



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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WORKSHEET 8

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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.

If any insert fails due to invalid data, only that insert should be rolled back while preserving the previous successful inserts using savepoints.

The system should provide clear messages for both successful and failed insertions, ensuring data integrity and controlled error handling.

2. Tools Used : PostGres

Solutions:

Q1)

```
DROP TABLE IF EXISTS students;
```

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

```
DO
```

```
$$ BE
```

```
GIN
```

```
BEGIN
```

```
INSERT INTO students(name, age, class) VALUES ('Supriya',16,8);
```

```
INSERT INTO students(name, age, class) VALUES ('Rakshit',17,8);
```

```

INSERT INTO students(name, age, class) VALUES ('Varun',19,9);

RAISE NOTICE 'Transaction Successfully Done';

EXCEPTION
  WHEN OTHERS THEN
    RAISE NOTICE 'Transaction Failed..! Rolling back changes.';
    RAISE;
  END;
END;
$$;

SELECT * FROM students;

----- WRONG DATA TYPE SCENARIO -----
BEGIN; -- start transaction

SAVEPOINT sp1;
INSERT INTO students(name, age, class) VALUES ('Aarav',16,8);

SAVEPOINT sp2;
BEGIN
  INSERT INTO students(name, age, class) VALUES ('Rahul','wrong',9); -- fails
EXCEPTION WHEN OTHERS THEN
  RAISE NOTICE 'Failed to insert Rahul, rolling back to savepoint sp2';
  ROLLBACK TO SAVEPOINT sp2;
END;

-- Next insert
INSERT INTO students(name, age, class) VALUES ('Sita',17,10);

COMMIT; -- commit all successful inserts

```

3. Output:

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Query Query History Scratch Pad x

```
23 INSERT INTO students(name, age, class) VALUES ('Varun',19,9);
24
25 RAISE NOTICE 'Transaction Successfully Done';
26
27 EXCEPTION
28 WHEN OTHERS THEN
29 RAISE NOTICE 'Transaction Failed..! Rolling back changes.';
30 RAISE;
31
32 END;
33
34 $$;
35
36 SELECT * FROM students;
```

Data Output Messages Notifications

NOTICE: Transaction Successfully Done
DO

Query returned successfully in 39 msec.

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Query Query History Scratch Pad x

```
28 WHEN OTHERS THEN
29 RAISE NOTICE 'Transaction Failed..! Rolling back changes.';
30 RAISE;
31
32 END;
33
34 $$;
35
36 SELECT * FROM students;
37
38 -----WRONG DATA TYPE SCENARIO-----
39
40 BEGIN;
41
42 SAVEPOINT spt1;
```

Data Output Messages Notifications

Showing rows: 1 to 3 Page No: 1 of 1

	id [PK] integer	name character varying (50)	age integer	class integer
1	1	Supriya	16	8
2	2	Rakshit	17	8
3	3	Varun	19	9

The screenshot displays a PostgreSQL query editor interface. The top section, titled 'Query', contains a SQL script. The script begins with a `SAVEPOINT sp2;` followed by a `BEGIN` transaction block. Inside this block, an `INSERT INTO students(name, age, class) VALUES ('Rahul','wrong',9);` statement is executed, which fails due to a syntax error. The script then enters an `EXCEPTION WHEN OTHERS THEN` block, where it executes `RAISE NOTICE 'Failed to insert Rahul, rolling back to savepoint sp2';` and `ROLLBACK TO SAVEPOINT sp2;`. The transaction block ends with `END;`. Following the transaction, a comment `-- Next insert` is present, followed by another `INSERT INTO students(name, age, class) VALUES ('Sita',17,10);` statement, and finally a `COMMIT;` statement to commit all successful inserts.

The bottom section of the interface shows the 'Messages' tab. It displays an error message: 'ERROR: syntax error at or near "INSERT"' on line 2. Below this, the SQL state is shown as '42601' and the character position as '11'. A subsequent message indicates 'ROLLBACK' and 'Query returned successfully in 35 msec.'

```
42
43 SAVEPOINT sp2;
44 BEGIN
45     INSERT INTO students(name, age, class) VALUES ('Rahul','wrong',9); -- fails
46 EXCEPTION WHEN OTHERS THEN
47     RAISE NOTICE 'Failed to insert Rahul, rolling back to savepoint sp2';
48     ROLLBACK TO SAVEPOINT sp2;
49 END;
50
51 -- Next insert
52 INSERT INTO students(name, age, class) VALUES ('Sita',17,10);
53
54 COMMIT; -- commit all successful inserts
55
```

ERROR: syntax error at or near "INSERT"
LINE 2: INSERT INTO students(name, age, class) VALUES ('Rahul','...
^

SQL state: 42601
Character: 11

ROLLBACK

Query returned successfully in 35 msec.

4. Learning Outcomes:

- Understand the concept of PostgreSQL transactions and how to start, commit, and rollback.
- Learn how to use **SAVEPOINT** to handle partial rollbacks within a transaction.
- Practice controlled error handling for individual insert failures without affecting other successful operations.
- Gain experience in maintaining **data integrity** while performing multiple inserts.
- Learn to generate informative **NOTICES** to monitor transaction progress and errors.