15.5 Applying MVC: Bank Account Balances

In this section, we apply the MVC approach to an application that displays bank account balances. The controller servlet (Listing 15.2) reads a customer ID and passes that to some data-access code that returns a `BankCustomer` value bean (Listing 15.3). The servlet then stores the bean in the `HttpServletRequest` object where it will be accessible from destination JSP pages but nowhere else. If the account balance of the resulting customer is negative, the servlet forwards to a page designed for delinquent customers (Listing 15.4, Figure 15-2). If the customer has a positive balance of less than $10,000, the servlet transfers to the standard balance-display page (Listing 15.5, Figure 15-3). Next, if the customer has a balance of $10,000 or more, the servlet forwards the request to a page reserved for elite customers (Listing 15.6, Figure 15-4). Finally, if the customer ID is unrecognized, an error page is displayed (Listing 15.7, Figure 15-5).

Listing 15.2 ShowBalance.java

```java
package coreservlets;

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

/** Servlet that reads a customer ID and displays
 *  information on the account balance of the customer
 *  who has that ID.
 */

public class ShowBalance extends HttpServlet {
  public void doGet(HttpServletRequest request,
                    HttpServletResponse response)
      throws ServletException, IOException {
    BankCustomer customer =
      BankCustomer.getCustomer(request.getParameter("id"));
    String address;
    if (customer == null) {
      address = "/WEB-INF/bank-account/UnknownCustomer.jsp";
    } else if (customer.getBalance() < 0) {
      address = "/WEB-INF/bank-account/NegativeBalance.jsp";
      request.setAttribute("badCustomer", customer);
    } else if (customer.getBalance() < 10000) {
      address = "/WEB-INF/bank-account/NormalBalance.jsp";
      request.setAttribute("regularCustomer", customer);
    } else {
      address = "/WEB-INF/bank-account/HighBalance.jsp";
      request.setAttribute("eliteCustomer", customer);
    }
    RequestDispatcher dispatcher =
      request.getRequestDispatcher(address);
    dispatcher.forward(request, response);
  }
}
```

Listing 15.3 BankCustomer.java

```java
package coreservlets;

import java.util.*;
```

```java
/** Bean to represent a bank customer. */

public class BankCustomer {
  private String id, firstName, lastName;
  private double balance;

  public BankCustomer(String id,
                      String firstName,
                      String lastName,
                      double balance) {
    this.id = id;
    this.firstName = firstName;
    this.lastName = lastName;
    this.balance = balance;
  }

  public String getId() {
    return(id);
  }

  public String getFirstName() {
    return(firstName);
  }

  public String getLastName() {
    return(lastName);
  }

  public double getBalance() {
    return(balance);
  }

  public double getBalanceNoSign() {
    return(Math.abs(balance));
  }

  public void setBalance(double balance) {
    this.balance = balance;
  }

  // Makes a small table of banking customers.

  private static HashMap customers;

  static {
    customers = new HashMap();
    customers.put("id001",
                  new BankCustomer("id001",
                                   "John",
                                   "Hacker",
                                   -3456.78));
    customers.put("id002",
                  new BankCustomer("id002",
                                   "Jane",
                                   "Hacker",
                                   1234.56));
    customers.put("id003",
                  new BankCustomer("id003",
                                   "Juan",
                                   "Hacker",
                                   987654.32));
  }

  /** Finds the customer with the given ID.
```

```
 *   Returns null if there is no match.
 */

public static BankCustomer getCustomer(String id) {
  return((BankCustomer)customers.get(id));
}
}
```

