1. **What is DBMS?** A Database Management System (DBMS) is software that helps you create, manage, and manipulate databases. Think of it as a digital organizer for your data, ensuring it's stored safely and can be easily retrieved. It plays a crucial role in keeping your information consistent and accessible. In short, it's essential for anyone working with large amounts of data.
2. **What is a database?** A database is a structured collection of data stored electronically, much like a digital filing cabinet. It organizes information into tables, making it easy to access and manage. Databases can hold various types of data, from customer details to product inventories. They are fundamental to many applications, enabling efficient data handling.
3. **Explain the following terms with examples:**
   * **Data integrity** ensures accuracy in your data; for instance, an employee's salary should always be a positive number.
   * **Data redundancy** occurs when the same data is stored in multiple places, like having a department name in both an employee and a department table.
   * **Data inconsistency** happens when there are conflicting data entries, such as different salaries for the same employee in two tables.
   * **Physical data independence** allows changes to how data is stored without affecting access methods.
   * **Logical data independence** means you can change the database structure, like adding new columns, without altering applications that use the data.
4. **What is RDBMS? Give 4 examples.** A Relational Database Management System (RDBMS) organizes data into tables and allows for easy data management and retrieval. Examples include Oracle Database, MySQL, Microsoft SQL Server, and PostgreSQL. Each of these systems helps keep data structured and accessible for various applications. They are widely used in both small and large-scale projects.
5. **What does relation mean with respect to RDBMS?** In RDBMS, a relation refers to a table that consists of rows and columns. Each row is a unique record, and each column represents a specific attribute of that record. This structure makes it easy to organize and retrieve data efficiently. Relations are fundamental to how data is stored in relational databases.
6. **What is SQL? How is it different from C language?** SQL, or Structured Query Language, is a language specifically designed for managing and manipulating relational databases. It allows you to perform tasks like querying and updating data easily. Unlike C, which is a general-purpose programming language, SQL focuses solely on data management. SQL uses a declarative style, while C requires a procedural approach, making them serve different purposes in programming.
7. **What is NULL value? How is it different from zero?**A NULL value in a database represents the absence of a value or an unknown value. It’s like saying "no information available." This is different from zero, which is a numeric value that represents a specific quantity. While zero is a valid number, NULL indicates that the data is missing or not applicable in that context.
8. **What is used to fetch only unique rows from the table?**To fetch only unique rows from a table, you use the DISTINCT keyword in your SQL query. For example, SELECT DISTINCT column\_name FROM table\_name; will return only the different values in the specified column, eliminating any duplicates.
9. **What does a simple SELECT statement fetch?**A simple SELECT statement retrieves data from a database table. For instance, SELECT \* FROM table\_name; fetches all columns and rows from the specified table. You can also specify particular columns to retrieve only the information you need, like SELECT column1, column2 FROM table\_name;.
10. **Which clause is used with SELECT statement to filter the data?** The WHERE clause is used with the SELECT statement to filter the data. It allows you to specify conditions that the records must meet to be included in the result set, like SELECT \* FROM table\_name WHERE condition;.
11. **Which clause is used with SELECT statement to order the data or sort the data?** The ORDER BY clause is used with the SELECT statement to order or sort the data. You can specify one or more columns to sort by, along with the sorting direction (ASC for ascending or DESC for descending), like SELECT \* FROM table\_name ORDER BY column\_name ASC;.
12. **Can you fetch records from the table based on some input from the user? How?** Yes, you can fetch records based on user input by using a parameterized query or prepared statement in your application code. For example, you might use SELECT \* FROM table\_name WHERE column\_name = ?; and replace the ? with the user's input when executing the query.
13. **What is the rule of precedence?** The rule of precedence refers to the order in which SQL operations are evaluated in a query. It determines which operations are performed first when multiple operations are present, such as arithmetic operations, logical operators, and comparison operators. For example, in SQL, the precedence order is typically: parentheses, then NOT, followed by AND, and finally OR.
14. **Is between … and operator inclusive or exclusive operator?** The BETWEEN ... AND ... operator is inclusive, meaning it includes the boundary values specified in the range. For example, SELECT \* FROM table\_name WHERE column\_name BETWEEN 10 AND 20; will include records where the column value is 10, 20, or any value in between.
15. **What is the difference between single row functions and group functions? Single row functions operate on individual rows and return a single result for each row, while group functions (also known as aggregate functions) operate on a set of rows and return a single result for the entire set. For example, single row functions can transform or manipulate individual data values, whereas group functions like SUM or AVG summarize data across multiple rows.**
16. **Give 5 examples of single row functions.**

**UPPER(): Converts a string to uppercase.**

**LOWER(): Converts a string to lowercase.**

**TRIM(): Removes leading and trailing spaces from a string.**

**SUBSTR(): Extracts a substring from a string.**

**ROUND(): Rounds a numeric value to a specified number of decimal places.**

1. **What arithmetic operations can be performed with dates? You can perform various arithmetic operations with dates, such as:**

Adding or subtracting days to/from a date (e.g., SYSDATE + 10 adds 10 days).

