**1a. Create a simple calculator application using servlet.**

**Index.html-**

```html
<!DOCTYPE html>
<!--
To change this license header, choose License Headers in Project Properties.
To change this template file, choose Tools | Templates
and open the template in the editor.
-->
<html>
  <head>
    <title>Calculator</title>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
  </head>
  <body>
    <form action="CalculatorServlet" >
 Enter First Number <input type="text" name="txtN1" ><br>
 Enter Second Number <input type="text" name="txtN2" ><br>
 Select an Operation
<input type="radio" name="opr" value="+">ADDTION
<input type="radio" name="opr" value="-">SUBSTRACTION
<input type="radio" name="opr" value="*">MULTIPLY
<input type="radio" name="opr" value="/">DIVIDE <br>
<input type="reset">
<input type="submit" value="Calculate" >
    </form>
  </body>
</html>
```

**CalenderServlet.java –**

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */

import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

/**
 *
 * @author DELL
 */
@WebServlet(urlPatterns = {"/CalculatorServlet"})
public class CalculatorServlet extends HttpServlet {
  public void doGet(HttpServletRequest request, HttpServletResponse response)
  throws ServletException, IOException {
    response.setContentType("text/html;charset=UTF-8");
    PrintWriter out = response.getWriter();
    out.println("<html><head><title>Servlet CalculatorServlet</title></head><body>");
    double n1 = Double.parseDouble(request.getParameter("txtN1"));
    double n2 = Double.parseDouble(request.getParameter("txtN2"));
    double result =0;
```

```java
        String opr=request.getParameter("opr");

        if(opr.equals("+")) result=n1+n2; if(opr.equals("-")) result=n1-n2;

        if(opr.equals("*")) result=n1*n2; if(opr.equals("/")) result=n1/n2;

        out.println("<h1> Result = "+result); out.println("</body></html>");

    }

}
```

**1b. Create a servlet for a login page. If the username and password are correct then it says message "Hello " else a message "login failed"**

**index.html –**

```html
<!DOCTYPE html>
<!--
To change this license header, choose License Headers in Project Properties.
To change this template file, choose Tools | Templates
and open the template in the editor.
-->
<html>
  <head>
    <title>Login Page</title>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
  </head>
  <body>
    <form action="LoginServlet">
      Enter User ID <input type="text" name="txtId"><br>
      Enter Password <input type="password" name="txtPass"><br>
      <input type="reset">
      <input type="submit" value="Click to Login">
    </form>
  </body>
</html>
```

**LoginServlet.java -**

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */

import java.io.IOException;

import java.io.PrintWriter;

import javax.servlet.ServletException;

import javax.servlet.annotation.WebServlet;

import javax.servlet.http.HttpServlet;

import javax.servlet.http.HttpServletRequest;

import javax.servlet.http.HttpServletResponse;


@WebServlet(urlPatterns = {"/LoginServlet"})

public class LoginServlet extends HttpServlet {

    public void doGet(HttpServletRequest request, HttpServletResponse response)throws ServletException, IOException {

        response.setContentType("text/html;charset=UTF-8");

        PrintWriter out = response.getWriter();

        out.println("<html><head><title>Servlet LoginServlet</title></head>");

        String uname = request.getParameter("txtId");

        String upass = request.getParameter("txtPass");

        if(uname.equals("admin") && upass.equals("12345")){

        out.println("<body bgcolor=green >");

        out.println("<h1> Welcome !!! "+uname+"</h1>");

            }
```

```
        else{

        out.println("<body bgcolor=red >");out.println("<h1> Login Fail !!! </h1>");

        }

    out.println("</body></html>");

      }

}
```

**1c. Create a registration servlet in Java using JDBC. Accept the details such as Username, Password, Email, and Country from the user using HTML Form and store the registration details in the database.**

MySql queries create database LoginDB; use LoginDB; create table user(username varchar(20) PRIMARY KEY, password varchar(20), email varchar(20), country varchar(20)); insert into user values ('admin','admin','admin@admin.com','India'); select * from user;

**index.html –**

```
<!DOCTYPE html>
<!--
To change this license header, choose License Headers in Project Properties.
To change this template file, choose Tools | Templates
and open the template in the editor.
-->
<html><head><title>Registration Page</title></head>
<body>
<form action="RegisterServlet" >
<H1>Welcome to Registration page</H1>
 Enter User Name <input type="text" name="txtUid"><br>
 Enter Password <input type="password" name="txtPass"><br>
 Enter Email <input type="text" name="txtEmail" ><br>
 Enter Country <input type="text" name="txtCon" ><br>
<input type="reset" ><input type="submit" value="REGISTER" >
</form>
</body>
</html>
```

