Assignment No. 3

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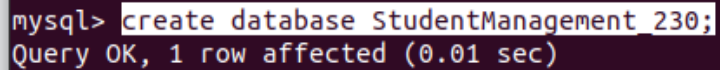PRN :- 123B1B230

1. Create a database named StudentManagement
Code :-

    create database StudentManagement;

Output :-

```
mysql> create database StudentManagement_230;
Query OK, 1 row affected (0.01 sec)
```

2. Define the following tables with appropriate constraints:
Code :-

    Table 1: Students
    create table Students_230(
            StudentID int primary key not null,
            Firstname varchar(50) not null,
            Lastname varchar(100) unique,
            Email varchar(100) unique,
            DOB date not null,
            CourseID int,
            foreign key (CourseID) references Courses(CourseID)
            );

    Table 2: Courses
    create table Courses(
            CourseID int primary key not null,
            CourseName varchar(100) not null unique,
            Credits int default 3
            );

3. Insert records into the tables while ensuring the constraints are not violated.
Code :-

    insert into Courses (CourseID, CourseName, Credits) values
    (1, 'Introduction to Computer Science', 3),
    (2, 'Data Structures and Algorithms', 4),
    (3, 'Database Management Systems', 3);

Output :-

```
+----------+--------------------------------+---------+
| CourseID | CourseName                     | Credits |
+----------+--------------------------------+---------+
|        1 | Introduction to Computer Science |     3 |
|        2 | Data Structures and Algorithms |       4 |
|        3 | Database Management Systems    |       3 |
+----------+--------------------------------+---------+
```

-- Inserting 6 random students

insert into Students_230 (StudentID, Firstname, Lastname, Email, DOB, CourseID) values
(101, 'Aarav', 'Sharma', 'aarav.sharma@example.com', '2001-05-12', 1),
(102, 'Isha', 'Patel', 'isha.patel@example.com', '2000-08-21', 2),
(103, 'Ravi', 'Verma', 'ravi.verma@example.com', '1999-11-30', 3),
(104, 'Priya', 'Gupta', 'priya.gupta@example.com', '2002-03-14', 1),
(105, 'Vikram', 'Reddy', 'vikram.reddy@example.com', '2000-01-25', 2),
(106, 'Ananya', 'Nair', 'ananya.nair@example.com', '1998-07-07', 3);

Output :-

```
+-----------+-----------+----------+--------------------------+------------+----------+
| StudentID | Firstname | Lastname | Email                    | DOB        | CourseID |
+-----------+-----------+----------+--------------------------+------------+----------+
|       101 | Aarav     | Sharma   | aarav.sharma@example.com | 2001-05-12 |        1 |
|       102 | Isha      | Patel    | isha.patel@example.com   | 2000-08-21 |        2 |
|       103 | Ravi      | Verma    | ravi.verma@example.com   | 1999-11-30 |        3 |
|       104 | Priya     | Gupta    | priya.gupta@example.com  | 2002-03-14 |        1 |
|       105 | Vikram    | Reddy    | vikram.reddy@example.com | 2000-01-25 |        2 |
|       106 | Ananya    | Nair     | ananya.nair@example.com  | 1998-07-07 |        3 |
+-----------+-----------+----------+--------------------------+------------+----------+
```

4. Test the Constraints

Code :- Attempt to violate the constraints and observe the results:

1. Test 1: Insert a NULL value into a NOT NULL column.

Attempting to insert NULL into the 'Firstname' column (NOT NULL constraint violation)
insert into Students_230 (StudentID, Firstname, Lastname, Email, DOB, CourseID)
values (107, NULL, 'Singh', 'singh@example.com', '2003-02-15', 1);

```
mysql> -- Attempting to insert NULL into the 'Firstname' column (NOT NULL constraint violation)
mysql> insert into Students_230 (StudentID, Firstname, Lastname, Email, DOB, CourseID)
    -> values (107, NULL, 'Singh', 'singh@example.com', '2003-02-15', 1);
ERROR 1048 (23000): Column 'Firstname' cannot be null
mysql>
```

2. Test 2: Insert a duplicate value in the UNIQUE column.

Attempting to insert a duplicate Email (UNIQUE constraint violation)

insert into Students_230 (StudentID, Firstname, Lastname, Email, DOB, CourseID)
values (108, 'Ankit', 'Kumar', 'aarav.sharma@example.com', '2001-05-12', 2);

```
mysql> insert into Students_230 (StudentID, Firstname, Lastname, Email, DOB, CourseID)
    -> values (108, 'Ankit', 'Kumar', 'aarav.sharma@example.com', '2001-05-12', 2);
ERROR 1062 (23000): Duplicate entry 'aarav.sharma@example.com' for key 'Students_230.Email'
mysql>
```

