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Index

S. No.	Title of the Experiment	Signature	Remark
1.	What is SQL? Also explain rules and data types of SQL.		
2.	What is DDL? Explain its Commands.		
3.	What is DML? Explain its Commands.		
4.	What is DQL? Explain its Commands.		
5.	Write a SQL query to create a table.		
6.	Write a SQL query to insert a new row in table.		
7.	Write a SQL query to insert a new value in table.		
8.	Write a SQL query to insert a column in existing table.		
9.	Write a SQL query to drop a column from existing table.		
10.	Write a SQL query to update a value in table.		
11.	Write a SQL query to delete a value from a table.		
12.	Write a SQL query to create view and index.		

Program #1

What is SQL? Also explain rules and data types of SQL.

SQL(Structure Query Language)

SQL stands for Structured Query Language. Structure Query Language (SQL) is a database query language used for storing and managing data in Relational DBMS. SQL was the first commercial language introduced for E.F Codd's **Relational** model of database. Today almost all RDBMS (MySql, SQL server, Oracle, Informix, Sybase, MS Access, POstgres) use **SQL** as the standard database query language. It enables a user to create, read, update and delete relational databases and tables.

Rules:

SQL follows the following rules:

- Structure query language is not case sensitive. Generally, keywords of SQL are written in uppercase.
- Statements of SQL are dependent on text lines. We can use a single SQL statement on one or multiple text line.
- Using the SQL statements, we can perform most of the actions in a database.
- SQL depends on tuple relational calculus and relational algebra.

Characteristics of SQL

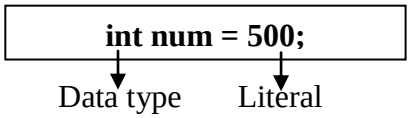
- SQL is easy to learn.
- SQL is used to access data from relational database management systems.
- SQL can execute queries against the database.
- SQL is used to describe the data.
- SQL is used to define the data in the database and manipulate it when needed.
- SQL is used to create and drop the database and table.
- SQL is used to create a view, stored procedure, function in a database.
- SQL allows users to set permissions on tables, procedures, and views.

SQL Data type and literals

SQL Data Type is an attribute that specifies the type of data of any object. Each column, variable and expression has a related data type in SQL. We can use these data types while creating our tables. We can choose a data type for a table column based on our requirement.

- SQL Data type is used to define the values that a column can contain.
- Every column is required to have a name and data type in the database table.

Data types are those which specify the type of data represented by the variable and literal is the value that is stored in to the variable.



Datatype	Use	Literal
INT	used for columns which will store integer values.	050 ,78, -14, 0 , +32767
FLOAT	used for columns which will store float values.	6.2, 2.9, 55.89
VARCHAR	used for columns which will be used to store characters and integers, basically a string.	'Hello world!'
DATE	used for columns which will store date values.	'1978-12-25';
TIME	used for columns which will store time values.	‘12:01:01';
TEXT	used for columns which will store text which is generally long in length. For example, if you create a table for storing profile information of a social networking website, then for **about me** section you can have a column of type TEXT.	‘Hello Myself John. I am a database designer. ’

Program #2

What is DDL? Explain its Commands.

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

1.	**CREATE** It is used to create a new table in the database. **Syntax:** CREATE TABLE TABLE_NAME (COLUMN_NAME DATATYPES [,....]); **Example:** CREATE TABLE Student(St_Name VARCHAR2(20), Stu_id int (20), Email VARCHAR2(100), DOB DATE);
2.(a)	**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:** To add a new column in the table ALTER TABLE *table_name* ADD *column_name datatype*; EXAMPLE ALTER TABLE Students ADD Address varchar(255);
(b)	To delete a column in a table ALTER TABLE *table_name* DROP COLUMN *column_name*; Example

	ALTER TABLE Students DROP COLUMN address;
(c)	To change the data type of a column in a table ALTER TABLE *table_name* ALTER COLUMN *column_name datatype*; Example ALTER TABLE Persons ALTER COLUMN DateOfBirth year;
3.	**DROP:** It is used to drop an existing table in a database. It is used to delete both the schema/structure and record stored in the table. DROP is permanently lost and it cannot be rolled back. **Syntax** DROP TABLE *table_name*; Example DROP TABLE Employees;
4.	**TRUNCATE:** It is used to delete all the rows from the table and free the space containing the table. **Syntax:** TRUNCATE TABLE *table_name*;

Program #3

What is DML? Explain its Commands.

