A.Y. 2020-2021
Class: SE-ITA/B, Semester: III

Subject: **Structured Query Lab**

Experiment – 9: Design and implementation of a full-fledged database with front-end using JDBC for the real life application.

1. **Aim:** To Design and implement a full-fledged database with front-end using JDBC for the real life application.

2. **Objective:**
   - After performing the experiment, the students will be able to learn to use JDBC for database connectivity
   - USse JDBC to design any application and various forms

3. **Outcome:** L303.1: To Construct problem definition statements for real life applications and implement a database for the same.

4. **Prerequisite:** Understanding of JDBC concepts and SQL queries
5. **Requirements:** PC, MySQL(Xampp Server), Microsoft Visual Studio/ PHP Net Oracle 11g/SQL Server 2008 R2, Microsoft Word, Internet.

6. **Pre-Experiment Exercise:**
   Brief Theory :
   1. Front-end that would be used.
   2. Explain JDBC drivers.
   3. Steps to build a JDBC connection.
   4. Explain step by step procedure to connect the database with front –end.

7. **Laboratory Exercise**
   A. Procedure:
   i) Open Xampp server
   ii) Start MySQL services and Apache from Admin panel
   iii) Open Netbeans
   iv) Create a new project -> create Form-> Drag and drop required components for Login form
   v) Construct Java Code
   vi) Construct tables for
   vii) Execute code Through entering data in forms

B. **Result/Observation/Program code:** Attach all executed code with proper output and screen shots

JDBCDemo.java

```
public class JDBCDemo {
    public static void main (String arg[])
    {
        DBConnection.createConnection();
        DBConnection.closeConnection();
    }
}
```

DBConnection.java

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

public class DBConnection {
    static Connection c = null;

    public static void createConnection(){

        Statement stmt = null;
        ResultSet rs = null;
           try {
               System.out.println("Connecting....");
             Class.forName("com.mysql.cj.jdbc.Driver");
             c =
DriverManager.getConnection("jdbc:mysql://localhost:3306/college","root","root");
             System.out.println("Connected");
             c.setAutoCommit(false);
             stmt = c.createStatement();

             String sql = "SELECT * FROM user;";
             rs = stmt.executeQuery(sql);

             System.out.println("Query Executed");

             while(rs.next()){
```

```
                System.out.println(rs.getString("user_name"));
            }
            stmt.close();
        } catch ( Exception e ) {
            System.err.println( e.getClass().getName() + ": " + e.getMessage() );
            System.exit(0);
        }
    }
    public static void closeConnection(){
        try {
            c.close();
        } catch (SQLException e) {
            e.printStackTrace();
        }
    }
}
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL                    1: Java Debug Console

Microsoft Windows [Version 10.0.19042.630]
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D:\College\DBMS\Exp9> c:\Users\yashm\.vscode\extensions\vscjava.vscode-java-debug-0.29.0\scripts\launcher.bat "C:\Program Files\Java\
jdk-15\bin\java.exe" -agentlib:jdwp=transport=dt_socket,server=n,suspend=y,address=localhost:58277 --enable-preview -XX:+ShowCodeDeta
ilsInExceptionMessages -Dfile.encoding=UTF-8 @C:\Users\yashm\AppData\Local\Temp\cp_3l6oppwzf2p3yhkp362o9hpvt.argfile JDBCDemo
Connecting....
Connected
Query Executed
user_1
user_2
user_3
user_4
user_5
user_7