Listing 15.4 NegativeBalance.jsp

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
<HTML>
<HEAD>
<TITLE>You Owe Us Money!</TITLE>
<LINK REL=STYLESHEET
      HREF="/bank-support/JSP-Styles.css"
      TYPE="text/css">
</HEAD>
<BODY>
<TABLE BORDER=5 ALIGN="CENTER">
  <TR><TH CLASS="TITLE">
      We Know Where You Live!</TABLE>
<P>
<IMG SRC="/bank-support/Club.gif" ALIGN="LEFT">
<jsp:useBean id="badCustomer"
             type="coreservlets.BankCustomer"
             scope="request" />
Watch out,
<jsp:getProperty name="badCustomer" property="firstName" />,
we know where you live.
<P>
Pay us the
$<jsp:getProperty name="badCustomer" property="balanceNoSign" />
you owe us before it is too late!
</BODY></HTML>
```

Listing 15.5 NormalBalance.jsp

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
<HTML>
<HEAD>
<TITLE>Your Balance</TITLE>
<LINK REL=STYLESHEET
      HREF="/bank-support/JSP-Styles.css"
      TYPE="text/css">
</HEAD>
<BODY>
<TABLE BORDER=5 ALIGN="CENTER">
  <TR><TH CLASS="TITLE">
      Your Balance</TABLE>
<P>
<IMG SRC="/bank-support/Money.gif" ALIGN="RIGHT">
<jsp:useBean id="regularCustomer"
             type="coreservlets.BankCustomer"
             scope="request" />
<UL>
  <LI>First name: <jsp:getProperty name="regularCustomer"
                                   property="firstName" />
  <LI>Last name: <jsp:getProperty name="regularCustomer"
                                  property="lastName" />
  <LI>ID: <jsp:getProperty name="regularCustomer"
                           property="id" />
  <LI>Balance: $<jsp:getProperty name="regularCustomer"
```

```
                                          property="balance" />
</UL>
</BODY></HTML>
```

Listing 15.6 HighBalance.jsp

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
<HTML>
<HEAD>
<TITLE>Your Balance</TITLE>
<LINK REL=STYLESHEET
      HREF="/bank-support/JSP-Styles.css"
      TYPE="text/css">
</HEAD>
<BODY>
<TABLE BORDER=5 ALIGN="CENTER">
  <TR><TH CLASS="TITLE">
      Your Balance</TABLE>
<P>
<CENTER><IMG SRC="/bank-support/Sailing.gif"></CENTER>
<BR CLEAR="ALL">
<jsp:useBean id="eliteCustomer"
             type="coreservlets.BankCustomer"
             scope="request" />
It is an honor to serve you,
<jsp:getProperty name="eliteCustomer" property="firstName" />
<jsp:getProperty name="eliteCustomer" property="lastName" />!

<P>
Since you are one of our most valued customers, we would like
to offer you the opportunity to spend a mere fraction of your
$<jsp:getProperty name="eliteCustomer"  property="balance" />
on a boat worthy of your status. Please visit our boat store for
more information.
</BODY></HTML>
```

Listing 15.7 UnknownCustomer.jsp

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
<HTML>
<HEAD>
<TITLE>Unknown Customer</TITLE>
<LINK REL=STYLESHEET
      HREF="/bank-support/JSP-Styles.css"
      TYPE="text/css">
</HEAD>
<BODY>
<TABLE BORDER=5 ALIGN="CENTER">
  <TR><TH CLASS="TITLE">
      Unknown Customer</TABLE>
<P>
Unrecognized customer ID.
</BODY></HTML>
```

