CSC263 Database Systems

Laboratory Assignment #8
Accessing Databases with JDBC

Objectives:
- To learn how to make database connection with JDBC
- To learn how to make queries to database via JDBC connection
- To learn how to display results returned to a Java program

Deliverables:
- A lab report in the form of .pdf.
- For Part I and Part II, run the programs (You can use any IDE or just work in Command Line environment). Show your source code and screenshots of the running results.
- For Part III, develop your program and run the program.
    - Submit your Java source code in .zip.
    - Show your source code and the screenshots of the running results in your lab report.

Part I: Connecting to MySQL database from a Java Application

The following short Java application is intended to make a connection to the back-end MySQL database server running on our department server. The department server is: weblab.salemstate.edu; the login user name and login password and the database name should be the same as the ones you have been using throughout this semester.

```java
1   import java.sql.Connection;
2   import java.sql.DriverManager;
3   import java.sql.SQLException;
4
5   public class connectToJDBC
6   {
7       // Note: xxx - username; yyy - password; zzz - database name
8       private static final String userName = "xxx";
9       private static final String passwd = "yyy";
10      private static final String serverURL = "jdbc:mysql://cs.salemstate.edu:3306/zzz";
11
12      // launch the application
13      public static void main(String[] args)
14      {
15          Connection connection = null; // manages connection
16          try
17          {
18              // establish connection to database
19              connection = DriverManager.getConnection(serverURL, userName, passwd);
20              System.out.println("Connection to the database is successful!");
21
22          } // end of try
23          catch (SQLException sqlException)
24          {
25              sqlException.printStackTrace();
26          } // end of Try ... Catch block
27
28          finally // ensure resultSet, statement and connection are closed
29          {   try
30              {
31                  connection.close();
32              } // end try
33              catch (Exception exception)
34              {
35                  exception.printStackTrace();
36              } // end catch
37          } // emd finally
38      } // end main
39  } // end class
```

Part II: The following is an example of a short Java program that sends a SQL query to the "Publication" MySQL Database, receiving the query result and displaying the results on Java console.

```java
import java.sql.Connection;
import java.sql.Statement;
import java.sql.DriverManager;
import java.sql.ResultSet;
import java.sql.ResultSetMetaData;
import java.sql.SQLException;

public class DisplayAuthors
{
    private static final String username = "xxx";
    private static final String passwd = "yyy";

    private static final String DATABASE_URL = "jdbc:mysql://cs.salemstate.edu/zzz";

    // launch the application
    public static void main(String[] args)
    {
        Connection connection = null; // manages connection
        Statement statement = null; // query statement
        ResultSet resultSet = null; // manages results

        // define a SQL query and store it as a string
        String sqlString1 = "SELECT AuthorID, FirstName, LastName FROM Authors";

            // connect to database books and query database
        try
        {
            // establish connection to database
            connection = DriverManager.getConnection(DATABASE_URL, username, passwd);
            System.out.println("Connected");

            // create Statement for querying database
            statement = connection.createStatement();

            // query database
            resultSet = statement.executeQuery(sqlString1);

            // process query results
            ResultSetMetaData metaData = resultSet.getMetaData();
            int numberOfColumns = metaData.getColumnCount();
            System.out.println("Authors Table of Books Database: \n");

            // to print the title bar with the attribute names from the database table
            for (int i = 1; i <= numberOfColumns; i++)
            {
                System.out.printf("%-8s\t", metaData.getColumnName(i));
            }
            System.out.println();

            // to print the tuples in the results of the query
            while (resultSet.next())
            {
                for (int i = 1; i <= numberOfColumns; i++)
                {
                    System.out.printf("%-8s\t", resultSet.getObject(i));
                }
                System.out.println();
            } // end of while

        } // end of try
        catch (SQLException sqlException)
        {
            sqlException.printStackTrace();
        } // end of Try ... Catch block

        finally // ensure resultSet, statement and connection are closed
        {
            try
            {
                resultSet.close();
                statement.close();
                connection.close();
            } // end try

        } // emd finally

    } // end main
} // end class DisplayAuthors
```

Part III: Develop a Java program to query the "Company" Database and display the query results in the format defined by the following headings.

<u>Query</u>*:   For each project, retrieve the project number, the project name, and the number of employees from "Research" department who work on the project.*

Project Name	Project Number	Number of Research Dept. Employees working on the project Year