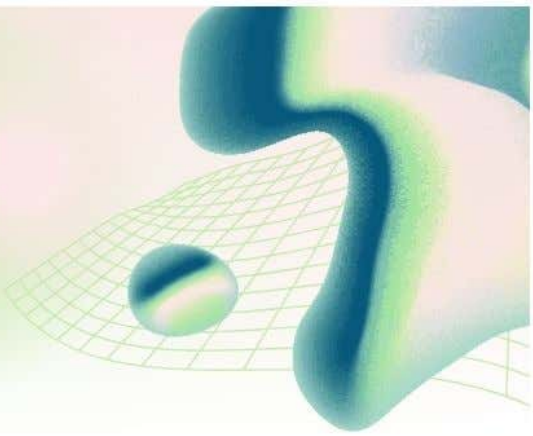
70 ADVANCED SQL QUESTIONS

Mostly asked in interviews



This document contains a curated list of 70 advanced SQL questions frequently encountered during technical interviews. It's designed to help candidates prepare for roles requiring in-depth SQL knowledge and problem-solving skills. Use this as a guide to solidify your understanding and showcase your expertise in SQL.

Key Areas Covered

- Query Optimization
- Indexing Strategies
- Advanced Joins
- Window Functions
- Common Table Expressions (CTEs)
- Stored Procedures
- Triggers

1. How to retrieve the second-highest salary of an employee?

```
SELECT MAX(salary)
FROM employees
WHERE salary < (SELECT MAX(salary) FROM employees);
```

2. How to get the nth highest salary in ?

```
SELECT salary
FROM (SELECT salary, DENSE_RANK() OVER (ORDER BY salary DESC) AS rank
    FROM employees) AS ranked_salaries
WHERE rank = N;
```

3. How do you fetch all employees whose salary is greater than the average salary?

```
SELECT *
FROM employees
WHERE salary > (SELECT AVG(salary) FROM employees);
```

4. Write a query to display the current date and time in .

```
SELECT CURRENT_TIMESTAMP;
```

5. How to find duplicate records in a table?

```
SELECT column_name, COUNT(*)
FROM table_name
GROUP BY column_name
HAVING COUNT(*) > 1;
```

6. How can you delete duplicate rows in ?

```
WITH CTE AS (
  SELECT column_name,
       ROW_NUMBER() OVER (PARTITION BY column_name ORDER BY column_name) AS row_num
  FROM table_name
)
DELETE FROM CTE WHERE row_num > 1;
```

7. How to get the common records from two tables?

```
SELECT *
FROM table1
INTERSECT
SELECT *
FROM table2;
```

8. How to retrieve the last 10 records from a table?

```
SELECT *
FROM employees
ORDER BY employee_id DESC
LIMIT 10;
```

9. How do you fetch the top 5 employees with the highest salaries?

```
SELECT *
FROM employees
ORDER BY salary DESC
LIMIT 5;
```

10. How to calculate the total salary of all employees?

```
SELECT SUM(salary)
FROM employees;
```

11. How to write a query to find all employees who joined in the year 2020?

```
SELECT *
FROM employees
WHERE YEAR(join_date) = 2020;
```

12. Write a query to find employees whose name starts with 'A'.

```
SELECT *
```

```
FROM employees
WHERE name LIKE 'A%';
```

13. How can you find the employees who do not have a manager?

```
SELECT *
FROM employees
WHERE manager_id IS NULL;
```

14. How to find the department with the highest number of employees?

```
SELECT department_id, COUNT(*)
FROM employees
GROUP BY department_id
ORDER BY COUNT(*) DESC
LIMIT 1;
```

15. How to get the count of employees in each department?

```
SELECT department_id, COUNT(*)
FROM employees
GROUP BY department_id;
```

16. Write a query to fetch employees having the highest salary in each department.

```
SELECT department_id, employee_id, salary
```

```
FROM employees AS e
WHERE salary = (SELECT MAX(salary)
        FROM employees
        WHERE department_id = e.department_id);
```

17. How to write a query to update the salary of all employees by 10%?

```
UPDATE employees
SET salary = salary * 1.1;
```

18. How can you find employees whose salary is between 50,000 and 1,00,000?

```
SELECT *
FROM employees
WHERE salary BETWEEN 50000 AND 100000;
```

19. How to find the youngest employee in the organization?

```
SELECT *
FROM employees
ORDER BY birth_date DESC
LIMIT 1;
```

20. How to fetch the first and last record from a table?

```
(SELECT * FROM employees ORDER BY employee_id ASC LIMIT 1)
```

UNION ALL

(SELECT * FROM employees ORDER BY employee_id DESC LIMIT 1);

21. Write a query to find all employees who report to a specific manager.

SELECT *

FROM employees

WHERE manager_id = ?;

22. How can you find the total number of departments in the company?

SELECT COUNT(DISTINCT department_id)

FROM employees;

