1. Write a Java program to connect to a MySQL database using JDBC.

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

public class JDBC_Connection {
   public static Connection getConnection(){
         String url="jdbc:mysql://localhost:3306/mydb";
         String user="root";
         String password="password";

      try {
         Class.forName("com.mysql.cj.jdbc.Driver");
         Connection con=DriverManager.getConnection(url,user,password);
         System.out.println("Connection created successfully");
        Con.close();
      } catch (ClassNotFoundException | SQLException e) {
         System.out.println("Connection Failed: " + e.getMessage());
         return null;
      }
   }

   public static void main(String[] args){
      getConnection();
   }
}
```

Output: Connection created successfully

2. Create a Java class to insert student records into a database table.

```
import java.sql.Connection;
import java.sql.PreparedStatement;
import java.util.Scanner;

public class StudentRecord {
   public static void main(String[] args) {
        String url="jdbc:mysql://localhost:3306/mydb";
        String user="root";
        String password="password";
      try {
        Class.forName("com.mysql.cj.jdbc.Driver");
        Connection con=DriverManager.getConnection(url,user,password);

        String sql = "INSERT INTO student (rollno, name, age) VALUES (?, ?, ?)";
        PreparedStatement pst = con.prepareStatement(sql);
        Scanner sc = new Scanner(System.in);

        System.out.print("Enter Roll No: ");
        int rno = sc.nextInt();
        sc.nextLine();
        System.out.print("Enter Name: ");
        String name = sc.nextLine();
        System.out.print("Enter Age: ");
        int age = sc.nextInt();

        pst.setInt(1, rno);
        pst.setString(2, name);
```

```
            pst.setInt(3, age);

            int rows = pst.executeUpdate();
            System.out.println(rows + " record(s) inserted.");
             pst.close();
             con.close();
        } catch (Exception e) {
            System.out.println("Error: " + e.getMessage());
        }
    }
}
```

Output:

Enter Roll No: 1

Enter Name: ajay

Enter Age: 22

1 record(s) inserted.

3. Write a JDBC program to fetch and display all student records from the database.

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

public class Fetchstudentdata {
    public static void main(String[] args) {
            String url="jdbc:mysql://localhost:3306/mydb";
            String user="root";
            String password="password";
        try {
```

```
            Class.forName("com.mysql.cj.jdbc.Driver");
            Connection con=DriverManager.getConnection(url,user,password);

           String query = "SELECT * FROM student1";
           Statement stmt = con.createStatement();
           ResultSet rs = stmt.executeQuery(query);

           System.out.println("RNo\tName\tAge");
           while (rs.next()) {
              System.out.println(rs.getInt("rollno") + "\t" +
                                 rs.getString("name") + "\t" +
                                 rs.getInt("age"));
            rs.close();
            stmt.close();
            con.close();
           }
       } catch (Exception e) {
           System.out.println("Error: " + e.getMessage());
       }
    }
}
```

Output:

RNo	Name	Age
101	Neeva Sharma	20
102	Reeva Sharma	21
103	Shiva Upadhyay	20
104	Amit Verma	22

4. Develop a program to search a student by ID using JDBC.

```
import java.sql.Connection;
import java.sql.PreparedStatement;
import java.sql.ResultSet;
import java.util.Scanner;

public class Program4 {
   public static void main(String[] args) {
         String url="jdbc:mysql://localhost:3306/mydb";
         String user="root";
         String password="password";
      try {
         Class.forName("com.mysql.cj.jdbc.Driver");
         Connection con=DriverManager.getConnection(url,user,password);
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter Roll No to Search: ");
        int rno = sc.nextInt();

        String sql = "SELECT * FROM student1 WHERE rollno = ?";
        PreparedStatement pst = con.prepareStatement(sql);
        pst.setInt(1, rno);
        ResultSet rs = pst.executeQuery();

        if (rs.next()) {
           System.out.println("Found: " + rs.getString("name") + ", Age: " +
rs.getInt("age"));
        } else {
           System.out.println("Student not found.");
        }
```

```
            rs.close();
            pst.close();
            con.close();
        } catch (Exception e) {
            System.out.println("Error: " + e.getMessage());
        }
    }
}
```

Output:

