PROGRAMOWANIE W JĘZYKU JAVA

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LABORATORIUM 6

Temat: Java EE Platform (Servlets, JSP, JSF, EJB)

1. Java Web Aplications - Serwlety

1.1. Przykład kompilacji, instalacji i uruchomienia serwletu

- **Kod źródłowy serwletu** `FirstServlet.java`

```
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;
public class FirstServlet extends HttpServlet {
      protected void processRequest(HttpServletRequest request, HttpServletResponse
                              response) throws ServletException, IOException {
            response.setContentType("text/html; charset=UTF-8");
            PrintWriter out = response.getWriter();
            try {
               out.println("<html>");
               out.println("<head>");
               out.println("<title>FirstServlet</title>");
               out.println("</head>");
               out.println("<body>");
               out.println("<h1>Servlet FirstServlet at: " +
                                          request.getContextPath() + "</h1>");
               out.println("</body>");
               out.println("</html>");
            } finally {
            out.close();
            }
      }
      protected void doGet(HttpServletRequest request, HttpServletResponse response)
                                          throws ServletException, IOException {
            processRequest(request, response);
      }
      protected void doPost(HttpServletRequest request, HttpServletResponse response)
                                          throws ServletException, IOException {
            processRequest(request, response);
      }
}
```

- **Plik konfiguracyjny** `web.xml`

```
<?xml version="1.0" encoding="UTF-8"?>
<web-app xmlns="http://java.sun.com/xml/ns/javaee"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://java.sun.com/xml/ns/javaee
http://java.sun.com/xml/ns/javaee/web-app_2_5.xsd"
   version="2.5">
    <servlet>
        <servlet-name>FirstServlet</servlet-name>
        <servlet-class>FirstServlet</servlet-class>
    </servlet>
    <servlet-mapping>
        <servlet-name>FirstServlet</servlet-name>
        <url-pattern>/</url-pattern>
    </servlet-mapping>
</web-app>
```

- **Kompilacja**

```
C:\>javac FirstServlet.java -classpath "C:\Program Files\Apache Software
Foundation\Tomcat 6.0\lib\servlet-api.jar"
```

● **Struktura katalogów i plików**	● **Uruchomienie**

`+apache-tomcat-6.0`
`|_+webapps`
`   |_+FirstServlet`
`      |_+WEB-INF`
`         |_+classes`
`         |  |_FirstServlet.class`
`         |_web.xml`
	`http://localhost:8080/FirstServlet`

1.2. Przykłady obsługi żądań protokołu HTTP

- **Kod serwletu obsługi żądań klienta** `RequestInfo.java`

```
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;
public class RequestInfo extends HttpServlet {
    public void doGet(HttpServletRequest request,
        HttpServletResponse response) throws IOException, ServletException {
        response.setContentType("text/html");
        PrintWriter out = response.getWriter();
        out.println("<html>");
        out.println("<body>");
        out.println("<head>");
        out.println("<title>Request Information Example</title>");
        out.println("</head>");
        out.println("<body>");
        out.println("<h3>Request Information Example</h3>");
        out.println("Method: " + request.getMethod() + "<br/>");
        out.println("Request URI: " + request.getRequestURI()+ "<br/>");
        out.println("Protocol: " + request.getProtocol()+ "<br/>");
        out.println("PathInfo: " + request.getPathInfo()+ "<br/>");
        out.println("Remote Address: " + request.getRemoteAddr());
        out.println("</body>");
        out.println("</html>");
    }
    public void doPost(HttpServletRequest request,
        HttpServletResponse response) throws IOException, ServletException {
        doGet(request, response);
    }
}
```

- **Kod licznika odwiedzin strony** `SimpleCounterServlet.java`

```
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;
public class SimpleCounterServlet extends HttpServlet {
    int count;
    public void init() throws ServletException {
        count = 0;
        log("Method init, count = " + count);
    }
    public void destroy(){
        log("Method destroy, count = " + count);
    }
    public void doGet(HttpServletRequest request, HttpServletResponse response)
        throws IOException, ServletException {
        response.setContentType("text/html; charset=UTF-8");
        PrintWriter out = response.getWriter();
        StringBuffer sb = new StringBuffer();
        sb.append("<html>");
        sb.append("<head>");
        sb.append("<title>SimpleCounterServlet</title>");
        sb.append("</head>");
        sb.append("<body>");
        count++;
        sb.append("<p>Since loading, this servlet has been accessed<b> ");
        sb.append(count);
        sb.append(" </b>times</p>");
        sb.append("</body>");
        sb.append("</html>");
        out.println(new String(sb));
        out.close();
    }
}
```

1.3. Przykład przekazywania parametrów z formularza strony HTML do serwletu i generowania odpowiedzi w formacie HTML

- **Formularz** `ShowParametersServlet.html`

```
<html>
<head><title>ShowParameterstServlet</title>
<meta http-equiv="content-type" content="text/html; charset=UTF-8">
</head>
<body>
<h3>Formularz</h3>
<form method="GET" action="http://localhost:8080/ShowParametersServlet">
 <table>
  <tr><td>Nazwisko:</td><td><input type=”text” size=”20” name="name"></td></tr>
  <tr><td>E-mail:</td><td><input type=”text” size=”20” name="mail"></td></tr>
  <tr><td>Płeć:</td><td><input type="radio" name="sex" value="K"> Kobieta</td></tr>
  <tr><td></td><td><input type="radio" name="sex" value="M"> Mężczyzna</td></tr>
  <tr></tr>
  <tr><td><input type="reset" value="Wyczyść"></td><td><input type="submit"
value="Wyślij"></td></tr>
 </table>
</form>
</body>
</html>
```

