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# Session Management

## Sessions and Listeners
## Technique: Error Handling in Servlets

*#Session #UrlRewriting #HiddenForm #SessionTracking #Cookie #ShoppingCart #ErrorHandle #JSP*

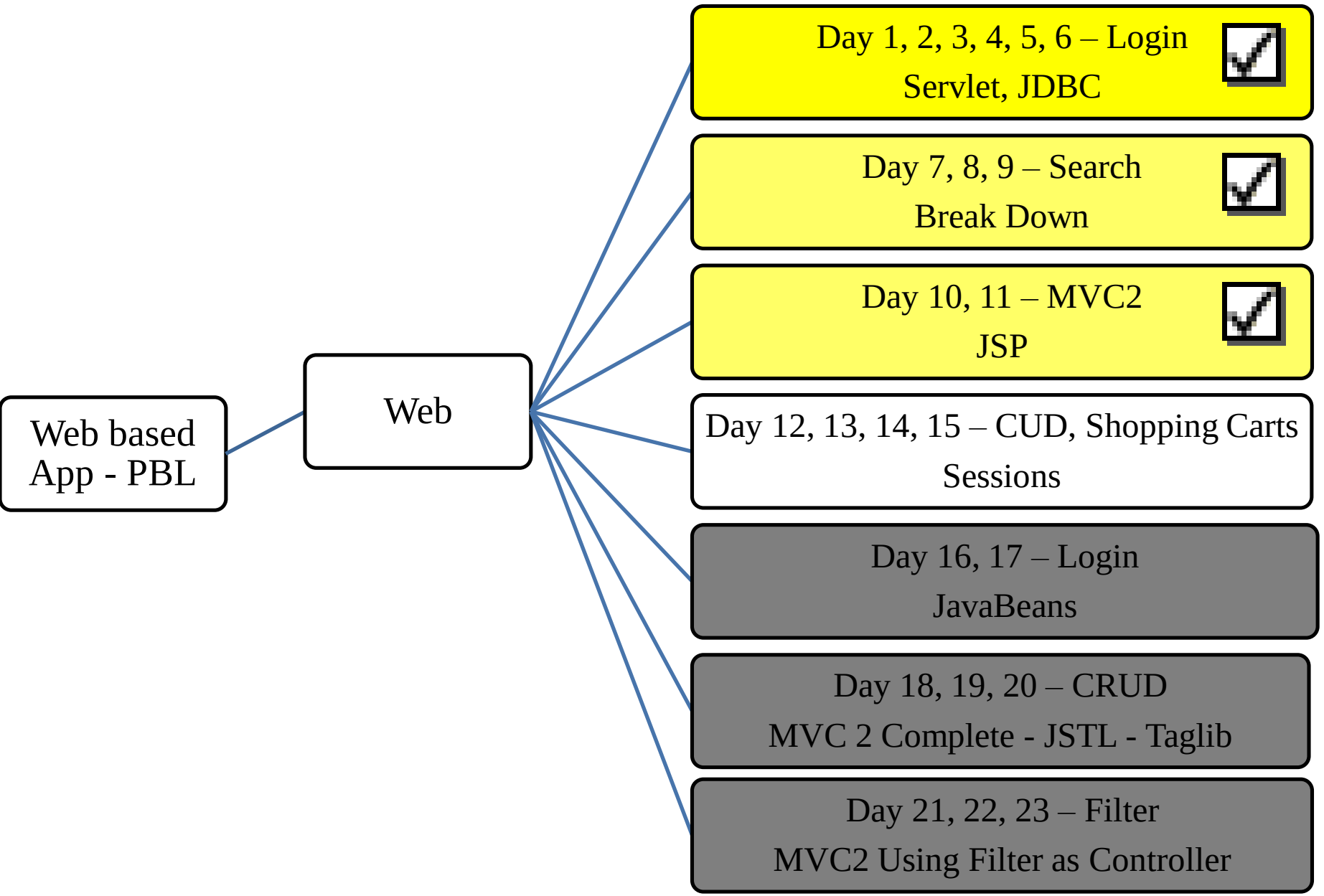
# Review

- **JSP**
  - JSP Syntax
    - Comment
    - Scripting Element: declaration, scriptlets, expression
    - Directives (page, include, taglib)
  - JSP Life Cycles
  - JSP Implicit Object
- **MVC Pattern**
  - No MVC
  - MVC 1
  - MVC 2

# Objectives

- **How to write CUD Web Application?**
  - Session Tracking Techniques
  - Manipulate DB Techniques in Web Application
  - Break down structure component in building web application
- **Techniques: Error Handling in Servlets**
  - Reporting Errors
  - Logging Errors
  - Users Errors vs. System Errors

# Objectives


Web based App - PBL
Web
Day 1, 2, 3, 4, 5, 6 – Login Servlet, JDBC
Day 7, 8, 9 – Search Break Down
Day 10, 11 – MVC2 JSP
Day 12, 13, 14, 15 – CUD, Shopping Carts Sessions
Day 16, 17 – Login JavaBeans
Day 18, 19, 20 – CRUD MVC 2 Complete - JSTL - Taglib
Day 21, 22, 23 – Filter MVC2 Using Filter as Controller

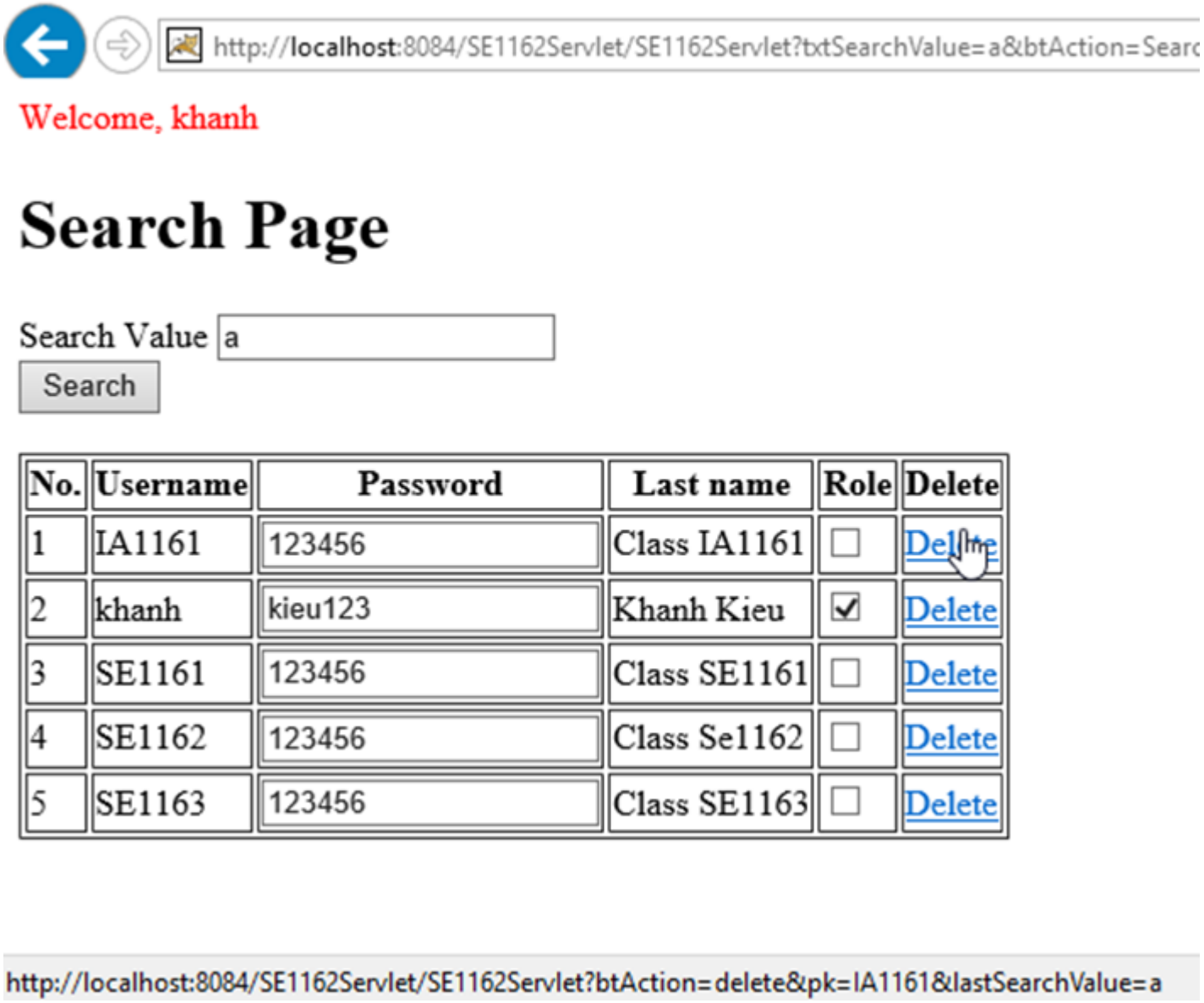
# How to write CRUD Web Application

## Requirements

- After the web application had searched and shown the result, some following functions are required
  - The data grid allows the user **delete the selected row**. **After delete** action is completed, **the data grid is updated**
  - The data grid also allows the user **update the password and roles on the selected row. After update** action is completed, **the data grid is refreshed**
  - The application allows to **store** the **user's account** that the **user** can **access the resource without** login **in the second access. The username can be shown at the search result**
  - The application allows the user **shopping book and order them**
  - When the user login fail, the **register page** is shown. When **register is fail**, the **error page is shown**. Otherwise, the **login page** is **shown**
- The GUI of web application is present as following

# How to write CRUD Web Application

## Expectation



# How to write CRUD Web Application

## Expectation


Welcome, khanh

# Search Page

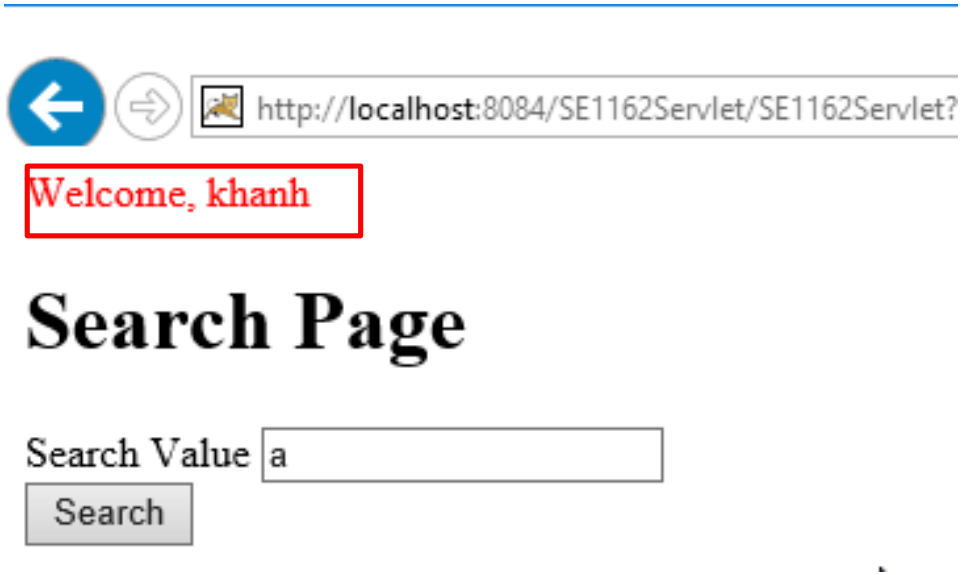
Search Value a

Search

| No. | Username | Password | Last name | Role | Delete | Update |
|---|---|---|---|---|---|---|
| 1 | IA1161 | 123456 | Class IA1161 | ☐ | Delete | Update |
| 2 | khanh | kieu123 | Khanh Kieu | ☑ | Delete | Update |
| 3 | SE1161 | 123456 | Class SE1161 | ☐ | Delete | Update |
| 4 | SE1162 | 123456 | Class Se1162 | ☐ | Delete | Update |
| 5 | SE1163 | 123456 | Class SE1163 | ☐ | Delete | Update |

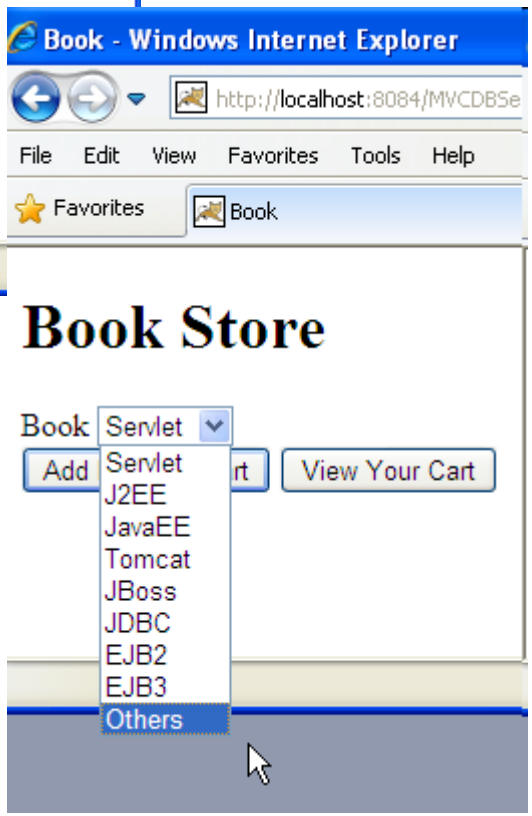
# How to write CRUD Web Application

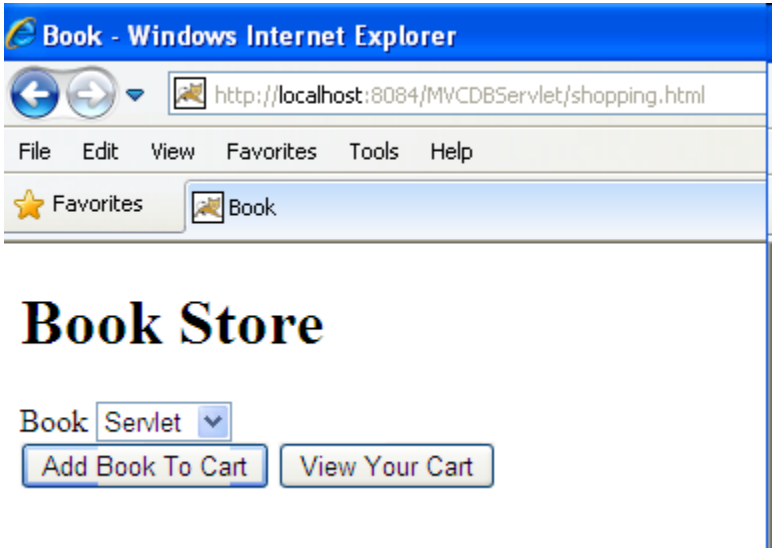
## Expectation



# How to write CRUD Web Application

## Expectation

# How to write CRUD Web Application

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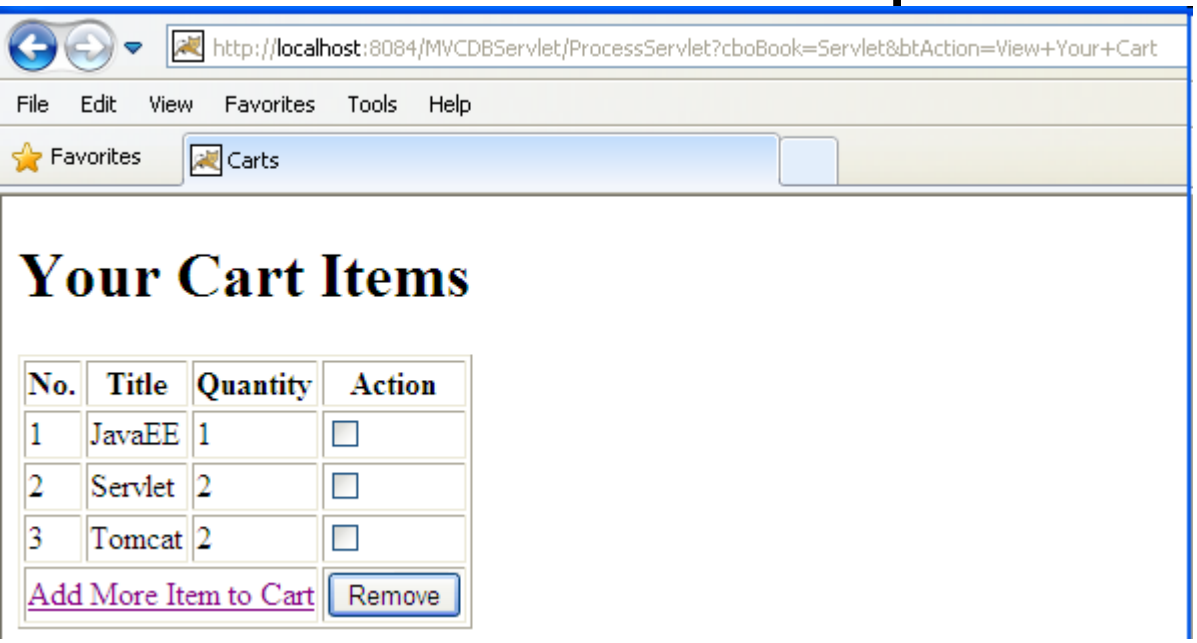
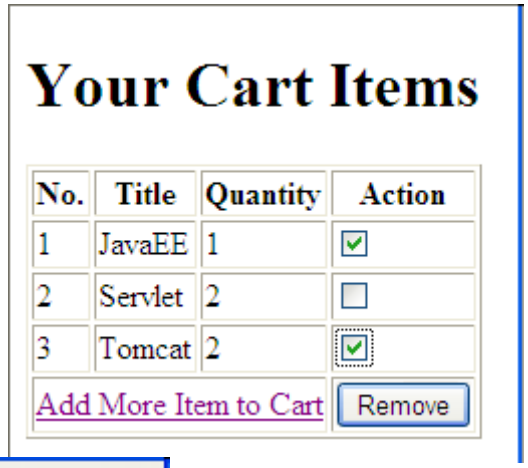
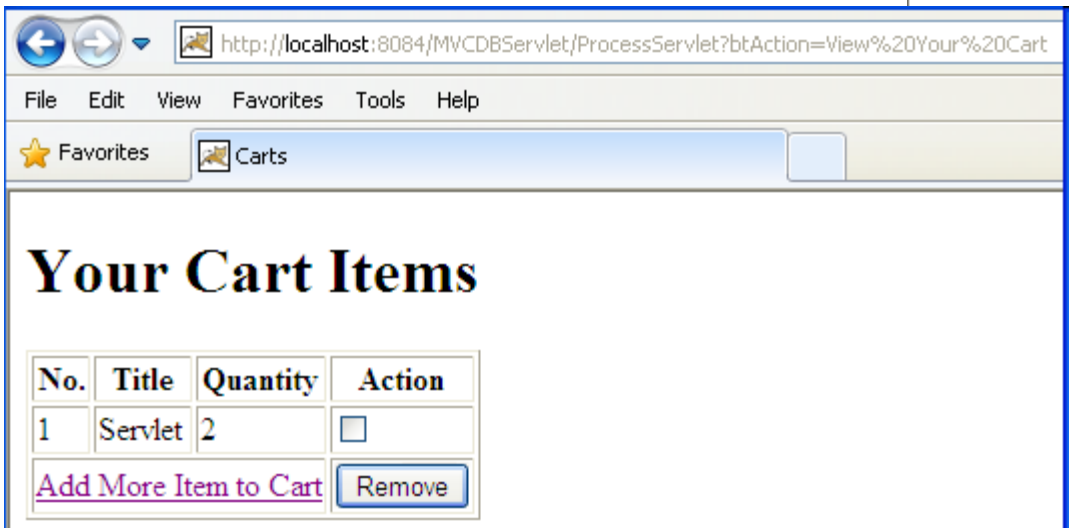
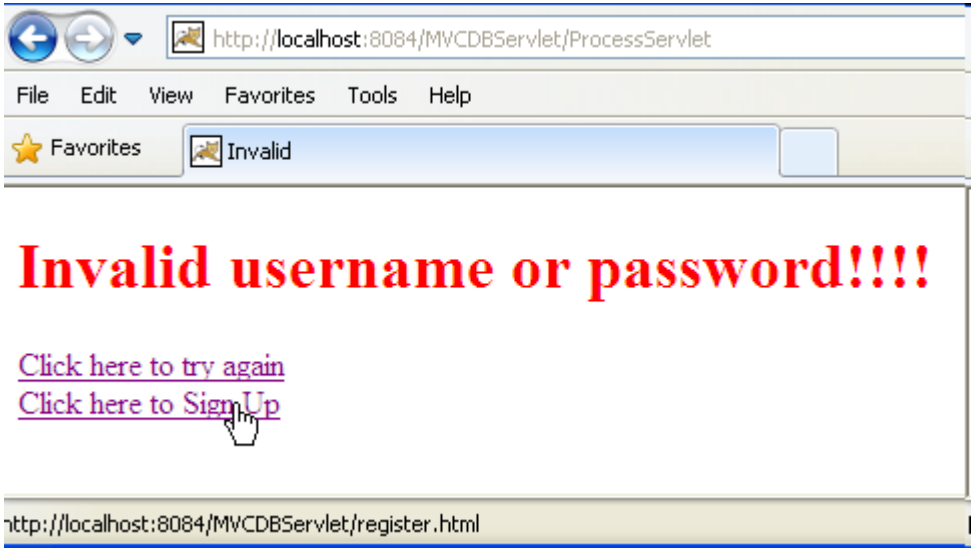


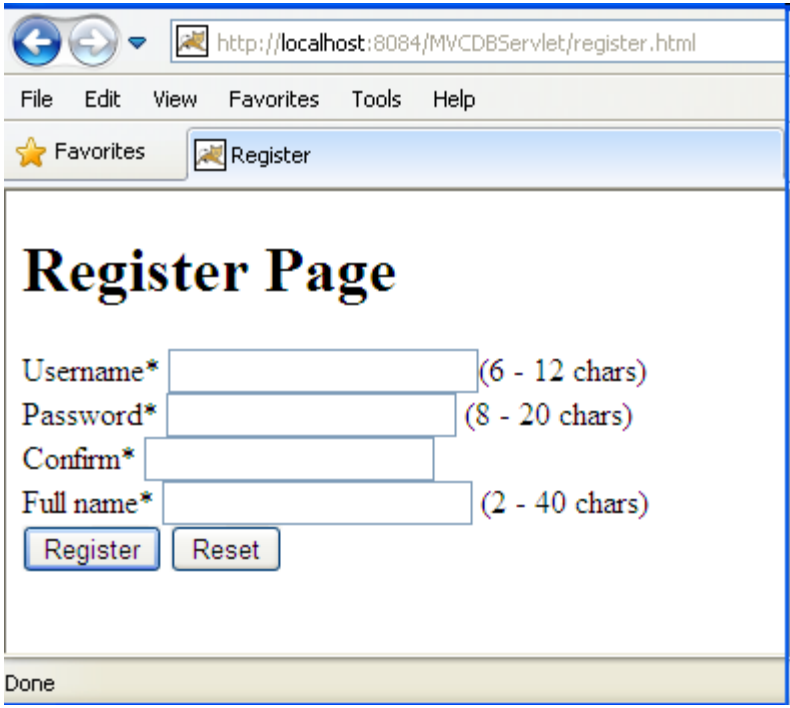



# How to write CRUD Web Application

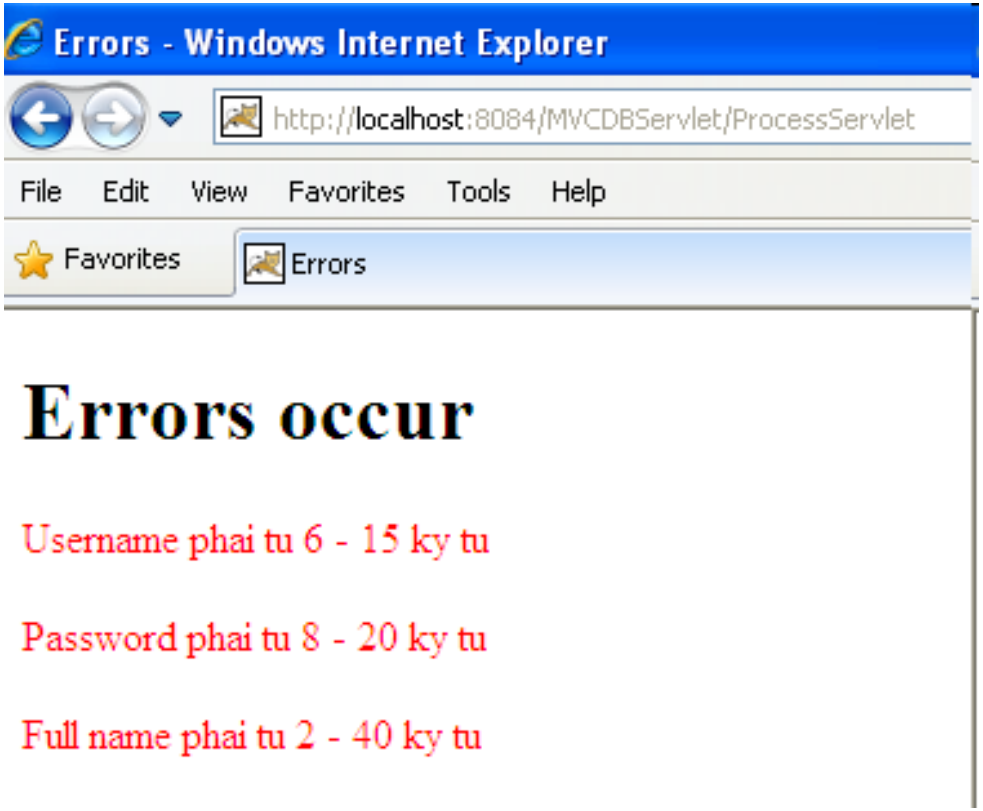
## Expectation



# How to write CRUD Web Application

## Expectation




# Sessions & Listeners

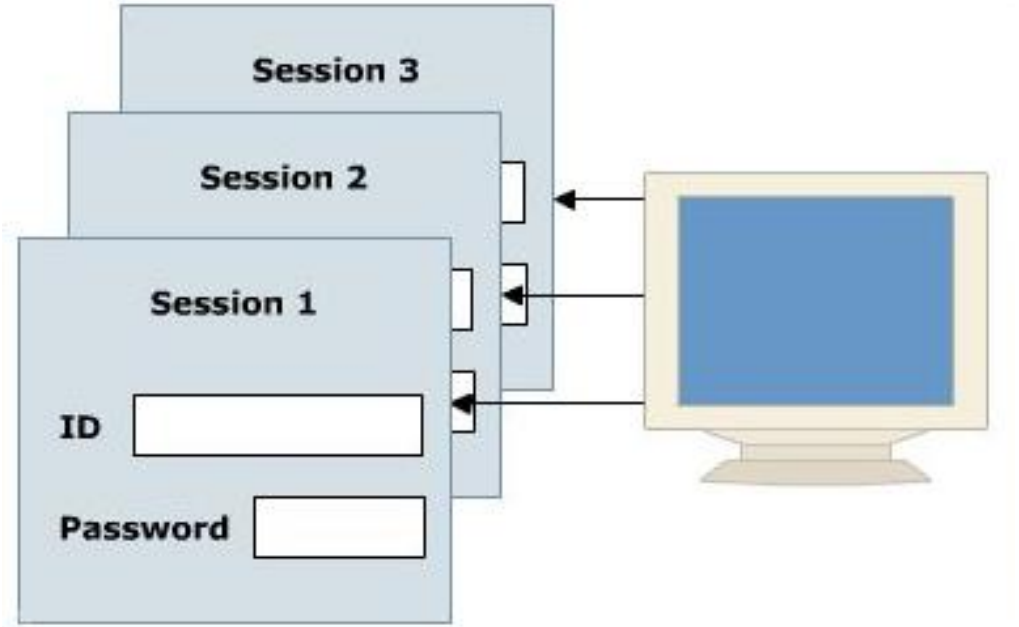
## Session

- Is the **period of connection** between client and server
- Is a group of activities that are performed by a user while accessing a particular web site
- HttpSession are **virtual connection** between client and server
- Web container reserves **an individual memory block for storing information about each session → Session objects.**
- **The session tracking** (mechanism)
  - Serves the purpose **tracking** the client identity and other state information required throughout the session
  - Allows the **server to keep a track of successive requests** made by same client
  - Allows **the customer to maintain the information with the server** as long as the customer does not log out from the website

# Sessions & Listeners

## Session Tracking Techniques

- URL Rewriting
- Hidden form field
- Cookies
- HttpSession interface




Session Tracking

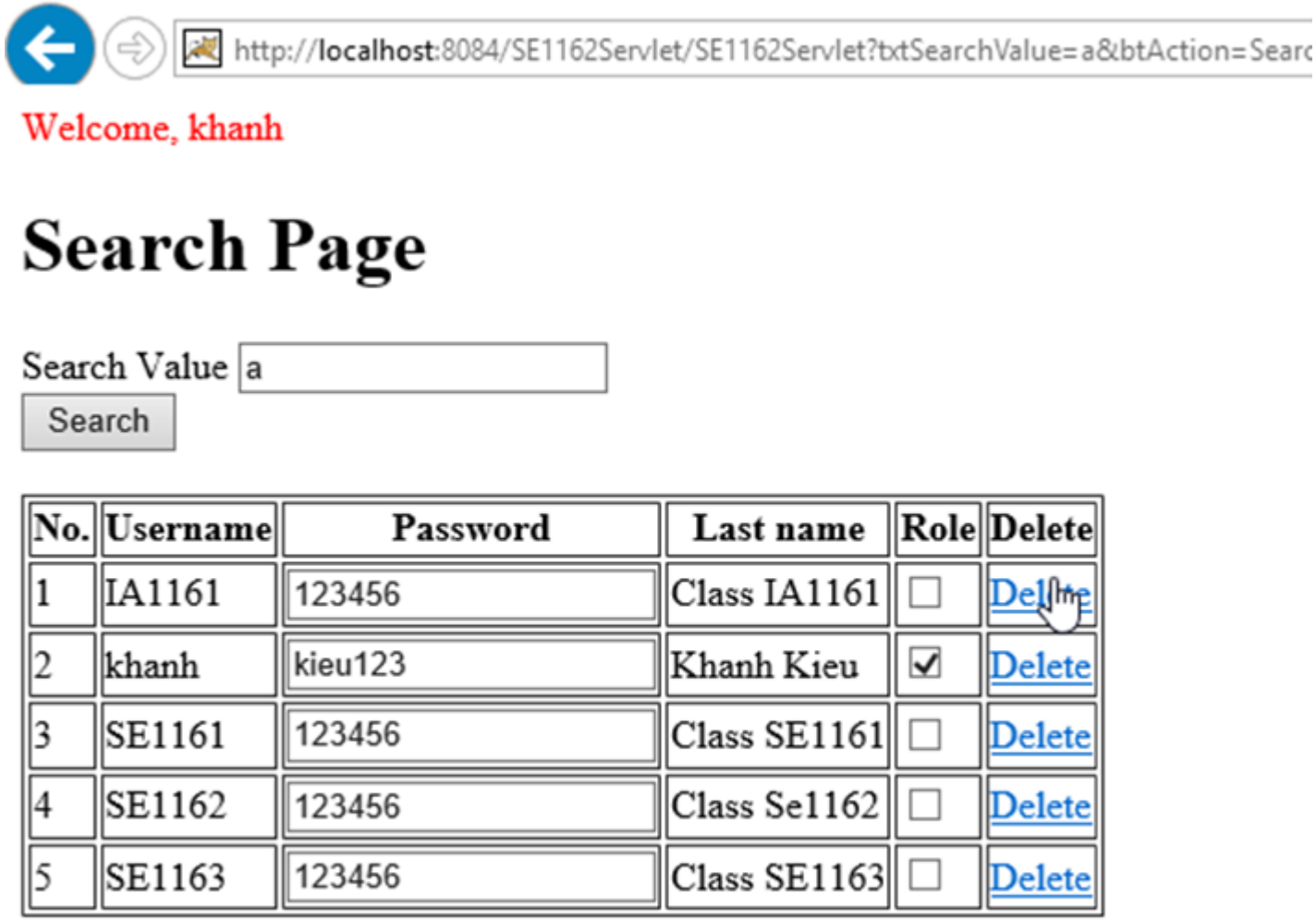
# Sessions & Listeners

## URL Rewriting

- **Maintains** the **state** of end user by **modifying the URL.**
- **Adds some extra data** at the end of the URL
- Is **used** when the **information to be transferred** is not critical.
- **Syntax**: **url?query_string**
- **Ex**
  - <a href="http://localhost:8080/Books?category=java"> Java Books </a>
  - <form action="http://localhost:8080/UpdateProfile?uid=123" method="get"> ---------- </form>
- **Disadvantages**:
  - Server side **processing is tedious**.
  - Every URL that is **returned** to the **user** should have **additional information appended** to it.
  - If the user **leaves the session** and **opens** the **Web page using a link or bookmark** then the session information is lost.
  - The **query string is limited**

