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### 1. What is Database?

A database is an organized collection of data, stored and retrieved digitally from a remote or local computer system. Databases can be vast and complex, and such databases are developed using fixed design and modeling approaches.

### 2. What is DBMS?

DBMS stands for Database Management System. DBMS is a system software responsible for the creation, retrieval, updation and management of the database. It ensures that our data is consistent, organized and is easily accessible by serving as an interface between the database and its end users or application softwares.

### 3. What is RDBMS? How is it different from DBMS?

RDBMS stands for Relational Database Management System. The key difference here, compared to DBMS, is that RDBMS stores data in the form of a collection of tables and relations can be defined between the common fields of these tables. Most modern database management systems like MySQL, Microsoft SQL Server, Oracle, IBM DB2 and Amazon Redshift are based on RDBMS.

### 4. What is SQL?

SQL stands for Structured Query Language. It is the standard language for relational database management systems. It is especially useful in handling organized data comprised of entities (variables) and relations between different entities of the data.

### 5. What is the difference between SQL and MySQL?

SQL is a standard language for retrieving and manipulating structured databases. On the contrary, MySQL is a relational database management system, like SQL Server, Oracle or IBM DB2, that is used to manage SQL databases.

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**6. What are Tables and Fields?**

A table is an organized collection of data stored in the form of rows and columns. Columns can be categorized as vertical and rows as horizontal. The columns in a table are called fields while the rows can be referred to as records.

### 7. What are Constraints in SQL?

Constraints are used to specify the rules concerning data in the table. It can be applied for single or multiple fields in an SQL table during creation of table or after creationg using the ALTER TABLE command. The constraints are:

* **NOT NULL**- Restricts NULL value from being inserted into a column.
* **CHECK**- Verifies that all values in a field satisfy a condition.
* **DEFAULT**- Automatically assigns a default value if no value has been specified for the field.
* **UNIQUE**- Ensures unique values to be inserted into the field.
* **INDEX**- Indexes a field providing faster retrieval of records.
* **PRIMARY KEY**- Uniquely identifies each record in a table.
* **FOREIGN KEY**- Ensures referential integrity for a record in another table.

**8. What is a Primary Key?**

The PRIMARY KEY constraint uniquely identifies each row in a table. It must contain UNIQUE values and has an implicit NOT NULL constraint.  
A table in SQL is strictly restricted to have one and only one primary key, which is comprised of single or multiple fields (columns).

**9. What is a UNIQUE constraint?**

A UNIQUE constraint ensures that all values in a column are different. This provides uniqueness for the column(s) and helps identify each row uniquely. Unlike primary key, there can be multiple unique constraints defined per table. The code syntax for UNIQUE is quite similar to that of PRIMARY KEY and can be used interchangeably.

**10. What is a Foreign Key?**

A FOREIGN KEY comprises of single or collection of fields in a table that essentially refer to the PRIMARY KEY in another table. Foreign key constraint ensures referential integrity in the relation between two tables.

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### **11. What is a Join? List its different types.**

The SQL Join clause is used to combine records (rows) from two or more tables in a SQL database based on a related column between the two.

There are four different types of JOINs in SQL:

* **(INNER) JOIN**: Retrieves records that have matching values in both tables involved in the join. This is the widely used join for queries.
* **LEFT (OUTER) JOIN**: Retrieves all the records/rows from the left and the matched records/rows from the right table.

**RIGHT (OUTER) JOIN**: Retrieves all the records/rows from the right and the matched records/rows from the left table.

**FULL (OUTER) JOIN**: Retrieves all the records where there is a match in either the left or right table.

### **12. What is a Self-Join?**

A **self JOIN**is a case of regular join where a table is joined to itself based on some relation between its own column(s). Self-join uses the INNER JOIN or LEFT JOIN clause and a table alias is used to assign different names to the table within the query.

### 13. What is a Cross-Join?

Cross join can be defined as a cartesian product of the two tables included in the join. The table after join contains the same number of rows as in the cross-product of number of rows in the two tables. If a WHERE clause is used in cross join then the query will work like an INNER JOIN.

**14. What is an Index? Explain its different types.**

A database index is a data structure that provides quick lookup of data in a column or columns of a table. It enhances the speed of operations accessing data from a database table at the cost of additional writes and memory to maintain the index data structure.

**15. Unique and Non-Unique Index**:

Unique indexes are indexes that help maintain data integrity by ensuring that no two rows of data in a table have identical key values. Once a unique index has been defined for a table, uniqueness is enforced whenever keys are added or changed within the index.

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**16.Clustered and Non-Clustered Index**:

Clustered indexes are indexes whose order of the rows in the database correspond to the order of the rows in the index. This is why only one clustered index can exist in a given table, whereas, multiple non-clustered indexes can exist in the table.

### 17. What is the difference between Clustered and Non-clustered index?

* Clustered index **modifies the way**records are stored in a database based on the indexed column. Non-clustered index creates a separate entity within the table which references the original table.
* Clustered index is used for easy and **speedy retrieval**of data from the database, whereas, fetching records from the non-clustered index is relatively slower.
* In SQL, a table can have **a single**clustered index whereas it can have multiple non-clustered indexes.

### 18. 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.

### 19. What is a Subquery? What are its types?

A subquery is a query within another query, also known as **nested query**or **inner query**. It is used to restrict or enhance the data to be queried by the main query, thus restricting or enhancing the output of the main query respectively.

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**20 Correlated Subquery**

A **correlated**subquery cannot be considered as an independent query, but it can refer the column in a table listed in the FROM of the main query.

**21. Non Corre;ated Subquery**

A non-correlated subquery can be considered as an independent query and the output of subquery is substituted in the main query.

### **22. What is the SELECT statement?**

SELECT operator in SQL is used to select data from a database. The data returned is stored in a result table, called the result-set.

### **23. What are some common clauses used with SELECT query in SQL?**

* **WHERE** clause in SQL is used to filter records that are necessary, based on specific conditions.
* **ORDER BY** clause in SQL is used to sort the records based on some field(s) in ascending (**ASC**) or descending order (**DESC**).

**GROUP BY** clause in SQL is used to group records with identical data and can be used in conjuction with some aggregation functions to produce summarized results from the database.

* **HAVING** clause in SQL is used to filter records in combination with the GROUP BY clause. It is different from WHERE, since WHERE clause cannot filter aggregated records.

**24. What are UNION, MINUS and INTERSECT commands?**

The **UNION**operator combines and returns the result-set retrieved by two or more SELECT statements.  
The **MINUS**operator in SQL is used to remove duplicates from the result-set obtained by the second SELECT query from the result-set obtained by the first SELECT query and then return the filtered results from the first.  
The **INTERSECT**clause in SQL combines the result-set fetched by the two SELECT statements where records from one match the other and then returns this intersection of result-sets.

### 25. What is Cursor? How to use a Cursor?

A database cursor is a control structure that allows for traversal of records in a database. Cursors, in addition, facilitates processing after traversal, such as retrieval, addition and deletion of database records. They can be viewed as a pointer to one row in a set of rows.