1. **What is SQL?**

*SQL* is an acronym for *Structured Query Language*. It is a programming language specifically designed for working with [databases](https://365datascience.com/sql-why-databases/). Of course, some may argue and say it is not exactly a programming language since it has not been created with the idea of using features of procedural languages such as conditional statements or “for” loops. These people will insist on calling [SQL a *coding* language](https://365datascience.com/sql-declarative-language/) because it is only about executing commands for [querying](https://365datascience.com/sql-subqueries/), [creating](https://365datascience.com/inner-join-sql/), [inserting](https://365datascience.com/sql-insert-statement/), [updating](https://365datascience.com/sql-update-statement/), and [deleting data](https://365datascience.com/sql-delete-statement/) in a database.

## ****What is a Database? What is a DBMS?****

A database, implying an electronic database, is data stored on a computer and organized in a way that makes it [easy to access and manipulate](https://365datascience.com/operators-in-sql/). The software tool that allows the user to interact with the data stored in the database is called a database management system – DBMS.

## ****What is the difference between DDL, DML, DCL, and TCL?****

First of all, what do these acronyms mean?

“L” stands for “Language” in all of them. And this must help you remember that these are the four categories in which the SQL commands have been separated into.

DDL stands for Data Definition Language and includes commands which allow you to CREATE, DROP, ALTER, and TRUNCATE data structures. DML, instead, involves commands for manipulating information. It actually means “Data Manipulation Language”, and regards the possibility to SELECT, INSERT, UPDATE, and DELETE data. If you are using SQL in the sphere of data science or business intelligence, it is this part of the language you will most use at work.

DCL, Data Control Language, consists of commands that are typically used by database administrators. This category allows the programmer to GRANT and REVOKE rights delineating how much control you can have over the information in the database.

Similarly, TCL, which is the Transaction Control Language, also contains commands applied by database administrators. They ensure the transactions occurring within the database will happen in such a way that minimalizes the danger of suffering from data loss.

## ****What is the point of using a foreign key constraint?****

The foreign key constraint comprises a set of rules, or limits, that will ensure that the values in the child and parent tables match. Technically, this means that the foreign key constraint will maintain the referential integrity within the database.

## ****What is the difference between****[MySQL](https://365datascience.com/installing-mysql/)****and****[PostgreSQL](https://www.postgresql.org/)****? How about between PL/SQL and SQL?****

Basically, the reason for encountering an SQL interview question like this is that the interviewer wants to understand the extent you are acquainted with the fact that SQL has a few versions, each carrying specific characteristics.

You could say that MySQL and PostgreSQL are just two versions of the Structured Query Language. Since you’ve just been asked about joins, you could mention that PostgreSQL supports outer joins, while MySQL doesn’t – you’ll need to use UNION or UNION ALL to emulate an outer join in MySQL.

PL/SQL is not a version of SQL. PL/SQL is a complete procedural programming language and its scope of application is different. It is not strictly related to relational databases.

1. **What is an SQL View?**

A *view*is a virtual table whose contents are obtained from an existing table or tables, called *base tables*. The retrieval happens through an SQL statement, incorporated into the view. So, you can think of a view object as a *view* into the base table. The view itself does not contain any real data; the data is electronically stored in the base table. The view simply *shows* the data contained in the base table.

1. What is the purpose of the group functions in SQL? Give some examples of group functions.
   1. Group functions are necessary to get summary statistics of a data set. COUNT, MAX, MIN, AVG, SUM, and DISTINCT are all group functions.
2. What does UNION do? What is the difference between UNION and UNION ALL?
   1. “UNION removes duplicate records (where all columns in the results are the same), UNION ALL does not.”
3. What is the difference between SQL and MySQL or SQL Server?
   1. “SQL stands for Structured Query Language. It’s a standard language for accessing and manipulating databases. MySQL is a database management system, like SQL Server, Oracle, Informix, Postgres, etc.”
4. If a table contains duplicate rows, does a query result display the duplicate values by default? How can you eliminate duplicate rows from a query result?
   1. Yes. One way you can eliminate duplicate rows with the DISTINCT clause.

