MYSQL

1. Data: Data is defined as facts or figures, or information that's stored in or used by a computer.

Ex: Information collected for a research paper, an Email, etc.

2. Information: This is data that has been "cleaned" of errors and further processed in a way that makes it easier to measure, visualize and analyze for a specific purpose.

3. Database: Database is nothing but an organized form of data for easy access, storing, retrieval and managing of data. This is also known as structured form of data which can be accessed in many ways.

Example: School Management Database, Bank Management Database.

3. DBMS: A Database Management System (DBMS) is a program that controls creation, maintenance and use of a database. DBMS can be termed as File Manager that manages data in a database rather than saving it in file systems.

4.) RDBMS:

RDBMS stands for Relational Database Management System. RDBMS store the data into the collection of tables, which is related by common fields between the columns of the table. It also provides relational operators to manipulate the data stored into the tables.

Example: SQL Server.

5.) Tables & Fields:

A table is a set of data that are organized in Columns and Rows. Columns can be categorized as vertical, and Rows are horizontal. A table has specified number of column called **fields** but can have any number of rows which is called **record** and also it is known as **Tuples.**

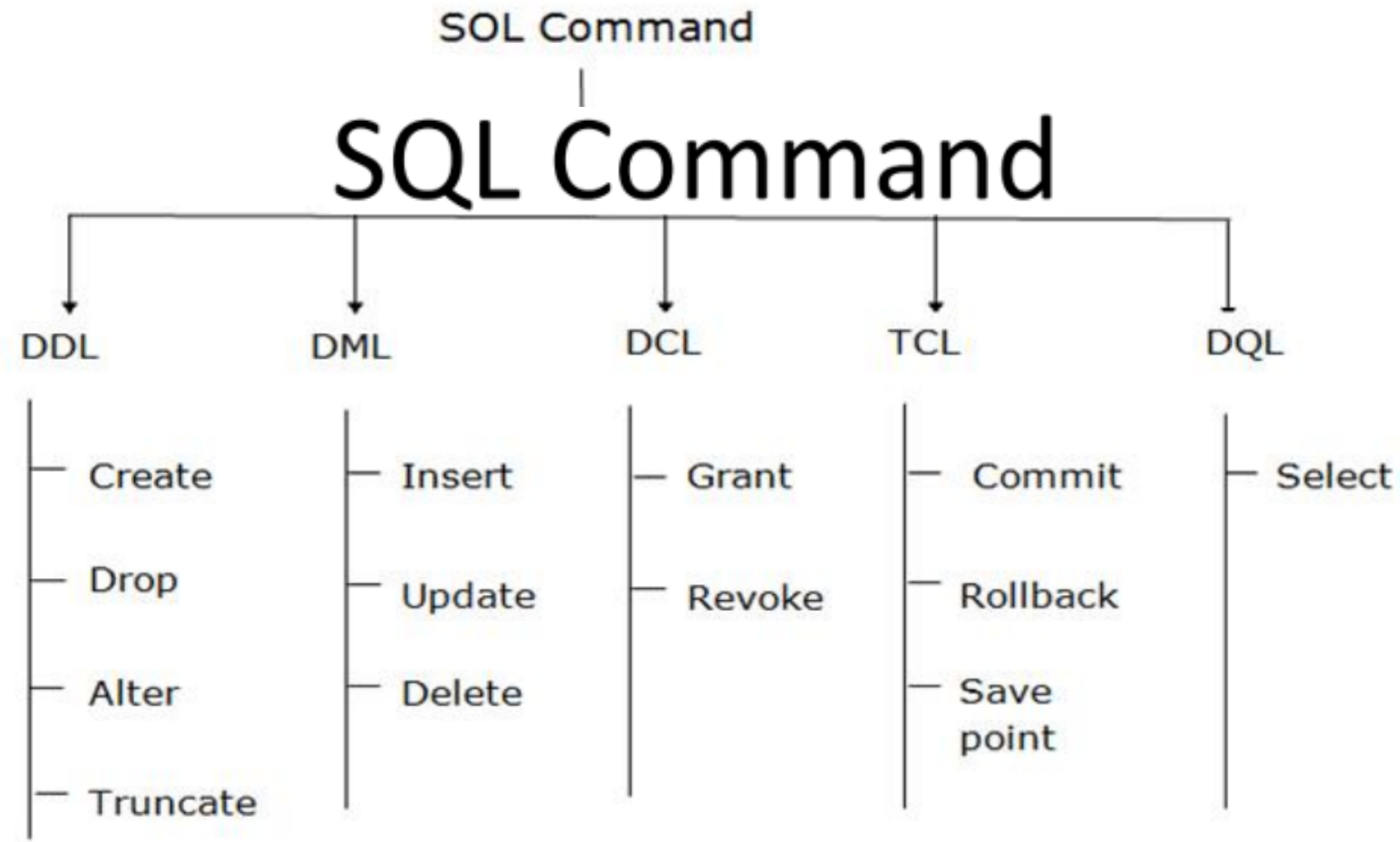
Example:.
Table Name : Employee.

Fields: Emp ID, Emp Name, Date of Birth.

Data: 201456, David, 11/15/1960.

Types of SQL Commands

- There are five types of SQL commands: DDL, DML, DCL, TCL, and DQL.



Types of SQL Commands

SQL Categorizes its commands on the basis of functionalities performed by them.
There are five types of SQL Commands which can be classified as:

Group	Statements	Description
Data Definition Language (DDL)	CREATE ALTER DROP TRUNCATE	Allows to create data structures i.e. tables, delete, alter etc.,
Data Manipulation Language (DML)	INSERT UPDATE DELETE	Allows modification of data in the database
Data Query Language (DQL)	SELECT SHOW HELP	Helps in Retrieving data and information from the database.
Data Control Language (DCL)	GRANT REVOKE	Allows or denies permissions to access the tables.
Transaction Control Language (TCL)	COMMIT ROLLBACK SAVEPOINT	Manages the changes made by the DML statements.

Data Definition Language (DDL)

- DDL changes the structure of the table like creating a table, deleting a table, altering a table, etc.

- All the command of DDL are auto-committed that means it permanently save all the changes in the database.
- Here are some commands that come under DDL:
  - CREATE
  - ALTER
  - DROP
  - TRUNCATE

Data Definition Language (DDL)- CREATE

CREATE It is used to create a new table in the database.

Syntax:

REATE TABLE TABLE_NAME (COLUMN_NAME DATATYPES[,....]);

Example:

CREATE TABLE EMPLOYEE(Name VARCHAR2(20), Email VARCHAR2(100), DOB DATE);

Data Definition Language (DDL)- Drop

Drop: It is used to delete both the structure and record stored in the table.

Syntax:

DROP TABLE ;

Example:

DROP TABLE EMPLOYEE;

Data Definition Language (DDL)- **ALTER**

ALTER: It is used to alter the structure of the database. This change could be either to modify the characteristics of an existing attribute or probably to add a new attribute.

Syntax:

```
ALTER TABLE table_name ADD column_name COLUMN-definition;
ALTER TABLE MODIFY(COLUMN DEFINITION....);
```

Example:

```
ALTER TABLE STU_DETAILS ADD(ADDRESS VARCHAR2(20));
ALTER TABLE STU_DETAILS MODIFY (NAME VARCHAR2(20));
```

Data Definition Language (DDL)- TRUNCATE

TRUNCATE: It is used to delete all the rows from the table and free the space containing the table.

Syntax:

```
TRUNCATE TABLE table_name;
```

Example:

```
TRUNCATE TABLE EMPLOYEE;
```

Data Manipulation Language

- DML commands are used to modify the database. It is responsible for all form of CHANGES in the database.

