

Institution of Technology

School of Computing

Department of Information Technology and computer science

Course Name: Introduction to Distributed System

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Lab 5: Java Database Connectivity (JDBC)

Objectives: This Lab is a demonstration on how to use JDBC.

• Making a connection to a database.

• Creating SQL or MySQL statements.

• Executing SQL or MySQL queries in the database.

• Viewing & Modifying the resulting record

Required Steps

The following steps are required to create a new Database using JDBC application

• Import the packages: Requires that you include the packages containing the JDBC classes needed for database programming. Most often, using import java.sql.\* will suffice.

item Register the JDBC driver: Requires that you initialize a driver so you can open a communications channel with the database.

• Open a connection: Requires using the DriverManager.getConnection() method to create a Connection object, which represents a physical connection with the database server.

To create a new database, you need not give any database name while preparing database URL as mentioned in the below example.

• Execute a query: Requires using an object of type Statement for building and submitting an SQL statement to the database.

• Clean up the environment . Requires explicitly closing all database resources versus relying on the JVM’s garbage collection.

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Step 1: Database connectivity

package jdbc;

import java.sql.\*;

public class CreateDB {

static final String JDBC\_DRIVER = "com.mysql.jdbc.Driver";

static final String DB\_URL = "jdbc:mysql://localhost/";

// Database credentials

static final String USER = "root";

static final String PASS = "";

public static void main(String[] args) { Connection conn = null;

Statement stmt = null;

try{

//STEP 2: Register JDBC driver

Class.forName("com.mysql.jdbc.Driver");

//STEP 3: Open a connection

System.out.println("Connecting to database...");

conn = DriverManager.getConnection(DB\_URL, USER, PASS);

//STEP 4: Execute a query System.out.println("Creating database..."); stmt = conn.createStatement();

String sql = "CREATE DATABASE STUDENTS";

stmt.executeUpdate(sql);

System.out.println("Database created successfully...");

}catch(SQLException se){

//Handle errors for JDBC

se.printStackTrace();

}catch(Exception e){

//Handle errors for Class.forName e.printStackTrace();

}finally{

//finally block used to close resources try{

if(stmt!=null)

stmt.close();

}catch(SQLException se2){

}// nothing we can do try{

if(conn!=null)

conn.close();

}catch(SQLException se){

se.printStackTrace();

}//end finally try

}//end try

System.out.println("Goodbye!");

}//end main

}

Step 2: Drop Database

package jdbc;

import java.sql.\*;

/\*\*

\*

\* [@author User](mailto:@author)

\*/

public class DropDB {

// JDBC driver name and database URL

static final String JDBC\_DRIVER = "com.mysql.jdbc.Driver";

static final String DB\_URL = "jdbc:mysql://localhost/";

// Database credentials

static final String USER = "root";

static final String PASS = "";

public static void main(String[] args) { Connection conn = null;

Statement stmt = null;

try{

//STEP 2: Register JDBC driver

Class.forName("com.mysql.jdbc.Driver");

//STEP 3: Open a connection

System.out.println("Connecting to a selected database..."); conn = DriverManager.getConnection(DB\_URL, USER, PASS); System.out.println("Connected database successfully...");

//STEP 4: Execute a query System.out.println("Deleting database..."); stmt = conn.createStatement();

String sql = "DROP DATABASE STUDENTS";

stmt.executeUpdate(sql);

System.out.println("Database deleted successfully...");

}catch(SQLException se){

//Handle errors for JDBC

se.printStackTrace();

}catch(Exception e){

//Handle errors for Class.forName e.printStackTrace();

}finally{

//finally block used to close resources try{

if(stmt!=null)

conn.close();

}catch(SQLException se){

}// do nothing try{

if(conn!=null)

conn.close();

}catch(SQLException se){

se.printStackTrace();

}//end finally try

}//end try

System.out.println("Goodbye!");

