Servlets and JSPs

CS174

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Outline

- Servlets and Cookies
- Session Tracking
- Synchronization
- Java Server Pages

Servlets and Cookies

- Recall we showed how to get and set cookies in Perl.
- In Java, there is a Cookie class in the package javax.servlet.http.
- If we want to create a Cookie with a given name and value we can do:

```
Cookie myCookie = new Cookie(name, value);
```

- Cookie has several useful get/set methods: setComment(String), setMaxAge(int), setValue(String), getComment(), getMaxAge(), getName(), getValue().

Placing a Cookie in the Response

- To place a cookie in the page we write back to the client we need to do the following steps:
  1. Add the cookies to the response with addCookie:

     response.addCookie(myCookie);
  2. Set the content type of the message with setContentType
  3. Get a response output stream with getWriter
  4. Place response information in the response stream with print or println

Getting Cookies from the Request

- When a client requests a Servlet the associated cookies get passed inside the HttpServletRequest object.
- To get at them we can do:

```
Cookie theCookies[];
theCookies = request.getCookies();
PrintWriter out = response.getWriter();
out.println(“First cookies
value”+theCookies[0].getValue());
```

Session Tracking

- One way to keep track of a given client is to place a unique identifier in a cookie on their browser.
- This cookie is associated with a some data that is kept on the server.
- When the client comes back, it gives this cookie to to server which then looks up the associated data.
- The above idea could be coded by hand, perhaps making use of a database.
- Java however has an easy mechanism for doing this encapsulated by the object HttpSession.

HttpSession

- Recall after the servlet is loaded into the Web Server’s memory, it stays there for some time, say 1/2 hour beyond the last request of that servlet.
- If your servlet does something like:

```
HttpSession mySession = request.getSession(false); //check for a session
int val = 0;
if(mySession == null)
{
     mySession = request.getSession(true);
      val =0;
}
else //if session already existed
{
   Integer value = (Integer)mySession.getAttribute(“count”);
   val = value.intValue() +1;
}
mySession.setAttribute(“count”,new Integer(val));
response.setContentType(“text/html”);
```

- Then if a session didn’t exist a unique identifier will be placed on the client. The HttpSession object will be remembered in RAM memory by the Servlet until the next request or the time out period occurs.
- If the client comes back, the unique cookie identifier will be retrieved and the data associated with the client can be gotten out of the request object as above.

More on Sessions

- Note using sessions can be very memory intensive.
- For instance, if someone has cookies turned off and repeatedly views a site, then a new HttpSession object could be created each visit.
- Two useful methods for HttpSession’s are: setMaxInactiveInterval/ getMaxInactiveInterval

Synchronization

- Java has built in support for thread synchronization.
- This can be used to achieve much the same effect that flock provided in the Perl setting:
- For instance, if we know only this servlet will access a file, then we can put critical code which does file access in a synchronized block:

```
synchronized(this) /*only one thread can execute this code at a time*/
{
    BufferedReader buf = new BufferedReader( new FileReader(dataFile));
    //…
}
```

Java Server Pages

- Java Server Pages are an approach to web programming which is built on top of Servlets
- One problem with servlets is that web code is embedded in print statements.
- This requires a person who creates a servlet to both be an expert web designer as well as a Java programmer.
- JSP allow one to embed short Java code snippets within an XHTML document.
- These code snippets typically make small requests for things like the value of a variable, so do not demand to much of a web programmer.
- Behind the scenes the maintenance of variables might live a be done in a Java bean which consists of pure Java code and is not responsible for any I/O.
- A coder writes the bean/ other objects and doesn’t have to worry about understanding web design.

JSP Documents

- When requested by a browser, a JSP document is processed by a program called a JSP container.
- Some JSP containers compile the document only when the document is loaded on the server; other compile them only when they are requested.
- This compilation process translates the JSP document into a servlet object.
- A JSP document consists of four different kinds of elements: directives, traditional XHTML or XML, action elements, and scriptlets.
- The XHTML code is used to produce the content that is fixed about the page. It is called template text.
- Action elements dynamically create content.
- The result of the JSP is an XHTML document consisting of the template part and the filled in output of the action elements.

More on JSPs

- The general form of an action element is:

<jsp: element>

- As an example <jsp:include page="my.jsp" > includes a file in the current file at the given location.
- This is a so called standard action element, there are also custon action elements created by users and JSTL action elements.
- action elements are like programming language statements
- directives are like messages to the JSP container.
- For example: <%@ page contentType = "text/html" %>
- Directives have the syntax <%@ .. %>