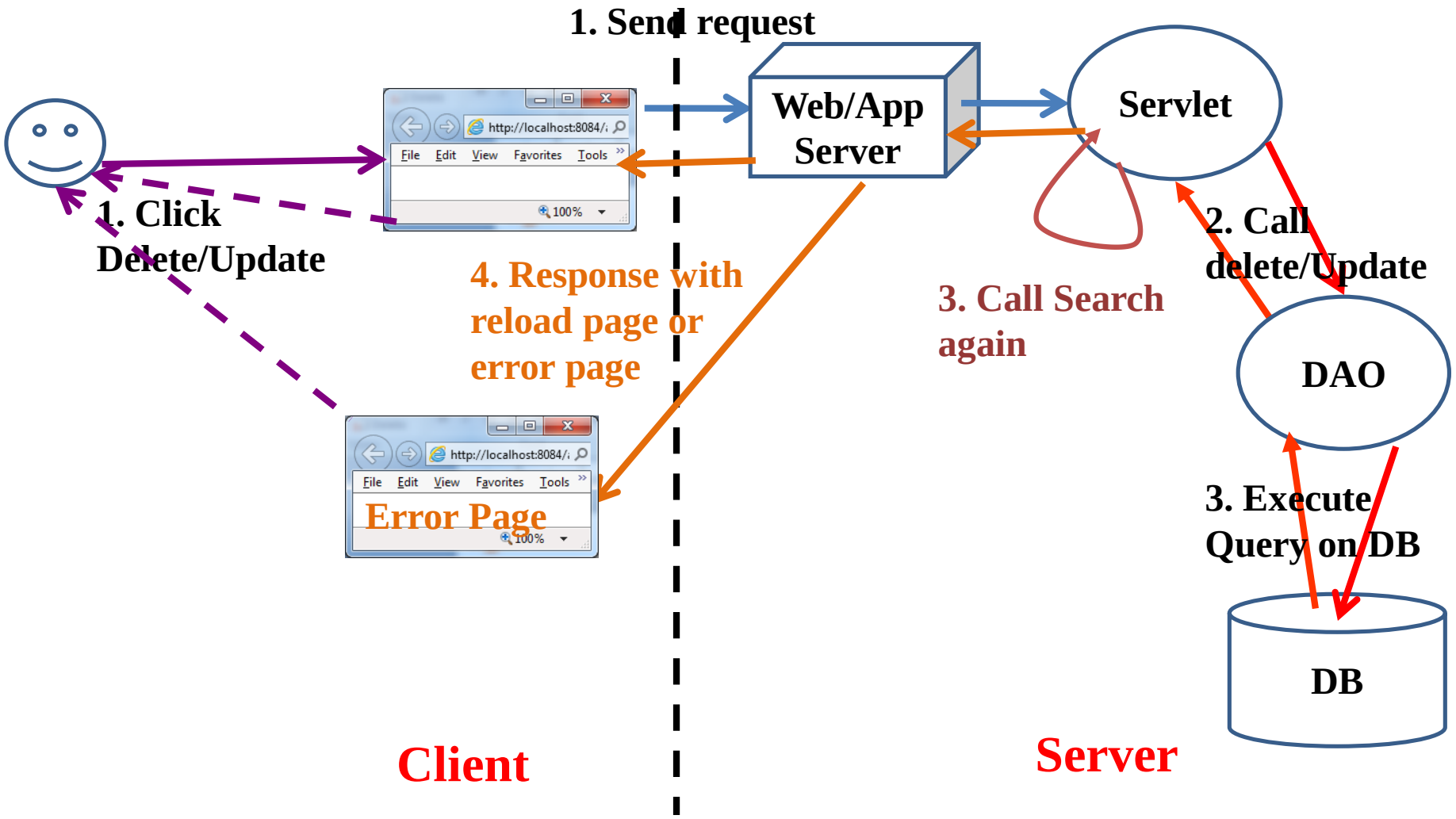
# How to write CRUD Web Application

## Delete Function



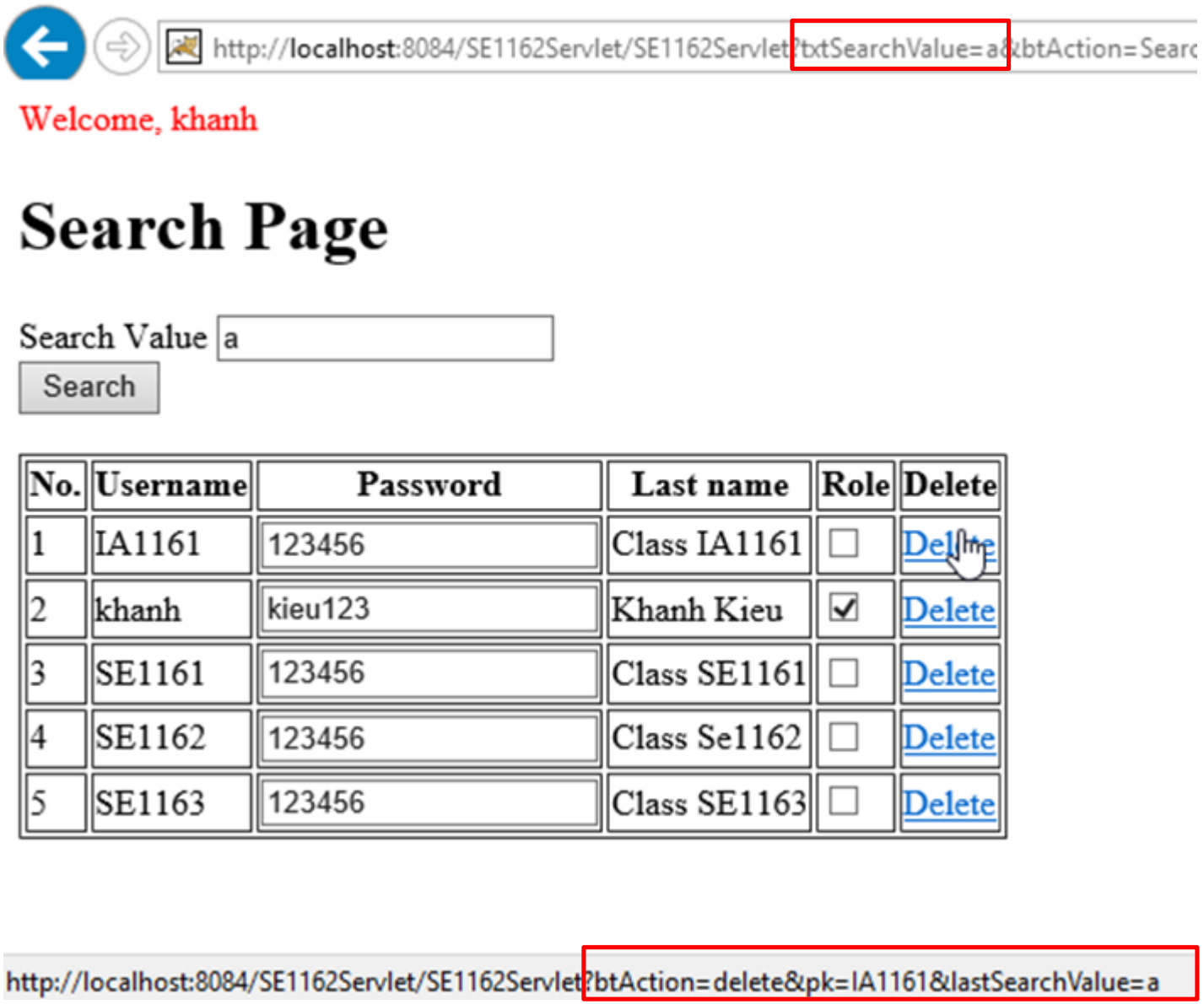
# How to write CRUD Web Application

## Interactive Server Model



# How to write CRUD Web Application

## Delete Function



# Sessions & Listeners

## Hidden Form Fields

- Simplest technique to **maintain the state of an end user**.
- **Insert** the session identifier into the **hidden form field** in the HTML of each page
- **Embedded the hidden form field in an HTML form** and **not visible** when you view an HTML file in a browser window.
- The session information can be **extracted** by the application by **searching** for these fields. The servlets or JSP pages read the field **using request.getParameter().**
- **Syntax**

  **<input type="hidden" name="…" value="…">**
- **Ex**

  <input type="hidden" name="productId" value="P01">
- **Advantages**
  - **Simplest** way to implement session tracking
  - Displays **nothing** on the HTML page but can be used to hold any kind of data
  - Helps to maintain a **connection between two pages**
- **Disadvantages**:
  - **Work** on the **dynamic pages**.
  - This method of session tracking **displays sensitive information to the user.**

# How to write CRUD Web Application

## Update Function


Welcome, khanh

# Search Page

Search Value a

Search

| No. | Username | Password | Last name | Role | Delete | Update |
|---|---|---|---|---|---|---|
| 1 | IA1161 | 123456 | Class IA1161 | ☐ | Delete | Update |
| 2 | khanh | kieu123 | Khanh Kieu | ☑ | Delete | Update |
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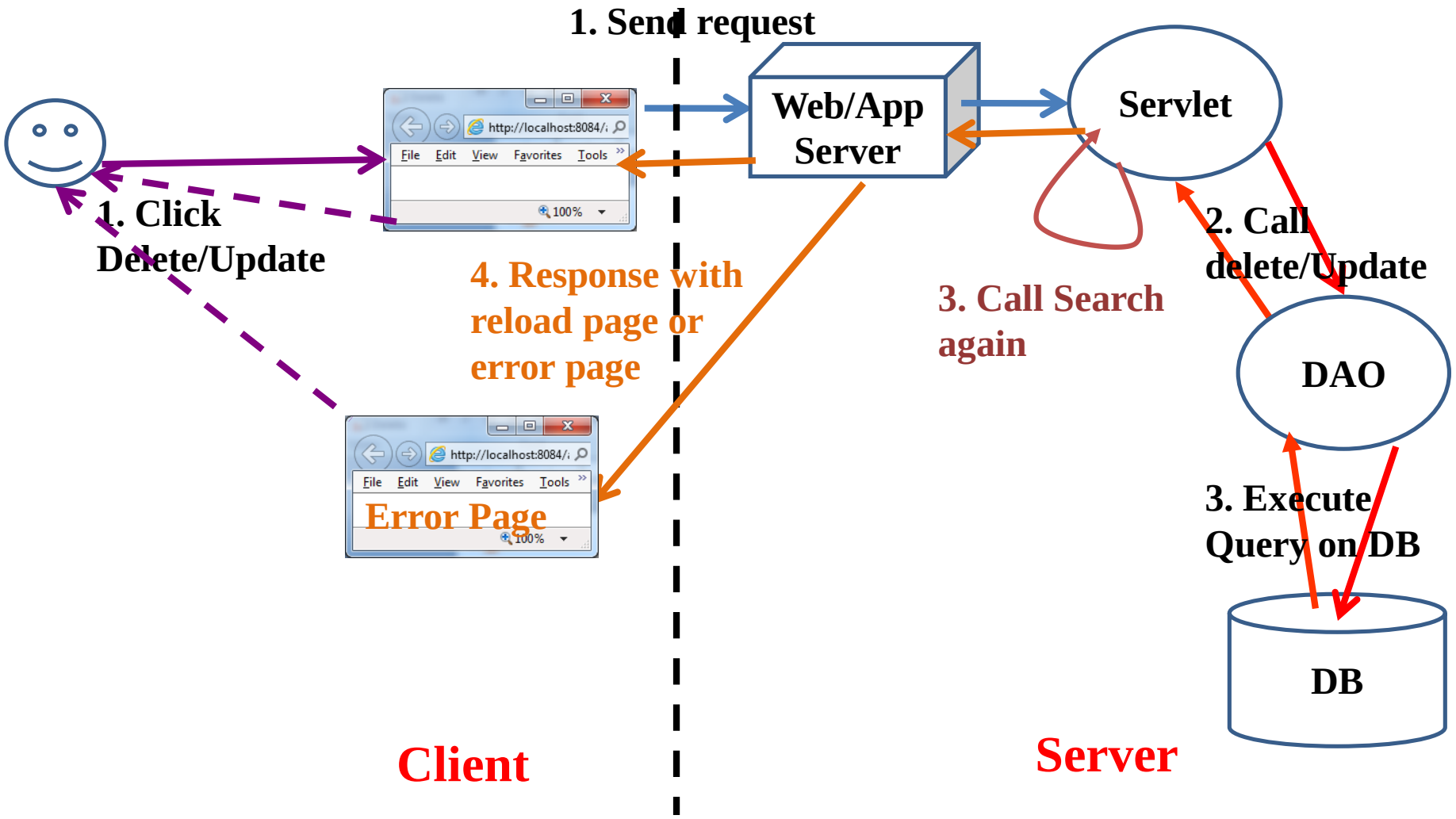
# How to write CRUD Web Application

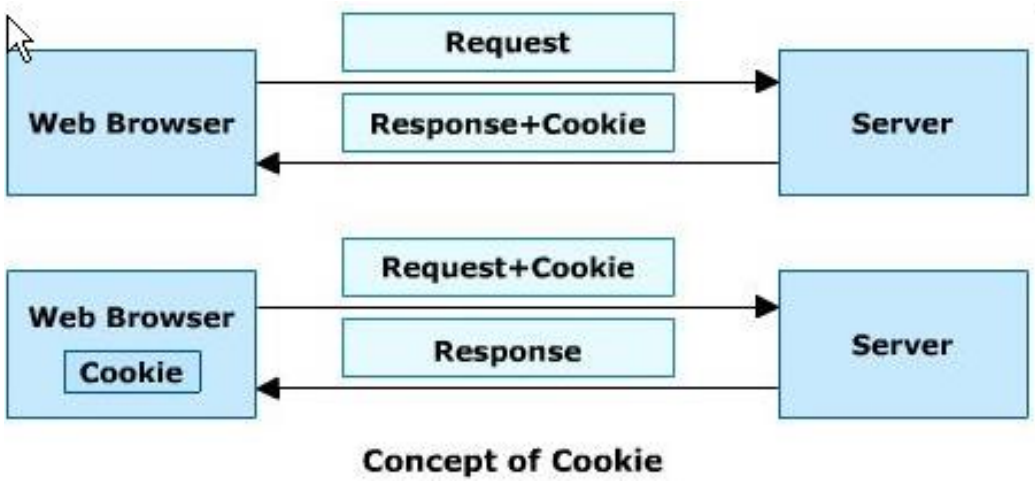
## Interactive Server Model



# Sessions & Listeners

## Cookies

- Is a **small piece** of information **sent by** the **web server to** the **client** to keep track of users.
- Size of each cookie can be a maximum of 4 KB.
- Cookie has values in the form of **key-value pairs**
- When the **server sends** a cookie, the **client receives** the cookie, **saves and sends** it **back** to the **server** each **time** the **client accesses** a page on that server
- Can uniquely identify a client (In the case of J2EE web applications, the cookie returned has a standard name **JSESSIONID** and store in memory)
- A web browser is expected to **support 20 Cookies** per host




Concept of Cookie

# Sessions & Listeners

## Cookies

- **Advantages**
  - **Remember** user IDs and password.(low security)
  - To **track** visitors on a Web site for better service and new features.
  - Cookies enable **efficient ad processing**.
  - Support **e-advertisement** on Internet.
  - Security (can not affect virus).
- **Disadvantages**
  - **Personal information** is **exposed** to the **other users**. (spam/ junk mail, pop up …)
  - Cookies fails to work if the security level is set too high in the Internet browser.
  - Most browsers **enable** the **user at** the **client machine to deactivate** (not to accept) cookies.
  - The size and number of cookies **stored are limited.**
- **Note**
  - **Browser is accepted cookies**
  - **Cookies are stored** at
    - **C:\Documents and Settings\LoggedUserName\Cookies\LoggedUserName@ContextPath[n].txt**
    - **C:\Users\LoggedUserName\AppData\Local\Microsoft\Windows\Temporary Internet Files \LoggedUserName@host[n].txt**
  - Cookies are existed following the **setMaxAge** and deleted automatically by OS

# Sessions & Listeners

## Cookies

- The servlet API provides **javax.servlet.http.Cookie** class **for creating and working** with cookies
- The **constructor** for the cookies class is: Cookie(java.lang.String name, java.lang.String value)
- **Sending Cookie**

| Methods | Descriptions |
|---|---|
| **addCookie** | - **public void addCookie(cookie1);**<br>- Adds field to the HTTP response headers to send cookies to the browser, one at a time<br>- Adds specified cookie to the response<br>- Can be called multiple times to set more than one cookies |
| **setValue** | - **public void setValue(String newValue);**<br>- Assigns a new value to a cookie after the cookie is created. In case if binary value is used, base 64 can be used for encoding |
| **setPath** | - **public void setPath(String path);**<br>- Sets the path for the cookie. The cookie is available to all the pages specified in the directory and its subdirectories. A cookie's path must have the servlet which sets the cookie |
| **setMaxAge** | - **public void setMaxAge(int expiry);**<br>- The maximum age of the cookie in seconds. If the value is positive, then the cookie will expire after that many seconds which is specified by the expiry |

# Sessions & Listeners
## Cookies

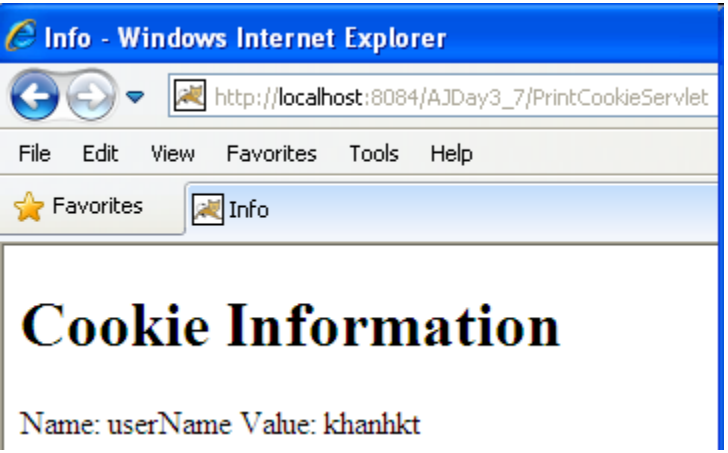
- **Reading Cookie**

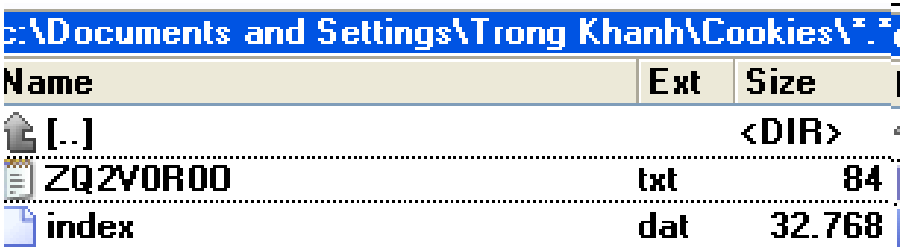
| Methods | Descriptions |
|---|---|
| **getCookies** | - **Cookie [] cookies = request.getCookies();**<br>- Returns an array containing all of the Cookie objects the client sends with the request |
| **getMaxAge** | - **public int getMaxAge();**<br>- Returns the maximum age of the cookie.<br>- Returns an integer which specify the maximum age of the cookies in seconds |
| **getValue** | - **public String getValue();**<br>- Returns the value of the cookie |
| **getName** | - **public String getName()**<br>- Returns the name of cookie. Once the cookie has been created its name cannot be changed |
| **getPath** | - **public void getPath()**<br>- Returns the path on the server to which the client return the cookie. The cookie is available to all sub paths on the server |

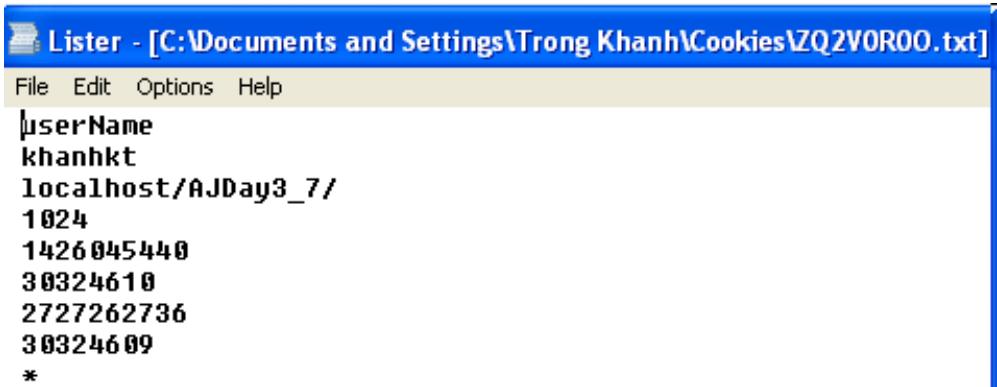
# Sessions & Listeners

## Cookies – Example





# Sessions & Listeners

## Cookies – Example

AddCookieServlet.java

```
29      protected void processRequest(HttpServletRequest request, HttpServletResponse response)
30      throws ServletException, IOException {
31          response.setContentType("text/html;charset=UTF-8");
32          PrintWriter out = response.getWriter();
33          try {
34              out.println("<html>");
35              out.println("<head>");
36              out.println("<title>Add</title>");
37              out.println("</head>");
38              out.println("<body>");
39              out.println("<h1>Adding Cookie processing</h1>");
40
41              String sName = request.getParameter("txtName");
42              Cookie cookie = new Cookie("userName", sName);
43              cookie.setMaxAge(60*5);
44              response.addCookie(cookie);
45              out.println("<a href='PrintCookieServlet'>Print Cookie</a>");
46
47              out.println("</body>");
48              out.println("</html>");
49          } finally {
50              out.close();
51          }
52      }
```

# Sessions & Listeners

## Cookies – Example

PrintCookieServlet.java

```
29      protected void processRequest(HttpServletRequest request, HttpServletResponse response)
30      throws ServletException, IOException {
31          response.setContentType("text/html;charset=UTF-8");
32          PrintWriter out = response.getWriter();
33          try {
34              out.println("<html>");
35              out.println("<head>");
36              out.println("<title>Info</title>");
37              out.println("</head>");
38              out.println("<body>");
39              out.println("<h1>Cookie Information</h1>");
40
41              Cookie[] c = request.getCookies();
42              for(int i = 0; i<c.length; i++){
43                  out.println("Name: " + c[i].getName());
44                  out.println("Value: " + c[i].getValue());
45              }
46
47              out.println("</body>");
48              out.println("</html>");
49          } finally {
50              out.close();
51          }
52      }
```

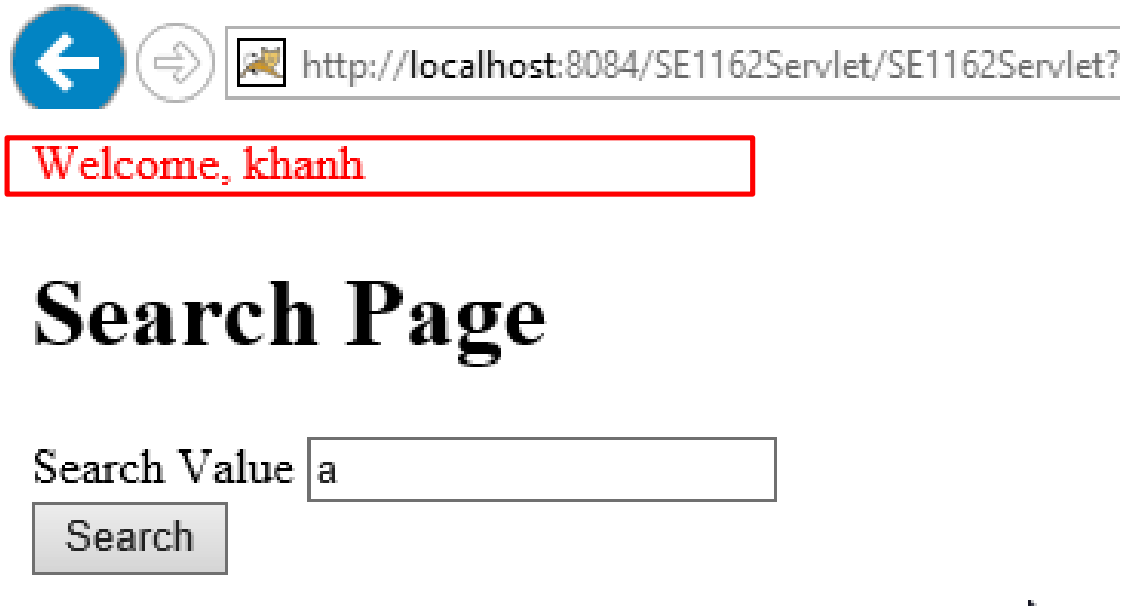
# How to write CRUD Web Application

## Requirements

- After the web application had searched and shown the result, some following functions are required
  - …
  - The application allows to **store** the **user's account** that the **user** can **access the resource without** login **in the second access. The username can be shown at the search result**
  - …
- The GUI of web application is present as following

