Week: 06 Date:10/05/2023

| 15-110 Recitation Week 6 |
| --- |

**Reminders**

* HW3 due Monday 10/09 at Noon
* How was the exam?
* Code Reviews this weekend!
* [Feedback Form](https://forms.gle/MsTcE2TCpwYBvx7U7)

**Overview**

* Linear and Binary Search
* Aliasing Code Trace
* Recursive Code Tracing
* Recursive Code Writing Practice

| Problems |
| --- |

**LINEAR AND BINARY SEARCH**

Binary search review notes:

| def binarysearch(L, item): if len(L) == 0: return False mid = len(L)//2  if L[mid] == item: return True elif L[mid] > item: return binarysearch(L[:mid],item) else: return binarysearch(L[mid+1:],item) |
| --- |

Run a visual trace on the list **[2, 4, 6, 7, 10, 11]** and find **1** and **7** using both linear and binary search.

Linear Search

|  |
| --- |

Binary Search

|  |
| --- |

# **Aliasing Code Trace**

At the end of this set of operations, what list value will each variable hold?

x = [ "15110", "Fall" ]

z = [ "15110", "Fall" ]

y = x

x.append("CMU")

y = y + [ "Reci" ]

z.append("CMU")

y.pop(0)

# x = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# y = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# z = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Are there any aliases at the end of the code?

# **RECURSIVE CODE TRACING**

Consider this recursive function:

**def f(a, b):**

 **if a == []:**

 **return []**

 **else:**

 **return [a[0]] + [b[0]] + f(a[1:], b[1:])**

If we call the function with these values:

**print(f([1,2,3], [4,5,6]))**

Trace through the code to determine what will be printed.

Tracing:

|  |
| --- |

**RECURSIVE CODE WRITING**

Write the function **isPalindrome** that takes in a string and returns **True** if the string is a palindrome and **False** otherwise. For example:

isPalindrome(“abba”) should return True

isPalindrome(“Dancing Queen”) should return False

isPalindrome(“123321”) should return True

isPalindrome(“”) should return True

| def isPalindrome(s): |
| --- |

Write the function **listMultiply** that takes in a list of integers and returns a new list, where each number in the original list (n) is repeated n times in the new list.

listMultiply([1,2,3]) should return [1, 2, 2, 3, 3, 3]

listMultiply([6]) should return [6, 6, 6, 6, 6, 6]

| def listMultiply(lst): |
| --- |

Write the function **fib** that takes in a number n and returns the nth number in the fibonacci sequence. Recall the definition of the fibonacci sequence

$f(0) =$ 0

$f(1) =$ 1

$f(n) = f(n-2) + f(n-1)$

| def fib(n): |
| --- |