**RegisterServlet.java –**

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

```java
import javax.servlet.ServletException;

import javax.servlet.http.HttpServlet;

import javax.servlet.http.HttpServletRequest;

import javax.servlet.http.HttpServletResponse;

import java.sql.*;



public class RegisterServlet extends HttpServlet {

public void doGet(HttpServletRequest request, HttpServletResponse response)
 throws ServletException, IOException {
response.setContentType("text/html;charset=UTF-8");
PrintWriter out = response.getWriter();
String id = request.getParameter("txtUid");
String ps = request.getParameter("txtPass");
String em = request.getParameter("txtEmail");
String co = request.getParameter("txtCon");
try{
Class.forName("com.mysql.jdbc.Driver");
Connection con = DriverManager.getConnection("jdbc:mysql://localhost:3306/logindb","root","");
PreparedStatement pst = con.prepareStatement("insert into user values(?,?,?,?)");
pst.setString(1,id);
pst.setString(2,ps);
pst.setString(3,em);
pst.setString(4,co);
int row = pst.executeUpdate();
out.println("<h1>"+row+ " Inserted Succesfullyyyyy");
}
catch(Exception e){
```

```
        out.println(e);
    }
  }
}
```

**2a. Using Request Dispatcher Interface create a Servlet which will validate the password entered by the user, if the user has entered "Servlet" as password, then he will be forwarded to Welcome Servlet else the user will stay on the index.html page and an error message will be displayed.**

## Index.html:

```html
<html><head><title>Login Form</title></head>
<form action="LoginServlet" >
 Enter User ID<input type="text" name="txtId"><br>
 Enter Password<input type="password" name="txtPass"><br>
<input type="reset">
<input type="submit" value=" Click to Login " >
</form>
</html>
```

## LoginServlet.java:

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */

import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
```

```java
import javax.servlet.RequestDispatcher;


/**
 *
 * @author DELL
 */
@WebServlet(urlPatterns = {"/LoginServlet"})
public class LoginServlet extends HttpServlet {

   /**
    * Processes requests for both HTTP <code>GET</code> and <code>POST</code>
    * methods.
    *
    * @param request servlet request
    * @param response servlet response
    * @throws ServletException if a servlet-specific error occurs
    * @throws IOException if an I/O error occurs
    */

public void doGet(HttpServletRequest request, HttpServletResponse response)
 throws ServletException, IOException {
response.setContentType("text/html;charset=UTF-8");
PrintWriter out = response.getWriter();
out.println("<html><head>");
out.println("<title>Servlet LoginServlet</title></head>");
 String uname = request.getParameter("txtId");
 String upass = request.getParameter("txtPass");
 if(uname.equals("admin") &&upass.equals("servlet")){
RequestDispatcherrd = request.getRequestDispatcher("WelcomeServlet");
rd.forward(request, response);
 }
else{
out.println("<body bgcolor=red >");
```

```java
out.println("<h1> Login Fail !!! </h1>");

RequestDispatcherrd = request.getRequestDispatcher("index.html");

rd.include(request, response);

}

out.println("</body>");

out.println("</html>");

}

}
```

## WelcomeServlet.java:

```java
import java.io.IOException;

import java.io.PrintWriter;

import javax.servlet.ServletException;

import javax.servlet.annotation.WebServlet;

import javax.servlet.http.HttpServlet;

import javax.servlet.http.HttpServletRequest;

import javax.servlet.http.HttpServletResponse;

import javax.servlet.RequestDispatcher;


@WebServlet(urlPatterns = {"/WelcomeServlet"})
public class WelcomeServlet extends HttpServlet {

    public void doGet(HttpServletRequest request, HttpServletResponse response)
    throws ServletException, IOException {
    response.setContentType("text/html;charset=UTF-8");
    PrintWriter out = response.getWriter();
    out.println("<html><head>");
    out.println("<title>Servlet LoginServlet</title></head>");
    String uname = request.getParameter("txtId");
```

```
 String upass = request.getParameter("txtPass");

 if(uname.equals("admin") &&upass.equals("servlet")){

out.println("<h1>Welcome to the World of Servlets!!!!!</h1>");

out.println("<body bgcolor=blue >");

 }

out.println("</body>");

out.println("</html>");