- **Plik serwletu** `ShowParametersServlet.java`

```
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;
public class ShowParametersServlet extends HttpServlet {
      String name, mail, sex;
    public void doGet(HttpServletRequest request, HttpServletResponse response)
                                          throws IOException, ServletException {
        name = request.getParameter("name");
        mail = request.getParameter("mail");
        sex = request.getParameter("sex");
        response.setContentType("text/html; charset=UTF-8");
        PrintWriter out = response.getWriter();
        out.println(createHTML());
        out.close();
    }
    protected String createHTML() {
        StringBuffer sb = new StringBuffer();
        sb.append("<html>");
        sb.append("<head>");
        sb.append("<title>Title</title>");
        sb.append("</head>");
        sb.append("<body>");
        sb.append("<h3>Twój wybór</h3>");
        sb.append("<table border=\"1\" bgcolor=\"#ffff00\">");
        sb.append("<tr><td>Nazwisko: </td><td>" + name + "</td></tr>");
        sb.append("<tr><td>E-mail: </td><td>" + mail + "</td></tr>");
        sb.append("<tr><td>Płeć:  </td><td>" + sex  + "</td></tr>");
        sb.append("</table>");
        sb.append("</body>");
        sb.append("</html>");
        return (new String(sb));
    }
}
```

1.4. Przykład aplikacji Web o nazwie Quiz - HTML + serwlet

- **Strona** `index.html`

```
<!DOCTYPE html>
<html>
    <head>
        <title>Quiz</title>
        <meta charset="UTF-8">
        <meta name="viewport" content="width=device-width, initial-scale=1.0">
    </head>
    <body>
        <form method="get" action="/Quiz">
            <b>1. Która technologia platformy Java EE związana jest z logika
biznesową aplikacji ?</b><br/>
            <input type="radio" name="q1" value="Servlet">Servlet<br/>
            <input type="radio" name="q1" value="JSP">JSP<br/>
            <input type="radio" name="q1" value="JSF">JSF<br/>
            <input type="radio" name="q1" value="EJB">EJB<br/>
            <br/>
            <b>2. W jakim kontenerze są przetwarzane serwlety na platformie Java EE ?
</b><br/>
            <input type="radio" name="q2" value="EJB">EJB<br/>
            <input type="radio" name="q2" value="CDI">CDI<br/>
            <input type="radio" name="q2" value="WEB">WEB<br/>
            <input type="radio" name="q2" value="EEE">EEE<br/>
            <br>
            <input type="submit" value="Sprawdź">
        </form>
    </body>
</html>
```

- **Serwlet** `Quiz.java`

```
package jp;
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(name = "Quiz", urlPatterns = {"/Quiz"})
public class Quiz extends HttpServlet {

    protected void processRequest(HttpServletRequest request, HttpServletResponse
response)
            throws ServletException, IOException {
        PrintWriter out = response.getWriter();
        String q1 = request.getParameter("q1");
        String q2 = request.getParameter("q2");
        String q3 = request.getParameter("q3");
        String q4 = request.getParameter("q4");

        if (q1.equals("EJB")) {
            out.println("Pytanie 1 - " + "OK");
        } else {
            out.println("Pytanie 1 - " + "NO");
        }

        if (q2.equals("WEB")) {
            out.println("Pytanie 2 - " + "OK");
        } else {
            out.println("Pytanie 2 - " + "NO");
        }
    }
    @Override
    protected void doGet(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        processRequest(request, response);
    }
    @Override
    protected void doPost(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        processRequest(request, response);
    }
}
```

1.5. Aplikacja Web o nazwie Calculator - HTML + serwlet

- **Strona** `index.html`

```
<!DOCTYPE html>
<html>
    <head>
        <title>Servlet calculator</title>
        <meta charset="UTF-8">
        <meta name="viewport" content="width=device-width, initial-scale=1.0">
    </head>
    <body>
        <form method="get" action="http://Calculator" >
            a: <input name="a" type="text" />
            <select name="operator">
                <option value="addition"> + </option>
                <option value="subtraction"> - </option>
                <option value="multiplication"> * </option>
                <option value="division"> / </option>
            </select>
            b: <input name="b" type="text" />
            <input type="submit" value="=" />
        </form>
    </body>
</html>
```

- **Serwlet** `Calculator.java`

```
package jp;
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(name = "Calculator", urlPatterns = {"/Calculator"})
public class Calculator extends HttpServlet {

    protected void processRequest(HttpServletRequest request, HttpServletResponse 
response)
            throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");
        try (PrintWriter out = response.getWriter()) {
            String a = request.getParameter("a");
            String b = request.getParameter("b");
            String operator = request.getParameter("operator");
            switch (operator) {
                case "addition":
                    out.println((Double.parseDouble(a) + Double.parseDouble(b)));
                    break;
                case "subtraction":
                    out.println(Double.parseDouble(a) - Double.parseDouble(b));
                    break;
                case "multiplication":
                    out.println(Double.parseDouble(a) * Double.parseDouble(b));
                    break;
                case "division":
                    out.println(Double.parseDouble(a) / Double.parseDouble(b));
                    break;
                default:
                    out.println(Double.parseDouble(a) + Double.parseDouble(b));
                    break;
            }
        }
    }

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

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

1.6. Przykład przekazywania parametrów do serwletu z aplikacji

- **Przekazywanie parametrów z aplikacji** `ShowParametersServletApplication.java`

