MySql

Objective

In this chapter learner able to understand:

- Defining a Relational Database
- Web Database Design
- Web Database Architecture
- Creating MySQL Database
- Creating Database Table
- Column Data Types
- What is SQL?
- Implementing Insert/Update/Delete and Select Query

Defining a Relational Database

Relational Databases is powerful because it describes about how it will be extracted or how data is related from the database.

Guidelines for Primary Keys and Foreign Keys

- In primary key, no duplicate values are allowed.
- Primary keys usually cannot be changed.
- Foreign keys are based on data values also are merely logical, not physical pointers.
- A foreign key value must match with an existing unique key value or primary key value or else be null.
- You cannot define foreign keys without existing unique / primary keys.

A Relational Database :

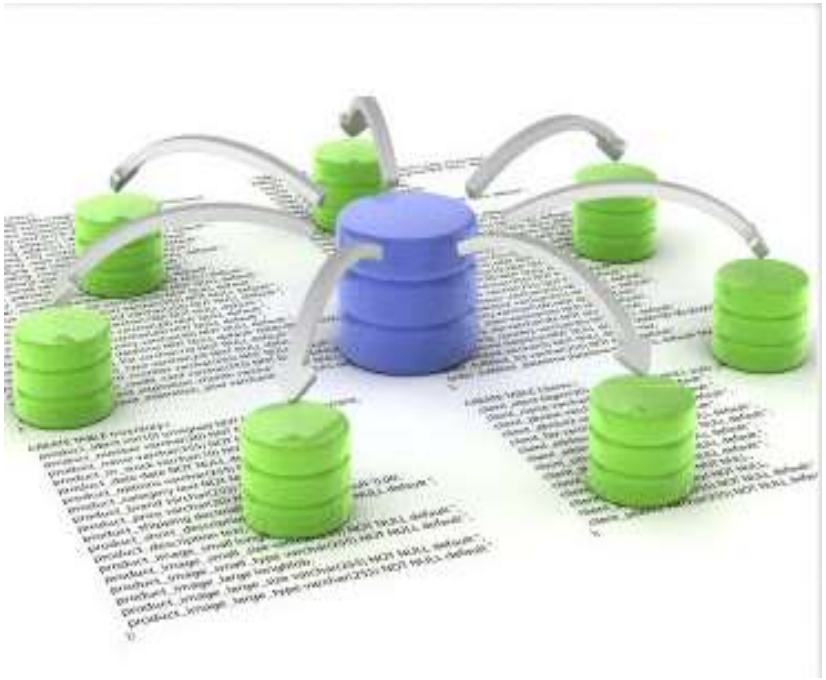
It can be accessed and modified by executing SQL (structured query language) statements and

It contains a collection of tables without physical pointers

Web Database Design

For all database designs, there is set of standard rules and best practices to follow, which may help to database hold organized with the respective site in an efficient and smart way.

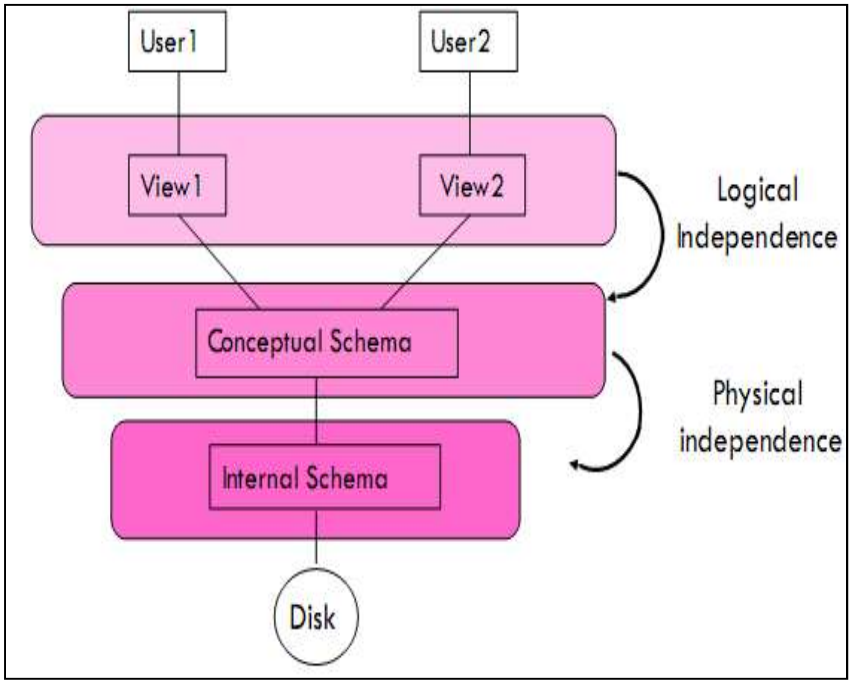
By using the combination of PHP, MySQL, and JavaScript, you can design your website as an interactive way to access the information.



