

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().