

## LAB 6

### Topics: JDBC, Servlet, JSP

1. Write a Java application to store and fetch student registration information (like firstName, lastName, branch, username and password) from a database using JDBC. Practice the use of the following methods of the ResultSet interface: absolute(), afterLast(), beforeFirst(), first(), isFirst(), isLast(), last(), previous(), next(), relative().

\*java application

```
package lab6.q1;

import java.sql.*;
import java.util.Scanner;

public class q1_ans { //Student Registration form
    private static final Scanner sc = new Scanner(System.in);
    public static void print_from_database(Connection con) throws SQLException {
        Statement s = con.createStatement();
        String selectQuery = "select * from `student`";
        ResultSet rs;
        rs = s.executeQuery(selectQuery);
        System.out.println("Printing the Information from Database");
        while (rs.next()) {
            System.out.println(".....");
            System.out.println("Auto id: " + rs.getInt(6));
            System.out.println("First Name: " + rs.getString(1));
            System.out.println("Last Name: " + rs.getString(2));
            System.out.println("Branch: " + rs.getString(3));
            System.out.println("Username: " + rs.getString(4));
            System.out.println("Password: " + rs.getString(5));
            System.out.println(".....");
        }
    }

    public static void insert_in_database(Connection con){
        System.out.println("\n\nInsertion of a Row Started....\nGive proper Inputs");

        try {
            System.out.print("Enter the First Name: ");
            String fname = sc.nextLine();
            System.out.print("Enter the Last Name: ");
            String lname = sc.nextLine();
            System.out.print("Enter the Branch: ");
            String branch = sc.nextLine();
            System.out.print("Enter the Username: ");
            String username = sc.nextLine();
            System.out.print("Enter the password: ");
            String password = sc.nextLine();
            PreparedStatement ps=con.prepareStatement("insert into student(`fname`, `lname`, `branch`, `username`, `password`) values(?,?,?,?,?)");
            ps.setString(1,fname);
            ps.setString(2,lname);
            ps.setString(3,branch);
            ps.setString(4,username);
            ps.setString(5,password);
            ps.executeUpdate();
            ps = con.prepareStatement("select * from student where username=?");
            ps.setString(1,username);
            ResultSet rs = ps.executeQuery();
            rs.next();
            System.out.println("row inserted, the given auto id to student is: "+rs.getInt(6));
        }
    }
}
```

```

    }
    catch (SQLIntegrityConstraintViolationException e){
        e.printStackTrace();
        System.out.println("Try again with different Username please");
        insert_in_database(con);
    }
    catch (Exception e){
        System.out.println("Unknown Error occurred");
        e.printStackTrace();
    }
}

public static void update_in_database(Connection con) throws SQLException{
    System.out.print("Update of row started...\nEnter the id for update: ");
    int id = sc.nextInt();
    sc.nextLine();
    Statement s = con.createStatement(ResultSet.TYPE_SCROLL_SENSITIVE, ResultSet.CONCUR_UPDATABLE);
    ResultSet rs = s.executeQuery("select * from student where id="+id);
    System.out.println("Enter new Details..");
    rs.next();
    System.out.print("Enter the First Name: ");
    String fname = sc.nextLine();
    System.out.print("Enter the Last Name: ");
    String lname = sc.nextLine();
    System.out.print("Enter the Branch: ");
    String branch = sc.nextLine();
    System.out.print("Enter the Username: ");
    String username = sc.nextLine();
    System.out.print("Enter the password: ");
    String password = sc.nextLine();
    rs.updateString(1,fname);
    rs.updateString(2,lname);
    rs.updateString(3,branch);
    rs.updateString(4,username);
    rs.updateString(5,password);
    rs.updateRow();
    System.out.println("Row successfully updated..");
}

public static void delete_from_database(Connection con) throws SQLException{
    System.out.print("Delete of row started...\nEnter the id for Delete: ");
    int id = sc.nextInt();
    sc.nextLine();
    Statement s = con.createStatement(ResultSet.TYPE_SCROLL_SENSITIVE, ResultSet.CONCUR_UPDATABLE);
    ResultSet rs = s.executeQuery("select * from student where id="+id);
    rs.absolute(1);
    rs.deleteRow();
    System.out.println("Row successfully deleted");
}

public static void selector(Connection con) throws SQLException {
    //Giving User to choose the option for manipulation of data
    System.out.println("Give your key according to choice.");
    System.out.println("View the data : 0");
    System.out.println("Insert a Row.: 1");
    System.out.println("Update a Row.: 2");
    System.out.println("Delete a Row.: 3");
    System.out.print("Multiple Insertion.: 4\nkey: ");
    int choice = sc.nextInt();
    sc.nextLine();
    if(0 == choice)print_from_database(con);
    if(1 == choice)insert_in_database(con);
    if(2 == choice)update_in_database(con);
}