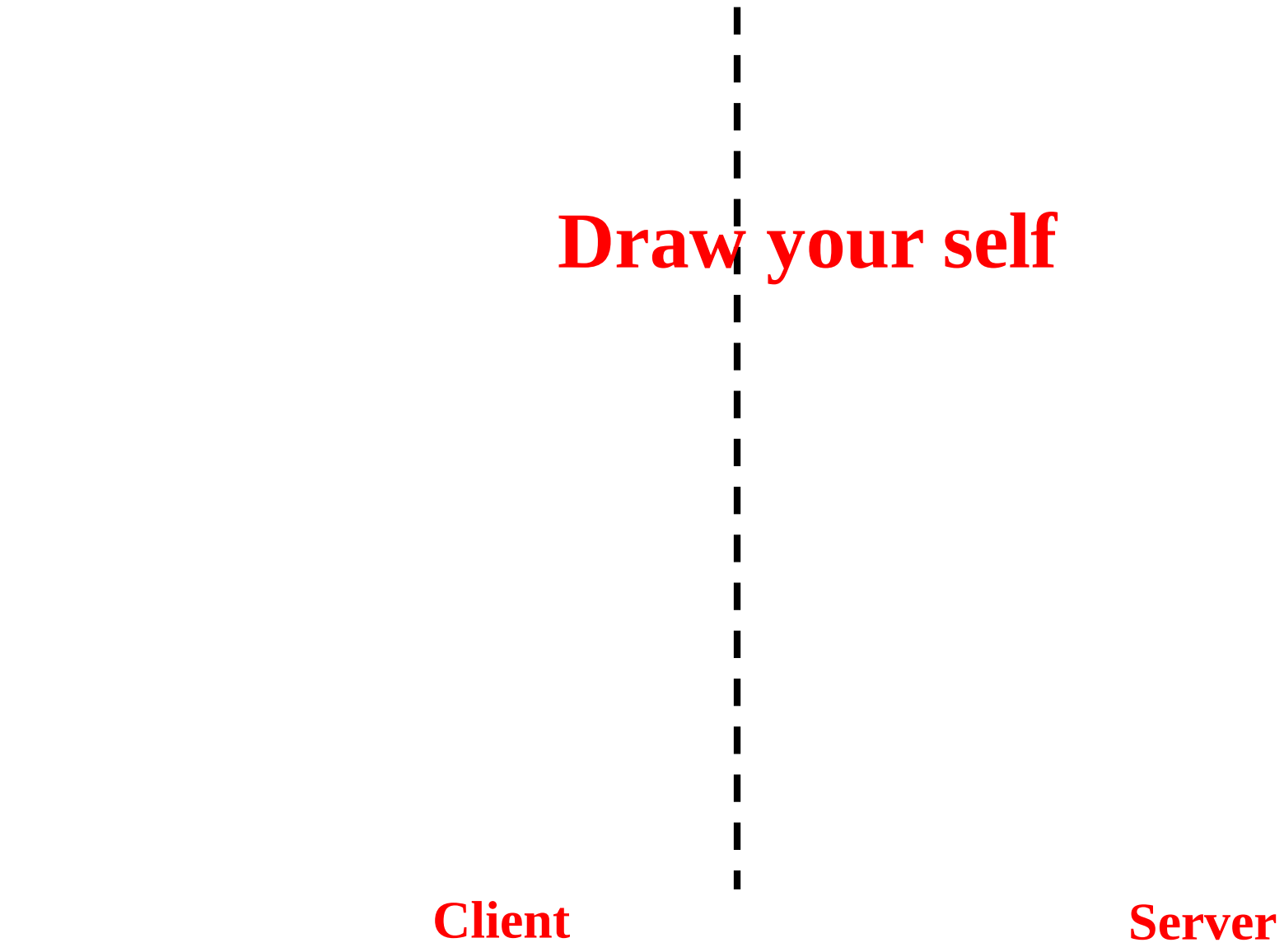
# How to write CRUD Web Application

Store Info



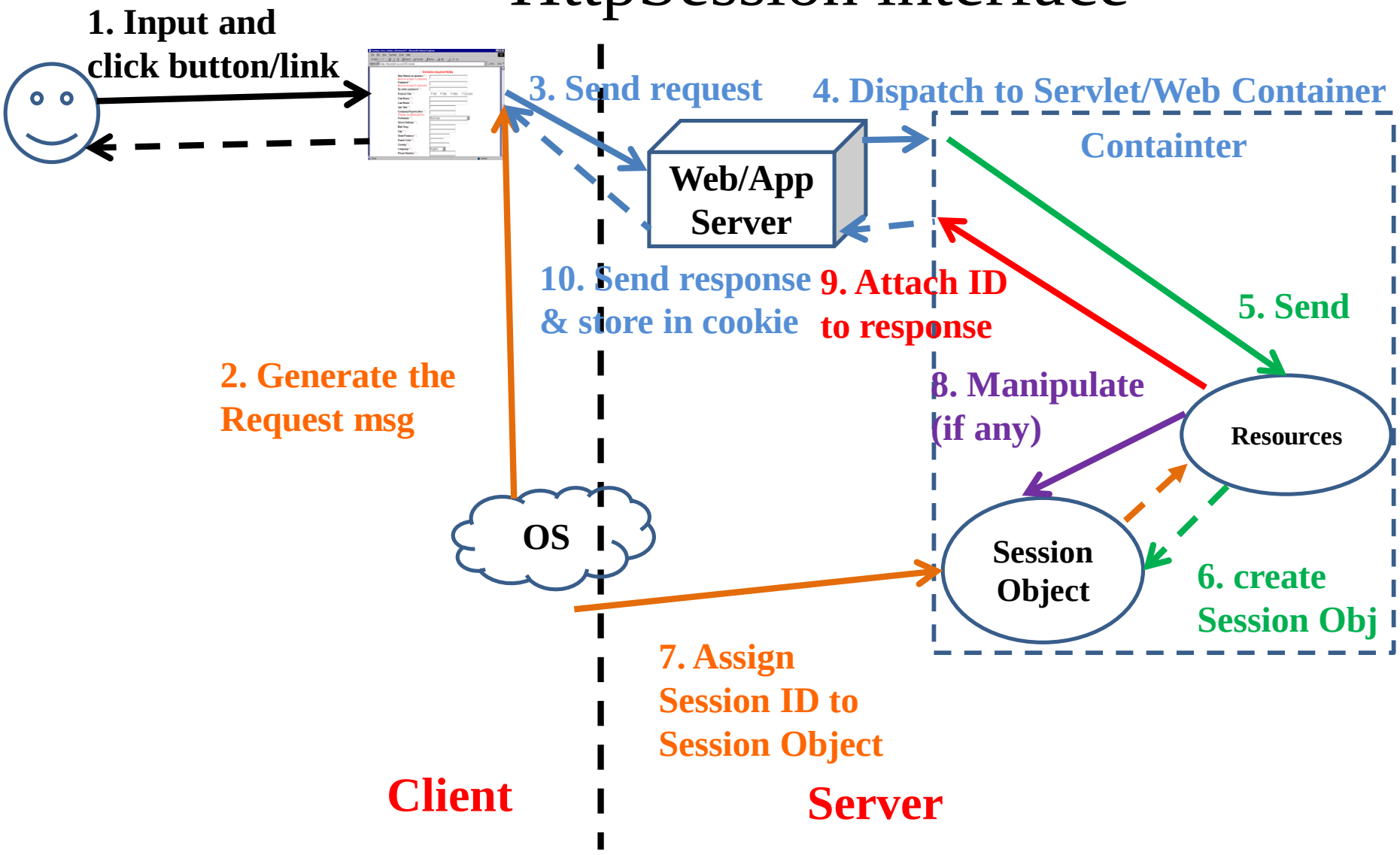
# How to write CRUD Web Application

## Interactive Server Model



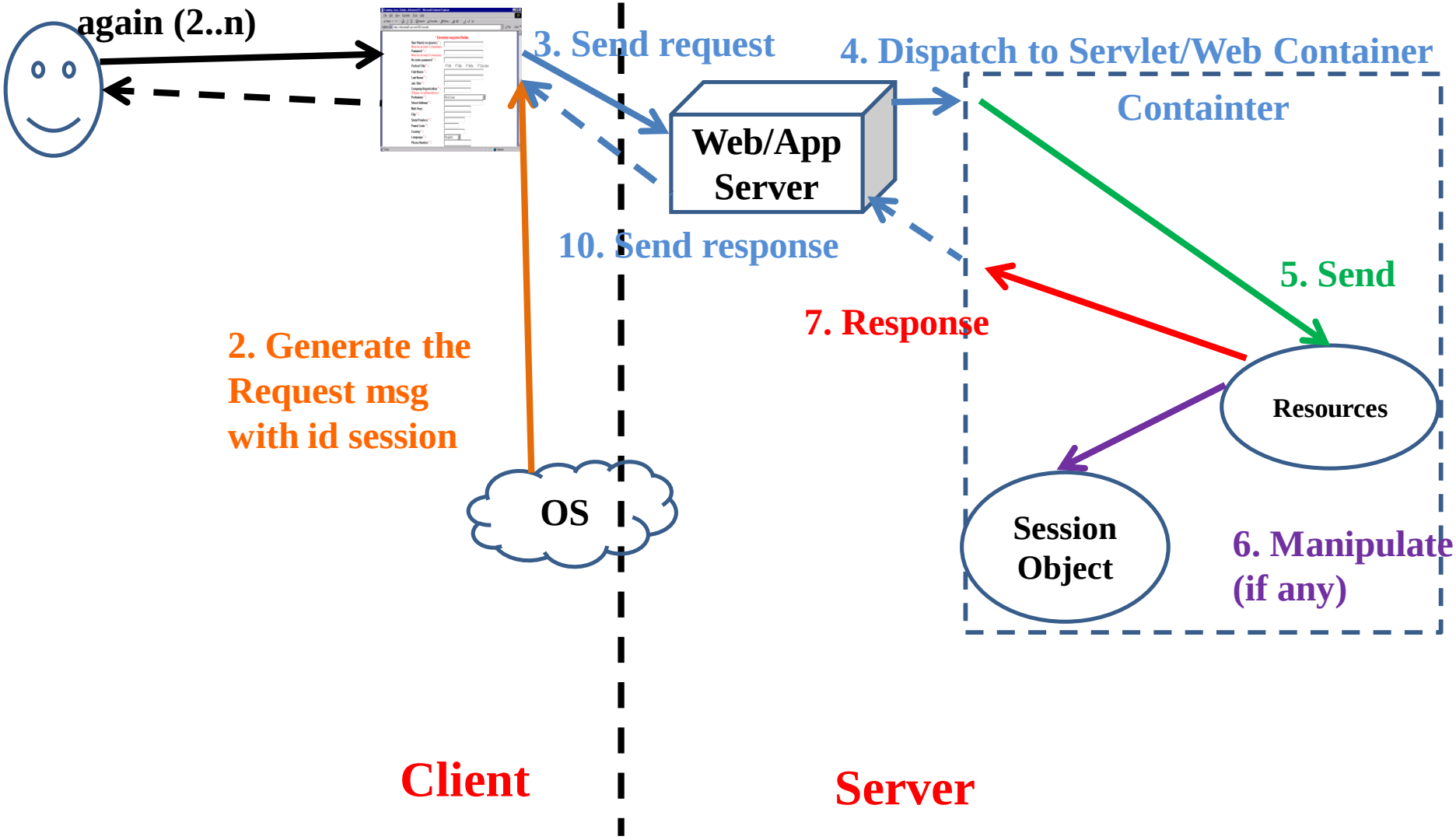
# Sessions & Listeners

## HttpSession interface



# Sessions & Listeners

## HttpSession interface



# Sessions & Listeners

## Session Management: General Principles

- Each of these requests **needs to carry a unique ID**, which identifies the session to which it belongs.
- The web application will **allocate this unique ID** on the first request from the client.
- The ID **must be passed back to the client** so that the client **can pass it back again with its next request**. In this way, the web application will know to which session the request belongs. This implies that the client **must need to store the unique ID somewhere—and** that's where session management mechanisms come in
- The **default mechanism for session management is cookie**

# Sessions & Listeners

## HttpSession interface

- Identifying user in a multi-page request scenario and information about that user
- Is used to **created** a **session between** the **client and server** by servlet container
  - When **users make** a **request**, the **server signs** it a **session object** and a **unique session ID**
  - The session ID matches the user with the session object in subsequent requests
  - The **session ID and the session object** are **passed** along with the **request** to the **server**
- **Session Timeout**
  - Is necessary as session utilizes the memory locations
  - Prevent the number of session increasing infinitely.
  - Set either in the web.xml file or can be set by the method **setMaxInactiveInterval**()

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# Sessions & Listeners

## HttpSession interface Methods

| Methods | Descriptions |
|---|---|
| **getSession** | - **request.getSession(boolean create);**<br>- Obtain a current session objects<br>- The getSession() method with true parameter is used to create a new session (no current session) |
| **getId** | - **public String getId()**<br>- Returns a string containing the unique identifier assigned to this session. The servlet container assigns the identifier and it is implementation independent |
| **getCreationTime** | - **public long getCreationTime()**<br>- Returns the creation time of session. |
| **getLastAccessedTime** | - **public long getLastAccessedTime()**<br>- Returns the last accessed Time of session |
| **getMaxInactiveInterval** | - **public int getMaxInactiveInterval()**<br>- Returns the maximum time interval, in seconds, for which the servlet container will keep the session alive between the client accesses |
| **setMaxInactiveInterval** | - **public void setMaxInactiveInterval(int interval)**<br>- Specifies the time, in seconds, between the client requests before the servlet container invalidates the current session |

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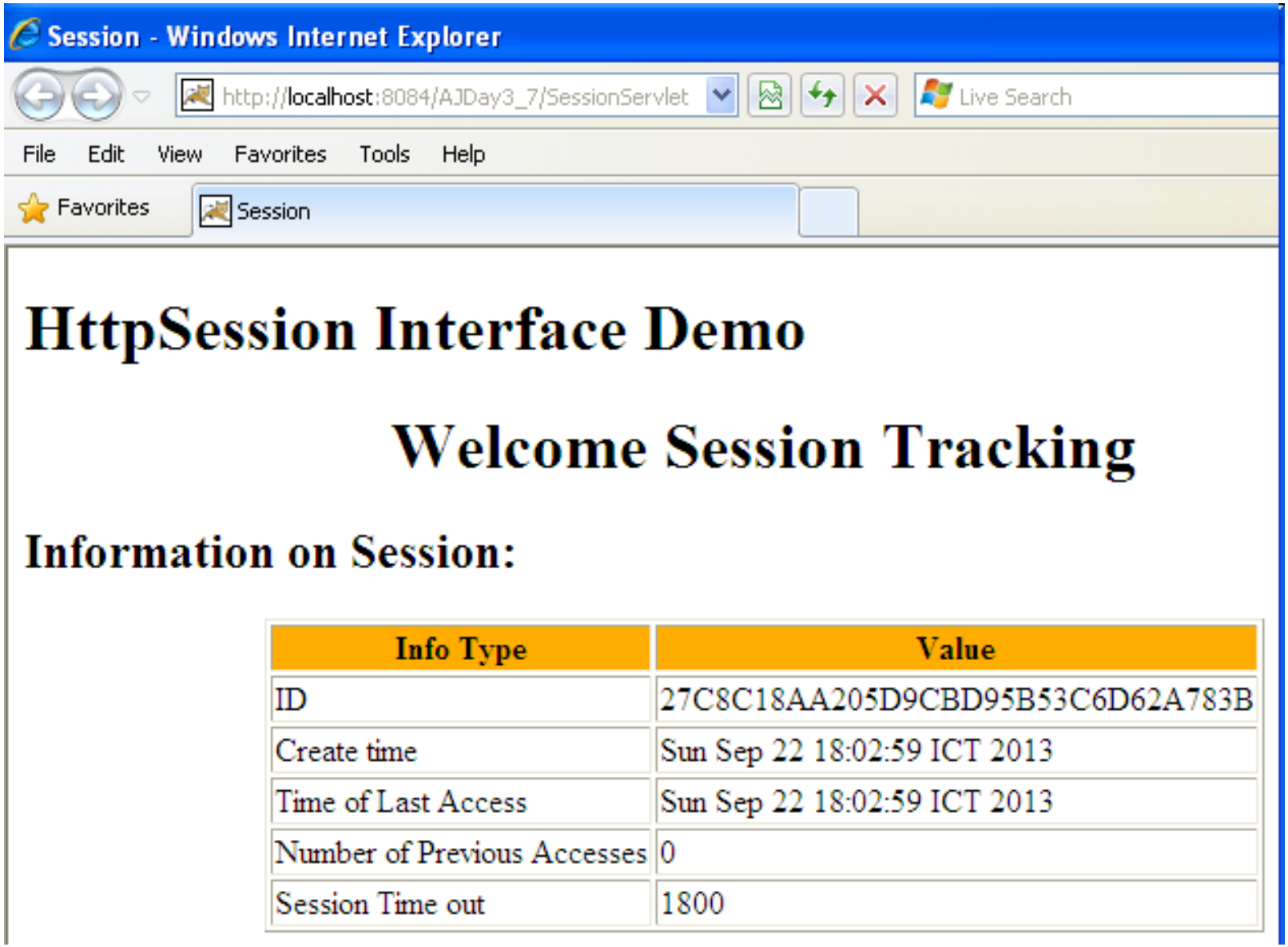
# Sessions & Listeners

## HttpSession interface Methods

| Methods | Descriptions |
|---|---|
| **isNew** | - **public boolean isNew()**<br>- Returns true if the client is unaware about the session or choose not to be part of the session |
| **invalidate** | - **public void invalidate()**<br>- Invalidates the session and the objects bound to the session are bounded. This method throws IllegalStateException if called on already invalidated session<br>- To avoid the hacker from causing any harm<br>- Destroys the data in a session that another servlet or JSP might require in future. Therefore, invalidating a session should be done cautiously as sessions are associated with client, not with individual servlets or JSP pages |

# Sessions & Listeners

## HttpSession interface – Example



# Sessions & Listeners
## HttpSession interface – Example

SessionServlet.java

```
30      protected void processRequest(HttpServletRequest request, HttpServletResponse response)
31              throws ServletException, IOException {
32          response.setContentType("text/html;charset=UTF-8");
33          PrintWriter out = response.getWriter();
34          try {
35              out.println("<html>");
36              out.println("<head>");
37              out.println("<title>Session</title>");
38              out.println("</head>");
39              out.println("<body>");
40              out.println("<h1>HttpSession Interface Demo</h1>");
41
42              HttpSession session = request.getSession(true);
43              String heading;
44              Integer accessCount = (Integer) session.getAttribute("accessCount");
45              if (accessCount == null) {
46                  accessCount = new Integer(0);
47                  heading = "Welcome Session Tracking";
48              } else {
49                  heading = "Comeback";
50                  accessCount = new Integer(accessCount.intValue() + 1);
51              }
```

# Sessions & Listeners
## HttpSession interface – Example

```
        DateFormat formatter = DateFormat.getDateTimeInstance(
                DateFormat.MEDIUM, DateFormat.MEDIUM);
        out.println("<H1 ALIGN=\"CENTER\">" + heading +
                "</H1>\n<H2>Information on Session:</H2>\n"
                + "<TABLE BORDER=1 ALIGN=\"CENTER\">\n<TR BGCOLOR="
                + "\"#FFADOO\">\n <TH>Info Type<TH>Value\n"
                + "<TR>\n <TD>ID\n <TD>" + session.getId() +
                "\n<TR>\n <TD>Create time\n <TD>"
                + new Date(session.getCreationTime()) +
                "\n<TR>\n <TD>Time of Last Access\n <TD>"
                + new Date(session.getLastAccessedTime()) +
                "\n<TR>\n <TD>Number of Previous Accesses\n <TD>"
                + accessCount + "\n<TR>\n <TD>Session Time out\n <TD>" +
                session.getMaxInactiveInterval()
                + "<TABLE>\n</BODY></HTML>");
        out.println("</body>");
        out.println("</html>");

    } finally {
        out.close();
    }
}
```

# Sessions & Listeners
## HttpSession interface – Example

SessionServlet.java

```
65                          session.getMaxInactiveInterval()
66                          + "<TABLE>\n</BODY></HTML>");
67                  session.setAttribute("accessCount", accessCount);
68                  out.println("</body>");
69                  out.println("</html>");
70              } finally {
71                  out.close();
72              }
73          }
```

Favorites | Session

# HttpSession Interface Demo

**Comeback**

### Information on Session:

| Info Type | Value |
|---|---|
| ID | 198A528D0D5B47FD7BCBDA0FCEFA3229 |
| Create time | Sun Sep 22 18:05:14 ICT 2013 |
| Time of Last Access | Sun Sep 22 18:05:14 ICT 2013 |
| Number of Previous Accesses | 1 |
| Session Time out | 1800 |

# Sessions & Listeners

## HttpSession interface

- **Distributed Session**
  - A **session** is **available** to be **shared between web resources** in a single web application (*e.g. a session **cannot cross web application boundaries***)
- Session **Death** is **controlled** in one of **3 ways**
  - **Application Server Global Default**
  - **Web Application Default (minutes)**
    - A negative value or zero value causes the session to never expire

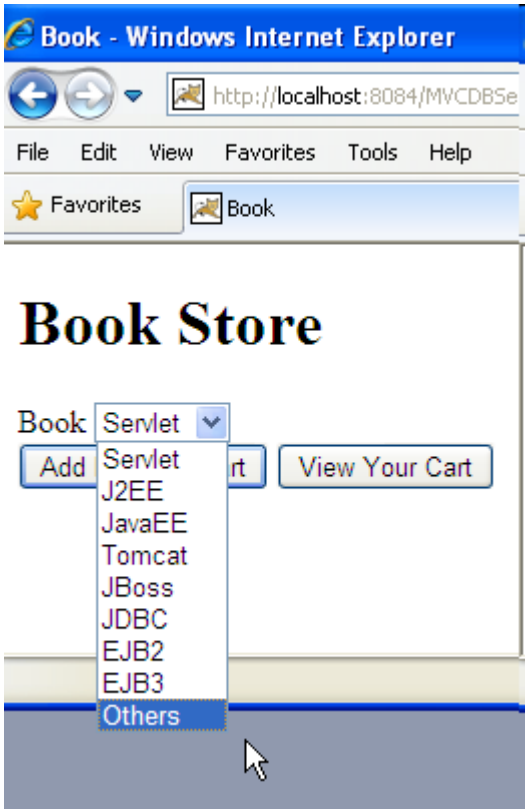

  - Individual Session Setting using **setMaxInactivateInterval**() method
    - A negative value supplied as an argument causes the session to never expire
- Other Session APIs
  - **HttpSession.getServletContext**() returns the SessionContext that the session is attached

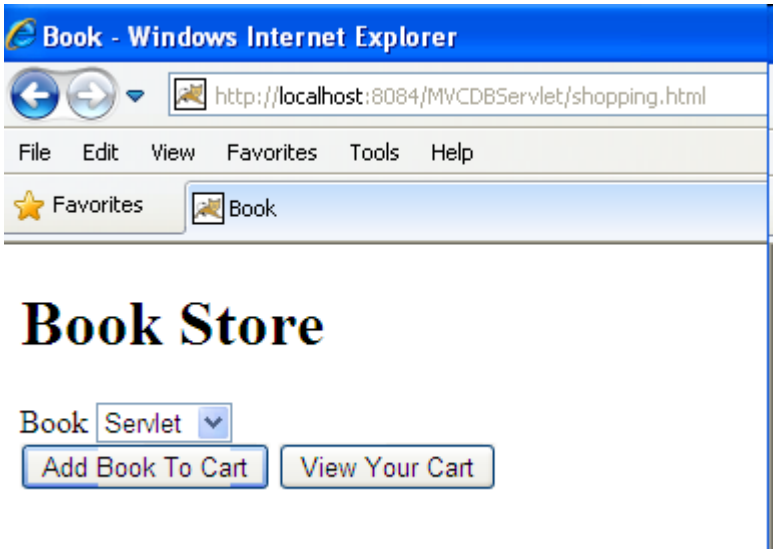
# How to write CRUD Web Application

## Shopping Cart

# How to write CRUD Web Application

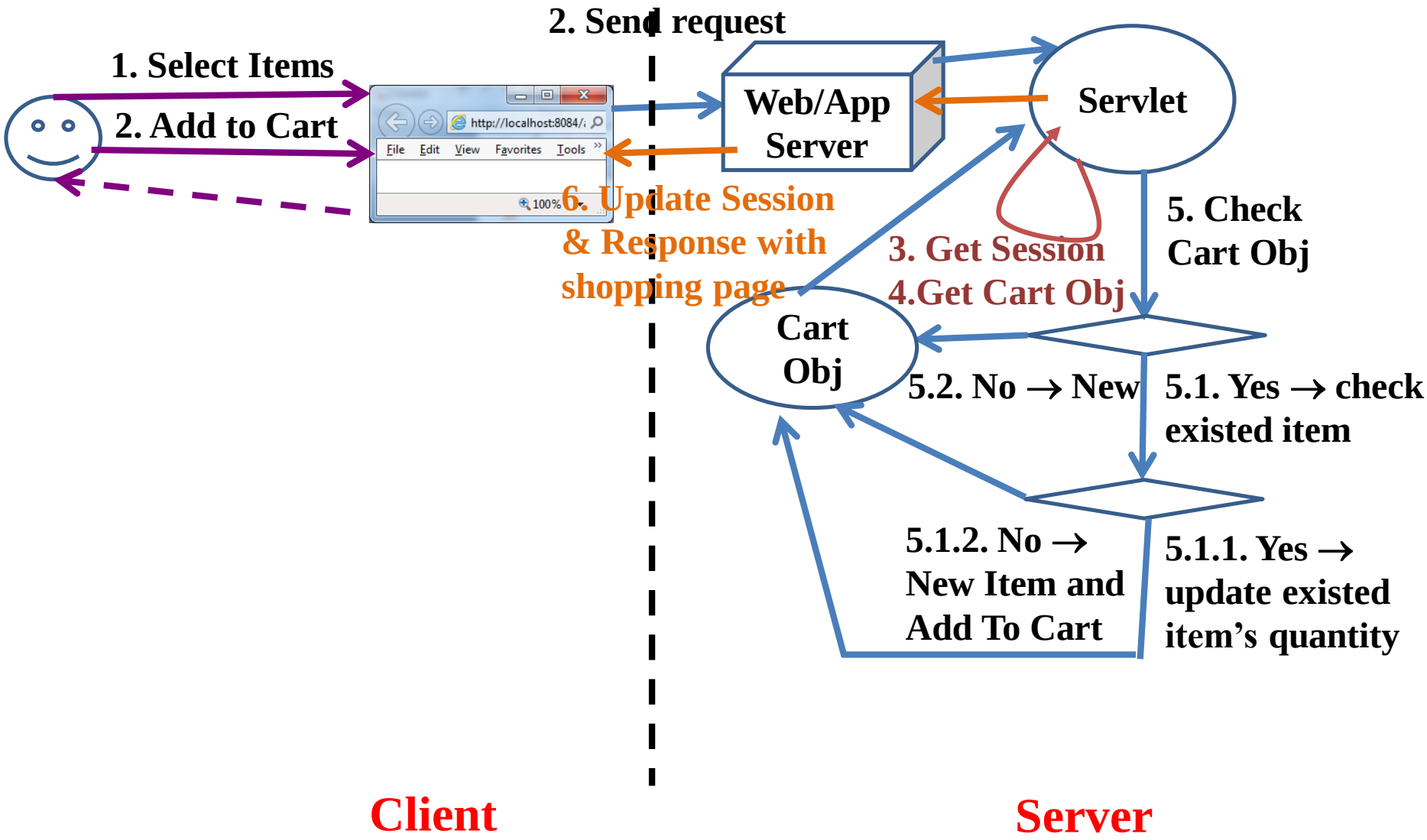
## Shopping Cart – Add To Cart



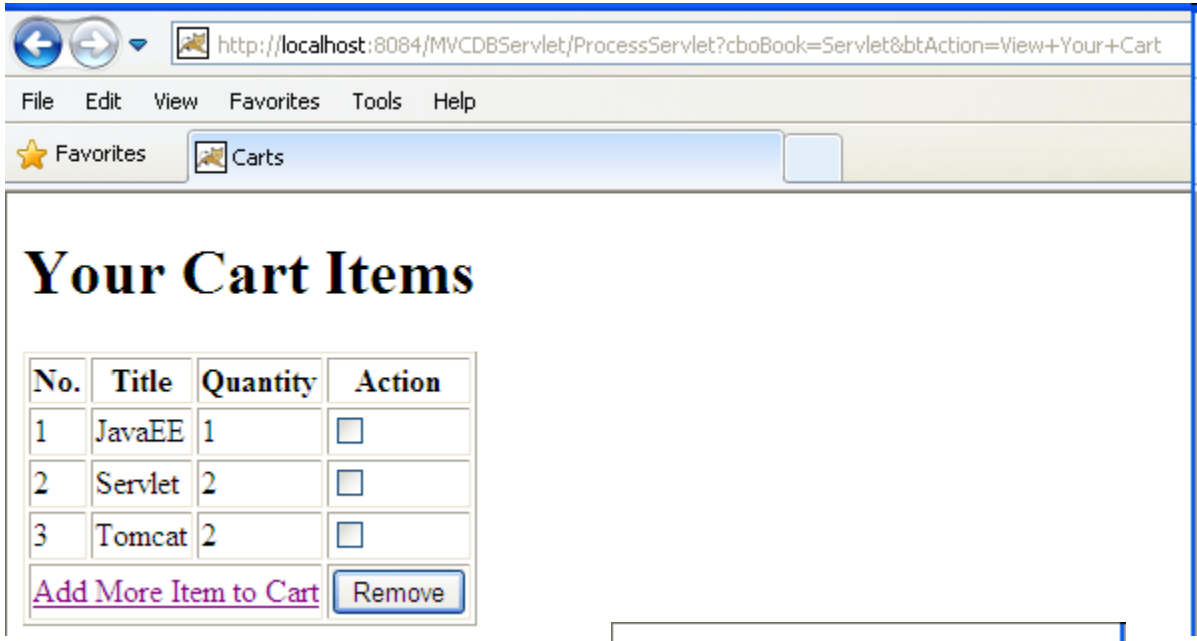
# How to write CRUD Web Application

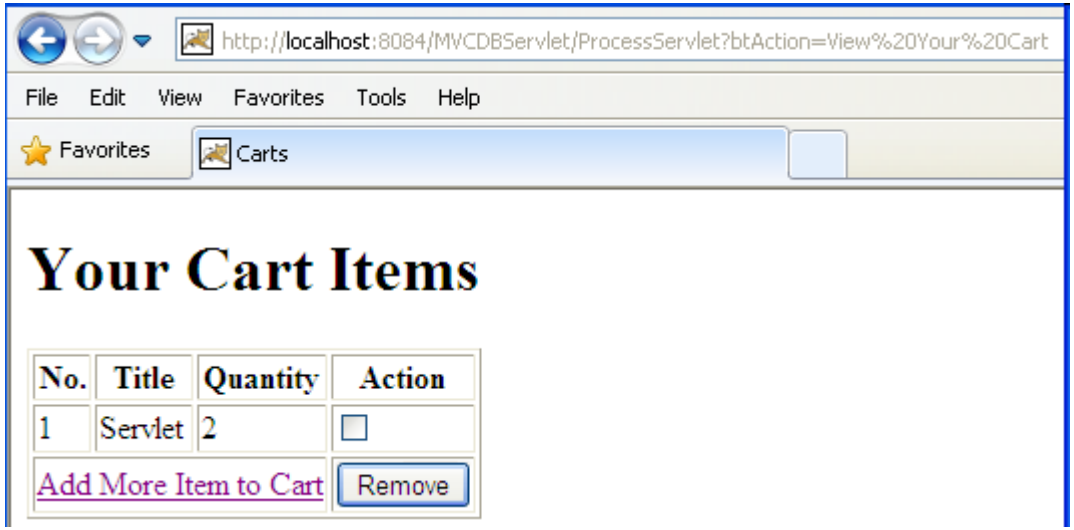
## Interactive Server Model – Add To Cart

