Lab Exercise 3
Implement the Bag Class and Iterator

1 Introduction
In a previous lab, you implemented and used an IntArrayBag class which used a dynamically sized array as its underlying data structure. In this lab exercise you will analyze and implement a StringArrayBag class which uses an array as its underlying data structure.

You will also implement a cursor-style iterator to allow for iteration. This means that the StringArrayBag has been modified to implement both Iterable and Iterator, as it is its own iterator.

2 Implement countOccurrences method
Using Eclipse, import “Lab3”:

/afs/cs.uwm.edu/users/classes/cs351/401/pantherid/git/lab3.git

The countOccurrences is similar to the previous implementation. There are some subtle differences. The first change is that you should no longer accept null elements. This has been done for you already but should be noted. The second is that you have to use the equals method when comparing two String objects. For example:

string1.equals( string2 )

Do not use any iterator methods to implement this method.

After implementing countOccurrences, run TestArrayBag.java and ensure the tests for countOccurrences pass (except for testCountOccurrencesWithIterator).

3 Implement Iterator methods
You are given a field currentIndex in the iterator section of StringArrayBag. Implement the method next, and make any other modifications necessary to the iterator so that all tests pass.

The next method should, assuming a next element exists, point the iterator to the new current element and return that value. If no such element exists, an appropriate exception should be raised. We start at -1 for currentIndex because we don’t have a current element until next is called.

4 Implement countOccurrencesWithIterator method
Write the countoccurrencesWithIterator method to make use of the iterator methods instead of accessing the data array directly. You can use the enhanced for loop to use these methods indirectly. Note how this type of loop is used in printOccurrences:

for (String element : this)

Use a similar loop to implement countOccurrencesWithIterator with the iterator methods. You should now pass testCountOccurrencesWithIterator:
5 Using ArrayBag

Complete ArrayBagDriver, which will open a given file (document.txt by default) and add each word to a StringArrayBag. After adding each word, the driver should call the printOccurrences and printOccurrencesWithIterator method to print the number of occurrences of each word in the document. You should take a look at these two printing methods to see how they differ.

The document.txt file simply contains the text to be or not to be, which should give the output:

to: 2
be: 2
or: 1
not: 1

The output from the printOccurrences method should look like this. However, the output from printOccurrencesWithIterator should not. Note that the both printing methods use the enhanced for loop, which makes use of the iterator methods. printOccurrencesWithIterator also calls countOccurrencesWithIterator, which itself also uses the iterator methods.

Set a breakpoint and debug the printOccurrencesWithIterator call. Pay attention to the values in the variables pane. What’s going wrong? See your TA to explain the problem and receive credit for this lab.