1. **Write a JAVA Servlet Program to implement a dynamic HTML using Servlet (user name and Password should be accepted using HTML and displayed using a Servlet).**

index.html

```
<html>
    <head>
        <title>User Input Form</title>
    </head>
    <body>
        <h2>User Input Form</h2>
        <form action="EchoServlet" method="Get">
            <fieldset>
                <legend>Personal Information</legend>
                User Name: <input type="text" name="username"/><br/>
                Password: <input type="password" name="password"/><br/>
            </fieldset>
            <input type="submit" value="SEND"/>
            <input type="reset" value="CLEAR"/>
        </form>
    </body>
</html>
```

EchoServlet.java

```
import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.http.*;

public class EchoServlet extends HttpServlet {
    @Override
    protected void doGet(HttpServletRequest request,
     HttpServletResponse response)
     throws ServletException, IOException {
       PrintWriter out = response.getWriter();
       String name=request.getParameter("username");
       String secretword=request.getParameter("password");
       out.println("<html>");
       out.println("<head>");
       out.println("<title>EchoServlet</title>");
       out.println("</head>");
       out.println("<body>");
       out.println("<h2>You have Entered</h2>");
       out.println("<p>Name: " + name + "</p>");
       out.println("<p>Password: " + secretword + "</p>");
       out.println("</body>");
       out.println("</html>");
    }
}
```

2. Write a JAVA Servlet Program to Auto Web Page Refresh (Consider a webpage which is displaying Date and time or stock market status. For all such type of pages, you would need to refresh your web page regularly; Java Servlet makes this job easy by providing refresh automatically after a given interval).

RefreshPage2.java

```
import  java.io.IOException;
import  java.io.PrintWriter;
import java.util.*;
import javax.servlet.ServletException;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

public class RefreshPage2 extends HttpServlet {
    protected void doGet(HttpServletRequest request,
    HttpServletResponse response)
    throws ServletException, IOException {

    resp  onse.setContentType("text/html;charset=UTF-8");
    PrintWriter out = response.getWriter();

    try {
       response.addHeader("Refresh", "2");
       out.println("<h1>Servlet says Wonderful day:"
                                        + new Date() + "</h1>");
    }
    finally{
      out.println("<br><h2>My Page Automatically Refreshed!
                Don't Press F5</h2>");
        }
     }
}
```

3. **Write a JAVA Servlet Program to implement and demonstrate get() and Post methods(Using HTTP Servlet Class).**

index.html

```
<html>
    <head>
        <title>Lab3</title>
    </head>
    <body>
        <H1>Post Method</H1>
        <form name="form1" action="DispColor" method="Post">
            Choose the page color <select name="color">
                <option> Red </option>
                <option> Green </option>
                <option> Blue </option>
                <option> Pink </option>
                <option> Yellow </option>
                <option> White </option>
            </select>
            <input type="submit"/>
        </form>
        <H1>Get Method</H1>
        <form name="form2" action="DispColor" method="Get">
            Choose your gender:
            <input type="Radio" name="gen" value="Male"/> Male
            <input type="Radio" name="gen" value="Female"/>
                                              Female <br>
            <input type="submit"/>
        </form>
    </body>
</html>
```

DispColor.java

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

public class DispColor extends HttpServlet {
    @Override
    protected void doGet(HttpServletRequest request,
     HttpServletResponse response)
     throws ServletException, IOException {

          PrintWriter out = response.getWriter();
          out.println("<body>");
```

DispColor.java(continued)

```
        out.println("<h1>Http Method is "+request.getMethod()+ </h1>");
        out.println("Gender is " + request.getParameter("gen"));
        out.println("</body>");
    }

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

         PrintWriter out = response.getWriter();

         String clr = request.getParameter("color");

         out.println("<body bgcolor="+clr+">");
         out.println("<h1>Http Method is  " +request.getMethod()+
                                                        "</h1>");
         out.println("Color name is " + clr);
         out.println("</body>");
    }
}
```

4. Write a JAVA Servlet Program using cookies to remember user preferences.

index.html

```
<html>
    <head>
        <title>Cookies to remember user preferences</title>
    </head>
    <body>
     <form action="RegistrationForm">
        <fieldset>
           <legend>Information</legend>
              First Name: <input type="text" placeholder="Enter First
                                  Name" name="firstName"/><br><br>
              Last Name : <input type="text" placeholder="Enter Last
                                  Name" name="lastName"/><br><br>
              Email-ID : <input type="text" placeholder="Enter Email
                                  Name" name="email"/><br><br>
              <input type="submit">
       </fieldset>
     </form>
    </body>
</html>
```

RegistrationForm.java

