

CNT 4714: Enterprise Computing Spring 2014

Introduction to JavaServer Pages (JSP) – Part 2

Instructor : Dr. Mark Llewellyn
 markl@cs.ucf.edu
 HEC 236, 407-823-2790
 <http://www.cs.ucf.edu/courses/cnt4714/spr2014>

Department of Electrical Engineering and Computer Science
Computer Science Division
University of Central Florida



A JSPs Conversion To A Servlet

- As shown in the diagram of the lifecycle of a JSP shown in part 2 (page 2), a JSP is converted into a servlet during execution.
- While the converted servlet looks very similar in nature to those we have already seen, there are some differences.
- Within Tomcat, the servlet version of the JSP is stored in the `work` directory (see part 2, page 12).
- The exact directory within the `work` directory depends in part on your Tomcat set-up and in part on your web-application structure. The next slide illustrates the location of the servlet files that were generated for the `ComputeLoan.jsp` and `ComputeLoan2.jsp` applications that appeared in part 2 of the notes on pages 7 and 13 respectively.



Servlet Versions of JSPs in Tomcat

File Home Share View

Navigation pane Preview pane Details pane

Layout Extra large icons Large icons Medium icons Small icons List Details

Current view Show/hide Item check boxes File name extensions Hidden items Hide selected items Options

Search jsp

clock.jsp.class clock.jsp clock2.jsp.class clock2.jsp ComputeL_oan.jsp.class ComputeL_oan.jsp ComputeL_oan2.jsp.class ComputeL_oan2.jsp forward1.jsp.class forward1.jsp forward2.jsp.class forward2.jsp include.jsp.class include.jsp welcome.jsp.class welcome.jsp

16 items

Directory location of the servlet files in work/Catalina/localhost/CNT4714/org/apache/jsp/jsp

The servlet files corresponding to the JSPs from the loan web-application example



The Converted JSP - Servlet Version

ComputeLoan

```
1  /*
2  * Generated by the Jasper component of Apache Tomcat
3  * Version: Apache Tomcat/7.0.42
4  * Generated at: 2014-03-12 20:42:01 UTC
5  * Note: The last modified time of this file was set to
6  *       the last modified time of the source file after
7  *       generation to assist with modification tracking.
8  */
9  package org.apache.jsp.jsp;
10
11  import javax.servlet.*;
12  import javax.servlet.http.*;
13  import javax.servlet.jsp.*;
14
15  public final class ComputeLoan_jsp extends org.apache.jasper.runtime.HttpJspBase
16  implements org.apache.jasper.runtime.JspSourceDependent {
17
18  private static final javax.servlet.jsp.JspFactory _jspxFactory =
19  javax.servlet.jsp.JspFactory.getDefaultFactory();
20
21  private static java.util.Map<java.lang.String,java.lang.Long> _jspx_dependants;
22
23  private javax.el.ExpressionFactory _el_expressionfactory;
24  private org.apache.tomcat.InstanceManager _jsp_instancemanager;
```

Note that this package is reflected in the location shown in the previous slide.

Java source file length: 4648 lines: 114 Ln: 1 Col: 1 Sel: 0|0 Dos\Windows ANSI as UTF-8 INS



```

File Edit Search View Encoding Language Settings Macro Run Plugins Window ?
hilit_e_field_basic3.html notes.html hw3dbscript-V2.sql ComputeLoan_jsp.java
61
62     out.write("<!-- ComputeLoan.jsp -->\r\n");
63     out.write("<html>\r\n");
64     out.write("<head>\r\n");
65     out.write("     <title>ComputeLoan</title>\r\n");
66     out.write("</head><body bgcolor=white background=images/background.jpg lang=EN-US link=blue vlink=blue\r\n");
67     out.write("style='tab-interval:.5in'>\r\n");
68     double loanAmount = Double.parseDouble( request.getParameter("loanAmount"));
69     double annualInterestRate = Double.parseDouble(request.getParameter("annualInterestRate"));
70     double numberOfYears = Integer.parseInt(request.getParameter("numberOfYears"));
71     double monthlyInterestRate = annualInterestRate / 1200;
72     double monthlyPayment = loanAmount * monthlyInterestRate /
73         (1 - 1 / Math.pow(1 + monthlyInterestRate, numberOfYears * 12));
74     double totalPayment = monthlyPayment * numberOfYears * 12;
75
76     out.write("\r\n");
77     out.write("<b><font size = 7> Loan Details </b></font><br><br>\r\n");
78     out.write("<font size = 5>\r\n");
79     out.write("Loan Amount: \r\n");
80     out.write("    ");
81     out.print( loanAmount );
82     out.write("    <br><br>\r\n");
83     out.write("Annual Interest Rate: \r\n");
84     out.write("    ");
85     out.print( annualInterestRate );
86     out.write("    <br><br>\r\n");
87     out.write("Number of Years: \r\n");
88     out.write("    ");
89     out.print( numberOfYears );
90     out.write("    <br><br>\r\n");
91     out.write("<b>\r\n");
92     out.write("Monthly Payment:\r\n");

```

Scroll well down in this file and eventually you will find the beginning of the original HTML output from the JSP.



The Converted JSP - Servlet Version

ComputeLoan2

```
1  /*
2  * Generated by the Jasper component of Apache Tomcat
3  * Version: Apache Tomcat/7.0.42
4  * Generated at: 2014-03-12 20:42:58 UTC
5  * Note: The last modified time of this file was set to
6  *       the last modified time of the source file after
7  *       generation to assist with modification tracking.
8  */
9  package org.apache.jsp.jsp;
10
11  import javax.servlet.*;
12  import javax.servlet.http.*;
13  import javax.servlet.jsp.*;
14  import code.Loan;
15
16  public final class ComputeLoan2_jsp extends org.apache.jasper.runtime.HttpJspBase
17  implements org.apache.jasper.runtime.JspSourceDependent {
18
19  private static final javax.servlet.jsp.JspFactory _jspxFactory =
20  javax.servlet.jsp.JspFactory.getDefaultFactory();
21
22  private static java.util.Map<java.lang.String,java.lang.Long> _jspx_dependants;
23
24  private javax.el.ExpressionFactory _el_expressionfactory;
```