Enter Roll No to Search: 101

Found: Neeva Sharma, Age: 20

5. Implement an update operation to modify student details in the database using JDBC.

```
import java.sql.Connection;
import java.sql.PreparedStatement;
import java.util.Scanner;

public class ModifyStudentDetails {
    public static void main(String[] args) {
            String url="jdbc:mysql://localhost:3306/mydb";
            String user="root";
            String password="password";
        try {
            Class.forName("com.mysql.cj.jdbc.Driver");
            Connection con=DriverManager.getConnection(url,user,password);
           Scanner sc = new Scanner(System.in);
           System.out.print("Enter Roll No to Update: ");
```

```
            int rno = sc.nextInt();

            System.out.print("Enter New Name: ");
            String name = sc.next();
            System.out.print("Enter New Age: ");
            int age = sc.nextInt();

            String sql = "UPDATE student1 SET name = ?, age = ? WHERE rollno = ?";
            PreparedStatement pst = con.prepareStatement(sql);
            pst.setString(1, name);
            pst.setInt(2, age);
            pst.setInt(3, rno);

            int rows = pst.executeUpdate();
            if (rows > 0) {
               System.out.println("Record Updated.");
            } else {
               System.out.println("No student found with that Roll Number");
            }
             pst.close();
             con.close();
        } catch (Exception e) {
            System.out.println("Error: " + e.getMessage());
        }
    }
}
```

Output:

Enter Roll No to Update: 104

Enter New Name: Ajay

Enter New Age: 26

Record Updated.

6. Write a Java program to delete a student record from the database using JDBC.

```
import java.sql.Connection;
import java.sql.PreparedStatement;
import java.util.Scanner;

public class Deleterecord {
   public static void main(String[] args) {
         String url="jdbc:mysql://localhost:3306/mydb";
         String user="root";
         String password="password";
      try {
         Class.forName("com.mysql.cj.jdbc.Driver");
         Connection con=DriverManager.getConnection(url,user,password);
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter Roll No to Delete: ");
        int rno = sc.nextInt();

        String sql = "DELETE FROM student1 WHERE rollno = ?";
        PreparedStatement pst = con.prepareStatement(sql);
        pst.setInt(1, rno);

        int rows = pst.executeUpdate();
        if (rows > 0) {
           System.out.println("Record Deleted.");
```

```
            } else {
                System.out.println("Student not found.");
            }
             pst.close();
             con.close();
        } catch (Exception e) {
            System.out.println("Error: " + e.getMessage());
        }
    }
}
```

Output:

```
Enter Roll No to Delete: 104
Record Deleted.
```

---

7. Create a JDBC-based program to count the total number of rows in a table.

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

public class Countrows {
    public static void main(String[] args) {
            String url="jdbc:mysql://localhost:3306/mydb";
            String user="root";
            String password="password";
        try {
            Class.forName("com.mysql.cj.jdbc.Driver");
            Connection con=DriverManager.getConnection(url,user,password);
```

```
            String sql = "SELECT COUNT(*) FROM student1";
            Statement stmt = con.createStatement();
            ResultSet rs = stmt.executeQuery(sql);
            if (rs.next()) {
               System.out.println("Total Students: " + rs.getInt(1));
            }
             rs.close();
             stmt.close();
             con.close();
        } catch (Exception e) {
            System.out.println("Error: " + e.getMessage());
        }
    }
}
```

Output:

Connection created

Total Students: 4

8. Develop a program to sort student data in ascending order by name using SQL in JDBC.

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

public class Sortstudents{
    public static void main(String[] args) {
            String url="jdbc:mysql://localhost:3306/mydb";
            String user="root";
            String password="password";
```

```
        try {
            Class.forName("com.mysql.cj.jdbc.Driver");
            Connection con=DriverManager.getConnection(url,user,password);
           String sql = "SELECT * FROM student1 ORDER BY name ASC";
           ResultSet rs = con.createStatement().executeQuery(sql);
           System.out.println("RNo\tName\t\t\tAge");
           while (rs.next()) {
              System.out.println(rs.getInt("rollno") + "\t" +
                                 rs.getString("name") + "\t\t" +
                                 rs.getInt("age"));
           }
            rs.close();
            Con.close();
        } catch (Exception e) {
           System.out.println("Error: " + e.getMessage());
        }
    }
}
```

Output:

```
104     Ajay                26
101     Neeva Sharma        20
102     Reeva Sharma        21
103     Shiva Upadhyay      20
```