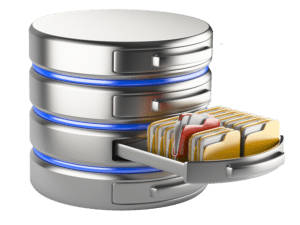
## **11. What is the difference between SQL and MySQL?**

|  |  |
| --- | --- |
| **SQL vs MySQL** | |
| **SQL** | **MySQL** |
| SQL is a standard language which stands for Structured Query Language based on the English language | MySQL is a database management system. |
| SQL is the core of the relational database which is used for accessing and managing database | MySQL is an RDMS (Relational Database Management System) such as SQL Server, Informix etc. |

## **12. What are the different subsets of SQL?**

* DDL (Data Definition Language) – It allows you to perform various operations on the database such as CREATE, ALTER and DELETE objects.
* DML (Data Manipulation Language) – It allows you to access and manipulate data. It helps you to insert, update, delete and retrieve data from the database.
* DCL (Data Control Language) – It allows you to control access to the database. Example – Grant, Revoke access permissions.

## **13. What do you mean by DBMS? What are its different types?**

A database is a structured collection of data.

A Database Management System (DBMS) is a  software application that interacts with the user, applications and the database itself to capture and analyze data.

A DBMS allows a user to interact with the database. The data stored in the database can be modified, retrieved and deleted and can be of any type like strings, numbers, images etc.

There are two types of DBMS:

* Relational Database Management System: The data is stored in relations (tables). Example – MySQL.
* Non-Relational Database Management System: There is no concept of relations, tuples and attributes.  Example – Mongo

## **14. What do you mean by table and field in SQL?**

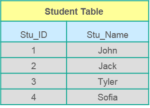
A table refers to a collection of data in an organised manner in form of rows and columns. A field refers to the number of columns in a table. For example:

***Table***:StudentInformation  
***Field***: Stu Id, Stu Name, Stu Marks

## **15.** **What is the difference between VARCHAR and VARCHAR2 datatype in SQL?**

## VARCHAR can store up to 2000 bytes of characters while VARCHAR2 can store up to 4000 bytes of characters.

## **16. What is a Primary key?**

* A Primary key is a column (or collection of columns) or a set of columns that uniquely identifies each row in the table.
* Uniquely identifies a single row in the table
* Null values not allowed

Example- In the Student table, Stu\_ID is the primary key.

## **17.** **What are Constraints?**

Constraints are used to specify the limit on the data type of the table. It can be specified while creating or altering the table statement. The sample of constraints are:

* NOT NULL
* AUTO\_INCREMENT
* DEFAULT
* UNIQUE
* PRIMARY KEY
* FOREIGN KEY

## **18. What is the difference between DELETE and TRUNCATE statements?**

|  |  |
| --- | --- |
| **DELETE vs TRUNCATE** | |
| **DELETE** | **TRUNCATE** |
| Delete command is used to delete a row in a table. | Truncate is used to delete all the rows from a table. |
| You can rollback data after using delete statement. | You cannot rollback data. |
| It is a DML command. | It is a DDL command. |
| It is slower than truncate statement. | It is faster. |

## **19. What is a Unique key?**

* Uniquely identifies a single row in the table.
* Multiple values allowed per table.
* Null values allowed.

## **20. What is a Foreign key?**

* Foreign key maintains referential integrity by enforcing a link between the data in two tables.
* The foreign key in the child table references the primary key in the parent table.
* The foreign key constraint prevents actions that would destroy links between the child and parent tables.

## **21. Write a SQL query to display the current date?**

In SQL, there is a built-in function called GetDate() which helps to return the current timestamp/date.

## **22. What are Entities and Relationships?**

**Entities**:  A person, place, or thing in the real world about which data can be stored in a database. Tables store data that represents one type of entity. For example – A bank database has a customer table to store customer information. Customer table stores this information as a set of attributes (columns within the table) for each customer.