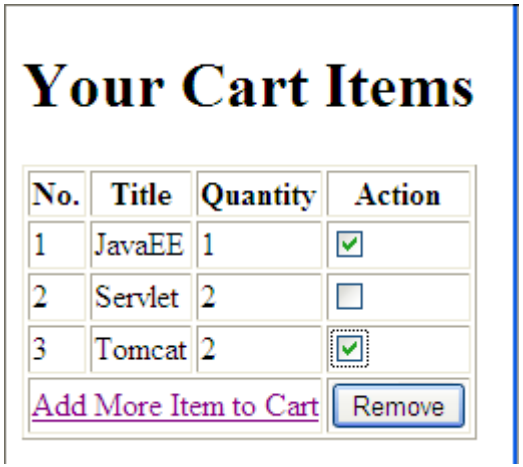


# How to write CRUD Web Application

## Shopping Cart – View Cart

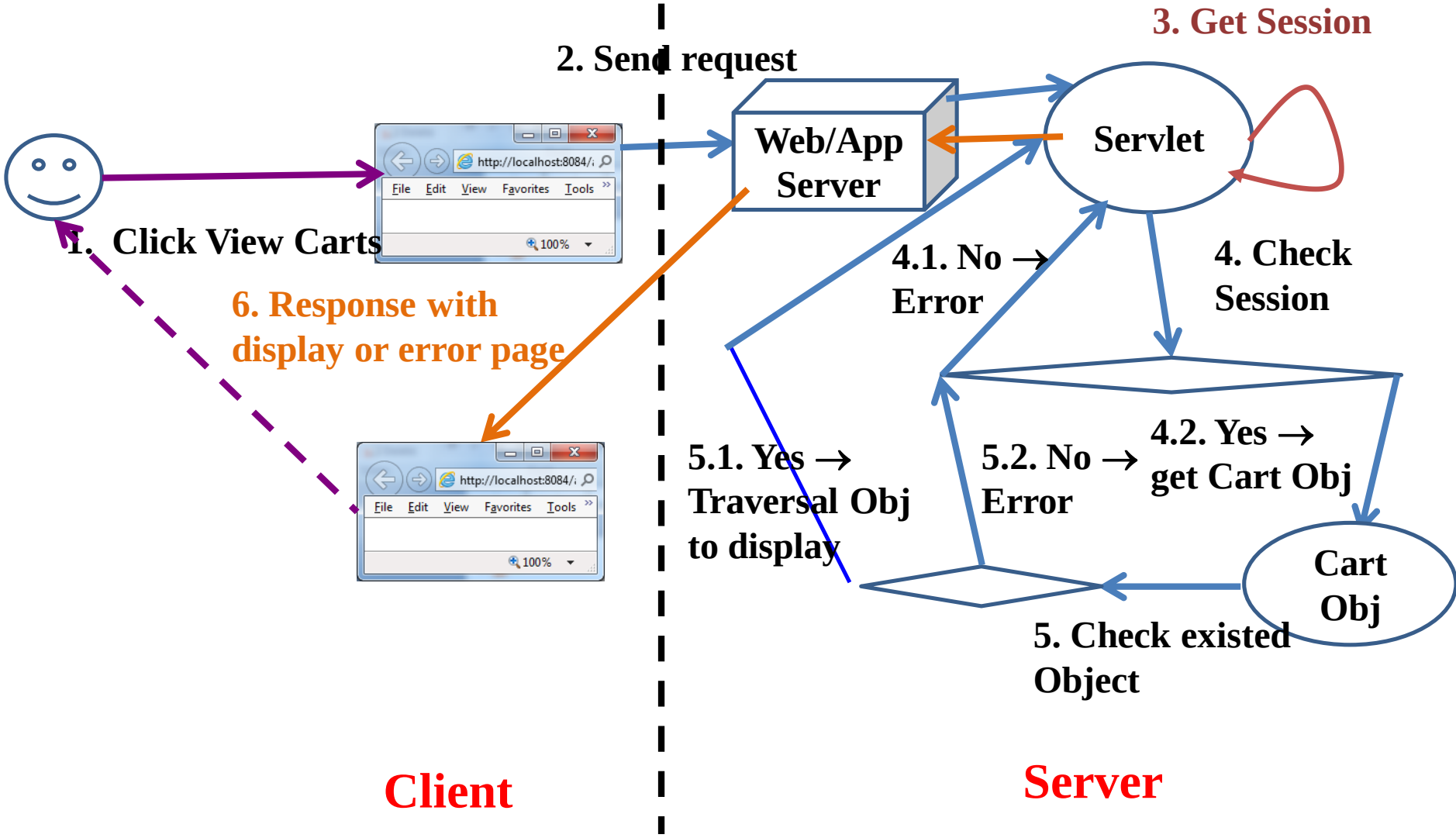


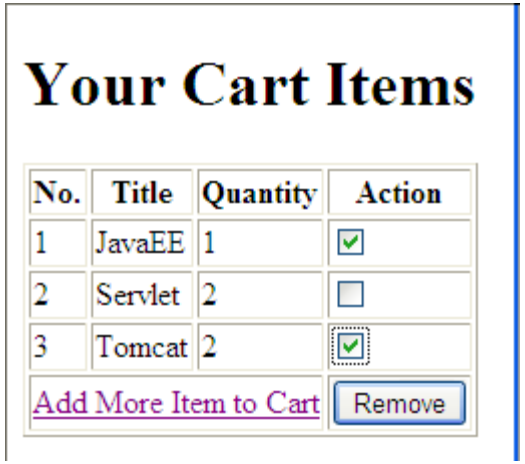
# How to write CRUD Web Application

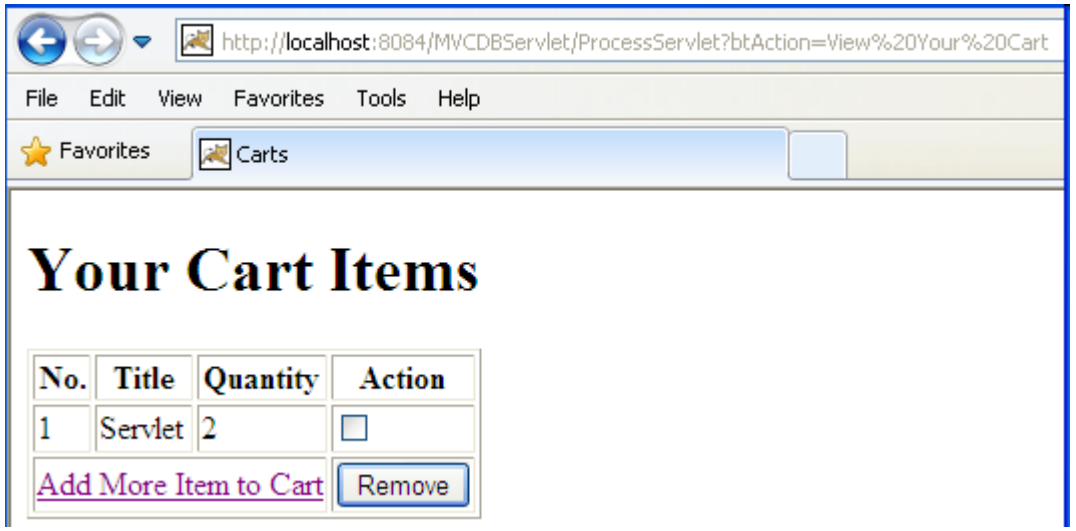
## Interactive Server Model – View Cart



# How to write CRUD Web Application

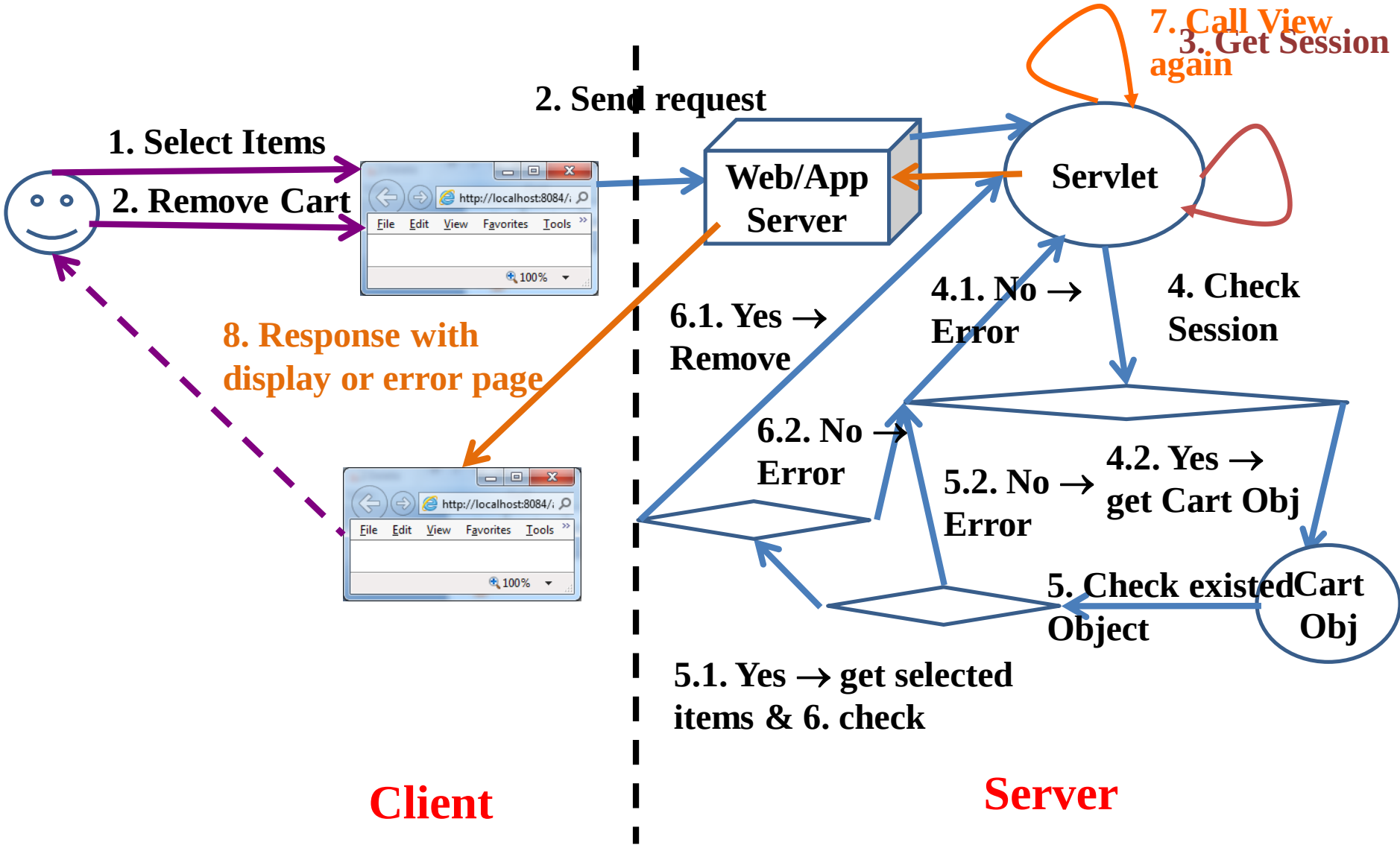
## Shopping Cart – Remove Cart



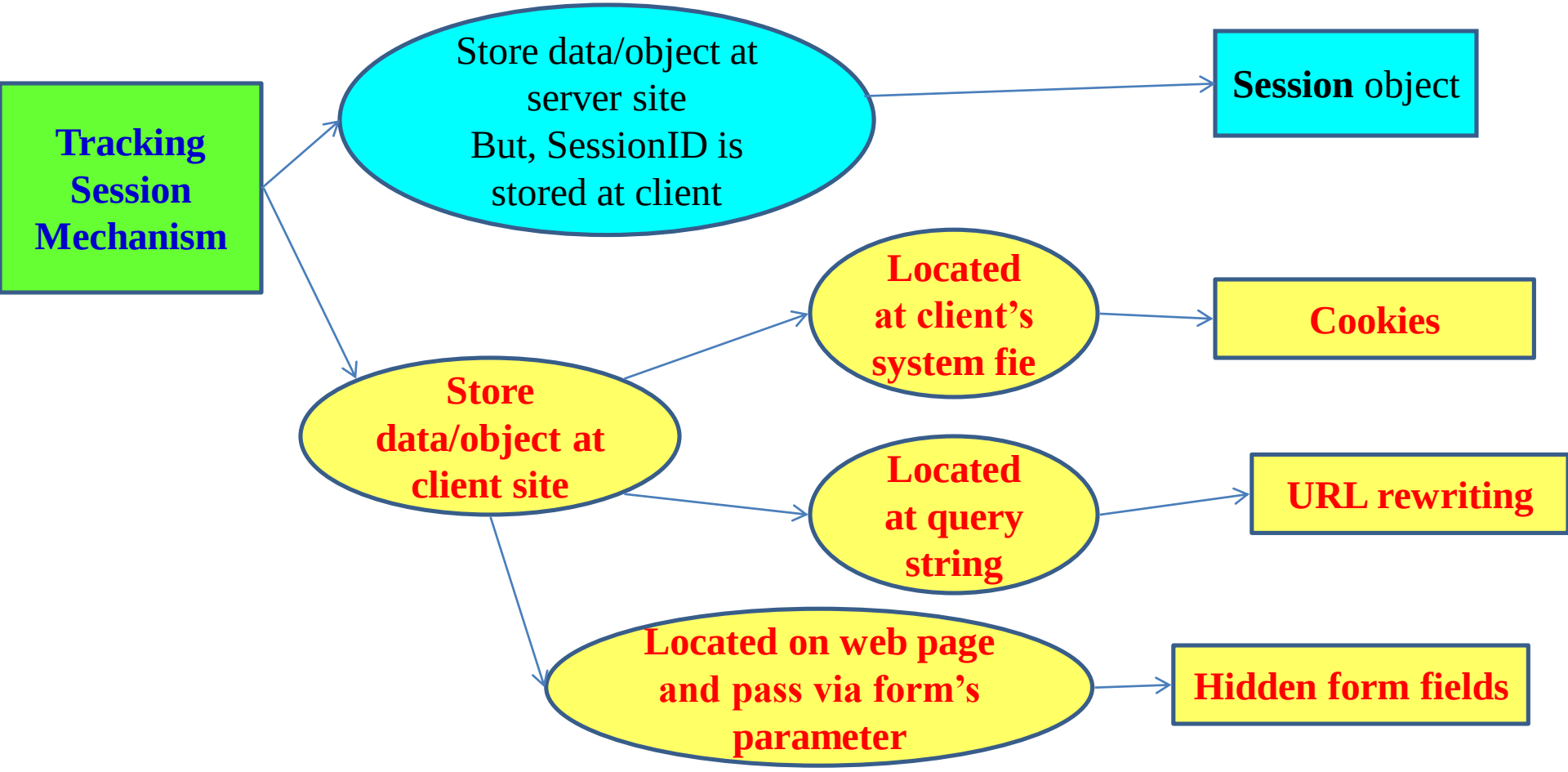
# How to write CRUD Web Application

## Interactive Server Model – Remove



# Sessions & Listeners

## Conclusion



# Error Handling in Servlet

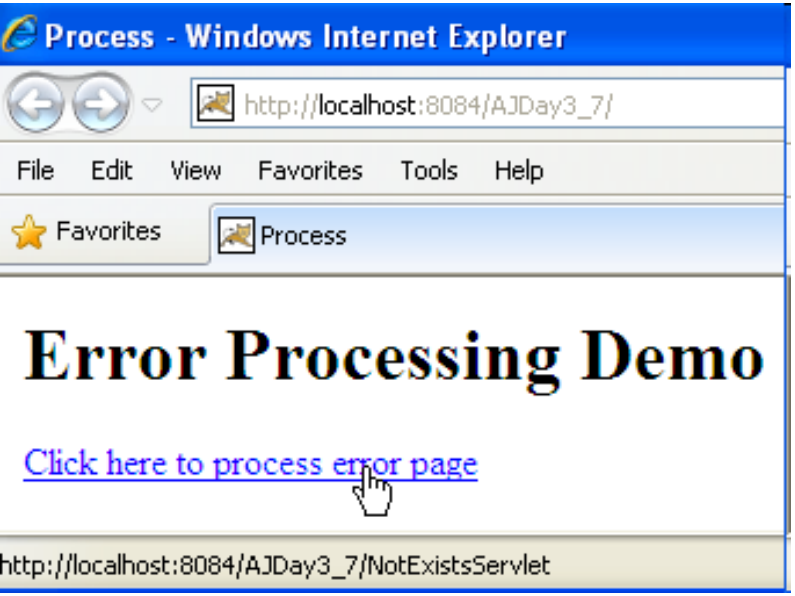
## Reporting Error

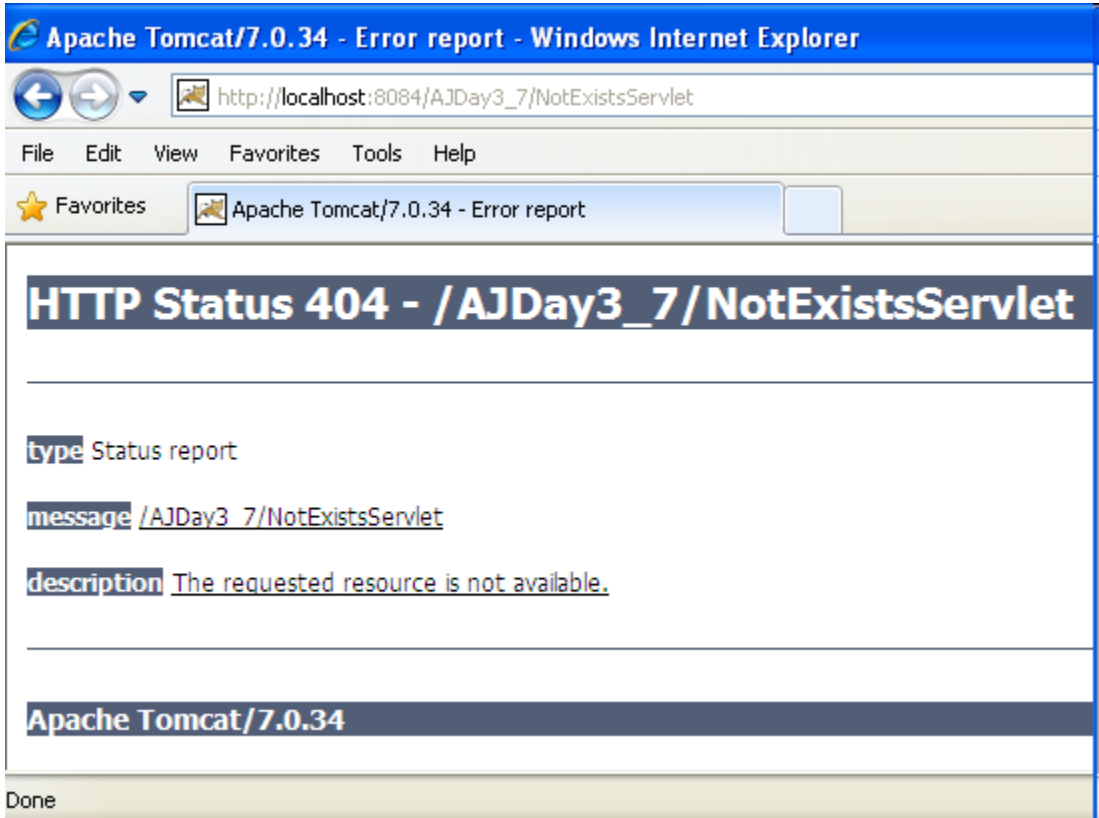
- **There are many situations** occur an error
  - A **requested page** may be **moved from one** location **to another**.
  - The **address** may be **wrongly typed.**
  - The requested page may be **forbidden**, may be **temporarily deleted** or **correct** HTTP version might **not have found**.
  - There are other situations where an **error** may **generated**.
- Error during the **execution** of a **web application** are **reported**

| Methods | Descriptions |
|---|---|
| **sendError** | - **public void sendError (int sc) throws IOException**<br>- **Checks** for the **status code and sends** to the **user the specified** response message<br>- **After sending** the error message the **buffer is cleared**<br>- response.sendError(response.SC_NOT_FOUND); |
| **setStatus** | - **public void HttpServletResponse.setStatus (int sc)**<br>- This **code** is **specified earlier** so that on **receiving the setStatus()** method, the error message is throw. Or **redirected to another default Web page**<br>- response.setStatus(response.SC_NOT_MODIFIED); |

# Error Handling in Servlet

## Reporting Error – Example

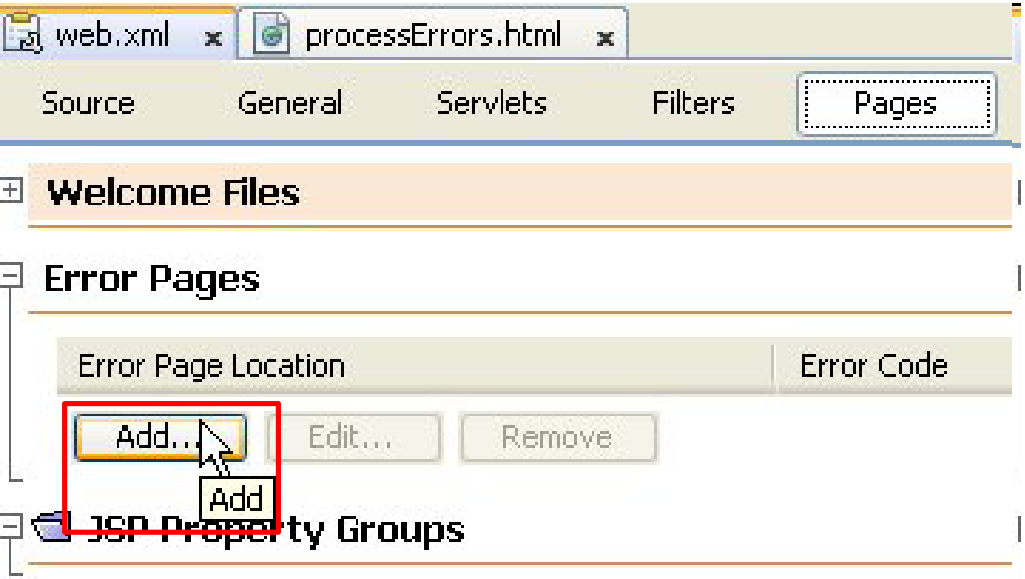


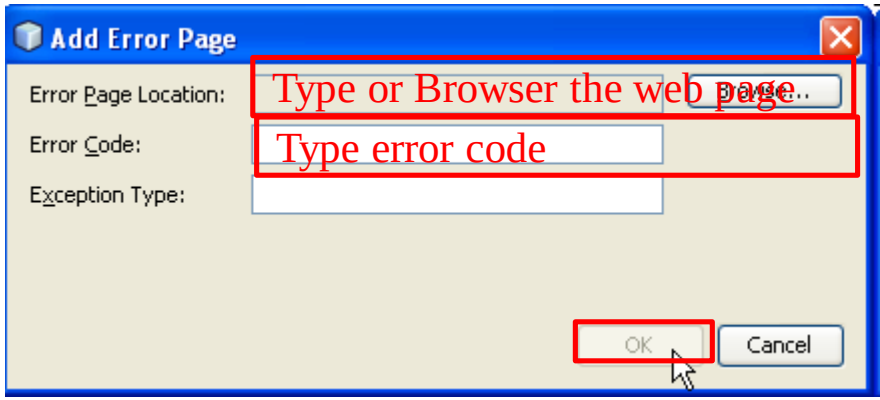



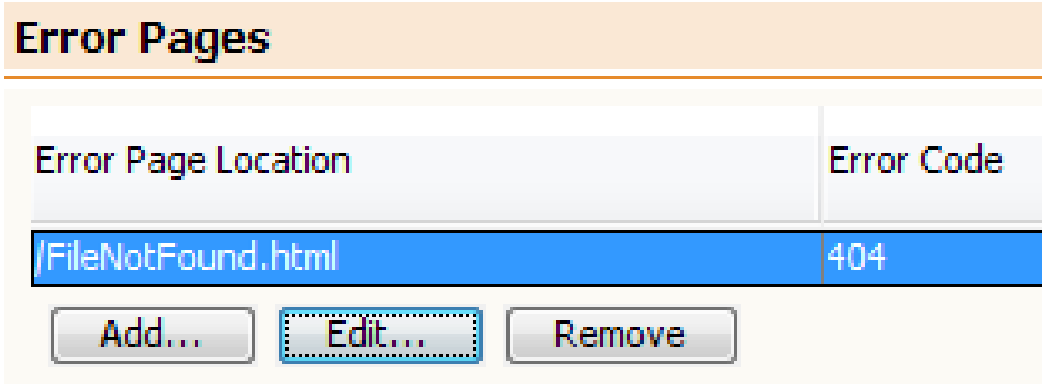
# Error Handling in Servlet

## Reporting Error – Example

- **Addition the following contents to web.xml file**
  - **In web.xml, choose Page tab, choose Error Pages, click Add**



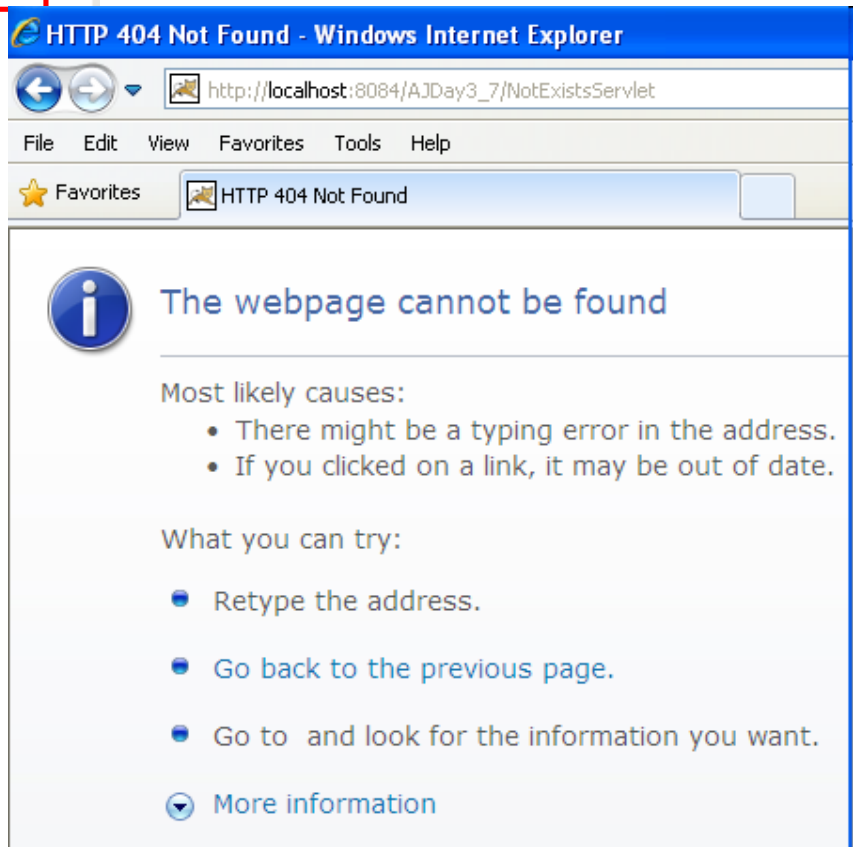
# Error Handling in Servlet

## Reporting Error – Example

web.xml

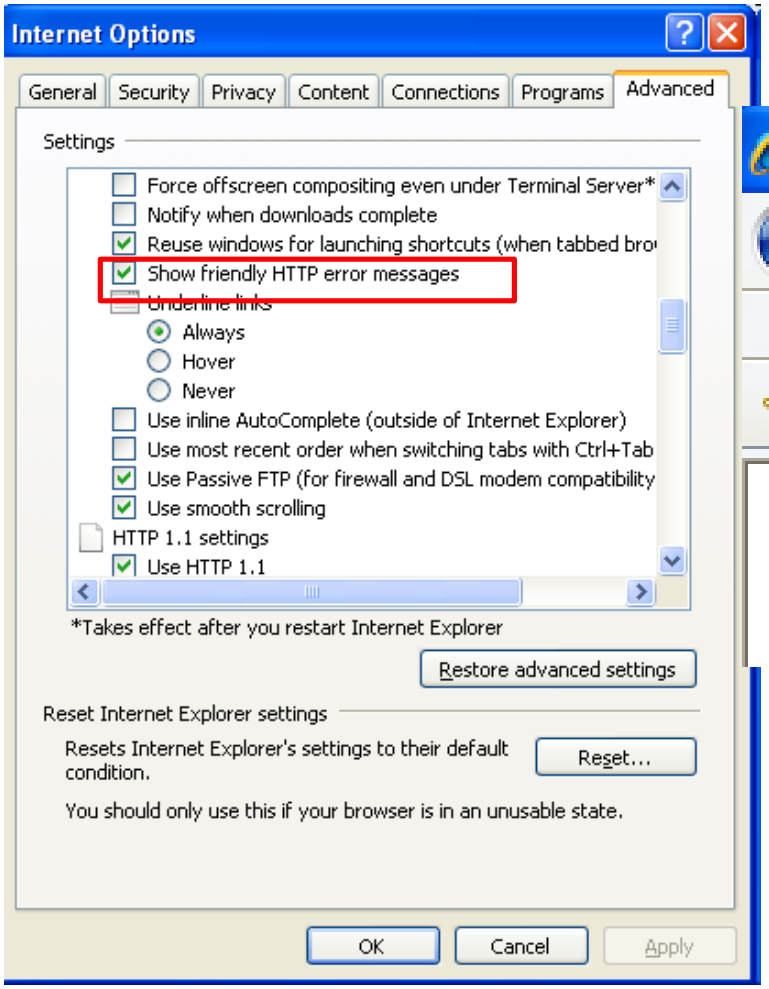
Source | General | Servlets | Filters | Pages | References | Secu

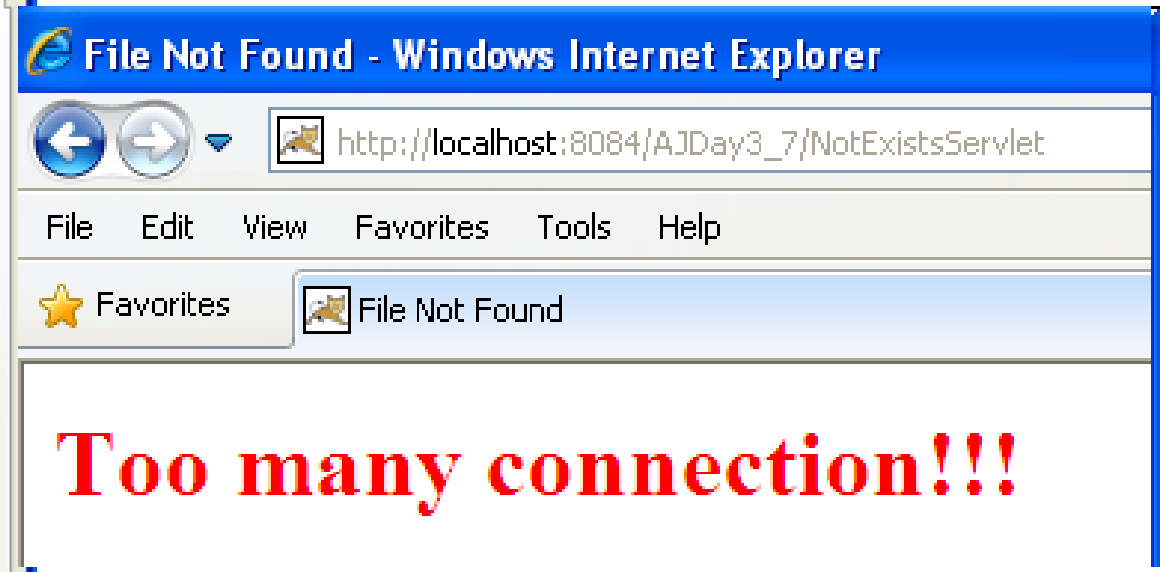
```
172     <welcome-file-list>
173         <welcome-file>logine.html</welcome-file>
174     </welcome-file-list>
175     <error-page>
176         <error-code>404</error-code>
177         <location>/fileNotFound.html</location>
178     </error-page>
179 </web-app>
```



# Error Handling in Servlet

## Reporting Error




**Uncheck the option "Show friendly HTTP error messages" from Tools/ "Internet Options" to set up the browser would be presented the user defined message**

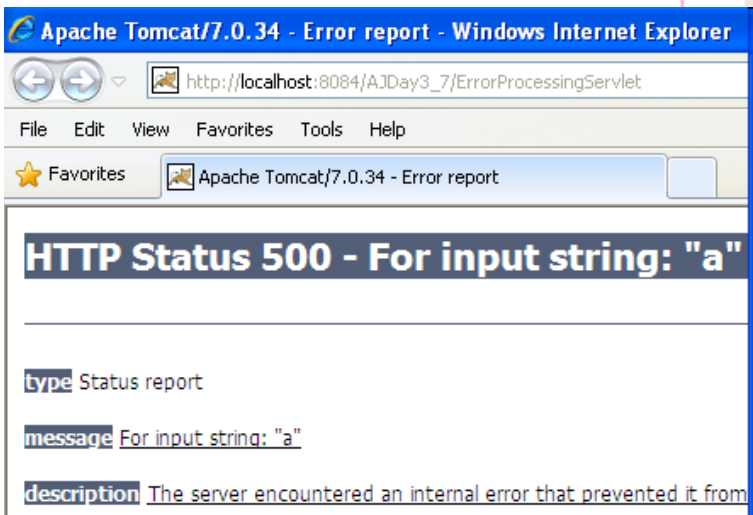
# Error Handling in Servlet

## Reporting Error – Example

ErrorProcessingServlet.java

Source | History

```
16      * @author Trong Khanh
17      */
18     public class ErrorProcessingServlet extends HttpServlet {
19
20         /**...*/
30         protected void processRequest(HttpServletRequest request, HttpServletResponse r
31                 throws ServletException, IOException {
32             response.setContentType("text/html;charset=UTF-8");
33             PrintWriter out = response.getWriter();
34             try {
35                 int a = Integer.parseInt("a");
36             } catch (NumberFormatException e) {
                   response.sendError(response.SC_INTERNAL_SERVER_ERROR, e.getMessage());
38             } finally {
39                 out.close();
40             }
41         }
```



# Error Handling in Servlet
## Reporting Error – Example

ErrorProcessingServlet.java | ProcessErrServlet.java

Source | History

```
17    * @author Trong Khanh
18    */
19   public class ErrorProcessingServlet extends HttpServlet {
20
21       /**...*/
31       protected void processRequest(HttpServletRequest request, HttpServletResponse resp
32               throws ServletException, IOException {
33           response.setContentType("text/html;charset=UTF-8");
34           PrintWriter out = response.getWriter();
35           try {
36               int a = Integer.parseInt("a");
37           } catch (NumberFormatException e) {
38               request.setAttribute("ERRORS", e.getMessage());
39               RequestDispatcher rd = request.getRequestDispatcher("ProcessErrServlet");
                 rd.forward(request, response);
41           } finally {
42               out.close();
43           }
44       }
```

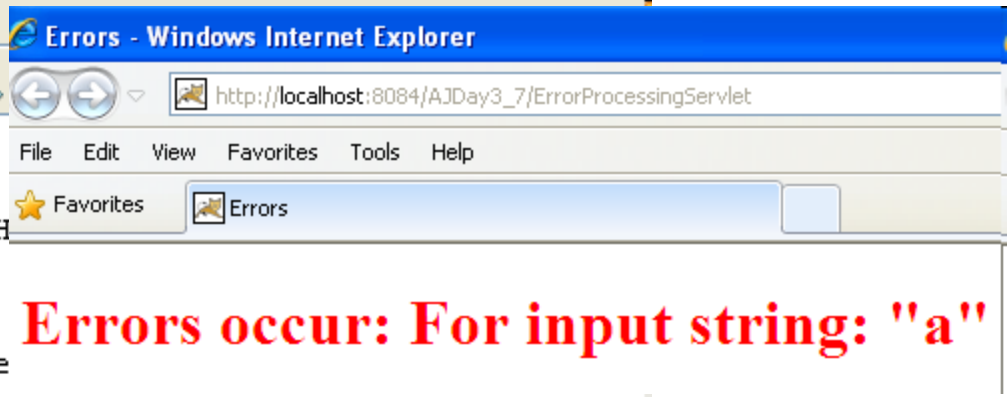
# Error Handling in Servlet

## Reporting Error – Example

ProcessErrServlet.java

Source | History

```
16      * @author Trong Khanh
17      */
18     public class ProcessErrServlet extends H
19
20         /**...*/
30         protected void processRequest(HttpSe
31                 throws ServletException, IOException {
32             response.setContentType("text/html;charset=UTF-8");
33             PrintWriter out = response.getWriter();
34             try {
35                 /* TODO output your page here. You may use following sample
36                 out.println("<!DOCTYPE html>");
37                 out.println("<html>");
38                 out.println("<head>");
39                 out.println("<title>Errors</title>");
40                 out.println("</head>");
41                 out.println("<body>");
42                 out.println("<h1><font color='red'>Errors occur: "
43                         + request.getAttribute("ERRORS") + "</font></h1>");
44                 out.println("</body>");
45                 out.println("</html>");
46             } finally {
47                 out.close();
48             }
49         }
```