- The command of **DML is not auto-committed** that means it can't permanently save all the changes in the database. They can be rollback.

Here are some commands that come under DML:

- **INSERT**
- **UPDATE**
- **DELETE**

Data Manipulation Language - **INSERT**

INSERT: The INSERT statement is a SQL query. It is used to insert data into the row of a table.

Syntax:

```
INSERT INTO TABLE_NAME    (col1, col2, col3,.... col N)
VALUES (value1, value2, value3, .... valueN);
```

OR

```
INSERT INTO TABLE_NAME    VALUES (value1, value2, value3, .... valueN);
```

Example:

```
INSERT INTO XYZ (Author, Subject) VALUES ("Sonoo", "DBMS");
```

Data Manipulation Language - **UPDATE**

Update: This command is used to **update or modify** the value of a column in the table.

Syntax:

```
UPDATE table_name SET [column_name1= value1,...column_nameN = valueN] [WHERE CONDITION]
```

Example:

```
UPDATE students
SET User_Name = 'Sonoo'
WHERE Student_Id = '3'
```

Data Control Language

DCL commands are used to GRANT and TAKE BACK authority from any database user.

Here are some commands that come under DCL:

- Grant
- Revoke

Transaction Control Language

TCL commands can only use with DML commands like INSERT, DELETE and UPDATE only.

These operations are automatically committed in the database that's why they cannot be used while creating tables or dropping them.

Here are some commands that come under TCL:

- COMMIT
- ROLLBACK
- SAVEPOINT

Transaction Control Language - COMMIT

Commit: Commit command is used to save all the transactions to the database.

Syntex:

```
COMMIT;
```

Example:

```
DELETE FROM CUSTOMERS
WHERE AGE = 25;
COMMIT;
```

Data Query Language

DQL is used to fetch the data from the database.

It uses only one command:

SELECT

a. **SELECT:** This is the same as the projection operation of relational algebra. It is used to select the attribute based on the condition described by WHERE clause.

Syntax:

```
SELECT expressions    FROM TABLES    WHERE conditions;
```

Example:

```
SELECT emp_name  FROM employee  WHERE age > 20;
```

Operators in Sql

An operator is a reserved character or word which is used in a SQL statement to query our database. We use a WHERE clause to query a database using operators.Operators are needed to specify conditions in a SQL statement.

	Types	Operators
1.	Arithmetic Operators	+ , -, *, /, %
2.	Comparison Operators	<, >, =, !=, <=, >=
3.	Logical Operators	AND, OR, NOT,BETWEEN, IN, ANY, ALL,LIKE

SQL Logical Operators

Operator	Description
All	It compares a value to all values in another value set.
AND	It allows the existence of multiple conditions in an SQL statement.
ANY	It compares the values in the list according to the condition.
Between	It is used to search for values that are within a set of values.
IN	It compares a value to that specified list value.
NOT	It reverses the meaning of any logical operator.
OR	It combines multiple conditions in SQL statements.
EXIST	It is used to search for the presence of a row in a specified table.
LIKE	It compares a value to similar values using wildcard operator.

Expressions in SQL

- An expression is a combination of one or more values, operators and SQL functions used to query a database to get a specific set of data.
- These SQL EXPRESSIONS are like formulae and they are written in query language.

There are different types of SQL expressions, which are mentioned below –

1. **Boolean Expression:**

   SQL Boolean Expressions fetch the data based on matching a single value.

   Syntax: SELECT column1, column2, columnN
   FROM table_name
   WHERE SINGLE VALUE MATCHING EXPRESSION;

   E.g: SELECT * FROM CUSTOMERS WHERE SALARY = 10000;

1. **Numeric Expression:**

   These expressions are used to perform any mathematical operation in any query.

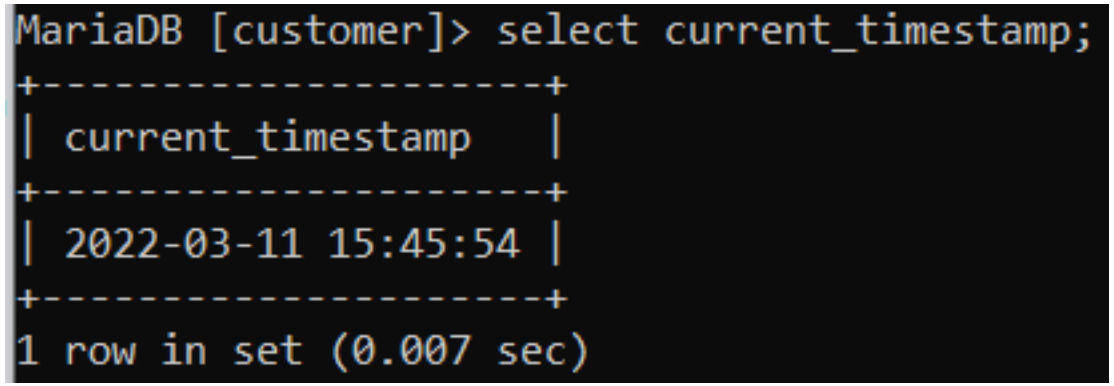
   Syntax: SELECT numerical_expression as OPERATION_NAME
   [FROM table_name
   WHERE CONDITION] ;

   E.g: SELECT (15 + 6) AS ADDITION

3.) Date Expression:

Date Expressions return current system date and time values .

E.g.: SELECT CURRENT_TIMESTAMP;



DataTypes in SQL

- Data types are used to represent the nature of the data that can be stored in the database table.
- Each column in a database table is required to have a name and a data type.
- We must decide what type of data that will be stored inside each column when creating a table.

1. Numeric:

Category	Datatype	Description	Size
Numeric	Int	A normal-sized integer that can be signed or unsigned.	4 bytes
Numeric	Tinyint	A very small integer that can be signed or unsigned.	1 byte
Numeric	Smallint	A small integer that can be signed or unsigned.	2 bytes
Numeric	Mediumint	A medium-sized integer that can be signed or unsigned.	3 bytes
Numeric	Bigint	A large integer that can be signed or unsigned.	8 bytes
Numeric	Float(m,d)	A floating-point number that cannot be unsigned.	4 bytes
Numeric	Double(m,d)	A double precision floating-point number that cannot be unsigned.	8 bytes
Numeric	Decimal(m,d)	An unpacked floating-point number that cannot be unsigned.	Length + 1 byte

2.) Date & Time:

Date & Time	Date	A date in YYYY-MM-DD format, between 1000-01-01 and 9999-12-31.	3 bytes
Date & Time	Datetime	A date and time combination in YYYY-MM-DD HH:MM:SS format, between 1000-01-01 00:00:00 and 9999-12-31 23:59:59.	8 bytes
Date & Time	Timestamp	A timestamp between midnight, January 1st, 1970 and sometime in 2037.	4 bytes
Date & Time	Time	Stores the time in a HH:MM:SS format.	3 bytes
Date & Time	Year(m)	Stores a year in a 2-digit or a 4-digit format.	2 bytes

3.) String:

String	Char(m)	A fixed-length string between 1 and 255 characters in length (for example CHAR(5)), right-padded with spaces to the specified length when stored.	Length bytes
String	Varchar(m)	A variable-length string between 1 and 255 characters in length.	String length + 1 byte
String	Blob or Text	A field with a maximum length of 65,535 characters.	String length + 2 byte
String	Tinyblob or tinytext	A BLOB or TEXT column with a maximum length of 255 characters. You do not specify a length with TINYBLOB or TINYTEXT.	String length + 1 byte
String	Mediumblob or mediumtext	A BLOB or TEXT column with a maximum length of 1,67,77,215 characters. You do not specify a length with MEDIUMBLOB or MEDIUMTEXT.	String length + 3 byte
String	Longblob or Longtext	A BLOB or TEXT column with a maximum length of 429,49,67,295 characters. You do not specify a length0 with LONGBLOB or LONGTEXT.	String length + 4 byte

Constraints in SQL

- Constraints are certain conditions,rules or restrictions we apply on the database.
- Constraints could be either on a column level or a table level.
- The column level constraints are applied only to one column, whereas the table level constraints are applied to the whole table.

