

9. Structured Query Language

1. SQL is originally developed by and

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2. What are the components of SQL?

SQL has three components :

a). Data Definition Language(DDL)

DDL is a component of SQL that provides commands to deal with the schema(Structure) of a database. DDL commands are used to create, modify and remove database objects like tables, views and keys. The common DDL commands are **CREATE**, **ALTER** and **DROP**.

b). Data Manipulation Language(DML)

DML is a component of SQL used to enhance efficient user interaction with Data Base System by a set of commands. It permits users to insert, delete and retrieve data from a database. The common DML commands are **SELECT**, **INSERT**, **UPDATE** and **DELETE**.

c). Data Control Language(DCL)

DCL is used to control access to database. It is used to control administrative privileges in a database. The common DCL commands are **GRANT** and **REVOKE**.

3. What are the use of GRANT and REVOKE commands?

GRANT : Allows access privileges to the users to the database

REVOKE: Withdraws user's access privileges given by GRANT

4. What are the data types of MySQL?

Data type specifies the type of value that can be entered in a column in a table. It ensures the correctness of data. Data types in SQL are classified into three, Numeric data type, String data type, Date and time data type.

I). Numeric data type

The commonly used numeric data types in MySQL are INT or INTEGER and DEC or DECIMAL.

a). **INT or INTEGERS** : They are whole numbers ie, without fractional part. They can be positive, negative or zero.

b). **DEC or DECIMAL**: They are numbers with fraction. Numbers.

The syntax is DEC (Size, D) where Size is the total number of digits and D is the number of digits after the decimal point. For example DEC(5,2), where the total number of digits is 5 and the number of digits after the decimal point will be 2.

II). String(Text) data types

A string is a group of characters. The two commonly used string data types in MYSQL are CHARACTER or CHAR and VARCHAR.



a) **CHAR or CHARACTER** : Character includes letters, digits, special symbols etc. It is a fixed length data type.

Syntax: CHAR (Size) where Size represent the maximum number of characters. The default size of CHAR data type is 1.

b) **VARCHAR data type** : The VARCHAR data type represent variable length strings. It is similar to CHAR, but the space allocated for the data depends only on the actual size of the string.

III). **Date and Time data type**

The date data type is used for storing **date** and time data type is used for storing **time**.

a) **Date**:-The date data type is used for storing date. The date in MySQL is represented in YYYY-MM-DD format(Standard format).

b) **Time**:-The time data type is used for storing time. The format is HH:MM:SS.

5. **What are the rules in naming Tables and Columns in MySQL?**

1. The name must not be an SQL keyword.
2. The name may contain alphabets, digits, under score(_) and dollar (\$) sign.
3. The name must contain at least one character.
3. The name should not be duplicate with the names of other tables in the same data base
4. The name of the table must not contain white space, special symbols.

6. **What are constraints**

Constraints are rules applied on data entered into the column of a table. They ensures the integrity of the relation . So they are known as integrity constraints.

Constraints may be table Constraints or Column Constraints. A table constraint is applied to a table where as a column constraint is applied to a column.

Column constraints : These are applied only to individual columns. They are written immediately after the column.

- 1) **NOT NULL**:-This constraint ensures that a column can never have NULL(empty) values.
- 2) **AUTO INCREMENT**:-The AUTO_INCREMENT keyword perform an auto increment ie, it automatically assigns a series of number automatically and insert it to column. The default starting value is 1.The auto increment column must be defined as primary key of the table. Only one auto_increment column is allowed in a table.
- 3) **UNIQUE**:- This constraint ensures that no two rows have the same value in a specified column. This constraint can be applied to those columns that have been declared NOT NULL.

4) **PRIMARY KEY**:- It declares a column as the primary key of a table. This column must not have null values and every value should be unique. So a PRIMARY KEY constraint is a combination of UNIQUE and NOT NULL constraints.

5) **DEFAULT**:- This constraint is used to specify a default value for a column.

Table Constraints

A table constraint can be applied to an individual column or group of columns. It usually appears at the end of table definition. Examples of table constraints are **UNIQUE** and **CHECK**

CHECK:- This constraint limits the values that can be inserted into a column of a table.

