DBMS Lab Assignment 3

Team 4

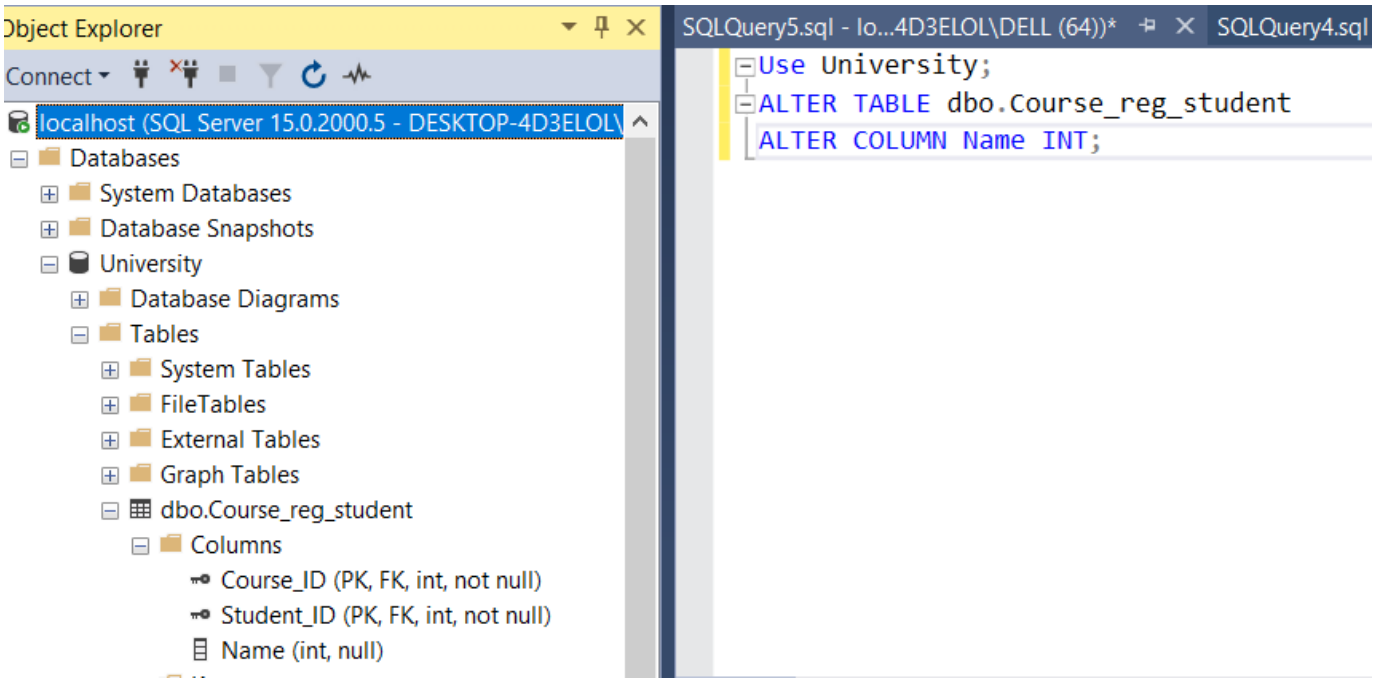
1.Add, Modify and Delete Column using Alter Command

Query:

To add column “Name” of datatype varchar(255) to T4_Course_reg_student

```
Use University;

ALTER TABLE dbo.Course_reg_student

ADD Name varchar(255);
```

Output:



Schema of table:

110 %

Results | Messages

	Name	Owner	Type	Created_datetime
1	Course_reg_student	dbo	user table	2021-02-18 19:53:12.340

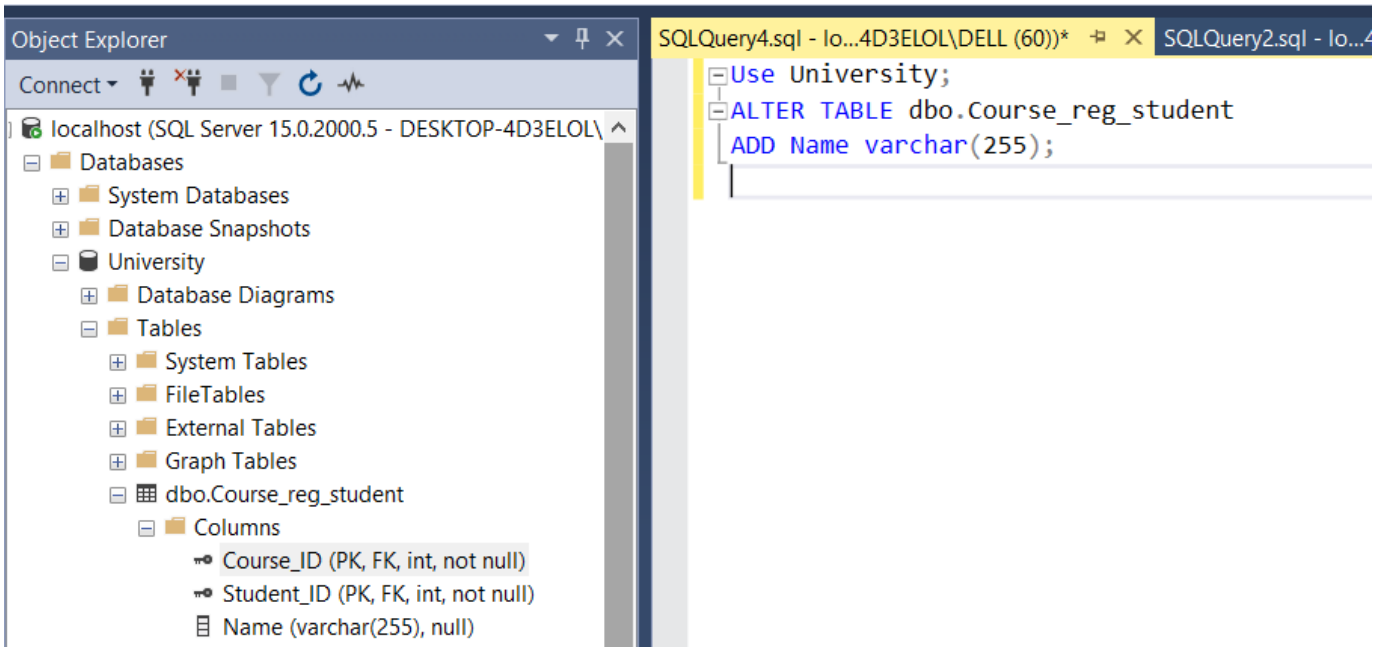
	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	Course_ID	int	no	4	10	0	no	(n/a)	(n/a)	NULL
2	Student_ID	int	no	4	10	0	no	(n/a)	(n/a)	NULL
3	Name	varchar	no	255			yes	no	yes	Latin1_General_CI_AS

