INTRODUCTION TO WEB PROGRAMMING II

A
LECTURE NOTE

PREPARED

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Database

- A database is a collection of related data

- Database software, called database management system (DBMS), allows you to create a computerized database.

- A DBMS consists of a group of programs that manipulate the database and provide an interface between the database and the user or the database and other application programs.

- A database, a DBMS, and the application programs that utilize the data in the database make up a database environment.

- Understanding basic concepts of database management systems can enhance your ability to use the power of a computerized database system to support organizational IS goals.

Benefits of Database

- Data Independence
- Data Consistency
- Controlled Redundancy
- Data Integrity
- Data Security

Relational Database Concept

- The principles of the relational model were first outlined by Dr. E. F. Codd in a June 1970 paper called *A Relational Model of Data for Large Shared Data Banks*. In this paper, Dr. Codd proposed the relational model for database systems.

- Components of the Relational Model
  - ✓ Collections of objects or relations that store the data
  - ✓ A set of operators that can act on the relations to produce other relations
  - ✓ Data integrity for accuracy and consistency

- Definition of Relational Database
  - ✓ A relational database uses relations or two-dimensional tables to store information. Relational databases are organized by fields, records, and tables. A field is a single piece of information; a record is one complete set of fields; and a table is a collection of records.

- Relational DB Terminologies
  - ✓ Table
  - ✓ Row
  - ✓ Column
  - ✓ Field
  - ✓ Null value

Communication with RDBMS by using SQL

- Relational database management system or RDBMS in short is a software or environment that acts as the middleman for the user to communicate to the database. The user needs to issue the SQL statement at the RDBMS and then RDBMS will send this statement to the database and return a list of results to the user at the RDBMS interface.

- SQL (pronounced "sequel") stands for Structured Query Language. SQL is used to communicate with a database. According to ANSI (American National Standards Institute), it is the standard language for relational database management systems.

- SQL statements are used to perform tasks such as updating data on a database, or retrieving data from a database.

- SQL is used to interact with your database's data. The process is as follows:

  - ✓ SQL is entered into the system

  - ✓ SQL statement is sent to the DBMS

  - ✓ DMBS processes the SQL statement against the database

  - ✓ DBMS sends the results and the data is retrieved

SQL Statements

▶ SQL statements can be grouped into a few categories based on their functionality

  ✓ Data Retrieval Language (DRL)

  ✓ Data Manipulation Language (DML)

  ✓ Data Definition Language (DDL)

  ✓ Transaction Control

  ✓ Data Control Language (DCL)

▶ How to design the database

▶ Steps

  ✓ What is the database about?

  ✓ Tables required to store "something" of significance

  ✓ Columns required in the table

  ✓ Relationship between the tables

  ✓ Check and refine the database

Logging to the MySQL server

- To do anything with SQL, you need to log on to the MySQL database. You will need
  - ✓ Username
  - ✓ Password
- You will also need *privileges* to carry out a task. Privileges are required to create tables and manipulate them later in the unit.
- To login to MySQL database engine, open a command prompt and type the following command:
  - ✓ mysql –u username –p   then press enter
  - ✓ Type the password that you set when you are installing the MySQL and press enter

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Command Prompt - mysql  -u salsafh -p

Microsoft Windows [Version 10.0.15063]
(c) 2017 Microsoft Corporation. All rights reserved.

C:\Users\Muhammad>mysql -u salsafh -p
Enter password:
```

Creating & Selecting the current Database

- Upon login, the next process is to create a database. The dataset acts as a container for a set of tables. For MySQL, each table must also be created within an existing database.

- We will create a database for the tennis club.

- A MySQL database server can offer access to more than one database. The user must specify the database which he/she wants to work with. This is called the current database. You must specify the dataset which you want to work with.

- Make the database current (type: **use db_name** and press enter).

Data Types

Data Type	Description
Integer	Stores whole number
Float	Stores approximate numeric value
String	Handles alphanumerical value
Text	Treats values as character strings
Logical	Boolean type of value.
Date	For year, month and day
Time	Handles hour, minute and second

Creating Tables

- Databases in MySQL are made up of database **objects**. The best-known and most important database object is probably the *table*.

- You will encounter simple data types; this lesson covers only the character, date, and numeric data types. There are other data types.

players

Column	Type	Null	Default
PLAYERNO	int(11)	No	
NAME	char(15)	No	
INITIALS	char(3)	No	
BIRTH_DATE	date	Yes	*NULL*
SEX	char(1)	No	
JOINED	smallint(6)	No	
STREET	varchar(30)	No	
HOUSENO	char(4)	Yes	*NULL*
POSTCODE	char(6)	Yes	*NULL*
TOWN	varchar(30)	No	
PHONENO	char(13)	Yes	*NULL*
LEAGUENO	char(4)	Yes	*NULL*

Insert Statement

▶ Once the table is ready, we can start to insert data into it. This is achieved via the Insert statement.

▶ There are 3 main components to an insert statement:

✓ The name of the table to add the data into

✓ The names of the columns in the table to be populated

✓ The values with which to populate the columns

Data Manipulation Language DML

- There are four (4) under the DML categories
    1. SELECT
    2. INSERT
    3. UPDATE
    4. DELETE