**Relationships**: Relation or links between entities that have something to do with each other. For example – The customer name is related to the customer account number and contact information, which might be in the same table. There can also be relationships between separate tables (for example, customer to accounts).

## **23. What is an Index?**

An index refers to a performance tuning method of allowing faster retrieval of records from the table. An index creates an entry for each value and hence it will be faster to retrieve data.

## **24. What is the difference between DROP and TRUNCATE commands?**

DROP command removes a table and it cannot be rolled back from the database whereas TRUNCATE command removes all the rows from the table.

## **25. What is ACID property in a database?**

ACID stands for Atomicity, Consistency, Isolation, Durability. It is used to ensure that the data transactions are processed reliably in a database system.

Atomicity: Atomicity refers to the transactions that are completely done or failed where transaction refers to a single logical operation of a data. It means if one part of any transaction fails, the entire transaction fails and the database state is left unchanged.

Consistency: Consistency ensures that the data must meet all the validation rules. In simple words,  you can say that your transaction never leaves the database without completing its state.

Isolation: The main goal of isolation is concurrency control.

Durability: Durability means that if a transaction has been committed, it will occur whatever may come in between such as power loss, crash or any sort of error.

## **26. What are the different operators available in SQL?**

There are three operators available in SQL, namely:

1. Arithmetic Operators
2. Logical Operators
3. Comparison Operators

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## **27.  Are NULL values same as that of zero or a blank space?**

A NULL value is not at all same as that of zero or a blank space. NULL value represents a value which is unavailable, unknown, assigned or not applicable whereas a zero is a number and blank space is a character.

**28. What is the need for group functions in SQL?**

Group functions work on the set of rows and returns one result per group. Some of the commonly used group functions are: AVG, COUNT, MAX, MIN, SUM, VARIANCE.

29. What is a Relationship and what are they?

Relation or links are between entities that have something to do with each other. Relationships are defined as the connection between the tables in a database. There are various relationships, namely:

* One to One Relationship.
* One to Many Relationship.
* Many to One Relationship.
* Self-Referencing Relationship.

## **30.  How can you insert NULL values in a column while inserting the data?**

NULL values can be inserted in the following ways:

* Implicitly by omitting column from column list.
* Explicitly by specifying NULL keyword in the VALUES clause

## **31. What is the main difference between ‘BETWEEN’ and ‘IN’ condition operators?**

BETWEEN operator is used to display rows based on a range of values in a row whereas the IN condition operator is used to check for values contained in a specific set of values.

### Example of BETWEEN:

SELECT \* FROM Students where ROLL\_NO BETWEEN 10 AND 50;

Example of IN:

SELECT \* FROM students where ROLL\_NO IN (8,15,25);

## **32. What is CLAUSE in SQL?**

SQL clause helps to limit the result set by providing a condition to the query. A clause helps to filter the rows from the entire set of records.

For example – WHERE, HAVING clause.

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## **33. What is the difference between ‘HAVING’ CLAUSE and a ‘WHERE’ CLAUSE?**

HAVING clause can be used only with SELECT statement. It is usually used in a GROUP BY clause and whenever GROUP BY is not used, HAVING behaves like a WHERE clause.  
Having Clause is only used with the GROUP BY function in a query whereas WHERE Clause is applied to each row before they are a part of the GROUP BY function in a query.

## 34. List some case manipulation functions in SQL?

There are three case manipulation functions in SQL, namely:

* LOWER: This function returns the string in lowercase. It takes a string as an argument and returns it by converting it into lower case. Syntax:

LOWER(‘string’)

* UPPER: This function returns the string in uppercase. It takes a string as an argument and returns it by converting it into uppercase. Syntax:

UPPER(‘string’)

* INITCAP: This function returns the string with the first letter in uppercase and rest of the letters in lowercase. Syntax:

INITCAP(‘string’)

## 35. What is an ALIAS command?

ALIAS name can be given to any table or a column. This alias name can be referred in WHERE clause to identify a particular table or a column.

