Faculty of Arts & Sciences
Department of Computer Science
CMPS 200—Intro. to Computer Programming
Fall 2005–2005
Wednesday, January 18, 2006

Lab Final

Name:______________________________ **Student Id:**__________________________

Signature:______________________________ **Section:**

Lect I	**10–11**
Lect II	**1–2**

Duration: 90 minutes

Lab:

PC:

Instructions

- This handout consists of 4 pages. Make sure you have all of them.
- This handout and the skeleton files are in the **Z:\profile\Desktop\cmps-200.lab-final.*username*** directory, where *username* is your name that you use for logging in. You will work within this directory and must not rename it to anything else. It will be collected automatically at the end of the exam.

  Failure to abide by these submission instructions will result in a severe penalty.
- The book examples and JDK documentation is at **http://light.cs.aub.edu.lb/walid/cmps-200/DOCUMENTATION/**.
- Remember to save your work frequently!
- **Plagiarism Note**—any communication between two students will be interpreted as a plagiarism attempt. As such, the two students will incur a 0 on the lab final and possibly an automatic failing grade in the course. The case may also be referred to the Faculty of Arts and Sciences Disciplinary Committee.
- **BlueJ Note**—BlueJ does not have a simple mechanism to stop infinite loops. In case of such runaway loops, you need to close the project (from the *Project* menu or via the *Control-w* shortcut key) and then reopen the project.

Good luck & good work ☺.

Introduction—Collections of CDs

In this exam, you will develop a Java application that manipulates collections of CDs. This exercise uses classes similar to ones we have used in class.

1. The first application is a driver program that tests some of the functionality of the classes that you will implement.
2. The second application is GUI based. It loads a CD collection from a file and allows the user to sort the collection by author name.

Part 1 Class `CD`

The file "`CD.java`" contains the code of the class `CD`. This class defines the following instance variables: `title` (`String`), `artist` (`String`), `cost` (`double`), and `tracks` (`int`). The class also defines a constructor and the `toString` method. The prototypes of these methods are as follows:

- `public CD (String name, String singer, double price, int numTracks)`
- `public String toString()`

Modify this class so it implements the `Comparable` interface. Two `CD` instances are compared according to their their `artist` fields. If the two fields have the same value, then compare the two instances according to their `title` fields.

Part 2 Class `CDCollection`

The file "`CDCollection.java`" contains the code of the class `CDCollection`. This class defines the following instance variables: `collection` (array of `CD`), `count` (`int`), and `totalCost` (`double`). The public interface of the class consists of the following methods: a constructor that does not take any parameter, an `addCD` method, and the `toString` method. The prototypes of these methods are as follows:

- `public CDCollection (String fileName)`
- `public void addCD (String title, String artist, double cost, int tracks)`
- `public String toString()`

The class also defines the following private methods:

- `private void increaseSize ()`
- `private void resetCollection()`

Modify the class as follows:

- Declare an additional instance variable `inputFile` of type `File`.
- Implement the public method `loadFile` which does not take any parameters and does not return a value.

  The method reads the contents of the file given by the instance variable `inputFile` and uses the data read to initialize the array of `CD` objects. Each line in the file consists of 4 fields: the first field is a word and gives a CD's title; the second field is also a word and gives a CD's artist; the third field is a real value that gives a CD's cost; the fourth field is an integer that gives the number of tracks on a CD.

  Hints—create two `Scanner` objects. The first `Scanner` object reads the file one line at a time. The second `Scanner` object operates on a line and extracts the four fields from the line. There is a sample "`input.dat`" file with the skeleton Java files.

- Implement the public method `sortCollection`. This method sorts the contents of the `CD` array in a collection by invoking one of the methods implemented in the `Sorting.java` class.

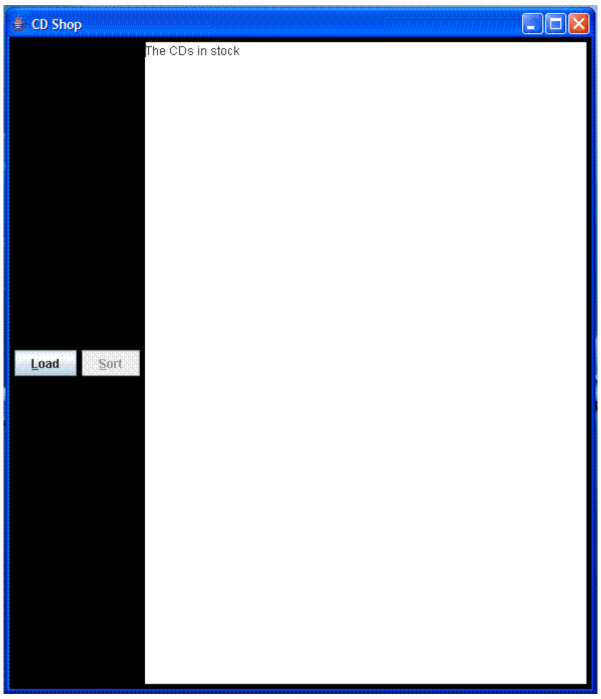
  Note—the methods in `Sorting.java` take two parameters: an array of `Comparable` objects and a count of the number of items stored in the array.

