Advanced Internet Technology Lab

Lab # 5

HTTP Request Handling

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March, 2014
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**Objectives**

To be familiar with reading HTTP request that contains:
- Form Data.
- HTTP request Headers.

**HTTP Request Format**

- **GET Request**

  GET /servlet/Search ? name=Haneen&password=123 HTTP/1.1
  
  Accept: text/html, image/gif, image/jpg, */*
  
  Accept-Encoding: gzip
  
  Connection: Keep-Alive
  
  Cookie: userID=id12345
  
  Host: www.servletsstore.com
  
  Referer: http://www.servletsstore.com/form1.html
  
  User-Agent: Mozilla/4.0 (compatible; MSIE 6.0; Windows NT 5.0)

- **POST Request**

  POST /servlet/Search HTTP/1.1
  
  Accept: text/html, image/gif, image/jpg, */*
  
  Host: www.servletsstore.com
  
  Content-Length: 24
  
  Content-Type: application/x-www-form-urlencoded

  name=Haneen&password=123
Servlet that Handles with Form Data

The HttpServletRequest class contains three main methods for extracting form data:

request.getParameter("ParamName")

- Returns the value of the first occurrence of “ParamName” in the query string.
- Returns empty String if the “ParamName” exists, but has no value.
- Returns NULL if no such “ParamName” is in query data.

request.getParameterValues("ParamName")

- Returns an array of String of the values of all occurrences of “ParamName” in query string.
- Returns a one-element array if the “ParamName” not repeated.
- Returns NULL if no such “ParamName” is in query.

request.getParameterNames() or request.getParameterMap()

- Returns Enumeration or Map of request parameters.

Notes

- The methods Work identically for GET and POST requests.
- Parameter name is case sensitive.
Example:

1- Create HTML file that generates the form.

```html
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">
<title>FormDataLab</title>
</head>
<body>
<form method="post" action="http://localhost/Labs/FormServlet">
<table>
<tr>
<th>UserName: </th>
<td><input type="text" name="userName"/></td>
</tr>
<tr>
<th>Password: </th>
<td><input type="password" name="password"/></td>
</tr>
</table>
<br>Choose Your Drink: <br/>
<input type="checkbox" name="Drink" value="Juice"/> Juice <br/>
<input type="checkbox" name="Drink" value="Tea"/> Tea <br/>
<input type="checkbox" name="Drink" value="Coffee"/> Coffee <br/>
<input type="submit" value="OK"/>
</form>
</body>
</html>
```

Form1.html Running:

![Form1.html Running](image)
We want the response to be as the following:

```
You Drink is:
Coffee

Your userName is:
Haneen

Your password is:
123
```

2- So FormServlet that handles with the request and prepare the response should be as following:

```java
protected void doGet(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
    response.setContentType("text/html");
    PrintWriter out=response.getWriter();
    out.println("<html> <head><title>Form Data</title></head>"+"<body>");
    Enumeration parameters=request.getParameterNames();
    while(parameters.hasMoreElements()){
        String param= (String)parameters.nextElement();
        out.println("<h3> Your "+param+" is: </h3>");
        String [] values=request.getParameterValues(param);
        if(values.length==1){
            out.println(values[0]);
        } else{
            for(int i=0;i<values.length;i++){
                out.println(values[i]+"<br/>");
            }
        }
    }
    out.println("</body></html>");
}
```

```java
protected void doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
    doGet(request,response);
}
```
Servlet that Handles with Request Headers

Common HTTP 1.1 Request Headers

- **Accept**
  Specifies media types which are acceptable for the response.

- **Accept-Charset**
  This header indicates the character sets (e.g., ISO-8859-1) the browser can use.

- **Accept-Encoding**
  This header designates the types of encodings that the client knows how to handle.

- **Accept-Language**
  This header specifies the client’s preferred languages.

- **Connection**
  Determines the connection type between server and clients.

- **Host**
  Indicates the host given in original URL. This is a **required** header in HTTP 1.1.

- **Referer**
  URL of referring Web page.

- **User-Agent**
  Contains information about the user agent originating the request, e.g., Web browser vs. I-mode cell phone, etc.

- **Cookie**
  Gives cookies previously sent to the client.

- **Content-Length**
  This header is applicable only to **POST** requests and gives the size of the POST data in bytes.

- **Content-Type**
  The MIME type of the body of the request, it is used with **POST** requests.

**Note:** Content-Type and Content-Length are NULL for GET Requests.
Reading Request Headers

The HttpServletRequest class contains many methods for extracting Headers as following:

General Methods

request.getHeader ("Header-name")

Returns a String if the specified header was supplied in the current request, NULL otherwise.

*Note:* Header name is not case sensitive.

request.getHeaders("Header-name")

In most cases, each header name appears only once in the request. Occasionally, however, a header can appear multiple times, with each occurrence listing a separate value.

getHeaders method returns an Enumeration of the values of all occurrences of the header.

request.getHeaderNames()

Returns an Enumeration of all header names received on this particular request.