1. **NOT NULL:**

- NULL means empty, i.e., the value is not available.
- Whenever a table's column is declared as NOT NULL, then the value for that column cannot be empty for any of the table's records.

Syntax:

CREATE TABLE TableName (ColumnName1 datatype NOT NULL, ColumnName2 datatype,⋯., ColumnNameN datatype);

E.g:

CREATE TABLE student(StudentID **INT** NOT NULL, Student_FirstName **VARCHAR**(20), Student_LastName **VARCHAR**(20));

2.) UNIQUE:

- Duplicate values are not allowed in the columns to which the UNIQUE constraint is applied.
- The column with the unique constraint will always contain a unique value.
- This constraint can be applied to one or more than one column of a table, which means more than one unique constraint can exist on a single table.
- Using the UNIQUE constraint, you can also modify the already created tables.

Syntax:

CREATE TABLE TableName (ColumnName1 datatype **UNIQUE**, ColumnName2 datatype,….., ColumnNameN datatype);

E.g:

CREATE TABLE student(StudentID **INT UNIQUE**, Student_FirstName **VARCHAR**(20), Student_LastName **VARCHAR**(20));

3. PRIMARY KEY:

- PRIMARY KEY Constraint is a combination of NOT NULL and Unique constraints.
- NOT NULL constraint and a UNIQUE constraint together forms a PRIMARY constraint.
- The column to which we have applied the primary constraint will always contain a unique value and will not allow null values.
- Primary keys cannot be NULL, unique keys can be. There can be more UNIQUE columns, but only one primary key in a table.
- Primary keys become foreign keys in other tables, when creating relations among tables.

Syntax:

```
CREATE TABLE TableName (ColumnName1 datatype PRIMARY KEY, ColumnName2 datatype,…., ColumnNameN datatype);
```

E.g:

```
CREATE TABLE student(StudentID INT PRIMARY KEY, Student_FirstName VARCHAR(20), Student_LastName VARCHAR(20));
```

4. FOREIGN KEY

- A FOREIGN KEY in one table points to a PRIMARY KEY in another table. It is a referential constraint between two tables.
- When we have two tables, and one table takes reference from another table, i.e., the same column is present in both the tables and that column acts as a primary key in one table. That particular column will act as a foreign key in another table.

Syntax:

CREATE TABLE tablename(ColumnName1 Datatype(**SIZE**) **PRIMARY KEY**, ColumnNameN Datatype(**SIZE**), **FOREIGN KEY**(ColumnName) **REFERENCES** PARENT_TABLE_NAME(Primary_Key_ColumnName));

E.g.:

CREATE TABLE employee (Emp_ID **INT** NOT NULL **PRIMARY KEY**, Emp_Name **VARCHAR** (40), Emp_Salary **VARCHAR** (40));

5. CHECK

- Whenever a check constraint is applied to the table's column, and the user wants to insert the value in it, then the value will first be checked for certain conditions before inserting the value into that column.

Syntax:

```
CREATE TABLE TableName (ColumnName1 datatype CHECK (ColumnName1 Condition), ColumnName2 datatype,…., ColumnNameN datatype);
```

E.g.:

```
CREATE TABLE student(
StudentID INT, Student_FirstName VARCHAR(20),
Student_LastName VARCHAR(20),
Student_PhoneNumber VARCHAR(20),
Student_Email_ID VARCHAR(40),
Age INT CHECK( Age <= 15));
```

6. DEFAULT

- Whenever a default constraint is applied to the table's column, and the user has not specified the value to be inserted in it, then the default value which was specified while applying the default constraint will be inserted into that particular column.

Syntax:

CREATE TABLE TableName (ColumnName1 datatype **DEFAULT** Value, ColumnName2 datatype,… ., ColumnNameN datatype);

E.g:

CREATE TABLE student(

StudentID **INT**,

Student_FirstName **VARCHAR**(20),

Student_LastName **VARCHAR**(20),

Student_PhoneNumber **VARCHAR**(20),

Student_Email_ID **VARCHAR**(40) **DEFAULT** 'xyz8@gmail.com');

DATA DEFINITION LANGUAGE (DDL)

- Data Definition Language consists of the SQL commands that can be used to define the database schema.
- It is a set of SQL commands used to create, modify, and delete database structures but not data.

S.No	DDL Commands	Description	Sample Query
1.	**CREATE**	**Used to create tables or databases.**	**CREATE table student;**
2.	**ALTER**	**Used to modify the values in the tables.**	**ALTER table student add column roll_no int;**
3.	**RENAME**	**Used to rename the table or database name.**	**RENAME student to student_details;**
4.	**DROP**	**Deletes the table from the database.**	**DROP table student_details;**
5.	**TRUNCATE**	**Used to delete a table from database.**	**TRUNCATE table student_details;**

Creating a Database

- **Creating a database:**

  Syntax: **CREATE DATABASE** Database_Name;

  E.g: **CREATE DATABASE** Student ;

- **To check that your database is created in SQL:**

  SHOW **DATABASES** ;

- **Selecting a MySQL Database:**

  USE database_name;

- **Removing Databases:**

  DROP DATABASE database_name;

What is a Table?

- Table is a collection of data, organized in terms of rows and columns.
- In DBMS term, table is known as relation, columns as fields and row as a record or tuple.
- A table has a specified number of columns, but can have any number of rows.
- It is a simple form of data storage.

EMP_NAME	ADDRESS	SALARY
Ankit	Lucknow	15000
Raman	Allahabad	18000
Mike	New York	20000

1.Creating a Table

SQL CREATE TABLE statement is used to create table in a database.

Syntax:

```
create table "tablename"
("column1" "data type",
"column2" "data type",
"column3" "data type",
...
"columnN" "data type");
```

E.g:

```
CREATE TABLE STUDENTS (
ID INT,
NAME VARCHAR (20) NOT NULL,
AGE INT                  NOT NULL,
ADDRESS CHAR (25),
PRIMARY KEY (ID)
);
```

1. Create the Tables

Table name: **item_master**

Column Name	Format	Remarks
Item_id	Char(4)	Not null, primary key
Item_desc	Char(20)	
Rate	Number(8, 2)	

Table name: **item_tran**

Column Name	Format	Remarks
order_id	Char(4)	Not null, primary key
Item_id	Char(4)	Not null, reference item_id of item_master
Quantity	Number(2)	

2. Add the following records to the table item_master

Item_id	Item_desc	Rate
I001	Pens	12.4
I002	Pencils	2.5
I003	Rubbers	2.3

3. Add the following records to the table item_tran

Order_id	Item_id	Quantity
A001	I001	40
A002	I002	70
A003	I001	90
A004	I003	56

2. ALTER TABLE COMMAND

- The ALTER TABLE command allows you to add, modify, and delete columns of an existing table.
- This statement also allows database users to add and remove various SQL constraints on the existing tables.
- Any user can also change the name of the table using this statement.

