**Foreign Key Constraint Example:**

**-- Creating the Department table**

CREATE TABLE Department (

D\_No INT PRIMARY KEY,

D\_Location VARCHAR(50)

);

**-- Inserting data into the Department table**

INSERT INTO Department (D\_No, D\_Location) VALUES

(11, 'Mumbai'),

(24, 'Delhi'),

(13, 'Noida');

**-- Creating the Employee table**

CREATE TABLE Employee (

Emp\_Name INT PRIMARY KEY,

Name VARCHAR(50),

Age INT,

D\_No INT,

FOREIGN KEY (D\_No) REFERENCES Department(D\_No)

);

-- Inserting data into the Employee table

INSERT INTO Employee (Emp\_Name, Name, Age, D\_No) VALUES

(1, 'Jack', 20, 11),

(2, 'Harry', 40, 24),

(3, 'John', 27, 18), -- This D\_No does not have a corresponding entry in Department, so this row would fail unless the department is added.

(4, 'Devil', 38, 13);

ERROR 1452 (23000): Cannot add or update a child row: a foreign key constraint fails (`today`.`employee`, CONSTRAINT `employee\_ibfk\_1` FOREIGN KEY (`D\_No`) REFERENCES `department` (`D\_No`))

**-- Creating the Department table**

CREATE TABLE Department (

D\_No INT PRIMARY KEY,

D\_Location VARCHAR(50)

);

-- Inserting data into the Department table

INSERT INTO Department (D\_No, D\_Location) VALUES

(11, 'Mumbai'),

(24, 'Delhi'),

(18, 'Pune'),

(13, 'Noida');

**-- Creating the Employee table**

CREATE TABLE Employee (

Emp\_Name INT PRIMARY KEY,

Name VARCHAR(50),

Age INT,

D\_No INT,

FOREIGN KEY (D\_No) REFERENCES Department(D\_No)

);

**-- Inserting data into the Employee table**

INSERT INTO Employee (Emp\_Name, Name, Age, D\_No) VALUES

(1, 'Jack', 20, 11),

(2, 'Harry', 40, 24),

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**-- Creating the Department table**

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(1, 'Jack', 20, 11),

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(4, 'Devil', 38, 13);

**Scenario: University Database**

* We have a university database with tables for Department, Student, Course, and Enrollment.
* Each Course belongs to a Department.
* Each Student is assigned to a Department.
* Enrollment tracks which students are enrolled in which courses.

**Step 1: Create Tables**

**1. Department Table**

This table stores information about departments in the university.

CREATE TABLE Department (

D\_No INT PRIMARY KEY,

D\_Name VARCHAR(50)

);

**2. Student Table**

This table stores information about students. Each student is associated with a department (foreign key D\_No).

CREATE TABLE Student (

Student\_ID INT PRIMARY KEY,

Name VARCHAR(50),

Age INT,

D\_No INT,

FOREIGN KEY (D\_No) REFERENCES Department(D\_No)

);

**3. Course Table**

This table stores information about courses. Each course is offered by a department (foreign key D\_No).

CREATE TABLE Course (

Course\_ID INT PRIMARY KEY,

Course\_Name VARCHAR(50),

Credits INT,

D\_No INT,

FOREIGN KEY (D\_No) REFERENCES Department(D\_No)

);

**4. Enrollment Table**

This table tracks which students are enrolled in which courses. It has two foreign keys: one referencing the Student table and another referencing the Course table.

CREATE TABLE Enrollment (

Enrollment\_ID INT PRIMARY KEY,

Student\_ID INT,

Course\_ID INT,

Enrollment\_Date DATE,

FOREIGN KEY (Student\_ID) REFERENCES Student(Student\_ID),

FOREIGN KEY (Course\_ID) REFERENCES Course(Course\_ID)

);

**Step 2: Insert Sample Data**

**1. Insert Data into Department**

INSERT INTO Department (D\_No, D\_Name) VALUES

(1, 'Computer Science'),

(2, 'Mathematics'),

(3, 'Physics');

2. Insert Data into Student

INSERT INTO Student (Student\_ID, Name, Age, D\_No) VALUES

(101, 'Alice', 20, 1),

(102, 'Bob', 21, 2),

(103, 'Charlie', 22, 3);

3. Insert Data into Course

INSERT INTO Course (Course\_ID, Course\_Name, Credits, D\_No) VALUES

(1001, 'Data Structures', 4, 1),

(1002, 'Calculus', 4, 2),

(1003, 'Quantum Physics', 4, 3);

4. Insert Data into Enrollment

INSERT INTO Enrollment (Enrollment\_ID, Student\_ID, Course\_ID, Enrollment\_Date) VALUES

(1, 101, 1001, '2024-01-15'),

(2, 102, 1002, '2024-01-16'),

(3, 103, 1003, '2024-01-17');