23. How to find the department with the lowest average salary?

SELECT department_id, AVG(salary)

FROM employees

GROUP BY department_id

ORDER BY AVG(salary) ASC

LIMIT 1;

24. How to delete all employees from a department in one query?

DELETE FROM employees

WHERE department_id = ?;

25. How to display all employees who have been in the company for more than 5 years?

```
SELECT *
FROM employees
WHERE DATEDIFF(CURDATE(), join_date) > 1825;
```

26. How to find the second-largest value from a table?

```
SELECT MAX(column_name)
FROM table_name
WHERE column_name < (SELECT MAX(column_name) FROM table_name);
```

27. How to write a query to remove all records from a table but keep the table structure?

```
TRUNCATE TABLE table_name;
```

28. Write a query to get all employee records in XML format.

```
SELECT employee_id, name, department_id
FROM employees
FOR XML AUTO;
```

29. How to get the current month's name from ?

```
SELECT MONTHNAME(CURDATE());
```

30. How to convert a string to lowercase in ?

```
SELECT LOWER('STRING_VALUE');
```

31. How to find all employees who do not have any subordinates?

```
SELECT *
FROM employees
WHERE employee_id NOT IN (SELECT manager_id FROM employees WHERE
manager_id IS NOT NULL);
```

32. Write a query to calculate the total sales per customer in a sales table.

```
SELECT customer_id, SUM(sales_amount)
FROM sales
GROUP BY customer_id;
```

33. How to write a query to check if a table is empty?

```
SELECT CASE
   WHEN EXISTS (SELECT 1 FROM table_name)
   THEN 'Not Empty'
   ELSE 'Empty'
END;
```

34. How to find the second highest salary for each department?

```
SELECT department_id, salary
FROM (SELECT department_id, salary,
        DENSE_RANK() OVER (PARTITION BY department_id ORDER BY salary
DESC) AS rank
    FROM employees) AS ranked_salaries
WHERE rank = 2;
```

35. Write a query to fetch employees whose salary is a multiple of 10,000.

```
SELECT *
FROM employees
WHERE salary % 10000 = 0;
```

36. How to fetch records where a column has null values?

```
SELECT *
FROM employees
WHERE column_name IS NULL;
```

37. How to write a query to find the total number of employees in each job title?

```
SELECT job_title, COUNT(*)
FROM employees
GROUP BY job_title;
```

38. Write a query to fetch all employees whose names end with ‘n’.

```
SELECT *
FROM employees
WHERE name LIKE '%n';
```

39. How to find all employees who work in both departments 101 and 102?

```
SELECT employee_id
FROM employees
WHERE department_id IN (101, 102)
GROUP BY employee_id
HAVING COUNT(DISTINCT department_id) = 2;
```

40. Write a query to fetch the details of employees with the same salary.

```
SELECT *
FROM employees
WHERE salary IN (SELECT salary
        FROM employees
        GROUP BY salary
        HAVING COUNT(*) > 1);
```

41. How to update salaries of employees based on their department?

```
UPDATE employees
SET salary = CASE
    WHEN department_id = 101 THEN salary * 1.10
    WHEN department_id = 102 THEN salary * 1.05
    ELSE salary
END;
```

42. How to write a query to list all employees without a department?

```
SELECT *
FROM employees
WHERE department_id IS NULL;
```

43. Write a query to find the maximum salary and minimum salary in each department.

```
SELECT department_id, MAX(salary), MIN(salary)
FROM employees
GROUP BY department_id;
```

44. How to list all employees hired in the last 6 months?

```
SELECT *
FROM employees
WHERE hire_date > ADDDATE(CURDATE(), INTERVAL -6 MONTH);
```

45. Write a query to display department-wise total and average salary.

```
SELECT department_id, SUM(salary) AS total_salary, AVG(salary) AS avg_salary
FROM employees
GROUP BY department_id;
```

46. How to find employees who joined the company in the same month and year as their manager?

```
SELECT e.employee_id, e.name
FROM employees e
JOIN employees m ON e.manager_id = m.employee_id
WHERE MONTH(e.join_date) = MONTH(m.join_date)
  AND YEAR(e.join_date) = YEAR(m.join_date);
```

47. Write a query to count the number of employees whose names start and end with the same letter.

```
SELECT COUNT(*)
FROM employees
WHERE LEFT(name, 1) = RIGHT(name, 1);
```

48. How to retrieve employee names and salaries in a single string?

```
SELECT CONCAT(name, ' earns ', salary) AS employee_info
FROM employees;
```

49. How to find employees whose salary is higher than their manager's salary?

```
SELECT e.employee_id, e.name
FROM employees e
JOIN employees m ON e.manager_id = m.employee_id
WHERE e.salary > m.salary;
```

50. Write a query to get employees who belong to departments with less than 3 employees.

```
SELECT *
FROM employees
WHERE department_id IN (SELECT department_id
                        FROM employees
                        GROUP BY department_id
                        HAVING COUNT(*) < 3);
```

