

Birla Institute of Technology & Science, Pilani, K. K. BIRLA Goa campus
Database Systems and Applications (IS F243)
Second Semester 2012-2013

Lab-1

To study DDL, DML and DQL commands.

Introduction: SQL stands for Structured Query Language. It was invented & developed by IBM in the early 1970's. SQL is a standard language common to all relational databases. It is actually a database language. A table is a primary database object of SQL.

Through MYSQL we can

- enter, edit, store, retrieve and run SQL commands and PL/SQL blocks.
- format, perform calculation, store, & print query results.
- list column definitions for any table.
- access and copy data between SQL databases.
- send/accept messages from/to the end user.

With SQL we can:

- Create tables in the database
- Store data
- Retrieve data
- Change data and change the structure of the underlying tables
- Combine and calculate data
- Provide security

Types of SQL commands:

Data Definition Language (DDL) Commands

CREATE TABLE
CREATE INDEX
CREATE VIEW
DESC
ALTER TABLE
DROP DATABASE
DROP TABLE
TRUNCATE

Data Manipulation Language (DML) Commands

DELETE
INSERT
UPDATE

Data Query Language (DQL) Commands

SELECT

Conventions used:

Keywords in syntax is shown in bold letters.

Words in syntax between '<' and '>' are name of the table or column given by user.

Words in syntax between '[' and ']' are optional.

DDL COMMANDS

Creating Database:

Syntax to create a database

create database <database name>;

Example:

mysql> create database mydb;

Note: User can create database only if DBA has assigned the permission for creating the database.

Today for practice session 'test' database is created for you. You have to use this database and create tables in it.

Using Database:

Syntax to use a database

use <database name>;

Example:

mysql> use mydb;

Note: For today's lab you use test database.

Listing Databases:

Syntax:

show databases;

Listing tables in current database:

Syntax:

show tables;

Creating tables:

Syntax to create a table

create table <table name> (column definition 1, column definition 2, ,);

Example:

mysql> CREATE TABLE students (id CHARACTER (12),

-> name VARCHAR(30),

-> hostel INTEGER NOT NULL,

-> percentage DECIMAL(5,2) DEFAULT 0.0,

-> phone INTEGER,

-> bdate DATE,

-> gender ENUM('f','F','m','M'),

-> CONSTRAINT uk UNIQUE(phone));

OR

CREATE TABLE students (id CHAR(12), name VARCHAR(30) UNIQUE, hostel INT NOT NULL, percentage DECIMAL(5,2) DEFAULT 0.0, phone INTEGER, bdate DATE, gender ENUM('f','F','m','M'));

Check using 'show tables' command.

NOTE: Every SQL statement ends with a semicolon.

SQL keywords are not case sensitive but the data in the table and name of the table is

case sensitive.

It is a good practice to write the query with line separator to make error detection more easy by finding the corresponding line number.

There are various inbuilt data types like char(for fixed length character string to store alphanumeric values), varchar(for variable length character strings to store alphanumeric values), integer (for integer values), decimal(to store floating point values), date(for date and time) and others like RAW, Long RAW, LOB, BLOB, CLOB, Bfile for audio and video files.

Syntax to add constraints like primary key, unique, not null and check while creating a table.

create table <table name> (column definition 1, column definition 2, , **primary key**(column name));

Example:

```
mysql> CREATE TABLE gradstudents (id CHARACTER (12), name VARCHAR(30), hostel
INTEGER NOT NULL, percentage DECIMAL(5,2) DEFAULT 0.0, phone INTEGER, bdate
DATE, gender ENUM('f','F','m','M'), CONSTRAINT ue UNIQUE (phone),PRIMARY KEY (id)
);
```

OR

```
mysql> CREATE TABLE gradstudents (id CHARACTER (12) PRIMARY KEY, name
VARCHAR(30), hostel INTEGER NOT NULL, percentage DECIMAL(5,2) DEFAULT 0.0,
phone INTEGER, bdate DATE, gender ENUM('f','F','m','M'),CONSTRAINT ue UNIQUE
(phone));
```

TRY THIS (justify if you get errors):

```
mysql> CREATE TABLE temp (id char(10), name varchar(30) unique, hostel int, percentage
decimal(5,2) default 0.0, phone integer, bdate date, gender enum('f','F','m','M'), primary key(id),
primary key(name) );
```

*/*to create composite primary key*/*

```
mysql> CREATE TABLE temp (id char(10), name varchar(30) unique, hostel int, percentage
decimal(5,2) default 0.0, phone integer, bdate date, gender enum('f','F','m','M'), primary
key(id,name) );
```

Describe Table:

Syntax to view the table structure

desc <table name>;

Example:

```
mysql > desc students;
```

```
mysql > desc gradstudents;
```

Why the column null of row id in students table is YES and NO in gradstudents table?

To alter a table:

Syntax to alter the table structure

alter table <table name> **modify** <column name> <column definition>;
alter table <table name> **rename** <new table name>;
alter table <table name> **add column** (column definition);
alter table <table name> **change** <old column name> <new name> <old column definition>;
alter table <table name> **drop column** <column name>;
alter table <table name> **add constraint** <constraint name> (condition);
alter table <table name> **drop constraint** <constraint name>;

Example:

```
mysql> alter table students modify name varchar (40); //to increase the size.  
mysql> alter table students modify name varchar (10); //to decrease the size.  
mysql > alter table students add column address varchar (25); //to add new column.  
mysql> alter table students change address postaladdress varchar (25); //to rename a column.  
mysql > alter table students drop column address; //to remove a column.  
//to add constraint on column.  
mysql > alter table students add constraint chk1 check (percentage>0);  
mysql > alter table gradstudents add primary key pk (id);  
OR  
mysql > alter table gradstudents add constraint pk primary key (id);  
mysql > alter table gradstudents add constraint chk2 unique (name);  
mysql > alter table gradstudents add primary key pk1(id,name);  
mysql > alter table gradstudents drop primary key; // to remove constraint.  
mysql > alter table gradstudents drop index ue; //to remove unique constraint on phone.
```

Check the result of above queries by desc SQL command.