```
import java.net.*;
import java.io.*;
public class ShowParametersServletApplication {
  public static void main(String[] args) {
    try {
      URL url = new URL("http://localhost:8080/MyGetPostServlet?name=Jan
                         +Prokop&mail=jprokop@prz.edu.pl&sex=M");
      BufferedReader in = new BufferedReader(
           new InputStreamReader(url.openStream()));
      String line;
      while ((line = in.readLine()) != null) {
        System.out.println(line);
      }
      in.close();
    } catch (IOException e) {
      e.printStackTrace();
    }
  }
}
```

1.7. Inne przykłady serwletów

- **Generowanie danych XML z tablicy języka Java**

```
protected void doGet(HttpServletRequest request, HttpServletResponse
                     response) throws ServletException, IOException {
   String[][] data = {{"1234", "Author 1", "Title 1"},
                      {"3456", "Author 2", "Title 2"}};
   response.setContentType("text/xml; charset=UTF-8");
   PrintWriter out = response.getWriter();
   try {
      out.println("<?xml version=\"1.0\"?>");
      out.println("<bookstore>");
      out.println("<book isbn=\"" + data[0][0] + "\">");
      out.println("<author>" + data[0][1] + "</author>");
      out.println("<title>" + data[0][2] + "</title>");
      out.println("</book>");
      // …
      out.println("</bookstore>");
   } finally {
      out.close();
   }
}
```

- **Generowanie grafiki**

```
import javax.servlet.annotation.WebServlet;
import javax.servlet.*;
import javax.servlet.http.*;
import java.io.*;
import java.awt.*;
import java.awt.image.*;
import com.sun.image.codec.jpeg.*;
public class ImageServlet extends HttpServlet {
    protected void doGet(HttpServletRequest request, HttpServletResponse
                         response) throws ServletException, IOException {
        BufferedImage image = new BufferedImage(640, 480,
                                        BufferedImage.TYPE_INT_RGB);
        Graphics g = image.getGraphics();
        g.setColor(Color.yellow);
        g.fillOval(100, 100, 250, 250);
        response.setContentType("image/jpeg");
        JPEGImageEncoder encoder =
                JPEGCodec.createJPEGEncoder(response.getOutputStream());
        encoder.encode(image);
    }
}
```

- **Przekierowanie do strony**

```
import java.io.*;
import java.sql.Date;
import java.util.*;
import javax.servlet.*;
import javax.servlet.http.*;
public class PageRedirect extends HttpServlet {

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

      response.setContentType("text/html");
      String webpage = new String("http://java.prz.edu.pl");
      response.setStatus(response.SC_MOVED_TEMPORARILY);
      response.setHeader("Location", webpage);

    }
}
```

- **Serwlet realizujący transformację XSLT -** `SimpleXSLTServlet.java`

```
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;
import javax.xml.transform.*;
import javax.xml.transform.stream.*;
public class SimpleXSLTServlet extends HttpServlet {
    public void doGet(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
       response.setContentType("text/html; charset=UTF-8");
       PrintWriter out = response.getWriter();
       StreamSource source = new StreamSource("http://localhost:8080/
                                               MyGetPostServlet/sample.xml");
       StreamSource style = new StreamSource("http://localhost:8080/
                                               MyGetPostServlet/sample.xsl");
       StreamResult result = new StreamResult(out);
       try {
           TransformerFactory transFactory = TransformerFactory.newInstance();
           Transformer transformer = transFactory.newTransformer(style);
           transformer.transform(source, result);
       } catch (Exception e){
           resp.getWriter().print(e.getMessage());
       }
    }

}
```

`sample.xml`

```
<?xml version="1.0"?>
<?xml-stylesheet type="text/xsl" href="lista.xsl"?>
<lista>
      <pracownik foto="jk.jpg" www="http://www.onet.pl"> CV Pracownik1
            <nazwisko>Jan Kowalski</nazwisko>
            <uczelnia>Politechnika Rzeszowska</uczelnia>
            <wydzial>Wydział Elektrotechniki i Informatyki</wydzial>
            <adres>ul. W. Pola 2, 35-959 Rzeszów</adres>
            <telefon>(0-prefix-17) 8651384</telefon>
            <mail>jk@prz.edu.pl</mail>
            <wzrost>175</wzrost>
      </pracownik>
      <pracownik foto="jn.jpg" www="http://www.wp.pl"> CV Pracownik2
            <nazwisko>Jan Nowak</nazwisko>
            <uczelnia>Politechnika Rzeszowska</uczelnia>
            <wydzial>Wydział Elektrotechniki i Informatyki</wydzial>
            <adres>ul. W. Pola 2, 35-959 Rzeszów</adres>
            <telefon>(0-prefix-17) 8651384</telefon>
            <mail>jn@prz.edu.pl</mail>
            <wzrost>175</wzrost>
      </pracownik>
</lista>
```

sample.xsl