Query:

To modify datatype of "Name" column from varchar to integer.

```
Use University;

ALTER TABLE dbo.Course_reg_student

ALTER COLUMN Name INT
```

Output:



Schema of table:

110 %

Results | Messages

	Name	Owner	Type	Created_datetime
1	Course_reg_student	dbo	user table	2021-02-18 19:53:12.340

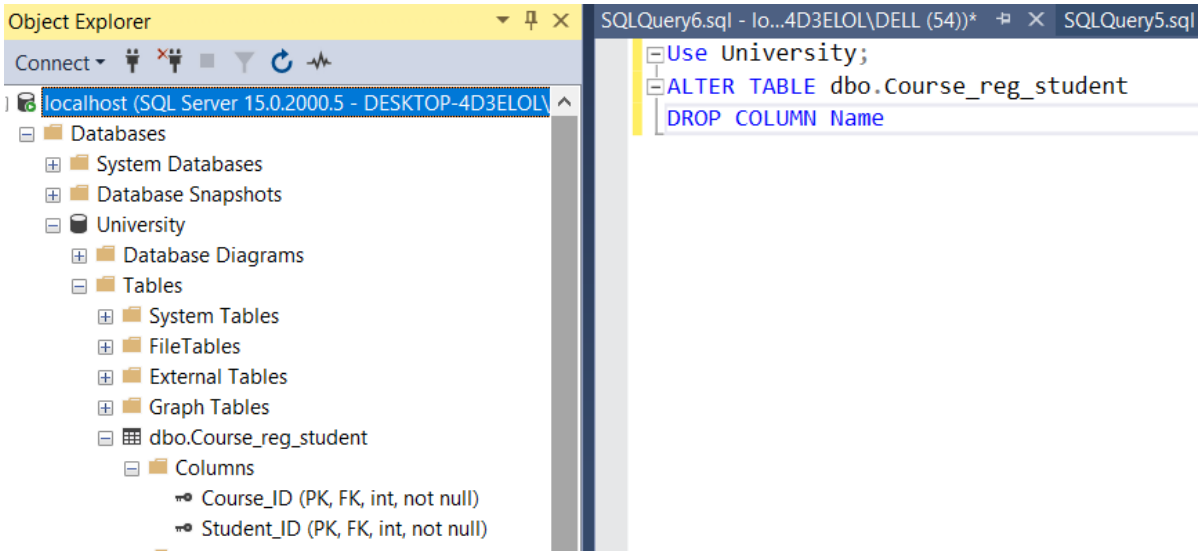
	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	Course_ID	int	no	4	10	0	no	(n/a)	(n/a)	NULL
2	Student_ID	int	no	4	10	0	no	(n/a)	(n/a)	NULL
3	Name	int	no	4	10	0	yes	(n/a)	(n/a)	NULL

Query:

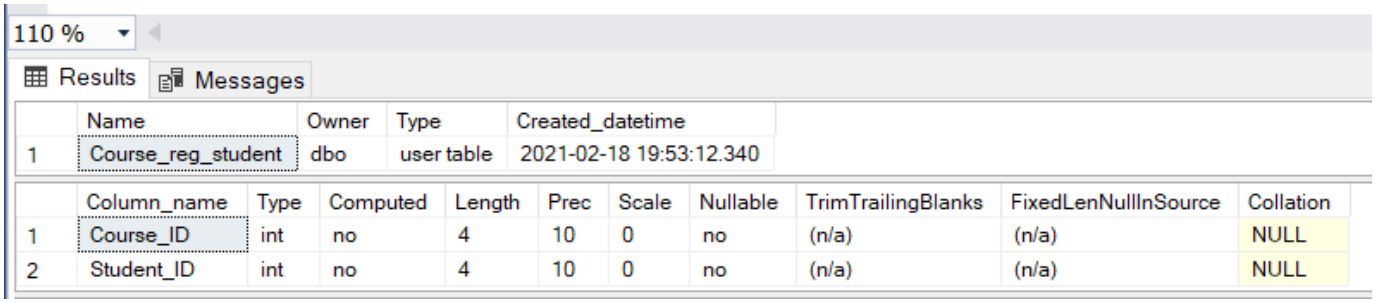
To drop column “Name” from T4_Course_reg_student

```
Use University;

ALTER TABLE dbo.Course_reg_student

DROP COLUMN Name
```

Output:



Schema of table:



110 %

Results | Messages

	Name	Owner	Type	Created_datetime
1	Course_reg_student	dbo	user table	2021-02-18 19:53:12.340

