Project 3: CMUQFlix

CMUQ’s Movies Recommendation System
Project Objective

1. Set up a front-end website with PostgreSQL back-end

2. Allow users to login, “like” movies, and get personalized movies recommendations
Three-Tier Architecture of CMUQFlix

Front-end Tier

Client Browser

Middle Tier

Web Server
- Tomcat
- Servlets, JSPs, Java

Back-end Tier

PostgreSQL Database
- Movies, Users, ..
HTML Forms
HTML Forms

• HTML forms are a common way for
  – Getting user input at the front-end tier
  – Communicating data from to the middle tier

• HTML forms are defined using the **FORM** tag

• FORM tag has three important attributes:
  – **NAME**: form name
  – **ACTION**: URI of the page to which the form is submitted
  – **METHOD**: method used to submit user input (GET/POST)
Apache Tomcat
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- Apache Tomcat is an *open-source web server* developed by the Apache Software Foundation (ASF)

- Apache Tomcat is a servlet container i.e. it can invoke and execute servlets and JSPs

- Unlike web-servers that run on a default port number 80, Tomcat runs on port number 8080
Installing Tomcat

- Login to your VM (root@andrewid-db.qatar.cmu.local)
- Install JDK 7 (apt-get install openjdk-7-jdk)
- Install Tomcat 7 (apt-get install tomcat7 tomcat7-admin)
- Check that Tomcat is running
  - Type service tomcat7 status, or
  - Browse to andrewid-db.qatar.cmu.local:8080
- Manually start/stop/restart Tomcat (service tomcat7 start/stop/restart)
- Deploy your application “cmuqflix” in Tomcat’s webapp (cp cmuqflix /var/lib/tomcat7/webapps)
- View Tomcat’s log files (for debug info.) (cd /var/log/tomcat7; cat *)
Java Servlets
What are Servlets?

• A servlet is primarily Java code that executes some application logic and produces HTML output

• A servlet can:
  – Interact with databases (using JDBC)
  – Dynamically generate custom HTML pages
  – Maintain session information for each client
Creating a Servlet

• A web-based servlet must:
  – Extend the **HTTPServlet** abstract class
  – Override the **doGet** and/or **doPost** methods

• The web-server (i.e. Tomcat) invokes **service** to distinguish the type of HTTP request (Get/Post)

<table>
<thead>
<tr>
<th>Methods defined in the HttpServlet Abstract Class</th>
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<tbody>
<tr>
<td>void doGet (HttpServletRequest request, HttpServletResponse response )</td>
</tr>
<tr>
<td>void doPost (HttpServletRequest request, HttpServletResponse response )</td>
</tr>
<tr>
<td>void Service( HttpServletRequest request, HttpServletResponse response )</td>
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</tbody>
</table>
Request and Response Classes

• Class **HttpServletRequest** provides methods:
  – getParameter, getParameterNames, getParameterValues, getCookies, getSession

• Class **HttpServletResponse** provides methods:
  – addCookie, getOutputStream, getWriter, setContentType
Integrating a Servlet with Tomcat

• Define the new servlet (e.g., newservlet.java) under cmuqflix/WEB-INF/src

• Compile newservlet.java
  javac -cp /usr/share/tomcat7/lib/servlet-api.jar newservlet.java

• Copy newservlet.class to cmuqflix/WEB-INF/classes

• Define the new servlet in cmuqflix/WEB-INF/web.xml
JavaServer Pages (JSPs)
What are JSPs?

- A JavaServer Page (JSP) is primarily HTML that embeds Java code to perform some application logic.

- JSPs serve the same purposes as servlets.
Servlets vs. JSPs

• Use servlets for:
  – Simple HTML
  – Complex application logic

• Use JSPs for:
  – Complex HTML
  – Simple application logic