Eg: CREATE TABLE STUDENT(adno INT PRIMARY KEY AUTO_INCREMENT, clno int, regno int, NAME VARCHAR(20) NOT NULL, TOTAL_MARK INT, PERCENTAGE DEC(5,2), UNIQUE (clno, regno);

7. Explain DDL Commands in MySQL with examples.

DDL commands are used to deal with the schema (Structure) of a database. CREATE, ALTER Commands are the examples.

a). CREATE Command

The CREATE TABLE Command is used to create a table (relation). The syntax is

```
CREATE TABLE <TableName> (<ColumnName1> <DataType> [<Constraints>] ,
<ColumnName2> <DataType> [<Constraints>] , .....);
```

Here Table Name represents the name of the table to be created, Column Name the name of the column and so on. A Constraint is a Condition (check) applied to a column or group of columns.

Eg:-CREATE TABLE STUDENT(ROLLNO INT PRIMARY KEY, NAME VARCHAR(20), TOTAL_MARK INT, PERCENTAGE DEC(5,2));

b). ALTER Command

The ALTER TABLE Command is used to add new column, modify existing column, drop column or renaming a table.

The ALTER TABLE Command with ADD keyword is used to add columns.

The Syntax is:

```
I). ALTER TABLE <TableName> ADD (<ColumnName> <NewDataType> [(<Size>)]
<ColumnConstraint> );
```

Eg:-ALTER TABLE student ADD (Grade CHAR(2));

II). ALTER TABLE Command with MODIFY keyword is used to modify an existing column

Syntax : ALTER TABLE <TableName> MODIFY (<ColumnName> <NewDataType>

[(<NewSize>)]);

Eg. ALTER TABLE student MODIFY (Grade CHAR(2));

III). ALTER TABLE Command with DROP keyword used to remove a column from a table.

Syntax: ALTER TABLE <Table Name> DROP <Column Name> ;

Eg:- ALTER TABLE STUDENT DROP Total_Mark ;

IV). ALTER TABLE Command with RENAME TO keyword used to rename an existing table

Syntax : ALTER TABLE <Table Name> RENAME TO <New Table Name> ;

Eg:- ALTER TABLE STUDENT RENAME TO STUDENT1;

c). **DROP Command.**

It is used to permanently removes table from the database.

Syntax: DROP TABLE <Table Name> ;

Eg:- DROP TABLE STUDENT;

8. Explain DML Commands in MySQL with examples.

DML commands used to insert, delete and retrieve data from a database. The common DML commands are SELECT, INSERT, UPDATE and DELETE.

a) **INSERT INTO Command**

This command is used to insert a row (tuple) into a table.

Syntax : INSERT INTO <TABLENAME> VALUES(<Value1>,<Value2>,);

Eg: INSERT INTO STUDENT VALUES(1106,'ANISH',599);

Or

INSERT INTO STUDENT(ROLLNO,NAME,TOTALMARK) VALUES
(1106,'ANISH',599);

b). **SELECT Command**

The SELECT Command is used to select rows (tuples or records) from a table. The

Syntax : SELECT <ColumnName1>,[<ColumnName2>,.....] FROM <Table Name> ;

Eg:- SELECT ROLLNO,NAME,TOTALMARK from STUDENT ;

i). **The DISTINCT Keyword** : It is used to avoid duplicate rows from the result of a select command

ii). **ALL** :The keyword ALL is used to display duplicate rows in a select command.

iii)**WHERE Clause** : The WHERE clause is used to select rows or columns from a table which satisfy a specific condition. The condition can be expressed using Relational operators or Logical operators.

Syntax:

SELECT <Columnname>,[<ColumnName>,.....] FROM <TableName> WHERE
<Condition> ;

Eg. SELECT name, salary from employee where salary >15000;

iv) **BETWEEN AND Operator** : It is used to specify a range .

Eg:- Select * from STUDENT where clno between 10 and 25;

v) **LIKE** : The LIKE keyword is used to search for a specified pattern in a column.

