# SQL Interview Questions and Detailed Answers with Examples

## 1. What is SQL, and why is it important in data analytics?

SQL (Structured Query Language) is the standard language for interacting with relational databases. It allows users to create, retrieve, update, and delete data stored in database tables. In data analytics, SQL is crucial because:  
- It simplifies complex data extraction tasks.  
- It integrates with data visualization tools.  
- It handles large datasets efficiently.  
- It supports decision-making by enabling advanced data queries and analysis.  
  
Example:  
```sql  
SELECT name, age FROM employees WHERE age > 30;  
```This query retrieves the names and ages of employees older than 30.

## 2. Explain the difference between INNER JOIN, LEFT JOIN, RIGHT JOIN, and FULL OUTER JOIN.

Joins combine rows from two or more tables based on a related column.  
  
- \*\*INNER JOIN\*\*: Returns only rows with matching values in both tables.  
Example:  
```sql  
SELECT orders.id, customers.name  
FROM orders  
INNER JOIN customers ON orders.customer\_id = customers.id;  
```  
- \*\*LEFT JOIN\*\*: Returns all rows from the left table and matching rows from the right table. Non-matches are NULL.  
Example:  
```sql  
SELECT orders.id, customers.name  
FROM orders  
LEFT JOIN customers ON orders.customer\_id = customers.id;  
```  
- \*\*RIGHT JOIN\*\*: Returns all rows from the right table and matching rows from the left table. Non-matches are NULL.  
- \*\*FULL OUTER JOIN\*\*: Combines results of LEFT and RIGHT JOIN, returning all rows with NULL for non-matches.

## 3. What is the difference between WHERE and HAVING clauses?

- \*\*WHERE Clause\*\*: Filters rows before grouping.  
- \*\*HAVING Clause\*\*: Filters aggregated data after grouping.  
  
Example:  
```sql  
SELECT department, COUNT(\*) AS employee\_count  
FROM employees  
WHERE age > 30  
GROUP BY department  
HAVING COUNT(\*) > 5;  
```

## 4. How do you use GROUP BY and HAVING in a query?

GROUP BY groups rows with similar values, and HAVING filters those groups.  
  
Example:  
```sql  
SELECT department, SUM(salary) AS total\_salary  
FROM employees  
GROUP BY department  
HAVING SUM(salary) > 100000;  
```

## 5. Write a query to find duplicate records in a table.

Duplicate records can be identified using GROUP BY and HAVING.  
  
Example:  
```sql  
SELECT name, COUNT(\*)  
FROM employees  
GROUP BY name  
HAVING COUNT(\*) > 1;  
```

## 6. How do you retrieve unique values from a table using SQL?

Use DISTINCT to remove duplicates.  
  
Example:  
```sql  
SELECT DISTINCT department  
FROM employees;  
```

## 7. Explain the use of aggregate functions like COUNT(), SUM(), AVG(), MIN(), and MAX().

Aggregate functions perform calculations on data:  
- \*\*COUNT()\*\*: Counts rows.  
- \*\*SUM()\*\*: Adds values.  
- \*\*AVG()\*\*: Calculates the average.  
- \*\*MIN()\*\*: Finds the smallest value.  
- \*\*MAX()\*\*: Finds the largest value.  
  
Example:  
```sql  
SELECT department, COUNT(\*) AS total\_employees, AVG(salary) AS avg\_salary  
FROM employees  
GROUP BY department;  
```

## 8. What is the purpose of a DISTINCT keyword in SQL?

DISTINCT ensures only unique values are returned.  
  
Example:  
```sql  
SELECT DISTINCT job\_title  
FROM employees;  
```