Starting with basic SQL Syntax

Types of Tables, Create Database statement, Drop database Statement, Use statement, Create table Statement, Drop table Statement, Create index Statement, Drop index Statement, Describe Statement, Truncate Statement, Alter table Statement, Insert INTO Statement, Update table Statement, Delete table Statement, Commit Statement

Create SQL Tables, Specify Column data types, Create user Defined Types, Specify Column Default Values, Alter SQL Tables, Updating Data, Using WHERE Clause, Using Logical operations, AND operations, OR operations, Deleting SQL table.

Quick Summary -

- SQL stands for Structured Query Language and is used to manage relational databases. ● Tables are used to store data in a relational database. Each table has a set of columns and rows. ● The CREATE DATABASE statement is used to create a new database.
- The DROP DATABASE statement is used to delete an existing database.
- The USE statement is used to select a database to use.
- The CREATE TABLE statement is used to create a new table in a database.
- The DROP TABLE statement is used to delete an existing table.
- The CREATE INDEX statement is used to create an index on a table for faster data retrieval.
- The DROP INDEX statement is used to remove an existing index.
- The DESCRIBE statement is used to display the structure of a table.
- The TRUNCATE statement is used to delete all data from a table.
- The ALTER TABLE statement is used to modify the structure of an existing table.
- The INSERT INTO statement is used to add new data to a table.
- The UPDATE statement is used to modify existing data in a table.
- The DELETE statement is used to delete data from a table.
- The COMMIT statement is used to save changes made to the database.

It's also important to understand the different types of data that can be stored in tables, such as text (VARCHAR), numbers (INT, FLOAT), and dates (DATE, DATETIME). You can also create user-defined data types to customize the way data is stored. Logical operators like AND and OR can be used to filter data based on multiple conditions, and WHERE clauses are used to filter data based on specific criteria.

Note: All the questions must be answered with the help of examples.

Questions:

Level: Remembering (Easy)

1. What is the purpose of the CREATE TABLE statement in SQL?
2. How do you create a new database in SQL using the CREATE DATABASE statement?
3. What is the purpose of the TRUNCATE statement in SQL?
4. How do you specify the data type of a column when creating a new table in SQL? 5. What is the difference between the ALTER TABLE and UPDATE TABLE statements in SQL?

Solutions:

1. **The CREATE TABLE statement** is used to create a new table in a database. For example, the following SQL statement creates a table named "students" with three columns - "id", "name", and "age" - where "id" is an integer, "name" is a string of up to 50 characters, and "age" is also an integer:

```
CREATE TABLE students (
  id INT,
  name VARCHAR(50),
  age INT
);
```

—----------

2. **To create a new database in SQL,** the CREATE DATABASE statement is used. For example, the following SQL statement creates a database named "mydatabase":

```
CREATE DATABASE mydatabase;
```

—----------

3. **The TRUNCATE statement** is used to delete all data in a table while preserving the structure of the table. For example, the following SQL statement truncates the "students" table:

```
TRUNCATE TABLE students;
```

—----------

4. When creating a new table in SQL, the data type of each column must be specified. This is done using the data type keywords such as INT, VARCHAR, DATE, etc. For example, the following SQL statement creates a table named "orders" with four columns - "order_id", "customer_id", "order_date", and "total_price"

```
CREATE TABLE orders (
  order_id INT,
```

```
  customer_id INT,
  order_date DATE,
  total_price DECIMAL(10,2)
);
```

—----------

5. **The ALTER TABLE statement** is used to modify the structure of a table, such as adding or removing columns or constraints. For example, the following SQL statement adds a new column named "email" to the "customers" table:

```
ALTER TABLE customers

ADD COLUMN email VARCHAR(50);
```

On the other hand, the **UPDATE TABLE statement** is used to modify data within the table, such as changing the values in a specific column. For example, the following SQL statement updates the "age" of a student with "id" equal to 1:

```
UPDATE students
SET age = 20
WHERE id = 1;
```

Level: Understanding (Easy)

1. What is an index in SQL and how does it improve query performance?
2. How do you use the WHERE clause in a SQL query to filter rows based on a specific condition?
3. How do you use the AND and OR operators in a SQL query to combine multiple conditions? 4. How do you specify a default value for a column when creating a new table in SQL? 5. How do you update data in a SQL table using the UPDATE statement, and what precautions should you take to ensure data integrity?

Solutions:

1. An index in SQL is a data structure that improves the speed of data retrieval operations on a table by providing quick access to specific rows. It is created on one or more columns of a table and can be used to efficiently search for rows based on the values in those columns.

For example, if you have a large customer table with a column for last name, you could create an index on the last name column to quickly find all customers with a specific last name.