1. ALTER TABLE ADD Column:

Syntax: ALTER TABLE table_name ADD column_name column-definition;

E.g: ALTER TABLE student

ADD marks INT;

Note: To add multiple columns:

Alter table table_name

ADD column_name,ADD column_name;

1. ALTER TABLE MODIFY Column:

Syntax: ALTER TABLE table_name MODIFY column_name column-definition;

E.g:

ALTER TABLE student

MODIFY NAME varchar(40);

3.) ALTER TABLE RENAME Column:

Syntax:

ALTER TABLE table_name change COLUMN old_name new_name datatype;

E.g: ALTER TABLE STUDENTS
Change column First_NAME Stud_Name varchar(20);

4.) ALTER TABLE DROP Column:

Syntax:

ALTER TABLE table_name DROP column_name ;

E.g: ALTER TABLE students
DROP ADDRESS;

Note: For Dropping Multiple columns:

```
Alter table table_name
DROP column_name,
DROP column_name;
```

3. RENAME TABLE COMMAND

The RENAME TABLE and ALTER TABLE syntax helps us to change the name of the table.

Syntax: ALTER TABLE old_table_name
RENAME TO new_table_name;

E.g: ALTER TABLE STUDENTS
RENAME TO STUDENT_DETAILS;

4. TRUNCATE TABLE COMMAND

- A truncate SQL statement is used to remove all rows (complete data) from a table.
- It is similar to the DELETE statement without WHERE clause.
- Truncate table is faster and uses less resources than DELETE TABLE command.
- Drop table command can also be used to delete complete table but it deletes table structure too.
- TRUNCATE TABLE doesn't delete the structure of the table.

Syntax: **TRUNCATE TABLE** table_name;

E.g: TRUNCATE TABLE STUDENTS;

5. DROP TABLE COMMAND

- DROP TABLE statement is used to delete a table definition and all data from a table.

Syntax: **DROP TABLE** "table_name";

E.g: DROP TABLE STUDENTS;

DATA MODIFICATION LANGUAGE (DML)

Once the tables are created and database is generated using DDL commands, manipulation inside those tables and databases is done using DML commands.

S.No	DML Command	Description	Sample Query
1.	**INSERT**	**Used to insert new rows in the tables.**	**INSERT into student(roll_no, name) values(1, Anoop);**
2.	**DELETE**	**Used to delete a row or entire table.**	**DELETE table student;**
3.	**UPDATE**	**Used to update values of existing rows of tables.**	**UPDATE students set s_name = 'Anurag' where s_name like 'Anoop';**

INSERT COMMAND

- It is used to insert a single or a multiple records in a table.
- There are two basic syntaxes of the INSERT INTO statement which are shown below:

Syntax 1: INSERT INTO TABLE_NAME (column1, column2, column3,...column N)
VALUES (value1, value2, value3,...valueN);

E.g: INSERT INTO STUDENTS (ID,NAME,AGE,ADDRESS)
VALUES (101,' PRACHITI',25,' THANE');

Syntax 2: INSERT INTO TABLE_NAME VALUES (value1,value2,value3,...valueN);

E.g: INSERT INTO STUDENTS VALUES (101,' PRACHITI',25,' THANE');

UPDATE COMMAND

- We use the UPDATE statement to update existing data in a table.
- We can use the UPDATE statement to change column values of a single row, a group of rows, or all rows in a table.
- Following is syntax to **update all rows in a table**:

```
Syntax:  UPDATE table_name
         SET
         column_name1 = expr1,
         column_name2 = expr2,
E.g:   UPDATE STUDENTS
         SET CITY=’ THANE’
```

- Following the syntax to **update a particular record/row**:

```
Syntax: UPDATE table_name
        SET
        column_name1 = expr1,column_name2 = expr2,
        WHERE
        Condition;
E.g: UPDATE STUDENTS
     SET MARKS=50
     WHERE ID=104;
```

DELETE COMMAND

- The **DELETE statement** is used to delete rows from a table.
- Generally DELETE statement removes one or more records from a table.

Syntax: **DELETE FROM** table_name

[**WHERE** condition];

E.g: **DELETE FROM** students

WHERE ID=101;

- To delete all the records from the table:

Syntax: **DELETE FROM** table_name;

E.g: DELETE FROM students;

Difference between DELETE and TRUNCATE statements:

- The **DELETE statement** only deletes the rows from the table based on the condition defined by WHERE clause or delete all the rows from the table when condition is not specified.
- But it does not free the space containing by the table.
- The **TRUNCATE statement:** it is used to delete all the rows from the table **and free the containing space.**

DATA QUERY LANGUAGE

- Data query language consists of command over which data selection in SQL relies.
- SELECT command in combination with other SQL clauses is used to retrieve and fetch data from database/tables on the basis of certain conditions applied by user.
- By using this command, we can also access the particular record from the particular column of the table.
- The table which stores the record returned by the SELECT statement is called a result-set table.

Syntax:

- To Select all attributes(columns) and tuples(rows) from a table:

  SELECT * **FROM** table_name;

  E.g: **SELECT** * **FROM** Students;

- To Select few attributes and all tuples from a table:

  SELECT Column_Name_1, Column_Name_2, ..., Column_Name_N **FROM** Table_Name;

  E.g: SELECT NAME,AGE FROM Students;

Select Distinct :

The **SQL DISTINCT command** is used with SELECT keyword to retrieve only distinct or unique data.

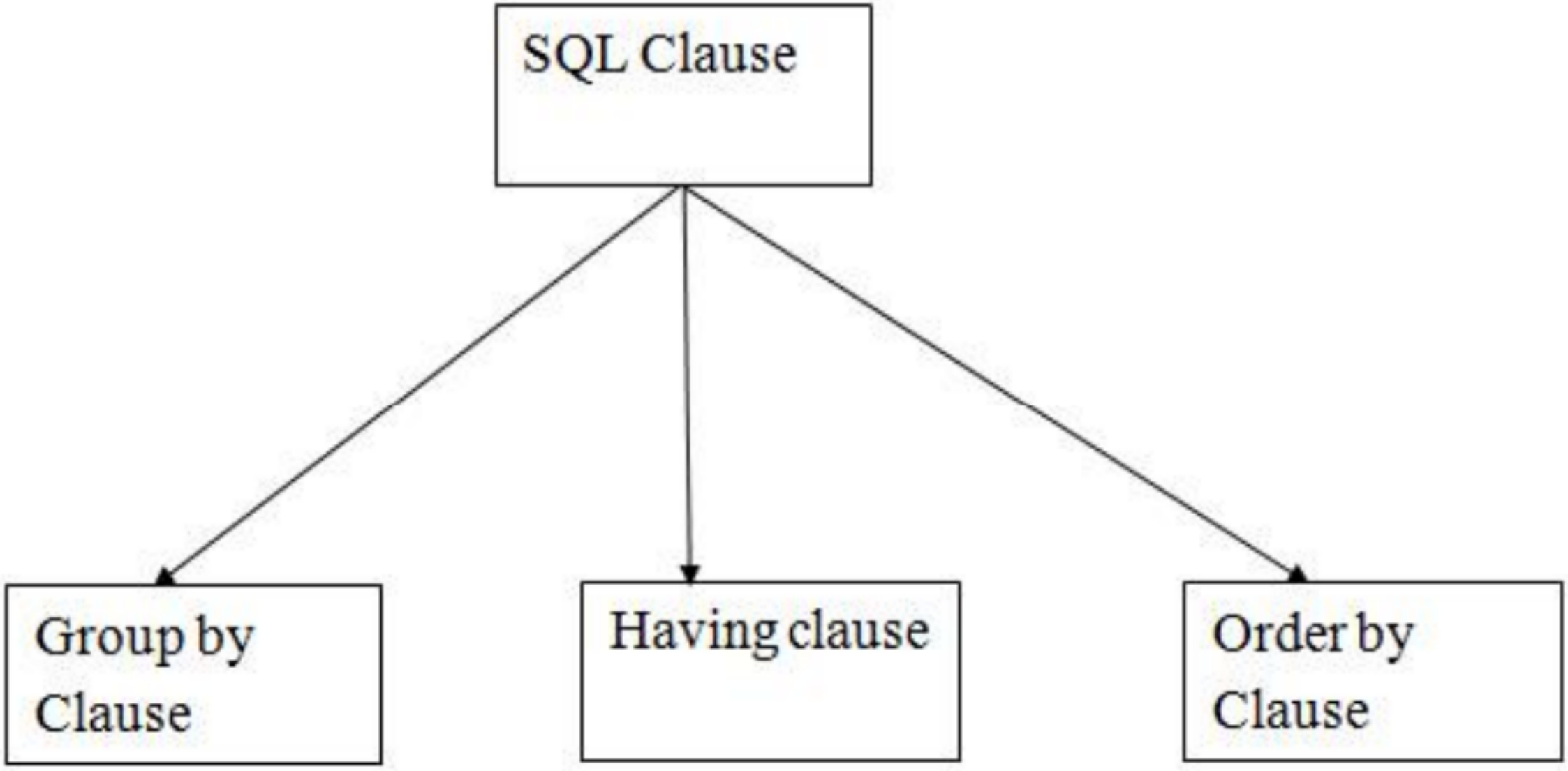
Syntax:

```
SELECT DISTINCT column_name ,column_name
FROM  table_name;
```

