INTERVIEW PREP

TOP 15 WINDOW FUNCTION QUESTIONS

Easy to Medium • < 9 Lines of Code

1. Find Duplicates
2. 2nd Highest Salary
3. MoM Growth %
4. Running Total (Dept)
5. Diff From Avg
6. % of Total Revenue
7. 3-Day Rolling Sum
8. Consecutive Groups
9. Last_Value (Fixed)
10. Nth_Value
11. Gap Analysis
12. Cume_Dist
13. Reverse Rank
14. Count Per Group
15. Median (Percentile)

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SQL INTERVIEW PREP

Q1

FIND DUPLICATES

Identify emails appearing > once

Standard SQL

```sql
-- Common interview starter
SELECT * FROM (
  SELECT *, ROW_NUMBER() OVER(
    PARTITION BY email ORDER BY id
  ) AS rn
  FROM users
) t
WHERE rn > 1;
```

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Q2

2ND HIGHEST SALARY

Handling ties with Dense_Rank

Standard SQL

```sql
-- Use CTE or Subquery
SELECT * FROM (
  SELECT *, DENSE_RANK() OVER(
    ORDER BY salary DESC
  ) AS rnk
  FROM employees
) t
WHERE rnk = 2;
```

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Q3

MoM Growth %

Current vs Previous Month

Standard SQL

```sql
-- (Curr - Prev) / Prev
SELECT month, sales,
  (sales - LAG(sales) OVER(ORDER BY month))
  / LAG(sales) OVER(ORDER BY month)
  AS mom_growth
FROM monthly_sales;
```

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Q4

RUNNING TOTAL (BY DEPT)

Reset total for each department

Standard SQL

```sql
-- Cumulutive sum per group
SELECT dept, date, amount,
  SUM(amount) OVER(
    PARTITION BY dept
    ORDER BY date
  ) AS dept_running_total
FROM expenses;
```

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Q5

DIFF FROM AVERAGE

Salary vs Department Average

Standard SQL

```sql
-- Mix row value with agg window
SELECT name, salary,
  salary - AVG(salary) OVER(
    PARTITION BY dept_id
  ) AS diff_from_avg
FROM employees;
```

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Q6

% OF TOTAL REVENUE

Grand Total Ratio

Standard SQL

```sql
-- Empty OVER() = Entire Table
SELECT product, revenue,
  revenue / SUM(revenue) OVER()
  * 100 AS pct_share
FROM sales_2024;
```

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Q7

3-DAY ROLLING SUM

Moving window of rows

Standard SQL

```sql
-- 2 Previous + Current = 3 Rows
SELECT date, visitors,
  SUM(visitors) OVER(
    ORDER BY date
    ROWS BETWEEN 2 PRECEDING
    AND CURRENT ROW
  ) AS rolling_3d
FROM traffic;
```

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Q8

CONSECUTIVE IDS

The "Islands" Problem Logic

Standard SQL

```sql
-- Math trick: ID - RowNum = Constant
SELECT id,
  id - ROW_NUMBER() OVER(
    ORDER BY id
  ) AS grp
FROM seats
WHERE is_free = 1;
```

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Q9

LAST_VALUE (FIXED)

Fixing the default frame

Standard SQL

```sql
-- Must change frame to UNBOUNDED
SELECT id, LAST_VALUE(status) OVER(
  ORDER BY date
  ROWS BETWEEN UNBOUNDED PRECEDING
  AND UNBOUNDED FOLLOWING
) AS last_status
FROM orders;
```

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Q10

NTH_VALUE

Pick exactly the 3rd row

Standard SQL

```sql
-- Get 3rd highest salary per dept
SELECT DISTINCT dept,
  NTH_VALUE(salary, 3) OVER(
    PARTITION BY dept
    ORDER BY salary DESC
    ROWS BETWEEN ... -- Frame needed
) FROM staff;
```

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Q11

GAP ANALYSIS

Time between events

Standard SQL

```sql
-- Next Time minus Current Time
SELECT event_time,
  LEAD(event_time) OVER(
    ORDER BY event_time
  ) - event_time AS time_gap
FROM events;
```

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Q12

CUME_DIST

Percentile Ranking

Standard SQL

```sql
-- 0.8 = You beat 80% of others
SELECT student, grade,
  CUME_DIST() OVER(
    ORDER BY grade
  ) AS distribution
FROM test_scores;
```

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Q13

REVERSE RANK

Finding the "Bottom" items

Standard SQL

```sql
-- Rank by Price ASC (Cheapest = 1)
SELECT item,
  RANK() OVER(
    ORDER BY price ASC
  ) AS cheapest_rank
FROM products;
```

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Q14

COUNT PER GROUP

Append count to every row

Standard SQL

```sql
-- How many users in this city?
SELECT city, username,
  COUNT(id) OVER(
    PARTITION BY city
  ) AS users_in_city
FROM users;
```

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Q15

MEDIAN (PERCENTILE)

Calculate 50th Percentile

PostgreSQL / T-SQL

```
-- Median Salary
SELECT PERCENTILE_CONT(0.5)
  WITHIN GROUP (ORDER BY sal)
FROM employees;
```

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Q15

MEDIAN (PERCENTILE)

Calculate 50th Percentile

PostgreSQL / T-SQL

```
-- Median Salary
SELECT DISTINCT PERCENTILE_CONT(0.5)
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FROM employees;
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