Applicazioni web basate su Servlet

Corso di ***Applicazioni Telematiche***

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Applicazioni web three-tier

- Three-tier distributed applications
  - User interface
  - Business logic
  - Database access
- Il Web container è impiegato per realizzare il middle tier
- Un esempio da Deitel “Java How To Program” ch.26
  - SurveyServlet
  - Survey.html
  - MySQL database

SQL script

```
CREATE DATABASE IF NOT EXISTS animalsurvey;
USE animalsurvey;
DROP TABLE IF EXISTS surveyresults;
CREATE TABLE surveyresults (
   id INT NOT NULL ,
   surveyoption varchar (20) NOT NULL ,
   votes INT NOT NULL ,
   PRIMARY KEY (id)
) TYPE=INNODB
;
insert into surveyresults (id,surveyoption,votes) values (1, 'Dog', 0);
insert into surveyresults (id,surveyoption,votes) values (2, 'Cat', 0);
insert into surveyresults (id,surveyoption,votes) values (3, 'Bird', 0);
insert into surveyresults (id,surveyoption,votes) values (4, 'Snake', 0);
insert into surveyresults (id,surveyoption,votes) values (5, 'None', 0);
```

A Web-based application that uses JDBC

```
1   // SurveyServlet.java
2   // A Web-based survey that uses JDBC from a servlet
3   package it.unina.at;
4
5   import java.io.*;
6   import java.text.*;
7   import java.sql.*;
8   import javax.servlet.*;
9   import javax.servlet.http.*;
10
11   public class SurveyServlet extends HttpServlet {
12      private Connection connection;
13      private PreparedStatement updateVotes, totalVotes, results;
14
15      // set up database connection and prepare SQL statements
16      public void init( ServletConfig config )
17         throws ServletException
18      {
19         // attempt database connection and create PreparedStatements
20         try {
21            Class.forName( "com.mysql.jdbc.Driver" );
22            connection = DriverManager.getConnection(
23               "jdbc:mysql://localhost:3306/animalsurvey" );
24
```

A Web-based application that uses JDBC (2)

```
25          // PreparedStatement to add one to vote total for a
26          // specific animal
27          updateVotes =
28             connection.prepareStatement(
29                "UPDATE surveyresults SET votes = votes + 1 " +
30                "WHERE id = ?"
31             );
32
33          // PreparedStatement to sum the votes
34          totalVotes =
35             connection.prepareStatement(
36                "SELECT sum( votes ) FROM surveyresults"
37             );
38
39          // PreparedStatement to obtain surveyoption table's data
40          results =
41             connection.prepareStatement(
42                "SELECT surveyoption, votes, id " +
43                "FROM surveyresults ORDER BY id"
44             );
45       }
```

A Web-based application that uses JDBC (3)

```
46
47        // for any exception throw an UnavailableException to
48        // indicate that the servlet is not currently available
49        catch ( Exception exception ) {
50           exception.printStackTrace();
51           throw new UnavailableException(exception.getMessage());
52        }
53
54     }  // end of init method
55
56     // process survey response
57     protected void doPost( HttpServletRequest request,
58        HttpServletResponse response )
59           throws ServletException, IOException
60     {
61        // set up response to client
62        response.setContentType( "text/html" );
63        PrintWriter out = response.getWriter();
64        DecimalFormat twoDigits = new DecimalFormat( "0.00" );
65
```

A Web-based application that uses JDBC (4)

```
66        // start XHTML document
67        out.println( "<?xml version = \"1.0\"?>" );
68
69        out.println( "<!DOCTYPE html PUBLIC \"-//W3C//DTD " +
70           "XHTML 1.0 Strict//EN\" \"http://www.w3.org" +
71           "/TR/xhtml1/DTD/xhtml1-strict.dtd\">" );
72
73        out.println(
74           "<html xmlns = \"http://www.w3.org/1999/xhtml\">" );
75
76        // head section of document
77        out.println( "<head>" );
78
79        // read current survey response
80        int value =
81           Integer.parseInt( request.getParameter( "animal" ) );
82
```

A Web-based application that uses JDBC (5)

```
83        // attempt to process a vote and display current results
84        try {
85
86           // update total for current surevy response
87           updateVotes.setInt( 1, value );
88           updateVotes.executeUpdate();
89
90           // get total of all survey responses
91           ResultSet totalRS = totalVotes.executeQuery();
92           totalRS.next();
93           int total = totalRS.getInt( 1 );
94
95           // get results
96           ResultSet resultsRS = results.executeQuery();
97           out.println( "<title>Thank you!</title>" );
98           out.println( "</head>" );
99
```

A Web-based application that uses JDBC (6)

```
100         out.println( "<body>" );
101         out.println( "<p>Thank you for participating." );
102         out.println( "<br />Results:</p><pre>" );
103
104         // process results
105         int votes;
106
107         while ( resultsRS.next() ) {
108            out.print( resultsRS.getString( 1 ) );
109            out.print( ": " );
110            votes = resultsRS.getInt( 2 );
111            out.print( twoDigits.format(
112               ( double ) votes / total * 100 ) );
113            out.print( "%  responses: " );
114            out.println( votes );
115         }
116
117         resultsRS.close();
118
119         out.print( "Total responses: " );
120         out.print( total );
121
122         // end XHTML document
123         out.println( "</pre></body></html>" );
124         out.close();
125      }
```

A Web-based application that uses JDBC (7)

