**what is database?**

* Database is a collection of organised and structured data that can be used to store retrieve manipulate easily.
* The main purpose of database is to store large amount of information.
* Data in database is stored in tables which contains rows(tuples) and columns(Attributes).

**what is dbms?**

* DBMS stands for Data Base Management System.
* It is a software which is used to deal with databases.
* It acts as an interface between User/Application to underlying database.
* Several dbms like mysql, oracle sql, ms sql, etc..,

**what is rdbms?**

* RDBMS stands for Relational Data Base Management System.
* The dbms which deals the relational databases is called rdbms.
* Due to collection of organised set of tables data is accessed easily in rdbms.
* The data in table is stored in the form of rows and columns(tuples and attributes).

**Difference between Sql and Nosql?**

* Sql is used to communicate with relational databases where as noSql is used to deal with non-relational or distributed databases
* Sql databases have fixed schema, but nonSql databases have dynamic schema.
* Sql deals with data that are in the form of tables(rows and columns) on the other hand noSql deal with data of type key-value par.
* Sql databases are vertically scalable noSql are horizontally scalable.

**what are sql data types?**

**Datatype:** defines the type of data that is stored in a variable. It helps compiler to tell how much space is needed to store that variable’s value based on datatype.

**Data types in Sql:**

1. String datatypes: Datatypes that are used to store string formatted data. There are char, varchar(max), text…. Datatypes in sql that can be used to store string formatted data.
2. Numeric datatypes: All type of numbers like integers real values can be assigned to numeric datatypes. There are int, bigint, float, real …..
3. Date and time datatypes: Data that are in the format of data, time, timestamp can use this data types. Those are datetime , date, time ……
4. Other datatypes: Values other than the type that was listed above can be of other types like cursor, table xml etc….

**What are constraints in Sql?**

* Constraints are used to put certain rules to data in tables.
* Constraints act as a condition to columns to check data enter into that particular column matches constraint/not.
* There are 6 constraints in Sql. They are

1. Unique constraint: Constraint ensures that the values entered as data to that column is unique there will be no duplicate values allowed.
2. Not Null constraint: This constraints make sure that there are no null values allowed to that particular column it should have a value for sure other than null.
3. Primary key Constraint: It is combination of both unique and not null constraints>Primary key helps to identify the specific row in a table.
4. Foreign Key Constraint: Foreign key is the primary key to the other table which helps to join the both tables and maintain relation between two tables.
5. Default Constraints: This constraint is used when you need to give same data to the entire rows in table.
6. Check Constraint: By using check constraint user can create custom condition. Conditions like checking limit value of a column, length of data entered to a column etc…

**What are the types of Sql Commands?**

* SQL(Structured Query Language) are like instructions to table. It is used to interact with database with some operation
* The SQL commands are catogerized into 5 types

1. DDL: Data Definition Language that can be used to define the database schema. It simply deals with description of the data base schema to create and modify structure of table. DDL commands are

Create: Used to create the database.

Alter: Used to change the column name table name add constraints and so on.

Truncate: Used to delete the rows keeping the structure of the table intact.

Drop: Drop the table ‘s data along with the structure of the table

1. DML: Data manipulation Language, commands used to manipulate the data present in database. It is the component of sql that control access to data.
2. DQL: Data Query Language, the purpose of the DQL Command is to get some schema relation based on the query passed to it. It includes SELECT Statements.
3. DCL: Data Control Language, used to control the users that can access tables’ data by granting permission from master. There are commands like Grant and Revoke.
4. TCL: Transaction Control Language, Used to control transactions and save data into the table for sure by commit. The commands are SavePoint, Commit and RollBack.

**How to configure the db?**

Configuration database depends on specific dbms user using. The general steps to configure database are:

1. Choose DBMS: select appropriate dbms that helps based on the requirements like MSSQL, MYSQL, PostgreSQL etc..,
2. Install and Configure: Install the server to the local and configure by specifying location and giving necessary permissions.
3. Create a Database: Once the DBMS is installed and configured, you need to create a database to store your data. Most DBMSs provide command-line tools or graphical interfaces to create databases. Use the appropriate method to create a new database, and give it a name that reflects its purpose.
4. Set up Database Users and Permissions: Create user accounts and define their permissions to access the database. It is recommended to assign different privileges to different users based on their roles, ensuring proper security and data integrity. Consider granting only the necessary permissions to each user
5. Define Tables and Schema: Determine the structure of your data by defining the tables and schema for your database.
6. Create Tables: Use SQL (Structured Query Language) statements or a graphical interface provided by the DBMS to create tables based on the defined schema. Specify the table name, column names, data types, and any constraints or indexes required.
7. Establish Relationships: If your data model involves relationships between tables, use foreign keys to establish these relationships. Foreign keys ensure data integrity by enforcing referential integrity rules. Determine the relationships between tables and define the appropriate foreign key constraints.
8. Optimize Performance: Configure performance-related settings based on your specific needs and workload. This includes settings like cache size, buffer pool size, connection limits, and query optimization. Refer to the DBMS documentation for guidance on performance tuning.

**How memory allocation happens for table?**

SQL databases, memory allocation for tables occurs through a combination of cache mechanism, buffer management and storage management

1. Buffer Cache: SQL databases maintain a portion of memory called the buffer cache. The buffer cache is used to cache frequently accessed data pages from tables.
2. Pages and Extents: In SQL databases, tables are divided into smaller units called pages. A page typically represents a fixed-size block of data.
3. Caching and I/O: When a query requires data from a table, the database first checks if the required data pages are present in the buffer cache. If the pages are already cached, the data can be retrieved directly from memory, avoiding the need for disk I/O.
4. Disk Storage: In addition to memory allocation, SQL databases also store table data on disk. When tables are created, the database allocates disk space to store the data pages and manages the physical placement of pages on disk.

**How a query gets executed?**

When a query gets executed, lot of background process happens while execution. The process that happens while executing the query is

1. Parsing: The dbms parses the query to make sure query has correct syntax of the query. It also checks for the database dictionary for correct table names and all columns etc…
2. Query Optimization: In optimization part, the optimizer analyses various execution plans and select optimized way.
3. Query Execution: After previous step, dbms executes the query plan it involves the steps like Data retrival, Join processing, Filtration and Aggregation
4. Result Retrival: Once the query executed dbms retrieves the resultset and returns the result to the user.

**Explain about Limiting rows?**

* The process of fetching only some of the rows among all the rows in a table to result set.
* There are many ways to do so, SELECT TOP, OFFSET FETCH, LIMIT CLAUSE etc…,
* Select Top n – it fetches first n values from the table.
* Limit-Select \* from <table name> limit n- returns n rows from table to result set
* Offset fetch clauses are options of order by clause to fetch limited number of rows

1. Offset clause specify to skip the number of rows before return the result.
2. The Fetch clause specifies the number of rows to return after the offset clause has been processed.