Simple Queries in SQL & Table Creation and Data Manipulation

Based on CBSE Curriculum

Class -11

Chapter- 17 & 18

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Introduction

• SQL was developed in 1970 in IBM lab. It is also known as SEQUEL which was a non-procedural language.
• It always specifies that WHAT is required?
• We can perform following tasks in SQL-
  I. Creation and modification of Database structure.
  II. Change in security settings for system.
  III. Giving permission to User to work with database or table.
  IV. Quering a Database.
  V. Insertion/modification/deletion of data...... etc
Elements of MySQL

- **Main elements of MySQL are**-
  - *Literals*
  - *Datatypes*
  - *Nulls*
  - *Comments*

- **Literals**: generally known as fixed data value. It can be character, numeric or text literal.

- **Data Types**: these are of following types-
  - (i) **Numeric**: INT, TINYINT, SMALLINT, MEDIUMINT, FLOAT, DOUBLE etc
  - (ii) **Date and Time**: DATE, DATETIME, TIME, YEAR etc
  - (iii) **String type**: CHAR, VARCHAR, BLOB or TEXT TINYTEXT, ENUM etc
Elements of MySQL

- **NULL Values**: if a column in a row has no value, then column is said to be null. NULL can appear in a column of any data type provided they are not restricted by NOT Null or Primary Key.

- **Comments**: it is a text which does not execute. Comments are used only for documentation purpose. Three types of comments are-
  - /* comment */
  - -- comment
  - # comment
SQL COMMAND SYNTAX

• SQL provides a set of predefined commands.
• SQL syntax has following elements-
  • Keyword:
    – Statements:
    – Clauses:
    – Arguments:
• SQL commands are not case sensitive.

Creation of Database

• Following command is used to create a Database

  mysql> CREATE DATABASE <database name >;

  For ex-
  mysql> create database school;
Using Database

- Following command is used to use a Database

```sql
mysql> USE <database name>;
```

For ex -

```sql
mysql> USE school;
```

A message will come saying- “database changed”
Table Creation

• To create a table in Database, following command is used-

\[
\text{mysql} \> \text{CREATE TABLE } \langle \text{Table Name} \rangle \ (\langle \text{Col1} \rangle \ \langle \text{DataType}(\text{Size})\rangle, \\
\quad \langle \text{Col2}\rangle\langle \text{DataType}(\text{size})\rangle, \ldots );
\]

For ex-

```
\text{mysql} \> \text{create table student} (\text{Roll INT}(4) \text{ Primary Key}, \text{Name CHAR}(20), \\
\quad (\text{Age INT}(2), \text{City CHAR}(10) ) ;
```

A message will come saying- “Query OK”

```
\text{mysql} \> \text{Create table Student}(\text{Roll INT}(4) \text{ Primary key, Name CHAR}(20), \\
\quad \rightarrow \text{Age INT}(2), \text{City CHAR}(10)) ;
\text{Query OK, 0 rows affected (0.35 sec)}
```

*Primary key restrict a column to have unique values only.*
**Viewing Table structure**

- To see structure of a table in Database, following command is used-

```
mysql> DESC <TableName>;
```

For ex -

```
mysql> DESC Student;
```

It displays whole structure of the table-

```
<table>
<thead>
<tr>
<th>Field</th>
<th>Type</th>
<th>Null</th>
<th>Key</th>
<th>Default</th>
<th>Extra</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roll</td>
<td>int(4)</td>
<td>NO</td>
<td>PRI</td>
<td>NULL</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>char(20)</td>
<td>YES</td>
<td></td>
<td>NULL</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>int(2)</td>
<td>YES</td>
<td></td>
<td>NULL</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>char(10)</td>
<td>YES</td>
<td></td>
<td>NULL</td>
<td></td>
</tr>
</tbody>
</table>
```

4 rows in set (0.00 sec)
Modification in Table structure

• To modify structure of a table in Database, following command is used-

```
mysql> ALTER TABLE <Table name> ADD/MODIFY
     (<Col> <type(size)>, . . . .)
```

For ex-

```
mysql> Alter Table Student Add (class INT(2));
A message comes saying “Query OK”.
```

Again run the DESC command-

```
mysql> DESC Student;
Field | Type | Null | Key | Default | Extra
----- | ---- | ---- | ---- | -------- | ----
Roll  | int<4> | NO   | PRI | NULL    |       
Name  | char<20> | YES  | NULL | NULL    |       
Age   | int<2> | YES  | NULL | NULL    |       
City  | char<10> | YES  | NULL | NULL    |       
class | int<2> | YES  | NULL | NULL    |       
5 rows in set (0.02 sec)
```

• A new column has been add.
• Columns can be added.
• Column size can be changed.
Dropping a Table

• To drop a table in Database, following command is used:

```
mysql> DROP Table <Table Name>;
```

For ex -

```
mysql> drop table <Student>
```

A message will come saying- “Query OK” now if you want to see the structure of the table you cant see because it has already been deleted.
Data Integrity by Constraints

• The checks or conditions applied on one or more columns of a table are known as **CONSTRAINTS**.