Select * from EMPLOYEE where designation like 'M%';

vi) **IN Operator**: It is used for setting a condition satisfying any list of values.

Eg:- SELECT Name, Total FROM STUDENT WHERE COURSE IN('COMMERCE','HUMANITIES') ;

vii) **IS NULL Operator**: This Operator in a WHERE clause to find rows containing a null value in a particular column.

Eg : SELECT * FROM STUDENT WHERE regno IS NULL ;

Display details of students whose regno is not specified.

viii) **ORDER BY Clause**: The ORDER BY clause is used to sort the result of a select statement in ascending (ASC) or descending(DESC) order. The default order is ascending.

Eg : SELECT * FROM STUDENT ORDER BY regno ASC;

vii) **COUNT (*) Function**: COUNT() function used to find the number of rows that matches a specified condition. It can be used with DISTINCT command to avoid duplicate rows.

viii) **GROUP BY Clause** : The GROUP BY clause is used to group the rows of a table based on a common value.

Eg:- SELECT Course, COUNT(*) FROM STUDENT GROUP BY Course

Display each Course and Number of Students in each Course.

Aggregate Functions

The aggregate functions act on a group of data and return a single data. They are also called **summary functions**. Commonly used aggregate functions

AVG() : Returns the average value

COUNT() : Returns the number of rows

FIRST() : Returns the first value

LAST() : Returns the last value

MAX() : Returns the largest value

MIN() : Returns the smallest value

SUM() : Returns the sum

Eg. SELECT MAX(total_mark), MIN(total_mark), AVG(total_mark) FROM student;

SELECT COUNT(*) FROM student WHERE course='Commerce' ;

c). **DELETE Command** : used to remove individual rows from a table

Syntax: DELETE FROM <Table_Name> [WHERE <condition>] ;

If Where Clause is not used all the rows in the table will be deleted.

Eg. DELETE FROM STUDENT Where And=1111;

- d) UPDATE** Command : used to change the values in a column of specified rows. The rows are set to new values using the SET keyword.

Syntax : UPDATE <Table Name> SET <Column Name> =<value>[,<Column Name>=<value>]

[Where <Condition>];

Eg. UPDATE STUDENT SET Adno=1111 WHERE Name='Biju' ;

- 9. Write SQL Command to create an employee table with the following attributes.**

Empid integer primary key

Name char(30) not null

Salary numeric(7,2)

```
CREATE TABLE employee(empid int primary key, name char(30) NOT NULL, salary numeric(7,2));
```

- 10. Write SQL command to data entry to employee table with the following attributes-**

Empid integer primary key

Name char(30) not null

Salary numeric(7,2)

```
INSERT INTO employee values(1111,'Subi',12500);
```

Or

```
INSERT INTO employee (Empid, Name, Salary) VALUES (111 , 'Subi',12500);
```

- 11. Write SQL command to insert name and empid of the above employee table.**

```
INSERT INTO employee (empid, name)values(1111,"Subi");
```

- 12. Which command is used to remove a row in a table ?**

DELETE Command

- 13. Write SQL command to delete a row with slno = 99 in the student table.**

```
DELETE FROM student where slno = 99;
```

- 14. Which command in MySQL is used to display rows in a table ?**

SELECT Command

- 15. What is the use of DESCRIBE Command?**

The DESC or DESCRIBE Command is used view the structure of a table.

Eg. DESC Student:

- 16. What is mean by nested queries?**

A Nested query is a query placed within another SQL query. The inner query is known as the sub query and the query that contains the sub query is known as

outer query. SQL first evaluate the sub query and its result is assigned to the outer query.

Eg. `SELECT Regno, Name FROM Student WHERE Score=(SELECT MAX(Score) from Student);`

17. Explain views of Relation.

A view is a virtual table which is derived from one or more tables. The Tables from which tuples are collected to create a view is known as Base Table. View can be created using the DDL Command **CREATE VIEW**. All the DDL commands can be used in a view. Syntax:

```
CREATE VIEW <View_Name> AS SELECT <ColumnName1> [,<ColumnName2>, .....]
FROM <TableName> [Where <Condition> ] ;
```

Eg: `CREATE VIEW Student1 AS SELECT * FROM STUDENT Where Course='Science ' ;`

DROP VIEW Command is used to remove a view.

