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Topic 7: Application Development (Ch. 9)

Database System Concepts

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(Modified for CS 4513)



Outline

- How our applications were using the database so far
- Developing an application to access the database through the web
- Implementing our web database application using JSP
 - What is JSP?
 - Installation Instructions Overview
 - Example Application Demo



Using The Database So Far

- We were connecting to our database application in two ways:
 - Azure Portal Console or Azure Data Studio IDE (homework 2)
 - ▶ Taking user's SQL queries to execute
 - Java Application connected to the database via a JDBC driver (homework 3)
 - ▶ Interacting with a user through a command prompt

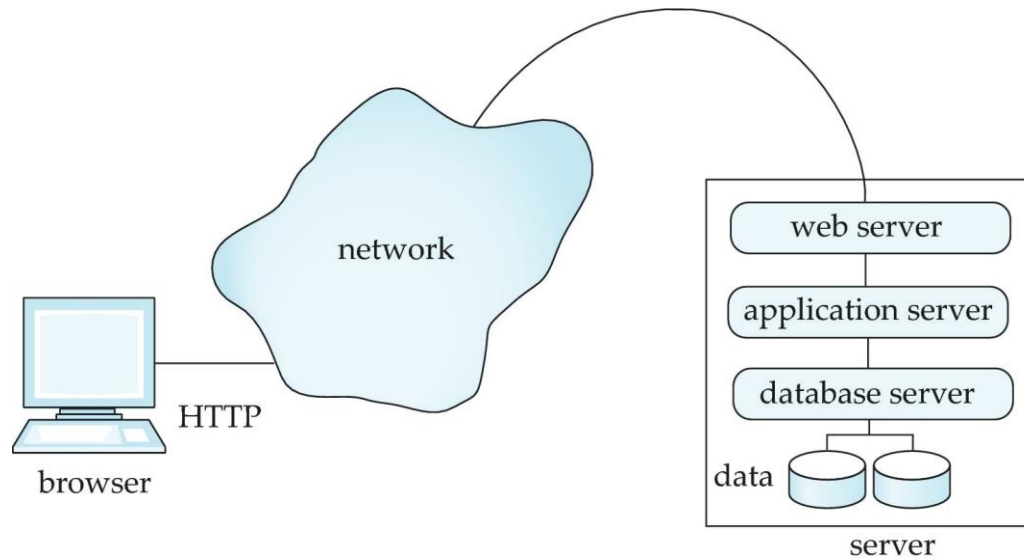


Web Database

- Most database users do *not* use a query language like SQL
- An application program acts as the intermediary between users and the database
 - Applications split into
 - ▶ front-end
 - ▶ middle layer
 - ▶ backend
- Front-end: user interface
 - Forms
 - Graphical user interfaces
 - Many interfaces are Web-based



Three-Layer Web Architecture





What is JSP?

- Java Server Pages (JSP) technology enables Web developers and designers to rapidly develop and easily maintain information-rich, dynamic Web pages that leverage existing business systems -
http://www.tutorialspoint.com/jsp/jsp_overview.htm
- As part of the Java technology family, JSP technology enables rapid development of Web-based applications that are platform-independent.
- JSP technology separates the user interface from content generation, enabling designers to change the overall page layout without altering the underlying dynamic content.



What is JSP?

A JSP page with embedded Java code:

```
<html>
<head> <title> Hello </title> </head>
<body>
<% if (request.getParameter("name") == null)
    { out.println("Hello World"); }
    else { out.println("Hello, " + request.getParameter("name")); }
%>
</body>
</html>
```



JSP Installation Overview

In order to develop a web database application using JSP we need:

- Azure SQL Database
- Eclipse IDE for **Enterprise** Java Developers
 - ▶ <https://www.eclipse.org/downloads/packages/>
- Apache Tomcat Web-Server
 - ▶ <https://tomcat.apache.org/download-90.cgi>
- JDBC driver for Azure SQL
 - ▶ <https://docs.microsoft.com/en-us/sql/connect/jdbc/download-microsoft-jdbc-driver-for-sql-server?view=sql-server-2017>



Example Web Application

We will use the below simple database consisting of a single table as an example. It can be used for keeping record of the guest who come to your movie nights:

