Database Project

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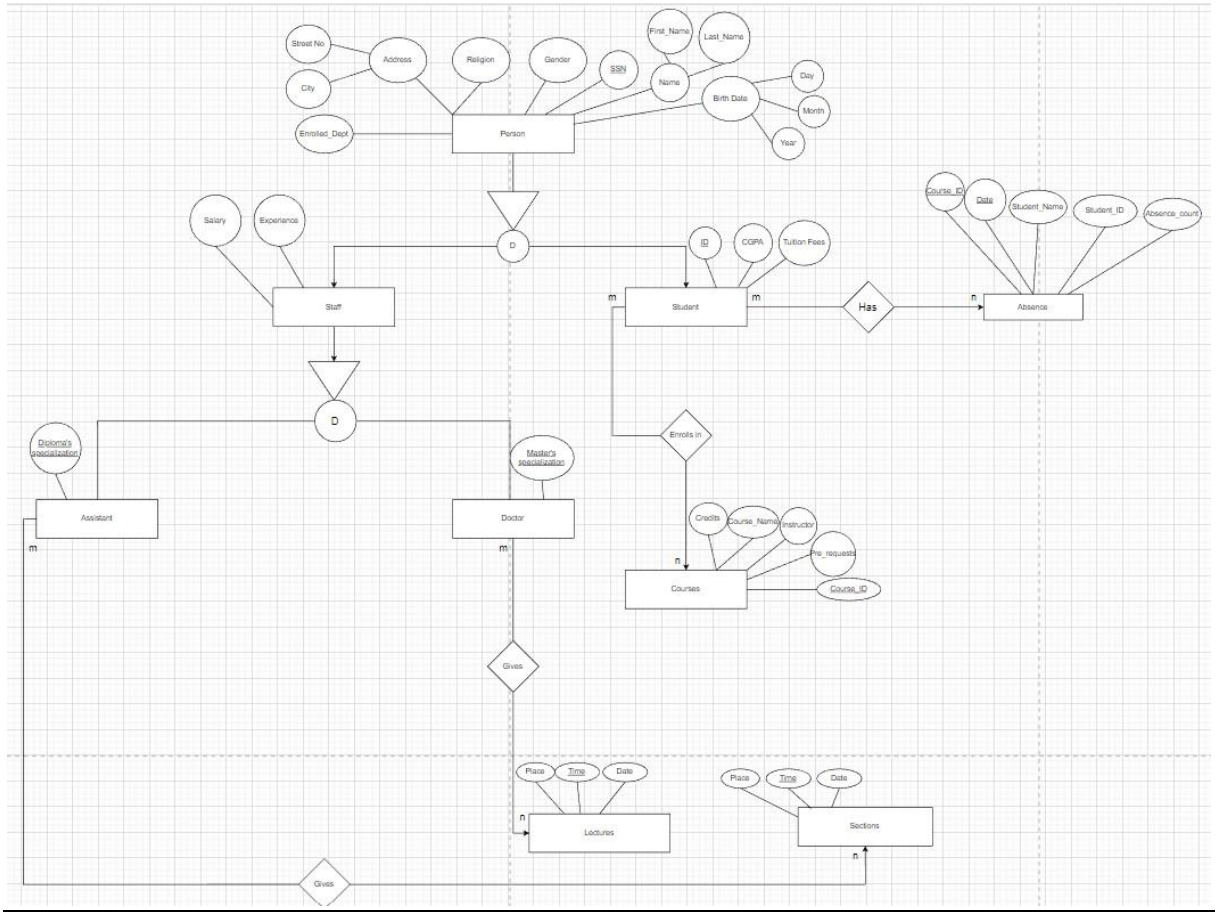
Year:2

Department : Data sciene(General)

1-ER Diagram :


Street No
City
Address
Religion
Gender
SSN
First_Name
Last_Name
Name
Day
Month
Year
Birth Date
Enrolled_Dept
Person
Salary
Experiance
D
Staff
ID
CGPA
Tuition Fees
Student
m
m
Has
n
Course_ID
Date
Student_Name
Student_ID
Absence_count
Absence
D
Diploma's specialization
Master's specialization
Assistant
Doctor
m
m
Enrols in
n
Credits
Course_Name
Instructor
Pre_requesit
Course_ID
Courses
Gives
Place
Time
Date
n
Lectures
Place
Time
Date
Sections
n
Gives

2-Schema :

Entities

Person(SSN,First_name,middle_name,Last_name,B_day,B_month,B_year,Gender,Religion,Street_no, Street_city,Enrolled_dept)

Student(SSN,Student_ID,CGPA,Tuition_fees)

Staff(SSN,Salary,Experience)

Courses(Course_id,Credits,C_name,Pre_requests,Instructor)

Doctor(SSN,Master's_specialization)

Assistant(SSN,Diploma's_specialization)

Lectures(Lec_Time,Lec_place,Lec_date)

Sections(Section_Time,Section_place,Section_date)

Absence(Date,Absence_count)

Relations ⬇

Has(Absence_Date,Course_ID,Student_ID) "Relation between Student entity and Courses entity and Absence entity"

Reference : Course_id is connected to the primary key in courses entity with a FK,Student_id is connected to the primary key(Student_ID) in Student entity with a FK,Absence_Date is connected to the primary key in Absence entity with a FK.