E.g:

```
SELECT DISTINCT city
FROM students;
```

SQL Clauses



‘ WHERE ’ Clause

- The WHERE clause is used to filter records.
- It is used to extract only those records that fulfill a specified condition.
- WHERE clause is used in SELECT, UPDATE, DELETE statement etc.

Syntax:

```
SELECT column1, column2,..column N
FROM table_name
WHERE condition;
```

E.G:

```
SELECT ID, NAME, SALARY
FROM CUSTOMERS
WHERE SALARY > 2000;
```

Where clause with Arithmetic operators

S.No	Operator	Description
1.	+	Addition
2.	-	Subtraction
3.	*	Multiply
4.	/	Division
5.	%	Modulo

Where clause with comparison operators

S. No	Operator	Description
1.	<	Less Than
2.	>	Greater Than
3.	=	Equal To
4.	<=	Less Than Or Equal To
5.	>=	Greater Than Or Equal To
6.	<>	Not Equal To

SQL Logical Operators

Operator	Description
All	It compares a value to all values in another value set.
AND	It allows the existence of multiple conditions in an SQL statement.
ANY	It compares the values in the list according to the condition.
Between	It is used to search for values that are within a set of values.
IN	It compares a value to that specified list value.
NOT	It reverses the meaning of any logical operator.
OR	It combines multiple conditions in SQL statements.
EXIST	It is used to search for the presence of a row in a specified table.
LIKE	It compares a value to similar values using wildcard operator.

1. AND Operator:

Logical AND compares two Booleans as expression and returns TRUE when both of the conditions are TRUE and returns FALSE when either is FALSE.

Syntax:

```
SELECT column1, column2, ...
FROM table_name
WHERE condition1 AND condition2 AND condition 3 ...;
```

For Example:

To find the names of the students between the age 10 to 15 years, the query would be like:

```
SELECT first_name, last_name, age
FROM student_details
WHERE age >= 10 AND City=’Thane’;
```

2. OR operator:

Logical OR compares two Booleans as expression and returns TRUE when either of the conditions is TRUE and returns FALSE when both are FALSE.

Syntax:

```
SELECT column1, column2, ...
FROM table_name
WHERE condition1 OR condition2 OR condition3 ...;
```

For example:

To find the names of students who are studying either Maths or Science, the query would be like,

```
SELECT first_name, last_name, subject
FROM student_details
WHERE subject = 'Maths' OR subject = 'Science'
```

3. NOT Operator:

- If you want to find rows that do not satisfy a condition, you can use the logical operator, NOT.
- NOT results in the reverse of a condition.
- That is, if a condition is satisfied, then the row is not returned.

Syntax:

```
SELECT column1, column2, ...
FROM table_name
WHERE NOT condition;
```

For example:

To find out the names of the students who do not play football, the query would be like:

```
SELECT first_name, last_name, games
FROM student_details
WHERE NOT games = 'Football'
```

4. BETWEEN Operator:

- This operator displays the records which fall between the given ranges.
- The results of the BETWEEN operator include begin and end values of the given range.

Syntax:

```
SELECT column_name(s)
FROM table_name
WHERE column_name BETWEEN value1 AND value2;
```

E.g:

```
SELECT * FROM employees WHERE Salary BETWEEN 5000 AND 9000;
```

➢ NOT BETWEEN:

To display the products outside a specific range we make use of NOT BETWEEN.

E.g: **SELECT** * **FROM** employees **WHERE** Salary NOT BETWEEN 5000 AND 9000;

5. IN Operator

- When we want to check for one or more than one value in a single SQL query, we use IN operator.
- The IN operator allows you to determine if a value matches any value in a list of values.

Syntax:

```
SELECT column_name(s)
FROM table_name
WHERE column_name IN (value1, value2, ...);
```

- IN operator is functionally equivalent to the combination of multiple OR operators:

value = value1 OR value = value2 OR value = value3 OR ⋯

E.g: **SELECT** * **FROM** employees **WHERE** age IN (25, 27, 24);

➢ NOT IN operator:

- The NOT IN operator is used when we don't want to match certain values in the list.

E.g: **SELECT** * **FROM** employees **WHERE** age NOT IN (25, 27, 24);

6. LIKE Operator

- LIKE Operator in SQL displays only those data from the table which matches the pattern specified in the query.
- There are two wildcards used in conjunction with the LIKE operator:

The percent sign (%) : Represents zero, one or multiple characters.
The underscore (_): Represents a single number or character.

Syntax:

```
SELECT column1, column2, ...
FROM table_name
WHERE columnN LIKE pattern;
```

LIKE Operator	Description
WHERE CustomerName LIKE 'a%'	Finds any values that start with "a"
WHERE CustomerName LIKE '%a'	Finds any values that end with "a"
WHERE CustomerName LIKE '%or%'	Finds any values that have "or" in any position
WHERE CustomerName LIKE '_r%'	Finds any values that have "r" in the second position
WHERE CustomerName LIKE 'a_%'	Finds any values that start with "a" and are at least 2 characters in length
WHERE CustomerName LIKE 'a__%'	Finds any values that start with "a" and are at least 3 characters in length
WHERE ContactName LIKE 'a%o'	Finds any values that start with "a" and ends with "o"

➢ NOT LIKE Operator:

- NOT LIKE Operator works exactly opposite the Like operator.
- It displays only those data from the table which does not match the pattern specified in the query.

Syntax:

```
SELECT column1, column2, ...
FROM table_name
WHERE columnN NOT LIKE pattern;
```

E.g:

```
SELECT * FROM Customers
WHERE CustomerName NOT LIKE 'a%';
```

SQL NULL Values

- A field with a NULL value is a field with no value.
- It is not possible to test for NULL values with comparison operators, such as =, <, or <>.
- We will have to use the ISNULL and IS NOT NULL operators instead.

