Program #4: Database-driven Web Application

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Overview

• You are given application domain to work on

• Your job is to build a database-driven web information management system.

  • Design the underlying database
  
  • Define the application functionalities

  • Implement this application as a web-based system
Application Domain

• The application itself is choose from Appendix B.2 of the textbook.

• You need to read it carefully to design your database.
  • Create an ER diagram
  • Analyze the FDs of each table
  • Justify that your schema satisfies 3NF, and if possible, BCNF
  • Populate your tables with some initial data
Three-tier Architecture

- Web front-end
  - web pages
- Application server
  - runs Tomcat web server
  - handles business logic and data processing
- Database back-end
  - runs Oracle DBMS
  - a set of tables
Required Functionalities

• Record insertion
  • required for all tables

• Record deletion
  • required for all tables

• Record update
  • required for only one table

• Record query
  • implement 5 different queries
Work in Teams

• Such a project is usually the work of multiple developers

• 2-4 members within a team

• Each team should email the TA (Shuo Yang) the members of your team no later than Nov 30
Demo Application

CS460 Fall2015, Program #4

Demo of a Simple JSP Application

Please excuse the simple appearance of this page, just click the button

list all employees
Demo Application

<table>
<thead>
<tr>
<th>FNAME</th>
<th>MNAME</th>
<th>LNAME</th>
<th>SSN</th>
<th>BDATE</th>
<th>ADDRESS</th>
<th>SEX</th>
<th>SALARY</th>
<th>SUPERSSN</th>
<th>DNO</th>
</tr>
</thead>
<tbody>
<tr>
<td>John</td>
<td>B</td>
<td>Smith</td>
<td>123456789</td>
<td>1955-01-09</td>
<td>00:00:00.0 731 Fondren, Houston, TX</td>
<td>M</td>
<td>30000</td>
<td>333445555</td>
<td>5</td>
</tr>
<tr>
<td>Franklin</td>
<td>T</td>
<td>Wong</td>
<td>333445555</td>
<td>1945-12-08</td>
<td>00:00:00.0 638 Voss, Houston, TX</td>
<td>M</td>
<td>40000</td>
<td>888665555</td>
<td>5</td>
</tr>
<tr>
<td>Alicia</td>
<td>J</td>
<td>Zelaya</td>
<td>999887777</td>
<td>1958-07-19</td>
<td>00:00:00.0 3321 Castle, Spring, TX</td>
<td>F</td>
<td>25000</td>
<td>987654321</td>
<td>4</td>
</tr>
<tr>
<td>Jennifer</td>
<td>S</td>
<td>Wallace</td>
<td>987654321</td>
<td>1931-06-20</td>
<td>00:00:00.0 291 Berry, Bellaire, TX</td>
<td>F</td>
<td>43000</td>
<td>888665555</td>
<td>4</td>
</tr>
<tr>
<td>Ramesh</td>
<td>K</td>
<td>Narayan</td>
<td>666884444</td>
<td>1952-09-15</td>
<td>00:00:00.0 975 Fire Oak, Humble, TX</td>
<td>M</td>
<td>38000</td>
<td>333445555</td>
<td>5</td>
</tr>
<tr>
<td>Joyce</td>
<td>A</td>
<td>English</td>
<td>453453453</td>
<td>1962-07-31</td>
<td>00:00:00.0 5631 Rice, Houston, TX</td>
<td>F</td>
<td>25000</td>
<td>333445555</td>
<td>5</td>
</tr>
<tr>
<td>Ahmed</td>
<td>V</td>
<td>Jabbar</td>
<td>987987987</td>
<td>1959-03-29</td>
<td>00:00:00.0 980 Dallas, Houston, TX</td>
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<td>987654321</td>
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</tr>
<tr>
<td>James</td>
<td>E</td>
<td>Borg</td>
<td>888665555</td>
<td>1927-11-10</td>
<td>00:00:00.0 450 Stone, Houston, TX</td>
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<td>55000</td>
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</tr>
</tbody>
</table>
Techniques used for demo

- HTML
  - for building web pages
- JavaScript
  - for client-side web programming
  - connects web pages with JSP files running on the server
- JavaServer Page (JSP)
  - server-side technology which is used to create dynamic web contents
- Java
  - talks with Oracle DB via JDBC and implements business logic
How it works

Web Front-End (WFE)

index.html → onClick → search.js

searchprocess.jsp

DatabaseController.class

query result

direct call to DatabaseController

Application Server

JDBC communications

Oracle DBMS

Database Back-End (DBE)

Figure 1: Diagram of the Architecture of the Demo Application

7. Demo

An architectural diagram is given in Figure 1 to illustrate the components in the demo application and the connections between these components and the functionalities of them.

7.1. If you already started the tomcat server, now please shutdown.

$TOMCAT_HOME/bin/shutdown.sh

We will provide a very simple example that demonstrates how JS works. Generally, all JavaScript applications (including the welcome page) are placed under "$TOMCAT_HOME/webapps/ROOT," in order to replace the default pages with your application, you can simply rename the existing "ROOT" dir and create a new empty "ROOT" dir.

mv $TOMCAT_HOME/webapps/ROOT $TOMCAT_HOME/webapps/old_root

mkdir $TOMCAT_HOME/webapps/ROOT

To run the demo, follow the next four steps.

7.2. Copy the provided example, which is located at "$TOMCAT_HOME/webapps/460demo," to "$TOMCAT_HOME/webapps/ROOT."

cp -r $TOMCAT_HOME/webapps/460demo/* $TOMCAT_HOME/webapps/ROOT/
Get Started

- Run the demo, make sure it works
- Understand the application domain
- Design the database (key point)
- Implement the application
  - client side
  - server side