```
<?xml version="1.0"?>
<xsl:stylesheet version="1.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
<xsl:template match="/">
 <html>
 <body>
   <h2>Wzrost większy niż 180 cm</h2>
   <table border="1">
     <tr bgcolor="#00ff00">
       <th>Imię i Nazwisko</th>
       <th>Wzrost</th>
     </tr>
     <xsl:for-each select="lista/pracownik">
      <tr>
        <td><xsl:value-of select="nazwisko"/></td>
        <xsl:choose>
          <xsl:when test="wzrost&gt;'180'">
            <td bgcolor="#ff00ff">
            <xsl:value-of select="wzrost"/></td>
          </xsl:when>
          <xsl:otherwise>
            <td><xsl:value-of select="wzrost"/></td>
          </xsl:otherwise>
        </xsl:choose>
      </tr>
      </xsl:for-each>
   </table>
 </body>
 </html>
</xsl:template>
</xsl:stylesheet>
```

- **Serwlet logowania -** LoginForm.java

```
import java.io.*;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.*;

@WebServlet(name = "LoginForm", urlPatterns = {"/LoginForm"})
public class LoginForm extends HttpServlet {

    public static String USER_KEY = "ServletLogin.user";
    public static String FIELD_USER = "username";
    public static String FIELD_PASSWORD = "password";

    @Override
    protected void doGet(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        response.setContentType("text/html");
        java.io.PrintWriter out = response.getWriter();
        response.setHeader("Expires", "01 Jan 2015 00:00:00 GMT");
        String uri = request.getRequestURI();
        HttpSession session = request.getSession();
        String user = (String) session.getAttribute(USER_KEY);
        if (user == null) {
            login(out, uri);
            return;
        }
        out.println("<html>");
        out.println("<head>");
        out.println("<title>Welcome</title>");
        out.println("</head>");
        out.println("<body>");
        out.println("<center><h2>Login OK !</h2>");
        out.println("</center><br><br>");
        out.println("</body>");
        out.println("</html>");
        out.flush();
    }

    @Override
    protected void doPost(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        response.setContentType("text/html");
        java.io.PrintWriter out = response.getWriter();
        HttpSession session = request.getSession(true);
        String user = (String) session.getAttribute(USER_KEY);
        if (user == null) {
            String username = request.getParameter(FIELD_USER);
            String password = request.getParameter(FIELD_PASSWORD);
            if (!validUser(username, password)) {
                out.println("<html>");
                out.println("<title>Invalid User</title>");
                out.println("<body><center><h2>" + "Invalid User!</h2><br>");
                out.println("Press the \"Back\" button to try again");
                out.println("</center></body></html>");
                out.flush();
                return;
            }
            session.setAttribute(USER_KEY, username);
        }
        response.sendRedirect(request.getRequestURI());

    }

    protected void login(java.io.PrintWriter out, String uri) throws
java.io.IOException {
        out.println("<html>");
        out.println("<head>");
        out.println("<title>Login</title>");
        out.println("<center><h2>Welcome! Please login</h2>");
        out.println("<br><form method=POST action=\"" + uri + "\">");
        out.println("<table>");
        out.println("<tr><td>User ID:</td>");
        out.println("<td><input type=text name=" + FIELD_USER + "
size=30></td></tr>");
        out.println("<tr><td>Password:</td>");
        out.println("<td><input type=password name=" + FIELD_PASSWORD + "
size=10></td></tr>");
        out.println("</table><br>");
        out.println("<input type=submit value=\"Login\">");
        out.println("</form></center></body></html>");
    }

    protected boolean validUser(String username, String password) {
        boolean valid = false;
        if ((username != null) && (username.length() > 0)) {
            valid = username.equals("admin") && password.equals("admin");
        }
        return valid;
    }
}
```

Zadania

1. Napisać serwlet, który dane z formularza strony HTML zapisuje w pliku XML i zwraca aktualną zawartość tego pliku w postaci tabeli HTML

2. Napisać aplikację JavaFX, która dane wprowadzone z pól tekstowych interfejsu graficznego wysyła do serwletu, a serwlet je odsyła do aplikacji w formacie kodu HTML interpretowanego w oknie aplikacji.

2. Java Web Applications - technologia JSP

2.1. Przykład strony JSP

- **Plik** `SimpleJSPExample.jsp`

```
<html>
<body>
<% java.util.Date date = new java.util.Date(); %>
<p>Time: <%= date %></p>
<%
    out.println("RemoteHost: " + request.getRemoteHost()+ "<br/>");
    out.println("Method: " + request.getMethod()+ "<br/>");
    out.println("RequestURI: " + request.getRequestURI() + "<br/>");
    out.println("Protocol: " + request.getProtocol() + "<br/>");
%>
</body>
</html>
```

2.2. Przykład zastosowania komponentu JavaBean w dokumencie JSP

- JSP akcje - kod formularza `JSPuseBean.html`

```
<html>
<body>
<form method="post" action="PrintUserData.jsp">
<h3>Wprowadź dane</h3>
<table border="0">
   <tr>
      <td>Name:</td>
      <td><input type="text" name="username" size="25"></td>
   </tr>
   <tr>
      <td>Email:</td>
      <td><input type="text" name="email" size="25"></td>
   </tr>
   <tr>
      <td>Age:</td>
      <td><input type="text" name="age" size="5"></td>
   </tr>
</table>
<p><input type="submit" value="Wyślij"></p>
</form>
</body>
</html>
```

- **JSP akcje - kod ziarna** `SimpleBean.java`