	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	Course_ID	int	no	4	10	0	no	(n/a)	(n/a)	NULL
2	Student_ID	int	no	4	10	0	no	(n/a)	(n/a)	NULL

2. Insert 20 Employees Data into all the tables. (Use all the 3 methods)

Query:

For inserting data into T4_Department:

```
INSERT INTO T4_Department
VALUES ('AI', 'A-01');
INSERT INTO T4_Department
VALUES ('CSE', 'C-02');
INSERT INTO T4_Department
VALUES ('ECE', 'E-03');
INSERT INTO T4_Department
VALUES ('BT', 'B-04');
INSERT INTO T4_Department
VALUES ('ME', 'M-05');
INSERT INTO T4_Department
VALUES ('CVE', 'CV-06');
INSERT INTO T4_Department
VALUES ('PHY', 'PH-07');
```

```
INSERT INTO T4_Department
VALUES ('MATH', 'MAT-08');
INSERT INTO T4_Department
VALUES ('IT', 'IT-09');
INSERT INTO T4_Department
VALUES ('EEE', 'EE-10');
INSERT INTO T4_Department
VALUES ('AERO', 'AR-11');
INSERT INTO T4_Department
VALUES ('HSE', 'HS-12');
```

Output:

	Department_Name	Location_
1	AERO	AR-11
2	AI	A-01
3	BT	B-04
4	CSE	C-02
5	CVE	CV-06
6	ECE	E-03
7	EEE	EE-10
8	HSE	HS-12
9	IT	IT-09
10	MATH	MAT-08
11	ME	M-05
12	PHY	PH-07

For inserting data into T4_Faculty:
All four methods of inserting shown here-

1) **Implicitly inserting data (without providing column names)**
2) **Specifying column names for insertion explicitly**
3) **Importing data from another table**
4) **Using SELECT INTO (creates new table)**

Query:

```
/* Method 1 of insertion: Implicitly inserting data*/

INSERT INTO T4_Faculty
VALUES (100, 'AI', 1, 'Virat', 'Kohli', 51188);

/* Method 2 of insertion: Specifying column names for insertion*/
INSERT INTO T4_Faculty (Faculty_ID ,Department_Name, HOD, FirstName, LastName, Phone)
VALUES (101, 'CSE', 0, 'Rohit', 'Sharma', 30487);

/* Temporary table for importing data into T4_Faculty*/
CREATE TABLE Faculty_Record
(
        Faculty_ID int PRIMARY KEY NOT NULL,
        Department_Name varchar(255) FOREIGN KEY REFERENCES
T4_Department(Department_Name) NOT NULL,
        HOD bit NOT NULL,
        FirstName VARCHAR(255) NOT NULL,
        LastName VARCHAR(255),
        Phone INT NOT NULL
)

INSERT INTO Faculty_Record
VALUES (102, 'CSE', 1, 'Mahendra Singh', 'Dhoni', 70781);

/* Method 3 of insertion: Importing data from another table*/
INSERT INTO T4_Faculty(Faculty_ID ,Department_Name, HOD, FirstName, LastName, Phone)
```

```
  SELECT *
  FROM Faculty_Record
  WHERE Faculty_ID = 102

/* Method 4 of insertion: Using SELECT INTO (creates new table)*/
SELECT
        103 AS Faculty_ID,
        'AI' AS Department_Name,
        0 AS HOD,
        'Ajinkya' AS FirstName,
        'Rahane' AS LastName,
        60688 AS Phone
INTO Test_Table;

INSERT INTO T4_Faculty
VALUES
(103, 'CSE', 0, 'Mithali', 'Raj', 05059),
(104, 'AI', 0, 'Ajinkya', 'Rahane', 60688),
(105, 'ECE', 1, 'Shubhman', 'Gill', 70895),
(106, 'ECE', 0, 'Harleen', 'Deol', 66666),
(107, 'BT', 1, 'Jasprit', 'Bumrah', 99999),
(108, 'BT', 0, 'Ekta', 'Bisht', 54545),
(109, 'AERO', 0, 'Hardik', 'Pandya', 23232),
(110, 'AERO', 1, 'Ravi', 'Ashwin', 11116),
(111, 'ME', 1, 'Ravindra', 'Jadeja', 33890),
(112, 'MATH', 1, 'Che', 'Pujara', 80806),
(113, 'ME', 0, 'Kuldeep', 'Yadav', 93947),
(114, 'CVE', 1, 'Smriti', 'Mandhana', 11112),
(115, 'CVE', 0, 'Md', 'Siraj', 99998),
(116, 'CVE', 0, 'Yuz', 'Chahal', 11117),
(117, 'ECE', 0, 'Rishabh', 'Pant', 11116),
(118, 'HSE', 1, 'Shikhar', 'Dhawan', 11114),
(119, 'AI', 0, 'Bhuvi', 'Kumar', 11113)
;
```

Output:

Results | Messages

	Faculty_ID	Department_Name	HOD	FirstName	LastName	Phone
1	100	AI	1	Virat	Kohli	51188
2	101	CSE	0	Rohit	Sharma	30487
3	102	CSE	1	Mahendra Singh	Dhoni	70781
4	103	CSE	0	Mithali	Raj	5059
5	104	AI	0	Ajinkya	Rahane	60688
6	105	ECE	1	Shubhman	Gill	70895
7	106	ECE	0	Harleen	Deol	66666
8	107	BT	1	Jasprit	Bumrah	99999
9	108	BT	0	Ekta	Bisht	54545
10	109	AERO	0	Hardik	Pandya	23232
11	110	AERO	1	Ravi	Ashwin	11116
12	111	ME	1	Ravindra	Jadeja	33890
13	112	MATH	1	Che	Pujara	80806
14	113	ME	0	Kuldeep	Yadav	93947
15	114	CVE	1	Smriti	Mandha...	11112
16	115	CVE	0	Md	Siraj	99998
17	116	CVE	0	Yuz	Chahal	11117
18	117	ECE	0	Rishabh	Pant	11116
19	118	HSE	1	Shikhar	Dhawan	11114
20	119	AI	0	Bhuvi	Kumar	11113