}//end main

}

Step 3: Create Table

package jdbc;

import java.sql.\*;

public class CreateTable {

// JDBC driver name and database URL

static final String JDBC\_DRIVER = "com.mysql.jdbc.Driver";

static final String DB\_URL = "jdbc:mysql://localhost/STUDENTS";

// Database credentials

static final String USER = "root";

static final String PASS = "";

public static void main(String[] args) { Connection conn = null;

Statement stmt = null;

try{

//STEP 2: Register JDBC driver

Class.forName("com.mysql.jdbc.Driver");

//STEP 3: Open a connection

System.out.println("Connecting to a selected database..."); conn = DriverManager.getConnection(DB\_URL, USER, PASS); System.out.println("Connected database successfully...");

//STEP 4: Execute a query

System.out.println("Creating table in given database...");

stmt = conn.createStatement();

String sql = "CREATE TABLE REGISTRATION " + "(id INTEGER not NULL, " +

" first VARCHAR(255), " + " last VARCHAR(255), " +

" age INTEGER, " +

" PRIMARY KEY ( id ))";

stmt.executeUpdate(sql);

System.out.println("Created table in given database...");

}catch(SQLException se){

//Handle errors for JDBC

se.printStackTrace();

}catch(Exception e){

//Handle errors for Class.forName e.printStackTrace();

}finally{

//finally block used to close resources try{

if(stmt!=null)

conn.close();

}catch(SQLException se){

}// do nothing try{

if(conn!=null)

conn.close();

}catch(SQLException se){

se.printStackTrace();

}//end finally try

}//end try

System.out.println("Goodbye!");

}//end main

}

Step 4: Drop Tables

package jdbc;

import java.sql.\*;

/\*\*

\*

\* [@author User](mailto:@author)

\*/

public class DropTable {

// JDBC driver name and database URL

static final String JDBC\_DRIVER = "com.mysql.jdbc.Driver";

static final String DB\_URL = "jdbc:mysql://localhost/STUDENTS";

// Database credentials

static final String USER = "root";

static final String PASS = "";

public static void main(String[] args) { Connection conn = null;

Statement stmt = null;

try{

//STEP 2: Register JDBC driver

Class.forName("com.mysql.jdbc.Driver");

//STEP 3: Open a connection

System.out.println("Connecting to a selected database..."); conn = DriverManager.getConnection(DB\_URL, USER, PASS); System.out.println("Connected database successfully...");

//STEP 4: Execute a query

System.out.println("Deleting table in given database...");

stmt = conn.createStatement();

String sql = "DROP TABLE REGISTRATION ";

stmt.executeUpdate(sql);

System.out.println("Table deleted in given database...");

}catch(SQLException se){

//Handle errors for JDBC

se.printStackTrace();

}catch(Exception e){

//Handle errors for Class.forName e.printStackTrace();

}finally{

//finally block used to close resources try{

if(stmt!=null)

conn.close();

}catch(SQLException se){

}// do nothing try{

if(conn!=null)

conn.close();

}catch(SQLException se){

se.printStackTrace();

}//end finally try

}//end try

System.out.println("Goodbye!");

}//end main

}

Step 5: JDBC - Insert Records

package jdbc;

import java.sql.\*;

public class InsertStatment {

// JDBC driver name and database URL

static final String JDBC\_DRIVER = "com.mysql.jdbc.Driver";

static final String DB\_URL = "jdbc:mysql://localhost/STUDENTS";

// Database credentials

static final String USER = "root";

static final String PASS = "";

public static void main(String[] args) { Connection conn = null;

Statement stmt = null;

try{

//STEP 2: Register JDBC driver

Class.forName("com.mysql.jdbc.Driver");

//STEP 3: Open a connection

System.out.println("Connecting to a selected database..."); conn = DriverManager.getConnection(DB\_URL, USER, PASS); System.out.println("Connected database successfully...");

//STEP 4: Execute a query

System.out.println("Inserting records into the table...");

stmt = conn.createStatement();