```
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;

public class RegistrationForm extends HttpServlet {

    @Override
    public void doGet(HttpServletRequest request,
     HttpServletResponse response)
     throws ServletException, IOException {
        response.setContentType("text/html");
        boolean isMissingValue=false;
        PrintWriter out = response.getWriter();

        String fn = request.getParameter("firstName");

        //creating cookie object
        Cookie FnCookie = new Cookie("fname", fn);
        Cookie LnCookie = new Cookie("lname", ln);
        Cookie EmailCookie = new Cookie("email", email);
```

RegistrationForm.java(cont..)

```
      //setting lifespan to a cookie(1 year)
      FnCookie.setMaxAge(60*60*24*365);
      LnCookie.setMaxAge(60*60*24*365);
      EmailCookie.setMaxAge(60*60*24*365);

      //adding cookie in the response object
      response.addCookie(FnCookie);
      response.addCookie(LnCookie);
      response.addCookie(EmailCookie);

      out.println("Cookie Created....! <BR>" +
            "<A HREF='ReadCookie'> Read Cookies Servlet </A>");
    }
}
```

ReadCookie.java

```
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;

public class ReadCookie extends HttpServlet {
    @Override
    public void doGet(HttpServletRequest request,
     HttpServletResponse response)
     throws ServletException,IOException {
        response.setContentType("text/html;charset=UTF-8");
        PrintWriter out = response.getWriter();
        try {
            String title = "Active Cookies";
            out.println("<BODY BGCOLOR=\"#FDF5E6\">\n" +
                "<H1 ALIGN=\"CENTER\">" + title + "</H1>\n" +
                "<TABLE BORDER=1 ALIGN=\"CENTER\">\n" +
                "<TR BGCOLOR=\"#FFAD00\">\n" + "<TH>Cookie Name</TH>" +
                "<TH>Cookie Value</TH>");
            //Read array of cookies from the request object
            Cookie[] cks = request.getCookies();
            Cookie ck;  //Declare a cookie object
            for(int i=0; i<cks.length; i++) {
               ck = cks[i];    //single value from cks is copy to ck
               out.println("<TR>" + "  <TD>" + ck.getName() + "</TD>" +
                           "<TD>" + ck.getValue()+ "</TD>" + "</TR>");
            }
            out.println("</TABLE></BODY></HTML>");
        }
        finally {
            out.close();
}} }
```

5. Write a JAVA Servlet program to track HttpSession by accepting user name and password using HTML and display the profile page on successful login.

index.html

```
<html>
  <head><title>Lab5 - Using HttpSession</title></head>
  <body>
    <form action="LoginForm" method="Post">
    <fieldset>
    <legend>Login Information</legend>
       User Name: <input type="text" placeholder="Enter User Name"
                                    name="username"/><br><br>
       Password : <input type="password" placeholder="Enter password"
                                      name="password"/><br><br>
       <input type="submit" value="login">
    </fieldset>
    </form>
   </body>
</html>
```

LoginForm.jsp

```
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;
import javax.servlet.http.HttpSession;

public class LoginForm extends HttpServlet {
  protected void doPost(HttpServletRequest request, HttpServletResponse
                    response)throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");
        PrintWriter out=response.getWriter();

        String uname=request.getParameter("username");
        String password=request.getParameter("password");

        if(password.equals("admin123")) {
            //out.print("Welcome, "+uname);
            HttpSession session=request.getSession();
            session.setAttribute("name",uname);
            response.sendRedirect("ProfilePage");
        }
        else{
            out.print("Sorry, username or password error!");
            //response.sendRedirect("index.html");
            request.getRequestDispatcher("index.html").include(request,
                                    response);
        }
    }
```

ProfilePage.java

```
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;
import javax.servlet.http.HttpSession;

public class ProfilePage extends HttpServlet {
   protected void doGet(HttpServletRequest request, HttpServletResponse
          response)throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");
        PrintWriter out = response.getWriter();

