SQL interview questions
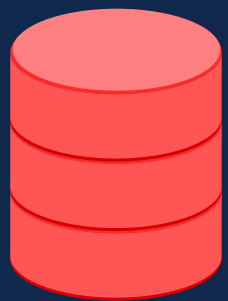
What is SQL?

SQL stands for Structured Query Language. It is the primary language to interact with databases. With the help of SQL, we can extract data from a database, modify this data and also update it whenever there is a requirement. This query language is evergreen and is widely used across industries. For example, if a company has records of all the details of their employees in the database. With the help of SQL, all of this data can be queried to find out valuable insights in a short span of time.

How to create a table in SQL?

The command to create a table in sql is extremely simple:

```
CREATE TABLE table_name (
    column1 datatype,
    column2 datatype,
    column3 datatype,
    ....
);
```

For example, if we want to create a simple employee table:

```sql
CREATE TABLE employee (
    name varchar(25),
    age int,
    gender varchar(25),
    ....
);
```

How to delete a table in SQL?

There are two ways to delete a table from sql: DROP and TRUNCATE. The DROP TABLE command is used to completely delete the table from the database. This is the command:
DROP TABLE table_name;
The above command will completely delete all the data present in the table along with the table itself.
But if we want to delete only the data present in the table but not the table itself, then we will use the truncate command:
DROP TABLE table_name ;

How to change a table name in SQL?

This is the command to change a table name in SQL:

ALTER TABLE table_name

RENAME TO new_table_name;

We will start off by giving the keywords ALTER TABLE, then we will follow it up by giving the original name of the table, after that, we will give in the keywords RENAME TO and finally, we will give the new table name.

For example, if we want to change the "employee" table to "employee_information", this will be the command:

ALTER TABLE employee

RENAME TO employee_information;

How to delete a row in SQL?

We will be using the DELETE query to delete existing rows from the table:

DELETE FROM table_name

WHERE [condition];

We will start off by giving the keywords DELETE FROM, then we will give the name of the table, after that we will give the WHERE clause and give the condition on the basis of which we would want to delete a row.

For example, from the employee table, if we would like to delete all the rows, where the age of the employee is equal to 25, then this will the command:

DELETE FROM employee

WHERE [age=25];

How to create a database in SQL?

A database is a repository in sql, which can comprise of multiple tables.

This will be the command to create a database in sql:

CREATE DATABASE database_name.

What is Normalizati -on in SQL?

Normalization is used to decompose a larger, complex table into simple and smaller ones. This helps us in removing all the redundant data.

What is join in SQL?

Joins are used to combine rows from two or more tables, based on a related column between them.

Types of Joins:

•**INNER JOIN** – Returns rows when there is a match in both tables.

•**LEFT JOIN** – Returns all rows from the left table, even if there are no matches in the right table.

•**RIGHT JOIN** – Returns all rows from the right table, even if there are no matches in the left table.

•**FULL OUTER JOIN** – Returns rows when there is a match in one of the tables.

•**SELF JOIN** – Used to join a table to itself as if the table were two tables, temporarily renaming at least one table in the SQL statement.

•**CARTESIAN JOIN (CROSS JOIN)** – Returns the Cartesian product of the sets of records from the two or more joined tables.

INNER JOIN:

The INNER JOIN creates a new result table by combining column values of two tables (table1 and table2) based upon the join-predicate. The query compares each row of table1 with each row of table2 to find all pairs of rows which satisfy the join-predicate.

SYNTAX :

```
 SELECT table1.col1, table2.col2,..., table1.coln

FROM table1

INNER JOIN table2

ON table1.commonfield = table2.commonfield;
```

LEFT JOIN:

The LEFT JOIN returns all the values from the left table, plus matched values from the right table or NULL in case of no matching join predicate.

SYNTAX :

```
 SELECT table1.col1, table2.col2,..., table1.coln
FROM table1
LEFT JOIN table2
ON table1.commonfield = table2.commonfield;
```

RIGHT JOIN:

The RIGHT JOIN returns all the values from the right table, plus matched values from the left table or NULL in case of no matching join predicate.

SYNTAX :

```
SELECT table1.col1, table2.col2,..., table1.coln
FROM table1
RIGHT JOIN table2
ON table1.commonfield = table2.commonfield;
```

FULL OUTER JOIN:

The FULL OUTER JOIN combines the results of both left and right outer joins. The joined table will contain all records from both the tables and fill in NULLs for missing matches on either side.