# Error Handling in Servlet

## Reporting Error – Example

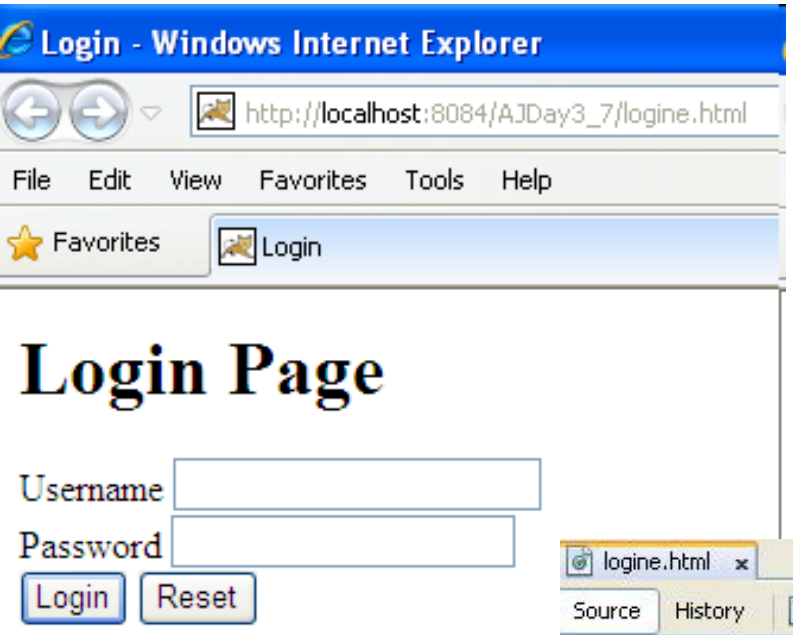
DisplayErrorServlet.java

Source | History

```
15      *
16      * @author Trong Khanh
17      */
18     public class DisplayErrorServlet extends HttpServlet {
19
20         /**...*/
30         protected void processRequest(HttpServletRequest request, HttpServletRespor
31                 throws ServletException, IOException {
32             response.setContentType("text/html;charset=UTF-8");
33             PrintWriter out = response.getWriter();
34             try {
35                 String action = request.getParameter("action");
36                 if (action == null) {
37                     response.setStatus(HttpServletResponse.SC_TEMPORARY_REDIRECT);
38                     String url = "http://" + request.getLocalName() + ":"
39                             + request.getLocalPort() + request.getContextPath() +
40                             "/logine.html";
41                     response.setHeader("Location", url);
42                 }
43             } finally {
44                 out.close();
45             }
46         }
```

# Error Handling in Servlet

## Reporting Error – Example




logine.html

Source | History

```
5   <!DOCTYPE html>
6   <html>
7       <head>
8           <title>Login</title>
9           <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
10      </head>
11      <body>
12          <h1>Login Page</h1>
13          <form action="TestServlet" method="POST">
14              Username <input type="text" name="txtUser" value="" /><br/>
15              Password <input type="password" name="txtPass" value="" /><br/>
16              <input type="submit" value="Login" name="action" />
17              <input type="reset" value="Reset" />
18          </form>
19      </body>
20  </html>
```

# Error Handling in Servlet

## Reporting Error – Example – Others

DisplayErrorServlet.java

Source | History

```
16   * @author Trong Khanh
17   */
18  public class DisplayErrorServlet extends HttpServlet {
19
20      /**...*/
30      protected void processRequest(HttpServletRequest request, HttpServletRespo
31              throws ServletException, IOException {
32          response.setContentType("text/html;charset=UTF-8");
33          PrintWriter out = response.getWriter();
34          try {
35              String action = request.getParameter("action");
36              if (action == null) {
37                  response.setStatus(HttpServletResponse.SC_TEMPORARY_REDIRECT);
38                  int pos = request.getRequestURL().lastIndexOf("/");
39                  String url = request.getRequestURL().substring(0, pos);
40                  url = url + "/logine.html";
41                  System.out.println("ddd " + url);
42                  response.setHeader("Location", url);
43              }
44          } finally {
45              out.close();
46          }
47      }
```

# Error Handling in Servlet

## Logging Error

LogServlet.java

Source | History

```
16      * @author Trong Khanh
17      */
18     public class LogServlet extends HttpServlet {
19         /**...*/
29         protected void processRequest(HttpServletRequest request
30                 throws ServletException, IOException {
31             response.setContentType("text/html;charset=UTF-8");
32             PrintWriter out = response.getWriter();
33             try {
34                 /* TODO output your page here. You may use follo
35                 out.println("<!DOCTYPE html>");
36                 out.println("<html>");
37                 out.println("<head>");
38                 out.println("<title>Log</title>");
39                 out.println("</head>");
40                 out.println("<body>");
41                 out.println("<h1>Log Servlet Server Demo</h1>");
42                 try {
43                     int a = Integer.parseInt("aaaa");
44                 } catch (NumberFormatException ex) {
                       ex.printStackTrace();
46                 }
47                 out.println("</body>");
48                 out.println("</html>");
49             } finally {
50                 out.close();
51             }
52         }
```

# Error Handling in Servlet

## Logging Error

LogServlet.java

Source | History

```
16      * @author Trong Khanh
17      */
18     public class LogServlet extends HttpServlet {
19         /**...*/
29         protected void processRequest(HttpServletRequest reque
30                 throws ServletException, IOException {
31             response.setContentType("text/html;charset=UTF-8");
32             PrintWriter out = response.getWriter();
33             try {
34                 /* TODO output your page here. You may use follo
35                 out.println("<!DOCTYPE html>");
36                 out.println("<html>");
37                 out.println("<head>");
38                 out.println("<title>Log</title>");
39                 out.println("</head>");
40                 out.println("<body>");
41                 out.println("<h1>Log Servlet Server Demo</h1>");
42                 try {
43                     int a = Integer.parseInt("aaaa");
44                 } catch (NumberFormatException ex) {
                       ex.printStackTrace();
46                 }
47                 out.println("<
48                 out.println("<
49             } finally {
50                 out.close();
51             }
52         }
```

Log - Windows Internet Explorer

http://localhost:8084/AJDay3_7/LogServlet

File Edit View Favorites Tools Help

Favorites | Log

**Log Servlet Server Demo**

```
INFO: Reloading Context with name [/AJDay3_7] is completed
java.lang.NumberFormatException: For input string: "aaaa"
        at java.lang.NumberFormatException.forInputString(NumberFormatE
        at java.lang.Integer.parseInt(Integer.java:492)
        at java.lang.Integer.parseInt(Integer.java:527)
        at sample.servlet.LogServlet.processRequest(LogServlet.java:43)
        at sample.servlet.LogServlet.doGet(LogServlet.java:67)
```

# Error Handling in Servlet

## Logging Error

- Servlet can store **the actions and errors through the log() method** of the **GenericServlet class.**
- The log() method also **assists in debugging and can viewed record** in a server
- **Syntax**: **public void log (String msg [, Throwable t])**
- **Ex**:

```
…
log("Servlet is not found ");
response.sendError(response.SC_INTERNAL_SERVER_ERROR, "The requested page ["+ page + "] not found.");
…
```

- **A log file locate at**
  - **C:\Documents and Settings\LoggedUser\Application Data\NetBeans\ 7.4\apache-tomcat-7.0.41.0_base\logs\localhost.yyyy-mm-dd.log**
  - **C:\Users\LoggedUser\AppData\Roaming\NetBeans\7.4\ apache-tomcat-7.0.41.0_base\work\Catalina\logs\localhost.yyyy-mm-dd.log**

# Error Handling in Servlet

## Logging Error

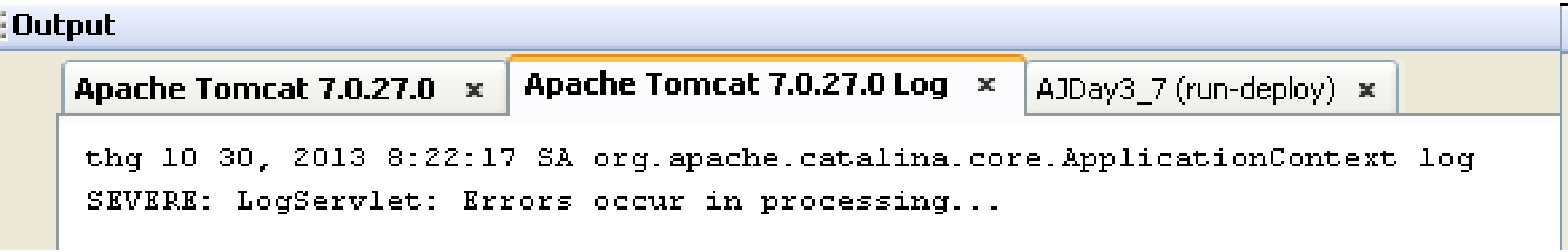
LogServlet.java

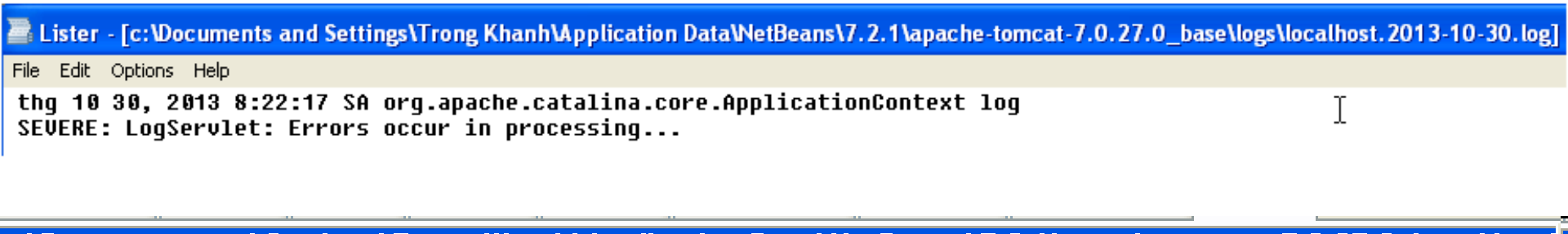
Source | History

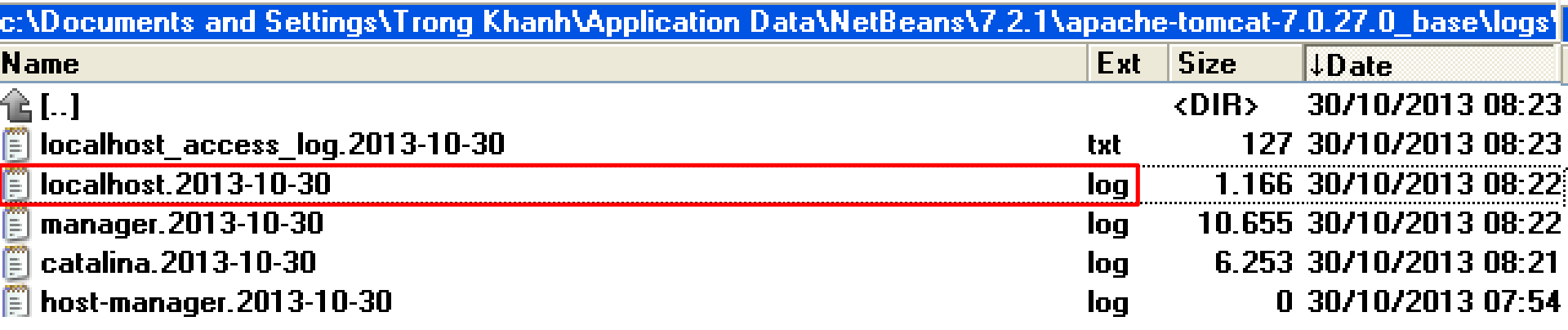
```
16      * @author Trong Khanh
17      */
18     public class LogServlet extends HttpServlet {
19         /**...*/
29         protected void processRequest(HttpServletRequest request, HttpSe
30                 throws ServletException, IOException {
31             response.setContentType("text/html;charset=UTF-8");
32             PrintWriter out = response.getWriter();
33             try {
34                 /* TODO output your page here. You may use following sam
35                 out.println("<!DOCTYPE html>");
36                 out.println("<html>");
37                 out.println("<head>");
38                 out.println("<title>Log</title>");
39                 out.println("</head>");
40                 out.println("<body>");
41                 out.println("<h1>Log Servlet Server Demo</h1>");
42                 try {
43                     int a = Integer.parseInt("aaaa");
44                 } catch (NumberFormatException ex) {
45                     log("Errors occur in processing...", ex.getCause());
46                 }
47                 out.println("</body>");
48                 out.println("</html>");
49             } finally {
50                 out.close();
51             }
52         }
```

# Error Handling in Servlet

## Logging Error

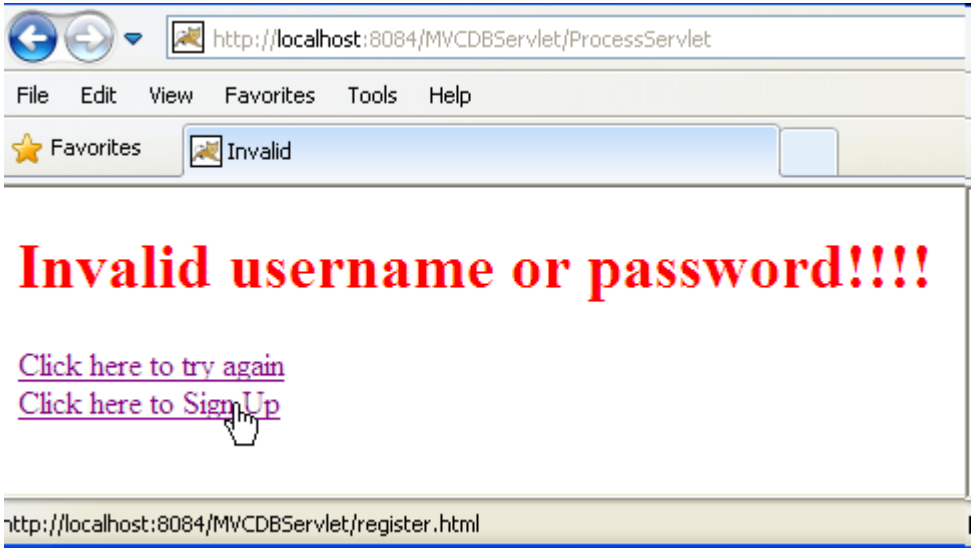


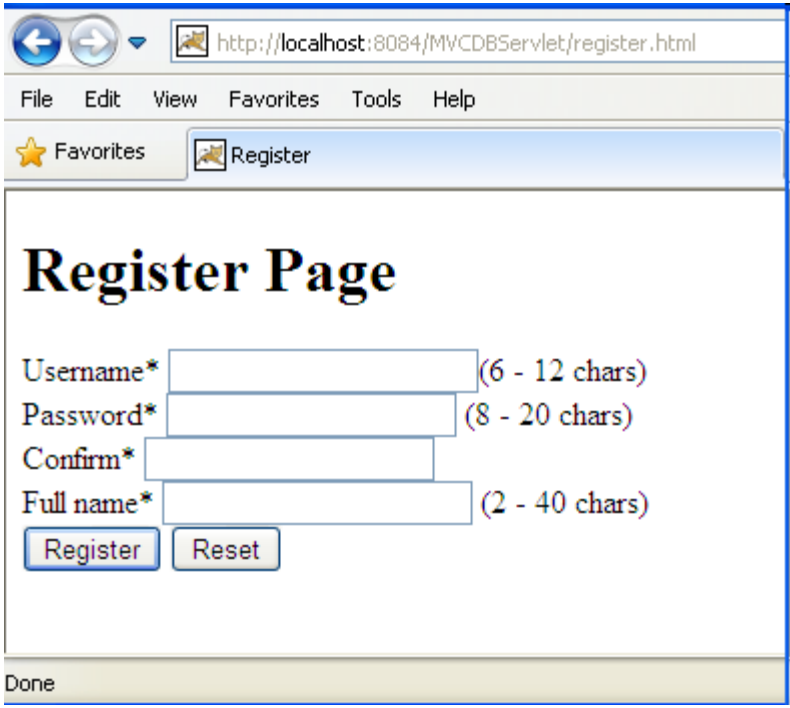



# How to write CRUD Web Application

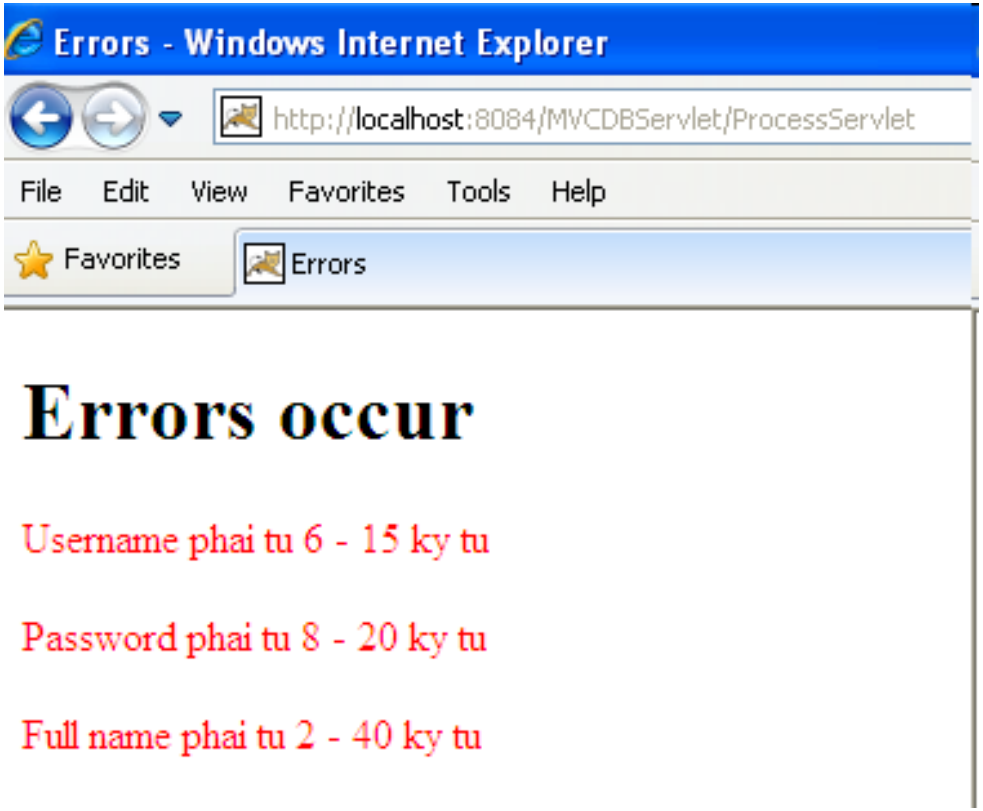
## Register Functions



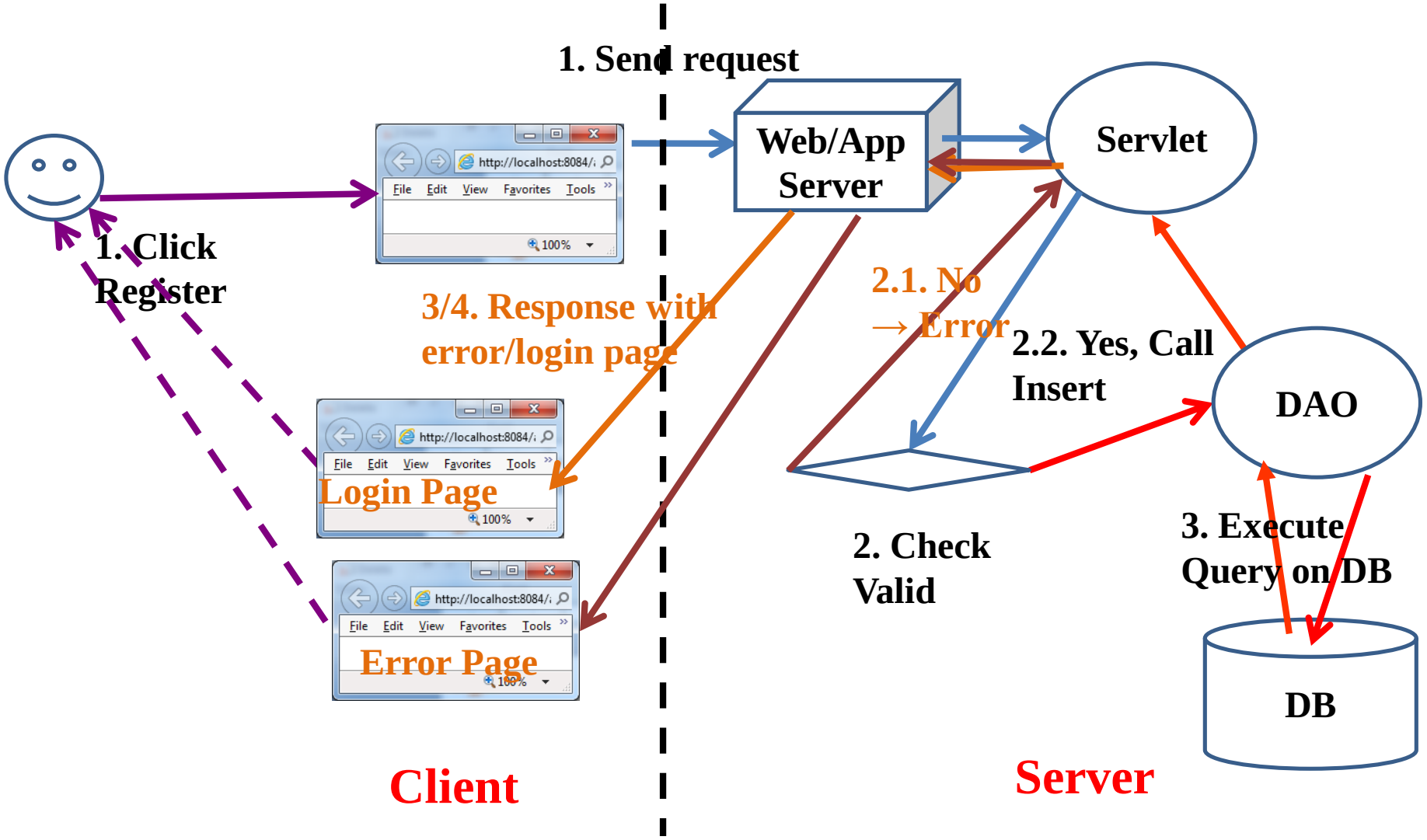
# How to write CRUD Web Application

## Validation




# How to write CRUD Web Application

## Interactive Server Model



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# Summary

- **How to write CRUD Web Application**
  - Session Tracking Techniques
  - Manipulate DB Techniques in Web Application
  - Break down structure component in building web application
- **Techniques: Error Handling in Servlets**
  - Reporting Errors
  - Logging Errors
  - Users Errors vs. System Errors

# Q&A

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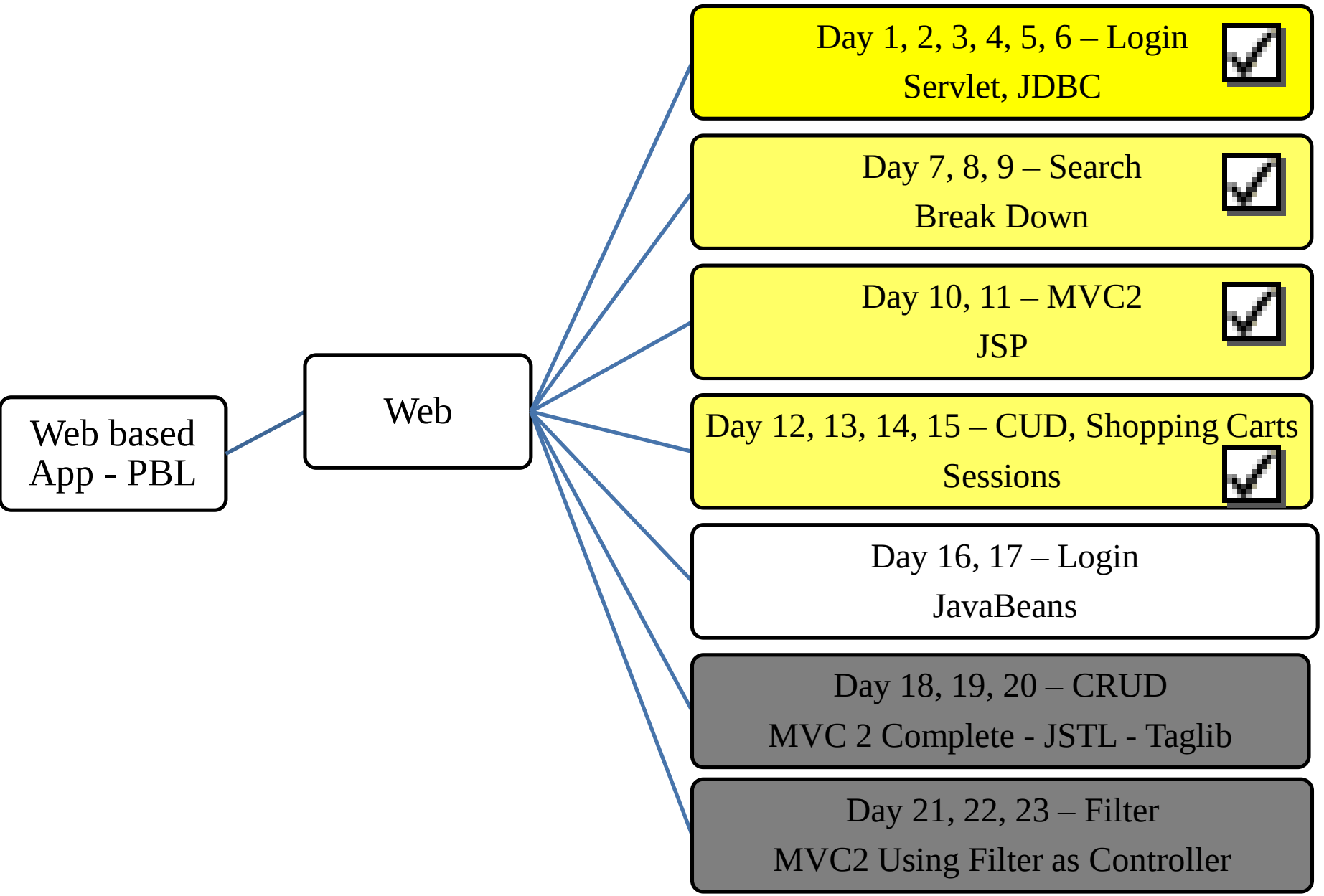
# Next Lecture

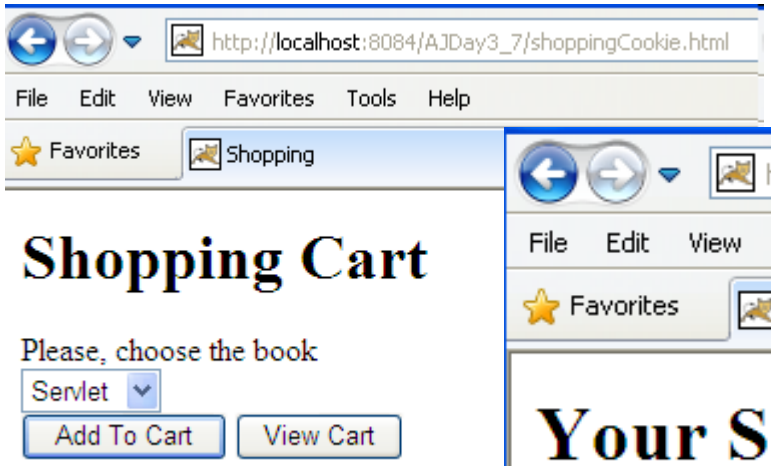
- **JSP Standard Actions**
  - JavaBeans
  - Standard Actions
- **Dispatcher Mechanism**
  - Including, Forwarding, and Parameters
  - Vs. Dispatcher in Servlets
- **EL – Expression Languages**
  - What is EL?
  - How to use EL in JSP?

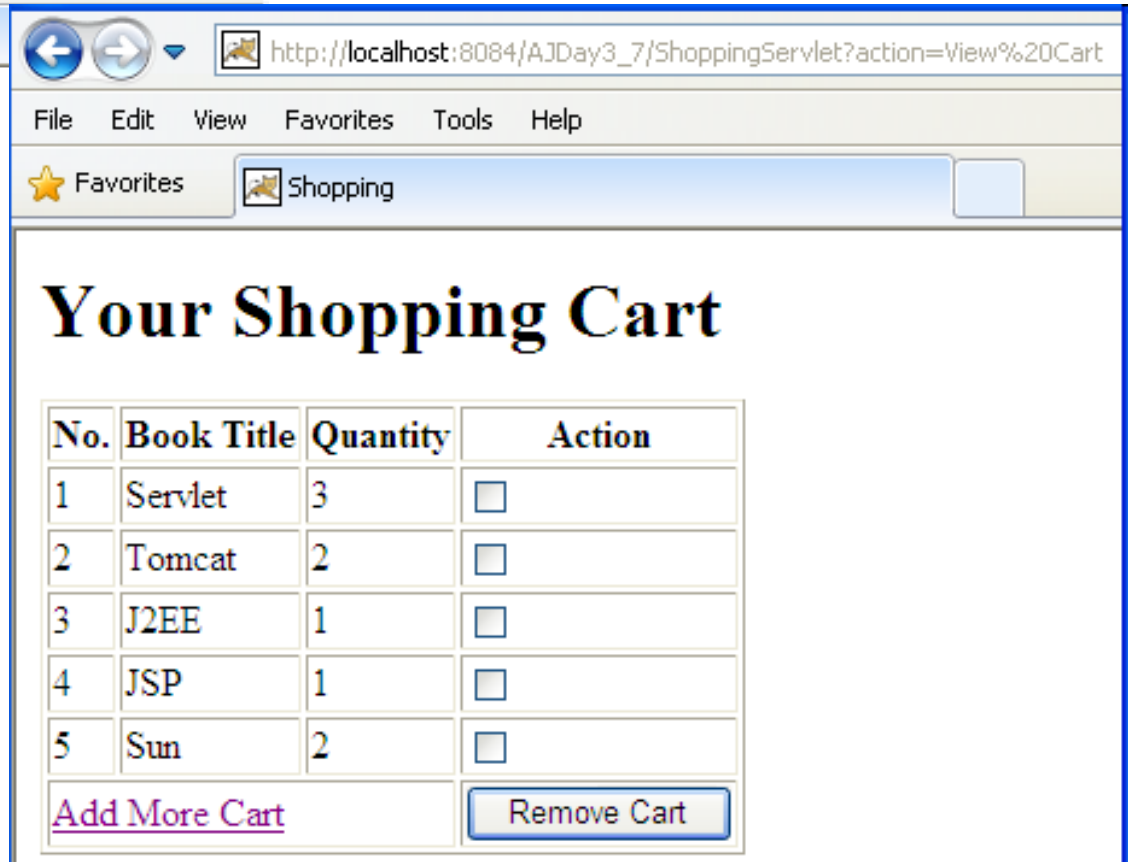
# Next Lecture

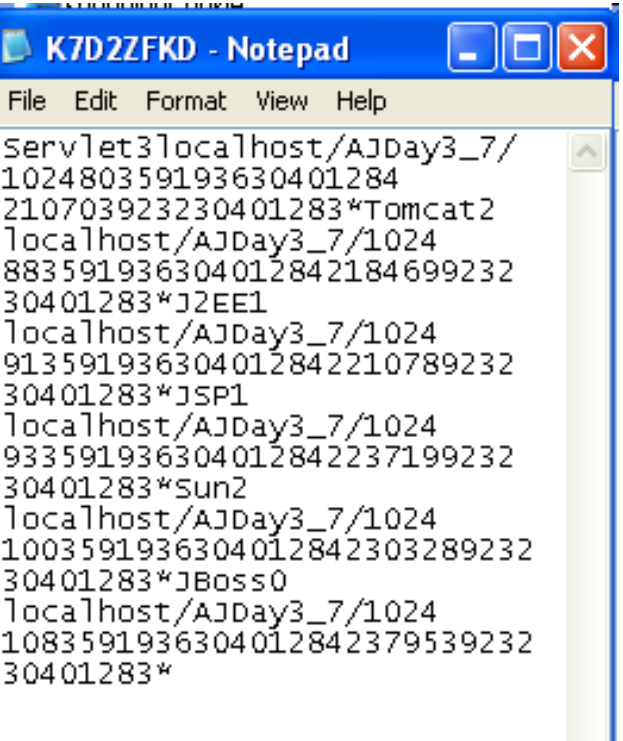


# Appendix

## Shopping Cart using Cookies



# Appendix

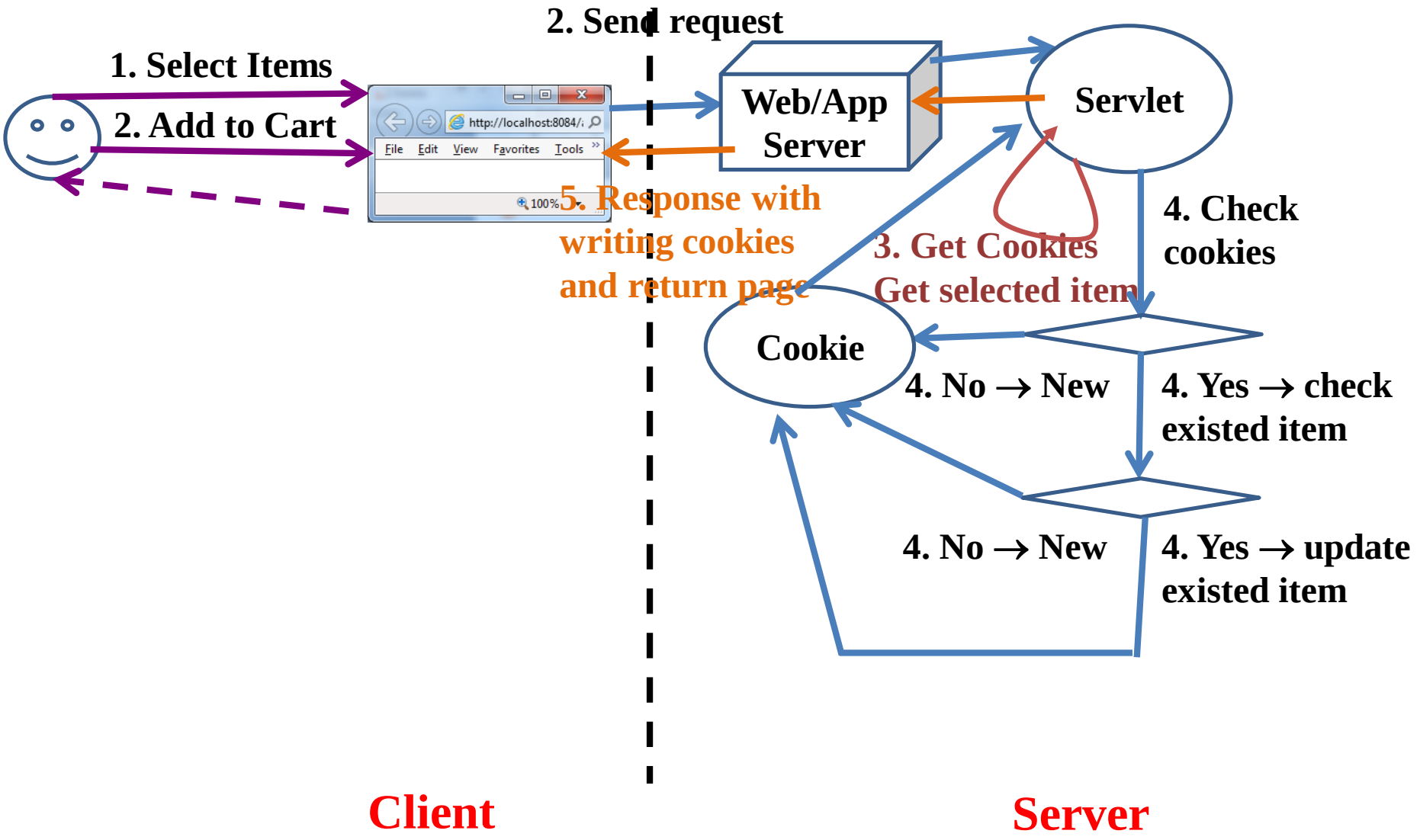
## Shopping Cart using Cookies

shoppingCookie.html

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN">
<html>
  <head>
    <title>Shopping</title>
    <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
  </head>
  <body>
      <h1>Shopping Cart</h1>
      <form action="ShoppingServlet">
          Please, choose the book <br/>
          <select name="bookList">
              <option>Servlet</option>
              <option>JSP</option>
              <option>EJB</option>
              <option>J2EE</option>
              <option>Tomcat</option>
              <option>JBoss</option>
              <option>Sun</option>
          </select><br/>
          <input type="submit" value="Add To Cart" name="action" />
          <input type="submit" value="View Cart" name="action" />
      </form>
  </body>
</html>
```

# Appendix

## Interactive Server Model



# Appendix

## Shopping Cart using Cookies

ShoppingServlet.java

Source | History