        HttpSession session=request.getSession(false);
        if(session!=null){
            String name=(String)session.getAttribute("name");
            out.println("<center>");
            out.println("<h3>Hello, " + name +
            " You have Successfully logged in<br><br>"
            + "Welcome to Profile Page</h3><br>");
            out.println("</center>");
        }
        else{
            out.print("Please login first");
            response.sendRedirect("index.html");
        }
    }
}
```

6. Write a JAVA JSP Program which uses jsp:include and jsp:forward action to display a Webpage.

ReadValue.html

```
<html><head><title>Lab-6</title></head>
    <body>
          <form action="Login.jsp" method="post">
            <H3>Please enter Login Details</H3>
                UserName: <input type="text" name="user"/><br/><br/>
                Password: <input type="password" name="pass"/><br/><br>
            <input type="submit" value="login"/>
     </form>
    </body>
</html>
```

Login.jsp

```
<html><head><title>Login Page</title></head>
    <body>
        <%  String s2=request.getParameter("pass");
            if(s2.equals("admin123")) { %>
            <jsp:forward page="Welcome.jsp"/>
        <% } else{ %>
            <h3>Please Re-Enter valid username and password</h3>
            <jsp:include page="index.html"/>
        <% } %>
    </body>
</html>
```

Welcome.jsp

```
<html><head><title>Welcome Page</title></head>
    <body>
        <h3> Login Successful</h1><br/>
     Welcome, <%= request.getParameter("user") %>
    </body>
</html>
```

7. Write a JAVA JSP Program which uses <jsp:plugin> tag to run a applet.

Lab7.jsp

```
<html><head><title>JSP Page</title></head>
    <body>
        <h1>Lab7: implement using jsp:plugin tag to run a applet</h1>

        <jsp:plugin type="applet" code="Lab7applet.class"
                                codebase="." width="400" height="400">

            <jsp:fallback>There is a error to download the plugin
            </jsp:fallback>
        </jsp:plugin>

    </body>
</html>
```

Lab7applet.java

```
import java.awt.*;
import java.applet.*;

public class Lab7applet extends Applet {
     public void init() {
          setBackground(Color.red);
     }

    @Override
    public void paint(Graphics g){
          g.drawString("RNS Institute of Technology", 30,50);
          g.drawString("VTU Belgavi", 60, 80);
    }
}
```

8. Write a JAVA JSP Program to get student information through a HTML and create a JAVA Bean class, populate Bean and display the same information through another JSP.

index.html

```
<html>
   <body>
   <center><br/><br/>
     <form action="Lab8.jsp" method="post">
      Enter Name: <input type="text" name="sname"/><br/>
      Enter USN : <input type="text" name="usnno"/><br/>
      Enter Branch: <input type="text" name="branch"/><br/>
      <input type="submit" value="submit"/></center>
     </form>
 </body>
</html>
```

Student.java

```
package Bean;
import java.io.Serializable;

public class Student implements Serializable{

    private String sname, usnno, branch;

    public void setsname(String s){
        sname=s;
    }
    public String getsname(){
        return sname;
    }
    public void setusnno(String u){
        usnno=u;
    }
    public String getusnno(){
        return usnno;
    }
    public void setbranch(String b){
        branch=b;
    }
    public String getbranch(){
        return branch;
    }
}
```

BeanProperty.jsp

```
<html><head><title>JSP Page</title></head>
    <body>
          <jsp:useBean id="bean" class="Bean.Student" scope="request"/>
          <jsp:setProperty name="bean" property="*"/>
          <jsp:forward page="viewStudentDetail.jsp"/>
    </body>
</html>
```

viewStudentDetail.jsp

```
<html><head><title>JSP Page</title></head>
    <body>
    <jsp:useBean id="bean" class="Bean.Student" scope="request"/>
    <center>
       <h1><ul><b>Student Information</b></ul></h1>
       <h3>Name: <jsp:getProperty name="bean" property="sname"/><br>
           USN:<jsp:getProperty name="bean" property="usnno"/><br><br>
           Branch:<jsp:getProperty name="bean" property="branch"/>
          <br><br></h3>
    </center>
</body></html>
```

9. Write a JSP program to implement all the attributes of page directive tag.

index.html

```
<html><head><title>TODO supply a title</title></head>
    <body>
     <h2>Read two value to divide</h2>
     <form action="dividePage.jsp">
          Enter First Value: <input type="text" name="val1"/><br><br>
          Enter Second Value: <input type="text" name="val2"/><br><br>
          <input type="submit" value="Calculate"/>
     </form>
    </body>
</html>
```

dividePage.jsp