 }

}
```
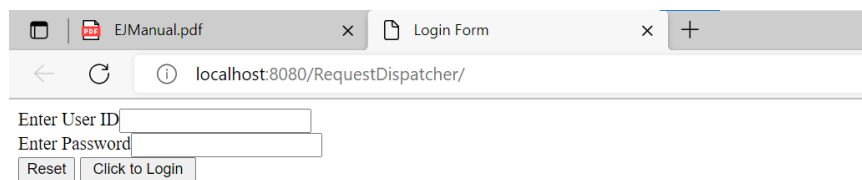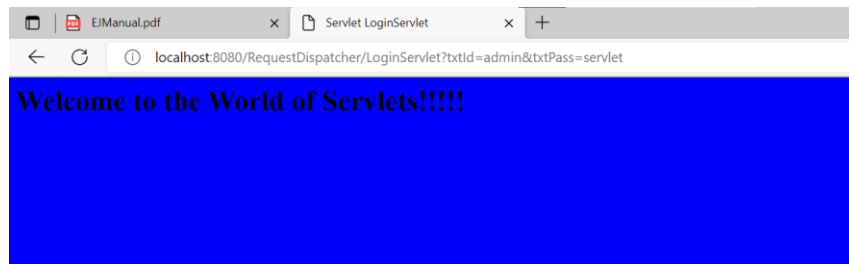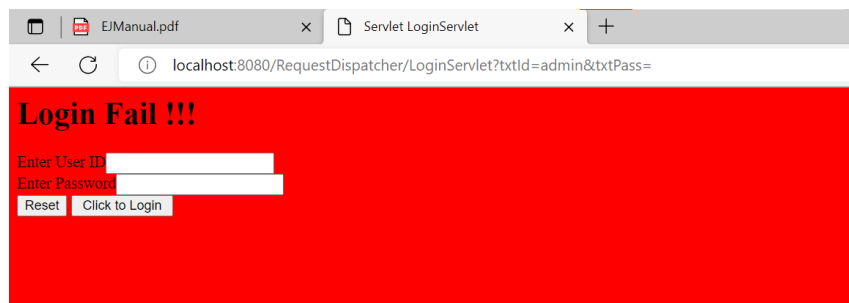
2b. Create a servlet that uses Cookies to store the number of times a user has visited servlet.

# Index.html

```html
<html>
<head><title>Cookie Demo</title></head>
<body>
<form action="Page1" >
 Enter Your Name <input type="text" name="txtName"><br>
<input type="submit" value="~~~ Click to Enter ~~~">
</form>
</body>
</html>
```

# Page1.java

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */

import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

import javax.servlet.http.Cookie;
```

```java
@WebServlet(urlPatterns={"/Page1"})

public class Page1 extends HttpServlet {

public void doGet(HttpServletRequest request, HttpServletResponse response)

 throws ServletException, IOException {

response.setContentType("text/html;charset=UTF-8");

PrintWriter out = response.getWriter();

out.println("<html><head><title>Page1</title></head>");

out.println("<body bgcolor=pink >");

 String uname = request.getParameter("txtName");

out.println("<h1>~~~ Welcome "+uname+"</h1>");

 Cookie ck1 = new Cookie("username", uname);

 Cookie ck2 = new Cookie("visit","1");

response.addCookie(ck1); response.addCookie(ck2);

out.println("<h1><a href=Page2 >Click to visit Page 2 </a></h1>");

out.println("</body>");

out.println("</html>");

}}
```

# Page2.java

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */

import java.io.IOException;

import java.io.PrintWriter;

import javax.servlet.ServletException;

import javax.servlet.annotation.WebServlet;

import javax.servlet.http.HttpServlet;
```

```java
import javax.servlet.http.HttpServletRequest;

import javax.servlet.http.HttpServletResponse;

import javax.servlet.http.*;

/**
 *
 * @author DELL
 */
@WebServlet(urlPatterns = {"/Page2"})
public class Page2 extends HttpServlet {


    /**
     * Processes requests for both HTTP <code>GET</code> and <code>POST</code>
     * methods.
     *
     * @param request servlet request
     * @param response servlet response
     * @throws ServletException if a servlet-specific error occurs
     * @throws IOException if an I/O error occurs
     */
    public void doGet(HttpServletRequest request, HttpServletResponse response)
throws ServletException, IOException {
response.setContentType("text/html;charset=UTF-8");
PrintWriter out = response.getWriter();
out.println("<html><head><title>Page2</title></head>");
out.println("<body bgcolor=yellow >");
Cookie [] ck = request.getCookies();
for(inti=1;i<ck.length;i++){
if(ck[i].getName().equals("visit")){
int count = Integer.parseInt(ck[i].getValue())+1;
out.println("<h1>Visit No : "+count+"</h1>");
ck[i] = new Cookie("visit",count+"");
response.addCookie(ck[i]);
}
```
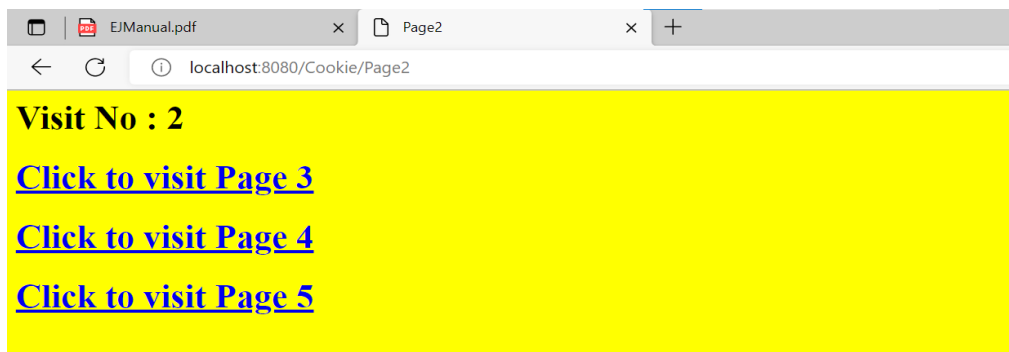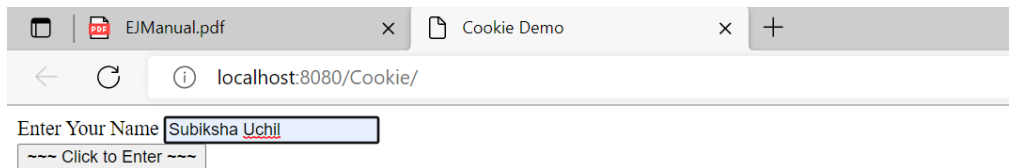
```
else {

