CSE 214, Fall 2022

Recitation 5 - Recursion

1. a) Write a recursive method print the value from n to 1. (n is a positive integer). Is this a tail recursive method? Example: n=5 should print out 5 4 3 2 1 **[3 mins]**

b) Write a recursive method that takes two input x and y, and returns the value that x is raise to power of y. (x and y are non-negative) Example, pow(3,2) returns 9.**[3 mins]**

2. a) Write a recursive method to print the Fibonacci sequence up to an integer n. **[3 mins]**

b) Is the Fibonacci sequence tail recursive? **[1 min]**

c) What is the time complexity for the recursive Fibonacci method? **[1 min]**

3. a) Given a String with only 0's and 1's as characters, write a recursive method to count the number of 1's. **[5 min]**

b) If the input string can contain any character, how would your above method change? **[1 min]**

4. Write a program to reverse a string using recursion. **[5 mins]**

5. Given the following LinkedListNode class:

```
class LinkedListNode {
        private int value;
        private LinkedListNode next;
        // ASSUME GETTERS AND SETTERS ARE AVAILABLE FOR ALL FIELDS
}
```

a) Write a recursive function to return the nth element in an integer linked list. Assume the linked list is zero-indexed. We are guaranteed that the nth node exists. **[3 min]**

b) Write a recursive function to find the length of the linked list. **[3 min].**

c) Remove consecutive duplicates from a linked list and return the new head. **[5 min].** Example: 1 -> 1 -> 1-> 2 -> 2-> 1-> 3-> 3-> 3 => 1 -> 2 -> 1 -> 3

6. Write a recursive method that returns the sum of natural numbers up to n. How could we make it tail recursive? **[5 min]**

7. Implement Binary Search on an array with positive integers. Return its index in this array. Return -1 if the target is not found. **[10 mins]**