```
<%@page import ="java.util.Date"
        contentType="application/msword"
        pageEncoding="UTF-8"
        session="true" buffer="16kb"
        autoFlush="true"
        isThreadSafe="false"
        isELIgnored="true"
        extends="org.apache.jasper.runtime.HttpJspBase"
        info="Lab 10: demonstrate all attributes of the page directive"
        language="java"
        errorPage="receiveError.jsp"%>

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

    <%! int a, b;
        Date d=new Date();%>
    <body>
     <h2>Welcome! Today is <%= d.getDate()%></h2>
        <%
          String str1=request.getParameter("val1");
          String str2=request.getParameter("val2");
          a=Integer.parseInt(str1);
          b=Integer.parseInt(str2);
        %>
          <h2>Using Expression Language</h2>
          A= ${param.val1} <br>
          B= ${param.val2} <br>
          <h3>Result: <%= a/b %> </h3>
    </body>
</html>
```

receiveError.jsp

```
<%@page contentType="text/html" pageEncoding="UTF-8"
          isErrorPage="true"%>
<html><head><title>JSP Page</title></head>
    <body>
       <%
          String str1=request.getParameter("val1");
          String str2=request.getParameter("val2");
          if(str1.equals("")||str2.equals("")){ %>
               <h3> Please enter the values properly </h3>
               <jsp:include page="index.html"/>
          <% } else { %>
               <h3>Sorry an exception occured!</h3>
               <h2>The exception is: <%= exception %> </h2>
          <% } %>
    </body>
</html>
```

10. Write a JAVA Program to insert data into Student DATA BASE and retrieve info based on particular queries(For example update, delete, search etc…).

StudentInfo.java

```
package lab9;

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

public class StudentInfo {
    Connection con;
    public void establishConnection(){
      try { Class.forName("com.mysql.jdbc.Driver");
        con=DriverManager.getConnection("jdbc:mysql://localhost:3309
                                        /studentdb", "root", "rnsit");
        }
        catch(Exception e){
            System.err.println("Connection failed" +e);
        }
    }

    public void sInsert(String usn, String name, String dept)
            throws ClassNotFoundException, SQLException{

        PreparedStatement pst=null;
        establishConnection();
        try {
            if(con!=null){
                pst=con.prepareStatement("insert into student
                                          values(?,?,?)");
                pst.setString(1, usn);  pst.setString(2,name);
                pst.setString(3,dept);
                int i=pst.executeUpdate();
                if(i==1){
                    System.out.println("Record inserted successfully");
                }
            }
        catch(SQLException e){
            System.err.println(e.getMessage());
        }
        finally {
            pst.close(); con.close();
        }
    }
```

StudentInfo.java(continued)

```
    public void sSelect(String usn)throws ClassNotFoundException,
                                          SQLException{
     PreparedStatement pst=null; ResultSet res;
     establishConnection();
     try{
      if(con!=null){
       pst=con.prepareStatement("select * from student where usn=?");
       pst.setString(1, usn);
       res=pst.executeQuery();

       if(res.next()){
         System.out.println("USN= "+res.getString(1)
                         +"\tName="+ res.getString(2)
                         + "\tDepartment= "+res.getString(3));
       }
      }
     }
     catch(SQLException e){
       System.err.println(e.getMessage());
     }
     finally{
       pst.close();
       con.close();
    }
  }

  public void sUpdate(String usn, String name, String dept)
              throws ClassNotFoundException, SQLException{
     PreparedStatement pst=null;
     establishConnection();
     try{
       if(con!=null){
         pst=con.prepareStatement("update student set name=?, dept=?
                                                  where usn=?");
         pst.setString(1, name);
         pst.setString(2,dept);
         pst.setString(3,usn);
         int i=pst.executeUpdate();
         if(i==1)
           System.out.println("Record updated successfully");
         else
           System.out.println("No such record");
       }
     }
     catch(SQLException e){System.err.println(e.getMessage()); }
     finally{  pst.close();    con.close();      }
  }
```

StudentInfo.java(continued)

```
    public void sDelete(String usn)throws ClassNotFoundException,
                                          SQLException{