```
18   * @author Trong Khanh
19   */
20  public class ShoppingServlet extends HttpServlet {
21      private final String addCartServlet = "ShoppingAddServlet";
22
23      /** Processes requests for both HTTP ...10 lines */
33      protected void processRequest(HttpServletRequest request, HttpServletResponse response)
34              throws ServletException, IOException {
35          response.setContentType("text/html;charset=UTF-8");
36          PrintWriter out = response.getWriter();
37          try {
38
39              String action = request.getParameter("action");
40
41              if (action.equals("Add To Cart")) {
42                  RequestDispatcher rd = request.getRequestDispatcher(addCartServlet);
43                  rd.forward(request, response);
44              }
```

# Appendix

## Shopping Cart using Cookies

ShoppingAddServlet.java

Source | History

```
18      * @author Trong Khanh
19      */
20     public class ShoppingAddServlet extends HttpServlet {
21         private final String shoppingPage = "shoppingCookie.html";
22         /** Processes requests for both HTTP <code>GET</code> and <c
31         protected void processRequest(HttpServletRequest request, Htt
32                 throws ServletException, IOException {
33             response.setContentType("text/html;charset=UTF-8");
34             PrintWriter out = response.getWriter();
35             try {
36                 String title = request.getParameter("bookList");
37                 Cookie[] cookies = request.getCookies();
38                 if (cookies == null) {//cookie chua ton tai
39                     Cookie cookie = new Cookie(title, "1");
40                     cookie.setMaxAge(60 * 5);//5m
41                     response.addCookie(cookie);
42                 } else {
```

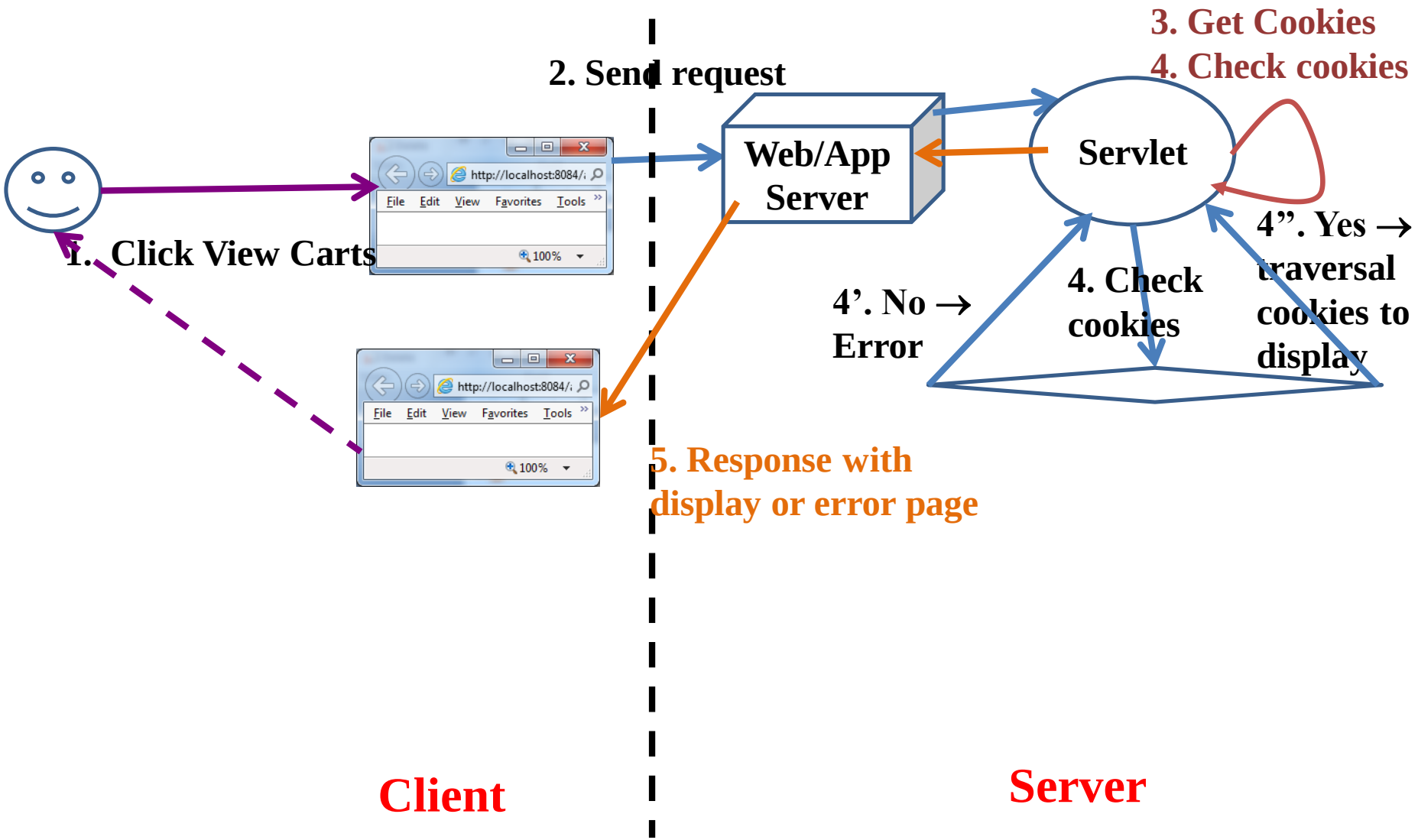
# Appendix

## Shopping Cart using Cookies

```
42              } else {
43                  boolean bFound = false;
44                  //find the exist title in the cart
45                  for (int i = 0; i < cookies.length; i++) {
46                      if (cookies[i].getName().equals(title)) {
47                          bFound = true;
48                          String value = cookies[i].getValue();
49                          int quantity = Integer.parseInt(value) + 1;
50                          Cookie cookie = new Cookie(title, String.valueOf(quantity));
51                          cookie.setMaxAge(60 * 5);//5m
52                          response.addCookie(cookie);//override
53                          break;
54                      }
55                  }
56                  if (!bFound) {
57                      Cookie cookie = new Cookie(title, "1");
58                      cookie.setMaxAge(60 * 5);//5m
59                      response.addCookie(cookie);
60                  }
61              }
62
63              response.sendRedirect(shoppingPage);
64          } finally {
65              out.close();
66          }
67      }
```

# Appendix

## Interactive Server Model



# Appendix

## Shopping Cart using Cookies

ShoppingServlet.java

Source | History

```
18      * @author Trong Khanh
19      */
20     public class ShoppingServlet extends HttpServlet {
21         private final String addCartServlet = "ShoppingAddServlet";
22         private final String viewCartServlet = "ShoppingViewServlet";
23
24         /** Processes requests for both HTTP ...10 lines */
34         protected void processRequest(HttpServletRequest request, HttpServletResponse resp
35                 throws ServletException, IOException {
36             response.setContentType("text/html;charset=UTF-8");
37             PrintWriter out = response.getWriter();
38             try {
39
40                 String action = request.getParameter("action");
41
42                 if (action.equals("Add To Cart")) {
43                     RequestDispatcher rd = request.getRequestDispatcher(addCartServlet);
44                     rd.forward(request, response);
45                 } else if (action.equals("View Cart")) {
46                     RequestDispatcher rd = request.getRequestDispatcher(viewCartServlet);
47                     rd.forward(request, response);
48                 }
```

# Appendix

## Shopping Cart using Cookies

ShoppingViewServlet.java

Source | History

```
18      * @author Trong Khanh
19      */
20     public class ShoppingViewServlet extends HttpServlet {
21
22         /** Processes requests for both HTTP <code>GET</code> and <c
31         protected void processRequest(HttpServletRequest request, Htt
32                 throws ServletException, IOException {
33             response.setContentType("text/html;charset=UTF-8");
34             PrintWriter out = response.getWriter();
35             try {
36                 Cookie[] cookies = request.getCookies();
37                 if (cookies != null) {
38                     out.println("<html>");
39                     out.println("<head>");
40                     out.println("<title>Shopping</title>");
41                     out.println("</head>");
42                     out.println("<body>");
43                     out.println("<h1>Your Shopping Cart</h1>");
44
45                     out.println("<table border='1'>");
46                     out.println("<tr>");
47                     out.println("<th>No.</th>");
48                     out.println("<th>Book Title</th>");
49                     out.println("<th>Quantity</th>");
50                     out.println("<th>Action</th>");
51                     out.println("</tr>");
52                     out.println("<form action='ShoppingServlet'>");
```

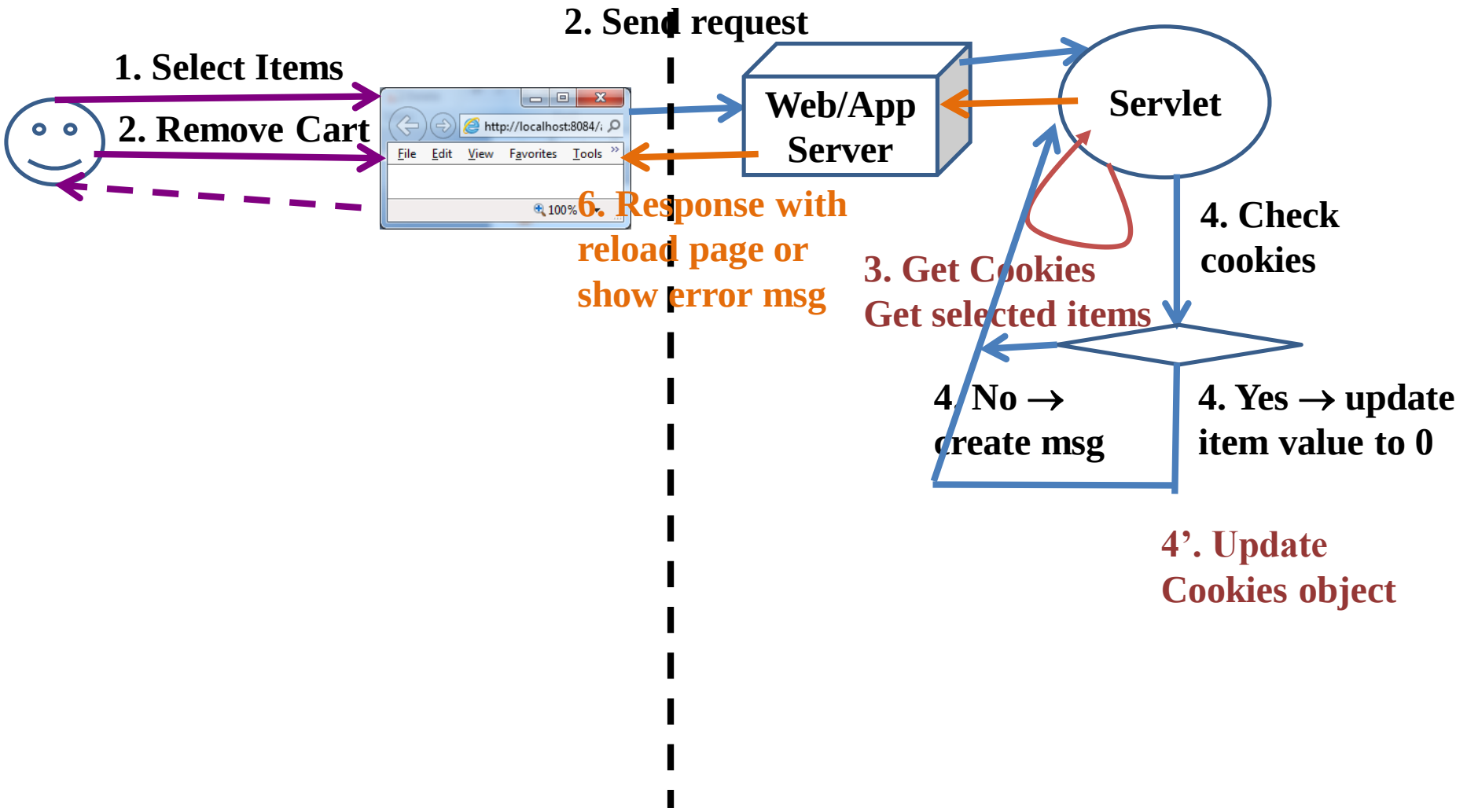
# Appendix

## Shopping Cart using Cookies

```
53
54                  int count = 1;
                    for (int i = 0; i < cookies.length; i++) {
56                      int tmp = Integer.parseInt(cookies[i].getValue());
57                      if (tmp > 0) {
58                          out.println("<tr>");
59                          out.println("<td>" + count++ + "</td>");
60                          out.println("<td>" + cookies[i].getName() + "</td>");
61                          out.println("<td>" + cookies[i].getValue() + "</td>");
62                          out.println("<td><input type='checkbox' name='rmv' value='"
63                                  + cookies[i].getName() + "' /></td>");
64                          out.println("</tr>");
65                      }
66                  }
67
68                  out.println("<tr>");
69                  out.println("<td colspan='3'><a href='shoppingCookie.html'>Add More Cart</a></td>");
70                  out.println("<td><input type='submit' value='Remove Cart' name='action' /></td>");
71                  out.println("</tr>");
72                  out.println("</form>");
73                  out.println("</table>");
74
75                  out.println("</body>");
76                  out.println("</html>");
77                  return;
78              }
79              out.println ("<h2>Cart is removed or No items in cart</h2>");
80          } finally {
81              out.close();
82          }
83      }
```

# Appendix

## Interactive Server Model



# Appendix
## Shopping Cart using Cookies

ShoppingServlet.java

Source | History

```
18      * @author Trong Khanh
19      */
20     public class ShoppingServlet extends HttpServlet {
21         private final String addCartServlet = "ShoppingAddServlet";
22         private final String viewCartServlet = "ShoppingViewServlet";
23         private final String removeCartServlet = "ShoppingRemoveServlet";
24         /** Processes requests for both HTTP ...10 lines */
34         protected void processRequest(HttpServletRequest request, HttpServletResponse respo
35                 throws ServletException, IOException {
36             response.setContentType("text/html;charset=UTF-8");
37             PrintWriter out = response.getWriter();
38             try {
39
40                 String action = request.getParameter("action");
41
42                 if (action.equals("Add To Cart")) {
43                     RequestDispatcher rd = request.getRequestDispatcher(addCartServlet);
44                     rd.forward(request, response);
45                 } else if (action.equals("View Cart")) {
46                     RequestDispatcher rd = request.getRequestDispatcher(viewCartServlet);
47                     rd.forward(request, response);
48                 } else if (action.equals("Remove Cart")) {
49                     RequestDispatcher rd = request.getRequestDispatcher(removeCartServlet);
50                     rd.forward(request, response);
51                 } else {
52                     //To Do Code
53                 }
54             } finally {
55                 out.close();
56             }
57     }
```

# Appendix
## Shopping Cart using Cookies

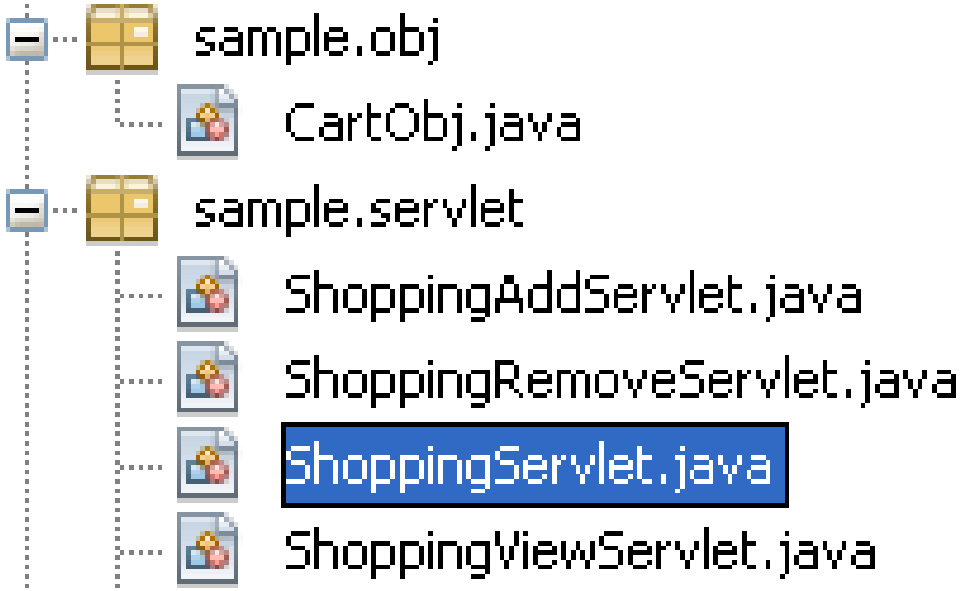
ShoppingRemoveServlet.java

Source | History

```
18      * @author Trong Khanh
19      */
20     public class ShoppingRemoveServlet extends HttpServlet {
21
22         /** Processes requests for both HTTP <code>GET</code> and <code>POST</
31         protected void processRequest(HttpServletRequest request, HttpServletR
32                 throws ServletException, IOException {
33             response.setContentType("text/html;charset=UTF-8");
34             PrintWriter out = response.getWriter();
35             try {
36                 Cookie[] cookies = request.getCookies();
37                 if (cookies != null) {
38                     String[] list = request.getParameterValues("rmv");
39                     if (list != null) {
41                         for (int i = 0; i < list.length; i++) {
                                String tmp = list[i];
                                for (int j = 0; j < cookies.length; j++) {
43                                  if (cookies[j].getName().equals(tmp)) {
44                                      cookies[j].setValue("0");
45                                      cookies[j].setMaxAge(60 * 5);
46                                      response.addCookie(cookies[j]);
47                                      break;
48                                  }
49                              }//for j
50                         }//for i
51                     }//end if list
52                     String urlRewriting = "ShoppingServlet?action=View Cart";
53                     response.sendRedirect(urlRewriting);
54                 }else {
55                     out.println ("<h2>Cart is removed!!!!</h2>");
56                 }
```

# Sessions & Listeners

## Shopping Cart using Cookies – Example



# Appendix

## Request and Context Listeners

| Listener Interface Name | Applies to | Function |
|---|---|---|
| ServletRequestListener | Request objects | Responds to the life and death of each request. |
| ServletContextListener | The context object | Responds to the life and death of the context for a web application. |
| ServletRequestAttributeListener | Request objects | Responds to any change to the set of attributes attached to a request object. |
| ServletContextAttributeListener | The context object | Responds to any change to the set of attributes attached to the context object. |

- There are **two things** that need to do **to set up a listener** in a web application:
  - **Write a class** that **implements** the **appropriate listener interface**.
  - **Register** the **class name in** the **web** application **deployment descriptor**, web.xml.

```
<listener>
    <listener-class>className</listener-class>
</listener>
```

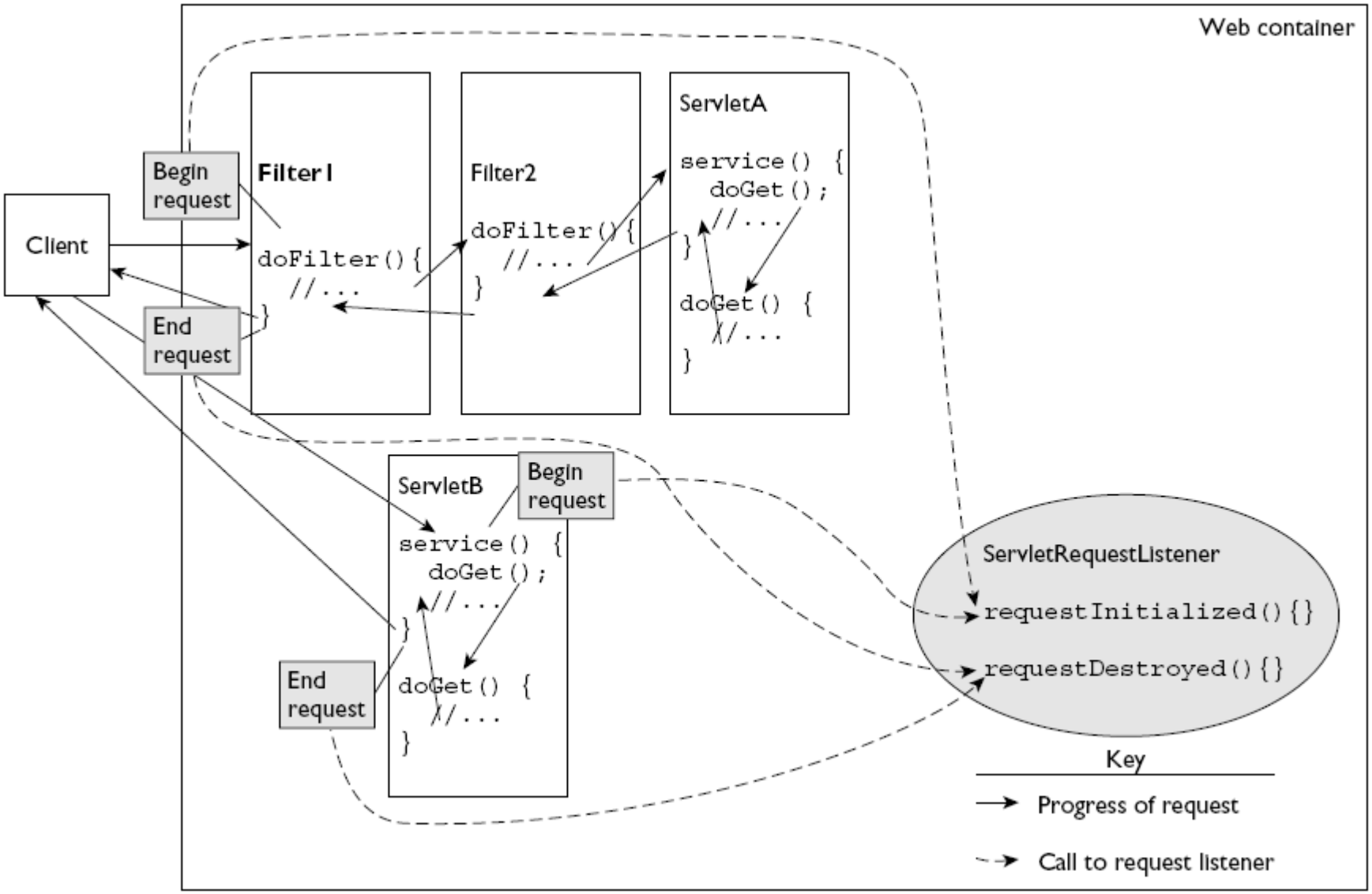
# Appendix

## Request Listeners

- ServletRequestListener **deals** with the **life cycle of each request object**
- A class **implementing** the **ServletRequestListener** interface has 2 methods
  - **requestInitialized**(): is **called** the **moment** that **any request** in the web container be **comes newly available** (or it is called at the **beginning of any request's scope)**
    - This is at the beginning of a servlet's service() method or earlier than that if filter chain is involved
  - **requestDestroyed**(): is called for each request that **comes to an end** – either at the **end of the servlet's service() method** or at the **end of the doFilter()** method for the first filter in a chain
- **Each** of these ServletRequestListener methods **accept** a **ServletRequestEvent** as a parameter. This event object has 2 methods
  - getServletContext()
  - getServletRequest()

# Appendix

## Request Listeners



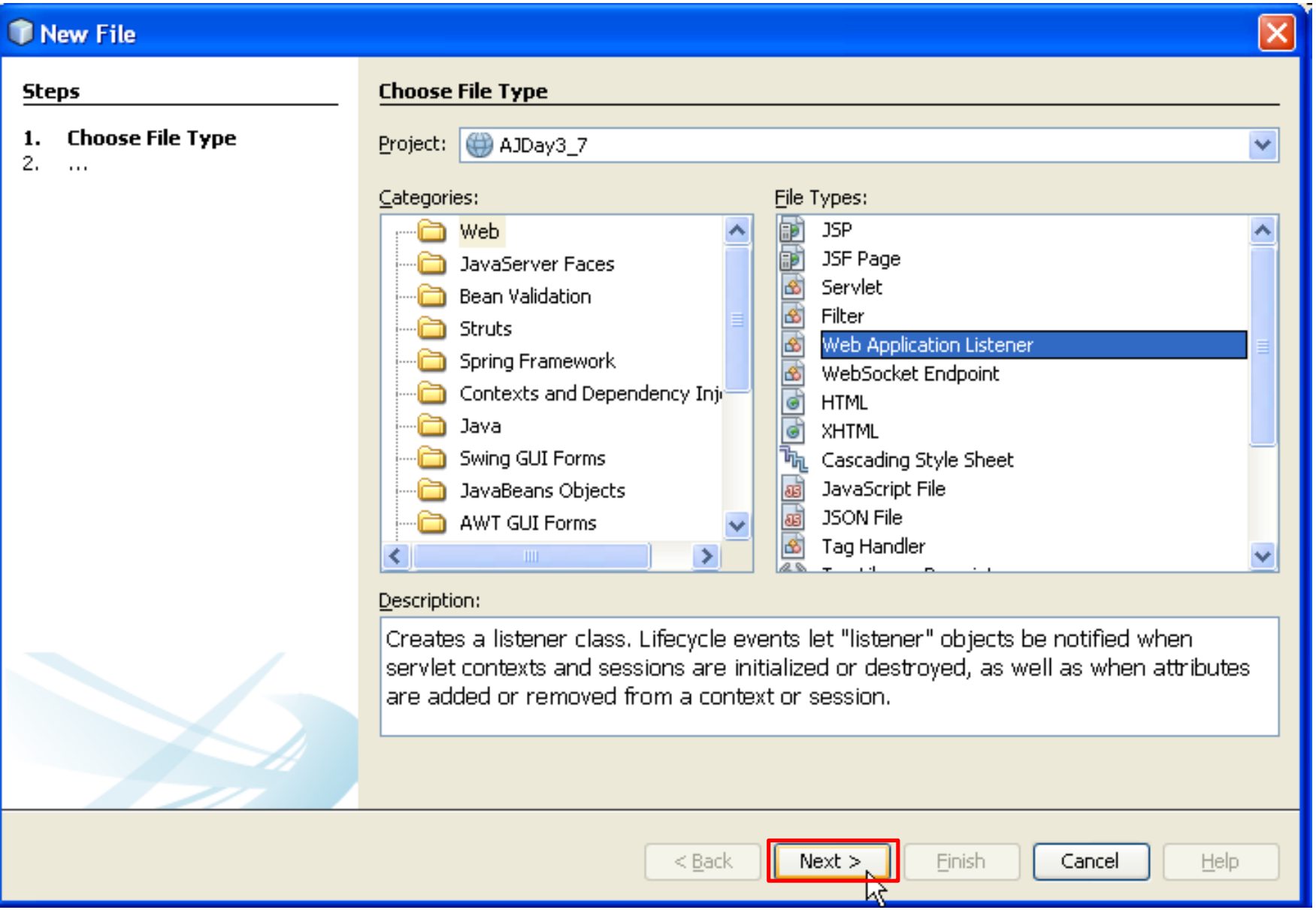
# Appendix

## Request Attribute Listeners

- **ServletRequestAttributeListener deals** with the **life cycle of the attributes attached** to **request objects**
- A **class implementing** the **ServletRequestAttributeListener** interface **has 3 methods**
  - **attributeAdded**(): is called whenever a new attribute is added to any request
  - **attributeRemoved**(): is called whenever an attribute is removed from a request
  - **attributeReplaced**(): is called whenever an attribute is replaced
- Each of these ServletRequestAttributeListener methods **accept** a **ServletRequestAttributeEvent** as a parameter. This event object has **2 methods**
  - **getName**(): returns name of attribute
  - **getValue**(): returns old value of attribute
- The ServletRequestAttributeEvent inherits from ServetRequestEvent
- The “grandparent” of The ServletRequestEvent is java.util.EventObject
  - The getSource() method returns the object that is the source of the event

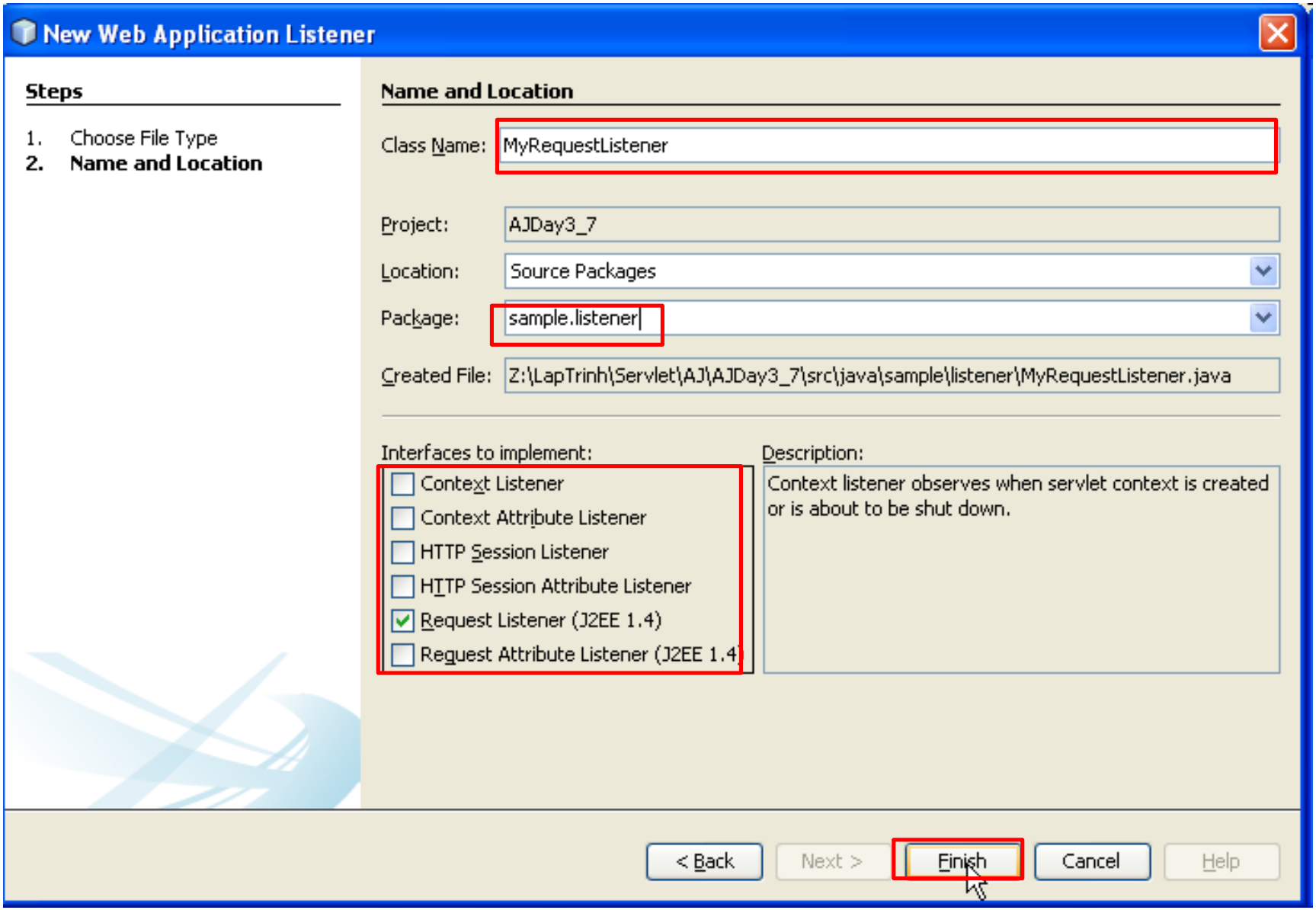
# Appendix

## How to Add Listener to Web Project



# Appendix

## How to Add Listener to Web Project



# Appendix
## Example

MyRequestListener.java

