Practical -1 Introduction to MYSQL and Create Datbase,Table

- **MySQL Introduction**

MySQL was developed by Michael Widenius and David Axmark in 1994. Presently MySQL is maintained by Oracle (formerly Sun, formerly MySQL AB).

- **Reasons of popularity**
    - MySQL is an open-source database
    - MySQL supports large databases, up to 50 million rows or more in a table, Default size limit is 4 GB and it can be extends upto 8 TB for a table.
    - MySQL uses a standard form of the well-known SQL data language.
    - MySQL is very friendly with PHP, the most popular language for web development.

- **MySQL Features**
    - MySQL is a relational database management system.
    - Easy to use: MySQL is easy to use. You have to get only the basic knowledge of SQL.
    - It is secure: MySQL consist of a solid data security layer that protects sensitive data from intruders. Passwords are encrypted in MySQL.
    - Client/ Server Architecture: MySQL follows a client /server architecture. There is a database server (MySQL) and arbitrarily many clients (application programs), which communicate with the server; that is, they query data, save changes, etc.
    - Allows roll-back: MySQL allows transactions to be rolled back, commit and crash recovery.
    - High Performance: MySQL is faster, more reliable and cheaper because of its unique storage engine architecture.
    - High Flexibility: MySQL supports a large number of embedded applications which makes MySQL very flexible.
    - High Productivity: MySQL uses Triggers, Stored procedures and views which allows the developer to give a higher productivity

Numeric Datatype of MySQL

DATATYPE	MAX SIZE
INT	A normal-sized integer that can be signed or unsigned. If signed, the allowable range is from -2147483648 to 2147483647. If unsigned, the allowable range is from 0 to 4294967295. You can specify a width of up to 11 digits.
TINYINT	A very small integer that can be signed or unsigned. If signed, the allowable range is from -128 to 127. If unsigned, the allowable range is from 0 to 255. You can specify a width of up to 4 digits.
SMALLINT	A small integer that can be signed or unsigned. If signed, the allowable range is from -32768 to 32767. If unsigned, the allowable range is from 0 to 65535. You can specify a width of up to 5 digits.
BIGINT	A large integer that can be signed or unsigned. If signed, the allowable range is from -9223372036854775808 to 9223372036854775807. If unsigned, the allowable range is from 0 to 18446744073709551615. You can specify a width of up to 20 digits.
FLOAT(m,d)	You can define the display length (m) and the number of decimals (d). This is not required and will default to 10,2, where 2 is the number of decimals and 10 is the total number of digits (including decimals). Decimal precision can go to 24 places for a float.
DOUBLE(m,d)	(d). This is not required and will default to 16,4, where 4 is the number of decimals. Decimal precision can go to 53 places for a double.

Date & Time Datatypes

DATATYPE	MAX SIZE	EXPLANATION
DATE	Values range from '1000-01-01' to '9999-12-31'.	Displayed as 'yyyy-mm-dd'
DATETIME	Values range from '1000-01-01 00:00:00' to '9999-12-31 23:59:59'.	Displayed as 'yyyy-mm-dd hh:mm:ss'.
TIME	Values range from '-838:59:59' to '838:59:59'.	Displayed as 'HH:MM:SS'

String Data Types:

DATATYPE	MAX SIZE	EXPLANATION
CHAR(size)	Maximum size of 255	Where size is the number of characters to store. Fixed-length strings. Space padded

		on right to equal size characters.
VARCHAR(size)	Maximum size of 255 characters.	Where size is the number of characters to store. Variable-length string.
TEXT(size)	Maximum size of 65,535 characters	Where size is the number of characters to store
LONGTEXT(size)	Maximum size upto 4 GB characters	Where size is the number of characters to store.
VARBINARY(size)	Maximum size of 255 characters.	Where size is the number of binary characters to store. Variable-length string.
ENUM	It takes 1 or 2 bytes that depend on the number of enumeration values. An ENUM can have a maximum of 65,535 values	It uses numeric indexes (1, 2, 3…) to represent string values

Large Object Data Types (LOB) Data Types:

DATATYPE	MAX SIZE	EXPLANATION
TINYBLOB	Maximum size of 255 bytes.	
BLOB(size)	Maximum size of 65,535 bytes.	Used to store the image in database

MySQL Create Database and Table

- Create Database

  It will create the database in MySQL

  Syntax : CREATE DATABASE [IF NOT EXISTS] database_name

  The database name must be unique within the MySQL er instance.

  you can specify **IF NOT EXISTS** option. In this case, MySQL does not issue an error but terminates the CREATE DATABASE statement instead.

