Java Web Mid-Term Exam Part 2   **Total Marks: 20**

Background Information: Payroll Calculator

Use the MVC pattern to provide a gross pay calculation for employees. To calculate the gross pay, the hourly rate is $10.0 for the first 40 hours and $15 for additional hours over 40 hours. For example, if hours worked is 50, the gross pay is $550.
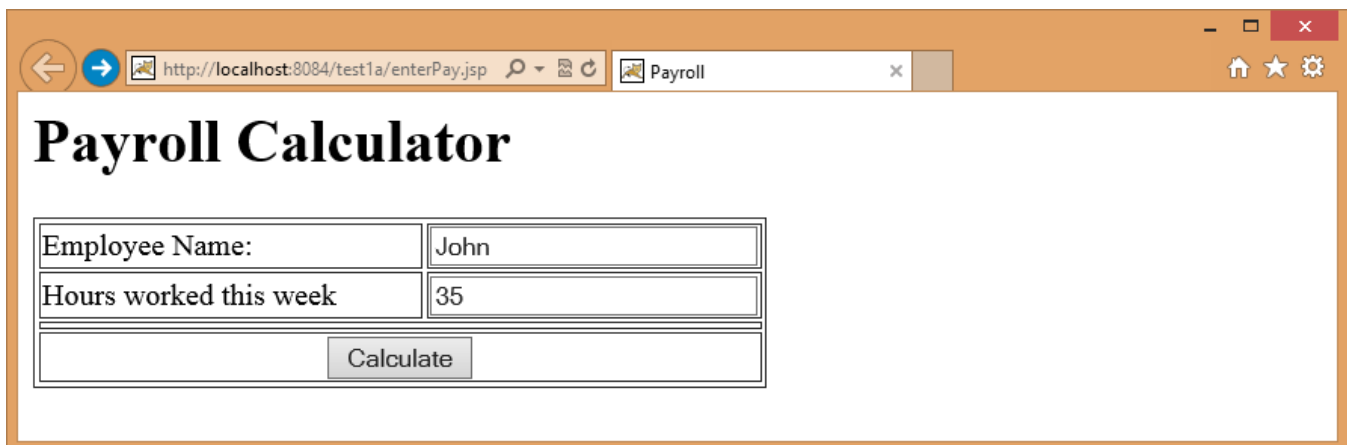
Study all the background information and all the partial code provided below. Then, complete the **CalculatePayServlet.java**, **enterPay.jsp**, **regular.jsp** and **overtime.jsp** starting in Page 6.

IMPORTANT: You are not allowed to create additional servlet or JSP other than the ones provided. Use EL within your JSP, as needed.