Calculating the difference between two dates, which returns the number of days between them (e.g., date1 - date2).

1. **What is RR format of date?** The RR format of date is a way to represent two-digit years in Oracle. It helps Oracle determine the century for a two-digit year based on the current date. For example, if the current year is 2023 and you enter RR with a year of 99, it will interpret it as 1999. If you enter 00, it will interpret it as 2000.
2. **Name any two character-based single row functions.**

CONCAT(): Concatenates two strings together.

LENGTH(): Returns the length of a string.

1. **Name any two arithmetic single row functions.**

ABS(): Returns the absolute value of a number.

MOD(): Returns the remainder of a division operation (e.g., MOD(m, n)).

1. **What are different conversion functions in SQL?**

Different conversion functions in SQL include:

**TO\_CHAR()**: Converts a number or date to a character string.

**TO\_DATE()**: Converts a character string to a date format.

**TO\_NUMBER()**: Converts a character string to a number.

**CAST()**: Converts a value from one data type to another.

**CONVERT()**: Converts a value from one character set to another.

1. **Can you convert a date into character format?**Yes, you can convert a date into character format using the TO\_CHAR() function. For example, you can use TO\_CHAR(hiredate, 'DD-MON-YYYY') to convert a date into a string formatted as "day-month-year".
2. **What is the significance of NVL and NVL2 functions?**

**NVL:** The NVL function is used to substitute a NULL value with a specified value. It takes two arguments; if the first argument is NULL, it returns the second argument. For example, NVL(comm, 0) would return 0 if comm is NULL.

**NVL2**: The NVL2 function is similar but takes three arguments. It returns the second argument if the first argument is not NULL, and the third argument if the first argument is NULL. This is useful for providing different outputs based on whether a value is NULL or not. For example, NVL2(comm, 'Applicable', 'Not applicable') would return 'Applicable' if comm is not NULL, otherwise it returns 'Not applicable'.

1. **Name any 5 group functions.**

**SUM()**: Calculates the total sum of a numeric column.

**AVG()**: Computes the average value of a numeric column.

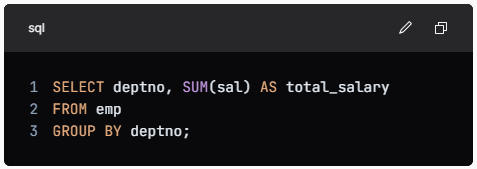
**COUNT()**: Counts the number of rows or non-NULL values in a specified column.

**MIN()**: Returns the minimum value of a specified column.

**MAX()**: Returns the maximum value of a specified column.

1. **When is GROUP BY clause used? Explain with an example.** The **GROUP BY** clause is used when you want to aggregate data across multiple rows based on one or more columns. It groups rows that have the same values in specified columns into summary rows.

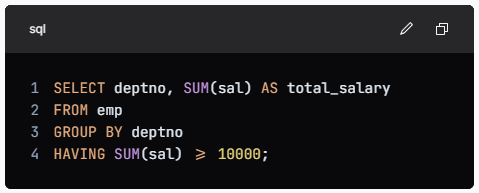
**Example:** If you want to find the total salary for each department, you can use the following query:



This query groups the rows by **deptno** and calculates the total salary for each department.

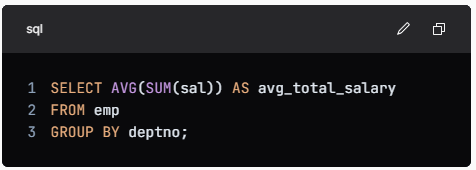
1. **How to exclude rows based on group functions from the O/P?** To exclude rows based on group functions, you can use the **HAVING** clause. The **HAVING** clause is used to filter records after the **GROUP BY** operation has been applied, allowing you to specify conditions on aggregate values.

Example: If you want to exclude departments with a total salary less than 10000, you can use:



1. **Can you nest two group functions?** Yes, you can nest group functions, but it is not common practice. The outer function will operate on the result of the inner function. However, nesting should be done carefully to ensure logical consistency.

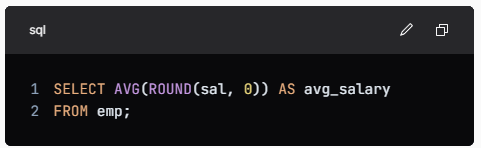
**Example:**



This example calculates the average of the total salaries grouped by department.

1. **Can you nest a single row function inside a group function?** Yes, you can nest a single row function inside a group function. This is a common practice when you want to perform an operation on each individual row before applying an aggregate function.

**Example:**



In this example, the **ROUND()** function is applied to each salary before the **AVG()** function calculates the average of the rounded salaries.