For inserting data into T4_Student:

Query:

```
INSERT INTO T4_Student
VALUES
('0001', 'Steve', 'Smith', 490, '1989-06-02', 'M'),
('0002', 'Pat', 'Cummins', 300, '1993-05-08', 'M'),
('0003', 'David', 'Warner', 250, '1986-10-27', 'M'),
('0004', 'Mitchell', 'Starc', 185, '1990-01-30', 'M'),
('0005', 'Josh', 'Philippe', 101, '1997-06-01', 'M'),
```

('0006', 'Alyssa', 'Healy', 166, '1990-03-24', 'F'),
('0007', 'Meg', 'Lanning', 165, '1992-03-25', 'F'),
('0008', 'Ellyse', 'Perry', 168, '1990-11-03', 'F'),
('0009', 'Rachel', 'Haynes', 170, '1986-12-26', 'F'),
('0010', 'Ashleigh', 'Gardner', 166, '1997-04-15', 'F'),
('0011', 'Joe', 'Root', 200, '1990-12-30', 'M'),
('0012', 'Eoin', 'Morgan', 201, '1986-09-10', 'M'),
('0013', 'Sam', 'Curran', 202, '1998-06-03', 'M'),
('0014', 'Jos', 'Buttler', 203, '1990-09-08', 'M'),
('0015', 'Stuart', 'Broad', 204, '1986-06-24', 'M'),
('0016', 'Heather', 'Knight', 205, '1990-12-26', 'F'),
('0017', 'Nat', 'Sciver', 206, '1992-08-20', 'F'),
('0018', 'Sarah', 'Taylor', 207, '1989-05-20', 'F'),
('0019', 'Amy', 'Jones', 208, '1993-06-13', 'F'),
('0020', 'Danni', 'Wyatt', 209, '1991-04-22', 'F')
;

Output:

Results | Messages

	Student_ID	first_Name	last_Name	Phone_num	Date_of_birth	Gender
1	1	Steve	Smith	490	1989-06-02	M
2	2	Pat	Cummins	300	1993-05-08	M
3	3	David	Warner	250	1986-10-27	M
4	4	Mitchell	Starc	185	1990-01-30	M
5	5	Josh	Philippe	101	1997-06-01	M
6	6	Alyssa	Healy	166	1990-03-24	F
7	7	Meg	Lanning	165	1992-03-25	F
8	8	Ellyse	Perry	168	1990-11-03	F
9	9	Rachel	Haynes	170	1986-12-26	F
10	10	Ashleigh	Gardner	166	1997-04-15	F
11	11	Joe	Root	200	1990-12-30	M
12	12	Eoin	Morgan	201	1986-09-10	M
13	13	Sam	Curran	202	1998-06-03	M
14	14	Jos	Buttler	203	1990-09-08	M
15	15	Stuart	Broad	204	1986-06-24	M
16	16	Heather	Knight	205	1990-12-26	F
17	17	Nat	Sciver	206	1992-08-20	F
18	18	Sarah	Taylor	207	1989-05-20	F
19	19	Amy	Jones	208	1993-06-13	F
20	20	Danni	Wyatt	209	1991-04-22	F

For inserting data into T4_Course_offered:

```
INSERT INTO T4_Course_offered
VALUES
(1101, 'AI', 104, 12, 'Programming'),
(1301, 'AI', 100, 12, 'ML'),
(2201, 'CSE', 102, 8, 'DSA'),
(11202, 'AERO', 110, 12, 'Aerodynamics'),
(5103, 'ME', 111, 4, 'Solid Mechanics'),
(3101, 'ECE', 105, 6, 'Digital Logic'),
(3204, 'ECE', 106, 12, 'Computer Organization'),
(8301, 'MATH', 112, 12, 'Scientific Computing'),
(6202, 'CVE', 114, 10, 'Structural Analysis'),
```

(4102, 'BT', 108, 8, 'Biology'),
(12205, 'HSE', 118, 6, 'Economics'),
(4305, 'BT', 107, 12, 'Genetics')
;

Output:

	Course_ID	Department_Name	Faculty_ID	Duration	Course_name
1	1101	AI	104	12	Programming
2	1301	AI	100	12	ML
3	2201	CSE	102	8	DSA
4	3101	ECE	105	6	Digital Logic
5	3204	ECE	106	12	Computer Organization
6	4102	BT	108	8	Biology
7	4305	BT	107	12	Genetics
8	5103	ME	111	4	Solid Mechanics
9	6202	CVE	114	10	Structural Analysis
10	8301	MATH	112	12	Scientific Computing
11	11202	AERO	110	12	Aerodynamics
12	12205	HSE	118	6	Economics

For inserting data into T4_Course_reg_student:

INSERT INTO T4_Course_reg_student
VALUES
(1301, 7),
(8301, 19),
(1301, 12),
(3204, 2),
(4305, 5),
(5103, 16),
(2201, 13),
(6202, 1),

(1101, 10),
(11202, 2)
;

Output:

	Course_ID	Student_ID
1	1101	10
2	1301	7
3	1301	12
4	2201	13
5	3204	2
6	4305	5
7	5103	16
8	6202	1
9	8301	19
10	11202	2

Inserting data into T4_Research_Projects:

Query:

```
INSERT INTO T4_Research_Projects
VALUES
('P-AI-18', 'NLP', 'Sentiment analysis'),
('P-EC-27', 'VLSI', 'FPGAs'),
('P-M-50', 'PDE', 'Soln of non linear PDE'),
('P-CS-36', 'Algo', 'NP complete'),
('P-BT-88', 'Bio', 'Downstream processing')
;
```

Output:

	Project_ID	Area_of_Research	Project_Name
1	P-AI-18	NLP	Sentiment analysis
2	P-BT-88	Bio	Downstream processing
3	P-CS-36	Algo	NP complete
4	P-EC-27	VLSI	FPGAs
5	P-M-50	PDE	Soln of non linear PDE

Inserting data into T4_Research_Projects:

Query:

```
INSERT INTO Instructor_on_Research
VALUES
('P-AI-18', 119, '2019-08-18', NULL),
('P-EC-27', 117, '2020-02-03', NULL),
('P-CS-36', 103, '2020-07-08', NULL)
;

INSERT INTO Instructor_on_Research
VALUES
('P-M-50', 112, '2017-10-01', '2021-02-14'),
('P-BT-88',      108, '2017-11-01', '2021-02-17')
;
```

Output:

	Project_ID	Faculty_ID	Date_from	Date_to
1	P-AI-18	119	2019-08-18	NULL
2	P-BT-88	108	2017-11-01	2021-02-17
3	P-CS-36	103	2020-07-08	NULL
4	P-EC-27	117	2020-02-03	NULL
5	P-M-50	112	2017-10-01	2021-02-14

3.Show Violation of Primary Key, Unique Not Null and default key constraints through Insertion.

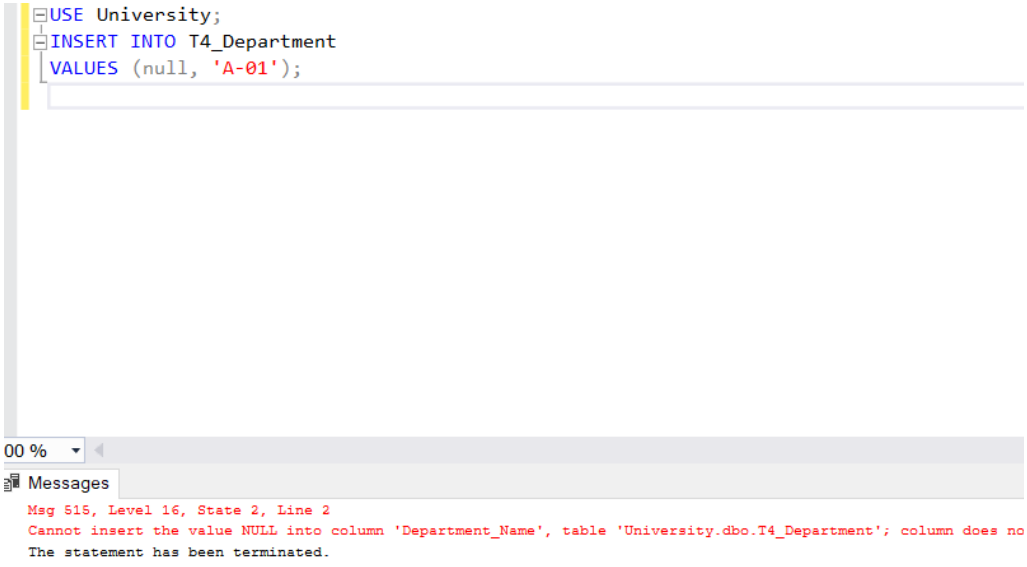
Query:

Violation of primary key:

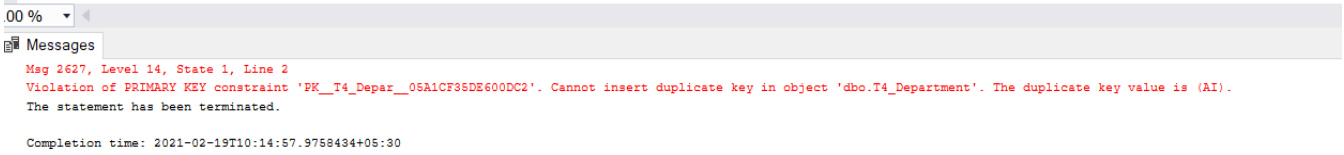
```
USE University;
INSERT INTO T4_Department
VALUES (null, 'A-01');
```

```
USE University;
INSERT INTO T4_Department
VALUES ('AI', 'A-108');
```

Output:



```
USE University;
INSERT INTO T4_Department
VALUES ('AI', 'A-108');
```



Violation of Unique key:

```
/* Creating temporary table for showing Unique key violation */
USE University;
CREATE TABLE T4_Alumni_student
(
        Alumni_student_ID int PRIMARY KEY NOT NULL,
        first_Name varchar(255) NOT NULL,
        last_Name varchar(255),
        Phone_num int UNIQUE NOT NULL,
        Date_of_birth date NOT NULL,
        Gender varchar(3) NOT NULL
);
INSERT INTO T4_Alumni_student
VALUES
('0001', 'Steve', 'Smith', 490, '1989-06-02', 'M'),
('0002', 'Pat', 'Cummins', 490, '1993-05-08', 'M')
```

