EECS 214 Fall 2017
TA Practice Midterm 1

Name: _____

For questions 1 to 3, go through the code snippet provided and answer the questions below.

Question	Points	Total
1	24	
2	24	
3	28	
Total	76	

You should be able to finish this exam in about 30 minutes. If you wish, you may work on this with others and discuss answers. Good luck!

I will post answers this Sunday October 22nd. I will also be hosting a review session (TBD, check Piazza) if you would like to see me go through the answers in person.

1. “O(n), this is fun” (8 points each)
   For each of the algorithms below, provide the Big-O runtime given the code snippet. You do not have to tell me what the algorithm is doing.

   I. Suppose m is a vector of numbers

```
def what_is_this(m):
        let result = 0
        for i in m:
                for j in m:
                        for k in m:
                                result+= k
        result
```

   Runtime: O(_____)

   II. Suppose m is a vector of numbers just like part I

```
def what_is_this(m):
        let result = 0
        for i in m:
                result += i
        for j in m:
                result +=j
        for k in m:
                result +=k
        result
```

   Runtime: O(_____)

   III. Give the runtime for the following operations:

   a. Deleting a specific node from a binary tree

   Runtime: O(_____)

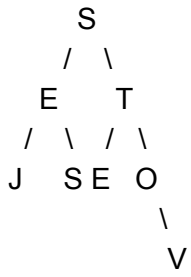
   b. Breadth first search performed on a graph stored as an adjacency list

   Runtime: O(_____)

   c. Getting the value from an array given the index of the value

Runtime: O(_____)

2. What are trees anyways? (4 points each)
   Your friend Daniel who's not exactly familiar with trees aside from how to draw them drew you the tree below:



   Assuming the character A holds the smallest value, the character Z holds the largest value,

   a. Select all properties that this tree fulfills:

      Binary Tree Binary Search Tree Balanced binary tree

   b. What would the in-order walk of this tree print out?

   c. What would the pre-order walk of this tree print out?

   d. What would the post-order walk of this tree print out?

   e. Do you see any patterns between the three tree walk methods???

3. I like my lists linked! (28 points)

Write a function that removes elements that are less than 0 in a linked list.

For example, given the list:

2 -> -1 -> 5 -> 600 -> -50

remove_negatives(head) should return

2 -> 5 -> 600

Head here represents the head of the list passed in. Here's an example

```
let head = node(2,
                node(-1,
                        node(5,
                                node(600,
                                        node(-50,nil()))))))
```

```
def remove_negatives(head):
```

Write a couple test cases to test your function.

What's the Big O runtime of your function?