```
 * @author Trong Khanh
 */
public class MyRequestListener implements ServletRequestListener {

    public void requestDestroyed(ServletRequestEvent sre) {
        System.out.println("destroyed in MyRequest is invoked!!!!");
        sre.getServletRequest().removeAttribute("REQUEST");
    }

    public void requestInitialized(ServletRequestEvent sre) {
        System.out.println("context in MyRequest is invoked!!!!");
        sre.getServletRequest().setAttribute("REQUEST", "ADD");
    }
}
```

web.xml

Source | General | Servlets | Filters | Pages | References | Security | History

```
<?xml version="1.0" encoding="UTF-8"?>
<web-app version="2.5" xmlns="http://java.sun.com/xml/ns/javaee" xmlns:xsi
    <listener>
        <description>RequestListener</description>
        <listener-class>sample.listener.MyRequestListener</listener-class>
    </listener>
```

# Appendix

## Example

MyRequestAttributeListener.java

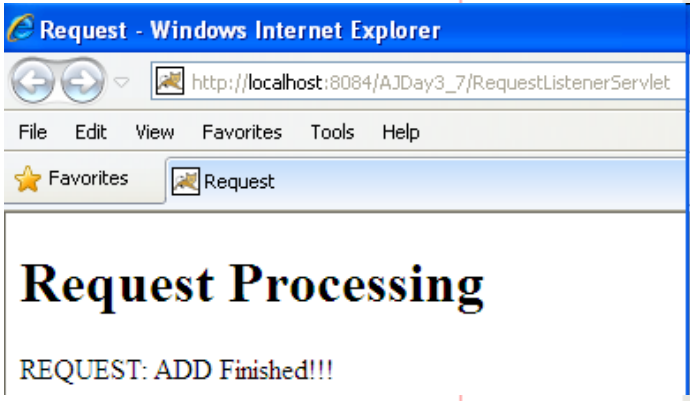
```
15  public class MyRequestAttributeListener implements ServletRequestAttributeListener {
        public void attributeAdded(ServletRequestAttributeEvent srae) {
17          System.out.println("Add is activated");
18          String name = srae.getName();
19          String oldValue = srae.getValue().toString();
20          String newValue = srae.getServletRequest().getAttribute(name).toString();
21          System.out.println("Name: " + name + " -old: " + oldValue + " -new: " + newValue);
22      }
        public void attributeRemoved(ServletRequestAttributeEvent srae) {
24          System.out.println("Remove is activated");
25          String name = srae.getName();
26          String oldValue = srae.getValue().toString();
27          System.out.println("Name: " + name + " -old: " + oldValue);
28      }
        public void attributeReplaced(ServletRequestAttributeEvent srae) {
30          System.out.println("Replace is activated");
31          String name = srae.getName();
32          String oldValue = srae.getValue().toString();
33          String newValue = srae.getServletRequest().getAttribute(name).toString();
34          System.out.println("Name: " + name + " -old: " + oldValue + " -new: " + newValue);
35      }
36  }
```

```
26      <listener>
27          <listener-class>sample.listener.MyContextAttributeListener</listener-class>
28      </listener>
```

# Appendix
## Example

RequestListenerServlet.java

```
28      protected void processRequest(HttpServletRequest request, HttpServletResponse response)
29      throws ServletException, IOException {
30          response.setContentType("text/html;charset=UTF-8");
31          PrintWriter out = response.getWriter();
32          try {
33              out.println("<html>");
34              out.println("<head>");
35              out.println("<title>Request</title>");
36              out.println("</head>");
37              out.println("<body>");
38              out.println("<h1>Request Processing</h1>");
39
40              request.setAttribute("VALUE", "ADD");
41              request.setAttribute("VALUE", "MODIFIED");
42              request.removeAttribute("VALUE");
43
44              out.println("REQUEST: " + request.getAttribute("REQUEST"));
45              out.println("Finished!!!");
46
47              out.println("</body>");
48              out.println("</html>");
49          } finally {
50              out.close();
51          }
52      }
```



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# Appendix

## Example

```
context in MyRequest is invoked!!!!
Add is activated
Name: REQUEST -old: ADD -new: ADD
Replace is activated
Name: org.apache.catalina.ASYNC_SUPPORTED -old: true -new: false
Add is activated
Name: netbeans.monitor.request -old: uri: /AJDay3_7/RequestListenerServlet
method: GET
QueryString: null
Parameters:
Headers:
        Name: accept    Value: */*
        Name: accept-language   Value: vi
        Name: user-agent        Value: Mozilla/4.0 (compatible; MSIE 8.0; W
        Name: accept-encoding   Value: gzip, deflate
        Name: host      Value: localhost:8084
        Name: connection        Value: Keep-Alive
 -new: uri: /AJDay3_7/RequestListenerServlet
method: GET
QueryString: null
Parameters:
Headers:
        Name: accept    Value: */*
        Name: accept-language   Value: vi
        Name: user-agent        Value: Mozilla/4.0 (compatible; MSIE 8.0; W
        Name: accept-encoding   Value: gzip, deflate
        Name: host      Value: localhost:8084
        Name: connection        Value: Keep-Alive
```

# Appendix
## Example

```
Add is activated
Name: netbeans.monitor.monData -old: [MonitorData] -new: [MonitorData]
Add is activated
Name: netbeans.monitor.response -old: org.netbeans.modules.web.monitor.serve
bb5
Add is activated
Name: netbeans.monitor.filter -old: MonitorFilter(ApplicationFilterConfig[na
ter(ApplicationFilterConfig[name=HTTPMonitorFilter, filterClass=org.netbeans
Add is activated
Name: VALUE -old: ADD -new: ADD
Replace is activated
Name: VALUE -old: ADD -new: MODIFIED
Remove is activated
Name: VALUE -old: MODIFIED
Remove is activated
Name: netbeans.monitor.request -old: uri: /AJDay3_7/RequestListenerServlet
method: GET
QueryString: null
Parameters:
Headers:
        Name: accept    Value: */*
        Name: accept-language   Value: vi
        Name: user-agent        Value: Mozilla/4.0 (compatible; MSIE 8.0; W
        Name: accept-encoding   Value: gzip, deflate
        Name: host      Value: localhost:8084
        Name: connection        Value: Keep-Alive
```

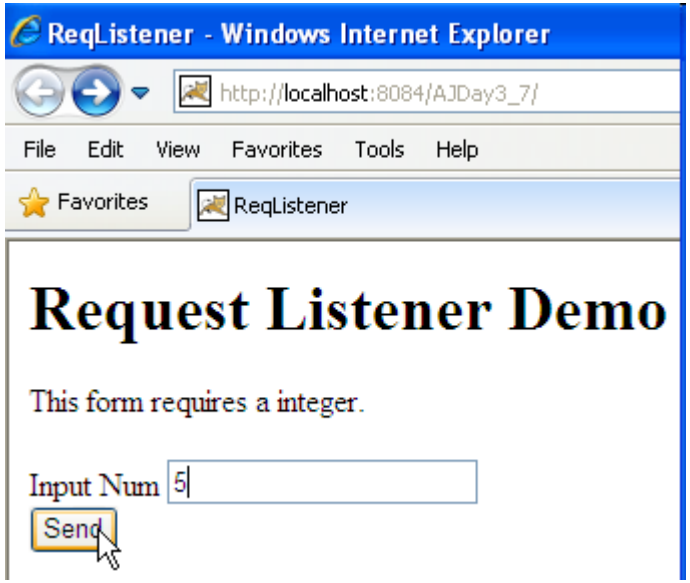
# Appendix

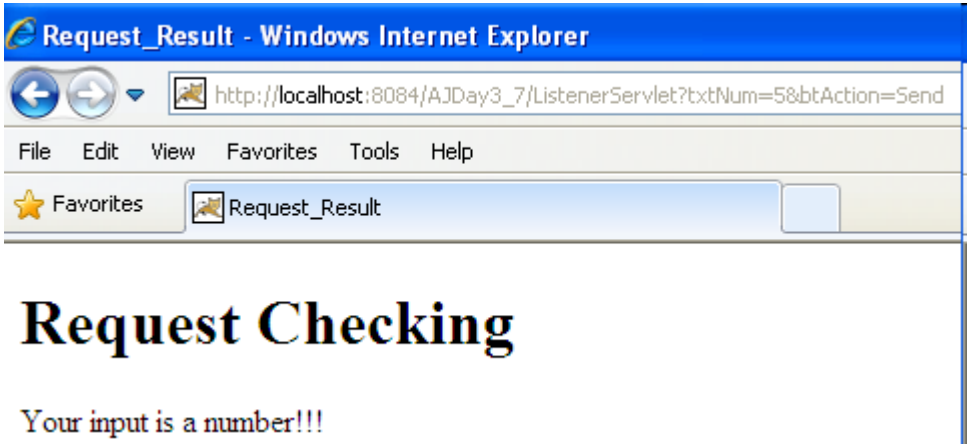
## Example

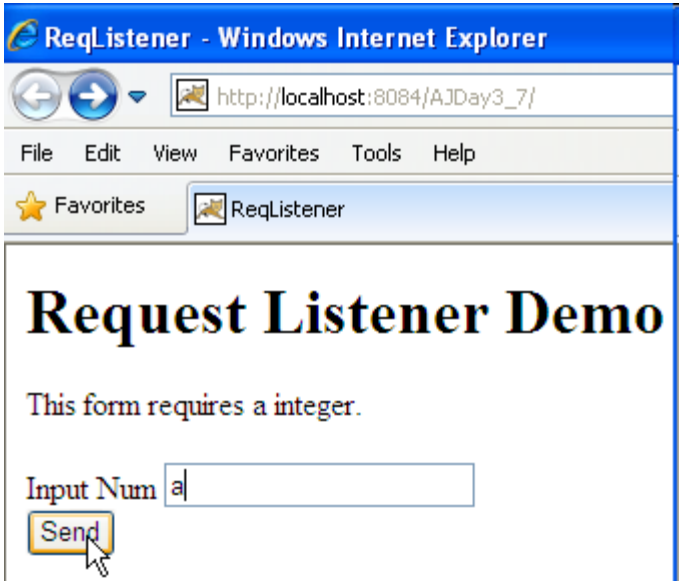
```
Remove is activated
Name: netbeans.monitor.response -old: org.netbeans.
Remove is activated
Name: netbeans.monitor.filter -old: MonitorFilter(A
Remove is activated
Name: netbeans.monitor.monData -old: [MonitorData]
destroyed in MyRequest is invoked!!!!
Remove is activated
Name: REQUEST -old: ADD
```

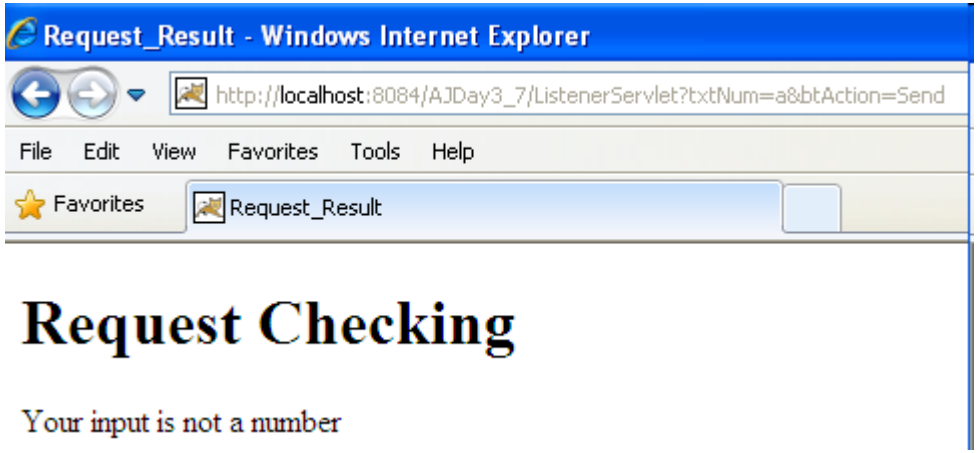
# Appendix

## Practices – Example



# Appendix

## Practices – Example

validUsingReqListener.html | ListenerServlet.java | MyRequestListener.java

Source | History

```
5   <!DOCTYPE html>
6   <html>
7       <head>
8           <title>ReqListener</title>
9           <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
10      </head>
11      <body>
12          <h1>Request Listener Demo</h1>
13          This form requires a integer. <br/>
14          <form action="ListenerServlet">
15              Input Num <input type="text" name="txtNum" value="" /><br/>
16              <input type="submit" value="Send" name="btAction" />
17          </form>
18      </body>
19  </html>
```

# Appendix

## Practices – Example

Fpt University

ListenerServlet.java | MyRequestListener.java

Source | History

```
16   * @author Trong Khanh
17   */
18  public class ListenerServlet extends HttpServlet {
19
20      /**...*/
30      protected void processRequest(HttpServletRequest request, HttpSe
31              throws ServletException, IOException {
32          response.setContentType("text/html;charset=UTF-8");
33          PrintWriter out = response.getWriter();
34          try {
35              /* TODO output your page here. You may use following sam
36              out.println("<!DOCTYPE html>");
37              out.println("<html>");
38              out.println("<head>");
39              out.println("<title>Request_Result</title>");
40              out.println("</head>");
41              out.println("<body>");
42              out.println("<h1>Request Checking</h1>");
43
44              Boolean check = (Boolean) request.getAttribute("VALID");
45              if (check.booleanValue()) {
46                  out.print("Your input is a number!!!");
47              } else {
48                  out.print("Your input is not a number");
49              }
50
51              out.println("</body>");
```

# Appendix

## Practices – Example

MyRequestListener.java

Source | History

```
12
13      * @author Trong Khanh
14      */
15     public class MyRequestListener implements ServletRequestListener {
16
17         public void requestDestroyed(ServletRequestEvent sre) {...}
20
21         public void requestInitialized(ServletRequestEvent sre) {
22
23             String num = sre.getServletRequest().getParameter("txtNum");
24             Boolean result = true;
25             try {
26                 int n = Integer.parseInt(num);
27             } catch (NumberFormatException ex) {
28                 result = false;
29             }
30             sre.getServletRequest().setAttribute("VALID", result);
31         }
32     }
```

# Appendix

## Context Listener

- Sessions have 02 listeners:
  - **ServletContextListener**
    - **Receive notifications** about **changes** to the **servlet context** of the Web application
      - **contextInitialized**(): gets **called before** any servlet's **init() method** or any filter's **doFilter() method**
      - **contextDestroyed**(): gets called **after** the **servlet's or filter's destroy()** method
      - Both of methods get passed a ServletContextEvent object that provides the getServletContext() method
  - **ServletContextAttributeListener**
    - **Recieves** a **notification** about any **modifications** made to the **attribute list** on the servlet context of a web application
    - Has the same trio of methods as **ServletRequestAttributeListener**

# Appendix

## Example

MyContextListener.java

```
15   */
16  public class MyContextListener implements ServletContextListener {
        public void contextInitialized(ServletContextEvent sce) {
18          System.out.println("context in MyContext is invoked!!!!");
19          sce.getServletContext().setAttribute("CONTEXT", "ADD");
20      }
        public void contextDestroyed(ServletContextEvent sce) {
22          System.out.println("destroyed in MyContext is invoked!!!!");
23          sce.getServletContext().removeAttribute("CONTEXT");
24      }
25  }
```

web.xml

General | Servlets | Filters | Pages | References | Security | XML

```
15      <listener>
16          <listener-class>sample.listener.MyContextListener</listener-class>
17      </listener>
18      <listener>
19          <listener-class>sample.listener.MyContextAttributeListener</listener-class>
20      </listener>
```

# Appendix

## Example

MyContextAttributeListener.java

```
15  public class MyContextAttributeListener implements ServletContextAttributeListener {
        public void attributeAdded(ServletContextAttributeEvent scab) {
17          System.out.println("Add is activated-");
18          String name = scab.getName();
            String oldValue = scab.getValue().toString();;
20          String newValue = scab.getServletContext().getAttribute(name).toString();
21          System.out.println("Name: " + name + "-old: " + oldValue + "-new: " + newValue);
22      }
        public void attributeRemoved(ServletContextAttributeEvent scab) {
24          System.out.println("Remove is activated-");
25          String name = scab.getName();
            String oldValue = scab.getValue().toString();;
27          System.out.println("Name: " + name + "-old: " + oldValue);
28      }
        public void attributeReplaced(ServletContextAttributeEvent scab) {
30          System.out.println("Replace is activated-");
31          String name = scab.getName();
            String oldValue = scab.getValue().toString();;
33          String newValue = scab.getServletContext().getAttribute(name).toString();
34          System.out.println("Name: " + name + "-old: " + oldValue + "-new: " + newValue);
35      }
36  }
```

# Appendix

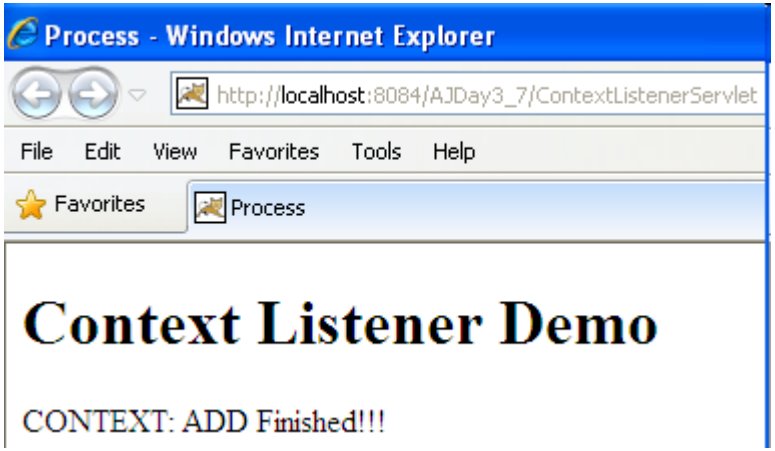
## Example

ContextListenerServlet.java

```
29      protected void processRequest(HttpServletRequest request, HttpServletResponse response)
30      throws ServletException, IOException {
31          response.setContentType("text/html;charset=UTF-8");
32          PrintWriter out = response.getWriter();
33          try {
34              out.println("<html>");
35              out.println("<head>");
36              out.println("<title>Process</title>");
37              out.println("</head>");
38              out.println("<body>");
39              out.println("<h1>Context Listener Demo</h1>");
40
41              ServletContext sc = getServletContext();
42              sc.setAttribute("VALUE", "ADD");
43              sc.setAttribute("VALUE", "MODIFIED");
44              sc.removeAttribute("VALUE");
45
46              out.println("CONTEXT: " + sc.getAttribute("CONTEXT"));
47              out.println("Finished!!!");
48
49              out.println("</body>");
50              out.println("</html>");
51          } finally {
52              out.close();
53          }
54      }
```

# Appendix

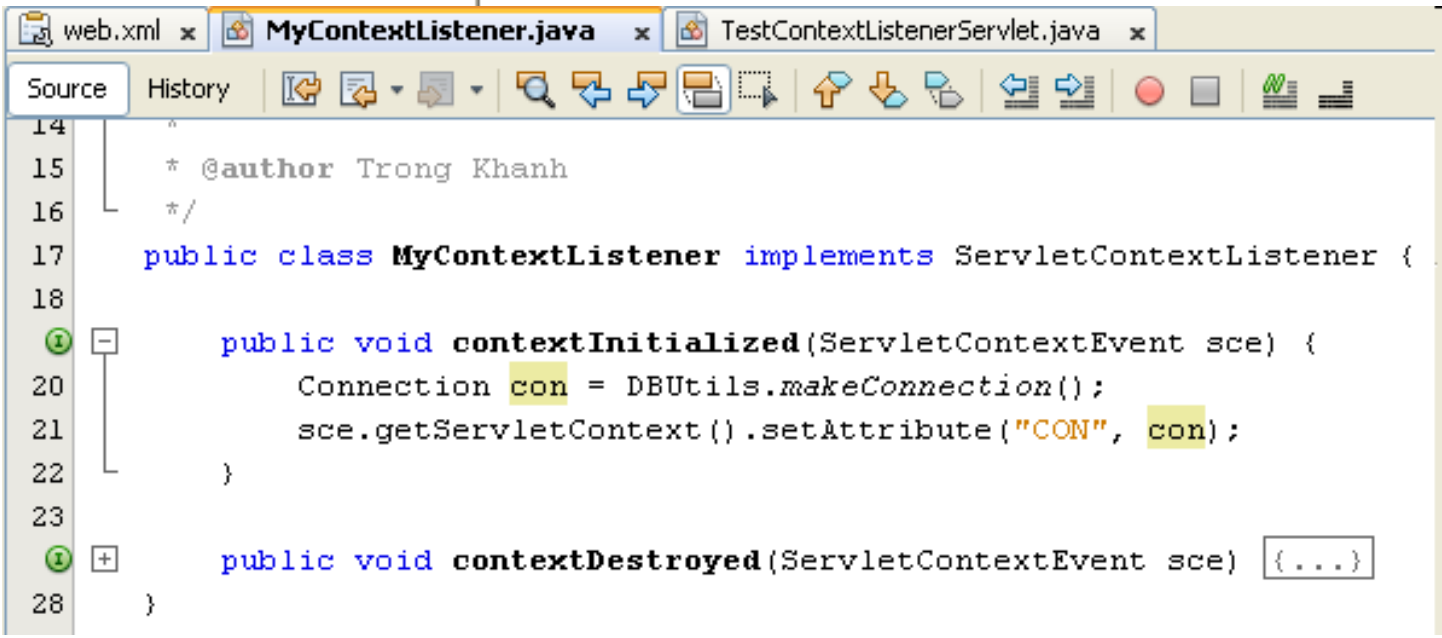
## Example




```
context in MyContext is invoked!!!!
Add is activated-
Name: CONTEXT-old: ADD-new: ADD
Add is activated-
Name: org.apache.jasper.compiler.TldLocationsCache-old: org.apache.jasper.
Add is activated
Name: VALID -old: false -new: false
Replace is activated
Name: org.apache.catalina.ASYNC_SUPPORTED -old: true -new: false
Add is activated
Name: netbeans.monitor.request -old: uri: /AJDay3_7/ContextListenerServlet
method: GET
QueryString: null
Parameters:
Headers:
```

# Appendix

## Practices – Example

# Appendix

## Practices – Example

web.xml | TestContextListenerServlet.java

Source | History

```
20      * @author Trong Khanh
21      */
22     public class TestContextListenerServlet extends HttpServlet {
23
24         /**...*/
34         protected void processRequest(HttpServletRequest request, HttpServletResponse
35                 throws ServletException, IOException {
36             response.setContentType("text/html;charset=UTF-8");
37             PrintWriter out = response.getWriter();
38             try {
39                 /* TODO output your page here. You may use following sample code. */
40                 out.println("<!DOCTYPE html>");
41                 out.println("<html>");
42                 out.println("<head>");
43                 out.println("<title>Context</title>");
44                 out.println("</head>");
45                 out.println("<body>");
46                 out.println("<h1>Test Context Listener Servlet</h1>");
47
48                 Connection con = (Connection) getServletContext().getAttribute("CON");
49                 try {
50                     out.print("Test DB Connection is Closed: " + con.isClosed());
51                 } catch (SQLException ex) {
52                     Logger.getLogger(TestContextListenerServlet.class.getName()).log(L
53                 }
54
55                 out.println("</body>");
```

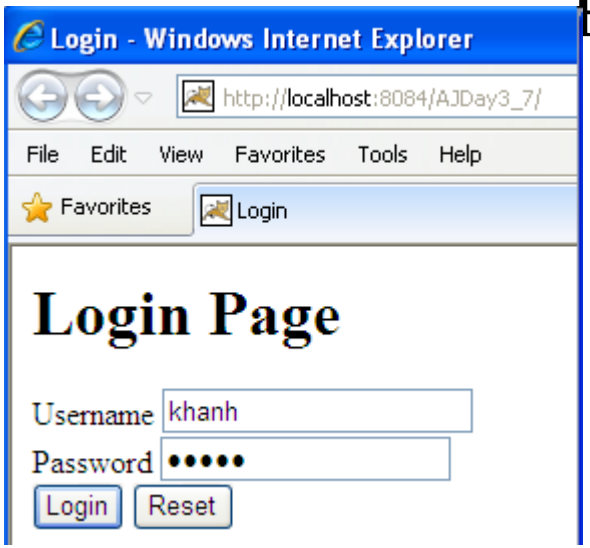
# Appendix

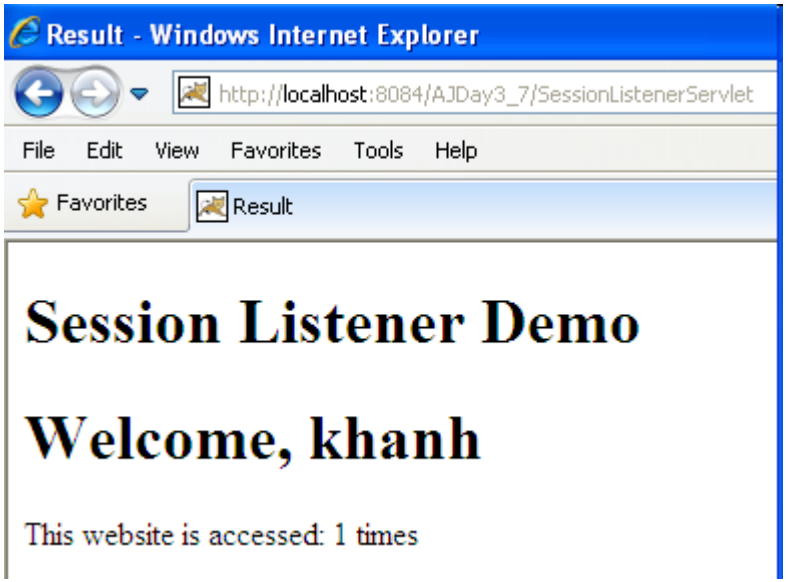
## Session Listeners Declared in DD

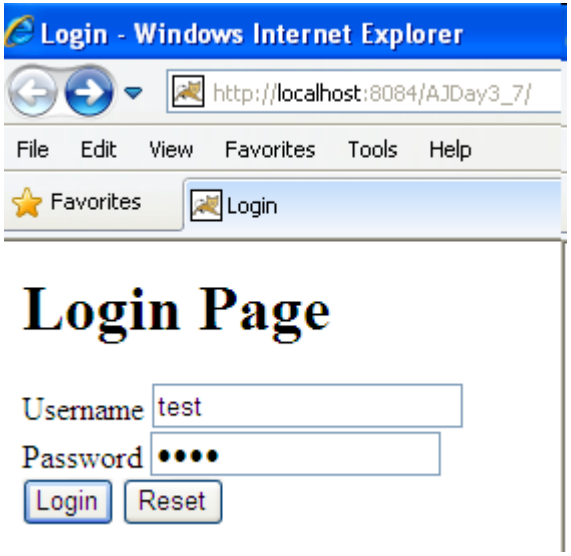
- Have **02 listeners:**
  - **HttpSessionListener**
    - Implements the changes to the list of active sessions in Web application
    - **sessionCreated**() method: is called whenever a **new session** is provided (*can say that **after** the **getSession()** method*)
    - **sessionDestroyed**(): is called at the **end of the sessions** (*within the call **invalidate()** or **session time out** but **before** the **session become invalid***)
    - Both of methods get passed a **HttpSessionEvent object** that provides the **getSession() method**
  - **HttpSessionAttributeListener**
    - Is **called** whenever **some changes** are made to the **attribute** list on the **servlet session** of a Web application
    - Is used to **notify when** an **attribute** has been **added**, **removed** or **replaced by another attribute**
    - Has the **same trio of** methods as **ServletRequestAttributeListener** that are passed the **HttpSessionBindingEvent** (is inherited from HttpSessionEvent)

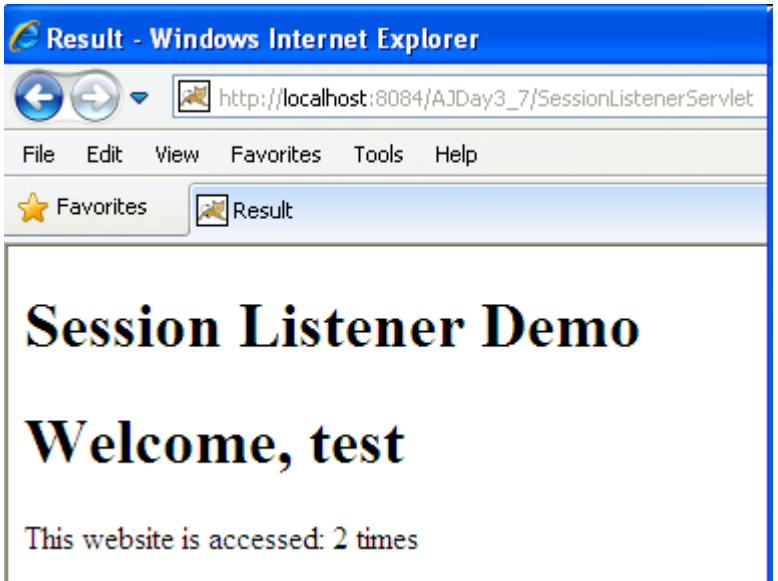
# Appendix

## Practices – Example



# Appendix

## Practices – Example

loginCountSession.html

Source | History