SYNTAX :

```
 SELECT table1.col1, table2.col2,..., table1.coln
FROM table1
Left JOIN table2
ON table1.commonfield = table2.commonfield;
Union
SELECT table1.col1, table2.col2,..., table1.coln
FROM table1
Right JOIN table2
ON table1.commonfield = table2.commonfield;
```

SELF JOIN:

The SELF JOIN joins a table to itself; temporarily renaming at least one table in the SQL statement.

SYNTAX:

```
SELECT a.col1, b.col2,..., a.coln
FROM table1 a, table1 b
WHERE a.commonfield = b.commonfield;
```

What is SQL server?

SQL Server comes under the category of Relational database management system.

How to insert date in SQL?

If the RDBMS is MYSQL, this is how we can insert date:

"INSERT INTO tablename (col_name, col_date) VALUES ('DATE: Manual Date', '2020-9-10')";

What is Primary Key in SQL?

Primary Key is a constraint in SQL. So, before understanding what exactly is a primary key, let's understand what exactly is a constraint in SQL.

How do I view tables in SQL?

To view tables in SQL, all you need to do is give this command:

Show tables;

What is PL/SQL

PL SQL stands for Procedural language constructs for Structured Query Language.

What is MYSQL?

How can I see all tables in SQL?

```
SELECT
  table_name
FROM
  User_tables;
```

This is how we can extract all tables in SQL Server:

```
SELECT
  *
FROM
  Information_schema.tables;
```

What is ETL in SQL?

ETL stands for Extract, Transform and Load. It is a three step process

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What is the update command in SQL?

The update command comes under the DML(Data Manipulation Langauge) part of sql and is used to update the existing data in the table.

UPDATE employees

SET last_name='Cohen'

WHERE employee_id=101;

With this update command, I am changing the last name of the employee.

How to rename column name in SQL Server?

When it comes to SQL Server, it is not possible to rename the column with the help of ALTER TABLE command, we would have to use sp_rename.

What are the types of SQL Queries?

We have four types of SQL Queries:

- **DDL** (Data Definition Language): the creation of objects
- **DML** (Data Manipulation Language): manipulation of data
- **DCL** (Data Control Language): assignment and removal of permissions
- **TCL** (Transaction Control Language): saving and restoring changes to a database

Write a Query to display the number of employees working in each region?

SELECT region, COUNT(gender)
FROM employee GROUP BY region;

What are Nested Triggers?

Triggers may implement DML by using INSERT, UPDATE, and DELETE statements. These triggers that contain DML and find other triggers for data modification are called Nested Triggers.

Write SQL query to fetch employee names having a salary greater than or equal to 20000 and less than or equal 10000.

By using BETWEEN in the where clause, we can retrieve the Employee Ids of employees with salary >= 20000and <=10000. SELECT FullName FROM EmployeeDetails WHERE EmpId IN (SELECT EmpId FROM EmployeeSalary WHERE Salary BETWEEN 5000 AND 10000)

Given a table Employee having columns empName and empId, what will be the result of the SQL query below?
select empName from Employee order by 2 asc;

"Order by 2" is valid when there are at least 2 columns used in SELECT statement. Here this query will throw error because only one column is used in the SELECT statement.
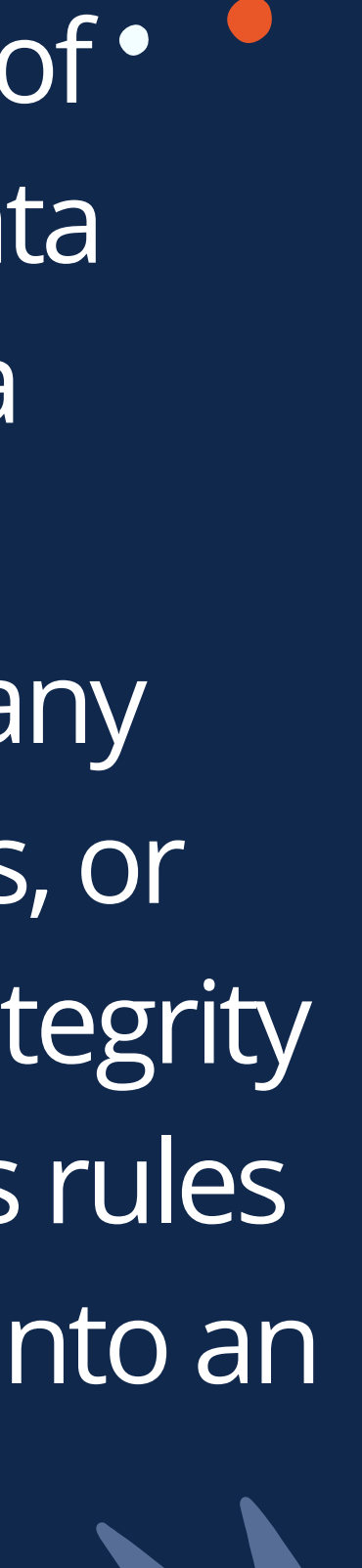
What is OLTP?

