.     end = s.find(' ')  
10.     return s[end+1:]
```
Example with a Mutable Object

1. `def cycle_left(p):`

2. """Cycle coords left"

3. **Pre:** p a point"

4. `temp = p.x`

5. `p.x = p.y`

6. `p.y = p.z`

7. `p.z = temp`

- May get a function on a mutable object
  >>> p = Point3(1.0, 2.0, 3.0)
  >>> cycle_left(p)

- You are not expected to come up w/ the “folder”
  - Will provide it for you
  - You just track changes

- **Diagram all steps**
Example with a Mutable Object

1. `def cycle_left(p):`

2. """Cycle coords left"""

3. `Pre: p a point"""

4. `temp = p.x`

5. `p.x = p.y`

6. `p.y = p.z`

7. `p.z = temp`

>>> `p = Point3(1.0,2.0,3.0)`

>>> `cycle_left(p)`
What is on the Exam?

• String slicing functions (A1)
• Call frames and the call stack (A2)
• Functions on mutable objects (A3)
  ▪ Given an object type (e.g. class)
  ▪ Attributes will have invariants
  ▪ Write a function respecting invariants
• Testing and debugging (Labs 6 and 10)
• Short Answer (Terminology)
Example from Assignment 3

- **Class: RGB**
  - Constructor function: RGB(r,g,b)
  - Remember constructor is just a function that gives us back a mutable object of that type
  - Attributes:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Invariant</th>
</tr>
</thead>
<tbody>
<tr>
<td>red</td>
<td>int, within range 0..255</td>
</tr>
<tr>
<td>green</td>
<td>int, within range 0..255</td>
</tr>
<tr>
<td>blue</td>
<td>int, within range 0..255</td>
</tr>
</tbody>
</table>
def lighten(rgb):

    """Lighten each attribute by 10%
    Attributes get lighter when they increase.
    **Parameter** rgb: the color to lighten
    **Precondition:** rgb an RGB object"""

    pass  # implement me
Another Example

• Class: Length
  ▪ Constructor function: Length(ft,in)
  ▪ Remember constructor is just a function that gives us back a mutable object of that type
  ▪ Attributes:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Invariant</th>
</tr>
</thead>
<tbody>
<tr>
<td>feet</td>
<td>int, non-negative, = 12 in</td>
</tr>
<tr>
<td>inches</td>
<td>int, within range 0..11</td>
</tr>
</tbody>
</table>
def difference(len1, len2):

    """Returns: Difference between len1 and len2
    Result is returned in inches
    Parameter len1: the first length
    Precondition: len1 is a length object longer than len2
    Parameter len2: the second length
    Precondition: len2 is a length object shorter than len1"

    pass  # implement me
What is on the Exam?

- String slicing functions (A1)
- Call frames and the call stack (A2)
- Functions on mutable objects (A3)
- Testing and debugging (Lab 6 and 10)
  - Coming up with test cases
  - Tracing program flow
  - Understanding assert statements
- Short Answer (Terminology)
def pigify(w):

    """**Returns**: copy of w converted to Pig Latin
    
    'y' is a vowel if it is not the first letter
    If word begins with a vowel, append 'hay'
    If word starts with 'q', assume followed by 'u';
    move 'qu' to the end, and append 'ay'
    If word begins with a consonant, move all
    consonants up to first vowel to end and add 'ay'

    **Parameter** w: the word to translate
    **Precondition**: w contains only (lowercase) letters"""
```python
def replace_first(word, a, b):
    """Returns: a copy with FIRST instance of a replaced by b

    Example: replace_first('crane','a','o') returns 'crone'
    Example: replace_first('poll','l','o') returns 'pool'

    Parameter word: The string to copy and replace
    Precondition: word is a string

    Parameter a: The substring to find in word
    Precondition: a is a valid substring of word

    Parameter b: The substring to use in place of a
    Precondition: b is a string"""
```
def replace_first(word, a, b):
    
    Returns: a copy with FIRST a replaced by b"

    pos = word.rfind(a)
    print(pos)
    before = word[:pos]
    print(before)
    after = word[pos+1:]
    print(after)
    result = before + b + after
    print(result)
    return result

>>> replace_first('poll', 'l', 'o')
3
pol

polo

'polo'

>>> replace_first('askew', 'sk', 'ch')
1
a

kew

akhirw
What is on the Exam?

• String slicing functions (A1)
• Call frames and the call stack (A2)
• Functions on mutable objects (A3)
• Testing and debugging (Labs 6 and 10)
• Short Answer (Terminology)
  ▪ See the study guide
  ▪ Look at the lecture slides
  ▪ Watch relevant videos

In that order
Open to Questions