IS NULL Syntax:

```
SELECT column_names
FROM table_name
WHERE column_name IS NULL;
```

E.g:
```
SELECT *
    FROM student
    WHERE age IS NULL;
```

IS NOT NULL Syntax:

```
SELECT column_names
FROM table_name
WHERE column_name IS NOT NULL;
```

E.g:
```
SELECT *
    FROM student
    WHERE age IS NOT NULL;
```

LIMIT Command

- The LIMIT clause is used to specify the number of records to return.
- The LIMIT clause is useful on large tables with thousands of records. Returning a large number of records can impact performance.

Syntax:

```
SELECT column_list
FROM table_name
LIMIT offset, count;
```

E.g:

```
SELECT * FROM Emp_info
LIMIT 3,7;
```

ORDER BY Clause

- The ORDER BY clause is used to sort the result-set in ascending or descending order.
- The ORDER BY clause sorts the records in ascending order by default.
- To sort the records in descending order, use the DESC keyword.

Syntax:

```
SELECT column1, column2, ...
FROM table_name
ORDER BY column1, column2, ... ASC|DESC;
```

E.g:

```
SELECT * FROM Emp_info
ORDER BY City;
```

```
SELECT * FROM CUSTOMERS
ORDER BY NAME DESC;
```

Renaming Attributes or SQL Aliases

- SQL aliases are used to give a table, or a column in a table, a temporary name.
- Aliases are often used to make column names more readable.
- An alias only exists for the duration of that query.
- An alias is created with the AS keyword.

Syntax:

```
SELECT column_name AS alias_name
FROM table_name;
```

E.g:

```
SELECT ID AS emp_ID, Name AS emp_name
FROM emp_info;
```

1. STRING():

String methods in SQL are useful for processing the string data type or manipulation of string values.

1. Concat:

The CONCAT() function adds two or more strings together.

Syntax: Select concat(‘string1’,’ string2’,….’ stringN’);

E.g: Select concat(‘xyz’,’ abc’);

Select concat(‘xyz’,’ ‘,’ abc’);

2. **Lower:** This function is used to convert the upper case character into lower case.

Syntax: select LOWER(text)

E.g: SELECT LOWER('GOOD MORNING');

```
SELECT LOWER(Name) AS LowercaseempName
FROM emp_info;
```

BUILT-IN SQL FUNCTIONS

- A function is **a set of SQL statements that perform a specific task**.
- Functions provides code reusability.
- If you have to repeatedly write large SQL scripts to perform the same task, you can create a function that performs that task.
- Next time instead of rewriting the SQL, you can simply call that function.
- There are 4 types of functions in sql,as follow:

1. String()
1. Math()
1. Date()
1. Aggregate()

3. Upper: This function converts the lower case character into the upper case.

Syntax: select UPPER(text)

E.g: SELECT UPPER('good morning');

```
SELECT UPPER(Name) AS UppercaseempName
FROM emp_info;
```

4. Replace: This function is used to replace all occurrences of the substring in a specified string with another string value.

Syntax: REPLACE(string, old_string, new_string)

E.g: SELECT REPLACE('Good Morning', 'Good', 'Happy');

SELECT REPLACE('Good Morning', 'G', 'F');

5. Reverse() : This function displays the character string in reverse order.

Syntax: REVERSE(string)

E.g: SELECT REVERSE('Good Morning');

```
SELECT REVERSE(Name) AS reversename
FROM emp_info;
```

6. Length() : This function returns the number of characters in a string, including trailing spaces.

Syntax: LENGTH(string)

E.g: SELECT LENGTH('Good Morning');

SELECT LENGTH(name) from emp_info;

7. Substring() : This function extracts a substring from a string that begins at a specific position and ends at a specific length.

Syntax: SUBSTRING(string, start, length)

E.g: SELECT SUBSTRING('Good morning', 1, 3) AS ExtractString;

```
SELECT SUBSTRING(Name, 1, 4) AS ExtractString
FROM emp_info;
```

8. Ltrim(): This function returns a string from a given string after removing all leading spaces.

Syntax: LTRIM(string)

E.g: SELECT LTRIM(' Hello world') AS LeftTrimmedString;

9. Rtrim(): This function returns a string from a given string after removing all trailing spaces.

Syntax: RTRIM(string)

E.g: SELECT RTRIM('Hello world ') AS RightTrimmedString;

Math() Functions:

- Mathematical functions are present in SQL which can be used to perform mathematical calculations.
- Some commonly used mathematical functions are given below:

1. **ABS(X):** This function returns the absolute value of a number.
   E.g: Select abs(-6);

1. **MOD(X,Y):** The variable X is divided by Y and their remainder is returned.
   E.g: Select mod(9,5);

1. **FLOOR(X):** This returns the largest integer value that is either less than X or equal to it.
   E.g: SELECT FLOOR(25.75)
   SELECT FLOOR(-13.5)

1. **CEIL(X):** This returns the smallest integer value that is either more than X or equal to it.
   E.g: SELECT CEILING(25.75)
   SELECT CEILING(-13.5)

5. **TRUNCATE(X,D):** Returns the number X, truncated to D decimal places. If D is 0, the result has no decimal point or fractional part.

E.g: SELECT TRUNCATE(123.321,2)

SELECT TRUNCATE(123.321,-1)

6. **EXP(X):** The EXP() function returns e raised to the power of a specified number.

E.g: SELECT EXP(2);

7. **POWER(X,Y) :** The POWER() function returns the value of a number raised to the power of another number.

E.g: SELECT POWER(4, 2);

8. **SQRT(X):** Return the square root of a number.

E.g: Select sqrt(144);

DATE Function

1. **CURDATE():** Returns the current date.

Syntax:

```
Select Curdate();
```

Eg:

```
create table orders
 (
  order_id int,
pro_name varchar(50),
order_date datetime default curdate(),
primary key(order_id));

insert into orders (order_id,pro_name) values (102,'Pen');
```

1. **Now():** Returns the current date and time.

Syntax:

```
SELECT NOW();
```

1. **Sysdate():** Returns the system's current date & time.

Syntax:

```
SELECT SYSDATE();
```

4. **Last_day(date):** Returns the last day of the corresponding month for a date or datetime value.

Syntax:
Select last_day(date);

E.g:
Select last_day(‘2022-03-12’);

5. **Date_format(date, format):** To format a date value to a specific format, you use the DATE_FORMAT function.

Syntax:
DATE_FORMAT(date,format)

E.g:
DATE_FORMAT(NOW(),'%b %d %Y %h:%i %p')
DATE_FORMAT(NOW(),'%m-%d-%Y')
DATE_FORMAT(NOW(),'%d %b %y')

6. **DATEDIFF():** The DATEDIFF() function returns the time between two dates.

Syntax: DATEDIFF(date1,date2)

E.g: SELECT DATEDIFF('2014-11-30','2014-11-29') AS DiffDate

7. **MONTH(date):** Returns the month for date, in the range 1 to 12 for January to December, or 0 for dates such as '0000-00-00' or '2008-00-00' that have a zero month part.

Syntax: Select month(date);
E.g: select month(now());

8. **YEAR(date):** Returns the year for date, in the range 1000 to 9999, or 0 for the "zero" date.

Syntax: Select year(date);
E.g: select year(now());

Aggregate() Function

- An aggregate function in SQL returns one value after calculating multiple values of a column.
- Aggregate functions are also known as group functions.

1. **AVG():** The AVG() function calculates the average of a set of values.

   Syntax:
   Select avg(column_name) as alias_name from table_name;

   E.g:
   Select avg(salary) as avg_sal from emp_info;

1. **Count():** The COUNT() function returns the number of rows in a database table.

   Syntax:
   Select count(column_name) from table_name;

   E.g:
   Select count(name) from emp_info;

3. **Max():** The MAX() function returns the maximum value of the selected column.

