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# 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 |
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**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.  } } |
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**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** |
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| **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.** |