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9.6 A Servlet That Shows Per-Client Access Counts

Listing 9.1 presents a simple servlet that shows basic information about the client's session. When the client connects, the servlet uses `request.getSession` either to retrieve the existing session or, if there is no session, to create a new one. The servlet then looks for an attribute called `accessCount` of type `Integer`. If it cannot find such an attribute, it uses 0 as the number of previous accesses. This value is then incremented and associated with the session by `setAttribute`. Finally, the servlet prints a small HTML table showing information about the session.

Note that `Integer` is an *immutable* (nonmodifiable) data structure: once built, it cannot be changed. That means you have to allocate a new `Integer` object on each request, then use `setAttribute` to replace the old object. The following snippet shows the general approach for session tracking when an immutable object will be stored.

```
HttpSession session = request.getSession();
SomeImmutableClass value =
  (SomeImmutableClass)session.getAttribute("someIdentifier");
if (value == null) { // No such object already in session
  value = new SomeImmutableClass(...);
} else {
  value = new SomeImmutableClass(calculatedFrom(value));
}
session.setAttribute("someIdentifier", value);
doSomethingWith(value);
```

This approach contrasts with the approach used in the next section (Section 9.7) with a mutable (modifiable) data structure. In that approach, the object is allocated and `setAttribute` is called only when there is no such object already in the session. That is, the *contents* of the object change each time, but the session maintains the same object *reference*.

Figures 9-1 and 9-2 show the servlet on the initial visit and after the page was reloaded several times.

Listing 9.1 ShowSession.java

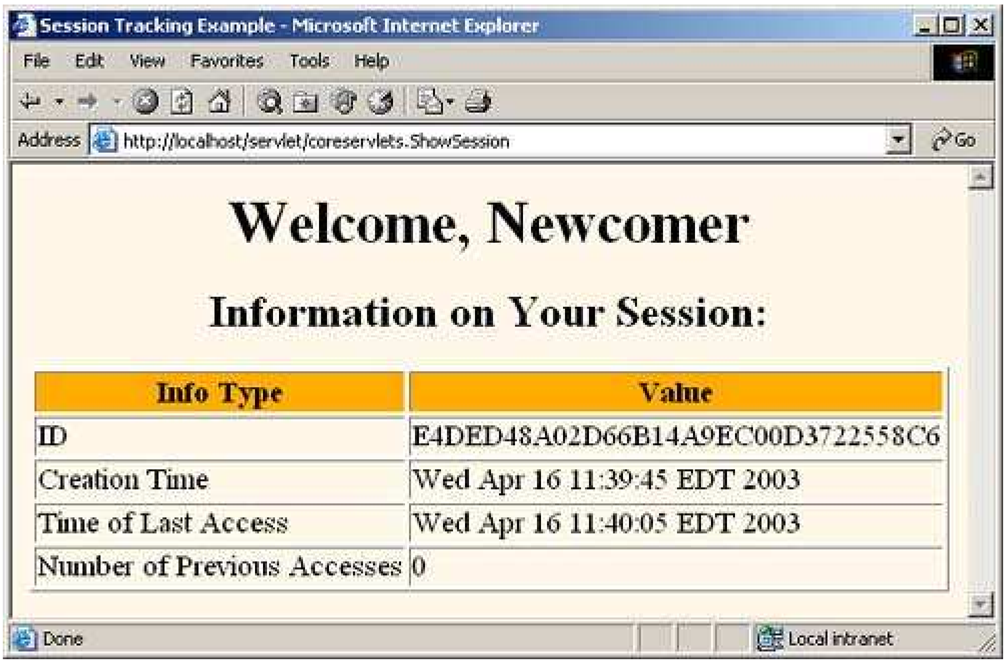
```
package coreservlets;

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

/** Servlet that uses session tracking to keep per-client
 *  access counts. Also shows other info about the session.
 */

public class ShowSession extends HttpServlet {
  public void doGet(HttpServletRequest request,
                    HttpServletResponse response)
      throws ServletException, IOException {
    response.setContentType("text/html");
    HttpSession session = request.getSession();
    String heading;
    Integer accessCount =
      (Integer)session.getAttribute("accessCount");
    if (accessCount == null) {
      accessCount = new Integer(0);
      heading = "Welcome, Newcomer";
    } else {
      heading = "Welcome Back";
      accessCount = new Integer(accessCount.intValue() + 1);
    }
    // Integer is an immutable data structure. So, you
    // cannot modify the old one in-place. Instead, you
    // have to allocate a new one and redo setAttribute.
    session.setAttribute("accessCount", accessCount);
    PrintWriter out = response.getWriter();
    String title = "Session Tracking Example";
    String docType =
      "<!DOCTYPE HTML PUBLIC \"-//W3C//DTD HTML 4.0 " +
      "Transitional//EN\">\n";
    out.println(docType +
                "<HTML>\n" +
                "<HEAD><TITLE>" + title + "</TITLE></HEAD>\n" +
                "<BODY BGCOLOR=\"#FDF5E6\">\n" +
                "<CENTER>\n" +
                "<H1>" + heading + "</H1>\n" +
                "<H2>Information on Your Session:</H2>\n" +
                "<TABLE BORDER=1>\n" +
                "<TR BGCOLOR=\"#FFAD00\">\n" +
                "  <TH>Info Type<TH>Value\n" +
                "<TR>\n" +
                "  <TD>ID\n" +
                "  <TD>" + session.getId() + "\n" +
                "<TR>\n" +
                "  <TD>Creation 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" +
                "</TABLE>\n" +
                "</CENTER></BODY></HTML>");
  }
}
```

