

## \* MySQL

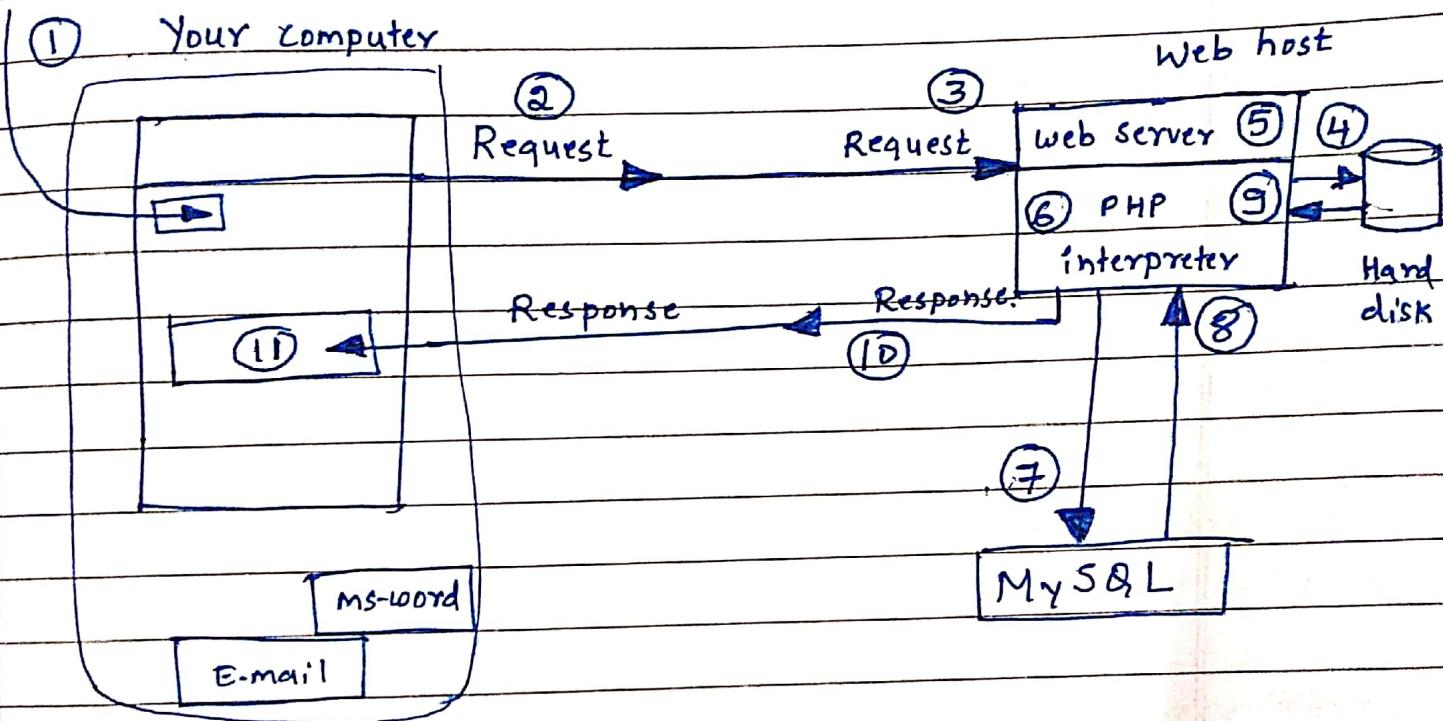
MySQL is the most commonly used database program for developing database-driven websites with PHP. MySQL is an open source database, it is free that runs on a majority of operating systems such as UNIX, Linux, Macintosh and Windows.

### Features or Characteristics of MySQL.

- Easy to Use: It is relatively easy to use and administer database system.
- Consistency: It is the world most popular open source database because of its consistent fast performance and high reliability.
- Large Community Developers: MySQL is relatively safe choice of large community of other developers who are building applications around it.
- Open Source License: MySQL is free to use as long as you do not bundle it with your commercial product.
- Commercial License: If user want to develop a commercial application with a MySQL database server, then user must purchase the License from MySQL.
- Scalability: It supports larger or smaller volumes of data and more or fewer users without degrading performance and less cost.
- It uses standard SQL
- It is developed, distributed and supported by oracle.