out.println(ck[i].getName()+ " = "+ck[i].getValue()); }

out.println("<h1><a href=Page3 >Click to visit Page 3 </a></h1>");

out.println("<h1><a href=Page4 >Click to visit Page 4 </a></h1>");

out.println("<h1><a href=Page5 >Click to visit Page 5 </a></h1>");

out.println("</body>");

out.println("</html>");

 }

   }

}
```

Output:

**2c. Create a servlet demonstrating the use of session creation and destruction. Also check whether the user has visited this page first time or has visited earlier also using sessions.**

# Index.html

```html
<!DOCTYPE html>
<!--
To change this license header, choose License Headers in Project Properties.
To change this template file, choose Tools | Templates
and open the template in the editor.
-->
<html>
<head>
<title>Session Demo</title>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
</head>
<body>
<form action="Page1" method="get">
        Enter the User ID <input type="text" name="txtName">
<input type="reset"><input type="submit">
</form>
</body>
</html>
```

# Page1.java

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */
```

```java
import java.io.IOException;

import java.io.PrintWriter;

import javax.servlet.ServletException;

import javax.servlet.annotation.WebServlet;

import javax.servlet.http.HttpServlet;

import javax.servlet.http.HttpServletRequest;

import javax.servlet.http.HttpServletResponse;

import javax.servlet.http.HttpSession;

/**
 *
 * @author DELL
 */
@WebServlet(urlPatterns = {"/Page1"})
public class Page1 extends HttpServlet {


    public void doGet(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
response.setContentType("text/html;charset=UTF-8");

PrintWriter out = response.getWriter();

out.println("<html><head><title>Servlet Page1</title></head>");

HttpSessionhs = request.getSession(true);

    if(hs.isNew()){

out.println("<body bgcolor=yellow>");

    String name = request.getParameter("txtName");

hs.setAttribute("uname", name);

hs.setAttribute("visit", "1");

out.println("<h1>Welcome First Time</h1>");

    }

else{

out.println("<h1>Welcome Again</h1>");

int visit = Integer.parseInt((String)hs.getAttribute("visit"))+1;

out.println("<h1>You Visited "+visit+"Times</h1>");
```

```java
        hs.setAttribute("visit", ""+visit);

    }

out.println("<h1>Your Session ID "+hs.getId()+"</h1>");

out.println("<h1>You Logged in at "+new java.util.Date(hs.getCreationTime())+"</h1>");

out.println("<h1><a href=Page2>Click for Page 2 </a></h1>");

out.println("<h1><a href=Page3>Click for Page 3 </a></h1>");

out.println("<h1><a href=Page4>Click for Page 4 </a></h1>");

out.println("<h1><a href=LogoutServlet>Click to Terminate Session </a></h1>");

out.println("</body>");

out.println("</html>");

    }
}
```

## Page2.java

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */

import java.io.IOException;

import java.io.PrintWriter;

import javax.servlet.ServletException;

import javax.servlet.annotation.WebServlet;

import javax.servlet.http.HttpServlet;

import javax.servlet.http.HttpServletRequest;

import javax.servlet.http.HttpServletResponse;

import javax.servlet.http.HttpSession;

/**
 *
```

```java
 * @author DELL
 */
@WebServlet(urlPatterns = {"/Page2"})
public class Page2 extends HttpServlet {


    protected void doGet(HttpServletRequest request, HttpServletResponse response)

            throws ServletException, IOException {
response.setContentType("text/html;charset=UTF-8");
PrintWriter out = response.getWriter();
out.println("<html><head><title>Servlet Page2</title></head>");
HttpSessionhs = request.getSession(false);
out.println("<h1>Welcome Again on Page No. 2</h1>");
int visit = Integer.parseInt((String)hs.getAttribute("visit"))+1;
out.println("<h1>You Visited "+visit+"Times</h1>");
hs.setAttribute("visit", ""+visit);
out.println("<h1>Your Session ID "+hs.getId()+"</h1>");
out.println("<h1>You Logged in at "+new java.util.Date(hs.getCreationTime())+"</h1>");
out.println("<h1><a href=Page1>Click for Page 1 </a></h1>");
out.println("<h1><a href=Page3>Click for Page 3 </a></h1>");
out.println("<h1><a href=Page4>Click for Page 4 </a></h1>");
out.println("<h1><a href=LogoutServlet>Click for Terminate Session </a></h1>");
out.println("</body>");
out.println("</html>");