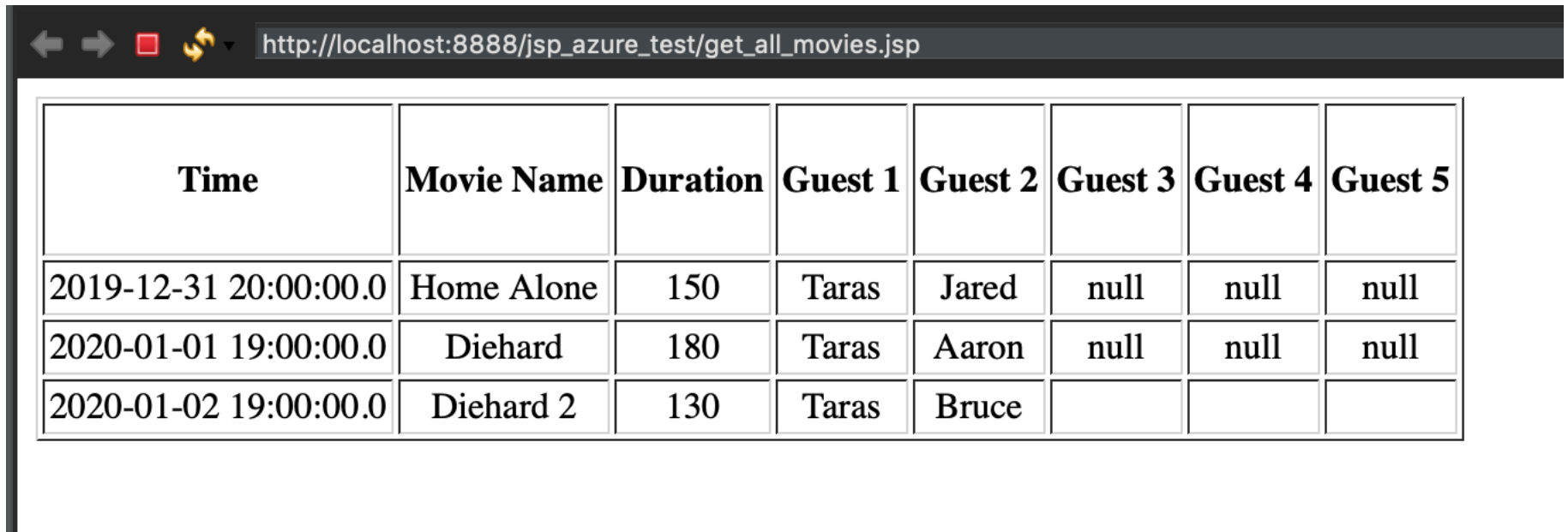
```
CREATE TABLE movie_night (  
    start_time DATETIME PRIMARY KEY,  
    movie_name VARCHAR(64),  
    duration_min INT,  
    guest_1 VARCHAR(64),  
    guest_2 VARCHAR(64),  
    guest_3 VARCHAR(64),  
    guest_4 VARCHAR(64),  
    guest_5 VARCHAR(64),  
);
```



Example Web Application

Resulting web application will consist of two web pages:

- First, to display the existing records of movie nights
- Second, to add a new movie night record



A screenshot of a web browser window. The address bar shows the URL `http://localhost:8888/jsp_azure_test/get_all_movies.jsp`. Below the address bar is a table with 8 columns: Time, Movie Name, Duration, Guest 1, Guest 2, Guest 3, Guest 4, and Guest 5. The table contains three rows of data.

Time	Movie Name	Duration	Guest 1	Guest 2	Guest 3	Guest 4	Guest 5
2019-12-31 20:00:00.0	Home Alone	150	Taras	Jared	null	null	null
2020-01-01 19:00:00.0	Diehard	180	Taras	Aaron	null	null	null
2020-01-02 19:00:00.0	Diehard 2	130	Taras	Bruce			



Example Web Application

Resulting web application will consist of two web pages:

- First, to display the existing records of movie nights
- Second, to add a new movie night record

The screenshot shows a web browser window with the address bar displaying `http://localhost:8888/jsp_azure_test/add_movie_form.jsp`. The page title is "Add Movie Night". Below the title is a form titled "Enter the Movie Night Data:". The form contains the following fields:

Enter the Movie Night Data:	
Movie night time:	<input type="text"/>
Movie Name:	<input type="text"/>
Duration:	<input type="text"/>
Guest 1 Name:	<input type="text"/>
Guest 2 Name	<input type="text"/>
Guest 3 Name	<input type="text"/>
Guest 4 Name	<input type="text"/>
Guest 5 Name	<input type="text"/>
<input type="button" value="Clear"/>	<input type="button" value="Insert"/>



Demo



End of Topic 7