Web Database Architecture

They are 1-tier, 2-tier and 3-tier architectures. All three architectures have different significance as follow.

- Architectures have the same components
  - Presentation
  - Business/Logic
  - Data
- Architectures try to separate the components into different tiers/layers
  - Tier: physical separation
  - Layer: logical separation



About Data

Data is the most important part for any Organization.

Basic need is to store it properly.

There should be some security for the data.

Data retrieval should be more synchronized.

About Database

Database provides a base to the data, in which data can be stored.

Database is used to store the similar data together.

To store data in an efficient way, it is necessary to manage the database properly.

It contains some database objects which is be used to deal with the data.

Database Objects

Collection of database objects forms a database.

There are several objects, which have there own tasks to perform.

Some database objects are:

Tables

Views

Procedures

Triggers

About Tables

Table is used to store data.

It is the most important part of the database.

It actually gives a structure to the database.

More About Tables

Table's structure is a combination of rows and columns.

Row represents a complete record, also known as 'Tuples'.

Columns represent distinct fields, also known as 'Attribute'.

Tables are used to store data because it is easy to manage and retrieve data from a tabular format.

Database Management System

Popularly called “DBMS”.

It is an ancient way to design a database.

It is way to structure your database.

Initially database was organized according to DBMS.

Major Drawbacks

Data Redundancy: There were no ways to check whether a particular data already exists or not, which causes the multiple existence of same data.

Data Inconsistency: If a particular data is updated or deleted from one table, the changes were not reflected in the related tables.

Evolution of RDBMS

A Research Scientist in IBM, Dr. E.F.Codd gave the concept of RDBMS in June 1970.

Dr. E.F.Codd gave 12 rules to distinguish, whether a database is DBMS or RDBMS.

The relational model consists of the following:

Collection of objects or relations

Set of operators to act on the relations

Data integrity for accuracy and consistency

SQL

SQL stands for Structured Query Language. It is used for managing data in relational database management system which stores data in the form of tables and relationship between data is also stored in the form of tables.

Constructs of SQL

Queries : Retrieves data against some criteria.

Statements : Controls transactions, program flow, connections, sessions, or diagnostics.

Clauses : Components of Queries and Statements.

Expressions : Combination of symbols and operators and key part of the SQL statements.

Predicates : Specifies conditions.

Types of SQL

Data manipulation: The Data Manipulation Language (DML) is the subset of SQL which is used to add, update and delete data

.

Data definition: The Data Definition Language (DDL) is used to manage table and index structure. CREATE, ALTER, RENAME, DROP and TRUNCATE statements are to name a few data definition elements.

Types of SQL

- **Data control :**The Data Control Language (DCL) is used to set permissions to users and groups of users whether they can access and manipulate data.
- **Transaction:** A transaction contains number of SQL statements. After the transaction begins, all of the SQL statements are executed and at the end of the transaction, permanent changes are made in the associated tables.
- **Procedure:** Using a stored procedure, a method is created which contains source code for performing repetitive tasks.

What is MySQL?

MySQL, the most popular Open Source SQL database management system, is developed, distributed, and supported by MySQL AB.

MySQL AB is a commercial company, founded by the MySQL developers.

The data in MySQL is stored in database objects called tables.

A table is a collections of related data entries and it consists of columns and rows.

Like:-

A company may have a database with the following tables: "Employees", "Products", "Customers" and "Orders".

Create a Database

- The CREATE DATABASE statement is used to create a database in MySQL.