Import the Loan class in package code



```

File Edit Search View Encoding Language Settings Macro Run Plugins Window ?
hiltite_field_basic3.html notes.html hw3dbscript-V2.sql ComputeLoan_jsp.java ComputeLoan2_jsp.java
61  _jspx_out = out;
62
63  out.write("<!-- ComputeLoan2.jsp -->\r\n");
64  out.write("<html>\r\n");
65  out.write("<head>\r\n");
66  out.write("<title>ComputeLoan</title>\r\n");
67  out.write("</head><body bgcolor=white background=images/ba\r\n");
68  out.write("style='tab-interval:.5in'>\r\n");
69  out.write("\r\n");
70  out.write("\r\n");
71  double loanAmount = Double.parseDouble( request.getParameter("loanAmount"));
72  double annualInterestRate = Double.parseDouble(request.getParameter("annualInterestRate"));
73  int numberOfYears = Integer.parseInt(request.getParameter("numberOfYears"));
74
75  Loan loan = new Loan (annualInterestRate, numberOfYears, loanAmount);
76
77  out.write("\r\n");
78  out.write("\r\n");
79  out.write("<b><font size = 7> Loan Details </b></font><br><br>\r\n");
80  out.write("<font size = 5>\r\n");
81  out.write("Loan Amount: \r\n");
82  out.print( loanAmount );
83  out.write("  <br><br>\r\n");
84  out.write("Annual Interest Rate: \r\n");
85  out.print( annualInterestRate );
86  out.write("  <br><br>\r\n");
87  out.write("Number of Years: \r\n");
88  out.print( numberOfYears );
89  out.write("  <br><br>\r\n");

```

Begin the HTML content from the original ComputeLoad.jsp file now constructed from within the servlet (i.e., Java).

Java source file length: 4503 lines: 113 Ln: 1 Col: 1 Sel: 0|0 Dos\Windows ANSI as UTF-8 INS



<jsp: setProperty> Action

- Action <jsp: setProperty> sets JavaBean property values and is most useful for mapping request parameter values to JavaBean properties.
- Request parameters can be used to set properties of primitive types `boolean`, `byte`, `char`, `short`, `int`, `long`, `float` and `double` as well as `java.lang` types `String`, `Boolean`, `Byte`, `Character`, `Short`, `Integer`, `Long`, `Float`, and `Double`.
- The table on the following page summarizes the attributes of this action.



<jsp: setProperty> Action

Attribute	Description
name	The ID of the JavaBean for which a property (or properties) will be set.
property	The name of the property to set. Specifying "*" for this attribute specifies that the JSP should match the request parameters to the properties of the bean. For each request parameter that matches (i.e., the name of the request parameter is identical to the bean's property name), the corresponding property in the bean is set to the value of the parameter. If the value of the request parameter is "", the property value in the bean remains unchanged.
param	If the request parameter names do not match bean property names, this attribute can be used to specify which request parameter should be used to obtain the value for a specific bean property. This attribute is optional. If this attribute is omitted, the request parameter names must match the bean property names.
value	The value to assign to a bean property. The value typically is the result of a JSP expression. This attribute is particularly useful for setting bean properties that cannot be set using request parameters. This attribute is optional. If this attribute is omitted, the JavaBean property must be of a type that can be set using request parameters.



JSP Directives

- Directives are messages to the JSP container that enable the programmer to specify page settings, such as, the error page to invoke if an error occurs (page directive), including content from other resources (include directive), and to specify custom-tag libraries for use in a JSP (taglib directive).
- Directives are delimited by `<%@` and `%>` and are processed at translation time. As such, directives do not produce any immediate output, because they are processed before the JSP accepts any requests.
- For our purposes here, the most important of these is the page directive, which we will make use of in the final example JSP. Some of the attributes of the page directive are shown on the next page.



JSP Page Directive Attributes

Attribute	Description
import	Specifies a comma-separated list of fully qualified type names and/or packages that will be used in the current JSP.
errorPage	Any exceptions in the current page that are not caught are sent to the error page for processing. The error-page implicit object <code>exception</code> references the original exception.
extends	Specifies the class from which the translated JSP can inherit. This attribute must be a fully qualified class name.



<jsp: useBean> Action

- Action <jsp: useBean> enables a JSP to manipulate a Java object. This action creates a Java object or locates an existing object for use in the JSP.
- The table on the following page summarizes the attributes of this action.
- If attributes `class` and `beanName` are not specified, the JSP container attempts to locate an existing object of the type specified in attribute `type`.
- Like JSP implicit objects, objects specified with this action have scope – page, request, session, or application – which indicates where they can be used in a web application. (Recall that objects with page scope are only accessible by the page in which they are defined. For example, all JSPs that process a single request can access an object in request scope.)



<jsp:useBean> Action

Attribute	Description
id	The name used to manipulate the Java object with actions <code><jsp:setProperty></code> and <code><jsp:getProperty></code> . A variable of this name is also declared for use in JSP scripting elements. Case sensitive.
scope	The scope in which the Java object is accessible – <code>page</code> , <code>request</code> , <code>session</code> , or <code>application</code> . The default scope is <code>page</code> .
class	The fully qualified class name of the Java object.
beanName	The name of the JavaBean that can be used with method <code>instantiate</code> of class <code>java.beans.Beans</code> to load a JavaBean into memory.
type	The type of the JavaBean. This can be the same type as the <code>class</code> attribute, a superclass of that type, or an interface implemented by that type. The default value is the same as for attribute <code>class</code> . A <code>ClassCastException</code> occurs if the Java object is not of the type specified with attribute <code>type</code> .



A JSP Using `<jsp:useBean>` Action

- A common feature on many web sites is to place rotating advertisements on their webpages. Each visit to one of these pages results in a different advertisement being displayed in the user's web browser. Typically, when you click on the advertisement (or picture of a product) you are redirected to the website of the company that placed the advertisement or to the page that more completely describes the product.
- The next example illustrates a similar scenario, by rotating through a series of pictures (click the refresh button of your browser to simulate multiple logins or login from different browsers). In this example, I set it up to rotate through some pictures of some of my toys. If you click on a picture...you'll be redirected to the manufacturer's web page.