Output:

```
/* Creating temporary table for showing Unique key violation */
USE University;
CREATE TABLE T4_Alumni_student
(
    Alumni_student_ID int PRIMARY KEY NOT NULL,
    first_Name varchar(255) NOT NULL,
    last_Name varchar(255),
    Phone_num int UNIQUE NOT NULL,
    Date_of_birth date NOT NULL,
    Gender varchar(3) NOT NULL
);
INSERT INTO T4_Alumni_student
VALUES
('0001', 'Steve', 'Smith', 490, '1989-06-02', 'M'),
('0002', 'Pat', 'Cummins', 490, '1993-05-08', 'M')
```

```
.00 %
Messages
Msg 2627, Level 14, State 1, Line 12
Violation of UNIQUE KEY constraint 'UQ__T4_Alumn__7DC10DF0DF731602'. Cannot insert duplicate key in object 'dbo.T4_Alumni_student'. The duplicate key value is (490).
The statement has been terminated.

Completion time: 2021-02-19T10:20:46.4708069+05:30
```

Violation of NOT NULL :

Query:

Use University;

INSERT INTO T4_Department

VALUES ('CSE', null);

Output:

```
SQLQuery1.sql - LA...H725O1\shres (54))*
Use University;
INSERT INTO T4_Department
VALUES ('CSE', null);
```

```
100 %
Messages
Msg 515, Level 16, State 2, Line 2
Cannot insert the value NULL into column 'Location_', table 'University.dbo.T4_Department'; column does not allow nulls. INSERT fails.
The statement has been terminated.

Completion time: 2021-02-19T15:53:04.1885411+05:30
```

Violation of default key constraint:

Query:

Use University;

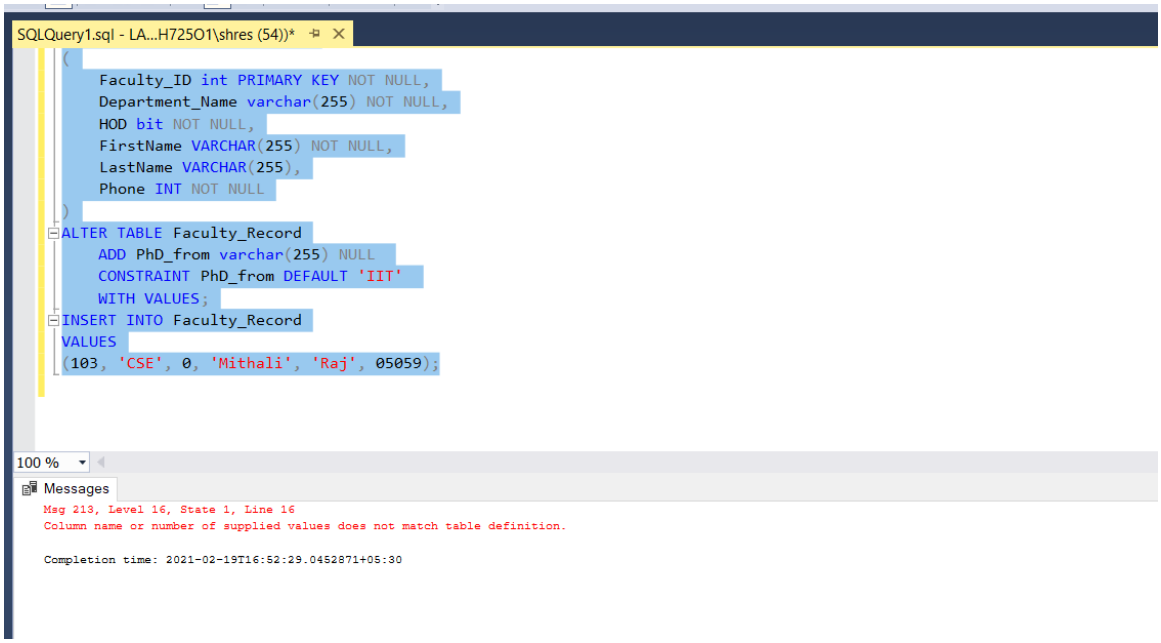
/* Temporary table to show insertion of default data */

CREATE TABLE Faculty_Record

```
(
        Faculty_ID int PRIMARY KEY NOT NULL,
        Department_Name varchar(255) NOT NULL,
        HOD bit NOT NULL,
        FirstName VARCHAR(255) NOT NULL,
        LastName VARCHAR(255),
        Phone INT NOT NULL
)
ALTER TABLE Faculty_Record
   ADD PhD_from varchar(255) NULL
   CONSTRAINT PhD_from DEFAULT 'IIT'
   WITH VALUES;
INSERT INTO Faculty_Record
VALUES
(103, 'CSE', 0, 'Mithali', 'Raj', 05059);
```

Here, if we don't mention DEFAULT as a parameter in INSERT VALUES, it throws an error.

Output:



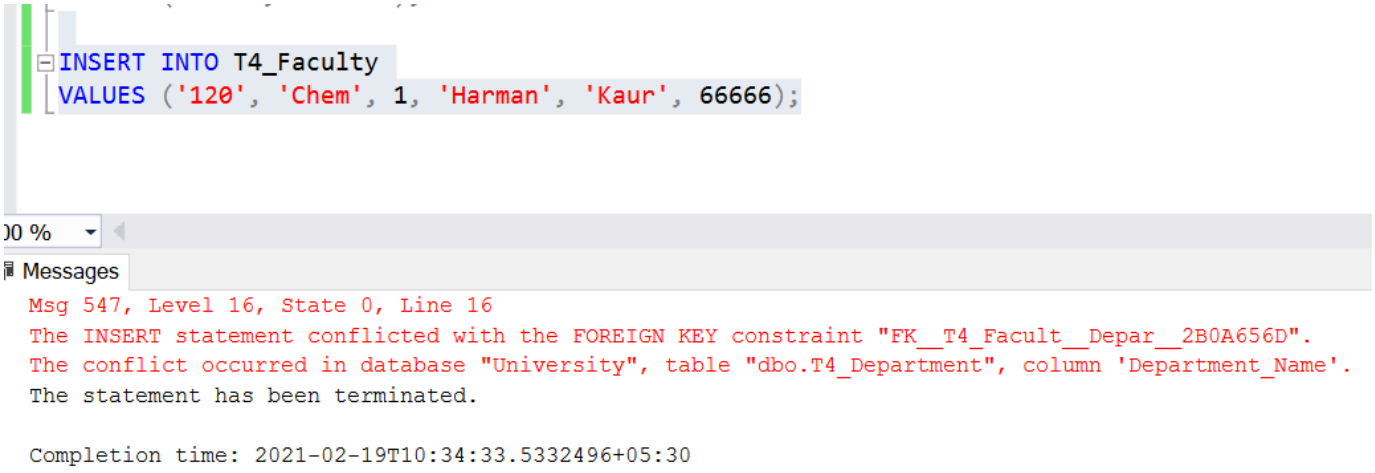
4. Insert tuples into the table and see how foreign key constraint works if you try to insert into dependent table first.