String sql = "INSERT INTO Registration " + "VALUES (100, ’Zara’, ’Ali’, 18)";

stmt.executeUpdate(sql);

sql = "INSERT INTO Registration " +

"VALUES (101, ’Mahnaz’, ’Fatma’, 25)";

stmt.executeUpdate(sql);

sql = "INSERT INTO Registration " +

"VALUES (102, ’Zaid’, ’Khan’, 30)";

stmt.executeUpdate(sql);

sql = "INSERT INTO Registration " +

"VALUES(103, ’Sumit’, ’Mittal’, 28)";

stmt.executeUpdate(sql);

System.out.println("Inserted records into the table...");

}catch(SQLException se){

//Handle errors for JDBC

se.printStackTrace();

}catch(Exception e){

//Handle errors for Class.forName e.printStackTrace();

}finally{

//finally block used to close resources try{

if(stmt!=null)

conn.close();

}catch(SQLException se){

}// do nothing try{

if(conn!=null)

conn.close();

}catch(SQLException se){

se.printStackTrace();

}//end finally try

}//end try

System.out.println("Goodbye!");

}//end main

}

Step 6: JDBC - Select Records

package jdbc;

import java.sql.\*;

public class SelectRecord {

// JDBC driver name and database URL

static final String JDBC\_DRIVER = "com.mysql.jdbc.Driver";

static final String DB\_URL = "jdbc:mysql://localhost/STUDENTS";

// Database credentials

static final String USER = "root";

static final String PASS = "";

public static void main(String[] args) { Connection conn = null;

Statement stmt = null;

try{

//STEP 2: Register JDBC driver

Class.forName("com.mysql.jdbc.Driver");

//STEP 3: Open a connection

System.out.println("Connecting to a selected database..."); conn = DriverManager.getConnection(DB\_URL, USER, PASS); System.out.println("Connected database successfully...");

//STEP 4: Execute a query System.out.println("Creating statement..."); stmt = conn.createStatement();

String sql = "SELECT id, first, last, age FROM Registration"; ResultSet rs = stmt.executeQuery(sql);

//STEP 5: Extract data from result set while(rs.next()){

//Retrieve by column name int id = rs.getInt("id"); int age = rs.getInt("age");

String first = rs.getString("first"); String last = rs.getString("last");

//Display values System.out.print("ID: " + id); System.out.print(", Age: " + age); System.out.print(", First: " + first); System.out.println(", Last: " + last);

}

rs.close();

}catch(SQLException se){

//Handle errors for JDBC

se.printStackTrace();

}catch(Exception e){

//Handle errors for Class.forName e.printStackTrace();

}finally{

//finally block used to close resources

try{

if(stmt!=null)

conn.close();

}catch(SQLException se){

}// do nothing try{

if(conn!=null)

conn.close();

}catch(SQLException se){

se.printStackTrace();

}//end finally try

}//end try

System.out.println("Goodbye!");

}//end main

}

Step 7: JDBC - Update Records

package jdbc;

import java.sql.\*;

public class UpdateRecord {

// JDBC driver name and database URL

static final String JDBC\_DRIVER = "com.mysql.jdbc.Driver";

static final String DB\_URL = "jdbc:mysql://localhost/STUDENTS";

// Database credentials

static final String USER = "root";

static final String PASS = "";

public static void main(String[] args) { Connection conn = null;

Statement stmt = null;

try{

//STEP 2: Register JDBC driver

Class.forName("com.mysql.jdbc.Driver");

//STEP 3: Open a connection

System.out.println("Connecting to a selected database..."); conn = DriverManager.getConnection(DB\_URL, USER, PASS); System.out.println("Connected database successfully...");

//STEP 4: Execute a query System.out.println("Creating statement..."); stmt = conn.createStatement();

String sql = "UPDATE Registration " +

"SET age = 30 WHERE id in (100, 101)";

stmt.executeUpdate(sql);

// Now you can extract all the records

// to see the updated records

}catch(Exception e){

//Handle errors for Class.forName e.printStackTrace();

}finally{

//finally block used to close resources try{

if(stmt!=null)

conn.close();