    }
}
```

## LogoutServlet.java


```java
/*
 * To change this license header, choose License Headers in Project Properties.
```

```java
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */

import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

/**
 *
 * @author DELL
 */
@WebServlet(urlPatterns = {"/LogoutServlet"})
public class LogoutServlet extends HttpServlet {


    protected void doGet(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
response.setContentType("text/html;charset=UTF-8");
PrintWriter out = response.getWriter();
out.println("<html><head><title>Servlet LogoutServlet</title></head>");
out.println("<body>");
javax.servlet.http.HttpSessionhs = request.getSession();
if(hs != null) hs.invalidate();
out.println("<h1>You are Logged out now........</h1>");
out.println("</body>");
out.println("</html>");
    }
  }
```
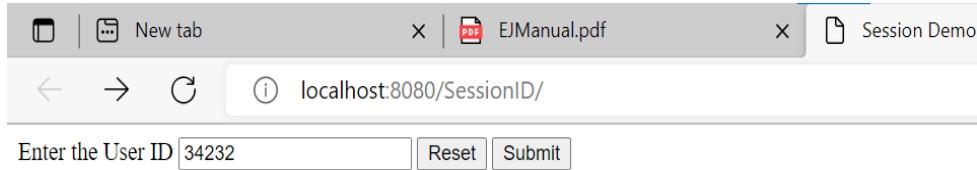
**Output:**



Enter the User ID `34232` [Reset] [Submit]



**Welcome Again**

**You Visited 2Times**

**Your Session ID 027d3ea51a0f799d9f81e9b8a97c**

**You Logged in at Wed Oct 19 17:41:25 IST 2022**

**Click for Page 2**

**Click for Page 3**

**Click for Page 4**

**Click to Terminate Session**

**Welcome Again on Page No. 2**

**You Visited 3Times**

**Your Session ID 027d3ea51a0f799d9f81e9b8a97c**

**You Logged in at Wed Oct 19 17:41:25 IST 2022**

**Click for Page 1**

**Click for Page 3**

**Click for Page 4**

**Click for Terminate Session**



# You are Logged out now........

**3a. Create a Servlet application to upload and download a file.**

**File Upload –**

**Index.html –**

```html
<!DOCTYPE html>
<!--
To change this license header, choose License Headers in Project Properties.
To change this template file, choose Tools | Templates
and open the template in the editor.
-->
<html>
  <head>
    <title>File Upload Page</title>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
  </head>
  <body>
    <form action="FileUploadServlet" method="post" enctype="multipart/form-data">
      Select File to Upload:<input type="file" name="file" id="file">
      Destination <input type="text" value="C:\Users\DELL\Documents\NetBeansProjects\Practical-3A(a)\Files" name="destination">
      <br>
      <input type="submit" value="Upload file" name="upload" id="upload">
 </form>
  </body>
</html>
```
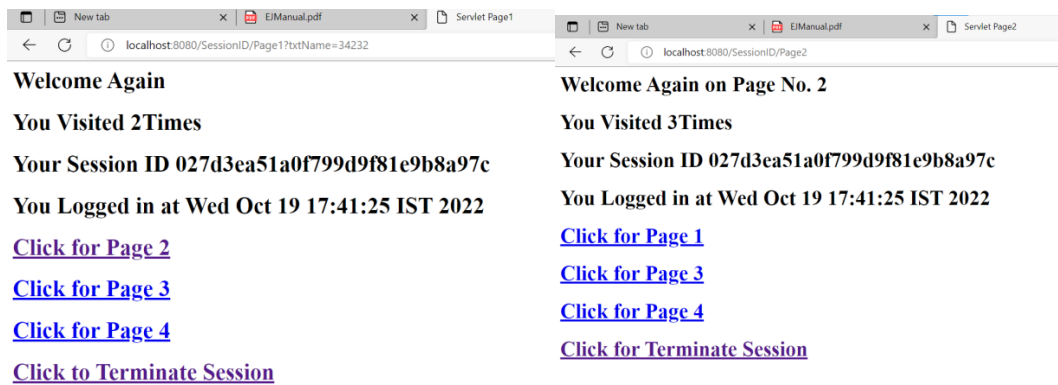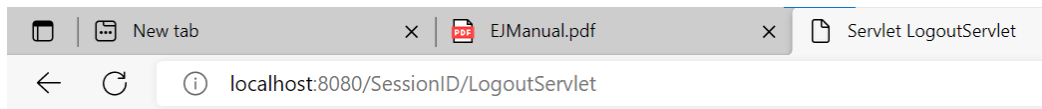
~~~~~ FileUploadServlet.java ~~~~~~~

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */

import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import java.io.*;
import javax.servlet.*;
import javax.servlet.annotation.MultipartConfig;
import javax.servlet.http.*;



/**
 *
 * @author DELL
 */
@MultipartConfig
@WebServlet(urlPatterns = {"/FileUploadServlet"})
public class FileUploadServlet extends HttpServlet {
```

