Name: _____ Andrew Id: _____

15-121 Fall 2018 Quiz 9

Up to 20 minutes. No calculators, no notes, no books, no computers. Show your work!
There are questions on *both sides* of this paper.

1. **Binary Heap**

Consider the following array representation of a binary heap:

	98	55	51	53	34	37	43	17	30	10			

(a) (4 points) Draw the heap represented by this array.

(b) (3 points) Give the array after adding 74 to the heap. Write your final answer in the boxes below.

(c) (3 points) Building on your answer from part b, give the array after calling `removeMax()` on the heap. Write your final answer in the boxes below.

2. (10 points) Free Response

Consider a binary search tree implementation that stores the binary tree in an array as we discussed in class. It might look something like:

```
public class BSTArray<DataType extends Comparable<DataType>> {
    private DataType[] nodes;

    /*
     * The constructor, and add, are both here, but not shown.
     */

}
```

Fill in this missing code for the `contains` method, which takes an item as an argument and returns `true` if that item is in the binary search tree and `false` otherwise.

```
public boolean contains(DataType item) {


        int n =


        while (n < nodes.length && nodes[n] !=         ) {


                int v = item.compareTo(nodes[n]);


                if (                 ) {









                } else if (                 ) {









                } else {









                }

        }


}
```