```
package jp;
import java.io.Serializable;
public class DataBean implements Serializable {
    String username, email;
    int age;
    public DataBean() {
    }
    public void setUsername(String value) {
        username = value;
    }
    public void setEmail(String value) {
        email = value;
    }
    public void setAge(int value) {
        age = value;
    }
    public String getUsername() {
      return username;
    }
    public String getEmail() {
      return email;
    }
    public int getAge() {
      return age;
    }
}
```

- **JSP akcje - kod odpowiedzi** `PrintUserData.jsp`

```
<jsp:useBean id="user" class="jp.DataBean" scope="session"/>
<jsp:setProperty name="user" property="*"/>
<html>
<body>
<h3>Twoje dane</h3>
<table border="1">
   <tr bgcolor="red">
      <th>Parametr</th><th>Wartość</th>
   </tr>
   <tr>
      <td bgcolor="blue">Name:  </td>
      <td><%=user.getUsername()%></td>
   </tr>
   <tr>
      <td bgcolor="blue">Email:</td>
      <td><%=user.getEmail()%></td>
   </tr>
   <tr>
      <td bgcolor="blue">Age:</td>
      <td><%=user.getAge()%></td>
   </tr>
</table>
</body>
</html>
```

3. Java Web Applications - Technologia JSF

3.1. Przykład strony JSF

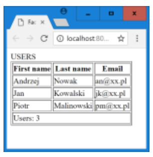
- JSF - plik `index.xhtml`

```
<html xmlns="http://www.w3.org/1999/xhtml"
      xmlns:h="http://xmlns.jcp.org/jsf/html"
      xmlns:f="http://java.sun.com/jsf/core">
    <h:head>
    <title>
       Facelet Title
    </title>
    </h:head>
    <h:body>
    <h2>Ajax Example</h2>
    <h:form>
    <h:inputText id="inputName" value="#{userData.name}"> </h:inputText>
    <h:commandButton value="Show Message">
    <f:ajax execute="inputName" render="outputMessage" />
    </h:commandButton>
    <h2><h:outputText id="outputMessage"
         value="#{userData.welcomeMessage !=null ?
            userData.welcomeMessage : ''}" />
</h2>
</h:form>
</h:body>
</html>
```

- JSF - plik `HelloWorld.java`

```
package jp;

import java.io.Serializable;
import javax.faces.bean.ManagedBean;
import javax.faces.bean.SessionScoped;
@ManagedBean(name = "userData", eager = true) // application-scoped
@SessionScoped
public class HelloWorld implements Serializable {
   private static final long serialVersionUID = 1L;
   private String name;
   public String getName() {
      return name;
   }
   public void setName(String name) {
      this.name = name;
   }
   public String getWelcomeMessage(){
      return "Hello " + name;
   }
}
```

3.2. Przykład strony JSF – dane ArrayList do tabeli HTML



USERS

First name	Last name	Email
Andrzej	Nowak	an@xx.pl
Jan	Kowalski	jk@xx.pl
Piotr	Malinowski	pm@xx.pl
Users: 3		

- JSF - plik `index.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"
      xmlns:f="http://xmlns.jcp.org/jsf/core">
    <h:head>
        <title>Facelet Title</title>
    </h:head>
    <h:body>
        <h:outputText value="USERS" />
        <h:dataTable value="#{userBean.userList}" var="user" border="1">
            <h:column>
                <f:facet name="header">
                    <h:outputText value="First name" />
                </f:facet>
                <h:outputText value="#{user.firstName}" />
            </h:column>
            <h:column>
                <f:facet name="header">
                    <h:outputText value="Last name" />
                </f:facet>
                <h:outputText value="#{user.lastName}" />
            </h:column>
            <h:column>
                <f:facet name="header">
                    <h:outputText value="Email" />
                </f:facet>
                <h:outputText value="#{user.email}" />
            </h:column>
            <f:facet name="footer">
                <h:outputText value="Users: " />
                <h:outputText value="#{userBean.userCount}" />
            </f:facet>
        </h:dataTable>
    </h:body>
</html>
```

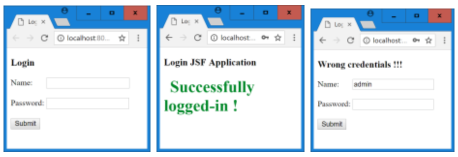
- JSF - plik `UserBean.java`

```
package jp;

import javax.inject.Named;
import javax.enterprise.context.Dependent;
import java.util.ArrayList;
import java.util.List;
import javax.annotation.PostConstruct;

@Named(value = "userBean")
@Dependent
public class UserBean {

    private List<User> userList;

    @PostConstruct
    private void init() {
        userList = new ArrayList<>();
        userList.add(new User("Andrzej", "Nowak", "an@xx.pl"));
        userList.add(new User("Jan", "Kowalski", "jk@xx.pl"));
        userList.add(new User("Piotr", "Malinowski", "pm@xx.pl"));
    }

    public List<User> getUserList() {
        return userList;
    }
    public int getUserCount() {
        return userList.size();
    }

}
```

- JSF - plik `User.java`

```
package jp;
public class User {

    private final String firstName;
    private final String lastName;
    private final String email;

    public User(String firstName, String lastName, String email) {
        this.firstName = firstName;
        this.lastName = lastName;
        this.email = email;
    }

    public String getFirstName() {
        return firstName;
    }

    public String getLastName() {
        return lastName;
    }

    public String getEmail() {
        return email;
    }

}
```

3.3. Przykład strony JSF – Logowanie



Login

Name:

Password:

Login JSF Application

Successfully logged-in !