```java
    protected void doPost(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException
    {
        response.setContentType("text/html");
        PrintWriter out = response.getWriter();
        String path=request.getParameter("destination");
        Part filePart=request.getPart("file");
        String filename=filePart.getSubmittedFileName().toString();
        out.print("<br><br><hr> File name: "+filename);
        OutputStream os=null;
        InputStream is=null;
        try {
            os=new FileOutputStream(new File(path+File.separator+filename));
            is=filePart.getInputStream();
            int read=0;
            while ((read = is.read()) != -1) {
            os.write(read);
        }
        out.println("<br>File uploaded sucessfully...!!!");
        }
        catch(FileNotFoundException e){out.print(e);}

    }
}
```

**File Download–**

**Index.html –**

```html
<!DOCTYPE html>
<!--
To change this license header, choose License Headers in Project Properties.
To change this template file, choose Tools | Templates
and open the template in the editor.
-->
<html>
  <head>
    <title>File Download Page</title>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
  </head>
  <body>
    <h1>File Download Application</h1>
    Click <a href="DownloadServlet?filename=Yuvraj_Iot.pdf">Yuvraj IOT PDF</a> To Download
    <br/><br/>
    Click <a href="DownloadServlet?filename=Subiksha_Iot.pdf">Subiksha IOT PDF</a> To Download
  </body>
</html>
```

~~~~~ DownloadServlet.java ~~~~~~

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */
```

```java
import java.io.IOException;

import java.io.PrintWriter;

import java.io.InputStream;                   //Added

import javax.servlet.ServletException;

import javax.servlet.annotation.WebServlet;

import javax.servlet.http.HttpServlet;

import javax.servlet.http.HttpServletRequest;

import javax.servlet.http.HttpServletResponse;

import javax.servlet.ServletContext;          //Added

import javax.servlet.ServletOutputStream;     //Added
/**
 *
 * @author DELL
 */
@WebServlet(urlPatterns = {"/DownloadServlet"})
public class DownloadServlet extends HttpServlet {


    protected void doGet(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
      response.setContentType("APPLICATION/OCTET-STREAM");

      String filename = request.getParameter("filename");

      ServletContext context = getServletContext();

      InputStream is = context.getResourceAsStream("/" + filename);


      try (PrintWriter out = response.getWriter()) {

        response.setHeader("Content-Disposition","attachment; filename=\"" + filename + "\"");
// if comment this statement then it will ask you about the editor with which you want to open the file

          int i;
```

```java
            while ((i=is.read()) != -1) {

            out.write(i);

            }

            is.close();

            out.close();

        }

    }

}
```

**3c. Create simple Servlet application to demonstrate Non-Blocking Read Operation**.

Index.html –

```html
<!DOCTYPE html>
<!--
To change this license header, choose License Headers in Project Properties.

To change this template file, choose Tools | Templates

and open the template in the editor.

-->
<html>
  <head>
    <title>Non Blocking IO</title>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <meta http-equiv ="Refresh" content ="0; URL=NonBlockingServlet">
  </head>
```

```html
    <body>

    </body>
</html>
```

-------------------------------------------- NonBlockingServlet.java --------------------

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */
import java.io.*;
import java.net.*;
import javax.servlet.*;
import javax.servlet.http.*;
import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;


/**
 *
 * @author DELL
```

```java
 */
@WebServlet(urlPatterns = {"/NonBlockingServlet"})
public class NonBlockingServlet extends HttpServlet {

    protected void service(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");
        try (PrintWriter out = response.getWriter()) {

            out.println("<h1>FileReader</h1>");
            String filename="/WEB-INF/tindog.txt";
            ServletContext c= getServletContext();
            InputStream in=c.getResourceAsStream(filename);
            String

path="http://"+request.getServerName()+":"+request.getServerPort()+request.getContextPath()+"/Rea
dingNonBloclingServlet";
            URL url=new URL(path);
            HttpURLConnection conn=(HttpURLConnection)url.openConnection();
            conn.setChunkedStreamingMode(2);
            conn.setDoOutput(true);
            conn.connect();
            if(in!=null)
            {
            InputStreamReader inr=new InputStreamReader(in);
            BufferedReader br = new BufferedReader(inr);
            String text="";
            System.out.println("Reading started....");
            BufferedWriter bw=new BufferedWriter(new OutputStreamWriter(conn.getOutputStream()));
            while((text=br.readLine())!=null){
```

```java
            out.print(text+"<br>");

            try{

            Thread.sleep(1000);

            out.flush();

            }

            catch(InterruptedException ex){}

            }

            out.print("reading completed....");

            bw.flush();

            bw.close();

        }

    }

}
```

------------------------------------ ReadingListener.java ----------------------------