A JSP Using the <jsp: useBean> Action

```
// Rotator.java
// A JavaBean that rotates pictures.
package com.cnt4174.jsp.beans;

public class Rotator
{
    private String images[] = { "images/image1.jpg",
        "images/image2.jpg", "images/image3.jpg",
        "images/image4.jpg", "images/image5.jpg" };

    private String links[] = {
        "http://www.eddymerckx.be",
        "http://www.competitivecyclist.com",
        "http://www.bianchi-usa.com",
        "http://www.colnago.it",
        "http://www.cometkartsales.com" };

    private int selectedIndex = 0;

    // returns image file name for current ad
    public String getImage()
    {
        return images[ selectedIndex ];
    } // end method getImage
```

```
//continue here -- returns the URL for corresponding Web
site
    public String getLink() {
        return links[ selectedIndex ];
    } // end method getLink

    // update selectedIndex so next calls to getImage and
    // getLink return a different picture

    public void nextPic()
    {
        selectedIndex = ( selectedIndex + 1 ) % images.length;
    } // end method nextPic
} // end class Rotator
```



picturerotator.jsp

```
<?xml version = "1.0"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<!-- picturerotator.jsp -->
<jsp:useBean id = "rotator" scope = "session"
  class = "com.cnt4714.jsp.beans.Rotator" />
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head>
    <title>PictureRotator Example</title>
    <style type = "text/css">
      .big { font-family: helvetica, arial, sans-serif; font-weight: bold; font-size: 2em }
    </style>
    <%-- update picture --%>
    <% rotator.nextPic(); %>
  </head>
  <body>
    <p class = "big">PictureRotator Example</p>
    <p>
      <a href = "<jsp:getProperty name = "rotator"
        property = "link" />">

      <img src = "<jsp:getProperty name = "rotator"
        property = "image" />" alt = "picture" />
    </a>
    </p>
  </body>
</html>
```

<jsp: useBean> action
specifying id, scope, and
class



AdRotator Example - Opera

File Edit View Bookmarks Tools Help

Open Save Print Find Home Tile Cascade


AdRotator Example x Downloads x Welcome to Opera x +

Web localhost:8080/CNT4714/jsp/picturerotator.jsp

Search with Google

Home Index Contents Search Glossary Help First Previous Next Last Up Copyright Author

PictureRotator Example



First image seen in the rotation of five images.



AdRotator Example - Opera

File Edit View Bookmarks Tools Help

Open Save Print Find Home Tile Cascade


AdRotator Example x Downloads x Welcome to Opera x +

Web localhost:8080/CNT4714/jsp/picturerotator.jsp

Search with Google

Home Index Contents Search Glossary Help First Previous Next Last Up Copyright Author

PictureRotator Example



Second image seen in the rotation of five images.



AdRotator Example - Opera

File Edit View Bookmarks Tools Help

Open Save Print Find Home Tile Cascade


AdRotator Example x Downloads x Welcome to Opera x +

Web localhost:8080/CNT4714/jsp/picturerotator.jsp

Search with Google

Home Index Contents Search Glossary Help First Previous Next Last Up Copyright Author

PictureRotator Example



Another image seen in the rotation of five images.

Reload (Ctrl+R)

The image shows a screenshot of a web browser window. The browser is Opera, and the page is titled 'AdRotator Example'. The URL in the address bar is 'localhost:8080/CNT4714/jsp/picturerotator.jsp'. The page content features a large heading 'PictureRotator Example' and a photograph of a blue and red Merckx road bicycle. A blue arrow points from a text box on the right to the bicycle image. The text box contains the text 'Another image seen in the rotation of five images.' The browser interface includes a menu bar, a toolbar, and a sidebar with navigation links.



AdRotator Example - Opera

File Edit View Bookmarks Tools Help

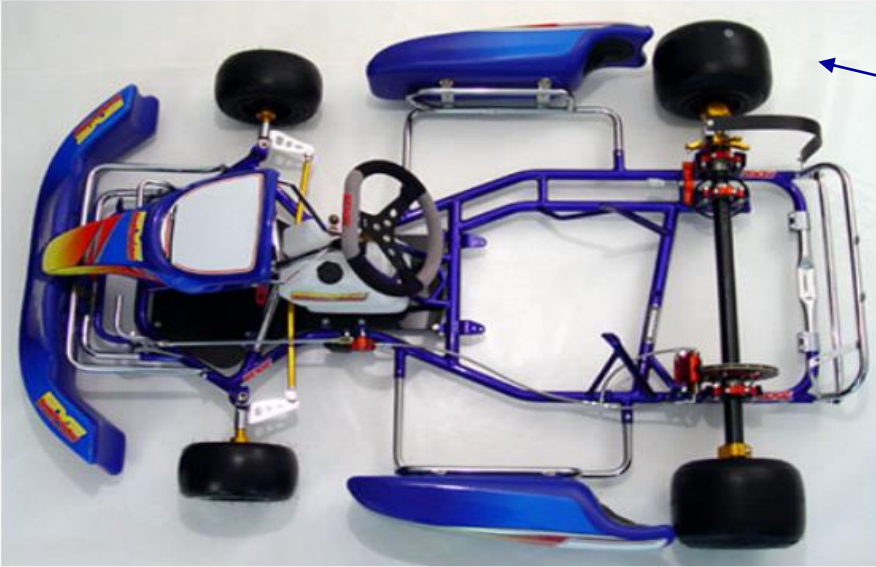
Open Save Print Find Home Tile Cascade

AdRotator Example x Downloads x Welcome to Opera x +

Web localhost:8080/CNT4714/jsp/picturerotator.jsp

Home Index Contents Search Glossary Help First Previous Next Last Up Copyright Author

PictureRotator Example



Fifth and final image seen in the rotation of five images.

The image shows a screenshot of a web browser window. The browser title is 'AdRotator Example - Opera'. The address bar shows the URL 'localhost:8080/CNT4714/jsp/picturerotator.jsp'. The page content features a large heading 'PictureRotator Example' and a photograph of a go-kart chassis. A blue arrow points from a text box on the right to the top-right wheel of the go-kart. The text box contains the text 'Fifth and final image seen in the rotation of five images.' The browser interface includes standard navigation buttons and a search bar with the text 'Search with Google'.