• These are set to maintain integrity in a table hence also known as integrity constraints.

• When a constraint is applied on a table, all the data should follow this constraint.

• Constraints are to be set at the time of table creation so that it should be followed at the time of data insertion. Syntax is -

```sql
mysql> CREATE TABLE <TableName>
    
    (<Col1> <type(size)> <Column Constraint>,
    <Col2> <type(Size)> <Column Constraint>, . . . . );
```
Integrity Constraints

- Constraints maintains the integrity of a database. Some of the constraints are-
  - **Unique Constraint**: This constraint ensures that all the data of the column should be unique. It allows null values.
  - **Primary key Constraint**: This constraint is used to uniquely identify data. It does not accept null values.
  - **Default Constraint**: This constraint is used to set a default value in case no value is provided by the user for a column.
  - **Check Constraint**: This constraint is used to set a limit for a column. For example, no data should be inserted less than 20 in the age column.
  - **Foreign key Constraint**: It is a non-key attribute of one table derived from the primary key from another table.
### Creation of a Table

```sql
mysql> create table student
    -> (Roll INT(4) PRIMARY KEY,
    ->     NAME CHAR(20) NOT NULL,
    ->     Age INT(2) CHECK (age>5),
    ->     Class CHAR(3) Default 'I',
    ->     City CHAR(10));
```

**This column will be primary key.**

**This column will not accept null.**

**This column will not accept age less than 5.**

**It will store ‘I’ in case of no value inserted.**

**Such constraints are known as column level constraints.**

```sql
mysql> CREATE TABLE Student
    ->  <ROLL INT(4) PRIMARY KEY,
    ->     NAME CHAR(20) NOT NULL,
    ->     AGE INT(2) CHECK(AGE>5),
    ->     CLASS CHAR(3) DEFAULT 'I',
    ->     CITY CHAR(10));
```

**Query OK, 0 rows affected (0.09 sec)**

```sql
mysql> DESC Student;
```

<table>
<thead>
<tr>
<th>Field</th>
<th>Type</th>
<th>Null</th>
<th>Key</th>
<th>Default</th>
<th>Extra</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROLL</td>
<td>int(4)</td>
<td>NO</td>
<td>PRI</td>
<td>NULL</td>
<td>NULL</td>
</tr>
<tr>
<td>NAME</td>
<td>char(20)</td>
<td>NO</td>
<td></td>
<td>NULL</td>
<td>NULL</td>
</tr>
<tr>
<td>AGE</td>
<td>int(2)</td>
<td>YES</td>
<td></td>
<td>I</td>
<td>NULL</td>
</tr>
<tr>
<td>CLASS</td>
<td>char(3)</td>
<td>YES</td>
<td></td>
<td></td>
<td>NULL</td>
</tr>
<tr>
<td>CITY</td>
<td>char(10)</td>
<td>YES</td>
<td></td>
<td></td>
<td>NULL</td>
</tr>
</tbody>
</table>

5 rows in set (0.00 sec)
Table level constraints Setting

```sql
mysql> create table student
    (Enroll INT(4),
     Roll INT(4),
     NAME CHAR(20) NOT NULL,
     Age INT(2),
     Class CHAR(3) Default ‘I’,
     City CHAR(10),
     PRIMARY KEY (Enroll, Roll));
```

These constraints are known as Table level constraints.
Insertion of a record in Table

Syntax to insert a record in a Table is-

```sql
mysql> INSERT INTO <TableName> (<Col1> <Col2> <Col3> <Col4>
VALUES (<val1>,<val2>,<val3>,<val4>,...);
```

- We can change the order of columns as-

```sql
mysql> INSERT INTO STUDENT (ROLL, NAME, AGE, CLASS, CITY) VALUES
   -> (1001,'Pankaj',6,'I','Barabanki');
Query OK, 1 row affected (0.03 sec)
```

- Here, we can insert values without specifying column names provided the order of values for columns should be same as in table.

```sql
mysql> INSERT INTO STUDENT VALUES
   -> (1003,'Sunita',7,'II','Barabanki');
Query OK, 1 row affected (0.03 sec)
```
Insertion of a record in Table

The columns in which you are inserting values will have the values. The columns previously set with default values will have Default value. Other columns will have null.