Specialized Methods

request.getCookies(): returns array of Cookie.

request.getContentType(): returns Content-Type header.

request.getDateHeader("HeaderName"): returns the specified header as Date.

request.getIntHeader("HeaderName"): returns the specified header as integer.
Main Request Line

You can get information on the main request line itself using the following methods:

- `request.getMethod()`
- `request.getRequestURI()`
- `request.getQueryString()`
- `request.getProtocol()`

Notes:
- Request.getQueryString returns NULL for Post Requests.
- Always check that request.getHeader is non-NULL before trying to use it.

Example:

1. Form1.html

```html
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">
<title>FormDataLab</title>
</head>
<body>
<form method="post" action="http://localhost/Labs/HeaderServlet">
<table>
<tr>
<th>UserName: </th>
<td><input type="text" name="userName"/></td>
</tr>
<tr>
<th>Password: </th>
<td><input type="password" name="password"/></td>
</tr>
</table>
<br> Choose Your Drink: 

<input type="checkbox" name="Drink" value="Juice"/> Juice <br/>
<input type="checkbox" name="Drink" value="Tea"/> Tea <br/>
<input type="checkbox" name="Drink" value="Coffee"/> Coffee <br/>
<br/>
<input type="submit" value="OK"/>
</form>
</body>
</html>
```
Form1.html Running

We want the response of Form1.html to be as following:

Reading Request Headers

- Request-Method: POST
- URI: /Labs/HeaderServlet
- Protocol: HTTP/1.1
- Query String: null

<table>
<thead>
<tr>
<th>Header Name</th>
<th>Header Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>host</td>
<td>localhost</td>
</tr>
<tr>
<td>user-agent</td>
<td>Mozilla/5.0 (Windows NT 6.1; rv:28.0) Gecko/20100101 Firefox/28.0</td>
</tr>
<tr>
<td>accept</td>
<td>text/html,application/xhtml+xml,application/xml;q=0.9,<em>/</em>;q=0.8</td>
</tr>
<tr>
<td>accept-language</td>
<td>en-US,en;q=0.5</td>
</tr>
<tr>
<td>accept-encoding</td>
<td>gzip, deflate</td>
</tr>
<tr>
<td>referer</td>
<td><a href="http://localhost/Labs/Form1.html">http://localhost/Labs/Form1.html</a></td>
</tr>
<tr>
<td>connection</td>
<td>keep-alive</td>
</tr>
<tr>
<td>content-type</td>
<td>application/x-www-form-urlencoded</td>
</tr>
<tr>
<td>content-length</td>
<td>40</td>
</tr>
</tbody>
</table>
Note: The request method is POST, so Query String is NULL.

2. So, HeaderServlet should to be as the following:

```java
protected void doGet(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
    response.setContentType("text/html");
    PrintWriter out = response.getWriter();
    out.print("<html><head><title>Request Headers</title> </head>" +
    "<body><h1>Reading Request Headers</h1>" +
    "<b>Request-Method:</b>" + request.getMethod() + "<br/>
    "<b>URI:</b>" + request.getRequestURI() + "<br/>
    "<b>Protocol:</b>" + request.getProtocol() + "<br/>
    "<b>Query String:</b>" + request.getQueryString() + "<br/>
    out.print("<table border="2">
    <tr><th>Header Name</th><th>Header Value</th></tr>
    Enumeration E = request.getHeaderNames();
    while(E.hasMoreElements()){
        String header = (String) E.nextElement();
        out.print("<tr><td>" + header + "</td><td>" +
                E.nextElement() + "</td></tr>");
        Enumeration V = request.getHeaders(header);
        while(V.hasMoreElements()){
            String v = (String) V.nextElement();
            out.print("<li>" + v + "</li>";
        }
    out.print("</ul></tr>");
    }
    out.print("</table>");
    out.print("</body></html>");
}
```
Exercise:

1- Create the following Form and Servlet that generates the result as in Figures.
### Reading All Request Parameters

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Parameter Value(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>cardNum</td>
<td>• 3.1415927</td>
</tr>
<tr>
<td></td>
<td>• 3.1415927</td>
</tr>
<tr>
<td>cardType</td>
<td>Java SmartCard</td>
</tr>
<tr>
<td>price</td>
<td>$456.78</td>
</tr>
<tr>
<td>initial</td>
<td>No Value</td>
</tr>
<tr>
<td>itemNum</td>
<td>123-A</td>
</tr>
<tr>
<td>address</td>
<td>One Microsoft Way Redmond, WA 98052</td>
</tr>
<tr>
<td>description</td>
<td>Wild Wonder Widget</td>
</tr>
<tr>
<td>firstName</td>
<td>Sam</td>
</tr>
<tr>
<td>lastName</td>
<td>Palmisano</td>
</tr>
</tbody>
</table>

2- Add to your servlet the code that generates a table of request headers.