Lab Exercise #4
Serialization
Computer Science 2334

Group #: _____   Section #: _____

Members: _____

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Learning Objectives:

- To learn how to use Serialization to write and read objects to and from files.
- To demonstrate this knowledge by completing a series of exercises.

Instructions:

This lab exercise requires a laptop with an Internet connection. Once you have completed the exercises in this document, your group will submit it for grading. All group members should legibly write their names at the top of this lab handout.

Make sure you read this handout and look at all of the source code posted on the class website for this lab exercise before you begin working.

Serialization is an important feature of Java, that could be used in a future project. You must be able to read and write data to a file using Serialization.

For this lab exercise you will modify a project similar to Lab Exersice #3. Carefully inspect how it works and the documentation comments included in the code.

1. Download the Eclipse project archive from the class website. Import the project into your Elipse workspace using the slides from Lab #2. You will submit the modified project when you are finished. But, before you start modifying these files, first answer Question #2.

2. ObjectInputStream and ObjectOutputStream can be used to read and write objects from and to streams. Combined with FileReader and FileWriter we can use these classes to read and write objects from and to binary files. What interface must the ZipCode class, whose objects we want to read and write implement?

3. Add the interface you chose for the above question to the declaration of the ZipCode class. For example, the declaration should read:

```
public class ZipCode implements <Insert interface here> {
```

4. Add a method with the following signature to the Driver class that writes a ZipCode object to a file, whose name is passed in as an argument to the method.

```
public static void writeZipCode( String fileName, ZipCode zip )
```

The code for this method will be similar to:

```
FileOutputStream fos = new FileOutputStream(fileName);
ObjectOutputStream oos = new ObjectOutputStream(fos);
oos.writeObject(zip);
oos.close();
```

5. Add a method with the following signature to the Driver class that reads in a ZipCode object from the file.

```
public static ZipCode readZipCode( String fileName )
```

The code for this method will be:

```
FileInputStream fis = new FileInputStream(fileName);
ObjectInputStream ois = new ObjectInputStream(fis);
ZipCode zip = (ZipCode) ois.readObject();
ois.close();
return zip;
```

6. Add code to the main method of the Driver class that uses the methods writeZipCode() and readZipCode() to write and read a ZipCode object to/from a binary file. The code should follow the algorithm given below. Once you have written this code, test your program to ensure it writes and reads the binary file.
   1. Write out the ZipCode object to a file.
   2. Read in the ZipCode object from a file.
   3. Print the ZipCode object to the console using System.out.println().

7. Add a new method to the Driver class that has the signature given below. This method will write the entire list of zip codes to an output file using ObjectOutputStream.

```
public static void writeZipCodeList( String fileName, List zips )
```

The method call to ObjectOutputStream should be:

```
oos.writeObject(zips);
```

8. Add a new method to the Driver class that has the signature given below. This method will read a complete list of zip codes from an input file using ObjectInputStream.

```
public static List readZipCodeList( String fileName )
```

The method call to ObjectInputStream should be similar to:

```
List zips = (List) ois.readObject();
```

9. Add code to the main method of the Driver class that uses the methods writeZipCodeList() and readZipCodeList() to write and read the list of zip codes to/from a binary file. The code should follow the algorithm given below. Once you have written this code, test your program to ensure it writes and reads the list of items.
   1. Create a list of ZipCode objects. See Lab #3 for how to do this.
   2. Write out the list of zip codes to a file.
   3. Erase all the elements in the list.
   4. Print the list, which should be empty, to the console using System.out.println().
   5. Read in the list of zip codes from the file used in step #1.
   6. Print the contents of the list of zip codes to the console using System.out.println().

10. Submit the project archive following the steps given in the **Submission Instructions** by 9:00pm.

11. Turn in this lab handout to your lab instructor. Please submit just one copy for your group.