Comet Kart Sales - The Largest Kart Shop on the Net - Racing Karts, Go Kart, Go Karts, Go Karting - Opera

File Edit View Bookmarks Tools Help

Open Save Print Find Home Tile Cascade

Comet Kart Sales -... x Downloads x Welcome to Opera x

Web www.cometkartsales.com Search with Google

Home Index Contents Search Glossary Help First Previous Next Last Up Copyright Author

CHECK KART Search Comet

ABOUT US NEWS SPECIALS
FAQs CATALOG REQUEST EMAIL

COMET THE LARGEST KART SHOP ON THE NET
kart sales

Welcome to the World's Largest Online Karting Catalog!

We have thousands of karting's most popular products in stock! You order it, we ship it! Comet can supply you with everything from nuts and bolts to turnkey race winning capable karts and engines!

COMET NEWS

- **Arrow Racing Karts**
Click here for details...
- **CRG Racing Karts**
Click here for details...
- **Comet Eagle Racing Karts**
Click here for details...
- **Margay Racing Karts**
Click here for details...
- **Tony Racing Karts**
Click here for details...
- **Comet Racing Engines**
We Build Measurement Click here for details...

Beginners Guide to Karting
[Click Here for Details](#)

Comet Racing Results

2012 Comet Race Support Schedule

New Castle

Redirected to web site by clicking on the image



More Details On Using Beans

- The `Rotator` bean has three elements: `getImage`, `getLink`, and `nextPic`.
 - Method `getImage` returns the image file name for the picture to be displayed.
 - Method `getLink` returns the hyperlink to the manufacturer/supplier of the “toy”.
 - Method `nextPic` updates the `Rotator` so that the next calls to `getImage` and `getLink` will return information for a different picture.
- Methods `getImage` and `getLink` each represent a read-only JavaBean property – `image` and `link`, respectively. These are read-only properties because no `set` methods are provided to change their values.
- `Rotator` keeps track of the current picture with its `selectedIndex` variable, which is updated by invoking method `nextPic`.



More Details On Using Beans (cont.)

- JavaBeans were originally intended to be manipulated visually in **visual development environments** (often called **builder tools** or **IDEs**).
- Builder tools that support beans provide programmers with tremendous flexibility by allowing for the reuse and integration of existing disparate components that, in many cases, were never intended to be used together.
- When used in an IDE, JavaBeans adhere to the following coding conventions:
 1. Implements the Serializable interface.
 2. Provides a public no-argument (default) constructor.
 3. Provides `get` and/or `set` methods for properties (which are normally implemented as fields.)



More Details On Using Beans (cont.)

- When used on the server side, such as within a JSP or a servlet, JavaBeans are less restricted.
 - Notice for example, that the `Rotator` bean does not implement the `Serializable` interface because there is no need to save and load the `Rotator` bean as a file.
- The JSP `picturerotator.jsp` (see page 6) obtains a reference to an instance of class `Rotator`. The `id` for the bean is `rotator`. The JSP uses this name to manipulate the bean. The scope of the object is `session`, so that every client will see the same sequence of pictures during their browsing sessions.



More Details On Using Beans (cont.)

- When `picturerotator.jsp` receives a request from a new client, the JSP container creates the bean and stores it in that client's session (an `HttpSession` object).
- In each request to this JSP, the `rotator` reference which is created is used to invoke the `Rotator` bean's `nextPic` method. Therefore, each request will receive the next picture selected by the `Rotator` bean.
- Notice the two `<jsp: getProperty>` actions in the `picturerotator.jsp` file. One of these obtains the `link` property value from the bean, the other obtains the `image` property value.
 - Action `<jsp: getProperty>` has two attributes: `name` and `property`, which specify the bean object to manipulate and the property to get.



More Details On Using Beans (cont.)

- Action `<jsp: getProperty>` has two attributes: `name` and `property`, which specify the bean object to manipulate and the property to get.
 - If the JavaBean object uses standard JavaBean naming conventions, the method used to obtain the `link` property value from the bean should be `getLink`.
 - Action `<jsp: getProperty>` invokes `getLink` on the bean referenced with `rotator`, converts the return value into a `String` and outputs the `String` as a part of the response to the client.



More Details On Using Beans (cont.)

- The link and image properties can also be obtained with JSP expressions.
 - The action `<jsp: getProperty>` (see page 6 for location, the line looks like: `<a href = "<jsp:getProperty name = "rotator" property = "link" />">`) could be replaced with the expression: `<%= rotator.getLink() %>`
 - Similarly, the action `<jsp: getProperty>` (see page 6 for location, the line looks like: `<img src = "<jsp:getProperty name = "rotator" property = "image" />" alt = "picture" />`) could be replaced with the expression:
`<%= rotator.getImage() %>`
- However, the benefit of using actions is that someone who is unfamiliar with Java can be told the name of a property and the name of a bean, and it is the action's responsibility to invoke the appropriate methods. The Java programmer's job is to create a bean that supports the capabilities required by the page designer.



Final JSP Example - GuestBook

- Our final JSP example will illustrate many of the techniques that we've covered in dealing with JDBC, servlets, and JSPs.
- This example constructs a simple MySQL database to maintain a guest book that includes a guest's first name, last name, and email address.
 - Once a guest enters their name into the guestbook, they will see a webpage containing all the guests in the guest book. Each email address is displayed as a hyperlink that makes it possible for guests to send email to another guest.
- This example illustrates the `<jsp: setProperty>` action, the JSP page directive, JSP error pages, and using JDBC from a JSP.



GuestBean.java

```
// GuestBean.java
// JavaBean to store data for a guest in the guest book.
package com.cnt4714.jsp.beans;

public class GuestBean
{
    private String firstName;
    private String lastName;
    private String email;

    // set the guest's first name
    public void setFirstName( String name )
    {
        firstName = name;
    } // end method setFirstName

    // get the guest's first name
    public String getFirstName()
    {
        return firstName;
    } // end method getFirstName
}
```

This JavaBean maintains information for one guest.