Wrong credentials !!!

Name: admin

Password:

- JSF - plik `index.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>Login JSF Application</title>
    </h:head>
    <h:body>
        <h3>#{userLogin.message}</h3>
        <h:form id="loginForm">
            <h:outputLabel value="Name:&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp; " />
            <h:inputText value="#{userLogin.username}" /> <br/><br/>
            <h:outputLabel value="Password: " />
            <h:inputSecret value="#{userLogin.password}"></h:inputSecret><br/><br/>
            <h:commandButton value="Submit"
                                    action="#{userLogin.login}"></h:commandButton>
        </h:form>
    </h:body>
```

```
</html>
```

- JSF - plik `UserLogin.java`

```
package jp;

import javax.inject.Named;
import javax.enterprise.context.RequestScoped;

@RequestScoped
@Named("userLogin")
public class UserLogin {

    public UserLogin() {
    }
    private String message = "Login";
    private String username;
    private String password;

    public String login() {
        if ("admin".equalsIgnoreCase(username) && "admin".equalsIgnoreCase(password))
{
            message = "Successfully logged-in !";
            return "success";
        } else {
            message = "Wrong credentials !!!";
            return "index";
        }
    }

    public String getMessage() {
        return message;
    }

    public void setMessage(String message) {
        this.message = message;
    }

    public String getUsername() {
        return username;
    }

    public void setUsername(String username) {
        this.username = username;
    }

    public String getPassword() {
        return password;
    }

    public void setPassword(String password) {
        this.password = password;
    }
}
```

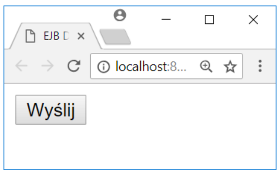
- JSF - plik `successs.xhtml`

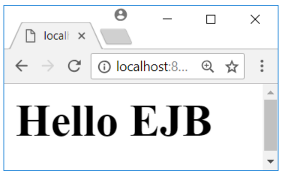
```
<?xml version='1.0' encoding='UTF-8' ?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml"
      xmlns:h="http://xmlns.jcp.org/jsf/html">
    <h:head>
        <title>Login JSF Application</title>
```

```
            <style type="text/css">
              .successText {
                  color: green;
                  margin: 12px;
                  font-weight: bold;
                    font-size: 32px;
              }
          </style>
    </h:head>
    <h:body>
        <h3>Login JSF Application</h3>
        <h:outputLabel class="successText" value="#{userLogin.message}" />
    </h:body>
</html>
```

4. Java Enterprise Application - Technologia EJB

4.1. EJB z klientem w postaci serwletu





Hello EJB

- Plik strony `index.html`

```
<!DOCTYPE html>
<html>
    <head>
        <title>EJB Demo</title>
        <meta charset="UTF-8">
        <meta name="viewport" content="width=device-width, initial-scale=1.0">
    </head>
    <body>
        <form method="get" action="http://localhost:8080/EnterpriseApplication-
war/NewServlet">
            <input type="submit" value="Wyślij">
        </form>
    </body>
</html>
```

- Plik interfejsu `HelloInterface.java`

```
package jp;
import javax.ejb.Remote;
@Remote
public interface HelloInterface {
    String sayHello(String text);
}
```

- Plik bean-a EJB `HelloBean.java`

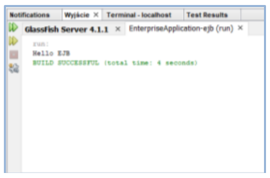
```
package jp;
import javax.ejb.Stateless;
import javax.ejb.LocalBean;
@Stateless
@LocalBean
public class HelloBean implements HelloInterface {
    @Override
    public String sayHello(String text) {
        return "Hello " + text;
    }
}
```

- Plik klienta, tj. serwletu `HelloServletClient.java`

```
package jp;

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;
```

```
@WebServlet(name = "NewServlet", urlPatterns = {"/NewServlet"})
public class HelloServletClient extends HttpServlet {

    @EJB
    private HelloInterface helloBean;

    protected void processRequest(HttpServletRequest request, HttpServletResponse
response)
            throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");
        try (PrintWriter out = response.getWriter()) {
            out.println("<h1>" + helloBean.sayHello("EJB") + "</h1>");
            out.close();
        }
    }
    @Override
    protected void doGet(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        processRequest(request, response);
    }
    @Override
    protected void doPost(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        processRequest(request, response);
    }
}
```

4.2. Klient aplikacyjny EJB do przykładu 4.1



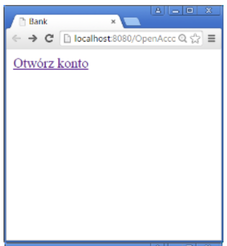
```
run:
Hello EJB
BUILD SUCCESSFUL (total time: 4 seconds)
```

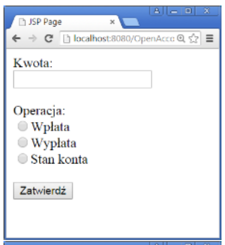
- Plik klienta aplikacyjnego `HelloClientApplication.java`