## \* Client - Server , Databases . Architecture :

<http://login.php>



If the website with database is to be made available to customers around the world (exa: www.gmail, facebook, whatsapp etc), then RDBMS is best to design client/server database.

These servers runs 24/7 to receive requests and give response. User can send requests from anywhere at all time. MySQL is one of the most popular client/server database systems.

→ The user requests a page from the browser and an HTTP connection is made to the server where the request is received and handled.

→ The web server starts up the PHP interpreter and process the script. and connect the database.

- Once the connection is made, the PHP program access to the database through the MySQL server.
- When it receives the request called queries from the PHP program and sends back information collected from the database using tables.
- Send the information back to the web server where it is relayed to the browser where the whole process started.

## \* RDBMS : Relational DataBase Management System.

"RDBMS is a collection of organized set of tables and ~~relations~~ related to each other where data can be accessed easily."

Relations are established using primary keys or foreign keys.

- It is based on the Relational Model introduced by E.F. codd.
- It is a server that store and manages huge volume of data.
- It is a basis for SQL, and all modern database system like MS-SQL; IBM DB2, Oracle, MySQL & MS-access.

The components of RDBMS are

- \* Database server.
- \* Database.
- \* Tables
- \* Records and fields
- \* Primary key & Foreign Keys
- \* Schema.

Database Server: The database server is the actual server that processes running the database. It controls the storage of the data, grants access to users, updates and delete records and communicates with other servers. It is a dedicated server.

Database:- A Database is collection of related data elements in tables.

Schema: Schema describes the structure of the database and design of the database similar to a blueprint.

Tables:- A table is a collection of data in terms rows and columns. It is the actual container of the data and all operations are performed on the table.

A relational database manipulates only on tables, and the result of all operations are also tables.

### Record and Field

A single row in a table is called record, each rows contains equal number of field.

The column heading is called field or attribute.

\* The properties of an entity is called an attribute.

Primary Key: A primary key is a unique identifier for each record. The values cannot occur twice.

A primary key is identified at the time of table creation.

Foreign Key : A key which refers the values present in the primary key is called foreign key.

\* MySQL Data Types : Datatype defines the type of data that column can hold. Each column in a table is required to have a datatype.

There are 3 main datatypes.

- Numeric datatypes
- Text or string datatypes
- Date datatypes.

Numeric datatype.

<code>int(size)</code>	It accept integer values in the range of -2147483648 to 2147483647.
<code>smallint(size)</code>	It accept integer values from -32768 to 32767.
<code>float(size, d)</code>	A small number with a floating decimal point. The maximum number of digits may be specified in the <u>size</u> parameter. The decimal point is specified in the <u>d</u> parameter.
<code>double(size, d)</code>	It support for floating-point or decimal numbers.

→ Text or string datatypes.

char(size)	It holds a fixed length string. It can store upto 255 characters.
Varchar(size)	It holds a variable length string. It can stores up to 255 characters.
Text	It holds a string with a maximum length of 65,535 characters.
BLOB	Binary Large Objects. holds up to 65,535 bytes.

→ Date datatypes

Date()	It contains date. Format YYYY-MM-DD
Time()	It contains date. Format HH:MM:SS.
Year()	It <del>yes</del> contains year either YYYY or YY format.
Datetime()	It contains a date and time combination. Format YYYY-MM-DD HH:MM:SS.
Timestamp()	It stored as the number of seconds Format YYYY-MM-DD HH:MM:SS.

### \* phpMyAdmin Features :

- PhpMyAdmin is a free and open source software written in PHP design to handle the administration of MySQL.
- It is a web based MySQL administration tool.
- It is widely used in web hosting around the world
- It is very stable and rich in features.
- It is very easy to use, it contains point-and-click interface.
- It is a browser based, allowing you to easily manage remote MySQL databases from anywhere.