```

```

        if(3 == choice)delete_from_database(con);
        if(4 == choice) {
            System.out.println("Enter the number of insertions: ");
            int loop = sc.nextInt();
            sc.nextLine();
            while (0 != loop--) {
                insert_in_database(con);
            }
        }
    }

    public static void main(String[] args) {
        //setting up database
        try (Connection con =
DriverManager.getConnection("jdbc:mysql://localhost/student-registration", "root", "")) {
            //initially showing information already present in database
            print_from_database(con);
            //starting selections
            selector(con);
            while(true){
                System.out.print("Do you want to exit (y/n): ");
                String s = sc.nextLine();
                if(s.equals("y"))break;
                selector(con);
            }
        } catch (SQLException e) {
            e.printStackTrace();
        }
    }
}

```

```

package lab6.q1;

import java.sql.*;

public class q1_ans_for_usage {
    public static void main(String[] args) {
        try (Connection con =
DriverManager.getConnection("jdbc:mysql://localhost/student-registration", "root", "")){
            Statement s = con.createStatement(ResultSet.TYPE_SCROLL_SENSITIVE,
ResultSet.CONCUR_UPDATABLE);
            ResultSet rs = s.executeQuery("select * from student");

            //            q1_ans.print_from_database(con);

            rs.afterLast();//following will not work due to rs at end of dataset
            try{System.out.println(rs.getInt(6));}
            catch (Exception e){e.printStackTrace();}

            rs.beforeFirst();//following will not work due to rs at start of dataset not initialised
            try{System.out.println(rs.getInt(6));}
            catch (Exception e){e.printStackTrace();}

            rs.first();//will show id of first row
            try{System.out.println(rs.getInt(6));}
            catch (Exception e){e.printStackTrace();}

            System.out.println(rs.isFirst());

```

```

        System.out.println(rs.isLast());

        rs.last();
        try{System.out.println(rs.getInt(6));}
        catch (Exception e){e.printStackTrace();}

        rs.previous();
        try{System.out.println(rs.getInt(6));}
        catch (Exception e){e.printStackTrace();}

        rs.next();
        try{System.out.println(rs.getInt(6));}
        catch (Exception e){e.printStackTrace();}

        rs.relative(1);//shift row position
        try{System.out.println(rs.getInt(6));}
        catch (Exception e){e.printStackTrace();}

        //to view data in database
        q1_ans.print_from_database(con);
    } catch (SQLException e) {
        e.printStackTrace();
    }
}
}

```

The screenshot displays an IDE with two open Java files: `q1_ans.java` and `q1_ans_for_usage.java`. The `q1_ans_for_usage.java` file contains the following code:

```

76      System.out.print("Enter the Branch: ");
77      String branch = sc.nextLine();
78      System.out.print("Enter the Username: ");
79      String username = sc.nextLine();
80      System.out.print("Enter the password: ");
81      String password = sc.nextLine();
82      rs.updateString( columnIndex: 1,fname);
83      rs.updateString( columnIndex: 2,lname);
84      rs.updateString( columnIndex: 3,branch);
85      rs.updateString( columnIndex: 4,username);
86      rs.updateString( columnIndex: 5,password);
87      rs.updateRow();
88      System.out.println("Row successfully updated..");
89  }
90
91  1 usage:  dhurmilpatel30 *
92  public static void delete_from_database(Connection con) throws SQLException{
93      System.out.print("Delete of row started...\nEnter the id for Delete: ");
94      int id = sc.nextInt();
95      sc.nextLine();
96      Statement s = con.createStatement(ResultSet.TYPE_SCROLL_SENSITIVE, ResultSet.CONC
97      ResultSet rs = s.executeQuery( sql: "select * from student where id="+id);
98      rs.absolute( row: 1);
99      rs.deleteRow();
100     System.out.println("Row successfully deleted");
101 }
102
103 2 usages:  dhurmilpatel30 *
104 public static void selector(Connection con) throws SQLException {
105     //Giving User to choose the option for manipulation of data
106     System.out.println("Give your key according to choice.");
107     System.out.println("View the data : 0");
108     System.out.println("Insert a Row.: 1");
109     System.out.println("Update a Row.: 2");
110     System.out.println("Delete a Row.: 3");
111 }