       PreparedStatement pst=null;
       establishConnection();
       try{
         if(con!=null){
           pst=con.prepareStatement("delete from student where usn=?");
           pst.setString(1, usn);
           int i=pst.executeUpdate();
           if(i==1)
              System.out.println("Record deleted successfully");
           else
              System.out.println("No such record");
         }
       }
       catch(SQLException e){
          System.err.println(e.getMessage());
       }
       finally{
          pst.close();
          con.close();
       }
    }

     public void viewAll( )throws ClassNotFoundException,
                                  SQLException {
          PreparedStatement pst=null; ResultSet res;
          establishConnection();
          try{
             if(con!=null){
               pst=con.prepareStatement("select * from student");
               res=pst.executeQuery();
               while(res.next()){
                    System.out.println("USN= "+res.getString(1)+
                    "\tName= "+res.getString(2)+
                    "\tDepartment= "+res.getString(3));
               }
             }
           }
           catch(SQLException e){
               System.err.println(e.getMessage());
           }
           finally{
               pst.close();   con.close();
           }}
```

StudentInfo.java(continued)

```
public static void main(String[] args)throws
                        ClassNotFoundException, SQLException {
  StudentInfo std=new StudentInfo();

  String usn,name,dept;
  Scanner sc=new Scanner(System.in);

  while(true){
     System.out.println("Operations on Student table");
     System.out.println("1.Insert\n2.Select\n3.Update\n 4.Delete\n
                         5.View All\n6.Exit");
     System.out.println("select the operation");
     switch(sc.nextInt()){
         case 1: System.out.println("Enter USN to insert");
                 usn=sc.next();
                 System.out.println("Enter Name to insert");
                 name=sc.next();
                 System.out.println("Enter Deapartment to  insert");
                 dept=sc.next();
                 std.sInsert(usn, name, dept);
         break;
         case 2: System.out.println("Enter USN to select");
                 usn=sc.next();
                 std.sSelect(usn);
         break;
         case 3: System.out.println("Enter USN to update");
                 usn=sc.next();
                 System.out.println("Enter Name to update");
                 name=sc.next();
                 System.out.println("Enter department to update");
                 dept=sc.next();
                 std.sUpdate(usn, name, dept);
         break;
         case 4: System.out.println("Enter USN to delete");
                 usn=sc.next();
                 std.sDelete(usn);
         break;
         case 5: std.viewAll();
         break;
         case 6: System.exit(0);
         default: System.out.println("Invalid operation");
         break;
     }
   }
}}
```

11. An EJB application that demonstrates Session Bean (with appropriate business logic).

NewSessionBeanLocal.java (SessionBean)

```
package lab11;

import javax.ejb.Local;

@Local
public interface NewSessionBeanLocal {

    double FindSquare(double num);

}
```

NewSessionBean.java (SessionBean)

```
package lab11;

import javax.ejb.Stateless;

@Stateless
public class NewSessionBean implements NewSessionBeanLocal {

    @Override
    public double FindSquare(double num) {
        return (num*num);
    }
}
```

index.html

```
<!DOCTYPE html>
<html>
    <body>
        <form action="Lab11">
            <input type="text" name="val"/>
            <input type="submit"/>
        </form>
    </body>
</html>
```

Lab11.java (Servlet)

```
package lab11;

import java.io.*;
import javax.ejb.EJB;
import javax.servlet.ServletException;
import javax.servlet.http.*;

public class Lab11 extends HttpServlet {

    @EJB
    private NewSessionBeanLocal newSessionBean;

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

        response.setContentType("text/html;charset=UTF-8");
        try (PrintWriter out = response.getWriter()) {

            out.println("<!DOCTYPE html>");
            out.println("<html>");
            out.println("<head>");
            out.println("<title>Servlet Lab11</title>");
            out.println("</head>");
            out.println("<body>");

            double input, output;
            input = Double.parseDouble(request.getParameter("val"));
            output = newSessionBean.FindSquare(input);
            out.println(" Result =" + output);