Displaying records of the Table

```
mysql> SELECT * FROM Student;
+----+-------+----+------+-------+
<table>
<thead>
<tr>
<th>ROLL</th>
<th>NAME</th>
<th>AGE</th>
<th>CLASS</th>
<th>CITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001</td>
<td>Pankaj</td>
<td>6</td>
<td>I</td>
<td>Barabanki</td>
</tr>
<tr>
<td>1002</td>
<td>Naresh</td>
<td>8</td>
<td>II</td>
<td>Kanpur</td>
</tr>
<tr>
<td>1003</td>
<td>Sunita</td>
<td>7</td>
<td>II</td>
<td>Barabanki</td>
</tr>
<tr>
<td>1004</td>
<td>Meera</td>
<td>9</td>
<td>I</td>
<td>NULL</td>
</tr>
<tr>
<td>1005</td>
<td>Nita</td>
<td>7</td>
<td>I</td>
<td>NULL</td>
</tr>
</tbody>
</table>
+----+-------+----+------+-------+
5 rows in set (0.00 sec)
```

No constraint was set for city hence it got null.

These values were set by default constraints
Updating a record in Table

Syntax to update a record in a Table is-

```sql
mysql> UPDATE <TableName> SET <ColName>=<NewValue> WHERE <Condition>
```

<table>
<thead>
<tr>
<th>ROLL</th>
<th>NAME</th>
<th>AGE</th>
<th>CLASS</th>
<th>CITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001</td>
<td>Pankaj</td>
<td>6</td>
<td>I</td>
<td>Barabanki</td>
</tr>
<tr>
<td>1002</td>
<td>Naresh</td>
<td>8</td>
<td>II</td>
<td>Kanpur</td>
</tr>
<tr>
<td>1003</td>
<td>Sunita</td>
<td>7</td>
<td>II</td>
<td>Barabanki</td>
</tr>
<tr>
<td>1004</td>
<td>Meera</td>
<td>9</td>
<td>I</td>
<td>NULL</td>
</tr>
<tr>
<td>1005</td>
<td>Nita</td>
<td>7</td>
<td>I</td>
<td>NULL</td>
</tr>
</tbody>
</table>

In this table, age of meera is to be set 6. and city of roll 1004 and 1005 is to be set as Lucknow.

- **age** is changed by the command.
- **City** is changed by the command.
Deletion of a record from a Table

- Syntax to delete a record from a Table is-

```
mysql> DELETE FROM <TableName> WHERE <Condition>
```

To delete all records from a table, following command will be used-

```
mysql> delete from student;
Query OK, 3 rows affected (0.03 sec)
mysql> select * from student;
Empty set (0.00 sec)
```
Accessing a Table

Syntax to access Data from a table is-

```
mysql> SELECT <Col Names> FROM <Table Name> WHERE <Condition>
```

Here * means all columns and without condition it will displays all records.

Here only those records will display where city is Barabanki.
Accessing a Table

Syntax to access Data from a table is -

```sql
mysql> SELECT <Col Names> FROM <Table Name> WHERE <Condition>
```

Here Name and class of only those records are displayed which are not from Barabanki.

Here columns have been rearranged.
Distinct keyword

Here DISTINCT keyword is used to remove duolicacy from city column. With this we can get an idea of total cities in the table.

Viewing Tables in a Database

Displays all tables in a database.
Pattern Matching

With ‘like’ two symbols are to be used ‘%’ and ‘_’. ‘%’ represents multiple characters whereas ‘_’ represents one character.

In above example all the names starting with ‘S’ are shown. In example given below all the names having ‘u’ as second character are shown.
Creation of Table from another Table

Syntax for creation of a table from another table is -
mysql>CREATE TABLE <TableName>
 AS (SELECT <Cols> FROM <ExistingTable>
 WHERE <Condition>);
Other SQL Commands

• Select * from Student where city in (‘Jaipur’,’Ajmer’);

• Select * from Student where city Not in (‘Jaipur’,’Ajmer’);

• Select * from Student where age between 5 and 7;

• Select * from Student Order by name DESC ;

• Select 5 * 6 from DUAL ;

• Select avg(age) from student; //Similarly count etc functions
Thank you

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