OLTP stands for Online Transaction Processing. And is a class of software applications capable of supporting transaction-oriented programs. An essential attribute of an OLTP system is its ability to maintain concurrency.

What is Data Integrity?

Data Integrity is the assurance of accuracy and consistency of data over its entire life-cycle, and is a critical aspect to the design, implementation and usage of any system which stores, processes, or retrieves data. It also defines integrity constraints to enforce business rules on the data when it is entered into an application or a database.

What is OLAP?

OLAP stands for Online Analytical Processing. And a class of software programs which are characterized by relatively low frequency of online transactions. Queries are often too complex and involve a bunch of aggregations.

Find the Constraint information from the table?

There are so many times where user needs to find out the specific constraint information of the table. following queries are useful, SELECT * From User_Constraints; SELECT * FROM User_Cons_Columns;

Can you get the list of employees with same salary?

Select distinct e.empid,e.empname,e.salary from employee e, employee e1 where e.salary =e1.salary and e.empid != e1.empid

What is an alternative for TOP clause in SQL?

1. ROWCOUNT function

2. Set rowcount 3

3. Select * from employee order by empid desc Set rowcount 0

Will following statement give error or 0 as output? SELECT AVG (NULL)

Error. Operand data type NULL is invalid for Avg operator.

What is the Cartesian product of the table?

The output of Cross Join is called a Cartesian product. It returns rows combining each row from the first table with each row of the second table. For Example, if we join two tables having 15 and 20 columns the Cartesian product of two tables will be 15×20=300 rows.

What is a schema in SQL?

schema is blueprint for the database

What is the WHERE clause in SQL?

The 'Where' clause is used to extract elements from the table on the basis of a condition.

How to delete a column in SQL?

To delete a column in SQL we will be using DROP COLUMN method:
ALTER TABLE employees
DROP COLUMN age;

What is a unique key in SQL?

Unique Key is a constraint in SQL.

How to implement multiple conditions using WHERE clause?

We can implement multiple conditions using AND, OR operators: SELECT * FROM employees WHERE first_name = 'Steven' AND salary <=10000;

What is SQL injection?

SQL injection is a hacking technique which is widely used by black-hat hackers to steal data from your tables or databases. Let's say, if you go to a website and give in your user information and password, the hacker would add some malicious code over there such that, he can get the user information and password directly from the database.

What is a trigger in SQL?

A trigger is a stored program in a database which automatically gives responses to an event of DML operations done by insert, update, or delete.

Let's look at an example of a trigger:

```sql
CREATE TRIGGER bank_trans_hv_alert
    BEFORE UPDATE ON bank_account_transaction
    FOR EACH ROW
    begin
    if( abs(:new.transaction_amount)>999999)THEN
  RAISE_APPLICATION_ERROR(-20000, 'Account transaction exceeding the daily
deposit on SAVINGS account.');
    end if;
    end;
```

How to insert multiple rows in SQL?

```
INSERT INTO table_name (column1, column2,column3...)
VALUES
    (value1, value2, value3......),
    (value1, value2, value3....),
    ...
    (value1, value2, value3);
```

```sql
INSERT INTO employees (
  name,
  age,
  salary)
VALUES
  (
    'Sam',
    21,
    75000
  ),
  (
    ' 'Matt',
    32,
    85000   ),

  (
    'Bob',
    26,
    90000
  );
```

How to find the nth highest salary in SQL?

SELECT TOP 1 salary FROM (SELECT DISTINCT TOP N salary FROM #Employee ORDER BY salary DESC) AS temp ORDER BY salary

How to copy table in SQL?

We can use the SELECT INTO statement to copy data from one table to another. Either we can copy all the data or only some specific columns.