Figure 9-1. First visit by client to `ShowSession` servlet.



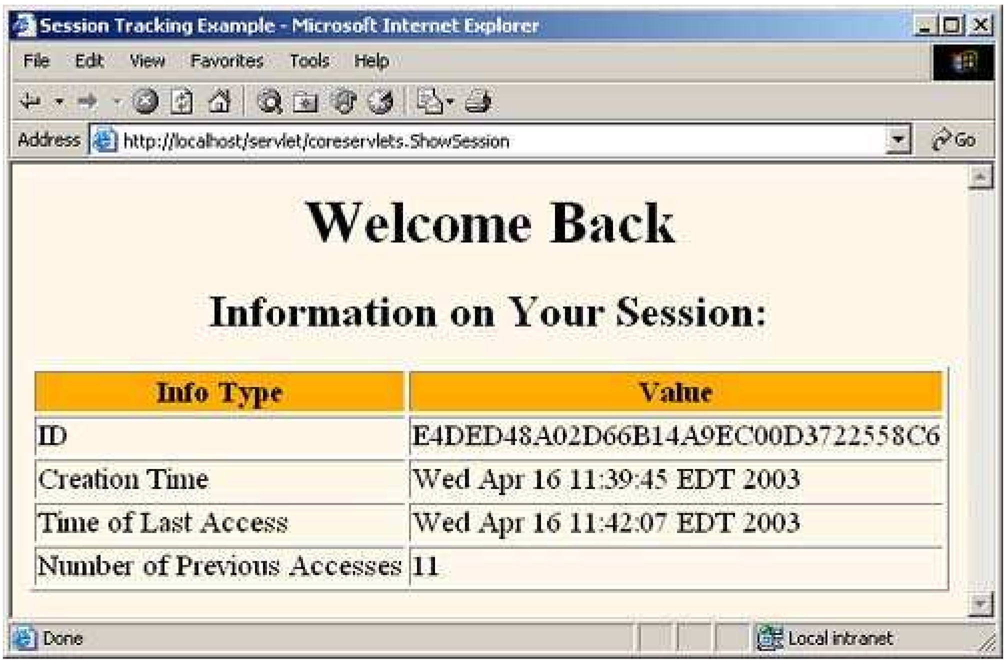
Session Tracking Example - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://localhost/servlet/coreservlets.ShowSession
Go
Done
Local intranet

Welcome, Newcomer

Information on Your Session:

Info Type	Value
ID	E4DED48A02D66B14A9EC00D3722558C6
Creation Time	Wed Apr 16 11:39:45 EDT 2003
Time of Last Access	Wed Apr 16 11:40:05 EDT 2003
Number of Previous Accesses	0

Figure 9-2. Twelfth visit to `ShowSession` servlet. Access count for this client is independent of number of visits by other clients.



Session Tracking Example - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://localhost/servlet/coreservlets.ShowSession
Go
Done
Local intranet

Welcome Back

Information on Your Session:

Info Type	Value
ID	E4DED48A02D66B14A9EC00D3722558C6
Creation Time	Wed Apr 16 11:39:45 EDT 2003
Time of Last Access	Wed Apr 16 11:42:07 EDT 2003
Number of Previous Accesses	11

[Team LiB]
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