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

12. An EJB application that demonstrates MDB (with appropriate business logic).

MBean.java (Message Driven Bean)

```
package MSG;

import java.util.logging.Level;
import java.util.logging.Logger;
import javax.ejb.ActivationConfigProperty;
import javax.ejb.MessageDriven;
import javax.jms.*;
import javax.jms.MessageListener;

@MessageDriven(mappedName = "jms/dm", activationConfig = {
    @ActivationConfigProperty(propertyName = "destinationType",
              propertyValue = "javax.jms.Queue")
})
public class MBean implements MessageListener {
    public MBean() {
    }

    @Override
    public void onMessage(Message message) {
        TextMessage tmsg=null;
        tmsg=(TextMessage)message;
        try {
            System.out.println("Message is: " + tmsg.getText());
        }
        catch (JMSException ex) {
         Logger.getLogger(MBean.class.getName()).log(Level.SEVERE,
                                                 null, ex);
        }
    }
}
```

index.jsp

```
<!DOCTYPE html>
<html>
    <body>
    <form action="MServlet">
        Enter Message:<input type="text" name="msg" size="80"></br>
              <input type="submit" value="Send Message" />
    </form>
    </body>
</html>
```

MServlet.java(Servlet)

```
import java.io.IOException;
import java.io.PrintWriter;
import java.util.logging.Level;
import java.util.logging.Logger;
import javax.annotation.Resource;
import javax.jms.Connection;
import javax.jms.ConnectionFactory;
import javax.jms.JMSException;
import javax.jms.Message;
import javax.jms.MessageProducer;
import javax.jms.Queue;
import javax.jms.Session;
import javax.jms.TextMessage;
import javax.servlet.ServletException;
import javax.servlet.http.*;

public class MServlet extends HttpServlet {

    @Resource(mappedName = "jms/dm")
    private Queue dm;
    @Resource(mappedName = "jms/ queue1")
    private ConnectionFactory queue1;

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

        response.setContentType("text/html;charset=UTF-8");
        String str=request.getParameter("msg");
        try {
            sendJMSMessageToDm(str);
        }
        catch (JMSException ex) {
           Logger.getLogger(MServlet.class.getName()).log(Level.SEVERE,
                                        null, ex);
        }
        try (PrintWriter out = response.getWriter()) {
            out.println("<!DOCTYPE html>");
            out.println("<html>");
            out.println("<head>");
            out.println("<title>Servlet MServlet</title>");
            out.println("</head>");
            out.println("<body>");
            out.println("<h1>Check your Server log!! </h1>");
            out.println("</body>");
            out.println("</html>");
        }
```

MServlet.java(Servlet) continued

```
    private Message createJMSMessageForjmsDm(Session session,
                        Object messageData) throws JMSException {
        // TODO create and populate message to send
        TextMessage tm = session.createTextMessage();
        tm.setText(messageData.toString());
        return tm;
    }

    private void sendJMSMessageToDm(Object messageData)
                                        throws JMSException {
        Connection connection = null;
        Session session = null;
        try {
            connection = queue1.createConnection();
            session = connection.createSession(false,
                                Session.AUTO_ACKNOWLEDGE);
            MessageProducer messageProducer =
                                session.createProducer(dm);
            messageProducer.send(createJMSMessageForjmsDm(session,
                                                messageData));
        } finally {
            if (session != null) {
                try {
                    session.close();
                }
               catch (JMSException e) {
                    Logger.getLogger(this.getClass().getName()).
                    log(Level.WARNING, "Cannot close session", e);
                }
            }
            if (connection != null) {
                connection.close();
            }
        }
    }
}
```

13. An EJB application that demonstrates persistence (with appropriate business logic).

BookEB java(Entity Bean)

```
package Book;

import java.io.Serializable;
import javax.persistence.Entity;
import javax.persistence.GeneratedValue;
import javax.persistence.GenerationType;
import javax.persistence.Id;

@Entity
public class BookEB implements Serializable {
    private static final long serialVersionUID = 1L;
    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    private Long id;
    private String name;
    private int price;

    public Long getId() {
        return id;
    }
    public void setId(Long id) {
        this.id = id;
    }

    @Override
    public int hashCode() {
        int hash = 0;
        hash += (id != null ? id.hashCode() : 0);
        return hash;
    }

    @Override
    public boolean equals(Object object) {
         if (!(object instanceof BookEB)) {
            return false;
        }
        BookEB other = (BookEB) object;
        if ((this.id == null && other.id != null) ||
                    (this.id != null && !this.id.equals(other.id))) {
            return false;
        }
        return true;
    }
    @Override
    public String toString() {
        return "Book.BookEB[ id=" + id + " ]";
    }
```