```
package jp;

import javax.naming.InitialContext;
import javax.naming.NamingException;
public class HelloClientApplication {
    public HelloClientApplication() {
    }
    public static void main(String[] args) {
        try {
            InitialContext ic = new InitialContext();
            HelloInterface hb = (HelloInterface)ic.lookup("jp.HelloInterface");
            System.out.println(hb.sayHello("EJB"));
        } catch (NamingException ex) {
        }
    }
}
```

5. Java Enterprise Application – aplikacja w architekturze MVC „BANK”

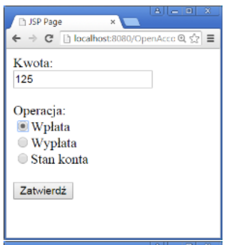
Uruchomić aplikację Java EE obsługi konta „banku” o wyglądzie i kodach źródłowych jak na rysunkach i listingu poniżej.


Otwórz konto


Kwota:

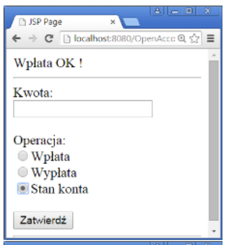
Operacja:
Wpłata
Wypłata
Stan konta

Zatwierdź


Kwota: 125

Operacja:
[✓ Wpłata]
Wypłata
Stan konta

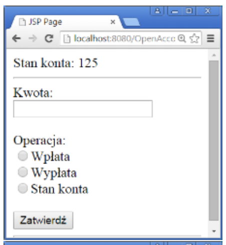
Zatwierdź


Wpłata OK !

Kwota:

Operacja:
Wpłata
Wypłata
[✓ Stan konta]

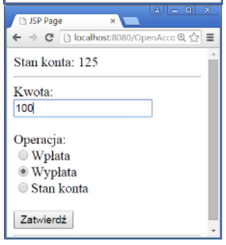
Zatwierdź


Stan konta: 125

Kwota:

Operacja:
Wpłata
Wypłata
Stan konta

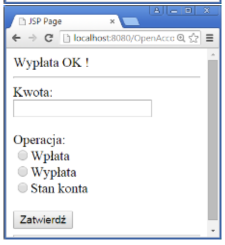
Zatwierdź


Stan konta: 125

Kwota: 100

Operacja:
Wpłata
[✓ Wypłata]
Stan konta

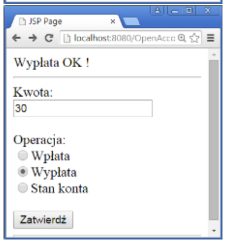
Zatwierdź


Wypłata OK !

Kwota:

Operacja:
Wpłata
Wypłata
Stan konta

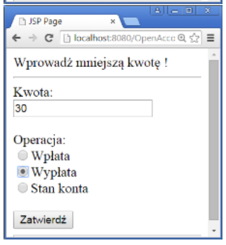
Zatwierdź


Wypłata OK !

Kwota: 30

Operacja:
Wpłata
[✓ Wypłata]
Stan konta

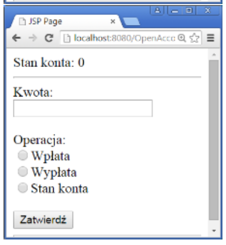
Zatwierdź


Wprowadź mniejszą kwotę !

Kwota: 30

Operacja:
Wpłata
[✓ Wypłata]
Stan konta

Zatwierdź


Stan konta: 0

Kwota:

Operacja:
Wpłata
Wypłata
Stan konta

Zatwierdź

- **Kod źródłowy interfejsu** `BankRemote.java`

```
package jp;
import javax.ejb.Remote;
@Remote
public interface BankRemote {
    /**
     *
     * @param amount
     * @return
     */
    boolean credit(int amount);
    void deposit(int amount);
    int getBalance();
}
```

- **Kod źródłowy klasy** `BankAccountBean.java`

```
package jp;
import javax.ejb.Stateful;
@Stateful(mappedName = "myBank")
public class BankAccountBean implements BankRemote {
    private int amount = 0;
    @Override
    public boolean credit(int amount) {
        if (amount <= this.amount) {
            this.amount -= amount;
            return true;
        } else {
            return false;
        }
    }
    @Override
    public void deposit(int amount) {
        this.amount += amount;
    }
    @Override
    public int getBalance() {
        return amount;
    }
}
```

- **Kod źródłowy pliku** `index.jsp`

```
<!DOCTYPE html>
<html>
    <head>
        <title>Bank</title>
        <meta charset="UTF-8">
        <meta name="viewport" content="width=device-width, initial-scale=1.0">
    </head>
    <body>
       <div>
             <a href="http://localhost:8080/OpenAccount">
            Otwórz konto
         </a>
            </div>
    </body>
</html>
```

- **Kod źródłowy pliku** `operation.jsp`

