

CS 1110

**Prelim 1 Review**  
**Fall 2022**

# Exam Info

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- **Prelim 1:** Thursday, October 12th at 7:30 pm
  - Last name **A – G** in Kennedy 116
  - Last name **H – 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 13

# Studying for the Exam

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- 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

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- 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 next week, October 17<sup>th</sup>
  - Will have **advising sessions** on the 14<sup>th</sup> and 15<sup>th</sup>
  - Will reach out to students of concern (C or lower)

# What is on the Exam?

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- **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

# What is on the Exam?

---

- **Five** Questions on the following topics:

- String slicing functions (A1)
- Call frames and ...
- Function ...
- Testing and debugging (Labs 6 and 10)
- Short Answer (Terminology)

What about lists?

- + 2 pts for writing your name and net-id

# 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

Lists may  
appear in  
any of  
these 5

- + 2 pts for writing your name and net-id

# What is on the Exam?

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- 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)



# String Slicing

---

**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

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

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

# What is on the Exam?

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- 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

```
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.
8. def lname(s):
9.     """Pre: same as above"""
10.    end = s.find(' ')
11.    return s[end+1:]
```

# Example with a Mutable Object

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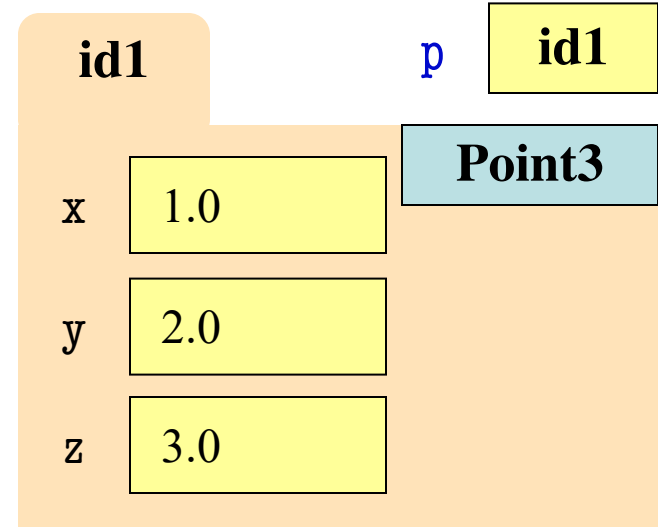
```
1. def cycle_left(p):
2.     """Cycle coords left
3.     Pre: p a point"""
4.     temp = p.x
5.     p.x = p.y
6.     p.y = p.z
7.     p.z = temp
```

- 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) Function Call
```

# 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

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- 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:

Attribute	Invariant
red	int, within range 0..255
green	int, within range 0..255
blue	int, within range 0..255



# Function that Modifies Object

---

```
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:

Attribute	Invariant
feet	int, non-negative, = 12 in
inches	int, within range 0..11

# Function that Does Not Modify Object

---

```
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)

# Picking Test Cases

---

```
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"""
```

# Debugging Example

---

```
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"""
```

# Debugging Example

```
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  
achkew  
'achkew'
```

Identify the bug(s)  
in this function.

# 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
    - Read relevant book chapters
- In that order



# Open to Questions

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