Guided LAB - 303.11.7 - Phone Directory Using TreeMap

Objective

In this lab, we will create a basic PhoneDirectory by using a TreeMap to store directory entries.

Learning Objective:

By the end of this lesson, learners will be able to utiliZe the TreeMap.

Scenario

- Finds the phone number, if any, for a given name and returns the phone number associated with the name if the name does not occur in the phone directory, and then returns the value as null.
- Associates a given name with a given phone number. If the name already exists in the phone directory, the new number replaces the old one. Otherwise, a new name/number pair is added. The name and number should both be non-null. An IllegalArgumentException is thrown if this is not the case.

Instructions

Step 1: Create a new Java project and create a new Class named **"PhoneDirectoryWithTreeMap,"** and then write the below code in the class.

```
import java.util.TreeMap;
import java.util.Map;
public class PhoneDirectoryWithTreeMap {
   /**
    * The TreeMap that will store the data.  Both key and value are
```

```
 * of type String.  The key represents a name and the value represents
 * the associated phone number.
 */
private TreeMap<String,String> data;

/**
 * Constructor creates an initially empty directory.
 */
public PhoneDirectoryWithTreeMap() {
    this.data = new TreeMap<String,String>();
}

/**
 * Finds the phone number, if any, for a given name.
 * @return The phone number associated with the name; if the name does
 *    not occur in the phone directory, then the return value is null.
 */
public String getNumber( String name ) {
    return   this.data.get(name);
}

/**
 * Associates a given name with a given phone number.  If the name
 * already exists in the phone directory, then the new number replaces
 * the old one.  Otherwise, a new name/number pair is added.  The
 * name and number should both be non-null.  An IllegalArgumentException
 * is thrown if this is not the case.    */
public void putNumber( String name, String number ) {
    if (name == null || number == null)
        throw new IllegalArgumentException("name and number cannot be null");
    this.data.put(name,number);
}

/**  Write the contents of the phone directory to System.out.
 */
public void print() {
    for ( Map.Entry<String,String> entry :   this.data.entrySet() )
        System.out.println( entry.getKey() + ":  " + entry.getValue() );
}
```

```
} // end class PhoneDirectoryWithTreeMap
```

Step 2: Create a new Java project and create a new Class named **"TestPhoneDirectoryWithTreeMap,"** and then write the code below in the class.

```
public class TestPhoneDirectoryWithTreeMap {
   public static void main(String[] args) {
       PhoneDirectoryWithTreeMap directory = new PhoneDirectoryWithTreeMap();
       System.out.println("This program creates a PhoneDirectoryWithTreeMap and");
       System.out.println("adds several entries.  It then prints the contents of");
       System.out.println("directory and does a few lookups.");
       System.out.println();
       directory.putNumber("Fred","555-1234");
       directory.putNumber("Barney","555-2345");
       directory.putNumber("Wilma","555-3456");
       directory.putNumber("Wilma","555-3456");
       directory.putNumber("Wilma","555-2563");
      // directory.putNumber("James",null);
       //directory.putNumber(null,"555-2853");

       System.out.println("Contents are:");
       System.out.println();
       directory.print();
       System.out.println();
       System.out.println("Number for Fred is " + directory.getNumber("Fred"));
       System.out.println("Number for Wilma is " +
directory.getNumber("Wilma"));
       System.out.println("Number for Tom is " + directory.getNumber("Tom"));
       System.out.println("Number for Tom is " + directory.getNumber("Alex"));
       // The output from the last line should be null.
   }
}
```

Output:

```
This program creates a PhoneDirectoryWithTreeMap and
adds several entries; it then prints the contents of
the directory and performs a few lookups.

Contents are:

Barney:  555-2345
Fred:  555-1234
Wilma:  555-2563

Number for Fred is 555-1234
Number for Wilma is 555-2563
Number for Tom is null
Number for Tom is null
```

Submission Instructions:

Include the following deliverables in your submission -

- Submit your source code using the Start Assignment button in the top-right corner of the assignment page in Canvas.

CANVAS STAFF USE ONLY: Canvas Submission Guideline:

Instructions for Canvas Assignment Creation
Assignment Name: GLAB - 303.11.7 - Phone Directory using TreeMap **Points:** 100 **Assignment Group:** Module 303: Java SE Review (Not Graded) **Display Grade As:** Complete/Incomplete

Do not count this assignment towards the final grade: Checked
Submission Types: Files Uploads

Everything else is the default.