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */

import java.io.IOException;

import java.io.PrintWriter;

import javax.servlet.ServletException;

import javax.servlet.annotation.WebServlet;

import javax.servlet.http.HttpServlet;

import java.io.IOException;

import java.util.logging.Level;
```

```java
import java.util.logging.Logger;

import javax.servlet.AsyncContext;

import javax.servlet.ReadListener;

import javax.servlet.ServletInputStream;


/**
 *
 * @author DELL
 */
@WebServlet(urlPatterns = {"/ReadingListener"})
public class ReadingListener implements ReadListener
{
    private ServletInputStream input = null;

    private AsyncContext ac = null;

    ReadingListener(ServletInputStream in, AsyncContext c) {

    input = in;

    ac = c;

    }
    @Override
    public void onDataAvailable() throws IOException {

    }
    @Override
    public void onAllDataRead() throws IOException {

    ac.complete();

    }
    @Override
    public void onError(final Throwable t) {

    ac.complete();

    t.printStackTrace();
```

```
 }

}
```

-------------------------------- ReadingNonBlockingServlet.java -------------------------------

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */

import java.io.IOException;

import java.io.PrintWriter;

import javax.servlet.ServletException;

import javax.servlet.annotation.WebServlet;

import javax.servlet.http.HttpServlet;

import javax.servlet.http.HttpServletRequest;

import javax.servlet.http.HttpServletResponse;

import javax.servlet.AsyncContext;

import javax.servlet.ServletInputStream;

/**
 *
 * @author DELL
 */
@WebServlet (name = "ReadingNonBlockingServlet", urlPatterns =
{"/ReadingNonBlockingServlet"},asyncSupported = true )
public class ReadingNonBlockingServlet extends HttpServlet {

    protected void service(HttpServletRequest request, HttpServletResponse response)
```

```java
    throws ServletException, IOException {

   response.setContentType("text/html");

   AsyncContext ac = request.startAsync();

   ServletInputStream in=request.getInputStream();

   in.setReadListener(new ReadingListener(in,ac));


   }
 }
```

**4a. Develop a simple JSP application to display values obtained from the use of intrinsic objects of various types**

**newjsp.jsp (right click on the jsp file n then select run file)**

```jsp
<%--
   Document   : newjsp
   Created on : Oct 12, 2022, 8:38:06 AM
   Author     : DELL
--%>


<%@page contentType="text/html" pageEncoding="UTF-8"%>
<html><head><title>JSP Page</title></head>
<body>
<h1>Use of Intrinsic Objects in JSP</h1>
<h1>Request Object </h1>
   Query String <%=request.getQueryString() %><br>
   Context Path <%=request.getContextPath() %><br>
   Remote Host <%=request.getRemoteHost() %><br>
<h1>Response Object </h1>
```

Character Encoding Type <%=response.getCharacterEncoding() %><br>

Content Type <%=response.getContentType() %><br>

Locale <%=response.getLocale() %><br>

<h1>Session Object </h1>

ID <%=session.getId() %><br>

Creation Time <%=new java.util.Date(session.getCreationTime()) %><br>

Last Access Time<%=new java.util.Date(session.getLastAccessedTime()) %><br>

</body>

</html>


**4b. Develop a simple JSP application to pass values from one page to another with validations. (Name-txt, age-txt, hobbies-checkbox, email-txt, gender-radio button).**


Index.html


<!DOCTYPE html>

<!--

To change this license header, choose License Headers in Project Properties.

To change this template file, choose Tools | Templates

and open the template in the editor.

-->

<html>

  <head>

    <title>Validation Page</title>

    <meta charset="UTF-8">

    <meta name="viewport" content="width=device-width, initial-scale=1.0">

  </head>

  <body>

    <form action="Validate.jsp">

Enter Your Name<input type="text" name="name" ><br>

Enter Your Age<input type="text" name="age" ><br>

Select Hobbies

<input type="checkbox" name="hob" value="Singing">Singing

<input type="checkbox" name="hob" value="Reading">Reading Books

<input type="checkbox" name="hob" value="Football">Playing Football<br>

Enter E-mail<input type="text" name="email" ><br>

Select Gender

<input type="radio" name="gender" value="male">Male

<input type="radio" name="gender" value="female">Female

<input type="radio" name="gender" value="other">Other<br>

<input type="hidden" name="error" value="">

<input type="submit" value="Submit Form">

</form>

</body>

</html>

----------------------------------------- Validate.jsp--------------------------------------------------

<%--

   Document   : Validate

   Created on : Oct 12, 2022, 9:10:59 AM

   Author     : DELL

--%>

<%@page contentType="text/html" pageEncoding="UTF-8" import="mypack.*" %>

<html><head><title>JSP Page</title></head>

<body>

   <h1>Validation Page</h1>

```jsp
<jsp:useBean id="obj" scope="request"
 class="mypack.CheckerBean" >
<jsp:setProperty name="obj" property="*"/>
</jsp:useBean>
<%if (obj.validate())
{ %>
<jsp:forward page="Validate.jsp"/>
<% }
else {%>
<jsp:include page="index.html"/>
<%}%>
<%=obj.getError() %>
</body></html>
```