```
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>JSP Page</title>
    </head>
    <body>
        <form action="operationprocess.jsp">
            Kwota: <br/>
            <input type="text" name="amount"/><br/><br/>
            Operacja: <br/>
            <input type="radio" name="operation" value="deposit"/>Wpłata<br/>
            <input type="radio" name="operation" value="withdraw"/>Wypłata<br/>
            <input type="radio" name="operation"
                                          value="checkbalance"/>Stan konta<br/>
            <br/>
            <input type="submit" value="Zatwierdź">
        </form>
    </body>
</html>
```

- **Kod źródłowy pliku** `operationprocess.jsp`

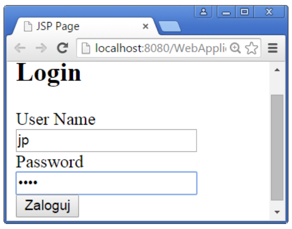
```
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
    <head>
        <title>JSP Page</title>
    </head>
    <body>
        <%@ page import="jp.*" %>
        <%
            BankRemote remote =
            (BankRemote)session.getAttribute("remote");
            String operation = request.getParameter("operation");
            String amount = request.getParameter("amount");
            if (operation != null) {
                if (operation.equals("deposit")) {
                    remote.deposit(Integer.parseInt(amount));
                    out.print("Wpłata OK !");
                }
                else if (operation.equals("withdraw")) {
                    boolean status = remote.credit(Integer.parseInt(amount));
                    if (status) {
                        out.print("Wypłata OK !");
                    }
                    else {
                        out.println("Wprowadź mniejszą kwotę !");
                    }
                } else {
                    out.println("Stan konta: " +
                                        remote.getBalance());
                }
            }
        %>
        <hr/>
        <jsp:include page="operation.jsp"></jsp:include>
        <hr/>
    </body>
</html>
```

- **Kod źródłowy pliku** `OpenAccount.java`

```
package jp;
import java.io.IOException;
import javax.naming.InitialContext;
import javax.naming.NamingException;
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(name = "OpenAccount", urlPatterns = {"/OpenAccount"})
public class OpenAccount extends HttpServlet {
    @Override
    protected void doGet(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        try {
            InitialContext context = new InitialContext();
            BankRemote b;
            b = (BankRemote)context.lookup("myBank");
            request.getSession().setAttribute("remote", b);
            request.getRequestDispatcher("/operation.jsp").
                                                    forward(request, response);
        }
        catch (NamingException | ServletException | IOException e) {
            System.out.println(e);
        }
    }
    @Override
    protected void doPost(HttpServletRequest request,HttpServletResponse response)
            throws ServletException, IOException {
        doGet(request, response);
    }
}
```

Zadania

5.1. Rozbudować aplikację z punku 5.2 o stronę logowania do "banku" jak na rysunku korzystając z kodu poniżej oraz możliwość wylogowania się.



Login

User Name
jp
Password
••••
Zaloguj

- **Kod źródłowy pliku** `login.jsp`

```
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
  <head>
    <title>Login</title>
  </head>
  <body>
    <h2>Login</h2>
    <form method="post" action="Receive.jsp">
    User Name <input type="text" name="user"><br/>
    Password <input type="password" name="pass"><br/>
    <input type="submit" value="Zaloguj">
    </form>
  </body>
</html>
```

- **Kod źródłowy pliku** `Receive.jsp`

```
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
    <head><title>JSP Page</title></head>
<body>
  <jsp:useBean id="myid" class="jp.ValidateBean" />
  <jsp:setProperty name="myid" property="user" />
  <jsp:setProperty name="myid" property="pass" />
   You name:
   <jsp:getProperty name="myid" property="user" /><br/>
   You password:
   <jsp:getProperty name="myid" property="pass" /><br/>
   <br/>You are a<%=myid.validate("jp","java")%> user !
</body>
</html>
```

- **Kod źródłowy pliku** `ValidateBean.java`

```
package jp;
public class ValidateBean {
  String user; String pass;
  public ValidateBean( ) {
  }
  public void setUser(String user) {
    this.user = user;
  }
  public String getUser( ) {
    return user;
  }
  public void setPass(String pass) {
    this.pass = pass;
  }
  public String getPass( ) {
    return pass; }
  public String validate(String s1,String s2) {
    if(s1.equals(user) && s2.equals(pass))
       return "VALID";
    else
```

```
        return "INVALID";
    }
}
```

5.2. Rozbudować aplikację z punku 5.2 wprowadzając transakcje korzystając z kodu poniżej.

- **Kod źródłowy pliku** `AccountBean.java`

```
import javax.annotation.Resource;
import javax.ejb.Stateless;
import javax.ejb.TransactionManagement;
import javax.ejb.TransactionManagementType;
import javax.transaction.UserTransaction;
@Stateless
@TransactionManagement(value=TransactionManagementType.BEAN)
public class AccountBean implements AccountBeanLocal {
   @Resource
   private UserTransaction userTransaction;
   public void transferFund(Account fromAccount, double fund , Account toAccount)
                  throws Exception {
      try {
         userTransaction.begin();
         confirmAccountDetail(fromAccount);
         withdrawAmount(fromAccount,fund);
         confirmAccountDetail(toAccount);
         depositAmount(toAccount,fund);
         userTransaction.commit();
      }
      catch (InvalidAccountException exception){
         userTransaction.rollback();
      }
      catch (InsufficientFundException exception){
         userTransaction.rollback();
      }
      catch (PaymentException exception){
         userTransaction.rollback();
      }
   }
   private void confirmAccountDetail(Account account)
      throws InvalidAccountException {
   }
   private void withdrawAmount() throws InsufficientFundException {
   }
   private void depositAmount() throws PaymentException{
   }
}
```

5.3. Zmienić strony widoku na JSF

5.4. Opracować klienta „banku” w postaci aplikacji JavaFX.

Inne zadania podaje prowadzący w trakcie zajęć laboratoryjnych