Query:

If we insert data into the dependent table first, then it will give a foreign key error, as the referred table does not have that value. Shown below:

```
INSERT INTO T4_Faculty
VALUES ('120', 'Chem', 1, 'Harman', 'Kaur', 66666);
```

Output:



But when we insert into the base table first, and then inserting into the dependent table, it works.

Query:

```
INSERT INTO T4_Department
VALUES ('Chem', 'Ch-12');

INSERT INTO T4_Faculty
VALUES ('120', 'Chem', 1, 'Harman', 'Kaur', 66666);
```

Output:

	Faculty_ID	Department_Name	HOD	FirstName	LastName	Phone
11	110	AERO	1	Ravi	Ashwin	11116
12	111	ME	1	Ravindra	Jadeja	33890
13	112	MATH	1	Che	Pujara	80806
14	113	ME	0	Kuldeep	Yadav	93947
15	114	CVE	1	Smriti	Mandha...	11112
16	115	CVE	0	Md	Siraj	99998
17	116	CVE	0	Yuz	Chahal	11117
18	117	ECE	0	Rishabh	Pant	11116
19	118	HSE	1	Shikhar	Dhawan	11114
20	119	AI	0	Bhuvi	Kumar	11113
21	120	Chem	1	Harman	Kaur	66666

Query executed successfully.

5. Show Violation of Foreign Key Constraint when you try to delete from a base table. If you get an error explain why deletion gives an error

There is a table name called T4_Course_offered with the following columns:

Course_ID (int), Department_Name (varchar(255)), Faculty_ID (int), Duration (int), Course_name (varchar(255))

Here, Faculty_ID is a foreign key that references the T4_Department table.

DELETE FROM T4_Department WHERE Faculty_id = 1

We get the error “update or delete on table "T4_Department" violates foreign key constraint.

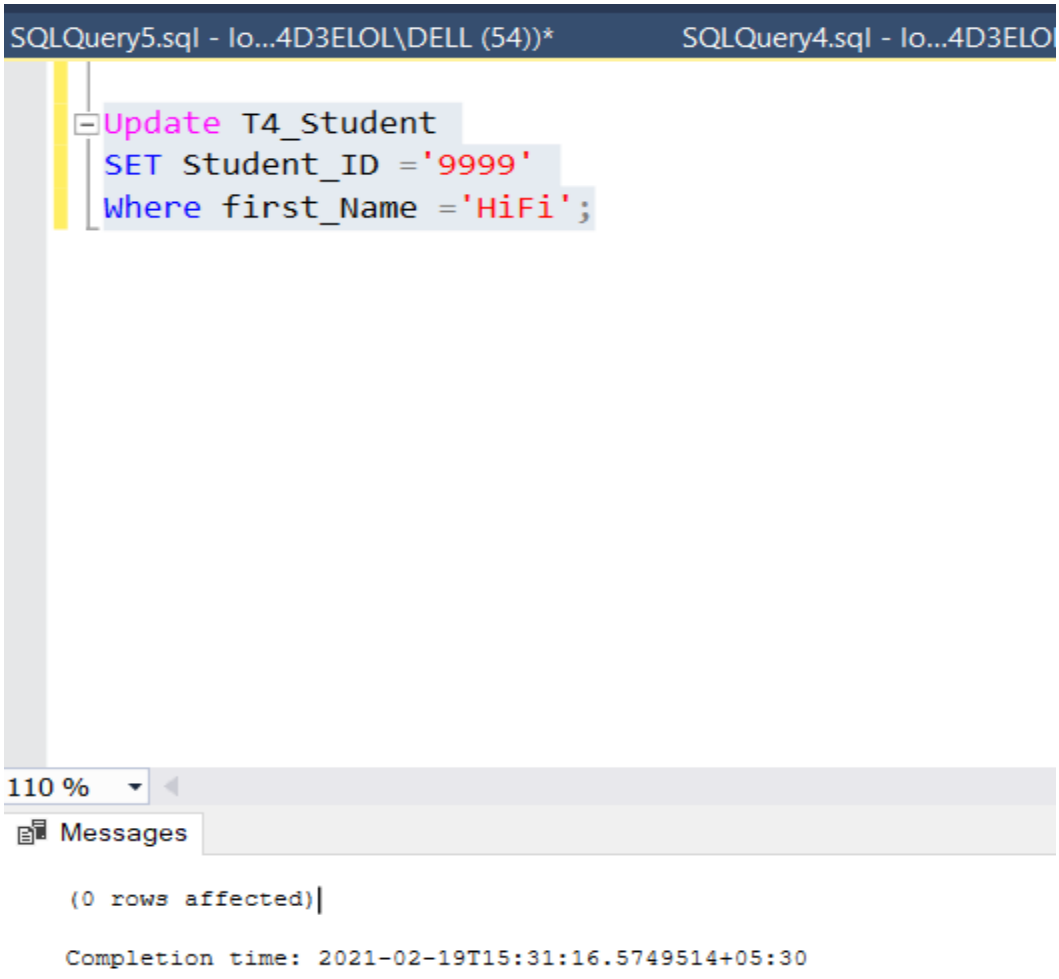
As Faculty_ID is a foreign key in table T4_Department; the reason you are unable to delete employee ID 1 is because Faculty_ID 1 exists on T4_Department. The system is trying to maintain

integrity of the database by preventing you from deleting an employee affiliated with T4_Department