Syntax: SELECT MAX(column_name) FROM table_name;

E.g: Select max(salary) from emp_info;

4. **Min():** The MIN() function returns the minimum value of the selected column.

Syntax:
SELECT MIN(column_name) FROM table_name;

E.g:
Select min(age) from emp_info;

5. **Sum():** The SUM() function returns the total sum of a numeric column.

Syntax:
SELECT SUM(column_name) FROM table_name;

E.g:
Select sum(age) from emp_info;

‘ Group By ‘ Clause

- The **Group By** statement is used along with the select statement for organizing similar data into groups.
- It is a command that is used to **group rows that have the same values**.
- The GROUP BY clause is used in the SELECT statement. Optionally it is used in conjunction with aggregate functions to produce summary reports from the database.
- It is used to summarize data from the database.

Points to remember:

- **The SELECT** statement is used with the **GROUP BY** clause in the SQL query.
- **WHERE** clause is placed before the **GROUP BY** clause in **SQL**.
- **ORDER BY** clause is placed after the **GROUP BY** clause in **SQL**.

Syntax:

```
SELECT column1, function_name(column2)
FROM table_name
WHERE condition
GROUP BY column1, column2
ORDER BY column_name(asc|desc)
```

E.g: 1. Group by with Count() function:

SELECT CITY, COUNT (NAME) **FROM** Employee
GROUP BY CITY;

```
MariaDB [employee]> select city,count(name) from emp_info group by city;
+--------+-------------+
| city   | count(name) |
+--------+-------------+
| jaipur |           1 |
| mumbai |           2 |
| nagpur |           1 |
| pune   |           2 |
| thane  |           2 |
+--------+-------------+
```

2. Group by with sum() Function:
Select city,sum(salary) from emp_info
Group by City;

```
MariaDB [employee]> select city,sum(salary) from emp_info group by city;
+--------+-------------+
| city   | sum(salary) |
+--------+-------------+
| jaipur |       10000 |
| mumbai |       25000 |
| nagpur |        7000 |
| pune   |       44000 |
| thane  |       15000 |
+--------+-------------+
5 rows in set (0.001 sec)
```

Select age,city from emp_info group by age,city;

```
MariaDB [employee]> select * from emp_info;
+-----+---------+------+--------+--------+
| id  | name    | age  | city   | salary |
+-----+---------+------+--------+--------+
| 101 | aditi   |   25 | thane  |  10000 |
| 102 | riya    |   24 | pune   |  22000 |
| 103 | raj     |   27 | mumbai |   5000 |
| 104 | diya    |   28 | nagpur |   7000 |
| 105 | ravi    |   24 | jaipur |  10000 |
| 106 | priya   |   25 | thane  |   5000 |
| 107 | manisha |   28 | pune   |  22000 |
| 108 | seema   |   28 | mumbai |  20000 |
+-----+---------+------+--------+--------+
```

```
MariaDB [employee]> select age,city from emp_info group by age,city;
+------+--------+
| age  | city   |
+------+--------+
|   24 | jaipur |
|   24 | pune   |
|   25 | thane  |
|   27 | mumbai |
|   28 | mumbai |
|   28 | nagpur |
|   28 | pune   |
+------+--------+
```

Note: If the age is the same but the city is different, then a row is treated as a unique one .If the age and the city is the same for more than one row, then it’s considered a duplicate and only one row is shown.

3. Group by with min() function:

```
SELECT dept_id, MIN(salary) FROM employees
GROUP BY dept_id;
```

4. Group by with max() function:

```
SELECT dept_id, Max(salary) FROM employees
GROUP BY dept_id;
```

Having clause:

The HAVING clause places the condition in the groups defined by the GROUP BY clause in the SELECT statement.
The WHERE clause places conditions on the selected columns, whereas the HAVING clause places conditions on groups created by the GROUP BY clause.

Syntax:
SELECT column_Name1, column_Name2, ..., column_NameN aggregate_function_name(column_Name)
FROM table_name
GROUP BY column_Name1
HAVING condition;

Eg.

```
select sum(salary),city from emp_info
group by city
having sum(salary)>10000;
```

1. Using sum() function:

```
SELECT designation, SUM(salary)
FROM emp_info
GROUP BY designation
 HAVING SUM(salary) > 10000;
```

1. Using Count() function:

```
SELECT designation, COUNT(*)
FROM emp_info
WHERE salary > 2000
GROUP BY designation
 HAVING COUNT(*) > 2;
```

1. Using min() function:

```
SELECT designation, MIN(salary)
FROM emp_info
GROUP BY designation
 HAVING MIN(salary) > 5000;
```

4. Using max() function:

```
SELECT designation, Max(salary)
FROM emp_info
GROUP BY designation
 HAVING Max(salary) > 5000;
```

DIFFERENCE BETWEEN Having and Where Clause

1. WHERE clause in MySQL cannot be used with aggregate functions whereas HAVING clause can be used with aggregate functions. That means the WHERE clause in MySQL is used for filtering individual rows on a table whereas the HAVING clause in MySQL is used to filtering the groups which are created by the Group by Clause.
2. The WHERE comes before the GROUP BY clause. That means the WHERE clause filters rows before aggregate calculations are performed. On the other hand, the HAVING clause comes after GROUP by Clause. That means the HAVING clause filters rows after aggregate calculations are performed. So, from a performance standpoint, the HAVING Clause is slower than the WHERE Clause and should be avoided if possible.
3. WHERE and HAVING clauses can be used together in a single SELECT statement. In that case, the WHERE clause is applied first to filter individual rows. The rows are then grouped and aggregate calculations are performed, and then only the HAVING clause filters the groups in MySQL.
4. The MySQL WHERE clause can be used with Select, Insert, and Update statements whereas the HAVING clause can only be used with the Select statement.
5. We can use the Where clause without using the Group by Clause but we can not use the Having Clause without using the Group by Clause in MySQL.

Foreign Key

- The foreign key is used to link one or more than one table together. It is also known as the **referencing** key.
- In simple words you can say that, a foreign key in one table used to point primary key in another table.
- It means a foreign key field in one table refers to the primary key field of the other table.
- It identifies each row of another table uniquely that maintains the **referential integrity** in MySQL.
- A foreign key makes it possible to create a parent-child relationship with the tables.
- In this relationship, the parent table holds the initial column values, and column values of child table reference the parent column values.
- MySQL allows us to define a foreign key constraint on the child table.

MySQL defines the foreign key in two ways:

1. Using CREATE TABLE Statement
2. Using ALTER TABLE Statement

1. Using CREATE TABLE Statement:

Syntax:

```
[CONSTRAINT constraint_name]
FOREIGN KEY [foreign_key_name] (col_name, ...)
REFERENCES parent_tbl_name (col_name,...)
ON DELETE referenceOption
ON UPDATE referenceOption
```

MySQL contains different referential options, which are given below:

CASCADE: It is used when we delete or update any row from the parent table, the values of the matching rows in the child table will be deleted or updated automatically.

RESTRICT: It is used when we delete or update any row from the parent table that has a matching row in the reference(child) table, MySQL does not allow to delete or update rows in the parent table.

SET NULL: With this ON UPDATE and ON DELETE clauses option, if the referenced values in the parent table are deleted or modified, all related values in the child table are set to NULL value.

NO ACTION: When the ON UPDATE or ON DELETE clauses are set to NO ACTION, the performed update or delete operation in the parent table will fail with an error.

