



Vidyavardhini's College of Engineering and Technology

Department of Artificial Intelligence & Data Science

Experiment No.13
Implement and demonstrate transaction and concurrency control techniques using locks
Date of Performance:
Date of Submission:



Aim :- Implement and demonstrate transaction and concurrency control techniques using locks

Objective :- demonstrate transaction and concurrency control techniques using locks

Theory:

Database used : MySql

1. Driver class: The driver class for the mysql database is `com.mysql.jdbc.Driver`.
2. Connection URL: The connection URL for the mysql database is `jdbc:mysql://localhost:3306/loan management` where `jdbc` is the API, `mysql` is the database, `localhost` is the server name on which `mysql` is running, can also use IP address, `3306` is the port number and `loan management` is the database name.
3. Username: The default username for the mysql database is `Hiren`.
4. Password: It is the password given by the user at the time of installing the mysql database. Password used is “ “.

To connect a Java application with the MySQL database, follow the following steps.

- First create a database and then create a table in the mysql database.
- To connect java application with the mysql database, `mysqlconnector.jar` file is required to be loaded.
- download the jar file `mysql-connector.jar`
- add the jar file to the same folder as the java program.
- Compile and run the java program to retrieve data from the database.



Implementation:

```
1 import java.sql.Connection;
2 import java.sql.DriverManager;
3 import java.sql.ResultSet;
4 import java.sql.SQLException;
5 import java.sql.Statement;
6
7 public class MySQLConnectionExample {
8     private static final String JDBC_URL = "jdbc:mysql://localhost:3306/mydatabase";
9     private static final String USERNAME = "root";
10    private static final String PASSWORD = "root";
11
12    public static void main(String[] args) {
13        Connection conn = null;
14        Statement stmt = null;
15        ResultSet rs = null;
16
17        try {
18            // Register MySQL JDBC driver
19            Class.forName("com.mysql.cj.jdbc.Driver");
20
21            // Open a connection
22            System.out.println("Connecting to database...");
23            conn = DriverManager.getConnection(JDBC_URL, USERNAME, PASSWORD);
24
25            // Execute a query
26            System.out.println("Creating statement...");
27            stmt = conn.createStatement();
```



```
26      System.out.println( "Creating statement... ");
27      stmt = conn.createStatement();
28      String sql = "SELECT id, name, age FROM employees";
29      rs = stmt.executeQuery(sql);
30
31      // Process the result set
32      while (rs.next()) {
33          // Retrieve by column name
34          int id = rs.getInt("id");
35          String name = rs.getString("name");
36          int age = rs.getInt("age");
37
38          // Display values
39          System.out.print("ID: " + id);
40          System.out.print(", Name: " + name);
41          System.out.println(", Age: " + age);
42      }
43  } catch (SQLException | ClassNotFoundException e) {
44      e.printStackTrace();
45  } finally {
46      // Close resources
47      try {
48          if (rs != null) rs.close();
49          if (stmt != null) stmt.close();
50          if (conn != null) conn.close();
51      } catch (SQLException e) {
```



J JDBCdemo.java

```
7   public class MySQLConnectionExample {
12      public static void main(String[] args) {
17          try {
32              while (rs.next()) {
34                  int id = rs.getInt("id");
35                  String name = rs.getString("name");
36                  int age = rs.getInt("age");
37
38                  // Display values
39                  System.out.print("ID: " + id);
40                  System.out.print(", Name: " + name);
41                  System.out.println(", Age: " + age);
42              }
43          } catch (SQLException | ClassNotFoundException e) {
44              e.printStackTrace();
45          } finally {
46              // Close resources
47              try {
48                  if (rs != null) rs.close();
49                  if (stmt != null) stmt.close();
50                  if (conn != null) conn.close();
51              } catch (SQLException e) {
52                  e.printStackTrace();
53              }
54          }
55      }
56  }
57 }
```

Conclusion: Data has been retrieved successfully from a table by establishing database connectivity of java program with mysql database.

1. Explain steps to connect a java application with the MySQL database

Ans. To connect a Java application with a MySQL database, you can follow these steps:

Download MySQL Connector/J:

- First, you need to download the MySQL Connector/J driver, which allows Java applications to connect to a MySQL database. You can download it from the official MySQL website or include it as a dependency in your project using a build tool like Maven or Gradle.

Include the Connector/J Driver in your Java Project:

- Once you have downloaded the MySQL Connector/J JAR file, include it in your Java project's classpath. If you are using a build tool like Maven or Gradle, you can specify the dependency in your project configuration file (pom.xml for Maven or build.gradle for Gradle).



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2. Establish a Connection:

Use the **DriverManager.getConnection()** method to establish a connection to your MySQL database. You need to provide the JDBC URL, username, and password as parameters to this method. For example:

```
String url = "jdbc:mysql://localhost:3306/mydatabase";
```

```
String username = "username";
```

```
String password = "password";
```

```
Connection connection = DriverManager.getConnection(url, username, password);
```

1. **Create a Statement:** Once the connection is established, create a **Statement** object using the **Connection.createStatement()** method. This statement will be used to execute SQL queries against the database.
2. **Execute SQL Queries:** Use the **Statement.executeQuery()** method to execute SELECT queries that retrieve data from the database, or use the **Statement.executeUpdate()** method to execute INSERT, UPDATE, DELETE, or DDL (Data Definition Language) queries that modify the database.

```
Statement statement = connection.createStatement();
```

```
ResultSet resultSet = statement.executeQuery("SELECT * FROM mytable");
```

3. Close the Connection and Resources:

```
resultSet.close();
```

```
statement.close();
```

```
connection.close();
```

4. Handle Exceptions:

Handle any potential exceptions that may occur during database connectivity and query execution. This includes **SQLExceptions** that may be thrown when interacting with the database.