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2. The WHERE clause in a SQL query is used to filter rows based on a specific condition. For example, if you have a customer table with columns for first name, last name, and email, you could use the WHERE clause to find all customers with the last name "Smith":

SELECT * FROM customers WHERE last_name = 'Smith';

—----------

3. The AND and OR operators in a SQL query are used to combine multiple conditions. The AND operator is used to retrieve rows that meet all of the specified conditions, while the OR operator is used to retrieve rows that meet at least one of the specified conditions.

For example, if you have a customer table with columns for first name, last name, and email, you could use the AND operator to find all customers with the last name "Smith" and the email "john@example.com":

SELECT * FROM customers WHERE last_name = 'Smith' AND email = 'john@example.com';

You could use the OR operator to find all customers with the last name "Smith" or the last name "Johnson":

SELECT * FROM customers WHERE last_name = 'Smith' OR last_name = 'Johnson';
—----------

4. To specify a default value for a column when creating a new table in SQL, you can use the DEFAULT keyword followed by the value you want to use as the default.

For example, if you have a customer table with columns for first name, last name, and phone number, and you want to set the default phone number to "555-555-5555", you could create the table with the following SQL statement:

```
CREATE TABLE customers (
  first_name VARCHAR(50),
  last_name VARCHAR(50),
  phone VARCHAR(20) DEFAULT '555-555-5555'
);
```

—----------

5. To update data in a SQL table using the UPDATE statement, you can use the following syntax:

UPDATE table_name SET column1 = value1, column2 = value2 WHERE condition;

For example, if you have a customer table with columns for first name, last name, and phone number, and you want to update the phone number for a specific customer with the last name "Smith", you could use the following SQL statement:

UPDATE customers SET phone = '555-555-1234' WHERE last_name = 'Smith';

To ensure data integrity when updating data in a SQL table, you **should always use the WHERE clause to specify the rows you want to update** and include a condition that ensures only the correct rows are affected. You should also make sure to backup your data before performing any updates, in case something goes wrong during the update process.
Level: Applying (Medium)

1. How do you create a user-defined data type in SQL, and what are some use cases? 2. How do you drop a table and all its associated indexes in SQL using a single statement? 3. What is the purpose of the COMMIT statement in SQL, and when should it be used? 4. How do you use the DESCRIBE statement in SQL to view the structure of a table? 5. How do you use the WHERE clause in a SQL query to filter rows based on a specific condition? 6. How do you use the AND and OR operators in a SQL query to combine multiple conditions?

1. How do you create a user-defined data type in SQL, and what are some use cases? To create a user-defined data type in SQL, you can use the CREATE TYPE statement. This allows you to define a new data type with a name and set of attributes. Some use cases for user-defined data types include creating custom data types for specific business needs or defining complex data structures that can be reused across multiple tables.

Example:

```
CREATE TYPE EmployeeName AS VARCHAR(50);
CREATE TABLE Employee (
  EmployeeId INT PRIMARY KEY,
  Name EmployeeName
);
```

—----------

2. How do you drop a table and all its associated indexes in SQL using a single statement? To drop a table and all its associated indexes in SQL using a single statement, you can use the DROP TABLE statement with the CASCADE option. This will automatically drop all indexes and constraints associated with the table.

Example:

```
DROP TABLE Employee CASCADE;
```

—----------

3. What is the purpose of the COMMIT statement in SQL, and when should it be used? The COMMIT statement in SQL is used to permanently save changes made to a database. It should be used after any INSERT, UPDATE, or DELETE statements to ensure that the changes are committed to the database.
Example:

```
BEGIN TRANSACTION;
UPDATE Employee SET Salary = 50000 WHERE EmployeeId = 1;
COMMIT;
```

—----------

4. How do you use the DESCRIBE statement in SQL to view the structure of a table? To view the structure of a table in SQL using the DESCRIBE statement, you can use the following syntax:

```
DESCRIBE TableName;
```

This will show you the column names, data types, and any constraints associated with the table.

Example:

```
DESCRIBE Employee;
```

—----------

5. How do you use the WHERE clause in a SQL query to filter rows based on a specific condition? To use the WHERE clause in a SQL query to filter rows based on a specific condition, you can include the WHERE keyword followed by the condition you want to filter on. For example, to select all employees with a salary greater than 50000:

```
SELECT * FROM Employee WHERE Salary > 50000;
```

—----------

6. How do you use the AND and OR operators in a SQL query to combine multiple conditions?

To use the AND operator in a SQL query to combine multiple conditions, you can include the keyword AND between each condition. For example, to select all employees with a salary greater than 50000 and a job title of 'Manager':

```
SELECT * FROM Employee WHERE Salary > 50000 AND JobTitle = 'Manager';
```

To use the OR operator in a SQL query to combine multiple conditions, you can include the keyword OR between each condition. For example, to select all employees with a job title of 'Manager' or 'Director':

```
SELECT * FROM Employee WHERE JobTitle = 'Manager' OR JobTitle = 'Director';
```

SCENARIO BASED CHALLENGE QUESTIONS: SELF PROBLEM-SOLVING TASK

Scenario 1:

You have been hired as a data analyst for a hospital. The hospital has a database that stores information about their patients, including patient ID, patient name, and admission date. Your task is to write an SQL query to retrieve the number of patients who were admitted in the last month.