Syntax: `DROP VIEW < VIEW NAME>`

Eg: `DROP View Student1;`

18. What are the advantages of View?

Advantages of View are,

- Views allows to setup different security levels for a table.
- Views allows to see the same data in a different way.
- It helps to hide complexity.

19. What are the features of MYSQL?

MySQL is an is an open-source relational database management system (RDBMS).

The main features of SQL are

- It is released under an open source license.
- It provide high security to database
- It is portable and works with many languages such as PHP,PERL,C,C++,JAVA etc.
- It works rapidly even with large volume of data.

20. Distinguish between CHAR and VARCHAR data types in SQL.

CHAR is a fixed length character data type which uses the specified amount of data even though the data not required it.

VARCHAR uses only the space required for the data.

21. The SQL operator.....is used with pattern matching.

%

22. Distinguish between WHERE clause and HAVING clause.

WHERE clause is used to impose some selection criteria for getting records.

HAVING clause is used with GROUP BY clause to form groups of records

23. Write the essential clause required for each of the following SQL command.

- INSERT INTO
- SELECT
- UPDATE

Ans. a). VALUE B). FROM c). SET

24. The command to remove rows from the table “CUSTOMER” IS ,

- a). Remove from CUSTOMER b). Drop table CUSTOMER
c). Delete from CUSTOMER d). Update CUSTOMER

Ans: c

25. If values for some columns are unknown , how is a row inserted?

Then insert row specifying column names and corresponding values.

Syntax: INSERT into <Table Name> (Column 1, Column 2,...) values (Value1, Value 2..);

Eg. INSERT into Student (clno, name, total) values (10, “Sajeev”,250);

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Previous Questions

1. keyword is used to in SELECT query to eliminate duplicate values in a column.

- (a) UNIQUE (b) DISTNICT (c) NOT NULL (d) PRIMARY

Answer any one question from the following (a) or (b) :

2. Consider the following table named ACCOUNTS :

(a) Write SQL statements to do the following :

- (i) Display all the details of accounts with amount greater than 50000 in Ernakulam branch.
- (ii) Display Acc.No ,Branch and Amount in the descending order of amount.
- (iii) display the number of accounts in each branch.

3. Write SQL statements to do the following :

- (i) Add a new record into the table .
- (ii) Update the amount of Sanjay to 100000.
- (iii) Delete the details of Anil.

4.How will you add a new column to an existing table using SQL statement ?

5.Explain the SQL statements used to insert and delete data from a table.

6. Explain any two DDL commands.

7. What is a view ?How can we create a view using SQL statement ?

8..... clause of SELECT query is used to apply condition to form groups of records

- (a) Orderby (b) groupby (c) having (d) where

9. Explain the SQL statements used to insert and delete data from a table.

10. Explain any two DDL commands.

11. An Employee table contains name , empno, basicpay , desig. Write SQL for,

- a) Display empno, name and basicpay of all managers(desig = "manager")
- b). Display empno and salary of all employees. (salary = basicpay + DA)

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(DA = basicpay *1.15)

c). Display name and mpno of all employees whose basicpay < 10000.

12. Write SQL for ,

- a). Create a table student with the data [name char(25), rollno number(3), marks number(3)]
- b). List name and rollno of all students
- c). List name and rollno of students having marks>600

13. Explain the Primary key constraints with an example.

14. Command in SQL used to display struture of a table

- a). LIST b). STRUCT c). DESCRIBE d). SHOW

15is a SQL datatype which is used to represent a variable length string.

16. The structure of table employee is given below.

EmPCODE	Numeric
Empname	String
Basicpay	Numeric
DA	Numeric
Grosspay	Numeric

Write SQL statements for the following.

- a). Insert a record into the table
- b). Update DA with 60% of Basic Pay
- c). Display the details of employees whose basic pay is greater than 20000
- d). Rename the table EMPLOYEE to EMPDETAILS.

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