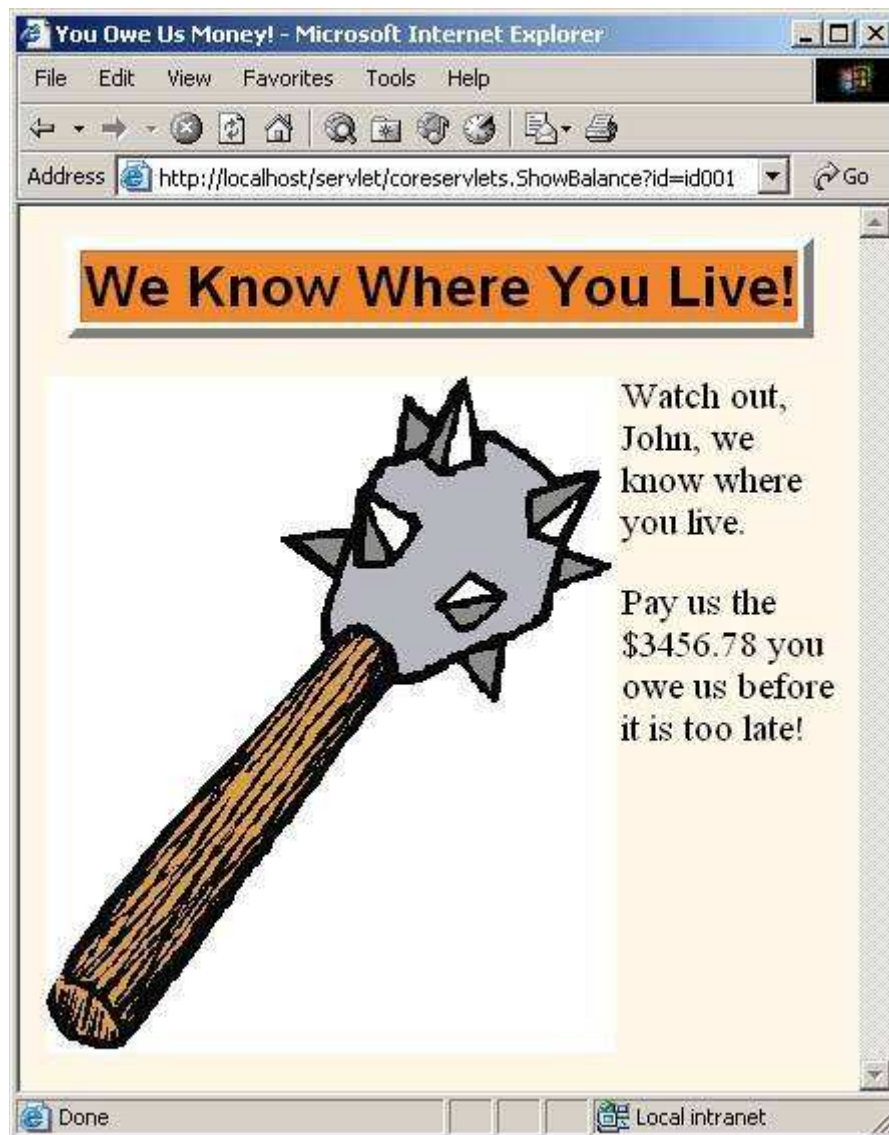**Figure 15-2. The `ShowCustomer` servlet with an ID corresponding to a customer with a negative balance.**