- Administrators can exercise complete control over user privileges, passwords, and resource usage.
- Developers from around the world have translated PhpMyAdmin's into 50 languages.
- Import data from CSV and SQL
  - CSV: Comma Separated Value.
  - SQL: Structured Query Language.
- Export data to various formats like CSV, SQL, XML, PDF, ISO/IEC, spreadsheet, word etc
- Create complex queries using Query-by-Example
- Support for most MySQL features on click
  - Browse and drop database, tables, views ..
  - create, copy, drop, rename and alter tables.
  - maintenance server, database & tables
  - execute, edit & bookmark any SQL statement
  - Manage MySQL user accounts & privileges.

## \* Introduction to SQL.

Structured Query Language is the standard language used to communicate with RDBMS, add or change records and user privileges and perform queries.

The SQL is an ANSI Standard, all popular databases use SQL.

SQL contains 3 main types of commands.

- DDL : Data Definition Language.
- DML : Data Manipulation Language.
- DCL : Data Control Language.

## Structured Query Language.

SQL is Structured Query Language, which is a database language for storing, manipulating and retrieving ~~to~~ data stored in database.

It includes database creation, deletion, retrieving and modifying rows etc.

Exa: MySQL, MS Access, Oracle, Sybase.

### SQL Commands.

These commands are used to interact with the database.

It can be classified into :

1. DDL [ Data Definition Language.]
2. DML [ Data Manipulation Language]
3. DCL [ Data Control Language]
4. DQL [ Data Query Language].

1. DDL: DDL defines the conceptual schema providing a link between the logical and the physical structures of the database.

"The logical structure of a database is called Schema".

Functions of DDL

- \* It defines the physical characteristics of each record, datatype, size, logical name etc.
- \* It describes the schema & indicates the keys.
- \* It provides data security.

Exa: Create, Alter, Drop.

(9)

Create: It is used to create a new table, view of table and other object in database.

Alter: It modifies an existing database object, and table.

Drop: It Deletes an entire table or other object in the database.

### Create syntax.

```
create table tablename
(
    column1 datatype(size),
    column2 datatype(size),
    column N datatype(size)
);
```

Ex :-

```
student ( name: varchar(10), regno: varchar(10),
          DOB: date, marks: number(10) )
```

Create table student

```
( name varchar(10),
  regno varchar(10) primary key,
  DOB date,
  marks number(10) );
```

## Alter Syntax:

Syntax:-

**Alter table table-name (column-name datatype(size));**

Exq:-

\* Alter table student modify(name varchar(20));

\* Alter table student Add(course varchar(10));

Drop syntax: It removes a table definition and all data. It cannot be recovered.

Syntax: Drop table table-name;

Exq: Drop table student;

DML: It provides the data manipulation techniques like insertion, deletion, update the records.

\* It gives the relationship between records.

Exq:- INSERT, DELETE, UPDATE.

INSERT: It is used to add new rows of data to a table in the database. we must maintain the same order of the values is in the same order as the columns in the table.

**Insert into table-name Values ('<column1>', '<column2>',  
'<column3>', ... '<column N>');**

Exq:-

Insert into Student values('Ramu', '100', '22-Jan-1998',  
'65', 'PCM&B');

Delete : It is used to delete the existing data from the table.

We can use WHERE clause with delete to delete selected rows, otherwise all the records will be deleted.

Syntax:

**DELETE From table-name**

**WHERE [condition];**

Ex:- Delete from student

where name='Ramu';

UPDATE :- It is used to modify the existing records in a table.

We can use WHERE clause with UPDATE to update selected rows, otherwise all the rows will be affected.

Syntax:

**UPDATE table-name**

**SET column1='Value', column2='Value', ... , columnN='Value'**

**WHERE [condition];**

We can combine N number of conditions using

AND or OR operators.

Ex:-

Update student

Set marks=85

Where name='Ramu';

DCL: It is used to enforce database security in a multiple user database environment.