9. Use **PreparedStatement** to insert multiple student records into the database.

```
import java.sql.Connection;
import java.sql.PreparedStatement;
import java.sql.SQLException;
import java.util.ArrayList;
import java.util.List;

class Student {
   int rollno;
   String name;
   int age;

   Student(int rollno, String name, int age) {
      this.rollno = rollno;
      this.name = name;
      this.age = age;
   }
}
public class Insertrecords{

        public static void main(String[] args) throws SQLException {

                String url="jdbc:mysql://localhost:3306/mydb";

                String user="root";

                String password="password";

                List<Student> student1= new ArrayList<>();
                Student1.add(new student1(101, "Neeva Sharma", 20));
                Student1.add(new student1(102, "Reeva Sharma", 21));
                 Student1.add(new student1(103, "Shiva Upadhyay", 20));
                Student1.add(new student1(104, "Amit Verma", 22));

                try {

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

         Connection con=DriverManager.getConnection(url,user,password);


        String insertQuery = "INSERT INTO student2 (rollno, name, age) VALUES (?, ?,
?)";
        PreparedStatement insertPst = con.prepareStatement(insertQuery);

        for (Student s : students) {
```

```
            insertPst.setInt(1, s.rollno);
            insertPst.setString(2, s.name);
            insertPst.setInt(3, s.age);
            insertPst.addBatch(); // Adds this set of data to the batch
        }

        int[] result = insertPst.executeBatch(); // Executes all insertions
        System.out.println(result.length + " records inserted successfully.\n");
         }
                catch (Exception e) {
        System.out.println("Error: " + e.getMessage());
    }

}
}
```

Output:
5 records inserted successfully.

10. Write a JDBC program to handle exceptions (like invalid ID, connection errors) gracefully.

```
import java.sql.Connection;
import java.sql.PreparedStatement;
import java.sql.ResultSet;
import java.sql.SQLException;
import java.sql.SQLNonTransientConnectionException;
import java.sql.SQLSyntaxErrorException;
import java.util.Scanner;
public class Handleexceptions {
        public static void main(String[] args) throws SQLException {
                String url="jdbc:mysql://localhost:3306/mydb";
                String user="root";
                String password="password";
```

```
 try {
 Class.forName("com.mysql.cj.jdbc.Driver");
 Connection con=DriverManager.getConnection(url,user,password);
Scanner sc = new Scanner(System.in);
System.out.print("Enter Student ID to search: ");
int id = sc.nextInt();

String sql = "SELECT * FROM student1 WHERE rollno=?";
PreparedStatement pst = con.prepareStatement(sql);
pst.setInt(1, id);

ResultSet rs = pst.executeQuery();

if (rs.next()) {
   System.out.println("ID: " + rs.getInt("rollno"));
   System.out.println("Name: " + rs.getString("name"));
   System.out.println("Age: " + rs.getInt("age"));
   System.out.println("Percentage: " + rs.getInt("percent"));
} else {
   System.out.println("No student found with ID " + id);
}
rs.close();
 pst.close();
 con.close();

} catch (SQLSyntaxErrorException e) {
   System.out.println("SQL Error " + e.getMessage());
} catch (SQLNonTransientConnectionException e) {
   System.out.println(e);
```

```
} catch (SQLException e) {
   System.out.println("SQL Error" + e.getMessage());
} catch (Exception e) {
   System.out.println("Unexpected Error " + e.getMessage());
}
            }
    }
```

Output:

Enter Student ID to search: 102

ID: 102

Name: Reeva Sharma

Age: 21

11. Create a login system using JDBC where user credentials are verified from the database.

```
import java.sql.Connection;
import java.sql.PreparedStatement;
import java.sql.ResultSet;
import java.sql.SQLException;
import java.util.Scanner;
public class Verifycredentials{
        public static void main(String[] args) throws SQLException {
                String url="jdbc:mysql://localhost:3306/mydb";
                String user="root";
                String password="password";
                try {
                        Class.forName("com.mysql.cj.jdbc.Driver");
        Connection con=DriverManager.getConnection(url,user,password);
```

```
                    Scanner sc = new Scanner(System.in);
                    System.out.print("Enter Username: ");
                    String uname = sc.nextLine();
                    System.out.print("Enter Password: ");
                    String pwd = sc.nextLine();
                    String sql = "SELECT * FROM users WHERE username=? AND
password=?";
                    PreparedStatement pst = con.prepareStatement(sql);
                    pst.setString(1, uname);
                    pst.setString(2, pwd);

                    ResultSet rs = pst.executeQuery();

                    if (rs.next()) {
                        System.out.println("Login Successful! Welcome " +
uname);
                    } else {
                        System.out.println("Invalid credentials! Try again.");
                    }
                rs.close();
                pst.close();
                Con.close();
                }
                catch(Exception e) {
                    System.out.println(e);
                }
        }

}
```

Output:

Enter Username: user

Enter Password: password

Login Successful! Welcome user