Syntax

CREATE DATABASE database_name

1) Creating a database
mysql> **CREATE database emp;**

2) Deleting a database
mysql> **DROP database emp;**

Loading Data into a Table

LOAD DATA LOCAL INFILE '/path/abc.txt' INTO TABLE pet;

If you created the file on Windows with an editor that uses \r\n as a line terminator, you should use this statement instead:

```
mysql> LOAD DATA LOCAL INFILE '/path/abc.txt' INTO TABLE pet
-> LINES TERMINATED BY '\r\n';
```

Creating Table

After we have created the database we use the USE statement to change the current database;

USE emp;

Database changed

Creating Table

Creating a table in the database is achieved with the CREATE table statement :-

CREATE TABLE emp_detail (emp_id varchar(10),emp_name varchar(30),emp_age int,emp_add varchar(100));

Examining the Results

To see what tables are present in the database use the SHOW tables:

SHOW tables;

```
+---------------+
| Tables_in_emp |
+---------------+
| emp_detail |
+---------------+
1 row in set (0.00 sec)
```

Examining the Results

The command DESCRIBE can be used to view the structure of a table

DESCRIBE emp_detail;’

```
+---------------+---------------------+----------------+---------------+---------------+--------------
|Field          |Type                 |Null            |Key            |Default        |Extra
|
+---------------+---------------------+----------------+---------------+---------------+--------------
| emp_id        | varchar(10)         | YES            |               | NULL          |
| emp_name      | varchar(30)         | YES            |               | NULL          |
| emp_age       | int(11)             | YES            |               | NULL          |
| emp_add       | varchar(100)        | YES            |               | NULL          |
```

Inserting / Retrieving Data

To insert new rows into an existing table use the INSERT command:

Mysql >

INSERT INTO emp_detail values (‘1001',‘Rajesh’,28,’127 Sec 62 NOIDA’);

Inseting values in specific column:-

INSERT INTO emp_detail (emp_id,emp_name) values(‘1001',‘Amit’);

Retrieving Data from Tables

- **Selecting Record:-**

  SELECT * FROM emp_detail;
- **Selecting Specific Rows and Columns :-**

  SELECT * FROM emp_detail WHERE emp_id=‘1001’;

Retrieving Data from Tables

Selecting specific columns by listing their names:-

SELECT emp_id, emp_name, emp_add FROM emp_detail;

Deleting Rows

Deleting selected rows from a table using the DELETE command:-

DELETE FROM emp_detail WHERE emp_name=‘rajesh’;

Deleting all rows of a table-:

DELETE FROM emp_detail ;

Updating Rows

To modify or update entries in the table use the UPDATE command :-

UPDATE emp_detail SET emp_add='hemant vihar Delhi' WHERE emp_name='rajesh';

Updating more than one column:-

UPDATE emp_detail SET emp_add='hemant vihar Delhi',emp_age=30 WHERE emp_name='rajesh';

More on SELECT

Operator:-

Comparison operators are:

< ; <= ; = ; != ; >= ; >

Logical operators are:

AND ; OR ; NOT

Comparison operator for special value NULL: IS

More on SELECT (cont.)

The following MySQL query will return all the fields for the emp_detail whose name field is ‘rajesh’;

```
SELECT * FROM emp_detail WHERE emp_name=‘rajesh’;
```

More on SELECT (cont.)

We can limit the values of the returned fields as it is shown bellow:

```
SELECT emp_name, emp_add FROM emp_detail WHERE emp_age=30;
```

More on SELECT (cont.)

The following entry SELECT will return the last name and
Note: The comparison operator will not work in this case:
SELECT * FROM emp_detail WHERE emp_add = NULL;

SELECT * FROM emp_detail WHERE emp_add is NULL;

ORDER by Clause with select

The following command will select the employee who was born first

For Ascending Order:-

SELECT * from president ORDER BY emp_age ASC ;

For Descending Order:-

SELECT * from president ORDER BY emp_age DESC ;

Chapter Summary

In this chapter, you have learned:

- Relational Database Management System (RDBMS) is the basis on SQL statement and is a feature for all modern database systems.
- In RDBMS, the data is stored in database objects, which is called as tables.
- Table is the basic storage design structure of an RDBMS.
- Each table in database contains data that describes exactly one entity.
- The database can be updated / modified by using the SQL statements.
- MySQL uses many different data types, divided into three sections: numeric, date and time, and string types.
- SQL consists of three major language components: Data Definition Language (DDL), Data Manipulation Language (DML), and Data Control Language (DCL).

Thank you