- -

web.xml:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<web-app version="2.5" …>
    <servlet>
        <servlet-name>CalculatePayServlet</servlet-name>
        <servlet-class>controller.CalculatePayServlet</servlet-class>
    </servlet>
    <servlet-mapping>
        <servlet-name>CalculatePayServlet</servlet-name>
        <url-pattern>/Calculate</url-pattern>
    </servlet-mapping>
</web-app>
```

- -

The **enterPay.jsp** page contains an HTML form with employee name and hours worked as input fields as shown below.
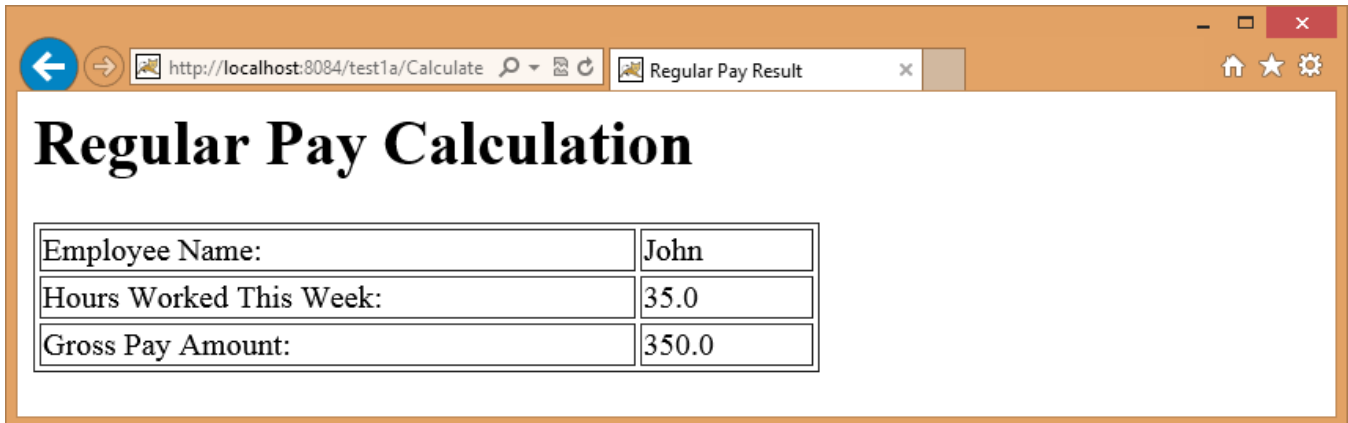
When the **Calculate** button is clicked, the data entered by the user will be sent to the **CalculatePayServlet**.
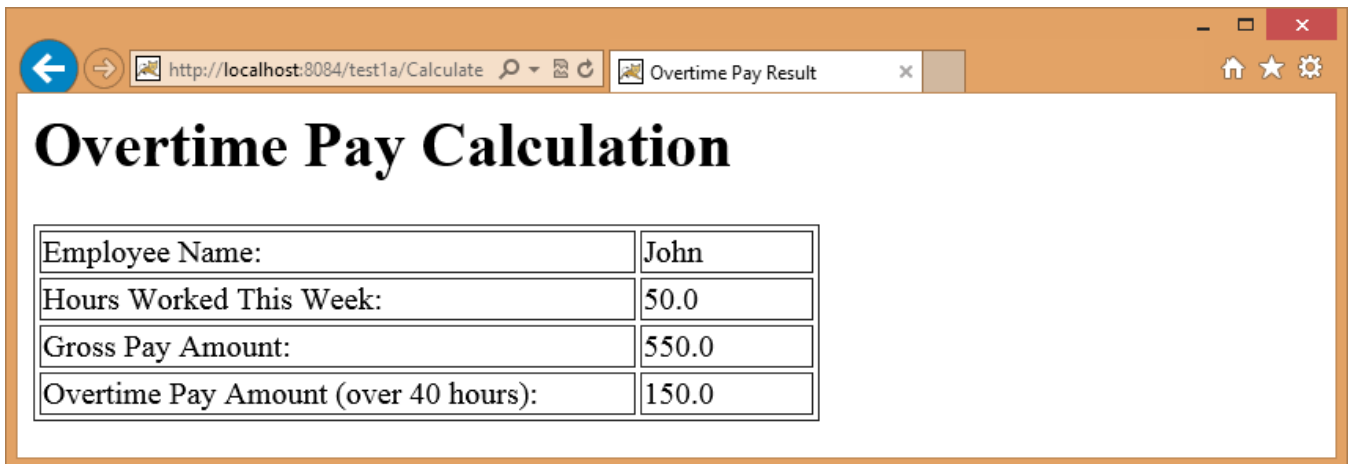