Only DBA of the database can provide or remove privileges on a database object.

Exq: GRANT, REVOKE

1. GRANT COMMAND: It is used to provide access or privileges on the database objects to the users.

Syntax:-

GRANT Privilege-name  
ON object-name  
TO user;

Exq  
GRANT Select  
ON employee  
TO user1;

It gives select option to the user1 in employee table.

2. REVOKE COMMAND: It is used removes user access rights or privileges to the database objects.

Syntax:

REVOKE privilege-name  
ON object-name  
From user;

Exq  
REVOKE select  
ON employee  
From user1;

It removes the select option from user1 in employee table.

COMMIT Command: It is the transactional command used to save changes by a transaction to the database.

## Aggregate [group/built-in] SQL functions:

These functions operate on groups of rows and return one value for the entire group.

Exa: Count, MAX, MIN, AVG, SUM, DISTINCT.

1. **Count()**: This function returns the number of rows in the table that satisfies the condition in the where clause.

If where clause is not specified then it returns the total number of rows in the Table.

2. **MAX()**: It is used to get the maximum value from a column.

3. **MIN()**: It is used to get the minimum value from a column.

4. **Avg()**: It is used to get a average value of a numeric column.

5. **SUM()**: It is used to get the sum of numeric column.

6. **DISTINCT()**: It is used with SELECT statement to eliminate all the duplicate records and fetching only unique records.

## Employee

Name	id	salary	dno
Arun	101	25000	1
Mohan	102	32000	2
Shyla	103	25000	1
Sahana	104	40000	2
Monika	105	35000	3

Exq. ① Select count(\*)  
From employee

count(\*)

② Select count(\*)  
From employee  
where salary > 25000

count(\*)

③ Select Distinct(salary)  
From employee

Distinct(salary)

25000  
32000  
40000  
35000

④ Select sum(salary), max(salary), min(salary)  
From employee;

sum(salary)	max(salary)	min(salary)
157000	40000	25000

SQL JOIN: A JOIN clause is used to combine rows from two or more tables, based on a related column between them.

### Types of JOIN

1. Inner join: The inner join keyword selects records that have matching values in both tables.  
\* Each table contain the common field.

Syntax: Select column\_names  
From table1 Inner Join table2  
ON table1.column\_name = table2.column\_name;

2. Left Join: The left join keyword returns all records from the left table and the matched records from the right table.  
The result is NULL from the right side, if there is no match.

Syntax: Select column\_names  
From table1 Left Join table2  
ON table1.column\_name = table2.column\_name;

3. Right Join: The right join keyword returns all records from the right table and the matched records from the left table.

The result is NULL from the left side if there is no match.

Syntax: Select column\_names  
From table1 Right Join table2  
ON table1.column\_name = table2.column\_name;

4. Full outer Join : The Full outer join keyword returns all records when there is a match in either left or right table.

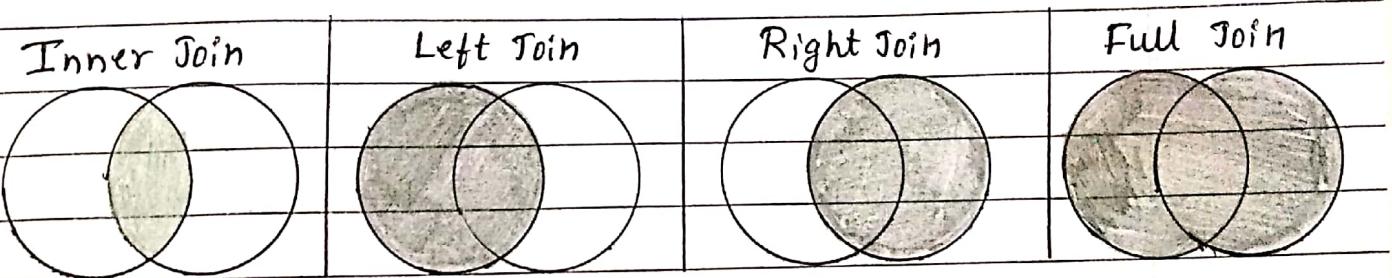
The result will contain all the rows from both tables.