GuestBean.java (cont.)

```
// set the guest's last name
public void setLastName( String name )
{
    lastName = name;
} // end method setLastName

// get the guest's last name
public String getLastName()
{
    return lastName;
} // end method getLastName

// set the guest's email address
public void setEmail( String address )
{
    email = address;
} // end method setEmail

// get the guest's email address
public String getEmail()
{
    return email;
} // end method getEmail
} // end class GuestBean
```



GuestDataBean.java

```
// GuestDataBean.java
// Class GuestDataBean makes a database connection and supports
// inserting and retrieving data from the database.
package com.cnt4714.jsp.beans;
```

```
import java.sql.SQLException;
import javax.sql.rowset.CachedRowSet;
import java.util.ArrayList;
import com.sun.rowset.CachedRowSetImpl; // CachedRowSet implementation
```

```
public class GuestDataBean
{
    private CachedRowSet rowSet;
```

This JavaBean performs the database access on behalf of the guestBookLogin.jsp

This application uses the CachedRowSet data model rather than the TableSet from our earlier JDBC application example.

```
// construct TitlesBean object
public GuestDataBean() throws Exception
{
```

Load JDBC driver and connect to database

```
    // load the MySQL driver
    Class.forName( "com.mysql.jdbc.Driver" );
```

```
    // specify properties of CachedRowSet
    rowSet = new CachedRowSetImpl();
    rowSet.setUrl( "jdbc:mysql://localhost:3310/guestbook" );
    rowSet.setUsername( "root" );
    rowSet.setPassword( "root" );
```

Note this will cause compilation errors in Eclipse. Change the default settings in Eclipse : Windows -> Preferences -> Java -> Compiler -> Errors/Warnings -> Deprecated and restricted API -> Forbidden reference (access rules): -> change from error to warning.



GuestDataBean.java (cont.)

```
// obtain list of titles
    rowSet.setCommand(
        "SELECT firstName, lastName, email FROM guests" );
    rowSet.execute();
} // end GuestDataBean constructor

// return an ArrayList of GuestBeans
public ArrayList< GuestBean > getGuestList() throws SQLException
{
    ArrayList< GuestBean > guestList = new ArrayList< GuestBean >();

    rowSet.beforeFirst(); // move cursor before the first row

    // get row data
    while ( rowSet.next() )
    {
        GuestBean guest = new GuestBean();

        guest.setFirstName( rowSet.getString( 1 ) );
        guest.setLastName( rowSet.getString( 2 ) );
        guest.setEmail( rowSet.getString( 3 ) );

        guestList.add( guest );
    } // end while
```



GuestDataBean.java

```
return guestList;
} // end method getGuestList

// insert a guest in guestbook database
public void addGuest( GuestBean guest ) throws SQLException
{
    rowSet.moveToInsertRow(); // move cursor to the insert row

    // update the three columns of the insert row
    rowSet.updateString( 1, guest.getFirstName() );
    rowSet.updateString( 2, guest.getLastName() );
    rowSet.updateString( 3, guest.getEmail() );
    rowSet.insertRow(); // insert row to rowSet
    rowSet.moveToCurrentRow(); // move cursor to the current row
    //rowSet.acceptChanges(); // force propagation of changes to database
} // end method addGuest
} // end class GuestDataBean
```

Note that the `acceptChanges()` method forces MySQL to perform a commit operation to make the changes permanent in the database. If your MySQL installation had autocommit set on (forcing automatic commits, you'll want to comment out this line, or in the reverse, if your MySQL has autocommit set off, you'll need to include this line of code.



GuestBookLogin.jsp

```
<?xml version = "1.0"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- guestBookLogin.jsp -->

<%-- page settings --%>
<%@ page errorPage = "guestBookErrorPage.jsp" %>

<%-- beans used in this JSP --%>
<jsp:useBean id = "guest" scope = "page"
    class = "com.cnt4714.jsp.beans.GuestBean" />
<jsp:useBean id = "guestData" scope = "request"
    class = "com.cnt4714.jsp.beans.GuestDataBean" />

<html xmlns = "http://www.w3.org/1999/xhtml">
<head>
    <title>Guest Book Login</title>
    <style type = "text/css">
        body
        {
            font-family: tahoma, helvetica, arial, sans-serif;
        }
    </style>
</head>
<body>
    <div style = "text-align: center;">
        <h2>Guest Book Login</h2>
        <form>
            <input type = "text" value = "Name" />
            <input type = "text" value = "Email" />
            <input type = "text" value = "Password" />
            <input type = "text" value = "Confirm Password" />
            <input type = "submit" value = "Login" />
        </form>
    </div>
</body>
</html>
```

GuestBookLogin.jsp is a modified version of our welcome1.jsp and welcome1 servlet that we've already seen. It displays a form that the guest uses to enter their information. When the form is submitted, GuestBookLogin.jsp is requested again so that it can ensure that all of the data is entered. If not, the form is regenerated until the guest enters all information. If all information is entered, then this JSP forwards the request to guestBookView.jsp to display the contents of the guest book.

All uncaught exceptions are forwarded to guestBookErrorPage.jsp for processing.



GuestBookLogin.jsp (cont.)

```
table, tr, td {
    font-size: 1.4em;
    border: 3px groove;
    padding: 5px;
    background-color: #dddddd;
}
</style>
</head>
<body>
<jsp:setProperty name = "guest" property = "*" />
<% // start scriptlet
    if ( guest.getFirstName() == null ||
        guest.getLastName() == null ||
        guest.getEmail() == null )
    {
%> <%-- end scriptlet to insert fixed template data --%>
<form method = "post" action = "guestBookLogin.jsp">
    <p>Enter your first name, last name and email
        address to register in our guest book.</p>
    <table>
        <tr>
            <td>First name</td>
            <td>
                <input type = "text" name = "firstName" />
            </td>
        </tr>
    </table>
</form>
```

<jsp:setProperty> action



GuestBookLogin.jsp (cont.)

```
<tr>
  <td>Last name</td>
  <td> <input type = "text" name = "lastName" /> </td>
</tr>
<tr>
  <td>Email</td>
  <td> <input type = "text" name = "email" /> </td>
</tr>
<tr>
  <td colspan = "2"> <input type = "submit" value = "Submit" /> </td>
</tr>
</table>
</form>
<% // continue scriptlet
  } // end if
  else
  {
    guestData.addGuest( guest );
  %> <%-- end scriptlet to insert jsp:forward action --%>
    <%-- forward to display guest book contents --%>
    <jsp:forward page = "guestBookView.jsp" />
  <% // continue scriptlet
  } // end else
  %> <%-- end scriptlet --%>
</body>
</html>
```

Once the guest has entered their information into the database, the guestBookView is generated via the <jsp: forward> action which invokes the guestBookView JSP.