Figure 15-3. The `ShowCustomer` servlet with an ID corresponding to a customer with a normal balance.
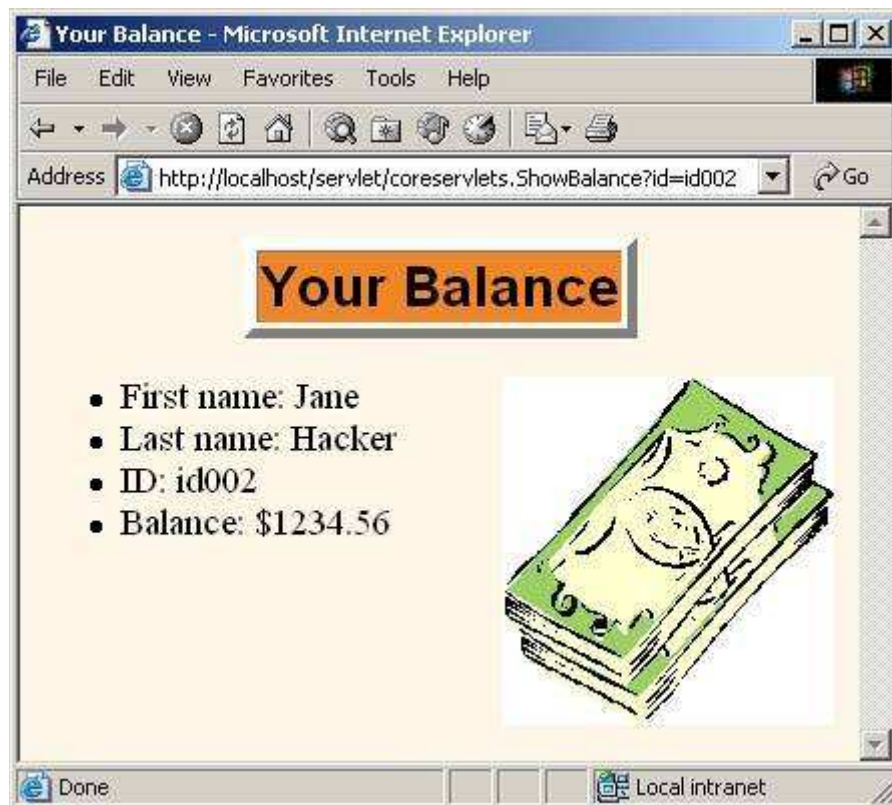
Figure 15-4. The `ShowCustomer` servlet with an ID corresponding to a customer with a high balance.
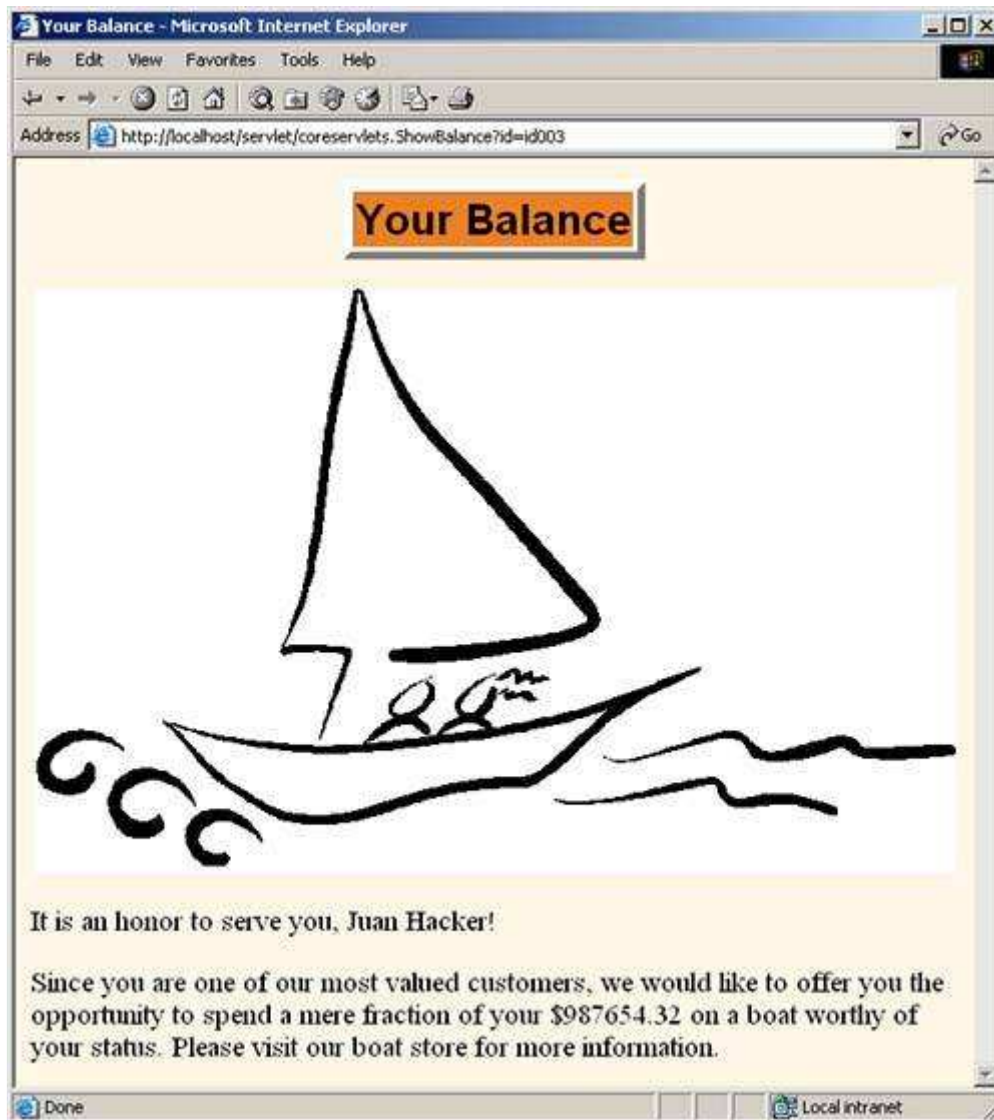
Figure 15-5. The `ShowCustomer` servlet with an unknown customer ID.