Question 1:

Write an SQL query to retrieve the number of patients who were admitted in the last month, given the following table schema:

```
patients (
  patient_id int,
  patient_name varchar(255),
  admission_date date
)
```

Expected Output 1:

The SQL query should return a single value: the number of patients who were admitted in the last month.

Hints 2:

Use the COUNT function to count the number of rows in the table.
Use the WHERE clause to filter the patients based on the admission date.
Use the BETWEEN operator to specify the range of dates for the last month.

Scenario 3:
You have been hired as a data analyst for a university. The university has a database that stores

information about their students, including student ID, student name, major, and GPA. Your task is to write an SQL query to retrieve the top 10 students with the highest GPA.

Question 2:

Write an SQL query to retrieve the top 10 students with the highest GPA, given the following table schema:

```
students (
  student_id int,
  student_name varchar(255),
  major varchar(255),
  gpa float
)
```

Expected Output 2:

The SQL query should return four columns: student_id, student_name, major, and gpa.

Hints 3:

Use the ORDER BY clause to sort the students based on the GPA column in descending order.
Use the LIMIT clause to limit the number of rows returned to 10.

Answers for Scenario task:

```
CREATE DATABASE hospital;
use hospital;
Scenario-1:
/*
You have been hired as a data analyst for a hospital. The hospital has a database that stores
information about their patients, including patient ID, patient name, and admission date. Your task is
to write an SQL query to retrieve the number of patients who were admitted in the last month.
*/
CREATE TABLE patient (
ID INT PRIMARY key,
NAMES VARCHAR(200),
ADMISSION_DATE date
);

INSERT INTO patient (ID, NAMES, ADMISSION_DATE)
```

```
VALUES
(1, 'John Smith', '2023-04-01'),
(2, 'Jane Doe', '2023-01-02'),
(3, 'Bob Johnson', '2023-04-03'),
(4, 'Sara Lee', '2023-01-04'),
(5, 'Mike Wilson', '2023-04-05'),
(6, 'Lisa Brown', '2023-04-06'),
(7, 'David Lee', '2023-02-07'),
(8, 'Amy Davis', '2023-04-08'),
(9, 'Eric Chen', '2023-04-09'),
(10, 'Emily Kim', '2023-04-10');

-- write an SQL query to retrieve the number of patients who were admitted in the last month.?
SELECT COUNT(*) FROM patient
WHERE MONTH(ADMISSION_DATE) = MONTH(NOW())-1;
```

Scenario-3:

```
/*
You have been hired as a data analyst for a university. The university has a database that stores
information about their students, including student ID, student name, major, and GPA. Your task is to

Q)Write an SQL query to retrieve the top 10 students with the highest GPA.
*/
CREATE TABLE students(
ID INT PRIMARY KEY,
NAMEs VARCHAR(200),
MAJOR VARCHAR(200),
GPA FLOAT);



INSERT INTO students (ID, NAMES, MAJOR, GPA)
VALUES
(1, 'John Smith', 'Computer Science', 3.5),
(2, 'Jane Doe', 'Mathematics', 3.8),
(3, 'Bob Johnson', 'Biology', 3.2),
(4, 'Sara Lee', 'Chemistry', 3.7),
(5, 'Mike Wilson', 'Psychology', 3.9),
```

(6, 'Lisa Brown', 'English', 3.6),
(7, 'David Lee', 'Physics', 3.1),
(8, 'Amy Davis', 'History', 3.4),
(9, 'Eric Chen', 'Economics', 3.9),
(10, 'Emily Kim', 'Political Science', 3.3),
(11, 'Rahul Sharma', 'Business', 3.5),
(12, 'Mira Patel', 'Computer Science', 3.8),
(13, 'Amit Singh', 'Engineering', 3.2),
(14, 'Neha Gupta', 'Marketing', 3.7),
(15, 'Kunal Shah', 'Finance', 3.9);

/* Your task is to
Q)Write an SQL query to retrieve the top 10 students with the highest GPA.*/
SELECT ID, NAMEs,GPA FROM Students
ORDER BY GPA DESC
LIMIT 10;

—---------- All the Best !! —---------