For example-

Select emp.empID, dept.Result from employee emp, department as dept where emp.empID=dept.empID

In the above example, emp refers to alias name for employee table and dept refers to alias name for department table.

## 36. What are aggregate functions?

Aggregate functions are used to evaluate mathematical calculation and returns a single value. These calculations are done from the columns in a table. For example- max(),count() are calculated with respect to numeric.

37. Name the operator which is used in the query for pattern matching?

LIKE operator is used for pattern matching, and it can be used as -.

1. % – It matches zero or more characters.

For example- select \* from students where studentname like ‘a%’

\_ (Underscore) – it matches exactly one character.  
For example- select \* from student where studentname like ‘abc\_’

## **38**. What is the main difference between SQL and PL/SQL?

SQL is a query language that allows you to issue a single query or execute a single insert/update/delete whereas PL/SQL is Oracle’s “Procedural Language” SQL, which allows you to write a full program (loops, variables, etc.) to accomplish multiple operations such as selects/inserts/updates/deletes.

## **39. What is a View?**

A view is a virtual table which consists of a subset of data contained in a table. Since views are not present, it takes less space to store. View can have data of one or more tables combined and it depends on the relationship.

## **40. What are Views used for?**

A view refers to a logical snapshot based on a table or another view. It is used for the following reasons:

* Restricting access to data.
* Making complex queries simple.
* Ensuring data independence.
* Providing different views of same data.

## 41. What is Auto Increment in SQL?

Auto increment keyword allows the user to create a unique number to get generated whenever a new record is inserted into the table.  
This keyword is usually required whenever PRIMARY KEY is used.

AUTO INCREMENT keyword can be used in Oracle and IDENTITY keyword can be used in SQL SERVER.

## 42. 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.

### **43. What is the default port for SQL?**

The default TCP port assigned by the official Internet Number Authority(IANA) for MySQL is 3306.

### **44. What do you mean by DBMS? What are its different types?**

A **Database Management System** (**DBMS**) is a software application that interacts with the user, applications and the database itself to capture and analyze data. The data stored in the database can be modified, retrieved and deleted, and can be of any type like strings, numbers, images etc.

There are mainly 4 types of DBMS, which are Hierarchical, Relational, Network, and Object-Oriented DBMS.

* **Hierarchical DBMS:**As the name suggests, this type of DBMS has a style of predecessor-successor type of relationship. So, it has a structure similar to that of a tree, wherein the nodes represent records and the branches of the tree represent fields.
* **Relational DBMS (RDBMS):** This type of DBMS, uses a structure that allows the users to identify and access data in relation to another piece of data in the database.
* **Network DBMS:**This type of DBMS supports many to many relations wherein multiple member records can be linked.
* **Object-oriented DBMS:**This type of DBMS uses small individual software called objects. Each object contains a piece of data and the instructions for the actions to be done with the data.

### **45. What is ACID property in a database?**

ACID is an acronym for Atomicity, Consistency, Isolation, and Durability. This property is used in the databases to ensure whether the data transactions are processed reliably in the system or not. If you have to define each of these terms, then you can refer below.

* **Atomicity:** Refers to the transactions which are either completely successful or failed. Here a transaction refers to a single operation. So, even if a single transaction fails, then the entire transaction fails and the database state is left unchanged.
* **Consistency:** This feature makes sure that the data must meet all the validation rules. So, this basically makes sure that the transaction never leaves the database without completing its state.
* **Isolation:** Isolation keeps transactions separated from each other until they’re finished. So basically each and every transaction is independent.
* **Durability:**Durability makes sure that your committed transaction is never lost. So, this guarantees that the database will keep track of pending changes in such a way that even if there is a power loss, crash or any sort of error the server can recover from an abnormal termination.

46. What are popular database management systems or softwares or tools ?

Oracle, Mysql, Microsoft SQL server, Ms access, Postgresql, MongoDB, DB2 etc.