GuestBookView.jsp

```
<?xml version = "1.0"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- guestBookView.jsp -->

<%-- page settings --%>
<%@ page errorPage = "guestBookErrorPage.jsp" %>
<%@ page import = "java.util.*" %>
<%@ page import = "com.cnt4714.jsp.beans.*" %>

<%-- GuestDataBean to obtain guest list --%>
<jsp:useBean id = "guestData" scope = "request"
class = "com.cnt4714.jsp.beans.GuestDataBean" />

<html xmlns = "http://www.w3.org/1999/xhtml">
  <head>
    <title>Guest List</title>
    <style type = "text/css">
      body
        {
          font-family: tahoma, helvetica, arial, sans-serif;
        }
    </style>
  </head>
  <body>
    <div style = "text-align: center;">
      <h2>Guest List</h2>
      <hr />
      <table border = "1" style = "width: 100%; border-collapse: collapse;">
        <thead>
          <tr>
            <th style = "text-align: left;">Name</th>
            <th style = "text-align: left;">Address</th>
            <th style = "text-align: left;">City</th>
            <th style = "text-align: left;">State</th>
            <th style = "text-align: left;">Zip</th>
            <th style = "text-align: left;">Phone</th>
            <th style = "text-align: left;">Email</th>
          </tr>
        </thead>
        <tbody>
          <tr>
            <td><input type = "text" value = "" /></td>
            <td><input type = "text" value = "" /></td>
            <td><input type = "text" value = "" /></td>
            <td><input type = "text" value = "" /></td>
            <td><input type = "text" value = "" /></td>
            <td><input type = "text" value = "" /></td>
            <td><input type = "text" value = "" /></td>
          </tr>
        </tbody>
      </table>
    </div>
  </body>
</html>
```

These three page directives specify that the error page for this JSP is `guestBookErrorPage.jsp`, that classes from package `java.util` are used in this JSP, and classes from the package `com.cnt4714.jsp.beans` are also used.



GuestBookView.jsp (cont.)

```
table, tr, td, th
{
    text-align: center;
    font-size: 1.4em;
    border: 3px groove;
    padding: 5px;
    background-color: #dddddd;
}
</style>
</head>
<body>
<p style = "font-size: 2em;">Guest List</p>
<table>
<thead>
<tr>
<th style = "width: 100px;">Last name</th>
<th style = "width: 100px;">First name</th>
<th style = "width: 200px;">Email</th>
</tr>
</thead>
<tbody>
<% // start scriptlet
List guestList = guestData.getGuestList();
Iterator guestListIterator = guestList.iterator();
GuestBean guest;
```



GuestBookView.jsp (cont.)

```
while ( guestListIterator.hasNext() )
{
    guest = ( GuestBean ) guestListIterator.next();
    %> <%-- end scriptlet; insert fixed template data --%>
    <tr>
        <td><%= guest.getLastName() %></td>
        <td><%= guest.getFirstName() %></td>
        <td>
            <a href = "mailto:<%= guest.getEmail() %>">
                <%= guest.getEmail() %></a>
        </td>
    </tr>
    <% // continue scriptlet
    } // end while
    %> <%-- end scriptlet --%>
</tbody>
</table>
</body>
</html>
```



guestBookErrorPage.jsp

```
<?xml version = "1.0"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- guestBookErrorPage.jsp -->

<%-- page settings --%>
<%@ page isErrorPage = "true" %>
<%@ page import = "java.util.*" %>
<%@ page import = "java.sql.*" %>

<html xmlns = "http://www.w3.org/1999/xhtml">
  <head>
    <title>Error!</title>
    <style type = "text/css">
      .bigRed { font-size: 2em; color: red; font-weight: bold; }
    </style>
  </head>
  <body>
    <p class = "bigRed">
      <% // scriptlet to determine exception type
      // and output beginning of error message
      if ( exception instanceof SQLException )
      {
        %>
```



guestBookErrorPage.jsp (cont.)

A SQLException

```
<%  
  } // end if  
    else if ( exception instanceof ClassNotFoundException )  
    {  
%>
```

A ClassNotFoundException

```
<%  
  } // end else if  
  else
```

```
{  
%>  
  A general exception
```

```
<%  
  } // end else  
%>
```

```
<%-- end scriptlet to insert fixed template data --%>  
<%-- continue error message output --%>  
  occurred while interacting with the guestbook database.
```

```
</p>  
<p class = "bigRed"> The error message was:<br /> <%= exception.getMessage() %>  
</p>  
<p class = "bigRed">Please try again later</p>
```

```
</body>  
</html>
```



Local instance MySQL56 x

File Edit View Query Database Server Tools Scripting Help

Navigator: problem 5 solution problem 4 solution* SQL File 37* SQL File 38* gues

SQLAdditions: Jump to

SCHEMAS

Filter objects

- bikedb
- coloursurvey
- guestbook
 - Tables
 - guests
 - Columns
 - lastName
 - firstName
 - email
 - Indexes
 - Foreign Keys
 - Triggers
 - Views
 - Stored Procedures
 - Functions
 - largeco
 - mailinglist
 - project2
 - project3
 - project4

Management Schemas

Information

Table: guests

Columns:

lastName	varchar(20)
firstName	varchar(20)
email	varchar(50) PK

describe guests;

Result Set Filter: Export: Wrap Cell Content: FA

Field	Type	Null	Key	Default	Extra
lastName	varchar(20)	YES		NULL	
firstName	varchar(20)	YES		NULL	
email	varchar(50)	NO	PRI		

