TASK-4 : Data Modification & Integrity - Complete Breakdown (OUTPUTS)

1. INSERT: Add New Employees

```sql
Query   Query History
1    -- Single insert
2    INSERT INTO employee_sandbox
3    (emp_no, birth_date, first_name, last_name, gender, hire_date)
4    VALUES
5    (500001, '1995-08-14', 'Emma', 'Johnson', 'F', '2023-06-01');
6
7    -- Bulk insert
8    INSERT INTO employee_sandbox VALUES
9    (500002, '1990-11-03', 'Liam', 'Smith', 'M', '2023-06-01'),
10   (500003, '1988-04-22', 'Olivia', 'Brown', 'F', '2023-06-01');
11
12   -- Verification
13   SELECT * FROM employee_sandbox
14   WHERE emp_no >= 500000;
15
```

Data Output   Messages   Notifications

	emp_no [PK] integer	birth_date date	first_name character varying (50)	last_name character varying (50)	gender character (1)	hire_date date
1	500001	1995-08-14	Emma	Johnson	F	2023-06-01
2	500002	1990-11-03	Liam	Smith	M	2023-06-01
3	500003	1988-04-22	Olivia	Brown	F	2023-06-01

## 2. UPDATE: Modify Existing Records

```
1    -- Correct name
2 ∨  UPDATE employee_sandbox
3    SET first_name = 'Amelia'
4    WHERE emp_no = 500003;
5
6    -- Simulate department transfer
7 ∨  UPDATE employee_sandbox
8    SET hire_date = '2023-07-15'
9    WHERE first_name = 'Georgi'
10   AND last_name = 'Facello';
11
12   -- Verification
13 ∨ SELECT * FROM employee_sandbox
14   WHERE first_name IN ('Amelia', 'Georgi');
15
```

Data Output   Messages   Notifications

	emp_no [PK] integer	birth_date date	first_name character varying (50)	last_name character varying (50)	gender character (1)	hire_date date
1	10040	1956-12-13	Amelia	Johnson	M	1992-06-15
2	10064	1956-04-17	Amelia	Harris	F	1988-05-17
3	10113	1960-07-11	Amelia	Thomas	M	1987-04-15
4	10136	1955-12-23	Amelia	Robinson	F	1986-05-12
5	10156	1974-03-03	Amelia	Clark	F	1991-07-27
6	10179	1973-09-14	Amelia	Smith	M	1989-03-29
7	10185	1956-03-05	Amelia	Brown	F	1991-03-08
8	10190	1967-06-25	Amelia	Clark	F	1986-03-20
9	10196	1981-01-06	Amelia	White	M	1988-10-31
10	10272	1989-06-27	Amelia	Brown	F	1990-02-12
11	10289	1978-05-27	Amelia	Taylor	M	1987-01-17
12	10290	1976-04-13	Amelia	Anderson	F	1991-12-25
13	10308	1957-08-23	Amelia	Taylor	F	1988-09-20
14	10346	1977-05-02	Amelia	Thompson	F	1985-08-31
15	10348	1966-04-12	Amelia	Robinson	F	1994-06-03
16	10398	1985-10-06	Amelia	Wilson	F	1991-03-23

3. DELETE: Remove Records

```sql
1 ⌄  DELETE FROM employee_sandbox
2    WHERE hire_date = '2023-06-01'
3    AND emp_no > 500000;
4
5 ⌄  SELECT COUNT(*) FROM employee_sandbox
6    WHERE emp_no > 500000;
7
```

Data Output | Messages | Notifications

	count bigint 🔒
1	0

4. Constraint Enforcement :
1. Primary Key Violation

Query   Query History

```sql
1 ⌄  INSERT INTO employee_sandbox
2    VALUES (10001, '1953-09-02', 'John', 'Doe', 'M', '1986-06-26');
3    -- Expected Error: Duplicate entry for PRIMARY KEY
4
```