```

The Run window shows the output of the program:

```

C:\Users\DhruMil\jdk\openjdk-19.0.2\bin\java.exe "-javaagent
Printing the Information from Database
.....
Auto id: 2
First Name: dhurmil
Last Name: patel
Branch: ce
Username: dhurmil30
Password: Dhurmil123
.....
Auto id: 3
First Name: dhurmil
Last Name: patel1
Branch: ce
Username: Dhurmil12
Password: Dhurmil12
.....
Give your key according to choice.
View the data : 0
Insert a Row.: 1
Update a Row.: 2
Delete a Row.: 3
Multiple Insertion.: 4
key: 3
Delete of row started...
Enter the id for Delete: 3
Row successfully deleted
Do you want to exit (y/n): y

Process finished with exit code 0

```

```
Run [Refresh] [Stop] [Settings] [Menu]
Last Name: Patel
Branch: ce
Username: dhrumil30
Password: Dhrumil123
.....
.....
Auto id: 3
First Name: Dhrumil1
Last Name: Patel1
Branch: ce
Username: Dhrumil102
Password: Dhrumil@121
.....
Give your key according to choice.
View the data : 0
Insert a Row.: 1
Update a Row.: 2
Delete a Row.: 3
Multiple Insertion.: 4
key: 2
Update of row started...
Enter the id for update: 3
Enter new Details..
Enter the First Name: dhrumil
Enter the Last Name: patel1
Enter the Branch: ce
Enter the Username: Dhrumil12
Enter the password: Dhrumil12
Row successfully updated..
Do you want to exit (y/n): y

Process finished with exit code 0

38:1 CRLF UTF-8 4 spaces
```

output of 2nd program

The screenshot shows an IDE with two panes. The left pane displays the source code for `q1_ans_for_usage.java`. The right pane shows the execution output, which includes several `SQLException` messages.

```

package lab6.q1;

import java.sql.*;

public class q1_ans_for_usage {
    // ...
    public static void main(String[] args) {
        try {
            Connection con = DriverManager.getConnection("url");
            Statement s = con.createStatement(ResultSet.TYPE_SCROLL_INSENSITIVE, ResultSet.CONCUR_READ_ONLY);
            ResultSet rs = s.executeQuery("select * from student");

            // ...
            rs.afterLast(); // following will not work due to rs being at end of result set
            try { System.out.println(rs.getInt("columnindex: 6")); } catch (Exception e) { e.printStackTrace(); }

            rs.beforeFirst(); // following will not work due to rs being at beginning of result set
            try { System.out.println(rs.getInt("columnindex: 6")); } catch (Exception e) { e.printStackTrace(); }

            rs.first(); // will show id of first row
            try { System.out.println(rs.getInt("columnindex: 6")); } catch (Exception e) { e.printStackTrace(); }

            System.out.println(rs.isFirst());

            System.out.println(rs.isLast());

            rs.last();
            try { System.out.println(rs.getInt("columnindex: 6")); } catch (Exception e) { e.printStackTrace(); }
        } catch (Exception e) { e.printStackTrace(); }
    }
}