Truncate the table:

Syntax to truncate a table

truncate table <table name>;

Example:

```
mysql> truncate table gradstudents;  
check by mysql> select * from gradstudents;
```

and mysql>desc gradstudents;

Dropping the database:

Syntax to drop a database

drop database<database name>;

Example:

mysql> drop database mydb;

check by use mydb; or show databases;

Dropping the tables:

Syntax to drop a table

drop table<table name>;

Example:

mysql> drop table gradstudents;

check by desc gradstudents; or show tables;

Q. What is the difference between truncate and drop SQL command?

DML COMMANDS

Insert data:

Syntax to insert a row in a table

insert into <table name> [field names] **values** (a list of data values);

Examples:

mysql > INSERT INTO students VALUES ('PS99305017','Sai Sundar',11,77.23,9800000001,'2001-01-25','M');

OR

mysql > INSERT INTO students (id, name, hostel, percentage, bdate) VALUES ('PS99305017','Sai Sundar',11,77.23,9800000001,'2001-01-25','M');

The format for date is 'YYYY-MM-DD'.

TRY THIS (justify if you get errors/warnings):

*/*to change the sequence of values*/*

mysql > INSERT INTO students VALUES ('Sai Sundar','PS99305017',11,77.23,'2001-01-25',9800000001,'M');

*/*to change the sequence of values*/*

mysql > INSERT INTO students (name, id, hostel, percentage, bdate, phone, gender) VALUES ('Sai Sundar','PS99305018',11,77.23,'2001-01-25',9800000002,'M');

/ to violate primary key constraint by inserting same id to another student*/*

mysql > INSERT INTO students VALUES ('PS99305017','Ram Sundar',11,90.23,9800000003,'2001-01-25','M');

/ to violate unique constraint by inserting same phone no. to another student*/*

mysql > INSERT INTO students VALUES ('PS99305018','Ram Sundar',11,90.23,9800000001,'2001-01-25','M');

/ to insert blank in primary key column by giving blank id to a student*/*

mysql > INSERT INTO students VALUES ('','Shyam Sundar',11,90.23,9800000004,'2001-01-25','M');

/* to insert blank in column having unique constraint by giving blank name to a student*/
mysql > INSERT INTO students VALUES ('PS99305018','Krishna',11,90.23,' ','2001-01-25','M');

/* to insert blank in percentage column*/
mysql > INSERT INTO students VALUES ('PS99305019','Sundar',11, , ,98000000005,'2001-01-25','M');

/* to violate not null constraint by inserting blank in hostel column*/
mysql > INSERT INTO students VALUES ('PS99305020','Sundaram',,90.23,98000000005,'2001-01-25');

/* to miss single quote in char or varchar data type)*/
mysql > INSERT INTO students VALUES (PS99305020,'Sundaram',11,90.23,98000000006,'2001-01-25','M');

/*to exceed the size of an attribute(name here)*/
mysql > INSERT INTO students VALUES ('PS99305021','Ram Prabhu Sundar',11,90.23,98000000006,'2001-01-25','M');

/*to insert negative value in integer datatype*/
mysql > INSERT INTO students VALUES ('PS99305022','Rama Sundar',-11,90.23,98000000006,'2001-01-25','M');

/* to violate check condition on percentage by inserting a value less than zero*/
mysql > INSERT INTO students VALUES ('PS99305023','Ramnarayan Sundar',11,-90.23,98000000006,'2001-01-25','M');

/*to exceed date limit*/
mysql > INSERT INTO students VALUES ('PS99305023','Ramnarayan Sundar',11,90.23,98000000006,'2001-02-30','M');

/*to violate enum datatype */
mysql > INSERT INTO students VALUES ('PS99305025','Narayan Sundar',11,90.23,98000000007,'2001-02-30','K');

DQL COMMAND

Syntax of select command

- to display all rows
select * from tablename;

Example:

mysql > SELECT * FROM students;

Observe the name Ram Prabhu Sundar, the last five characters are not stored in the database.

Observe the bdate of student with id PS99305023, it is the default value.
Observe percentage of student with id PS99305019, it is 0.0, the default value set by user.
Observe value in gender column of student with id PS99305025, its blank.

- *to display particular column(s)*
select column name**from** table name;

Example:

```
mysql > SELECT id FROM students;  
mysql > SELECT id, name FROM students;
```

- *to display distinct rows*
select distinct column name **from** tablename;

Example:

```
mysql > SELECT DISTINCT name from student;
```

Update Query

Syntax of update command

update tablename **set** field=value, ...**where** condition;

Example:

```
mysql > UPDATE students SET percentage=90.46 WHERE id='PS99305018';  
mysql > UPDATE students SET name ='Sham' WHERE name =' Sai Sundar';  
mysql > UPDATE students SET hostel=hostel*10;
```

Delete Query:

Syntax of delete command

delete from <table name> **where** condition(and/or conditions);

*Example: /*to delete record of a particular student*/*

```
mysql > delete from students where id='PS99305018';
```