```
5   <!DOCTYPE html>
6   <html>
7       <head>
8           <title>Login</title>
9           <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
10      </head>
11      <body>
12          <h1>Login Page</h1>
13          <form action="SessionListenerServlet" method="POST">
14              Username <input type="text" name="txtUsername" value="" /><br/>
15              Password <input type="password" name="txtPassword" value="" /><br/>
16              <input type="submit" value="Login" name="btAction" />
17              <input type="reset" value="Reset" />
18          </form>
19      </body>
20  </html>
```

# Appendix
## Practices – Example

SessionListenerServlet.java

Source | History

```
17   * @author Trong Khanh
18   */
19  public class SessionListenerServlet extends HttpServlet {
20
21      /**...*/
31      protected void processRequest(HttpServletRequest request, HttpServletResponse res
32              throws ServletException, IOException {
33          response.setContentType("text/html;charset=UTF-8");
34          PrintWriter out = response.getWriter();
35          try {
36              out.println("<!DOCTYPE html>");
37              out.println("<html>");
38              out.println("<head>");
39              out.println("<title>Result</title>");
40              out.println("</head>");
41              out.println("<body>");
42              out.println("<h1>Session Listener Demo</h1>");
43              String user = request.getParameter("txtUsername");
44              String pass = request.getParameter("txtPassword");
45              if (user.equals(pass)) {
46                  HttpSession session = request.getSession();
47                  out.println("<h1>Welcome, " + user + "</h1>");
48                  Integer count = (Integer) getServletContext().getAttribute("COUNT");
49                  out.println("This website is accessed: " + count + " times");
50              } else {
51                  out.println("<h1>Invalid username or password</h1>");
52              }
53              out.println("</body>");
```

# Appendix
## Practices – Example

web.xml

Source | General | Servlets | Filters | Pages | References | Security | History

```
1   <?xml version="1.0" encoding="UTF-8"?>
2   <web-app version="2.5" xmlns="http://java.sun.com/xml/ns/javaee" xmlns:xsi=
3       <listener>
4           <description>ServletContextListener</description>
5           <listener-class>sample.listener.MyContextListener</listener-class>
6       </listener>
7       <listener>
8           <description>HttpSessionListener</description>
9           <listener-class>sample.listener.MySessionListener</listener-class>
10      </listener>
```

MyContextListener.java

Source | History

```
15      * @author Trong Khanh
16      */
17  public class MyContextListener implements ServletContextListener {
18
20          public void contextInitialized(ServletContextEvent sce) {
21              sce.getServletContext().setAttribute("COUNT", 0);
22          }
27          public void contextDestroyed(ServletContextEvent sce) {...}
28  }
```

# Appendix
## Practices – Example

MySessionListener.java

Source | History

```
13      * @author Trong Khanh
14      */
15     public class MySessionListener implements HttpSessionListener {
16
17         public void sessionCreated(HttpSessionEvent se) {
18             Integer count = (Integer) se.getSession().
19                                       getServletContext().getAttribute("COUNT");
20             count++;
21             System.out.println("ccc " + count);
22             se.getSession().getServletContext().setAttribute("COUNT", count);
23         }
24
25         public void sessionDestroyed(HttpSessionEvent se) {...}
28     }
```

# Appendix

## Session Listeners Not Declared in DD

- Have **02 listeners:**
  - **HttpSessionBindingListener**
    - **Notifies** the **object** when it is being **bound** to **or unbound** from a **session**
    - This **notification** can be the **result** of a **forced unbinding of an attribute** from a **session by the programmer**, **invalidation of the session or due to timing out of session**
    - This **implementation** do **not require any configuration within** the deployment descriptor of the Web application
    - **Notes**: The object data types not implemented in **BindingListener don't fire any events!**

| Methods | Descriptions |
|---|---|
| **valueBound** | - **public void valueBound(HttpSessionBindingEvent se);**<br>- **Notifies** the object in being **bound** to a **session** and is responsible for identification of the session |
| **valueUnbound** | - **public void valueUnbound(HttpSessionBindingEvent se);**<br>- **Notifies** the **object** on being **unbound** from a session and is responsible for identification of the session |

# Appendix

## Session Listeners Not Declared in DD - Example

SessionAttrObject.java

```
15  public class SessionAttrObject implements HttpSessionBindingListener {
16      private String data;
17      public SessionAttrObject(String value){
18          this.data = value;
19      }
20      public String getData() {
21          return data;
22      }
        public String toString() {
24          return data;
25      }
26      public void setData(String data) {
27          this.data = data;
28      }
        public void valueBound(HttpSessionBindingEvent event) {
30          System.out.println("valueBound() " + getData());
31      }
        public void valueUnbound(HttpSessionBindingEvent event) {
33          System.out.println("valueUnbound " + getData());
34      }
35  }
```

# Appendix

## Session Listeners Not Declared in DD - Example

SessionBindingServlet.java

```
40              out.println("<h1>Session Binding Demo</h1>");
41
42              SessionAttrObject bObj1 = new SessionAttrObject("khanh");
43              SessionAttrObject bObj2 = new SessionAttrObject("kieu");
44              HttpSession session = request.getSession();
45              session.setAttribute("BOUND", bObj1);
46              session.setAttribute("BOUND1", bObj2);
47              session.setAttribute("NONBOUND", "NON");
48              session.setAttribute("BOUND", bObj2);
49              session.setAttribute("BOUND", null);
50              session.removeAttribute("BOUND2");
51              session.removeAttribute("NONBOUND");
52              out.println("Finished!!!!");
53
54              out.println("</body>");
55              out.println("</html>");
56
57          } finally {
```

```
valueBound() khanh
valueBound() kieu
valueBound() kieu
valueUnbound khanh
valueUnbound kieu
valueUnbound kieu
```

# Appendix

## Session Listeners Not Declared in DD

- Have **02 listeners** (cont)
  - **HttpSesssionActivationListener** (*receives events when a value object is transported across JVMs*).
    - **Stateful** session (activated and passivated)
    - Is **implemented** when a **container migrates** the **session between VM** or **persists sessions** and **is not required** any **configuration within** the **deployment descriptor**

| Methods | Descriptions |
|---|---|
| **sessionDidActivate** | - **public void sessionDidActivate(HttpSessionEvent se);**<br>- Provides notification that the session has just been activated. |
| **sessionWillPassivate** | - **public void sessionWillPassivate(HttpSessionEvent se);**<br>- Provide notification that the session is about to be passivated. |

# Appendix

## CRUD Function

search.jsp

Source | History

```
4       Author     : kieukhanh
5   --%>
6
7   <%@page import="sample.registration.RegistrationDTO"%>
8   <%@page import="java.util.List"%>
9   <%@page contentType="text/html" pageEncoding="UTF-8"%>
10  <%@taglib uri="http://java.sun.com/jsp/jstl/core" prefix="c"%>
11  <!DOCTYPE html>
12  <html>
13      <head>
14          <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
15          <title>Search</title>
16      </head>
17      <body>
18          <font color="red">
19          <%
20              Cookie[] cookies = request.getCookies();
21              if (cookies != null) {
22                  String username = "";
23                  for (Cookie cookie : cookies) {
24                      String temp = cookie.getName();
25                      if (!temp.equals("JSESSIONID")) {
26                          username = temp;
27                      }
28                  }
29                  %>
30                  Welcome, <%= username %>
31      <%
32              }
33          %>
```

# Appendix

## CRUD Function

```
35          </font>
36          <h1>Search Page</h1>
37          <form action="SE1162Servlet">
38              Search Value <input type="text" name="txtSearchValue"
39                                  value="" /><br/>
40              <input type="submit" value="Search" name="btAction" />
41          </form>
42
43          <br/>
44
45          <%
46                String searchValue = request.getParameter("txtSearchValue");
47
48                if (searchValue != null) {
49                    List<RegistrationDTO> result =
50                            (List<RegistrationDTO>)request.getAttribute("SEARCHRESULT");
51
52                    if (result != null) {
53                        %>
54                        <table border="1">
55                            <thead>
56                                <tr>
57                                    <th>No.</th>
58                                    <th>Username</th>
59                                    <th>Password</th>
60                                    <th>Lastname</th>
61                                    <th>Role</th>
62                                    <th>Delete</th>
63                                    <th>Update</th>
64                                </tr>
```

# Appendix

## CRUD Function

```
65                    </thead>
66                    <tbody>
67                        <%
68                            int count = 0;
69                            for (RegistrationDTO dto : result) {
70                                String urlRewriting = "SE1162Servlet?btAction=delete&pk="
71                                        + dto.getUsername()
72                                        + "&lastSearchValue="
73                                        + searchValue;
74                                %>
75                    <form action="SE1162Servlet">
76                        <tr>
77                            <td>
78                                <%= ++count %>
79                            .</td>
80                            <td>
81                                <%= dto.getUsername() %>
82                                <input type="hidden" name="txtUsername"
83                                       value="<%= dto.getUsername() %>" />
84                            </td>
85                            <td>
86                                <input type="text" name="txtPassword"
87                                       value="<%= dto.getPassword()%>" />
88                            </td>
89                            <td>
90                                <%= dto.getLastname() %>
91                            </td>
```

# Appendix

## CRUD Function

```
92                                  <td>
93                                      <input type="checkbox" name="chkRole" value="ADMIN"
94                                             <%
95                                              if (dto.isRole()) {
96                                                  %>
97                                                  checked="checked"
98                                              <%
99                                              }
100                                            %>
101                                            />
102                                 </td>
103                                 <td>
104                                     <a href="<%= urlRewriting %>">Delete</a>
105                                 </td>
106                                 <td>
107                                     <input type="hidden" name="lastSearchValue"
108                                            value="<%= searchValue %>" />
109                                     <input type="submit" value="Update" name="btAction" />
110                                 </td>
111                             </tr>
112                         </form>
113                             <%
114                                 }
115                             %>
116                         </tbody>
117                     </table>
118
119             <%
120                     } else {
121                         %>
```

```
122                         <h2>No record is matched!!!</h2>
123             <%
124                     }
125                 }//end if search Value
                %>
127         </body>
128     </html>
```

# Appendix

## CUD Function

RegistrationDAO.java

Source | History

```
113     public boolean deleteRecord(String username)
114             throws SQLException, NamingException {
115         Connection con = null;
116         PreparedStatement stm = null;
117         try {
118             con = DBUtils.makeConnection();
119 
120             if (con != null) {
121                 String sql = "Delete From Registration Where username = ?";
122 
123                 stm = con.prepareStatement(sql);
124                 stm.setString(1, username);
125 
126                 int row = stm.executeUpdate();
127 
128                 if (row > 0) {
129                     return true;
130                 }
131             }
132         } finally {
133             if (stm != null) {
134                 stm.close();
135             }
136             if (con != null) {
137                 con.close();
138             }
139         }
140 
141         return false;
142     }
```

# Appendix

## CRUD Function

RegistrationDAO.java

Source | History

```
147     public boolean updatePassRole(String username, String password,boolean role)
148          throws SQLException, NamingException {
149         Connection con = null;
150         PreparedStatement stm = null;
151         try {
152             con = DBUtils.makeConnection();
153             if (con != null) {
154                 String sql = "Update Registration Set password = ?, isAdmin = ? Where username = ?";
155
156                 stm = con.prepareStatement(sql);
157                 stm.setString(1, password);
158                 stm.setBoolean(2, role);
159                 stm.setString(3, username);
160
161                 int row = stm.executeUpdate();
162
163                 if (row > 0) {
164                     return true;
165                 }
166             }
167         } finally {
168             if (stm != null) {
169                 stm.close();
170             }
171             if (con != null) {
172                 con.close();
173             }
174         }
175         return false;
176     }
```

# Appendix

## CRUD Function

NullServlet.java

Source | History

```
23      * @author kieukhanh
24      */
25     @WebServlet(name = "NullServlet", urlPatterns = {"/NullServlet"})
26     public class NullServlet extends HttpServlet {
27         private final String loginPage = "login.html";
28         private final String searchPage = "search.jsp";
29
30         /** Processes requests for both HTTP <code>GET</code> and <code>POST<
39         protected void processRequest(HttpServletRequest request, HttpServlet
40                 throws ServletException, IOException {
41             response.setContentType("text/html;charset=UTF-8");
42             PrintWriter out = response.getWriter();
43
44             String url = loginPage;
45             try {
46                 Cookie[] cookies = request.getCookies();
47
48                 if (cookies != null) {
49                     for (Cookie cookie : cookies) {
50                         String username = cookie.getName();
51                         String password = cookie.getValue();
52
53                         RegistrationDAO dao = new RegistrationDAO();
54                         boolean result = dao.checkLogin(username, password);
55
56                         if (result) {
57                             url = searchPage;
58                         }
59                     }
60                 }
```

# Appendix

## CRUD Function

```
61          } catch (NamingException ex) {
62              ex.printStackTrace();
63          } catch (SQLException ex) {
64              ex.printStackTrace();
65          } finally {
66              RequestDispatcher rd = request.getRequestDispatcher(url);
67              rd.forward(request, response);
68
69              out.close();
70          }
71      }
```

# Appendix

## CRUD Function

SE1162Servlet.java

Source | History

```
 * @author kieukhanh
 */
public class SE1162Servlet extends HttpServlet {
    private final String loginServlet = "LoginServlet";
    private final String loginPage = "login.html";
    private final String searchServlet = "SearchServlet";
    private final String deleteRecordServlet = "DeleteRecordServlet";
    private final String updatePassRoleServlet = "UpdatePassRoleServlet";
    private final String nullServlet = "NullServlet";
    private final String addItemServlet = "AddItemServlet";
    private final String viewCartPage = "viewCart.jsp";
    private final String deleteItemServlet = "DeleteItemServlet";
    private final String createAccountServlet = "CreateAccountServlet";

    /** Processes requests for both HTTP <code>GET</code> and <code>POST</
    protected void processRequest(HttpServletRequest request, HttpServletR
            throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");
        PrintWriter out = response.getWriter();

        String button = request.getParameter("btAction");
        String url = loginPage;
        try {
            if (button == null) {
                url = nullServlet;
            } else if (button.equals("Login")) {
                url = loginServlet;
            } else if (button.equals("Search")) {
                url = searchServlet;
            } else if (button.equals("delete")) {
```

# Appendix

## CRUD Function

```
56                  url = deleteRecordServlet;
57              } else if (button.equals("Update")) {
58                  url = updatePassRoleServlet;
59              } else if (button.equals("Add Book To Your Cart")) {
60                  url = addItemServlet;
61              } else if (button.equals("View Your Cart")) {
62                  url = viewCartPage;
63              } else if (button.equals("Remove Selected Items")) {
64                  url = deleteItemServlet;
65              } else if (button.equals("Create New Account")) {
66                  url = createAccountServlet;
67              }
68
69          } finally {
70              RequestDispatcher rd = request.getRequestDispatcher(url);
71              rd.forward(request, response);
72
73              out.close();
74          }
75      }
```

# Appendix

## CRUD Function

DeleteRecordServlet.java

Source | History

```
21      * @author kieukhanh
22      */
23     @WebServlet(name = "DeleteRecordServlet", urlPatterns = {"/DeleteRecordServlet"
24     public class DeleteRecordServlet extends HttpServlet {
25         private final String deleteErrPage = "deleteErr.html";
26         /** Processes requests for both HTTP <code>GET</code> and <code>POST</code>
35         protected void processRequest(HttpServletRequest request, HttpServletRespon
36                 throws ServletException, IOException {
37             response.setContentType("text/html;charset=UTF-8");
38             PrintWriter out = response.getWriter();
39
40             String urlRewriting = deleteErrPage;
41             try {
42                 String username = request.getParameter("pk");
43                 String searchValue = request.getParameter("lastSearchValue");
44
45                 RegistrationDAO dao = new RegistrationDAO();
46                 boolean result = dao.deleteRecord(username);
47
48                 if (result) {
49                     urlRewriting = "SE1162Servlet?btAction=Search&txtSearchValue="
50                             + searchValue;
51                 }
52             } catch (NamingException ex) {
                   ex.printStackTrace();
54             } catch (SQLException ex) {
                   ex.printStackTrace();
56             } finally {
57                 response.sendRedirect(urlRewriting);
58                 out.close();
```

# Appendix

## CRUD Function

UpdatePassRoleServlet.java

Source | History

```
22      * @author kieukhanh
23      */
24     @WebServlet(name = "UpdatePassRoleServlet", urlPatterns = {"/UpdatePassRoleServl
25     public class UpdatePassRoleServlet extends HttpServlet {
26         private final String updateErrPage = "update.Err.html";
27         /** Processes requests for both HTTP <code>GET</code> and <code>POST</code>
36         protected void processRequest(HttpServletRequest request, HttpServletRespons
37                 throws ServletException, IOException {
38             response.setContentType("text/html;charset=UTF-8");
39             PrintWriter out = response.getWriter();
40
41             String urlRewriting = updateErrPage;
42             try {
43                 String username = request.getParameter("txtUsername");
44                 String password = request.getParameter("txtPassword");
45                 String admin = request.getParameter("chkRole");
46                 boolean role = false;
47                 if (admin != null) {
48                     role = true;
49                 }
50                 String searchValue = request.getParameter("lastSearchValue");
51
52                 RegistrationDAO dao = new RegistrationDAO();
53                 boolean result = dao.updatePassRole(username, password, role);
54
55                 if (result) {
56                     urlRewriting = "SE1162Servlet?btAction=Search&txtSearchValue="
57                             + searchValue;
58                 }
59             }   catch (NamingException ex) {
                    ex.printStackTrace();
61             } catch (SQLException ex) {
                    ex.printStackTrace();
63             } finally {
64                 response.sendRedirect(urlRewriting);
65                 out.close();
66             }
67         }
```

# Appendix

## CRUD Function

bookStore.html

Source | History

```
1  <!DOCTYPE html>
2  ...5 lines
7  <html>
8      <head>
9          <title>Book Store</title>
10         <meta charset="UTF-8">
11         <meta name="viewport" content="width=device-width, initial-scale=1.0">
12     </head>
13     <body>
14         <h1>Book Store</h1>
15         <form action="SE1162Servlet">
16             Choose book <select name="cboBook">
17                 <option>Servlet</option>
18                 <option>Tomcat</option>
19                 <option>JSP</option>
20                 <option>MVC</option>
21                 <option>JavaEE</option>
22                 <option>EL</option>
23                 <option>EJB2</option>
24                 <option>EJB3</option>
25                 <option>JBoss</option>
26             </select><br/>
27             <input type="submit" value="Add Book To Your Cart" name="btAction" />
28             <input type="submit" value="View Your Cart" name="btAction" />
29         </form>
30     </body>
31 </html>
```

# Appendix

## CRUD Function

CartObj.java

Source | History

```
14      * @author kieukhanh
15      */
16     public class CartObj implements Serializable {
17         private String customerId;
18         private Map<String, Integer> items;
19
20         public String getCustomerId() {
21             return customerId;
22         }
23
24         public void setCustomerId(String customerId) {
25             this.customerId = customerId;
26         }
27
28         public Map<String, Integer> getItems() {
29             return items;
30         }
31
32         public void addItemToCart(String title) {
33             if (this.items == null) {
34                 this.items = new HashMap<String, Integer>();
35             }
36
37             int quantity = 1;
38             if (this.items.containsKey(title)) {
39                 quantity = this.items.get(title) + 1;
40             }
41
42             this.items.put(title, quantity);
43         }
```

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# Appendix

## CRUD Function

```
44
45      public void removeItemFromCart(String title) {
46          if (this.items == null) {
47              return;
48          }
49
50          if (this.items.containsKey(title)) {
51              this.items.remove(title);
52              if (this.items.isEmpty()) {
53                  this.items = null;
54              }
55          }
56      }
57  }
58
```

# Appendix

## CRUD Function

AddItemServlet.java

Source | History

```
20  * @author kieukhanh
21  */
22 @WebServlet(name = "AddItemServlet", urlPatterns = {"/AddItemServlet"})
23 public class AddItemServlet extends HttpServlet {
24     private final String shoppingPage = "bookStore.html";
25
26     /** Processes requests for both HTTP <code>GET</code> and <code>P
35     protected void processRequest(HttpServletRequest request, HttpServ
36             throws ServletException, IOException {
37         response.setContentType("text/html;charset=UTF-8");
38         PrintWriter out = response.getWriter();
39         try {
40             HttpSession session = request.getSession();
41
42             CartObj cart = (CartObj)session.getAttribute("CART");
43             if (cart == null) {
44                 cart = new CartObj();
45             }
46
47             String title = request.getParameter("cboBook");
48
49             cart.addItemToCart(title);
50
51             session.setAttribute("CART", cart);
52
53             response.sendRedirect(shoppingPage);
54         } finally {
55             out.close();
56         }
57     }
```

# Appendix

## CRUD Function

viewCart.jsp

Source | History

```
    Author     : kieukhanh
--%>

<%@page import="java.util.Map"%>
<%@page import="sample.cart.CartObj"%>
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>Book Store</title>
    </head>
    <body>
        <h1>Your Cart includes </h1>

        <%
            if (session != null) {
                CartObj cart = (CartObj) session.getAttribute("CART");

                if (cart != null) {
                    if (cart.getItems() != null) {
                        %>
                        <table border="1">
                            <thead>
                                <tr>
                                    <th>No.</th>
                                    <th>Title</th>
                                    <th>Quantity</th>
                                    <th>Action</th>
                                </tr>
```

# Appendix

## CRUD Function

```
34                      </thead>
35                      <tbody>
36                      <form action="SE1162Servlet">
37                          <%
38                              Map<String, Integer> items = cart.getItems();
39                              int count = 0;
40                              for (Map.Entry item : items.entrySet()) {
41                                  %>
42                          <tr>
43                              <td>
44                                  <%= ++count %>
45                              .</td>
46                              <td>
47                                  <%= item.getKey() %>
48                              </td>
49                              <td>
50                                  <%= item.getValue() %>
51                              </td>
52                              <td>
53                                  <input type="checkbox" name="chkItem" value="<%= item.getKey() %>" />
54                              </td>
55                          </tr>
56                          <%
57                              }//end for
58                          %>
59                          <tr>
60                              <td colspan="3">
61                                  <a href="bookStore.html">Add More Items to Your Cart</a>
62                              </td>
```

# Appendix

## CRUD Function

```
63                                  <td>
64                                      <input type="submit" value="Remove Selected Items" name="btAction" />
65                                  </td>
66                              </tr>
67                          </form>
68                          </tbody>
69                      </table>
70
71          <%
72                          return;
73                      }//end items
74                  }//end cart
75              }//end session
76          %>
77
78          <h2>No cart is existed</h2>
79      </body>
80  </html>
```

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# Appendix

## CRUD Function

DeleteItemServlet.java

Source | History

```
20      * @author kieukhanh
21      */
22     @WebServlet(name = "DeleteItemServlet", urlPatterns = {"/DeleteItemServlet"})
23     public class DeleteItemServlet extends HttpServlet {
24
25         /** Processes requests for both HTTP <code>GET</code> and <code>POST</cod
34         protected void processRequest(HttpServletRequest request, HttpServletRespo
35                 throws ServletException, IOException {
36             response.setContentType("text/html;charset=UTF-8");
37             PrintWriter out = response.getWriter();
38             try {
39                 HttpSession session = request.getSession(false);
40
41                 if (session != null) {
42                     CartObj cart = (CartObj)session.getAttribute("CART");
43
44                     if (cart != null) {
45                         String[] items = request.getParameterValues("chkItem");
46
47                         if (items != null) {
48                             for (String item : items) {
49                                 cart.removeItemFromCart(item);
50                             }//end for
51                             session.setAttribute("CART", cart);
52                         }//end if items
53                     }//end if cart
54                 }//end if session
55
56                 String urlRewriting = "SE1162Servlet?btAction=View Your Cart";
57                 response.sendRedirect(urlRewriting);
```

# Appendix

## CRUD Function

createNewAccount.html

Source | History

```
1   <!DOCTYPE html>
2   ...5 lines
7   <html>
8       <head>
9           <title>New Account</title>
10          <meta charset="UTF-8">
11          <meta name="viewport" content="width=device-width, initial-scale=1.0">
12      </head>
13      <body>
14          <h1>Create New Account</h1>
15          <form action="SE1162Servlet" method="POST">
16              Username* <input type="text" name="txtUsername" value="" />(6 - 20 chars)<br/>
17              Password* <input type="password" name="txtPassword" value="" />(6 - 30 chars)<br/>
18              Confirm* <input type="password" name="txtConfirm" value="" /><br/>
19              Full name <input type="text" name="txtFullname" value="" />(2 - 50 chars)<br/>
20              <input type="submit" value="Create New Account" name="btAction" />
21              <input type="reset" value="Reset" />
22          </form>
23      </body>
24  </html>
```

# Appendix

## CRUD Function

RegistrationInsertError.java

Source | History

```
 * @author kieukhanh
 */
public class RegistrationInsertError implements Serializable {
    private String usernameLengthErr;
    private String passwordLengthErr;
    private String confirmNotMatch;
    private String fullNameLengthErr;
    private String usernameIsExisted;
    /**...3 lines */
    public String getUsernameLengthErr() {...3 lines }
    /**...3 lines */
    public void setUsernameLengthErr(String usernameLengthErr) {...3 lines }
    /**...3 lines */
    public String getPasswordLengthErr() {...3 lines }
    /**...3 lines */
    public void setPasswordLengthErr(String passwordLengthErr) {...3 lines }
    /**...3 lines */
    public String getConfirmNotMatch() {...3 lines }
    /**...3 lines */
    public void setConfirmNotMatch(String confirmNotMatch) {...3 lines }
    /**...3 lines */
    public String getFullNameLengthErr() {...3 lines }
    /**...3 lines */
    public void setFullNameLengthErr(String fullNameLengthErr) {...3 lines }
    /**...3 lines */
    public String getUsernameIsExisted() {...3 lines }
    /**...3 lines */
    public void setUsernameIsExisted(String usernameIsExisted) {...3 lines }
}
```

# Appendix

## CRUD Function

RegistrationDAO.java

Source | History

```
182     public boolean insertRecord(String username, String password, String lastname, boolean role)
183         throws SQLException, NamingException {
184         Connection con = null;
185         PreparedStatement stm = null;
186         try {
187             con = DBUtils.makeConnection();
188             if (con != null) {
189                 String sql = "Insert Into Registration(username, password, lastname, isAdmin)"
190                         + " Values(?, ?, ?, ?)";
191                 stm = con.prepareStatement(sql);
192                 stm.setString(1, username);
193                 stm.setString(2, password);
194                 stm.setString(3, lastname);
195                 stm.setBoolean(4, role);
196                 int row = stm.executeUpdate();
197                 if (row > 0) {
198                     return true;
199                 }
200             }
201         } finally {
202             if (stm != null) {
203                 stm.close();
204             }
205             if (con != null) {
206                 con.close();
207             }
208         }
209 
210         return false;
211     }
```

# Appendix

## CRUD Function

DeleteRecordServlet.java

Source | History

```
21      * @author kieukhanh
22      */
23     @WebServlet(name = "DeleteRecordServlet", urlPatterns = {"/DeleteRecordServlet"})
24     public class DeleteRecordServlet extends HttpServlet {
25         private final String deleteErrPage = "deleteErr.html";
26         /** Processes requests for both HTTP <code>GET</code> and <code>POST</code> .
35         protected void processRequest(HttpServletRequest request, HttpServletResponse
36                 throws ServletException, IOException {
37             response.setContentType("text/html;charset=UTF-8");
38             PrintWriter out = response.getWriter();
39
40             String urlRewriting = deleteErrPage;
41             try {
42                 String username = request.getParameter("pk");
43                 String searchValue = request.getParameter("lastSearchValue");
44
45                 RegistrationDAO dao = new RegistrationDAO();
46                 boolean result = dao.deleteRecord(username);
47
48                 if (result) {
49                     urlRewriting = "SE1162Servlet?btAction=Search&txtSearchValue="
50                             + searchValue;
51                 }
52             } catch (NamingException ex) {
                   ex.printStackTrace();
54             } catch (SQLException ex) {
                   ex.printStackTrace();
56             } finally {
57                 response.sendRedirect(urlRewriting);
58                 out.close();
```

# Appendix

## CRUD Function

createNewAccount.jsp

Source | History

```
4       Author     : kieukhanh
5   --%>
6
7   <%@page import="sample.registration.RegistrationInsertError"%>
8   <%@page contentType="text/html" pageEncoding="UTF-8"%>
9   <%@taglib uri="http://java.sun.com/jsp/jstl/core" prefix="c"%>
10  <!DOCTYPE html>
11  <html>
12      <head>
13          <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
14          <title>New Account</title>
15      </head>
16      <body>
17          <h1>Create New Account</h1>
18          <form action="SE1162Servlet" method="POST">
19              Username* <input type="text" name="txtUsername"
20                                value="<%= request.getParameter("txtUsername") %>" />(6 - 20 chars)<br/>
21              <font color="red">
22                  <%
23                      RegistrationInsertError errors =
24                              (RegistrationInsertError)request.getAttribute("INSERTERR");
25
26                      if (errors != null) {
27                          if (errors.getUsernameLengthErr() != null) {
28                              %>
29                                  <%= errors.getUsernameLengthErr() %><br/>
30              <%
31                          }
32                      }//end if errors
33                  %>
```

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# Appendix

## CRUD Function

```
34                  </font>
35                  Password* <input type="password" name="txtPassword" value="" />(6 - 30 chars)<br/>
36                  <font color="red">
37                      <%
38                          if (errors != null) {
39                              if (errors.getPasswordLengthErr()!= null) {
40                                  %>
41                                      <%= errors.getPasswordLengthErr()%><br/>
42                  <%
43                              }
44                          }//end if errors
45                      %>
46                  </font>
47                  Confirm* <input type="password" name="txtConfirm" value="" /><br/>
48                  <font color="red">
49                      <%
50                          if (errors != null) {
51                              if (errors.getConfirmNotMatch()!= null) {
52                                  %>
53                                      <%= errors.getConfirmNotMatch()%><br/>
54                  <%
55                              }
56                          }//end if errors
57                      %>
58                  </font>
59                  Full name <input type="text" name="txtFullname"
60                                   value="<%= request.getParameter("txtFullname") %>" />(2 - 50 chars)<br/>
61                  <font color="red">
```

# Appendix

## CRUD Function

```
62                  <%
63                      if (errors != null) {
64                          if (errors.getFullNameLengthErr()!= null) {
65                              %>
66                                  <%= errors.getFullNameLengthErr()%><br/>
67              <%
68                          }
69                      }//end if errors
70                  %>
71              </font>
72              <input type="submit" value="Create New Account" name="btAction" />
73              <input type="reset" value="Reset" />
74          </form><br/>
75          <font color="red">
76                  <%
77                      if (errors != null) {
78                          if (errors.getUsernameIsExisted()!= null) {
79                              %>
80                                  <%= errors.getUsernameIsExisted()%><br/>
81              <%
82                          }
83                      }//end if errors
84                  %>
              </font>
86      </body>
87  </html>
```

# Appendix

## CRUD Function

web.xml

Source | General | Servlets | Filters | Pages | References | Security | History

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  <web-app version="3.0" xmlns="http://java.sun.com/xml/ns/javaee" xmln
3      <servlet>
4          <servlet-name>LoginServlet</servlet-name>
5          <servlet-class>sample.servlet.LoginServlet</servlet-class>
6      </servlet>
7      <servlet>
8          <servlet-name>SE1162Servlet</servlet-name>
9          <servlet-class>sample.servlet.SE1162Servlet</servlet-class>
10     </servlet>
11     <servlet-mapping>
12         <servlet-name>LoginServlet</servlet-name>
13         <url-pattern>/LoginServlet</url-pattern>
14     </servlet-mapping>
15     <servlet-mapping>
16         <servlet-name>SE1162Servlet</servlet-name>
17         <url-pattern>/SE1162Servlet</url-pattern>
18     </servlet-mapping>
19     <session-config>
24     <welcome-file-list>
25         <welcome-file>SE1162Servlet</welcome-file>
26     </welcome-file-list>
27     <resource-ref>
33 </web-app>
```