

# Google Asked This SQL Question

INPUT

**n = 8**

FULL OUTPUT (Fibonacci)

0

1

1

2

3

5

8

13

⚠️ 90% of candidates fail by using **LOOPS**.

You need to solve this in a single query.

✓ **THE SECRET: RECURSIVE CTES**



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# Recursive CTE Pattern

Three key components to master recursion

## Anchor Member

The starting point. Defines the base cases 0 and 1.

```
SELECT 1, 0, 1
```

## Recursive Member

The rule: Add previous two numbers to get the next.

$$F(n) = F(n-1) + F(n-2)$$

## Termination

The stop condition. Essential to prevent infinite loops.

**WHERE**  $n < 8$



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# The SMART Solution

Clean, Elegant, Declarative



⚡ MYSQL • POSTGRESQL • SQL SERVER

```
WITH RECURSIVE fibonacci AS (  
    -- 1. Base Case: Start with 0 and 1  
    SELECT  
        1 AS n,  
        0 AS fib_value,  
        1 AS next_value  
  
    UNION ALL  
  
    -- 2. Recursive Step  
    SELECT  
        n + 1,  
        next_value,  
        fib_value + next_value  
    FROM fibonacci  
    WHERE n < 8  
    -- 3. Stop Condition  
)  
SELECT n AS pos, fib_value FROM fibonacci;
```



# How It Works

## Step-by-step memory trace

### Step 1 (Anchor)

Initial State

n: 1

Fib: 0

Next: 1

### Step 2 (Recurse)

Shift & Add (0+1)

n: 2

Fib: 1

Next: 1

### Step 3 (Recurse)

Shift & Add (1+1)

n: 3

Fib: 1

Next: 2

### Step 4 (Recurse)

Shift & Add (1+2)

n: 4

Fib: 2

Next: 3

... repeats until n=8



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# Where to Use CTEs

Real places where recursion shines



## Org Hierarchies

Traversing employee reporting lines (Manager -> Employee).



## Bill of Materials

Exploding product components (Car -> Engine -> Screw).



## Graph Traversal

Finding shortest paths (Flights, Social Networks).



## Date Series

Generating calendars, missing dates, or sequences.



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## Quick Summary:

- ✓ Recursion is key for FAANG Interviews
- ✓ Anchor defines the start (0, 1)
- ✓ Recursive Member adds logic (Prev + Curr)
- ✓ Always include a Termination Clause



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