This is how we can copy all the columns into a new table:

```sql
SELECT *
INTO newtable
FROM oldtable
WHERE condition;
```

If we want to copy only some specific columns, we can do it this way:

```sql
SELECT column1, column2, column3, ...
INTO newtable
FROM oldtable
WHERE condition;
```

How to add a new column in SQL?

We can add a new column in SQL with the help of alter command:
ALTER TABLE employees ADD COLUMN contact INT(10);

How to use LIKE in SQL?

The LIKE operator checks if an attribute value matches a given string pattern. Here is an example of LIKE operator

SELECT * FROM employees WHERE first_name like 'Steven';

If we drop a table, does it also drop related objects like constraints, indexes, columns, default, views and sorted procedures?

Yes, SQL server drops all related objects, which exists inside a table like constraints, indexex, columns, defaults etc. But dropping a table will not drop views and sorted procedures as they exist outside the table.

Can we disable a trigger? If yes, How?

Yes, we can disable a single trigger on the database by using "DISABLE TRIGGER triggerName ON<> We also have an option to disable all the trigger by using, "DISABLE Trigger ALL ON ALL SERVER"

What is a Live Lock?

A live lock is one where a request for an exclusive lock is repeatedly denied because a series of overlapping shared locks keep interferring. A live lock also occurs when read transactions create a table or page.

How to fetch alternate records from a table??

Records can be fetched for both Odd and Even row numbers- To display even numbers-. Select employeeId from (Select rowno, employeeId from employee) where mod(rowno,2)=0 To display odd numbers-. Select employeeId from (Select rowno, employeeId from employee) where mod(rowno,2)=1

Define COMMIT and give an example?

When a COMMIT is uded in a transaction all chnages made in the transaction are written into the database permanently. Example: BEGIN TRANSACTION; DELETE FROM HR.JobCandidate WHERE JobCandidateID = 20; COMMIT TRANSACTION; The above example deletes a job candidate in a SQL server.

Can you join table by itself?

A table can be joined to itself using self join, when you want to create a result set that joins records in a table with other records in the same table.

Explain Equi join with example

When two or more tables has been joined using equal to operator then this category is called as equi join. Just we need to concentrate on condition is equal to(=) between the columns in the table. Example: Select a.Employee_name,b.Department_name from Employee a,Employee b where a.Department_ID=b.Department_ID

How do we avoid getting duplicate entries in a query?

The SELECT DISTINCT is used to get distinct data from tables using a query. The below SQL query selects only the DISTINCT values from the "Country" column in the "Customers" table: SELECT DISTINCT Country FROM Customers;

How can you create an empty table from an existing table?

Lets take an example: Select * into studentcopy from student where 1=2 Here, we are copying student table to another table with the same structure with no rows copied.

Write a Query to display odd records from student table?

SELECT * FROM (SELECT *, ROW_NUMBER() OVER (ORDER BY student_no) AS RowID FROM student) WHERE row_id %2!=0

Explain Non Equi Join with example?

 When two or more tables are joining without equal to condition then that join is known as Non Equi Join. Any operator can be used here that is <>,!=,<,>,Between. Example: Select b.Department_ID,b.Department_name from Employee a,Department b where a.Department_id <> b.Department_ID;

How can you delete duplicate records in a table with no primary key?

By using the SET ROWCOUNT command. It limits the number of records affected by a command. Let's take an example, if you have 2 duplicate rows, you would SET ROWCOUNT 1, execute DELETE command and then SET ROWCOUNT 0

Difference between NVL and NVL2 functions?

Both the NVL(exp1, exp2) and NVL2(exp1, exp2, exp3) functions check the value exp1 to see if it is null. With the NVL(exp1, exp2) function, if exp1 is not null, then the value of exp1 is returned; otherwise, the value of exp2 is returned, but case to the same data type as that of exp1. With the NVL2(exp1, exp2, exp3) function, if exp1 is not null, then exp2 is returned; otherwise, the value of exp3 is returned.

What is the difference between clustered and non-clustered indexes?

1. Clustered indexes can be read rapidly rather than non-clustered indexes.

2. Clustered indexes store data physically in the table or view whereas, non-clustered indexes do not store data in the table as it has separate structure from the data row.

What does this query says?
GRANT privilege_name ON object_name TO {user_name|PUBLIC |role_name} [WITH GRANT OPTION];

The given syntax indicates that the user can grant access to another user too.

Where MyISAM table is stored?

Each MyISAM table is stored on disk in three files.