  If you omit the CHARACTER SET and COLLATE clauses, MySQL uses the default character set and collation for the new database. It is optional

e.g : mysql> CREATE DATABASE testdb;

- Show the databases

  Syntax : SHOW DATABASES;

e.g mysql> show databases;

output : information_schema
mysql
performance_schema
sys
testdb

Syntax : SHOW DATABASES [like pattern];

Show only those database which match the pattern

e. g : mysql > show databases like 't%' ;

shows all database whose name start with charater 't'
output : test
testdb

- Use of Database

For using created database
Syntax : USE <database name>;
e.g mysql> use testdb;

SELECT DATABASE();
shows currently selected database.

- Delete Database

The DROP DATABASE statement drops all tables in the database and deletes the database permanently.
Syntax : DROP DATABASE [IF EXISTS] database_name;

DROP SCHEMA [IF EXISTS] database_name;
e.g drop database if exists test;
To prevent an error from occurring if you delete a database that does not exist, you can use the IF EXISTS option

e.g drop schema testdb;
show databases;

- Create Table

- Creating table inside the current database. It is used to define a schema of the table.
- Create table syntax also contains the constraints and it also show the relationship between two table.

  Syntax : CREATE TABLE [IF NOT EXISTS] table_name(column_ name datatype [constraint] ,
  Column_name datatype [constraint] ,
  Column_name datatype [constraint]);

  Table name must be unique in the database
  If not exists : will create table only table_name is not exists into database. If it is exists it will stop executing the query.

  E.g create table test(no tinyint(2) , name varchar(20));

e.g CREATE TABLE if not exists publisher(
pub_id varchar(8),
pub_name varchar(50),

pub_city varchar(25),
country varchar(25),
country_office varchar(25),
no_of_branch int(3),
estd date);

e.g CREATE TABLE shirts (name VARCHAR(40),
size ENUM('x-small', 'small', 'medium', 'large', 'x-large'));

- Shows tables of the database
  Display list of tables available in current selected database.
  Syntax : show tables;
- Checking a structure of a table
  MySQL DESCRIBE statement is used to show the structure/schema of the created table.

Syntax : DESCRIBE <table_name>;

e.g DESCRIBE test ; // test is a table name

DESCRIBE publisher ;

Output:

```
+---------------+------------+------+-----+---------+-------+
| Field         | Type       | Null | Key | Default | Extra |
+---------------+------------+------+-----+---------+-------+
| pub_id        | varchar(8) | YES  |     | NULL    |       |
| pub_name      |varchar(50) | YES  |     | NULL    |       |
| pub_city      |varchar(25) | YES  |     | NULL    |       |
| country       |varchar(25) | YES  |     | NULL    |       |
| country_office | varchar(25) | YES  |     | NULL    |       |
| no_of_branch  | int        | YES  |     | NULL    |       |
| estd          | date       | YES  |     | NULL    |       |
+---------------+------------+------+-----+---------+-------+
```

- Insert values into table.

  Insert one or more records/rows into table.

  Syntax : INSERT INTO table_name(c1,c2,...)
  VALUES
  (v11,v12,...),
  (v21,v22,...),
  ...

  (vnn,vn2,...);

  In this syntax, rows are separated by commas in the VALUES clause.

  Table_name : name of the table
  (c1,c2,..) : Are all column names of the table for which values to be inserted
  (v11,v12,..) : Are the actual values of respective column(c1,c2) {sequence is important}
  Text/char datatype columns value inserted with single quote ‘ ‘
  Multiple row can be inserted at same time, it rows are separated by commas in Value clause.

  E.g Insert single row

```
insert into test(no,name) values(1,'xyz');
```

  2. insert multiple row

```
insert into test(no,name) values(2,'aaa'),(3,'bbb'),(4,'ccc');
```

Exercise :

1. Define the data-type and size for the following information.

    - Name of the person
    - Birthdate of the person
    - Salary of the person
    - Age of the person
    - Student percentage
    - Category of Students(Open,SEBC,SC,ST)

2. **Create Database Bank.**
   Create Table Account

Column Name	Data Type	Size	default	NoT NULL
Accno	Bigint	12		YES
Name	varchar	20		YES
City	varchar	15		YES
Balance	int			YES
Mobno	Bigint			
Accounttype	Enum			

Account_type can be S**aving, current ,fixed**

3 . Insert 7 records into the database