Data Output   Messages   Notifications

```
ERROR:  Key (emp_no)=(10001) already exists.duplicate key value violates unique constraint "employee_sandbox_pkey"

ERROR:  duplicate key value violates unique constraint "employee_sandbox_pkey"
SQL state: 23505
Detail: Key (emp_no)=(10001) already exists.
```

2. Foreign Key Enforcement

Query   Query History

```sql
1 ⌄  INSERT INTO salary_sandbox
2    VALUES (999999, 80000, '2023-01-01', '9999-01-01');
3    -- Expected Error: Foreign key constraint fails
4
```

Data Output   Messages   Notifications

```
ERROR:  Key (emp_no)=(999999) is not present in table "employee_sandbox".insert or update on table "salary_sandbox" violates foreign key constraint "fk_emp"

ERROR:  insert or update on table "salary_sandbox" violates foreign key constraint "fk_emp"
SQL state: 23503
Detail: Key (emp_no)=(999999) is not present in table "employee_sandbox".
```

5. Transaction Control :

1. Atomic Update Example

```
Query   Query History

1    START TRANSACTION;
2
3  ⌄ UPDATE employee_sandbox
4    SET first_name = 'Alexander'
5    WHERE emp_no = 10002;
6
7  ⌄ INSERT INTO salary_sandbox
8    VALUES (10002, 75000, CURDATE(), '9999-01-01');
9
10   ROLLBACK;
11
```

```
Data Output   Messages   Notifications

ERROR:  function curdate() does not exist
LINE 8: VALUES (10002, 75000, CURDATE(), '9999-01-01');
                                   ^
HINT:  No function matches the given name and argument types. You might need to add explicit type casts.

SQL state: 42883
Character: 146
```

2. Savepoints

```
Query   Query History

1    START TRANSACTION;
2
3  ⌄ UPDATE employee_sandbox
4    SET hire_date = '2023-01-01'
5    WHERE emp_no = 10003;
6
7    SAVEPOINT sp1;
8
9  ⌄ DELETE FROM employee_sandbox
10   WHERE first_name LIKE 'A%';
11
12   ROLLBACK TO SAVEPOINT sp1;
13   COMMIT;
14
```

```
Data Output   Messages   Notifications

ERROR:  current transaction is aborted, commands ignored until end of transaction block

SQL state: 25P02
```

6. Constraint Management :

1.Adding Constraints
2.Constraint Removal

```
Query    Query History

1  ⌄  ALTER TABLE employee_sandbox
2      ADD COLUMN email VARCHAR(255);
3
4  ⌄  ALTER TABLE employee_sandbox
5      ADD CONSTRAINT uc_email UNIQUE (email);
6
```

Data Output   Messages   Notifications

```
ALTER TABLE


Query returned successfully in 76 msec.
```

7.Real-World Scenarios :

Scenario 1: Department Consolidation

```
Query    Query History

1      START TRANSACTION;
2
3  ⌄  UPDATE dept_emp
4      SET dept_no = (
5          SELECT dept_no FROM departments
6          WHERE dept_name = 'People Ops'
7      )
8      WHERE dept_no = (
9          SELECT dept_no FROM departments
10         WHERE dept_name = 'Human Resources'
11     );
12
13 ⌄  DELETE FROM departments
14     WHERE dept_name = 'Human Resources';
15
16     COMMIT;
17
```

Data Output   Messages   Notifications

```
COMMIT


Query returned successfully in 51 msec.
```

Scenario 2: GDPR Data Purge

Query   Query History

```sql
1    BEGIN;
2
3    -- 1. Delete dependent salary records
4  ∨ DELETE FROM salary_sandbox
5    WHERE emp_no IN (
6        SELECT emp_no
7        FROM employee_sandbox
8        WHERE hire_date < '1990-01-01'
9    );
10
11   -- 2. Delete employees
12 ∨ DELETE FROM employee_sandbox
13   WHERE hire_date < '1990-01-01';
14
15   COMMIT;
16
```

Data Output   Messages   Notifications

```
COMMIT

Query returned successfully in 55 msec.
```