6. Try to update a non-existing entity data and check for error.

Here we are trying to update **Student_Id** to '9999' in **T4_Student** whose **first_name** is 'HiFi' but there does no exist **first_name** = 'HiFi' in **T4_Student** .
But it accepts the query and **showing no error.**

Output:



7. Add a column which has default value.

Query:

```
/* Temporary table to show insertion of default data */
CREATE TABLE Faculty_Record
(
        Faculty_ID int PRIMARY KEY NOT NULL,
        Department_Name varchar(255) FOREIGN KEY REFERENCES
T4_Department(Department_Name) NOT NULL,
        HOD bit NOT NULL,
        FirstName VARCHAR(255) NOT NULL,
        LastName VARCHAR(255),
        Phone INT NOT NULL
)

INSERT INTO Faculty_Record
VALUES
(103, 'CSE', 0, 'Mithali', 'Raj', 05059),
(104, 'AI', 0, 'Ajinkya', 'Rahane', 60688),
(105, 'ECE', 1, 'Shubhman', 'Gill', 70895),
(106, 'ECE', 0, 'Harleen', 'Deol', 66666),
(107, 'BT', 1, 'Jasprit', 'Bumrah', 99999),
(108, 'BT', 0, 'Ekta', 'Bisht', 54545)
;

ALTER TABLE Faculty_Record
   ADD PhD_from varchar(255) NULL
   CONSTRAINT PhD_from DEFAULT 'IIT'
   WITH VALUES;
```

Output:

/* PhD_from is the default column with ‘IIT’ as default data*/

	Faculty_ID	Department_Name	HOD	FirstName	LastName	Phone	PhD_from
1	102	CSE	1	Mahendra Singh	Dhoni	70781	IIT
2	103	CSE	0	Mithali	Raj	5059	IIT
3	104	AI	0	Ajinkya	Rahane	60688	IIT
4	105	ECE	1	Shubhman	Gill	70895	IIT
5	106	ECE	0	Harleen	Deol	66666	IIT
6	107	BT	1	Jasprit	Bumrah	99999	IIT
7	108	BT	0	Ekta	Bisht	54545	IIT

8. 5 Simple Select queries to retrieve data from your database.

Query:

```
SELECT first_Name FROM T4_Student WHERE Student_ID IN ('003');

SELECT * FROM T4_Student WHERE Student_ID IN ('003');

SELECT COUNT(*) FROM T4_Faculty;

SELECT Concat(first_Name, ' ', last_Name)  FROM T4_Student;

SELECT Student_ID, first_Name FROM T4_Student;
```

Output:

Results Messages

	first_Name
1	David

Results | Messages

	Student_ID	first_Name	last_Name	Phone_num	Date_of_birth	Gender
1	3	David	Warner	250	1986-10-27	M

Results | Messages

	(No column name)
1	20

Results | Messages

	(No column name)
1	Steve Smith
2	Pat Cummins
3	David Warner
4	Mitchell Starc
5	Josh Philippe
6	Alyssa Healy
7	Meg Lanning
8	Ellyse Perry
9	Rachel Haynes
10	Ashleigh Gardner
11	Joe Root
12	Eoin Morgan
13	Sam Curran
14	Jos Buttler
15	Stuart Broad
16	Heather Knight
17	Nat Sciver
18	Sarah Taylor
19	Amy Jones
20	Danni Wyatt

	Student_ID	first_Name
1	1	Steve
2	2	Pat
3	3	David
4	4	Mitchell
5	5	Josh
6	6	Alyssa
7	7	Meg
8	8	Ellyse
9	9	Rachel
10	10	Ashleigh
11	11	Joe
12	12	Eoin
13	13	Sam
14	14	Jos
15	15	Stuart
16	16	Heather
17	17	Nat
18	18	Sarah
19	19	Amy
20	20	Danni

9. Show how Foreign key constraint affects updating a dependent table when value is not existing and in the base table where the value is referred and you want to update it.

We have tables T4_Department and T4_Faculty. In T4_Faculty, the attribute named Department_Name is the foreign key which references the T4_Department table. Thus, T4_Faculty is the dependent table and T4_Department is the base table.

Query:

To show how foreign key constraints affect updating a dependent table when value does not exist:

/* We are trying to update the Department_Name (FK) to 'Mining' which does not exist. */
UPDATE T4_Faculty
SET Department_Name = 'Mining'
WHERE Faculty_ID = 105;

```
/* We are trying to update the Department_Name (FK) to 'Mining' which does not exist. */
UPDATE T4_Faculty
SET Department_Name = 'Mining'
WHERE Faculty_ID = 105;
```

```
) %
Messages
Msg 547, Level 16, State 0, Line 227
The UPDATE statement conflicted with the FOREIGN KEY constraint "FK__T4_Facult__Depar__2B0A656D".
The conflict occurred in database "University", table "dbo.T4_Department", column 'Department_Name'.
The statement has been terminated.

Completion time: 2021-02-19T15:43:43.4745314+05:30
```