Full Stack Application Development / Software Workshop 2

Week 10 – JDBC Lab Exercises

Prerequisites:

1. PostgreSQL installed on a local machine;
2. The 'Music' database already imported;
3. Java IDE (IntelliJ);
4. JDBC driver for PostgreSQL.

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 albums in the ‘Album’ table (all attributes) that were released prior to 1980 and cost more than £8. A sample program output is:

```
Album ID: 2      ArtistID: 1      Title: The Beatles      Label: Apple      Year: 1968      Genre: null      Price: 10.99
Album ID: 5      ArtistID: 1      Title: Revolver      Label: Parlophone      Year: 1966      Genre: psychedelic rock      Price: 9.99
Album ID: 11      ArtistID: 4      Title: Trans-Europe Express      Label: Kling Klang      Year: 1977      Genre: electronica      Price: 9.99
Album ID: 14      ArtistID: 1      Title: Abbey Road      Label: Apple      Year: 1969      Genre: null      Price: 9.99
Album ID: 19      ArtistID: 17      Title: Exile On Main St      Label: Rolling Stones Records      Year: 1972      Genre: rock      Price: 9.99
```

Exercise 3.

Write a Java program that displays the title, year, genre and price of the albums in the ‘Album’ table that were released before 1990, but were not in the ‘rock’ or ‘art rock’ genres and do not cost more than £7. A sample program output is:

```
Title: Hounds of Love      Year: 1985      Genre: art pop      Price: 5.99
Title: The Stone Roses      Year: 1989      Genre: alternative      Price: 4.99
```

Exercise 4.

Write a Java program that displays the custid and the text review of customers in the 'Review' table, but excludes the customers with custid 3 and 8. A sample program output is:

```
Custid: 2       Review: Not as good as the last one
Custid: 4       Review: terrible
Custid: 9       Review: a classic
Custid: 2       Review: null
Custid: 0       Review: the best album EVER!
Custid: 2       Review: can u tell me when my other album will arrive pls???
Custid: 9       Review: null
Custid: 12       Review: greatest roclk album ever.
Custid: 14       Review: ok
Custid: 14       Review: great album
Custid: 6       Review: null
```

Exercise 5.

Write a Java program that displays the year and the average price of albums by year. Order the year groups by year and round the averages to 2dp. A sample program output is:

```
Year: 1966      Avg Price: 9.99
Year: 1967      Avg Price: 4.99
Year: 1968      Avg Price: 10.99
Year: 1969      Avg Price: 7.49
Year: 1970      Avg Price: 5.99
Year: 1971      Avg Price: 4.99
Year: 1972      Avg Price: 9.99
Year: 1973      Avg Price: 5.49
Year: 1974      Avg Price: 7.99
Year: 1976      Avg Price: 6.99
Year: 1977      Avg Price: 7.99
Year: 1984      Avg Price: 4.99
Year: 1985      Avg Price: 5.99
Year: 1987      Avg Price: 5.99
Year: 1989      Avg Price: 7.32
Year: 1992      Avg Price: 5.99
Year: 2000      Avg Price: 7.99
Year: 2005      Avg Price: 7.99
```

Exercise 6.

Rewrite Exercise 5 so that it includes only albums that cost more than £8 and groups having an average price less than £10. A sample program output is:

```
Year: 1966      Avg Price: 9.99
Year: 1969      Avg Price: 9.99
Year: 1972      Avg Price: 9.99
Year: 1977      Avg Price: 9.99
Year: 1989      Avg Price: 8.99
```

Exercise 7.

Write a Java program that displays the title, year and the sum of sales (total money spent on the albums) of the albums released since 1970. Order by year in descending order. A sample program output is:

```
Title: Kid A      Year: 2000      Sum: 7.99
Title: Bleach      Year: 1989      Sum: 17.98
Title: Appetite for Destruction      Year: 1987      Sum: 5.99
Title: The Top      Year: 1984      Sum: 9.98
Title: Station to Station      Year: 1976      Sum: 13.98
Title: Diamond Dogs      Year: 1974      Sum: 31.96
Title: Sabbath Bloody Sabbath      Year: 1973      Sum: 5.99
Title: For Your Pleasure      Year: 1973      Sum: 4.99
```

Exercise 8.

Write a Java program that displays the album records which cost 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' table 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 9.

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
Inserted 1 records successfully
```

Verify that the record is successfully saved:

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
Red Hill	Oregon	USA

(21 rows)

Exercise 10.

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:

```
         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
(20 rows)
```

Exercise 11.

[Note: to do exercise 11, you have to download Ex11.java file from Canvas in Week 10 materials]

The purpose of the Java class "Ex11" is to display the title of all records in the 'Album' table which cost more than the customer budget. The program first asks the customer to enter the budget.

However, one method `public static ArrayList<String> getTitles(double budget)` is incomplete.

```
public class Ex11 {
    private static Connection con;
    /*
     * This method returns an ArrayList that contains titles of all records
     * in the album table with price greater than the provided budget
     */
    public static ArrayList<String> getTitles(double budget) {
        //Incomplete. Add code here
    }
    //This method executes a query and returns a  ResultSet
    public static ResultSet executeThisQuery(String sql, double budget) {
        //Code not shown here
    }
    //This method establishes a DB connection & returns 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
    }
    //Main method
    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`. The method `getTitles` returns `ArrayList` at the end.

Executing Ex11.java produces the following outputs (depending upon the provided `budget`):

When `budget = 20.0`, output is:

```
Please enter your budget
20
No record found
```

When `budget = 10.0`, output is:

```
Please enter your budget
10
Titles are:
The Beatles
```

When `budget = 9.55`, output is:

```
Please enter your budget
9.55
Titles are:
The Beatles
Revolver
Trans-Europe Express
Abbey Road
Exile On Main St
```

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