Lab-02

DATA INTEGRITY CONSTRAINTS IMPLEMENTATION

TASK:

Q1. Create a database UniversityDB and the following tables with constraints:
- Students
- student_id (INTEGER, PRIMARY KEY)
- name (VARCHAR(100), NOT NULL)
- email (VARCHAR(100), UNIQUE)
- department_id (INTEGER, FOREIGN KEY referencing
- Departments(department_id))

Departments
- department_id (INTEGER, PRIMARY KEY)
- department_name (VARCHAR(100), UNIQUE, NOT NULL)

SQL QUERY:

```
1   DROP DATABASE universitydb;
2   CREATE DATABASE UniversityDB;
3   USE UniversityDB;
4   CREATE TABLE Departments (
5       department_id INTEGER PRIMARY KEY,
6       department_name VARCHAR(100) UNIQUE NOT NULL
7   );
8   CREATE TABLE Students (
9       student_id INTEGER PRIMARY KEY,
10      name VARCHAR(100) NOT NULL,
11      email VARCHAR(100) UNIQUE,
12      department_id INTEGER,
13      FOREIGN KEY (department_id) REFERENCES Departments(department_id)
14  );
15  INSERT INTO Departments (department_id, department_name) VALUES (101, 'Computer Science');
16  INSERT INTO Departments (department_id, department_name) VALUES (102, 'Electrical Engineering');
17  INSERT INTO Departments (department_id, department_name) VALUES (103, 'Mechanical Engineering');
18  INSERT INTO Students (student_id, name, email, department_id) VALUES (1, 'Alice', 'alice@example.com', 101);
19  INSERT INTO Students (student_id, name, email, department_id) VALUES (2, NULL, 'bob@example.com', 102);
20  INSERT INTO Students (student_id, name, email, department_id) VALUES (3, 'Charlie', 'alice@example.com', 103);
21  INSERT INTO Students (student_id, name, email, department_id) VALUES (4, 'David', 'david@example.com', 104);
22  describe Students;
23  ALTER TABLE Students
24  MODIFY email VARCHAR(100) NOT NULL;
25  SHOW CREATE TABLE Students;
26  ALTER TABLE Students DROP FOREIGN KEY students_ibfk_1;
27  ALTER TABLE Students DROP COLUMN department_id;
28  -- Step 1: Drop the existing foreign key constraint
29  ALTER TABLE Students DROP FOREIGN KEY students_ibfk_1;
30  ALTER TABLE Students
```

```sql
30    ALTER TABLE Students
31    ADD CONSTRAINT fk_department
32    FOREIGN KEY (department_id) REFERENCES Departments(department_id) ON DELETE CASCADE;
33    DELETE FROM Departments WHERE department_id = 102;
34    SELECT * FROM Students WHERE department_id = 102;
35    SELECT * FROM Students WHERE email IS NULL;
36
```

Output:

Output

Action Output ▾

#	Time	Action	Message
✔ 1	09:16:35	DROP DATABASE universitydb	2 row(s) affected
✔ 2	09:16:38	CREATE DATABASE UniversityDB	1 row(s) affected
✔ 3	09:16:40	USE UniversityDB	0 row(s) affected
✔ 4	09:16:43	CREATE TABLE Departments (department_id INTEGER PRIMARY KEY, department_name VARCHAR(100) UNIQUE NOT NULL)	0 row(s) affected
✔ 5	09:16:49	CREATE TABLE Students (student_id INTEGER PRIMARY KEY, name VARCHAR(100) NOT NULL, email VARCHAR(100) UNI...	0 row(s) affected
✔ 6	09:18:14	INSERT INTO Departments (department_id, department_name) VALUES (101, 'Computer Science')	1 row(s) affected
✔ 7	09:18:20	INSERT INTO Departments (department_id, department_name) VALUES (102, 'Electrical Engineering')	1 row(s) affected
✔ 8	09:18:23	INSERT INTO Departments (department_id, department_name) VALUES (103, 'Mechanical Engineering')	1 row(s) affected
✔ 9	09:19:15	INSERT INTO Students (student_id, name, email, department_id) VALUES (1, 'Alice', 'alice@example.com', 101)	1 row(s) affected
✘ 10	09:19:16	INSERT INTO Students (student_id, name, email, department_id) VALUES (2, NULL, 'bob@example.com', 102)	Error Code: 1048. Column 'name' cannot be null
✘ 11	09:19:16	INSERT INTO Students (student_id, name, email, department_id) VALUES (2, NULL, 'bob@example.com', 102)	Error Code: 1048. Column 'name' cannot be null
✘ 12	09:19:19	INSERT INTO Students (student_id, name, email, department_id) VALUES (3, 'Charlie', 'alice@example.com', 103)	Error Code: 1062. Duplicate entry 'alice@example.com' for key 'students.email'
✘ 13	09:19:21	INSERT INTO Students (student_id, name, email, department_id) VALUES (4, 'David', 'david@example.com', 104)	Error Code: 1452. Cannot add or update a child row: a foreign key constraint fails ('universitydb'
✔ 14	09:22:23	ALTER TABLE Students MODIFY email VARCHAR(100) NOT NULL	0 row(s) affected Records: 0 Duplicates: 0 Warnings: 0
✔ 15	09:23:48	SHOW CREATE TABLE Students	1 row(s) returned
✔ 16	09:23:53	ALTER TABLE Students DROP FOREIGN KEY students_ibfk_1	0 row(s) affected Records: 0 Duplicates: 0 Warnings: 0
✔ 17	09:23:56	ALTER TABLE Students DROP COLUMN department_id	0 row(s) affected Records: 0 Duplicates: 0 Warnings: 0
✘ 18	09:25:11	ALTER TABLE Students ADD CONSTRAINT fk_department FOREIGN KEY (department_id) REFERENCES Departments(department_i...	Error Code: 1072. Key column 'department_id' doesn't exist in table
✔ 19	09:25:13	DELETE FROM Departments WHERE department_id = 102	1 row(s) affected
✘ 20	09:25:14	SELECT * FROM Students WHERE department_id = 102 LIMIT 0, 1000	Error Code: 1054. Unknown column 'department_id' in 'where clause'
✔ 21	09:28:14	SELECT * FROM Students WHERE email IS NULL LIMIT 0, 1000	0 row(s) returned
✔ 22	09:28:37	SELECT * FROM Students WHERE email IS NULL LIMIT 0, 1000	0 row(s) returned

Result Grid	Filter Rows:	Export:	Wrap Cell Content:

Field	Type	Null	Key	Default	Extra
student_id	int	NO	PRI	NULL	
name	varchar(100)	NO		NULL	
email	varchar(100)	NO	UNI	NULL	
department_id	int	YES	MUL	NULL	