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

1.(a)	**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* (*column1*, *column2*, *column3*, ...) VALUES (*value1*, *value2*, *value3*, ...); Example INSERT INTO Customers (CustomerName, City, Country) VALUES ('Ramesh', Moradabad','India');
(b)	For adding values for all the columns of the table, we do not need to specify the column names in the SQL query. INSERT INTO *table_name* VALUES (*value1*, *value2*, *value3*, ...);
2.	**UPDATE:** This command is used to update or modify the value of a column in the table. **Syntax:** UPDATE *table_name* SET *column1 = value1*, *column2 = value2*, ... WHERE *condition*;

	Example UPDATE Students SET Stu_Add = 'Rampur', Phone= '4568233545' WHERE St_rollno = 184524552;
3.	**DELETE:** It is used to remove one or more row from a table. **Syntax:** DELETE FROM *table_name* WHERE *condition*; Example DELETE FROM Students WHERE St_Id='1820530255';

Program #4

What is DQL? Explain its Commands.

Data Query Language

DQL is used to fetch the data from the database.

It uses only one command:

- SELECT

1.	SELECT: The SELECT statement is used to select data from a database. Syntax: SELECT *column1, column2, ...* FROM *table_name*; **Example** SELECT *stu_rollno ,stu_name, stu_add* FROM *student*; Or SELECT * FROM *student*; Or SELECT student_name FROM student WHERE age > 20; Select stu_roll, stu_name FROM student WHERE course=BCA;

Program #5

Write a SQL query to create a table.

```
mysql> CREATE TABLE  Students
    -> (
    -> St_roll_no int,
    -> St_FName varchar(50),
    -> St_LName varchar(50),
    -> Address varchar(50),
    -> City varchar(50),
    -> Email_id varchar(50)
    -> );
Query OK, 0 rows affected (0.14 sec)
```

Output

```
mysql> desc students;
+------------+-------------+------+-----+---------+-------+
| Field      | Type        | Null | Key | Default | Extra |
+------------+-------------+------+-----+---------+-------+
| St_roll_no | int(11)     | YES  |     | NULL    |       |
| St_FName   | varchar(50) | YES  |     | NULL    |       |
| St_LName   | varchar(50) | YES  |     | NULL    |       |
| Address    | varchar(50) | YES  |     | NULL    |       |
| City       | varchar(50) | YES  |     | NULL    |       |
| Email_id   | varchar(50) | YES  |     | NULL    |       |
+------------+-------------+------+-----+---------+-------+
6 rows in set (0.00 sec)
```

Program #6

Write a SQL query to insert a new row in table.

```
mysql> insert into students
    -> values
   -> (1750255, 'Rohan', 'Sharma', 'H.no-135, Near Pillikothi', 'Moradabad', 'rohansharma01@gmail.com');
Query OK, 1 row affected (0.00 sec)
```

Output

```
mysql> select * from students;
+------------+----------+----------+--------------------------+-----------+-------------------------+
| St_roll_no | St_FName | St_LName | Address                  | City      | Email_id                |
+------------+----------+----------+--------------------------+-----------+-------------------------+
|    1750255 | Rohan    | Sharma   | H.no-135, Near Pillikothi | Moradabad | rohansharma01@gmail.com |
+------------+----------+----------+--------------------------+-----------+-------------------------+
1 row in set (0.00 sec)
```

Program #7

Write a SQL query to insert a new value in table.

```
mysql> insert into students
    -> (St_FName,St_LName)
    -> values
    -> ('Mohan','Singh');
Query OK, 1 row affected (0.13 sec)
```

Output:

```
mysql> select * from students;
+------------+----------+----------+---------------------------+-----------+-------------------------+
| St_roll_no | St_FName | St_LName | Address                   | City      | Email_id                |
+------------+----------+----------+---------------------------+-----------+-------------------------+
|    1750255 | Rohan    | Sharma   | H.no-135, Near Pillikothi | Moradabad | rohansharma01@gmail.com |
|       NULL | Mohan    | Singh    | NULL                      | NULL      | NULL                    |
+------------+----------+----------+---------------------------+-----------+-------------------------+
2 rows in set (0.06 sec)
```

Program #8

Write a SQL query to insert a column in existing table.

```
mysql> alter table students
    -> add column phone_no int;
Query OK, 3 rows affected (0.59 sec)
```

