Full Stack Development/Software Workshop 2

Formative Exercise 5

Based on Week 04 lectures

Topic: Connecting a Java Application to a Database

Prerequisites:

1. PostgreSQL installed on local machine

2. The 'Music' database already imported

3. Java IDE (Eclipse, NetBeans etc.)

4. JDBC driver for PostgreSQL [https://jdbc.postgresql.org/download.html]

Exercise 1.

(Part a) Write a Java program that displays the title, label and price of the albums in the 'Album' table. A sample program output is

```
Title: Diamond Dogs     Label: RCA      Price: 7.99
Title: Station to Station      Label: RCA      Price: 6.99
Title: The Beatles      Label: Apple     Price: 10.99
Title: The Idiot        Label: RCA       Price: 5.99
Title: For Your Pleasure        Label: Island    Price: 4.99
Title: Revolver         Label: Parlophone        Price: 9.99
Title: Sabbath Bloody Sabbath   Label: Vertigo  Price: 5.99
Title: Welcome to Jamrock        Label: Universal        Price: 7.99
Title: The Top Label: Fiction  Price: 4.99
Title: Strange Days     Label: Elektra  Price: 4.99
Title: Appetite for Destruction       Label: Geffen     Price: 5.99
Title: Trans-Europe Express      Label: Kling Klang       Price: 9.99
Title: Bleach  Label: Sub Pop  Price: 8.99
Title: The Man Who Sold The World       Label: RCA        Price: 5.99
Title: Abbey Road       Label: Apple     Price: 9.99
Title: Hounds of Love  Label: EMI       Price: 5.99
Title: The Velvet Underground and Nico Label: Verve     Price: 4.99
Title: The Stone Roses Label: Silvertone        Price: 4.99
Title: Kid A   Label: Parlophone        Price: 7.99
Title: Exile On Main St        Label: Rolling Stones Records    Price: 9.99
Title: It Takes A Nation Of Millions To Hold Us Back    Label: Def Jam Price: 7.99
Title: Led Zeppelin     Label: Atlantic Price: 4.99
Title: The Southern Harmony and Musical Companion        Label: Def American      Price: 5.99
Title: Imagine Label: Apple     Price: 4.99
```

(Part b) Modify the above program such that it displays only five rows (title, label and price) in the 'Album' table (sorted by price). A sample program output is

```
Title: Strange Days     Label: Elektra  Price: 4.99
Title: The Velvet Underground and Nico Label: Verve    Price: 4.99
Title: The Top Label: Fiction  Price: 4.99
Title: For Your Pleasure        Label: Island   Price: 4.99
Title: The Stone Roses Label: Silvertone        Price: 4.99
```

Exercise 2.

Write a Java program that displays the album records which costs less than the customer budget. The program first asks the customer to enter the maximum budget. It uses this information to show the title, label and price of the albums in the 'Album' in descending order of price. A sample program output is

```
Please enter your budget
6
Here are the records that satisfy your budget
 Title: The Idiot,Label: RCA,Price: 5.99
 Title: Sabbath Bloody Sabbath,Label: Vertigo,Price: 5.99
 Title: Appetite for Destruction,Label: Geffen,Price: 5.99
 Title: The Man Who Sold The World,Label: RCA,Price: 5.99
 Title: Hounds of Love,Label: EMI,Price: 5.99
 Title: The Southern Harmony and Musical Companion,Label: Def American,Price: 5.99
 Title: Led Zeppelin,Label: Atlantic,Price: 4.99
 Title: Imagine,Label: Apple,Price: 4.99
 Title: For Your Pleasure,Label: Island,Price: 4.99
 Title: The Velvet Underground and Nico,Label: Verve,Price: 4.99
 Title: The Top,Label: Fiction,Price: 4.99
 Title: Strange Days,Label: Elektra,Price: 4.99
 Title: The Stone Roses,Label: Silvertone,Price: 4.99
```

Exercise 3

Write a Java program that asks the user to enter a new record in the label table. A sample program output is

```
Please enter a new record for the Label table (name, region, country)
Please enter a Label Name
red hill
Please enter a region Name
Oregon
Please enter a country Name
USA
```

Verify that the record is successfully saved.

```
Silvertone              | Illinois     | USA
Rolling Stones Records  | London       | UK
Def Jam                 | New York     | USA
Atlantic                | Los Angeles  | USA
Def American            | Los Angeles  | USA
red hill                | Oregon       | USA
```

Exercise 4

Write a Java program that asks the user to delete a record from the label table based upon region. A sample program output is

```
Please enter the name of region you would like to delete from label table
Birmingham
ERROR OCCURED. No record found :(
```

```
Please enter the name of region you would like to delete from label table
Oregon
region Oregon successfully deleted
```

Verify that the record is successfully deleted.

```
postgres=# select * from label;
          name          |    region     | country
------------------------+---------------+---------
 RCA                    | New York      | USA
 Apple                  | London        | UK
 Island                 | London        | UK
 Parlophone             | London        | UK
 Vertigo                | London        | UK
 Universal              | Santa Monica  | USA
 Fiction                | London        | UK
 Elektra                | New York      | USA
 Geffen                 | Santa Monica  | USA
 Klink Klang            | Dusseldorf    | Germany
 Sub Pop                | Seattle       | USA
 EMI                    | London        | UK
 Sony                   | New York      | USA
 Verve                  | Santa Monica  | USA
 Silvertone             | London        | UK
 Silvertone             | Illinois      | USA
 Rolling Stones Records | London        | UK
 Def Jam                | New York      | USA
 Atlantic               | Los Angeles   | USA
 Def American           | Los Angeles   | USA
```

Exercise 5

[Note: To do exercise 5, you have to download Exercise5.java file from Canvas in Week 4 materials]

The purpose of the Java class "Exercise5" is to displays the title of all records in the album table which costs more than the customer budget. However, one of the method public static ArrayList<String> getTitles(double budget) is incomplete.

```java
public class Exercise5 {

    //This method returns an ArrayList that contains titles of all
    //records in the album table with price greater than given budget
    public static ArrayList<String> getTitles(double budget) {
        //Incomplete. Add code here
    }

    //This method return executes a query and return a ResultSet
    public static ResultSet executeThisQuery(String query) {
        //Code not shown here
    }

    //This method return establishes a DB connection &
    //return a boolean status
    public static boolean establishDBConnection() {
        //Code not shown here
    }

    //This method prints all of the values inside an ArrayList
    public static void print(ArrayList<String> titles) {
        //Code not shown here
    }

    public static void main(String[] args) {
        //Code not shown here
    }
}
```

The method getTitles takes a budget (type double) as input. It then queries the database by calling executeThisQuery method and stores the result in a ResultSet. Each record in the ResultSet is then added in an ArrayList (java.util.ArrayList. The method getTitles returns ArrayList at the end.

Executing Exercise5.java produces the following output (depending upon the provided budget), for instance

When budget = 20.0, output is

```
No record found
```

When budget = 10.0, output is

```
Titles are:The Beatles
```

When budget = 9.0, output is

```
Titles are:The Beatles
Titles are:Revolver
Titles are:Trans-Europe Express
Titles are:Abbey Road
Titles are:Exile On Main St
```

When budget = 7.0, output is

```
Titles are:Diamond Dogs
Titles are:The Beatles
Titles are:Revolver
Titles are:Welcome to Jamrock
Titles are:Trans-Europe Express
Titles are:Bleach
Titles are:Abbey Road
Titles are:Kid A
Titles are:Exile On Main St
Titles are:It Takes A Nation Of Millions To Hold Us Back
```

Write the missing code for public static ArrayList<String> getTitles(double budget) method.