Important: If the **CalculatePayServlet** is called directly without any input parameters, it forwards control to the **enterPay.jsp**.

If hours worked is less than or equal to 40 hours, calculate the Gross Pay and forward to **regular.jsp** as shown below.

If hours worked is more than 40 hours, calculate the Gross Pay and Overtime Pay, and forward to **overtime.jsp** as shown below.

Input Validation:
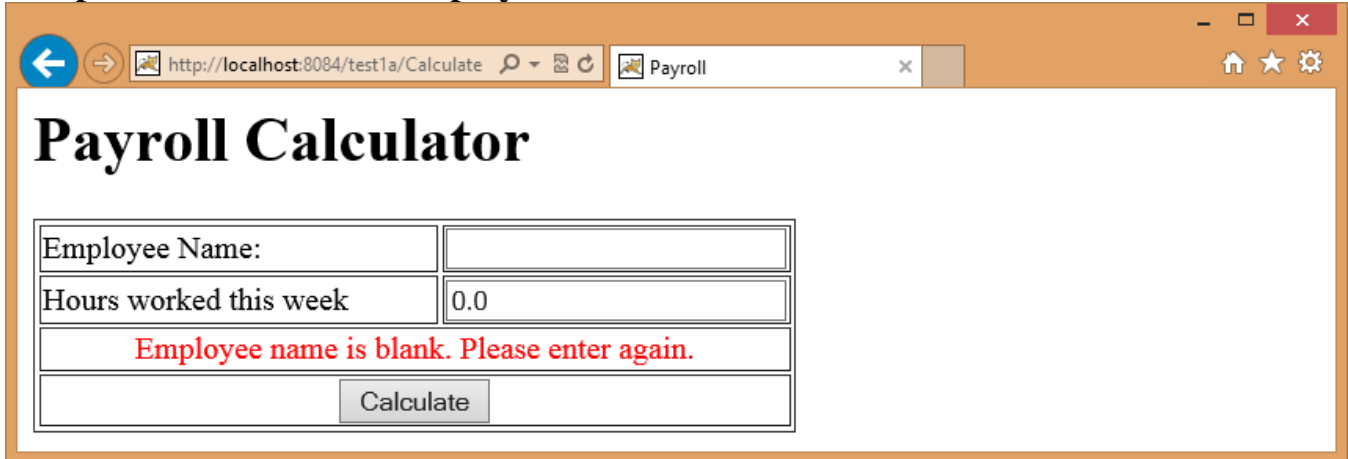
If the hours worked is blank, assign a default of zero. **Write code that will prevent** *NullPointerException*. **No exception handling is required.**
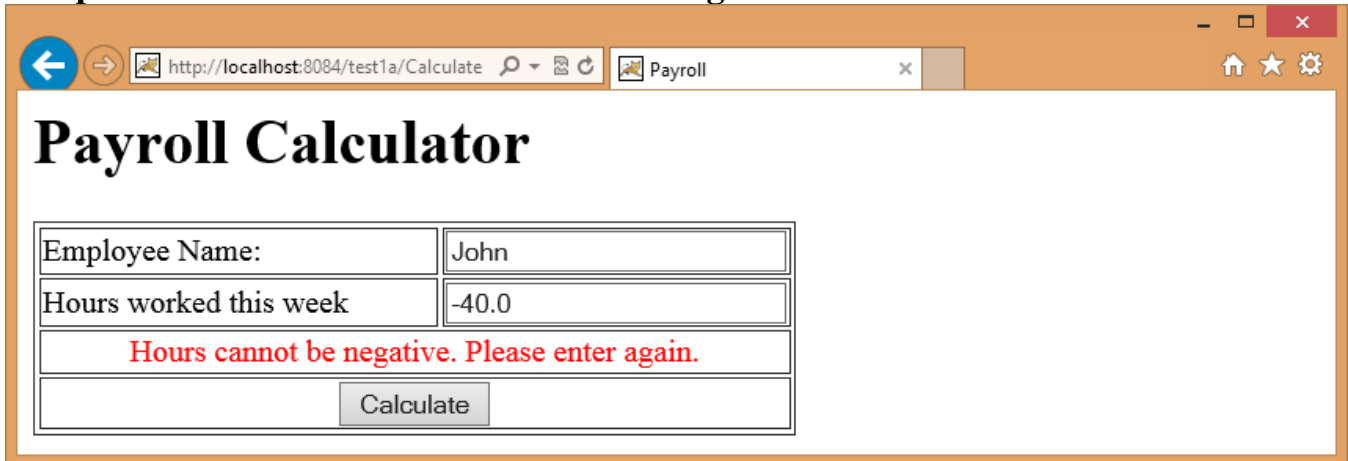
If there are errors, display the error as shown below.

Sample screenshot when employee name is blank:

Sample screenshot when hours worked is negative:

Code for Pay.java:

```java
public class Pay implements java.io.Serializable {

    private String employeename;
    private double hours;
    private double grosspay;
    private double overtimepay;
    final static double PAY_RATE = 10.0;
    final static double OVERTIME_RATE = 15.0;

    /** Creates a new instance of Pay */
    public Pay() {
    }

    public String getEmployeename() {
        if (employeename == null)
            employeename = new String();
        return employeename;
    }

    public void setEmployeename(String employeename) {
        this.employeename = employeename;
    }

    public double getHours() {
        return hours;
    }

    public void setHours(double hours) {
        this.hours = hours;
    }

    public double getGrosspay() {
        if (hours <= 40)
            grosspay = hours * PAY_RATE;
        else
            grosspay = 40 * PAY_RATE + (hours-40) * OVERTIME_RATE;
        return grosspay;
    }

    public double getOvertimepay() {
        if ((getGrosspay() - 40 * PAY_RATE) > 0)
            overtimepay = getGrosspay() - 40 * PAY_RATE;
        return overtimepay;
    } }
```

1. Entry Form: Code for enterPay.jsp: [3 *marks*]

```
<html>
  <head>
    <title>Payroll</title>
  </head>
  <body>
    <h1>Payroll Calculator</h1>

      <form  action="_____" method="post">

      <input type="hidden" name="action" value="calcPay"/>
       <table border="1">
          <tr>
            <td width="200">Employee Name: </td>
            <td><input name="employeename" type="text"



      value="${_____}" size="25"/></td>
          </tr>
          <tr>
            <td width="200">Hours worked this week</td>
            <td><input name="hours" type="text"



      value="${_____}" size="25"/></td>
          </tr>

          <tr>
            <td colspan="2" align="center"><font



      color="red"/>${_____}</td>
          </tr>
          <tr>
            <td colspan="2" align="center"><input type="submit" value="Calculate"/></td>
          </tr>
        </table>
      </form>
    </body>
</html>
```

2. Code for Servlet (CalculatePayServlet.java):   [13 *marks*]

IMPORTANT: All method variables are provided. Do not create any new variables.

```java
package controller;

import com.abc.Pay;
import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.RequestDispatcher;
import javax.servlet.ServletException;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import javax.servlet.http.HttpSession;

public class CalculatePayServlet extends HttpServlet {

    protected void processRequest(HttpServletRequest request,
      HttpServletResponse response)
            throws ServletException, IOException {


        Pay payinfo = new Pay();
        String errorMessage = "";
        String employeeName = "";
        String hourString = "";
        double hours = 0;
        String url = "/enterPay.jsp";

        // process action input parameter [2 points]
        String action = request.getParameter("action");

        if (_____  ) {
            action = "";
        }

        if ( _____  ) {

             // get parameters of input form
            employeeName = request.getParameter("employeename");
            hourString = request.getParameter("hours");

      //  hours worked is null or blank, assign a default of zero. [1 point]

            if ( _____  ) {
                hourString = "0";
            }

            hours = Double.parseDouble(hourString);
```

```
    // validate employee name [1 point]

    if ( _____ ) {


_____
          url = "/enterPay.jsp";
    }
    else {

        // validate hours worked [1 point]

        if (_____) {


_____
          url = "/enterPay.jsp";
        }

  // Check hours worked is less than 40 or overtime hours [2 points]

        if ( _____ ) {

            url = "/regular.jsp";
        }

        if (_____  ) {

         url = "/overtime.jsp";
        }

    } // end of else block
} // end of outer if

// prepare Pay object and error message [4 points]

_____

_____

_____

_____

_____

_____

// forward to JSP page [1 point]

_____
```

_____

_____

```
   }


    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);
    }

} // end of servlet code
```

3. View Layer: [**4** *marks*]

regular.jsp:

```
<html>
  <head>
    <title>Regular Pay Result</title>
  </head>
  <body>
    <h1>Regular Pay Calculation</h1>
    <table width="400" border="1">
      <tr>
        <td width="300">Employee Name: </td>

        <td>${ _____ }</td>
      </tr>
      <tr>
        <td width="300">Hours Worked This Week: </td>

        <td>${ _____ }</td>
      </tr>
      <tr>
        <td width="300">Gross Pay Amount: </td>

        <td>${ _____ }</td>
      </tr>
    </table>
  </body>
</html>
```

overtime.jsp:

```
<html>
  <head>
    <title>Overtime Pay Result</title>
  </head>
  <body>
    <h1>Overtime Pay Calculation</h1>
    <table width="400" border="1">
      <tr>
        <td width="300">Employee Name: </td>

        <td>${ _____ }</td>
      </tr>
      <tr>
        <td width="300">Hours Worked This Week: </td>

        <td>${ _____ }</td>
      </tr>
      <tr>
        <td width="300">Gross Pay Amount: </td>


        <td>${_____ }</td>
      </tr>
      <tr>
        <td width="300">Overtime Pay Amount (over 40 hours): </td>


        <td>${ _____ }</td>
      </tr>
    </table>
  </body>
</html>
```