Short guide to

Implementing a servlet interfacing to a database and running it with Tomcat

The goal of this short guide is to describe how a small web application interfacing to a database can be realized.

For this purpose, we will assume that i) the servlet is written in Java, ii) MySQL is used as the underlying database and iii) Tomcat is used as the application server.

We will use the Banking database discussed in the lecture and connect to it via JDBC.

This guide assumes that you will be running tomcat locally on your machine.

Step1: Implementing the HTML form

The HTML Form for our example might look as follows:

```
<form action="http://localhost:8080/examples/BankAbfrage" method="get">

<select name ="type">

  <option value="account" selected> Girokonto </option>

  <option value="loan" selected> Kredit </option>

</select>

<input type=text size=5 name="number">

<input type="submit" value="submit">

</form>
```

The above form has two fields: one field to select the type of account (Girokonto or Kredit) and a textfield where the account number can be typed into. The values of the fields are stored by the parameters type and number.

http://localhost:8080/examples/BankAbfrage?type=account&number=A-101

See how this HTML Code is embedded into our course website at: http://philipp.cimiano.org/teaching/datenbanken_WS09/

When the form is submitted, a "get"-request is sent to http://localhost:8080/examples/BankAbfrage with parameters type and number. For example, if we select Girokonto and type in A-101, the requested URL is:

http://localhost:8080/examples/BankAbfrage?type=account&number=A-101

In order to react successfully to this request, we need a servlet BankAbfrage running under http://localhost:8080/examples which processes the two parameters.

Step2: Implementing the servlet in Java

In order to implement a servlet in Java we simply have to create a class extending HttpServlet. Our class could look as follows:

```
import java.io.IOException;
import java.io.PrintWriter;
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.ResultSet;
import java.sql.SQLException;
import java.sql.Statement;

import javax.servlet.ServletException;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

/**
 * Servlet implementation class BankAbfrage
 */
public class BankAbfrage extends HttpServlet {
     private static final long serialVersionUID = 1L;


public void doGet(HttpServletRequest request,
                  HttpServletResponse response)
    throws ServletException, IOException {

Connection conn=null;
Statement stmt;
```

```
ResultSet rs;

// load the driver

System.out.println("Loading driver...");
 try{
   Class.forName("com.mysql.jdbc.Driver").newInstance();
 } catch(Exception e) {}


// establish the connection

 try{
   conn =
DriverManager.getConnection("jdbc:mysql://localhost/Banking?us
er=cimiano");
 }  catch (SQLException ex) {}

String type = request.getParameter("type");
String number = request.getParameter("number");
String ergebnis = null;

if (type.equals("loan"))
{
     try {
         stmt = conn.createStatement();
         rs = stmt.executeQuery("SELECT * from loan WHERE
loan_number = \'"+number+"\'");
         rs.next();
         ergebnis = rs.getString("amount");
 } catch (SQLException ex){}
}
if (type.equals("account"))
{
     try {
         stmt = conn.createStatement();
         rs = stmt.executeQuery("SELECT * from account WHERE
account_number = \'"+number+"\'");
         rs.next();
         ergebnis = rs.getString("balance");
 } catch (SQLException ex){}
}

response.setContentType("text/html");
PrintWriter out = response.getWriter();

if (ergebnis != null)
```

```
out.println("<!DOCTYPE HTML PUBLIC \"-//W3C//DTD HTML 4.0 " +
                        "Transitional//EN\">\n" +
                        "<HTML>\n" +
                        "<HEAD><TITLE>BankAbfrage
(Ergebnis)</TITLE></HEAD>\n" +
                        "<BODY>\n" +
                        "<H1>Sie haben den Kontostand von
folgendem Konto angefragt:"+number+"<br>" +
                                "Das Ergebnis lautet: "+
ergebnis +
                        "</H1>\n"+

                                "</BODY></HTML>");

else

     out.println("<!DOCTYPE HTML PUBLIC \"-//W3C//DTD HTML 4.0
" +
            "Transitional//EN\">\n" +
            "<HTML>\n" +
            "<HEAD><TITLE>BankAbfrage
(Ergebnis)</TITLE></HEAD>\n" +
            "<BODY>\n" +
            "<H1> Es gibt leider keine Informationen zu
Konto:"+number+"<br>"+
            "</H1>\n"+
                "</BODY></HTML>");


}

}
```

You can also download the above program here.

Step3: Downloading and installing Tomcat

You can download tomcat here:

http://tomcat.apache.org/

Follow the installation instruction to install tomcat locally.

Step4: Uploading the servlet into Tomcat

In order to upload your servlet into tomcat, you need to copy the .class file (compile your program first!) into some WEB-INF/classes folder of the tomcat home directory.

The easiest is to use the /examples folder for this.

Copy the .class file BankAbfrage.class into the following folder:

<TOMCAT_FOLDER>/webapps/examples/WEB-INF/classes

Copy the required libraries into

<TOMCAT_FOLDER>/webapps/examples/WEB-INF/lib

In our example case you need to copy mysql-connector-java-5.1.10-bin.jar into the above directory.

Step5: Running the servlet

Start the tomcat server by executing:

<TOMCAT_FOLDER>/bin/startup.sh (under Linux/Mac OS)

You can now invoke the servlet through the following URL:

http://localhost:8080/examples/BankAbfrage?type=account&number=A-101

You can shut down the tomcat server by executing:

<TOMCAT_FOLDER>/bin/shutdown.sh (under Linux/Mac OS)

Try out invoking the servlet from the form in:

http://philipp.cimiano.org/teaching/datenbanken_WS09/