Output

```
mysql> desc students;
+------------+-------------+------+-----+---------+-------+
| Field      | Type        | Null | Key | Default | Extra |
+------------+-------------+------+-----+---------+-------+
| St_roll_no | int(11)     | YES  |     | NULL    |       |
| St_FName   | varchar(50) | YES  |     | NULL    |       |
| St_LName   | varchar(50) | YES  |     | NULL    |       |
| Address    | varchar(50) | YES  |     | NULL    |       |
| City       | varchar(50) | YES  |     | NULL    |       |
| Email_id   | varchar(50) | YES  |     | NULL    |       |
| phone_no   | int(11)     | YES  |     | NULL    |       |
+------------+-------------+------+-----+---------+-------+
7 rows in set (0.06 sec)
```

Program #9

Write a SQL query to drop a column from existing table.

```
mysql> alter table students
    -> drop column Email_id;
Query OK, 3 rows affected (0.08 sec)
```

Output

```
mysql> desc students;
+------------+-------------+------+-----+---------+-------+
| Field      | Type        | Null | Key | Default | Extra |
+------------+-------------+------+-----+---------+-------+
| St_roll_no | int(11)     | YES  |     | NULL    |       |
| St_FName   | varchar(50) | YES  |     | NULL    |       |
| St_LName   | varchar(50) | YES  |     | NULL    |       |
| Address    | varchar(50) | YES  |     | NULL    |       |
| City       | varchar(50) | YES  |     | NULL    |       |
| phone_no   | int(11)     | YES  |     | NULL    |       |
+------------+-------------+------+-----+---------+-------+
6 rows in set (0.00 sec)
```

Program #10

Write a SQL query to update a value in table.

```
mysql> update students
    -> set St_LName= 'Shrivastava'
    -> where St_roll_no=1750255;
Query OK, 1 row affected (0.03 sec)
```

Output

```
mysql> select * from students;
+------------+----------+-------------+---------------------------+-----------+----------+
| St_roll_no | St_FName | St_LName    | Address                   | City      | phone_no |
+------------+----------+-------------+---------------------------+-----------+----------+
|    1750255 | Rohan    | Shrivastava | H.no-135, Near Pillikothi | Moradabad |        0 |
|       NULL | Mohan    | Singh       | NULL                      | NULL      |     NULL |
+------------+----------+-------------+---------------------------+-----------+----------+
2 rows in set (0.00 sec)
```

Program #11

Write a SQL query to delete a value from a table.

```
mysql> delete from students
    -> where St_FName='Mohan';
Query OK, 1 row affected (0.00 sec)
```

Output

```
mysql> select * from students;
+------------+----------+-------------+---------------------------+-----------+----------+
| St_roll_no | St_FName | St_LName    | Address                   | City      | phone_no |
+------------+----------+-------------+---------------------------+-----------+----------+
|    1750255 | Rohan    | Shrivastava | H.no-135, Near Pillikothi | Moradabad |        0 |
+------------+----------+-------------+---------------------------+-----------+----------+
1 row in set (0.00 sec)
```

Program #12

Write a SQL query to create view and index.

Create View

```
mysql> CREATE VIEW RollNo AS
    -> select st_roll_no from students;
```

Query OK, 0 rows affected (0.19 sec)

Output

```
mysql> desc RollNo;
+------------+---------+------+-----+---------+-------+
| Field      | Type    | Null | Key | Default | Extra |
+------------+---------+------+-----+---------+-------+
| st_roll_no | int(11) | YES  |     | NULL    |       |
+------------+---------+------+-----+---------+-------+
1 row in set (0.07 sec)

mysql> select * from rollno;
+------------+
| st_roll_no |
+------------+
|    1750255 |
+------------+
1 row in set (0.00 sec)
```

Create Index

```
mysql> CREATE INDEX index_stu
    ->   ON students (st_roll_no,st_FName);
```

Query OK, 1 row affected (0.23 sec)

Output

```
mysql> SHOW INDEXES FROM students;
+----------+------------+----------+--------------+-------------+-----------+-------------+----------+--------+------+------------+---------+---------------+
| Table    | Non_unique | Key_name | Seq_in_index | Column_name | Collation | Cardinality | Sub_part | Packed | Null | Index_type | Comment | Index_comment |
+----------+------------+----------+--------------+-------------+-----------+-------------+----------+--------+------+------------+---------+---------------+
| students |          1 | index_stu |            1 | St_roll_no  | A         |        NULL |     NULL | NULL   | YES  | BTREE      |         |               |
| students |          1 | index_stu |            2 | St_FName    | A         |        NULL |     NULL | NULL   | YES  | BTREE      |         |               |
+----------+------------+----------+--------------+-------------+-----------+-------------+----------+--------+------+------------+---------+---------------+
2 rows in set (0.06 sec)
```