D:\College\DBMS\Exp9>
```

8. Post Experimental Exercise-

A. Questions:

1. What is a connection?
2. What is a ResultSet?
3. What are the different types of JDBC Statements? Etc.

B. Conclusion:

1. Write what was performed in the experiment
2. Mention a few applications of what was studied.
3. Write the significance of the studied topic

C. **References:**

[1] Elmasri and Navathe, “Fundamentals of Database Systems”, 5th Edition, PEARSON Education.

[2] Korth, Silberchatz, Sudarshan, “Database System Concepts”, 6th Edition, McGraw – Hill

[3] https://www.w3schools.com/sql/sql_default.asp

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6. Pre-Experiment Exercise :-

A. Brief Theory :-

1. Front-end

→ The front end of a software program or website is everything which the user interacts. From a user stand point, the front end is synonymous with user interface. From a developer stand point it is the interface design and programming that makes the interface function. Conversely, the backend includes function and data processing that takes place behind the scenes.

Examples of frontend elements includes :-
1) Application or page layout
2) Graphics
3) audio and video elements
4) Text content
5) user interface elements, buttons, links etc.
6) Input areas, dialog boxes, etc.
7) user prefrences, themes and customization

2) Explain JDBC drivers :-
Java database connectivity (JDBC) is an application programming interface (API) for the programming language JAVA, which defines how a client may access any kind of tabular data, especially relational database. It is

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part of Java Standard Edition platform, from Oracle Corporation. It acts like a middle layer interface between java applications and database. The JDBC classes are contained in java package java.sql and javax.sql.
JDBC helps you to write java applications that can perform programming activities like.
i) Connect to a data source, like database.
ii) Send queries and update statement to database
iii) Retrieve and process the results received from the database in answer to your query.

3. Steps to build a JDBC connection.
Fundamental steps in JDBC are as follows.
1) Import JDBC packages.
2) Load and register JDBC packages and open connection.
3) Create a statement object to perform a query.
4) Execute the statement and object and return a query result set.
5) Process the result set.
6) Close the result set and statement objects.
7) Close the connection.

4) Explain step by step procedure to connect a database with frontend.
i) Loading the drivers.
To begin with, you first need to load the driver or register it before using it in the program. Registration is to be done once in

your program. You can register the drivers in one of the two methods
a) Class.forName(); Here we load the drivers class file into memory at runtime.
b) Driver Manager.registerDriver(); Driver Manager is a Java utility class with static member register. Here we call constructor of driver class at compile time.

2) Create the connections:-
After loading the drivers, establish connections using: Connection con = DriverManager.getConnection (url, user, password).
user:- username from which your sql command prompt can be accessed.
password:- password from which your sql command prompt can be accessed.

3) Create a statement:-
Once a connection is established you can interact with the database. The JDBC statement, is a callable statement and prepared statement interface defines the methods that enable you to send SQL commands and receive data from database. Use of JDBC statement is as follows:-
Statement st = con.createStatement();

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4) Execute Query :-
Now comes the most important part i.e. executing the query. Query here is the sql query The execute query() method of Statement interface is used to execute the queries of retrieving values from the database. This method returns the object of result set that can be used to get all records of table.

5) Close the connections :-
By closing connection, objects of statement and resultset will be closed automatically The close() method of connection interface is used to close the connection.
Ex. con.close();

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8. Post Experiment Exercise:

A) Questions :-

1) What is connection :-
A database connection is a SQL developers object that specifies the necessary information for connecting to a specific database as a specific user & that database. You must have at least one database connection to use SQL Developers.

2) What is a Result set?
A table of data representing a database result set which usually is generated by executing a statement that queries the database.
Eg : ResultSet rs = stmt.executeQuery(query);

3) What are different types of JDBC statements?

There are 3 type of JDBC statements :-
i) Statement :- The Statement interface represents the static SQL statement. It helps you to create general purpose SQL statement.

ii) Prepared Statement :- The prepared statement interface extends the statement interface.

iii) Callable statement :- The callable statement interface provides method to execute stored procedures.

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B. Conclusion:-

In this Experiment we have studied ~~and~~ the use of JDBC for database connectivity and also to design any application using it.

JDBC helps us to connect with a data source, to send queries and updatestatements and process the results.

Java Database Connectivity (JDBC) is an API for programming language Java, which defines how client may access the database. It is a Java based data access technology used for Java database connectivity.

Attitude