Result 1 x Read Only

Output: Action Output

Topic: EXPLAIN

Syntax:

```
{EXPLAIN | DESCRIBE | DESC}
tbl_name [col_name | wild]

{EXPLAIN | DESCRIBE | DESC}
[explain_type] explainable_stmt
```

explain_type:

```
EXTENDED
PARTITIONS
FORMAT = format_name
```

format_name:

```
TRADITIONAL
JSON
```

explainable_stmt:

```
SELECT statement
DELETE statement
INSERT statement
REPLACE statement
UPDATE statement
```

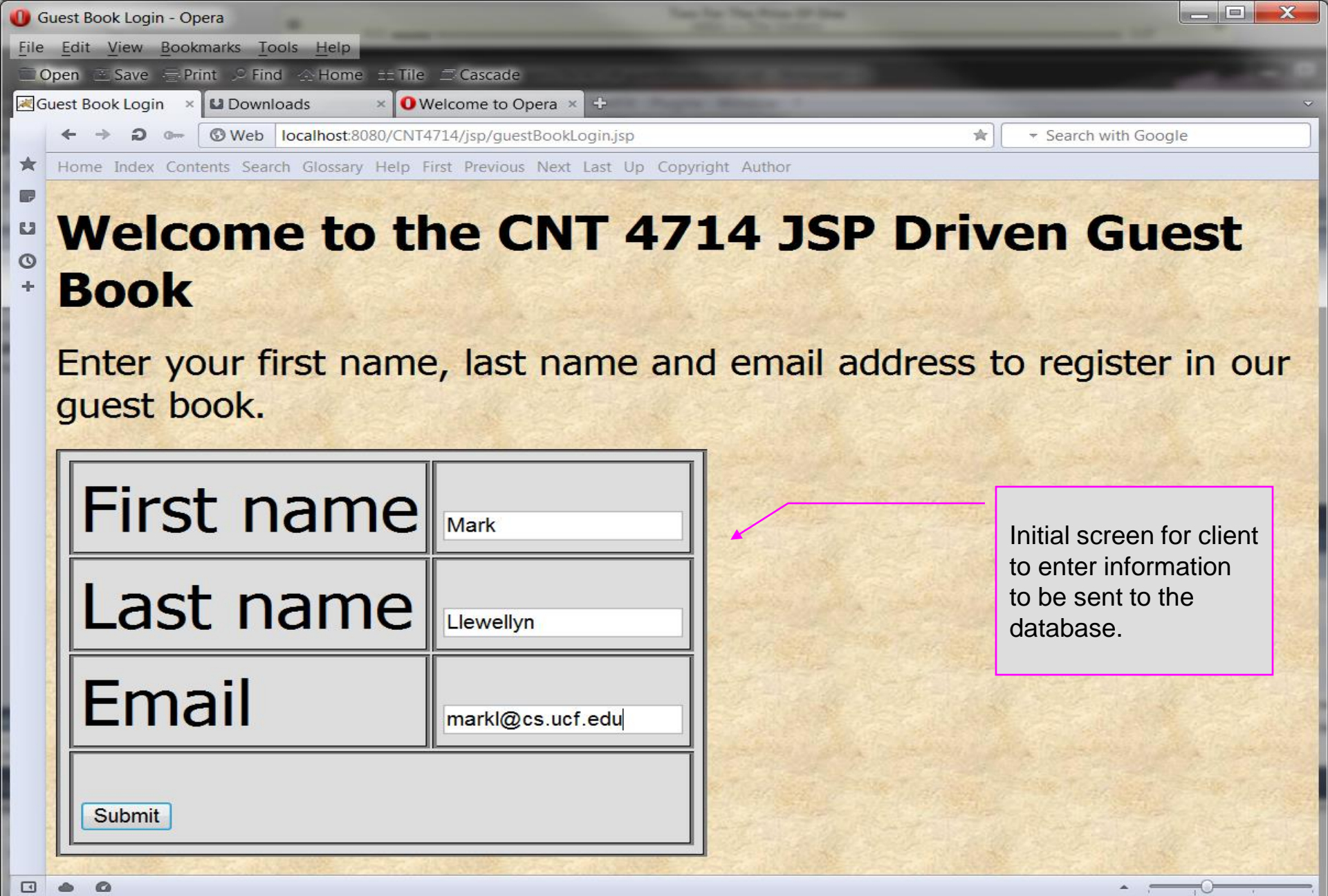
The **DESCRIBE** and **EXPLAIN** statement **DESCRIBE** keyword is more often used to describe the structure, whereas **EXPLAIN** is used to get an explanation of how MySQL would execute a statement. **EXPLAIN** uses the **DESCRIBE** and **EXPLAIN** keywords, but the MySQL parser tree uses the **EXPLAIN** keyword.

Obtaining Table Structure Information

DESCRIBE provides information about the structure of a table. It is a shortcut for **SHOW COLUMNS FROM**.

Context Help Snippets





Current Guest List - Opera

Opera Current Guest List

localhost:8080/CNT4714/jsp/guestBookLogin.jsp

Guest List

Last name	First name	Email
Llewellyn	Mark	markl@cs.ucf.edu

User's screen after they click the submit button after entering their information into the form.