The rows for which there is no matching, the result-set will contain NULL values.

Syntax : Select column-names

From table1 InnerJoin table2

ON table1.column-name = table2.column-name ;



Ex :-

Table 1

Table 2

Name	Job		Name	Hobby
Radha	Engineer		Priya	Singer
Anil	Doctor		Radha	Dancer
Pavan	Teacher		Pavan	Painter

1. Inner Join

Name	Job	Hobby
Radha	Engineer	Dancer
Pavan	Teacher	Painter

## 2. Left JOIN.

Name	Job	Hobby
Radha	Engineer	Dancer
Anil	Doctor	-
Pavan	Teacher	Painter

## 3. Right JOIN

Name	Job	Hobby
Priya	-	Singer
Radha	Engineer	Dancer
Pavan	Teacher	Painter

## 4. Full JOIN

Name	Job	Hobby
Radha	Engineer	Dancer
Anil	Doctor	-
Pavan	Teacher	Painter
Priya	-	Singer

## \* PHP MySQL Database Functions,

1. mysqli\_connect() :- i indicates improved version of mysqli.

mysqli\_connect() function is used to connect to a MySQL database server. It opens a new connection to the MySQL server.

Syntax :

```
$db-handle = mysqli_connect($servername, $username,  
$password, $databaseName);
```

"\$db-handle" is the database connection resource variable.  
"servername" is the name or IP address of the server  
hosting MySQL Server

"\$username" is a valid user name in MySQL Server  
"\$password" is a valid password associated with a user name  
"\$databaseName" is the name of the database.

2. mysqli\_select\_db(); This function is used to  
Select a database.

Syntax:

```
mysqli_select_db($db-handle, $databaseName);
```

It returns true or false.

3. mysqli\_query(); This function is used to execute  
queries.

It can execute Insert, Delete, Update, Select.

Syntax:

```
mysqli_query($db-handle, $query);
```

"\$query" is the SQL query to be executed.

4. mysqli\_num\_rows(); This function is used to get  
the number of rows returned from a select  
query.

```
mysqli_num_rows($result);
```

5. `mysqli_fetch_array()`; This function is used to fetch row array from a query result set.

`mysqli_fetch_array($result);`

'\$result' is the result returned by the `mysqli_query` function

6. `mysqli_close()`; This function is used to close an open database connection.

`mysqli_close($db_handle);`

7. `mysqli_error()`; It returns the description of the last error.

## \* Connecting to a MySQL database:

PHP provides 2 main ways to connect to MySQL database.

1. Mysqli (MySQL improved):- It provides the complete access to MySQL from PHP. It has both procedural and object-oriented interfaces. It has a large set of functions and classes. It is a good choice.

2. PDO (PHP Data Objects):- This is an Object-oriented extension that sits between the MySQL Server and the PHP engine. PDO will work on 12 different database systems, whereas Mysqli will work only with MySQL database.

\* The following examples opens a server and  
create a database named "student"

The create database statement is used to create  
a database in MySQL.

All queries must be enclosed within a " " ;

```

<?php
$servername = "localhost";
$username = "username";
$password = "";
$con = mysqli_connect("$servername", "$username",
                      "$password");
if ($con->connect_error)
{
    die ("connection failed");
}
$sql = " create database student";
if ($con->query($sql) == TRUE)
{
    echo "Database created successfully";
}
else
{
    echo "error";
}
$con->close();
?>

```

\* The following code to create a table in PHP.

```
<?php
```

```
$con = mysqli_connect("localhost", "username", "", "student");
if ($con->connect_error)
{
    die ("connection failed");
}

$sql = "create table stu
        ( sid int(6) primary key,
          name varchar(20),
          gender varchar(5));
if ($con->query($sql) == TRUE)
{
    echo "Table created";
}
else
{
    echo "Error";
}
$con->close();
?>
```

NOTE: Read All lab programs to theory also.