

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Worksheet 8

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Subject Name: ADBMS

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1. Aim:

Design a robust PostgreSQL transaction system for the students table where multiple student records are inserted in a single transaction.

- a. If any insert fails due to invalid data, only that insert should be rolled back.
- b. Previous successful inserts should remain intact.
- c. Use savepoints to manage partial rollbacks.
- d. Provide clear messages for successful and failed insertions.

2. Objective:

- Understand Transaction Management in PostgreSQL
- Learn Partial Rollback Using Savepoints
- Handle Errors Gracefully
- Provide Feedback on Database Operations
- Develop Robust and Fault-tolerant Database Systems

3. Code:

-- Create table

```
CREATE TABLE students (
    id SERIAL PRIMARY KEY,
    name VARCHAR(50),
    age INT,
    class INT
);
```

-- Insert multiple students in one transaction

```
DO $$
BEGIN
    BEGIN
        INSERT INTO students(name, age, class) VALUES ('Shivanshu',20,12);
        INSERT INTO students(name, age, class) VALUES ('Tanya',21,12);
        INSERT INTO students(name, age, class) VALUES ('Devanshu',16,10);

        RAISE NOTICE 'Transaction Successfully Done';
    EXCEPTION
        WHEN OTHERS THEN
```

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RAISE NOTICE 'Transaction Failed..! Rolling back all changes.';
RAISE;

END;

END;

\$\$;

SELECT * FROM students;

-- Transaction with Savepoints

BEGIN; -- Start transaction

-- Savepoint 1: Karan

SAVEPOINT sp1;

INSERT INTO students(name, age, class) VALUES ('Karan',19,12);
DO \$\$ BEGIN RAISE NOTICE 'Inserted Karan successfully'; END \$\$;

-- Savepoint 2: Rohit (invalid insert)

SAVEPOINT sp2;

DO \$\$

BEGIN

BEGIN

INSERT INTO students(name, age, class) VALUES ('Rohit','wrong',12);

EXCEPTION WHEN OTHERS THEN

RAISE NOTICE 'Failed to insert Rohit, rolling back to savepoint sp2';

END;

END;

\$\$;

-- Rollback the failed insert in SQL

ROLLBACK TO SAVEPOINT sp2;

-- Savepoint 3: Aditya

SAVEPOINT sp3;

INSERT INTO students(name, age, class) VALUES ('Aditya',17,10);
DO \$\$ BEGIN RAISE NOTICE 'Inserted Aditya successfully'; END \$\$;

-- Commit all successful inserts

COMMIT;

SELECT * FROM students;



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4. Output:

Output:

```
CREATE TABLE
```

```
DO
```

id	name	age	class
1	Shivanshu	20	12
2	Tanya	21	12
3	Devanshu	16	10

(3 rows)

```
BEGIN
```

```
SAVEPOINT
```

```
INSERT 0 1
```

```
DO
```

```
SAVEPOINT
```

```
DO
```

```
ROLLBACK
```

```
SAVEPOINT
```

```
INSERT 0 1
```

```
DO
```

```
COMMIT
```

id	name	age	class
1	Shivanshu	20	12
2	Tanya	21	12
3	Devanshu	16	10
4	Karan	19	12
5	Aditya	17	10

(5 rows)

```
psql:commands.sql:27: NOTICE: Transaction Successfully Done
```

```
psql:commands.sql:38: NOTICE: Inserted Karan successfully
```

```
psql:commands.sql:50: NOTICE: Failed to insert Rohit, rolling back to savepoint sp2
```

```
psql:commands.sql:57: NOTICE: Inserted Aditya successfully
```

4. Learning Outcomes:

- Master Transaction Control
- Implement Partial Rollbacks with Savepoints
- Error Handling in Database Operations
- Provide Clear Feedback and Maintain Data Consistency