3. Test 3: Insert a record with an invalid FOREIGN KEY reference.

```
ERROR 1452 (23000): Cannot add or update a child row: a foreign key constraint fails (`StudentManagement_230`.`Students_230`, CONSTRAINT `Students_230_ibfk_1` FOREIGN K
EY (`CourseID`) REFERENCES `Courses_230` (`CourseID`))
mysql>
```

5. Attempt following questions:
   1. Write a query to display the names of students who were born after the year 2000.
   Code :-
   select Firstname,Lastname from Students_230
   where year(DOB) > 2000;
   Output :-

```
+-----------+----------+
| Firstname | Lastname |
+-----------+----------+
| Aarav     | Sharma   |
| Priya     | Gupta    |
+-----------+----------+
2 rows in set (0.00 sec)
```

   2. Write a query to update the course credits for "Computer Science" to 4.
   Code :-
   update Courses_230
   set Credits = 4
   where CourseName = 'Introduction to Computer Science';
   Output :-

```
+----------+----------------------------------+---------+
| CourseID | CourseName                       | Credits |
+----------+----------------------------------+---------+
|        1 | Introduction to Computer Science |       4 |
|        2 | Data Structures and Algorithms   |       4 |
|        3 | Database Management Systems      |       3 |
+----------+----------------------------------+---------+
```

3. Write a query to delete a student record whose email is "isha.patel@example.com".

Code :-

DELETE FROM Students_230 WHERE Email = 'isha.patel@example.com';

Output :-

```
+-----------+-----------+----------+-----------------------------+------------+----------+
| StudentID | Firstname | Lastname | Email                       | DOB        | CourseID |
+-----------+-----------+----------+-----------------------------+------------+----------+
|       101 | Aarav     | Sharma   | aarav.sharma@example.com    | 2001-05-12 |        1 |
|       103 | Ravi      | Verma    | ravi.verma@example.com      | 1999-11-30 |        3 |
|       104 | Priya     | Gupta    | priya.gupta@example.com     | 2002-03-14 |        1 |
|       105 | Vikram    | Reddy    | vikram.reddy@example.com    | 2000-01-25 |        2 |
|       106 | Ananya    | Nair     | ananya.nair@example.com     | 1998-07-07 |        3 |
+-----------+-----------+----------+-----------------------------+------------+----------+
```

4. Write a query to find students who are not enrolled in any course.

Code :-

Select *from Students_230
Where CourseID = NULL;

Output :-

```
Empty set (0.00 sec)
```

5.Test the UNIQUE constraint by inserting a duplicate email into the Students table.

Code :-

INSERT INTO Students_230 (StudentID, Firstname, Lastname, Email, DOB, CourseID)
VALUES (110, 'Arjun', 'Chaudhary', 'aarav.sharma@example.com', '2001-06-10', 2);

Output :-

```
mysql> -- Attempting to insert a duplicate email into the Students_230 table
mysql> INSERT INTO Students_230 (StudentID, Firstname, Lastname, Email, DOB, CourseID)
    -> VALUES (110, 'Arjun', 'Chaudhary', 'aarav.sharma@example.com', '2001-06-10', 2);
ERROR 1062 (23000): Duplicate entry 'aarav.sharma@example.com' for key 'Students_230.Email'
mysql>
```

6. Test the FOREIGN KEY constraint by inserting a student with a CourseID that does not exist in the Courses table.

Code :-

INSERT INTO Students_230 (StudentID, Firstname, Lastname, Email, DOB, CourseID)
VALUES (111, 'Ravi', 'Kumar', 'ravi.kumar@example.com', '2002-12-15', 999);

Output :-

```
mysql> INSERT INTO Students_230 (StudentID, Firstname, Lastname, Email, DOB, CourseID)
    -> VALUES (111, 'Ravi', 'Kumar', 'ravi.kumar@example.com', '2002-12-15', 999);
ERROR 1452 (23000): Cannot add or update a child row: a foreign key constraint fails (`StudentManagement_230`.`Students_230`, CONSTRAINT `Students_230_ibfk_1` FOREIGN K
EY (`CourseID`) REFERENCES `Courses_230` (`CourseID`))
mysql>
```