Part 3 Class Shop

The file “`Shop.java`” implements a GUI application that manipulates CD collections from a file; the application obtains the name of the file to process from the application’s on the command line. A sample run is as follows:

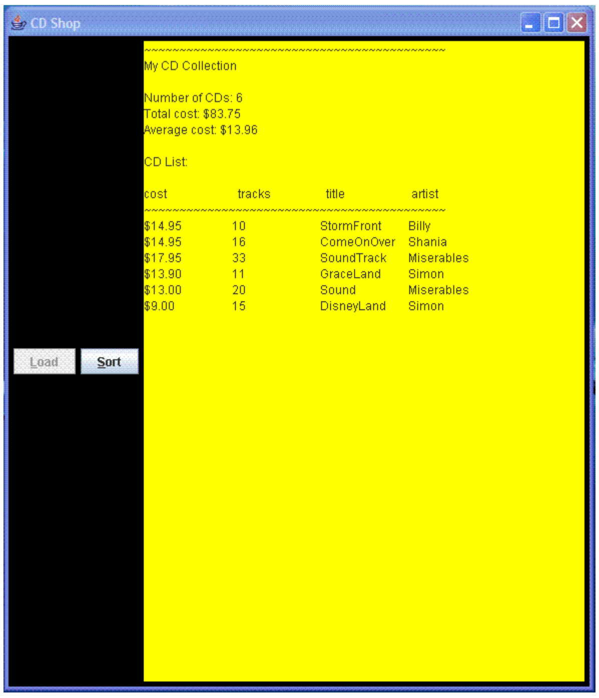
```
...> java Shop input.dat
```

For BlueJ, you need to specify the filename as a parameter for the `main` method.



```
The CDs in stock
```

Empty window upon starting the application. Note that the “Sort” button is disabled.



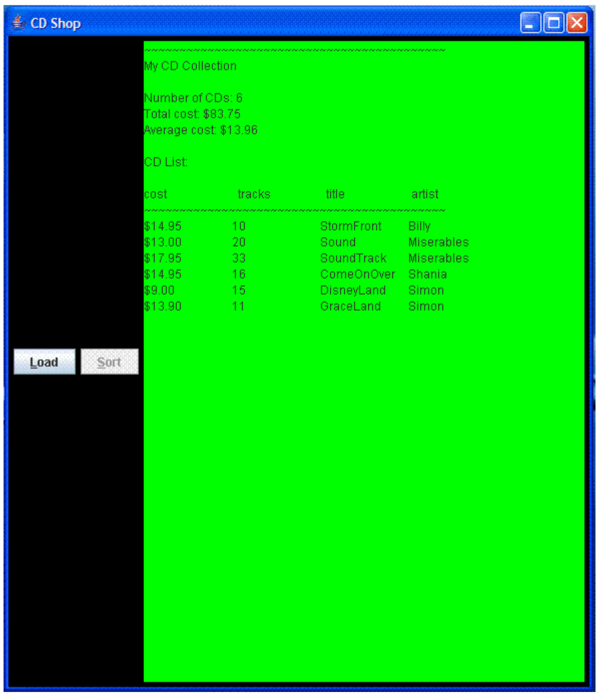
```
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
My CD Collection

Number of CDs: 6
Total cost: $83.75
Average cost: $13.96

CD List:

cost          tracks        title         artist
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
$14.95        10            StormFront    Billy
$14.95        16            ComeOnOver    Shania
$17.95        33            SoundTrack    Miserables
$13.90        11            GraceLand     Simon
$13.00        20            Sound         Miserables
$9.00         15            DisneyLand    Simon
```

The application after pressing the “Load” button. Note that the “Sort” button is now enabled.



```
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
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$14.95        16            ComeOnOver    Shania
$9.00         15            DisneyLand    Simon
$13.90        11            GraceLand     Simon
```

The application after pressing the “Sort” button. Note that the “Load” button is now enabled whereas the “Sort” button is disabled.

Part 4 Class `CDStockPanel`

The file “`CDStockPanel.java`” implements the panel class used in the class Shop. The panel includes two buttons, `Load` and `Sort`, and a `JTextArea`. The panel does not specify its width and height; the text area’s size is 40×40. A sample run is as follows:

The file `CDStockPanel.java` must define the `CDStockPanel` class as well as listener classes for the two buttons. The class `CDStockPanel` declares at least one instance variable, collection, of type `CDCollection`.

Part 5 Class `ShopDriver`

The file “`ShopDriver.java`” implements a driver class that tests the functionality of the `CD` and `CDCollection` classes. The main method creates a `CDColledtion` object, loads the input file whose name appears on the command line. It then prints the `CDCollection` object before sorting the collection and printing it again. A sample invocation of the program is as follows:

```
...> java ShopDriver input.dat
```

For BlueJ, you need to specify the filename as a parameter for the `main` method. A sample run of the application on the file “`input.dat`” is in the file “`sample-driver-run.txt`”.