----------------------------------------CheckerBean.java----------------------------------------

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */
package mypack;
import javax.servlet.annotation.WebServlet;

/**
 *
 * @author DELL
 */
@WebServlet(urlPatterns={"/CheckerBean"})
```

```java
public class CheckerBean {

    private String name, age, hob, email, gender, error;

    public CheckerBean(){error="";}

    public void setName(String n){name=n;}

    public void setAge(String a){age=a;}

    public void setHob(String h){hob=h;}

    public void setEmail(String e){email=e;}

    public void setGender(String g){gender=g;}

    public void setError(String e){error=e;}

    public String getName(){return name;}

    public String getAge(){return age;}

    public String getHob(){return hob;}

    public String getEmail(){return email;}

    public String getGender(){return gender;}

    public String getError(){return error;}

    public boolean validate(){

    boolean res=true;

    if(name.trim().equals("")) {error+="<br>Enter First Name";res=false;}

    if(age.length() > 2 )

    {error+="<br>Age Invalid";res=false;}

    return res;

}

}
```

**6a. Create a Currency Converter application using EJB**


-------------------- index.html -----------------------------------

```html
<!DOCTYPE html>
<!--
To change this license header, choose License Headers in Project Properties.
To change this template file, choose Tools | Templates
and open the template in the editor.
-->
<html>
  <head>
    <title>CURRENCY CONVERTION</title>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
  </head>
  <body>
    <form action="CCServlet">
        Enter Amount <input type="text" name="amt"><br>
        Select Conversion Type
      <input type="radio" name="type" value="r2d" checked>Rupees to Dollar
      <input type="radio" name="type" value="d2r" >Dollar to Rupees<br>
      <input type="reset" ><input type="submit" value="CONVERT" >
    </form>
  </body>
</html>
```

------------------------------- CCServlet.java -------------------------

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
```

```java
 */
package mypack;

import java.io.IOException;

import java.io.PrintWriter;

import javax.servlet.ServletException;

import javax.servlet.annotation.WebServlet;

import javax.servlet.http.HttpServlet;

import javax.servlet.http.HttpServletRequest;

import javax.servlet.http.HttpServletResponse;

import javax.ejb.EJB;



/**
 *
 * @author DELL
 */
@WebServlet(name = "CCServlet", urlPatterns = {"/CCServlet"})
public class CCServlet extends HttpServlet {
  @EJB CCBean obj;
  protected void doGet(HttpServletRequest request, HttpServletResponse response)
      throws ServletException, IOException {
    response.setContentType("text/html;charset=UTF-8");
    try (PrintWriter out = response.getWriter()) {
      double amt = Double.parseDouble(request.getParameter("amt"));
      if(request.getParameter("type").equals("r2d"))
      {
      out.println("<h1>"+amt+ " Rupees = "+obj.r2Dollor(amt)+" Dollors</h1>");
      }
```

```
            if(request.getParameter("type").equals("d2r"))

            {

            out.println("<h1>"+amt+ " Dollors = "+obj.d2Rupees(amt)+" Rupees</h1>");

            }

        }

    }
}
```

------------------------ CCBean --------------------------

Create a stateless session bean --------------------------

```
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */
package mypack;

import javax.ejb.Stateless;

/**
 *
 * @author DELL
 */
@Stateless
public class CCBean {
    public CCBean(){}
        public double r2Dollor(double r){ return r/65.65; }
        public double d2Rupees(double d){ return d*65.65; }
```

```
    }
```

**7a. Develop simple EJB application to demonstrate Servlet Hit count using Singleton Session Beans.**

----------------------- CounterBean.java ----------------------------------

```java
package counter.ejb;

import javax.ejb.Singleton;

/**
 *
 * @author DELL
 */
@Singleton
public class CounterBean {
    private int hits = 1;
     // Increment and return the number of hits
    public int getHits() {
    return hits++;
  }
}
```

------------------------------------- Count.java -----------------------------------

```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */
package mypack;

import java.io.Serializable;
import javax.ejb.EJB;
import javax.enterprise.context.ConversationScoped;
import javax.inject.Named;
import counter.ejb.CounterBean;


@Named("count")
@ConversationScoped
public class Count implements Serializable {
    @EJB
    private CounterBean counterBean;
    private int hitCount;
    public Count() {
    this.hitCount = 0;
    }
    public int getHitCount() {
    hitCount = counterBean.getHits();
    return hitCount;
    }
    public void setHitCount(int newHits) {
    this.hitCount = newHits;
```

```
   }
}
```

------------------------------------------- HitCountPage.xhtml ----------------------

```
<?xml version="1.0" encoding="UTF-8"?>

<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" xmlns:h="http://xmlns.jcp.org/jsf/html">
  <h:head>
     <title>Page Hit Counter Using Singleton Session Bean ~~~~ </title>
  </h:head>
  <h:body>
     <h1>Welcome to Hit Count Page</h1>
      Page was hit #{count.hitCount} times
  </h:body>
</html>
```