BookEB java(Entity Bean) Continued

```
    public String getName() {
        return name;
    }

    public void setName(String name) {
        this.name = name;
    }

    public int getPrice() {
        return price;
    }

    public void setPrice(int price) {
        this.price = price;
    }
}
```

AbstractFacade.java

```
package Book;
import java.util.List;
import javax.persistence.EntityManager;

public abstract class AbstractFacade<T> {
    private Class<T> entityClass;

    public AbstractFacade(Class<T> entityClass) {
        this.entityClass = entityClass;
    }

    protected abstract EntityManager getEntityManager();

    public void create(T entity) {
        getEntityManager().persist(entity);
    }

    public void edit(T entity) {
        getEntityManager().merge(entity);
    }

    public void remove(T entity) {
        getEntityManager().remove(getEntityManager().merge(entity));
    }

    public T find(Object id) {
        return getEntityManager().find(entityClass, id);
    }
```

AbstractFacade.java(Continued)

```
    public List<T> findAll() {
        javax.persistence.criteria.CriteriaQuery cq =
                getEntityManager().getCriteriaBuilder().createQuery();

        cq.select(cq.from(entityClass));
        return getEntityManager().createQuery(cq).getResultList();
    }

    public List<T> findRange(int[] range) {
        javax.persistence.criteria.CriteriaQuery cq =
                getEntityManager().getCriteriaBuilder().createQuery();
        cq.select(cq.from(entityClass));
        javax.persistence.Query q = getEntityManager().createQuery(cq);
        q.setMaxResults(range[1] - range[0] + 1);
        q.setFirstResult(range[0]);
        return q.getResultList();
    }

    public int count() {
        javax.persistence.criteria.CriteriaQuery cq =
          getEntityManager().getCriteriaBuilder().createQuery();
        javax.persistence.criteria.Root<T> rt = cq.from(entityClass);
        cq.select(getEntityManager().getCriteriaBuilder().count(rt));
        javax.persistence.Query q = getEntityManager().createQuery(cq);
        return ((Long) q.getSingleResult()).intValue();
    }
}
```

BookEBFacadeLocal.java(Session Bean for Entity)

```
package Book;
import java.util.List;
import javax.ejb.Local;

@Local
public interface BookEBFacadeLocal {
    void create(BookEB bookEB);
    void edit(BookEB bookEB);
    void remove(BookEB bookEB);
    BookEB find(Object id);
    List<BookEB> findAll();
    List<BookEB> findRange(int[] range);
    int count();
}
```

BookEBFacade.java(Session Bean for Entity)

```
package Book;

import javax.ejb.Stateless;
import javax.persistence.EntityManager;
import javax.persistence.PersistenceContext;

@Stateless
public class BookEBFacade extends AbstractFacade<BookEB> implements
BookEBFacadeLocal {

    @PersistenceContext(unitName = "Lab13-EB-ejbPU")
    private EntityManager em;

    @Override
    protected EntityManager getEntityManager() {
        return em;
    }

    public BookEBFacade() {
        super(BookEB.class);
    }

}
```

index.jsp

```
<!DOCTYPE html>
<html>
    <head><title>JSP Page</title></head>
    <body>
        <form action="BookServlet">
            Enter Text: <input type="text" name="text"/>
            Enter Price: <input type="text" name="price"/>
            <input type="submit" value="Click Here"/>
        </form>
    </body>
</html>
```

BookServlet.java(Servlet)

```
import Book.BookEB;
import Book.BookEBFacadeLocal;
import java.io.IOException;
import java.io.PrintWriter;
import javax.ejb.EJB;
import javax.servlet.ServletException;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

public class BookServlet extends HttpServlet {
    @EJB
    private BookEBFacadeLocal bookEBFacade;

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

        response.setContentType("text/html;charset=UTF-8");
        try (PrintWriter out = response.getWriter()) {

            String tname=request.getParameter("text");
            int pr=Integer.parseInt(request.getParameter("price"));

            BookEB obj=new BookEB();
            obj.setName(tname);
            obj.setPrice(pr);

            bookEBFacade.create(obj);
            out.println("<!DOCTYPE html>");
            out.println("<html>");
            out.println("<head>");
            out.println("<title>Servlet BookServlet</title>");
            out.println("</head>");
            out.println("<body>");
            out.println("<h1>Table Created and Data Inserted</h1>");
            out.println("</body>");
            out.println("</html>");
        }
    }
}
```