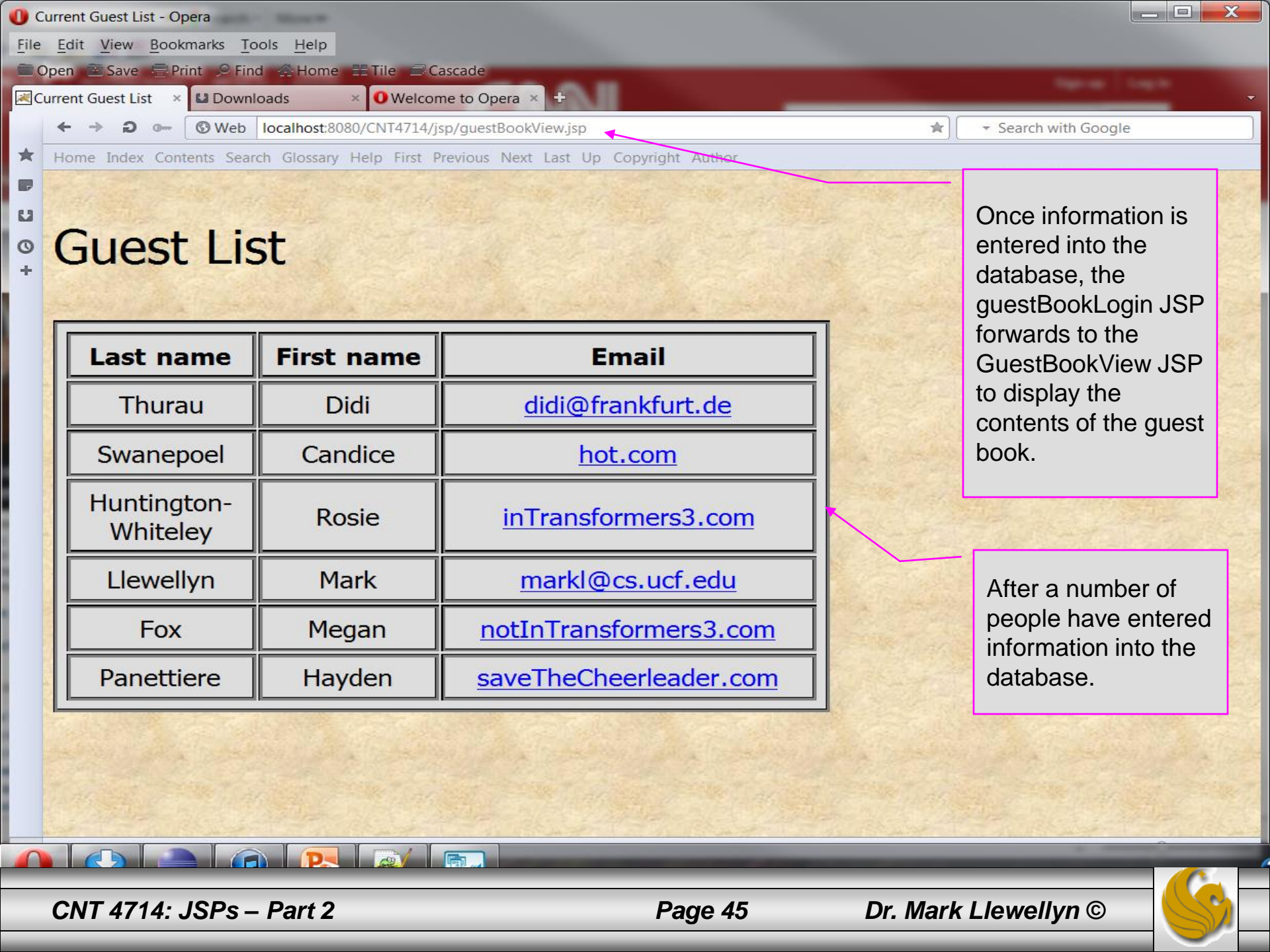
Once they click the submit button the guestBookLogin JSP forwards to the GuestBookView JSP to display the contents of the guest book (the database) at that point in time.

Start MySQL Workb... 2 Windows E... C:\Program Fil... Current Gues... Current Guest ... vm 12:46 PM

To direct input to this virtual machine, press Ctrl+G.

vmware





Guest List

Last name	First name	Email
Thureau	Didi	didi@frankfurt.de
Swanepoel	Candice	hot.com
Huntington-Whiteley	Rosie	inTransformers3.com
Llewellyn	Mark	markl@cs.ucf.edu
Fox	Megan	notInTransformers3.com
Panettiere	Hayden	saveTheCheerleader.com

Once information is entered into the database, the guestBookLogin JSP forwards to the GuestBookView JSP to display the contents of the guest book.

After a number of people have entered information into the database.



Object Browser

SCHEMAS

- bikedb
- coloursurvey
- guestbook**
- test

SQL File 1 bikedbscript SQL File 3* coloursurvey script guestbookscript SQL File 6* x

```
1 • select * from guests
```

Filter: Edit: Export: Autosize:

lastName	firstName	email
Thurau	Didi	didi@frankfurt.de
Swanepoel	Candice	hot.com
Huntington-Whiteley	Rosie	inTransformers3.com
Llewellyn	Mark	markl@cs.ucf.edu
Fox	Megan	notInTransformers3.com
Panettiere	Hayden	saveTheCheerleader....
* NULL	NULL	NULL

guests 3

Apply Cancel Snippets

Output

Action Output

	Time	Action	Message	Duration / Fetch
✓	2 19:35:11	USE guestbook	0 row(s) affected	0.000 sec
⚠	3 19:35:11	DROP TABLE IF EXISTS guests	0 row(s) affected, 1 warning(s): 1051 Unknown table 'guests'	0.000 sec
✓	4 19:35:11	CREATE TABLE guests (lastName varchar (20), firstName...	0 row(s) affected	0.093 sec
✓	5 19:35:11	select * from guests LIMIT 0, 1000	0 row(s) returned	0.000 sec / 0.000 sec

Information

No object selected

Object Info Session

Query Completed



Causing An Error From GuestBookLogin JSP

The screenshot shows a web browser window with the URL `localhost:8080/CNT4714/jsp/guestBookLogin.jsp`. The page title is "Welcome to the CNT 4714 JSP Driven Guest Book". Below the title, there is a form with three input fields: "First name" (containing "Eva"), "Last name" (containing "Mendes"), and "Email" (containing "markl@cs.ucf.edu"). A "Submit" button is located below the form. A blue arrow points from a text box on the right to the email input field.

Home Index Contents Search Glossary Help First Previous Next Last Up Copyright Author

Welcome to the CNT 4714 JSP Driven Guest Book

Enter your first name, last name and email address to register in our guest book.

First name	<input type="text" value="Eva"/>
Last name	<input type="text" value="Mendes"/>
Email	<input type="text" value="markl@cs.ucf.edu"/>
<input type="button" value="Submit"/>	

Zoom (110%)

Email address is the primary key and this one will be a duplicate value when the user clicks the submit button. Next page illustrates the results.



Causing An Error From GuestBookLogin JSP (cont.)

A SQLException occurred while interacting with the guestbook database.

**The error message was:
7conflicts while synchronizing**

Please try again later

Error page was generated due to the duplicate key value.