47. How many types of DBMS ?

We have four types of DBMS are there . Here is the list.  
Relational Database Management Systems.  
Hierarchical Database Management Systems.  
Network Database Management Systems.  
Object-oriented Database Management Systems.

48. What is RDBMS ?

RDBMS stands for Relational Database Management Systems. It is a database management system (DBMS) that is based on the relational model as introduced by E. F. Codd.

49. How many types of sql commands are available ?

DDL – Data Definition Language

DML – Data Manipulation Language

DQL – Data Query Language

DCL – Data Control Language

TCL – Transaction Control Language

50. What are DDL Commands in SQL?

Create, Alter, Drop, Truncate, Rename.

51. What are DML Commands in SQL?

Select, Insert, Update, Delete

52. What are DCL Commands in SQL?

Grant, Revoke

53. What are TCL Commands in SQL?

Commit, Rollback

54. What are different Clauses used in SQL?

Where, Having, Group by, Order by

55. What is Where clause in sql? when we can use it?

56. What is Having clause in sql? when we can use it?

57. What is Group by clause in sql? when we can use it?

58. What is difference between having clause and group by?

59. What is Use in sql? when we can use it?

60. What is order by in sql? when we can use it?

61. What are transactions?

62. What is commit in sql? When we will use it?

63. What is rollback in sql? When we will use it?

64.What are sql privileges?

65. What is Case Function?

66. What are comments in sql?

67. What is schema?

68. What is difference between rename and alias?

69. How many foreign keys can we have for one table?

70. How many primary keys can we have for one table?

71.How can you sort a column data in sql?

72. How can you rename a column in the output of SQL query?

73.What is Temp Table? When we can use it?

74. What is difference NULL, NOT NULL?

EXTRA

## **1. 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.

## **2. What is the difference between clustered and non clustered index in SQL?**

The differences between the clustered and non clustered index in SQL are :

1. Clustered index is used for easy retrieval of data from the database and its faster whereas reading from non clustered index is relatively slower.
2. Clustered index alters the way records are stored in a database as it sorts out rows by the column which is set to be clustered index whereas in a non clustered index, it does not alter the way it was stored but it creates a separate object within a table which points back to the original table rows after searching.
3. One table can only have one clustered index whereas it can have many non clustered index.

## **3. Explain different types of index.**

There are three types of index namely:

### **Unique Index:**

This index does not allow the field to have duplicate values if the column is unique indexed. If a primary key is defined, a unique index can be applied automatically.

### **Clustered Index:**

This index reorders the physical order of the table and searches based on the basis of key values. Each table can only have one clustered index.

#### **Non-Clustered Index:**

Non-Clustered Index does not alter the physical order of the table and maintains a logical order of the data. Each table can have many nonclustered indexes.

## **4. What is the need of MERGE statement?**

This statement allows conditional update or insertion of data into a table. It performs an UPDATE if a row exists, or an INSERT if the row does not exist.

## 5. What are the various levels of constraints?

Constraints are the representation of a column to enforce data entity and consistency. There are two levels  of a constraint, namely:

* column level constraint
* table level constraint

6. 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.

## 7. What are the different types of Collation Sensitivity?

Following are the different types of collation sensitivity:

* Case Sensitivity: A and a and B and b.
* Kana Sensitivity: Japanese Kana characters.
* Width Sensitivity: Single byte character and double-byte character.
* Accent Sensitivity.

## **8. What are STUFF and REPLACE function?**

**STUFF Function**: This function is used to overwrite existing character or inserts a string into another string. Syntax:

STUFF(string\_expression,start, length, replacement\_characters)

where,  
string\_expression: it is the string that will have characters substituted

start: This refers to the starting position  
length: It refers to the number of characters in the string which are substituted.

replacement\_string: They are the new characters which are injected in the string.

**REPLACE function**: This function is used to replace the existing characters of all the occurrences. Syntax:

REPLACE (string\_expression, search\_string, replacement\_string)

* 1. How many types of scalar functions available in sql ? What are those ?
  2. What is CHECK CONSTRAINT?