- create database data1;
- use dh1;
- create table demo1(id int,name varchar(66),primary key(id));
- insert into demo1 values(1,'Aditi');
- insert into demo1 values(2,'simran');
- select * from demo1;
- create table emp(e_id int,name varchar(88),id int,primary key(e_id),foreign key(id)references demo1(id));
- insert into emp values(11,'xyz',1);
- insert into emp values(13,'pqr',2);
- select * from emp;
- create table stud(s_id int,s_name varchar(88),age int,id int,e_id int,primary key(s_id),foreign key(id)references demo1(id),foreign key(e_id)references emp(e_id));
- insert into stud values(111,'amit',9,1,11);
- insert into stud values(112,'riya',9,1,11);
- select * from stud;

2. Using ALTER TABLE Statement:

```
ALTER TABLE Contact ADD CONSTRAINT fk_person
FOREIGN KEY (PERSON_ID ) REFERENCES Person (PERSON_ ID ) ON DELETE CASCADE ON UPDATE RESTRICT;
```

Table: Person

```
CREATE TABLE Person (
  PERSON_ID INT NOT NULL AUTO_INCREMENT,
  Name varchar(50) NOT NULL,
  City varchar(50) NOT NULL,
  PRIMARY KEY (PERSON_ID)
);
```

Table: Contact

```
CREATE TABLE Contact (
  C_ID INT,
  Person_Id INT,
  Info varchar(50) NOT NULL,
  Type varchar(50) NOT NULL
);
```

DROP Foreign Key:

Syntax: (Perform both the steps one below the other)

i.) **ALTER TABLE** table_name **DROP FOREIGN KEY** fk_constraint_name(Constraint_name);

ii.) **ALTER TABLE** table_name **Drop** key constraint_name;

For eg:

ALTER TABLE contact **DROP FOREIGN KEY** fk_customer;

ALTER TABLE contact **Drop** key fk_customer;

Note:

To find the constraint_name:

show create table table_name;

For e.g.:

show create table student;

Sub-queries

- A subquery is a SELECT statement which is used in another SELECT statement.
- Subqueries are very useful when you need to select rows from a table with a condition that depends on the data of the table itself.
- You can use the subquery in the SQL clauses including WHERE clause, HAVING clause, FROM clause etc.
- The subquery can also be referred as nested SELECT, sub SELECT or inner SELECT.
- In general, the subquery executes first and its output is used in the main query or outer query.

Guidelines for using a subquery:

- Enclose subqueries in ().
- Place subqueries on the right side of the comparison operator.
- Do not add an ORDER BY clause to a subquery.
- Use single-row operators with single-row subqueries. (<,>,<=,>=,<>)
- Use multiple-row operators with multiple-row subqueries (IN, ANY, ALL).
- We can write a sub query with in a subquery.

There are two types of subqueries:

1. Single Row Subqueries:

- The subquery returns only one row i.e It returns only one row from the inner select statement.
- Use single row comparison operators like =, > etc while doing comparisons.

2. Multiple Row Subqueries:

- The subquery returns more than one row i.e It returns more than one row from the inner select statement.
- Use multiple row comparison operators like IN, ANY, ALL in the comparisons.

1. SINGLE ROW SUBQUERIES:

When we want to find out the employees of an office in which GEORGE is working.

```
SELECT officeCode FROM employees
WHERE firstname = 'George';
```

Once it returns the office code (let us say 3) you would then give

```
SELECT firstName, lastName FROM employees
WHERE officeCode = 3;
```

This can be done using the subquery as follows:

```
SELECT firstName, lastName FROM employees
WHERE officeCode = (SELECT officeCode FROM employees
WHERE firstname = 'George');
```

1. Write a query to find the salary of employees whose salary is greater than the salary of employee whose id is 100?

```
SELECT EMPLOYEE_ID,
 SALARY
FROM EMPLOYEES
WHERE SALARY >
                (
  SELECT SALARY
  FROM EMPLOYEES
  WHERE EMPLOYEED_ID = 100
  )
```

2. Write a query to find the employees who all are earning the highest salary?

```
SELECT EMPLOYEE_ID,
 SALARY
FROM EMPLOYEES
WHERE SALARY =
  (
  SELECT  MAX(SALARY)
  FROM EMPLOYEES
  )
```

3. Write a query to find the departments in which the least salary is greater than the highest salary in the department of id 200?

```
SELECT DEPARTMENT_ID,

 MIN(SALARY)

FROM EMPLOYEES

GROUP BY DEPARTMENT_ID

HAVING MIN(SALARY) >

  (

  SELECT MAX(SALARY)

  FROM EMPLOYEES

  WHERE DEPARTMENT_ID = 200

  )
```

Multiple Row Subqueries

- They are queries that return more than one row from the inner select statement.
- You may use the IN, ANY, or ALL operator in outer query to handle a subquery that returns multiple rows.

ID	NAME	CITY	SALARY	DEPT_NO	DESIGNATION
1	ADITI	THANE	30000	5	HR
2	JOHN	PUNE	40000	5	HR
3	SMITH	NAGPUR	25000	4	MANAGER
4	RAVI	MUMBAI	43000	4	ANALYST
5	RIYA	NAGPUR	38000	5	CLERK
6	TINA	MUMBAI	25000	5	ANALYST

Subquery with 'IN':

Returns values equal to any member in the list.

E.g: Display all the employees who are in same office as ‘Tom’ or ‘Martin’.

```
SELECT firstName, lastName FROM employees
WHERE officeCode IN (SELECT officeCode FROM employees
WHERE firstName IN (‘Tom’, ‘Martin’));
```

```
SELECT Name,City FROM emp_info
WHERE dept_no IN (SELECT dept_no FROM emp_info
WHERE Name IN (‘Tom’, ‘Martin’));
```

Subquery with 'ANY':

Returns values compared to each value returned by the subquery.

```
Select f_name from employee
        where salary > Any (20000,25000,30000);
```

Note: > Any → 'More than minimum.

```
Select f_name from employee
        where salary < Any (20000,25000,30000);
```

Note: < Any → 'Less than the maximum'.

```
Select f_name from employee
        where salary > Any (Select salary from employee where dept_no=5);
```

```
Select f_name from employee
        where salary < Any (Select salary from employee where dept_no=5);
```

Subquery with 'ALL':

Returns values compared to every value returned by the subquery.

```
Select f_name from employee
        where salary > All (20000,25000,30000);
```

Note: > All→ 'More than maximum.

```
Select f_name from employee
        where salary < All (20000,25000,30000);
```

Note: < All → 'Less than minimum.

```
Select f_name from employee
        where salary > All (Select salary from employee where dept_no=5);
```

```
Select f_name from employee
        where salary < All (Select salary from employee where dept_no=5);
```

1. Write a query to find the employees whose salary is equal to the salary of at least one employee in department of id 300?

```
SELECT EMPLOYEE_ID,

 SALARY

FROM EMPLOYEES

WHERE SALARY IN

  (

  SELECT  SALARY

  FROM EMPLOYEES

  WHERE DEPARTMENT_ID = 300

  )
```

2. Write a query to find the employees whose salary is greater than at least on employee in department of id 500?

```
SELECT EMPLOYEE_ID,

 SALARY

FROM EMPLOYEES

WHERE SALARY > ANY

  (

  SELECT  SALARY

  FROM EMPLOYEES

  WHERE DEPARTMENT_ID = 500

  )
```

3.) Write a query to find the employees whose salary is less than the salary of all employees in department of id 100?

```
SELECT EMPLOYEE_ID,
 SALARY
FROM EMPLOYEES
WHERE SALARY < ALL
  (
  SELECT  SALARY
  FROM EMPLOYEES
  WHERE DEPARTMENT_ID = 100
  )
```