```

The right pane shows the execution output, which includes several `SQLException` messages:

```

C:\Users\Dhruvil\jdk-openjdk-19.0.2\bin/java.exe --javaagent:C:\Program Files\JetBrains\IntelliJ IDEA\lib\idea_rt.jar -Dfile.encoding=UTF-8 -jar C:\Users\Dhruvil\Idea\workspace\lab6\out\production\lab6\q1_ans_for_usage.jar
java.sql.SQLException Create breakpoint : After end of result set
at com.mysql.cj.jdbc.exceptions.SQLException.createSQLException(SQLError.java:129)
at com.mysql.cj.jdbc.exceptions.SQLException.createSQLException(SQLError.java:97)
at com.mysql.cj.jdbc.exceptions.SQLException.createSQLException(SQLError.java:89)
at com.mysql.cj.jdbc.result.ResultSetImpl.checkRowPos(ResultSetImpl.java:532)
at com.mysql.cj.jdbc.result.UpdateableResultSet.checkRowPos(UpdateableResultSet.java:18)
at com.mysql.cj.jdbc.result.ResultSetImpl.getObject(ResultSetImpl.java:1322)
at com.mysql.cj.jdbc.result.ResultSetImpl.getInt(ResultSetImpl.java:830)
at lab6.q1.q1_ans_for_usage.main(q1_ans_for_usage.java:14)
java.sql.SQLException Create breakpoint : Before start of result set
at com.mysql.cj.jdbc.exceptions.SQLException.createSQLException(SQLError.java:129)
at com.mysql.cj.jdbc.exceptions.SQLException.createSQLException(SQLError.java:97)
at com.mysql.cj.jdbc.exceptions.SQLException.createSQLException(SQLError.java:89)
at com.mysql.cj.jdbc.exceptions.SQLException.createSQLException(SQLError.java:63)
at com.mysql.cj.jdbc.result.ResultSetImpl.checkRowPos(ResultSetImpl.java:532)
at com.mysql.cj.jdbc.result.UpdateableResultSet.checkRowPos(UpdateableResultSet.java:18)
at com.mysql.cj.jdbc.result.ResultSetImpl.getObject(ResultSetImpl.java:1322)
at com.mysql.cj.jdbc.result.ResultSetImpl.getInt(ResultSetImpl.java:830)
at lab6.q1.q1_ans_for_usage.main(q1_ans_for_usage.java:18)
java.sql.SQLException Create breakpoint : After end of result set
at com.mysql.cj.jdbc.exceptions.SQLException.createSQLException(SQLError.java:129)
at com.mysql.cj.jdbc.exceptions.SQLException.createSQLException(SQLError.java:97)
at com.mysql.cj.jdbc.exceptions.SQLException.createSQLException(SQLError.java:89)
at com.mysql.cj.jdbc.result.ResultSetImpl.checkRowPos(ResultSetImpl.java:532)
at com.mysql.cj.jdbc.result.UpdateableResultSet.checkRowPos(UpdateableResultSet.java:18)
at com.mysql.cj.jdbc.result.ResultSetImpl.getObject(ResultSetImpl.java:1322)
at com.mysql.cj.jdbc.result.ResultSetImpl.getInt(ResultSetImpl.java:830)
at lab6.q1.q1_ans_for_usage.main(q1_ans_for_usage.java:42)
true

```

The screenshot displays an IDE with a Java source file named `q1_ans.java` and its corresponding output window.

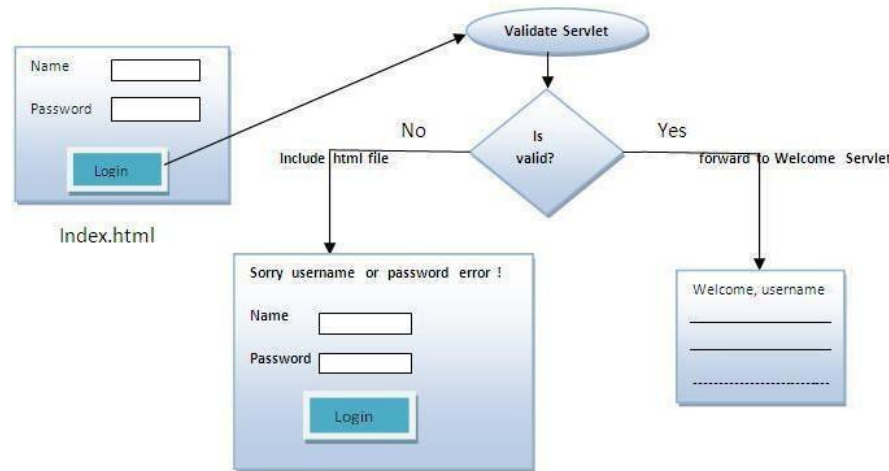
**Source File: `q1_ans.java`**

```
1 package lab6.q1;
2
3 import java.sql.*;
4
5 public class q1_ans_for_usage {
6     // dhrumilpatel30 *
7     public static void main(String[] args) {
8         try (Connection con = DriverManager.getConnection("url:"j
9             Statement s = con.createStatement(ResultSet.TYPE_SCROLL
10             ResultSet rs = s.executeQuery("sql" "select * from stud
11
12         // q1_ans.print_from_database(con);
13
14         rs.afterLast(); // Following will not work due to rs ac
15         try { System.out.println(rs.getInt( columnIndex: 6)); }
16         catch (Exception e) { e.printStackTrace(); }
17
18         rs.beforeFirst(); // Following will not work due to r
19         try { System.out.println(rs.getInt( columnIndex: 6)); }
20         catch (Exception e) { e.printStackTrace(); }
21
22         rs.first(); // will show id of first row
23         try { System.out.println(rs.getInt( columnIndex: 6)); }
24         catch (Exception e) { e.printStackTrace(); }
25
26         System.out.println(rs.isFirst());
27
28         System.out.println(rs.isLast());
29
30         rs.last();
31         try { System.out.println(rs.getInt( columnIndex: 6)); }
32         catch (Exception e) { e.printStackTrace(); }
```