51. How to write a query to find employees with the same first name?

```
SELECT *
FROM employees
WHERE first_name IN (SELECT first_name
                     FROM employees
                     GROUP BY first_name
                     HAVING COUNT(*) > 1);
```

52. How to write a query to delete employees who have been in the company for more than 15 years?

```
DELETE FROM employees
WHERE DATEDIFF(CURDATE(), join_date) > 5475;
```

53. Write a query to list all employees working under the same manager.

```
SELECT *
FROM employees
WHERE manager_id = ?;
```

54. How to find the top 3 highest-paid employees in each department?

```
SELECT *
FROM (SELECT *,
        DENSE_RANK() OVER (PARTITION BY department_id ORDER BY salary
DESC) AS rank
    FROM employees) AS ranked_employees
WHERE rank <= 3;
```

55. Write a query to list all employees with more than 5 years of experience in each department.

```
SELECT *
FROM employees
WHERE DATEDIFF(CURDATE(), join_date) > 1825;
```

56. How to list all employees in departments that have not hired anyone in the past 2 years?

```
SELECT *
FROM employees
WHERE department_id IN (SELECT department_id
                        FROM employees
                        GROUP BY department_id
                        HAVING MAX(hire_date) < ADDDATE(CURDATE(), INTERVAL -2
YEAR));
```

57. Write a query to find all employees who earn more than the average salary of their department.

```
SELECT *
FROM employees e
WHERE salary > (SELECT AVG(salary)
                FROM employees
                WHERE department_id = e.department_id);
```

58. How to list all managers who have more than 5 subordinates?

```
SELECT *
FROM employees
WHERE employee_id IN (SELECT manager_id
                      FROM employees
```

```
        GROUP BY manager_id
        HAVING COUNT(*) > 5);
```

59. Write a query to display employee names and hire dates in the format "Name - MM/DD/YYYY".

```
SELECT CONCAT(name, ' - ', DATE_FORMAT(hire_date, '%m/%d/%Y')) AS
employee_info
FROM employees;
```

60. How to find employees whose salary is in the top 10%?

```
SELECT *
FROM employees
WHERE salary >= (SELECT PERCENTILE_CONT(0.9)
        WITHIN GROUP (ORDER BY salary ASC)
        FROM employees);
```

61. Write a query to display employees grouped by their age brackets (e.g., 20-30, 31-40, etc.).

```
SELECT CASE
    WHEN age BETWEEN 20 AND 30 THEN '20-30'
    WHEN age BETWEEN 31 AND 40 THEN '31-40'
    ELSE '41+'
  END AS age_bracket,
  COUNT(*)
```

```
FROM employees
GROUP BY age_bracket;
```

62. How to find the average salary of the top 5 highest-paid employees in each department?

```
SELECT department_id, AVG(salary)
FROM (SELECT department_id, salary,
        DENSE_RANK() OVER (PARTITION BY department_id ORDER BY salary DESC) AS rank
    FROM employees) AS ranked_employees
WHERE rank <= 5
GROUP BY department_id;
```

63. How to calculate the percentage of employees in each department?

```
SELECT department_id,
    (COUNT(*) * 100.0 / (SELECT COUNT(*) FROM employees)) AS percentage
FROM employees
GROUP BY department_id;
```

64. Write a query to find all employees whose email contains the domain '@example.com'.

```
SELECT *
FROM employees
WHERE email LIKE '%@example.com';
```

65. How to retrieve the year-to-date sales for each customer?

```
SELECT customer_id, SUM(sales_amount)
FROM sales
WHERE sale_date BETWEEN '2024-01-01' AND CURDATE()
GROUP BY customer_id;
```

66. Write a query to display the hire date and day of the week for each employee.

```
SELECT name, hire_date, DAYNAME(hire_date) AS day_of_week
FROM employees;
```

67. How to find all employees who are older than 30 years?

```
SELECT *
FROM employees
WHERE DATEDIFF(CURDATE(), birth_date) / 365 > 30;
```

68. Write a query to display employees grouped by their salary range (e.g., 0-20K, 20K-50K).

```
SELECT CASE
    WHEN salary BETWEEN 0 AND 20000 THEN '0-20K'
    WHEN salary BETWEEN 20001 AND 50000 THEN '20K-50K'
    ELSE '50K+'
```

```
    END AS salary_range,
    COUNT(*)
FROM employees
GROUP BY salary_range;
```

69. How to list all employees who do not have a bonus?

```
SELECT *
FROM employees
WHERE bonus IS NULL;
```

70. Write a query to display the highest, lowest, and average salary for each job role.

```
SELECT job_role, MAX(salary) AS highest_salary, MIN(salary) AS lowest_salary,
AVG(salary) AS avg_salary
FROM employees
GROUP BY job_role;
```