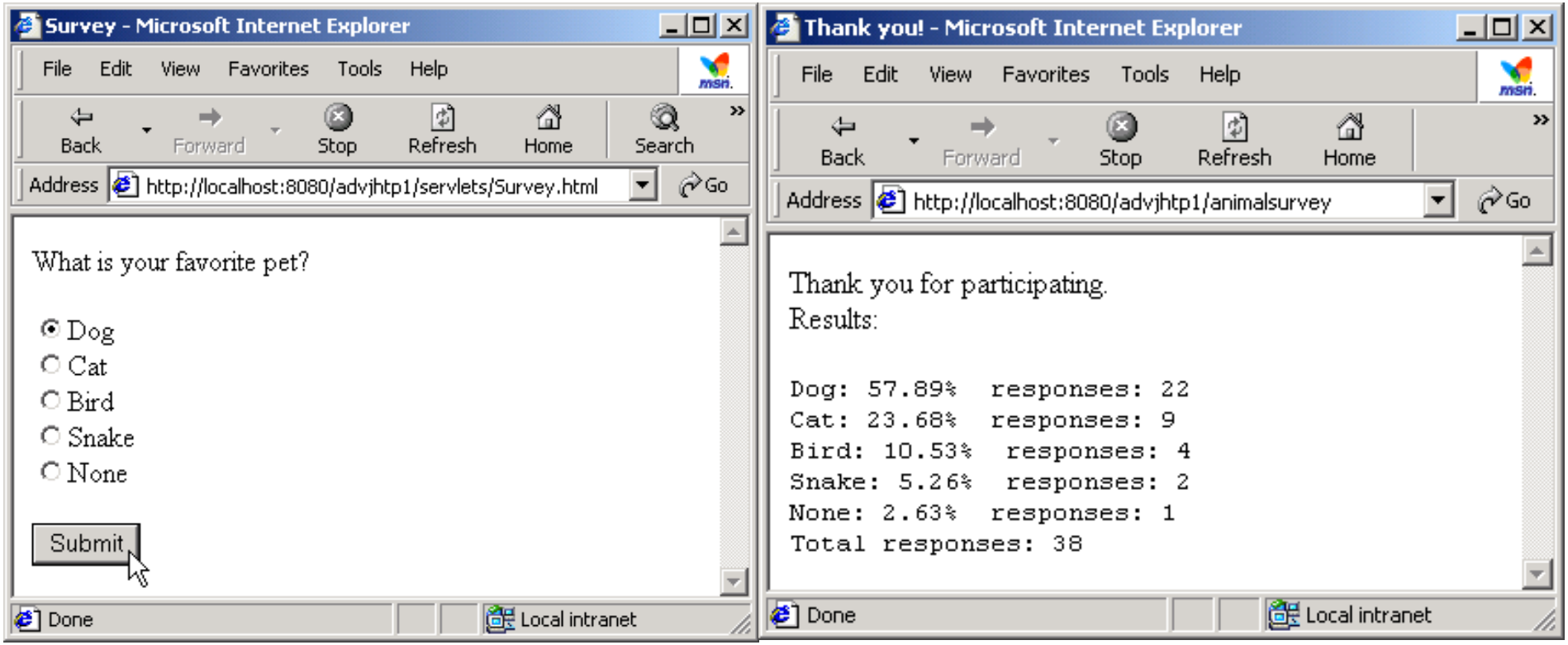
```
126
127       // if database exception occurs, return error page
128       catch ( SQLException sqlException ) {
129          sqlException.printStackTrace();
130          out.println( "<title>Error</title>" );
131          out.println( "</head>" );
132          out.println( "<body><p>Database error occurred. " );
133          out.println( "Try again later.</p></body></html>" );
134          out.close();
135       }
136
137    }  // end of doPost method
138
```

A Web-based survey that uses JDBC (8)

```
139    // close SQL statements and database when servlet terminates
140    public void destroy()
141    {
142       // attempt to close statements and database connection
143       try {
144          updateVotes.close();
145          totalVotes.close();
146          results.close();
147          connection.close();
148       }
149
150       // handle database exceptions by returning error to client
151       catch( SQLException sqlException ) {
152          sqlException.printStackTrace();
153       }
154    } // end of destroy method
155 }
```

```
1  <?xml version = "1.0"?>
2  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
3    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
7  <html xmlns = "http://www.w3.org/1999/xhtml">
8  <head><title>Survey</title></head>
11
12  <body>
13  <form method = "post" action = "/AT_servlets/animalsurvey">
14
15    <p>What is your favorite pet?</p>
16
17    <p>
18      <input type = "radio" name = "animal"
19        value = "1" />Dog<br />
20      <input type = "radio" name = "animal"
21        value = "2" />Cat<br />
22      <input type = "radio" name = "animal"
23        value = "3" />Bird<br />
24      <input type = "radio" name = "animal"
25        value = "4" />Snake<br />
26      <input type = "radio" name = "animal"
27        value = "5" checked = "checked" />None
28    </p>
29
30    <p><input type = "submit" value = "Submit" /></p>
31  </form> </body>
34  </html>
```

Esempi


Survey - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search
Address http://localhost:8080/advjhtp1/servlets/Survey.html
Go
What is your favorite pet?
Dog
Cat
Bird
Snake
None
Submit
Done
Local intranet
Thank you! - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home
Address http://localhost:8080/advjhtp1/animalsurvey
Go
Thank you for participating.
Results:
Dog: 57.89% responses: 22
Cat: 23.68% responses: 9
Bird: 10.53% responses: 4
Snake: 5.26% responses: 2
None: 2.63% responses: 1
Total responses: 38
Done
Local intranet