**Output Window:**

```
2 true
false
4
2
4
Printing the Information from Database
.....
Auto id: 2
First Name: dhrumil
Last Name: patel
Branch: ce
Username: dhrumil30
Password: Dhrumil223
.....
Auto id: 4
First Name: dhrumil
Last Name: patek
Branch: ce
Username: dsi
Password: caWfd
.....
Process finished with exit code 0
```

2. Write a Java web application for a login module which contains the following components:
  - **index.jsp**: for getting input from the user.
  - **ValidateServlet.java**: a servlet class for validating the user. If it is a valid user (validate from a database using PreparedStatement), it will forward the request to the WelcomeServlet. If the user is not validated then it displays an Error message along with the response from index.html.
  - **WelcomeServlet.java**: a servlet class for displaying the welcome message.



```

<%@ page contentType="text/html; charset=UTF-8" %>
<html>
<head>
    <title>Login Validation page</title>
</head>
<body>
<h1>Login Validation page</h1>
<form action="ValidateServlet" method="post">
    <label>Name
        <input type="text" name="username">
    </label><br><br>
    <label>Password
        <input type="password" name="password">
    </label><br><br>
    <input type="submit" value="Submit">
</form>
</body>
</html>

package lab6.q2;

import jakarta.servlet.*;
import jakarta.servlet.http.*;
import jakarta.servlet.annotation.*;
import java.sql.*;

import java.io.IOException;
import java.io.PrintWriter;

@WebServlet(name = "ValidateServlet", value = "/lab6/q2/ValidateServlet")
public class ValidateServlet extends HttpServlet {
    @Override
    protected void doGet(HttpServletRequest request, HttpServletResponse response) throws
ServletException, IOException {

```

```

        response.setContentType("text/html");
        String username = request.getParameter("username");
        String password = request.getParameter("password");
        PrintWriter out = response.getWriter();
        try (Connection con =
DriverManager.getConnection("jdbc:mysql://localhost:3306/student-registration", "root", ""))
{
            PreparedStatement ps = con.prepareStatement("select * from student where
username=? and password=?", ResultSet.TYPE_SCROLL_INSENSITIVE, ResultSet.CONCUR_READ_ONLY);
            ps.setString(1,username);
            ps.setString(2,password);
            ResultSet rs = ps.executeQuery();
            rs.last();
            if(0 == rs.getRow()){
                out.println("Sorry Username or password error");
                RequestDispatcher rd = request.getRequestDispatcher("/lab6/q2/index.jsp");
                rd.include(request,response);
            }
            else {
                RequestDispatcher rd = request.getRequestDispatcher("/WelcomeServlet");
                rd.forward(request,response);
            }
        } catch (SQLException e) {
            throw new RuntimeException(e);
        }
    }
    // out.println(username+password);
}

@Override
protected void doPost(HttpServletRequest request, HttpServletResponse response) throws
ServletException, IOException {
    doGet(request,response);
}
}

package lab6.q2;

import jakarta.servlet.*;
import jakarta.servlet.http.*;
import jakarta.servlet.annotation.*;

import java.io.IOException;
import java.io.PrintWriter;

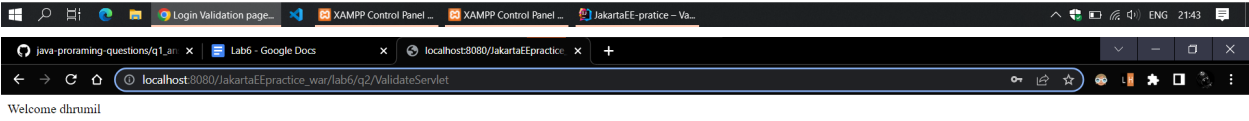
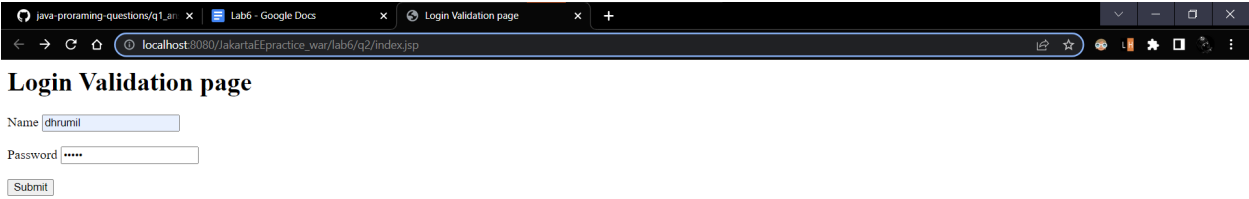
@WebServlet(name = "WelcomeServlet", value = "/WelcomeServlet")
public class WelcomeServlet extends HttpServlet {
    @Override
    protected void doGet(HttpServletRequest request, HttpServletResponse response) throws
ServletException, IOException {
        PrintWriter out = response.getWriter();
        String username = request.getParameter("username");
        out.println("Welcome "+username);
    }

    @Override
    protected void doPost(HttpServletRequest request, HttpServletResponse response) throws