1. The ".frm" file stores the table definition.

2. The data file has a '.MYD' (MYData) extension.

3. The index file has a '.MYI' (MYIndex) extension.

What does myisamchk do?

It compresses the MyISAM tables, which reduces their disk or memory usage.

What is ISAM?

IISAM is abbreviated as Indexed Sequential Access Method. It was developed by IBM to store and retrieve data on secondary storage systems like tapes.

What is Database White box testing?

IWhite box testing includes: Database Consistency and ACID properties Database triggers and logical views Decision Coverage, Condition Coverage, and Statement Coverage Database Tables, Data Model, and Database Schema Referential integrity rules.

What are the different types of SQL sandbox?

There are 3 different types of SQL sandbox:

1. Safe Access Sandbox: Here a user can perform SQL operations such as creating stored procedures, triggers etc. but cannot have access to the memory as well as cannot create files.

2. External Access Sandbox: Users can access files without having the right to manipulate the memory allocation.

3. Unsafe Access Sandbox: This contains untrusted codes where a user can have access to memory.

What is Database Black Box Testing?

This testing involves 1. Data Mapping 2. Data stored and retrieved 3. Use of Black Box testing techniques such as Equivalence Partitioning and Boundary Value Analysis (BVA).

Explain Right Outer Join with Example?

This join is usable, when user wants all the records from Right table (Second table) and only equal or matching records from First or left table. The unmatched records are considered as null records. Example: Select t1.col1,t2.col2....t 'n'col 'n.'. from table1 t1,table2 t2 where t1.col(+)=t2.col;

What is a Subquery?

A SubQuery is a SQL query nested into a larger query. Example: SELECT employeeID, firstName, lastName FROM employees WHERE departmentID IN (SELECT departmentID FROM departments WHERE locationID = 2000) ORDER BY firstName, lastName;

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What is the use of the Intersect operator?

The Intersect operator helps combine two select statements and returns only those records that are common to both the select statements. So, after we get Table A and Table B over here and if we apply the Intersect operator on these two tables, then we will get only those records that are common to the result of the select statements of these two.

What is Cursor? How to use a Cursor?

A database Cursor is a control that allows you to navigate around the table's rows or documents.

What is the difference between Union and Union All operators?

The Union operator is used to combine the result set of two or more select statements.

What do you understand by Self Join?

Self Join in SQL is used for joining a table with itself. Here, depending upon some conditions, each row of the table is joined with itself and with other rows of the table.

What do you know about the stuff() function?

Syntax:

```
STUFF(String1, Position, Length, String2)
```

What is the ACID property in a database?

The full form of ACID is Atomicity, Consistency, Isolation, and Durability. To check the reliability of the transactions, ACID properties are used.

What are Entities and Relationships?

Entities: Entity can be a person, place, thing, or any identifiable object for which data can be stored in a database.

Relationships: Relationships between entities can be referred to as the connection between two tables or entities.

What is a foreign key?

A foreign key is an attribute or a set of attributes that references to the primary key of some other table. Basically, it is used to link together two tables

What is a Datawarehouse?

Datawarehouse refers to a central repository of data where the data is assembled from multiple sources of information. Those data are consolidated, transformed and made available for the mining as well as online processing. Warehouse data also have a subset of data called Data Marts

What do you mean by Collation?

Collation is defined as a set of rules that determine how data can be sorted as well as compared. Character data is sorted using the rules that define the correct character sequence along with options for specifying case-sensitivity, character width etc.

What is a Stored Procedure?

A Stored Procedure is a function which consists of many SQL statements to access the database system. Several SQL statements are consolidated into a stored procedure and execute them whenever and wherever required which saves time and avoid writing code again and again.

How can you fetch first 5 characters of the string?

There are a lot of ways to fetch characters from a string. For example:
Select SUBSTRING(StudentName,1,5) as studentname from student

What do you mean by data integrity?

Data Integrity defines the accuracy as well as the consistency of the data stored in a database. It also defines integrity constraints to enforce business rules on the data when it is entered into an application or a database.

What is the difference between DROP and TRUNCATE statements?

If a table is dropped, all things associated with the tables are dropped as well. This includes - the relationships defined on the table with other tables, the integrity checks and constraints, access privileges and other grants that the table has.

What is Denormalization?

IDenormalization is the inverse process of normalization, where the normalized schema is converted into a schema which has redundant information. The performance is improved by using redundancy and keeping the redundant data consistent. The reason for performing denormalization is the overheads produced in query processor by an over-normalized structure.