Practice Problems 2/15/2016

Part 1: Bags

Implement the insert methods below using the appropriate field variable.

1.

```
public class ArrayBag {
      private T[] bag = new T[10];

      /**
      * Insert an item to the bag at the given index.
      * @return true if item was inserted and false otherwise
      * @param index is where to insert the item
      * @param item is the item to insert
      */
      public boolean insert(int index, T item) {
            //TODO: Implement the method

      }
}
```

2.

```
public class LinkedBag {
      private Node<T> firstNode = null;

      /**
      * Insert an item to the bag at the given index.
      * @return true if item was inserted and false otherwise
      * @param index is where to insert the item
      * @param item is the item to insert
      */
      public boolean insert(int index, T item) {
            //TODO: Implement the method
      }
}
```

Part 2: Efficiency

1. What is the efficiency of the insert methods above?

2. Rank the following efficiencies from from 1(most efficient). Hint: Some may be equally efficient.

n^3	
4^n	
nlog(2n)	
3n	

$(8n)^2$	
nlog(n)	
100n	
log(70n)	

Part 3: Nodes

1. Insert a new node with data "END" at the end of a linked chain of 4 Nodes using only the variable firstNode to access the end.

2. Insert a new node with data "MIDDLE" at the middle of a linked chain of 6 Nodes using only the variable firstNode to access the middle.

3. Consider two linked chains of Nodes. Write a nested for loop to determine the intersection of these two linked chains of Nodes. You will need to initialize a firstNode Node variable for the intersection chain.

Part 4: Arrays

1. http://codingbat.com/prob/p162010

2. http://codingbat.com/prob/p127384

3. http://codingbat.com/prob/p136254

4. http://codingbat.com/prob/p159979

5. http://codingbat.com/prob/p134300

6. http://codingbat.com/prob/p105031

7. http://codingbat.com/prob/p196976

8. http://codingbat.com/prob/p199484