

☑ 1. Procedure in Database (Stored Procedure)

Definition (Very Short):

A **Stored Procedure** is a set of SQL statements saved in the database, which can be executed whenever needed.

Key Points:

- Used to perform tasks repeatedly.
- Improves performance (precompiled).
- Helps maintain security.
- Can accept parameters and return results.

Example (MySQL / SQL):

```
DELIMITER $$
CREATE PROCEDURE getStudents()
BEGIN
    SELECT * FROM Students;
END $$
DELIMITER ;
```

Call the procedure:

```
CALL getStudents();
```

☑ 2. Recursive in Database (Recursive Query / CTE)

Definition (Very Short):

A **recursive query** is a query that calls itself repeatedly until a condition is met. It is used for hierarchical data (tree/parent-child).

Key Points:

- Implemented using **WITH RECURSIVE**.
- Used for → employee hierarchy, folder structure, family tree, etc.
- Has two parts:
 1. **Anchor query** (base case)

2. Recursive query (repeats)

Example (Find all subordinates of a manager):

```
WITH RECURSIVE empCTE AS (  
    SELECT id, name, manager_id  
    FROM employees  
    WHERE manager_id IS NULL      -- anchor  
  
    UNION ALL  
  
    SELECT e.id, e.name, e.manager_id  
    FROM employees e  
    JOIN empCTE c ON e.manager_id = c.id -- recursive  
)  
SELECT * FROM empCTE;
```

3. Ranking in Database (Ranking Functions)

Definition (Very Short):

Ranking functions assign a **rank or number** to rows based on some ordering.

Main Ranking Functions:

1. **ROW_NUMBER()** → gives unique numbers
2. **RANK()** → same rank for ties (gaps exist)
3. **DENSE_RANK()** → same rank for ties (no gaps)

Example:

```
SELECT  
    student_name,  
    marks,  
    ROW_NUMBER() OVER (ORDER BY marks DESC) AS row_num,  
    RANK() OVER (ORDER BY marks DESC) AS rank_num,  
    DENSE_RANK() OVER (ORDER BY marks DESC) AS dense_rank_num  
FROM Students;
```

Ultra-Short Exam-Friendly Answers (If teacher asks verbally)

Q: What is a stored procedure?

A stored procedure is a pre-written SQL program stored in the database that can be executed whenever needed.

Q: What is a recursive query?

A recursive query is a query that calls itself to fetch hierarchical or repeated data.

Q: What are ranking functions?

Ranking functions give positions to rows based on order—like ROW_NUMBER(), RANK(), and DENSE_RANK().