```



```
ServletException, IOException {  
    doGet(request,response);  
}  
}
```



3. Write a web based java application containing a JSP which performs the simple arithmetic calculation. Take the necessary operands and operators in textboxes. Write your JSP code using **jsp:useBean** action tag.

```
<%@ page contentType="text/html; charset=UTF-8" language="java" %>
<html>
<head>
    <title>Calculator</title>
</head>
<body>
<h2>Calculator Using JSP</h2>
<form method="post" action="ans.jsp">
    <label>number 1
        <input type="number" name="a">
    </label>
    <label>number 2
        <input type="number" name="b">
    </label>
    <label><br></br>operation
        <br>+ for sum
        <br>- for sub
        <br>* for multi
        <br>/ for division
        <input type="text" name="operation">
    </label>
    <input type="submit" value="Submit">
</form>

</body>
</html>

<%@ page contentType="text/html; charset=UTF-8" language="java" %>
<html>
<head>
    <title>Ans</title>
</head>
<body>
<jsp:useBean id="obj" class="lab6.q3.Calculator" />
<jsp:setProperty name="obj" property="*" />
<h2>Ans = <%= obj.calc() %></h2>
</body>
</html>

package lab6.q3;

public class Calculator {
    int a;
    int b;
    String operation;
    int ans;
    public int getA() {
        return a;
    }
    public void setA(int a) {
        this.a = a;
    }
    public int getB() {
        return b;
    }
    public void setB(int b) {
        this.b = b;
    }
}
```

```
}
public String getOperation() {
    return operation;
}
public void setOperation(String operation) {
    this.operation = operation;
}
public int getAns() {
    return ans;
}
public void setAns(int ans) {
    this.ans = ans;
}
}
public int calc(){
    if(operation.equals("+"))return ans=a+b;
    if(operation.equals("-"))return ans=a-b;
    if(operation.equals("*"))return ans=a*b;
    if(operation.equals("/"))return ans=a/b;
    else return ans=-1;
}
}
```

Calculator Using JSP

number 1

12

number 2

25

operation

+ for sum

- for sub

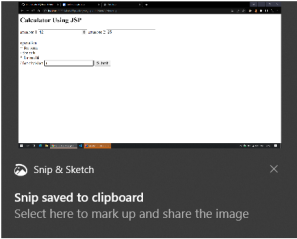
\* for multi

/ for division

+

Submit

Ans = 37



Practice Problem

- 1. Write a Java web application to search a word or phrase on Google search engine. The application should have the following components:  
**Search.html:** It contains a textbox to accept search-word or phrase from the user.  
**SearchOnGoogleServlet.java:** It should redirect the search query to Google search engine.
- 2. Write a Java web application to demonstrate usage of JSP Scripting Elements (Scriptlet, Expression, Declaration) and JSP implicit objects (out, request, response.) Use method post to submit a feedback form (html) (Full Name, Email, Subject, Message) to a jsp page and let the jsp page preview the same as the confirmation page with additional text “Feedback received. Thank you.”
- 3. Write a web based java application that contains a scriptless JSP which works like a unit convertor. (Hint: create a bean to do calculations)

<b>a) Length</b> Meter ↔ Centimeter Inch ↔ Centimeter	<div>Length ▾</div> <div>1 = 100</div> <div>Metre ▾Centimetre ▾</div>
<b>b) Temperature</b> Celsius ↔ Fahrenheit	