This assignment is designed to give you practice in test driven development, using junit and maintaining code.

Here is what you need to do.

1. Create a package in eclipse with the name assign1. Copy the OrderedIntList.java file from the first assignment and change the package name to assign1

2. Make the following changes to the OrderedIntList.java file. Do not change the data structure – it must remain an array of int. You may add other private methods if desired. Do not add additional class level variables. Reminder – there is no output printed from these methods.
a. Add the method size that returns the current size of the array.
i. The size is determined by size of the array, not the number of elements in the array.
ii. The method must have the following signature.

public int size ()
b. Add the method size that returns the current length of the list.
i. The size is determined by the number of elements in the list, not the size of the array..
ii. The method must have the following signature.

public int length ()
c. Add a private method to search the array using the binary search algorithm.
i. This must be a recursive implementation of the binary search.
ii. In this case, multiple returns from the method are acceptable.
iii. If the key is not in the array, then the method should return -1.
d. Add a public delete method that will remove an item from the list.
i. The method must have the following signature

public void delete (int key)
ii. The method should call the method search (above) to determine if the item is in the list.
iii. If the item is in the list, the value should be removed from the list by moving all other items up in the list.
iv. After the delete, the size of the list may need to be deleted. The list should never be more than 50% empty. If it is, then the list should be made smaller by 40%. Use integer arithmetic for the calculations.
e. Change the insert method.
i. The insert should continue to insert in ascending order without duplicates.
ii. If the list is full, then the size of the array must be increased by 50%. This means that there is never overflow. Use integer arithmetic for the calculation.

f. Delete the print method and replace it with a toString method.
i. The signature for the toString must be

public String toString ()
ii. The format of the String returned must be the integers in the array separated by a space as in “1 2 3 4”. There should be no space after the last integer.
iii. An empty array should yield an empty String, not a null value.
g. Overload the constructor so that the size of the array can be specified. The signature must be OrderedIntList (int size).

3. Generate the initial set of junit test cases. All should have the default of fail.

4. Complete the code for your test cases. Create new methods as needed for the tests. Your tests should not have any if statements, loops or output. Use the asserts to check the results. Thoroughly test your code.

5. Make sure that all the code meets all coding and documentation standards. The junit test cases should include internal documentation while the OrderedIntList.java file should contain external documentation.