}catch(SQLException se){

}// do nothing try{

if(conn!=null)

conn.close();

}catch(SQLException se){

se.printStackTrace();

}//end finally try

}//end try

System.out.println("Goodbye!");

}//end main

}

Step 8: JDBC - Delete Records

Step 9: JDBC - Delete Records

package jdbc;

import java.sql.\*;

public class DeleteRecord {

// JDBC driver name and database URL

static final String JDBC\_DRIVER = "com.mysql.jdbc.Driver";

static final String DB\_URL = "jdbc:mysql://localhost/STUDENTS";

// Database credentials

static final String USER = "root";

static final String PASS = "";

public static void main(String[] args) { Connection conn = null;

Statement stmt = null;

try{

//STEP 2: Register JDBC driver

Class.forName("com.mysql.jdbc.Driver");

//STEP 3: Open a connection

System.out.println("Connecting to a selected database..."); conn = DriverManager.getConnection(DB\_URL, USER, PASS); System.out.println("Connected database successfully...");

//STEP 4: Execute a query System.out.println("Creating statement..."); stmt = conn.createStatement();

String sql = "DELETE FROM Registration " + "WHERE id = 101";

stmt.executeUpdate(sql);

// Now you can extract all the records

// to see the remaining records

}catch(Exception e){

//Handle errors for Class.forName e.printStackTrace();

}finally{

//finally block used to close resources try{

if(stmt!=null)

conn.close();

}catch(SQLException se){

}// do nothing try{

if(conn!=null)

conn.close();

}catch(SQLException se){

se.printStackTrace();

}//end finally try

}//end try

System.out.println("Goodbye!");

}//end main

}

Step 10: JDBC - WHERE Clause

package jdbc;

import java.sql.\*;

public class WhereClause {

// JDBC driver name and database URL

static final String JDBC\_DRIVER = "com.mysql.jdbc.Driver";

static final String DB\_URL = "jdbc:mysql://localhost/STUDENTS";

// Database credentials

static final String USER = "root";

static final String PASS = "";

public static void main(String[] args) { Connection conn = null;

Statement stmt = null;

try{

//STEP 2: Register JDBC driver

Class.forName("com.mysql.jdbc.Driver");

//STEP 3: Open a connection

System.out.println("Connecting to a selected database..."); conn = DriverManager.getConnection(DB\_URL, USER, PASS); System.out.println("Connected database successfully...");

//STEP 4: Execute a query System.out.println("Creating statement..."); stmt = conn.createStatement();

// Extract records without any condition. System.out.println("Fetching records without condition..."); String sql = "SELECT id, first, last, age FROM Registration"; ResultSet rs = stmt.executeQuery(sql);

while(rs.next()){

//Retrieve by column name int id = rs.getInt("id"); int age = rs.getInt("age");

String first = rs.getString("first"); String last = rs.getString("last");

//Display values System.out.print("ID: " + id); System.out.print(", Age: " + age); System.out.print(", First: " + first); System.out.println(", Last: " + last);

}

// Select all records having ID equal or greater than 101

System.out.println("Fetching records with condition...");

sql = "SELECT id, first, last, age FROM Registration" + " WHERE id >= 101 ";

rs = stmt.executeQuery(sql);

while(rs.next()){

//Retrieve by column name int id = rs.getInt("id"); int age = rs.getInt("age");

String first = rs.getString("first"); String last = rs.getString("last");

//Display values System.out.print("ID: " + id); System.out.print(", Age: " + age); System.out.print(", First: " + first); System.out.println(", Last: " + last);

}

rs.close();

}catch(SQLException se){

//Handle errors for JDBC

se.printStackTrace();

}catch(Exception e){

//Handle errors for Class.forName e.printStackTrace();

}finally{

//finally block used to close resources try{

if(stmt!=null)

conn.close();

}catch(SQLException se){

}// do nothing try{

if(conn!=null)

conn.close();

}catch(SQLException se){

se.printStackTrace();

}//end finally try

}//end try

System.out.println("Goodbye!");

}//end main

}