Enrolls in(Student_id,Course_id) "Relation between Student entity and Courses entity"

Reference :**Course_id is connected to the primary key in Courses entity with a FK,Student_id is connected to the primary key in student entity with a FK.**

Gives(Master's_specialization,Lecture_time) "Relation between Doctor entity and Lectures entity"

Reference**: Master's_specialization is connected to the primary key in Doctor entity with a FK,Lecture_time is connected to the primary key in Lectures entity with a FK.**

Gives(Diploma's_specialization,Section_time) "Relation between Assistant entity and Sections entity"

Reference : **Diploma's_specialization is connected to the primary key in Assistant entity with a FK,Section_time is connected to the primary key in Sections entity with a FK.**

Full creation of Database Using SQL

absence	CREATE TABLE `absence` (`Date` date NOT NULL, `Absence_count` int(11) DEFAULT NULL, PRIMARY KEY (`Date`)) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci
assistant	CREATE TABLE `assistant` (`SSN` int(11) NOT NULL, `Diploma_specialization` varchar(50) NOT NULL, PRIMARY KEY (`Diploma_specialization`,`SSN`), KEY `SSN` (`SSN`), CONSTRAINT `assistant_ibfk_1` FOREIGN KEY (`SSN`) REFERENCES `person` (`SSN`)) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci
courses	CREATE TABLE `courses` (`Course_id` int(11) NOT NULL, `Credits` int(11) DEFAULT NULL, `C_name` varchar(50) DEFAULT NULL, `Pre_requests` varchar(100) DEFAULT NULL, `Instructor` varchar(50) DEFAULT NULL, PRIMARY KEY (`Course_id`)) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci
doctor	CREATE TABLE `doctor` (`SSN` int(11) NOT NULL, `masters_specialization` varchar(50) NOT NULL, PRIMARY KEY (`masters_specialization`,`SSN`), KEY `SSN` (`SSN`), CONSTRAINT `doctor_ibfk_1` FOREIGN KEY (`SSN`) REFERENCES `person` (`SSN`)) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci

enrolls_in	CREATE TABLE `enrolls_in` (`Student_ID` int(11) NOT NULL, `Course_id` int(11) NOT NULL, PRIMARY KEY (`Student_ID`,`Course_id`), KEY `Course_id` (`Course_id`), CONSTRAINT `enrolls_in_ibfk_1` FOREIGN KEY (`Student_ID`) REFERENCES `student` (`Student_ID`), CONSTRAINT `enrolls_in_ibfk_2` FOREIGN KEY (`Course_id`) REFERENCES `courses` (`Course_id`)) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci
has	CREATE TABLE `has` (`Absence_Date` date NOT NULL, `Course_id` int(11) NOT NULL, `Student_ID` int(11) NOT NULL, PRIMARY KEY (`Absence_Date`,`Course_id`,`Student_ID`), KEY `Course_id` (`Course_id`), KEY `Student_ID` (`Student_ID`), CONSTRAINT `has_ibfk_1` FOREIGN KEY (`Absence_Date`) REFERENCES `absence` (`Date`), CONSTRAINT `has_ibfk_2` FOREIGN KEY (`Course_id`) REFERENCES `courses` (`Course_id`), CONSTRAINT `has_ibfk_3` FOREIGN KEY (`Student_ID`) REFERENCES `student` (`Student_ID`)) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci
lectures	CREATE TABLE `lectures` (`Lec_Time` varchar(50) NOT NULL, `Lec_place` varchar(50) NOT NULL, `Lec_date` date NOT NULL, PRIMARY KEY (`Lec_Time`)) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci

person	CREATE TABLE `person` (`SSN` int(11) NOT NULL, `First_name` varchar(50) NOT NULL, `Middle_name` varchar(50) DEFAULT NULL, `Last_name` varchar(50) NOT NULL, `B_day` int(11) DEFAULT NULL, `B_month` int(11) DEFAULT NULL, `B_year` int(11) DEFAULT NULL, `Gender` varchar(10) DEFAULT NULL, `Religion` varchar(50) DEFAULT NULL, `Street_no` int(11) DEFAULT NULL, `Street_city` varchar(50) DEFAULT NULL, `Enrolled_dept` varchar(50) DEFAULT NULL, PRIMARY KEY (`SSN`)) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci
sections	CREATE TABLE `sections` (`Section_date` date NOT NULL, `Section_place` varchar(50) NOT NULL, `Section_time` int(11) NOT NULL, PRIMARY KEY (`Section_time`) USING BTREE) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci
staff	CREATE TABLE `staff` (`SSN` int(11) NOT NULL, `Salary` float DEFAULT NULL, `Experience` int(11) DEFAULT NULL, `Staff_type` varchar(20) NOT NULL, PRIMARY KEY (`SSN`)) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci

student	CREATE TABLE `student` (`Student_ID` int(11) NOT NULL, `SSN` int(11) NOT NULL, `CGPA` float DEFAULT NULL, `Tuition_fees` float DEFAULT NULL, PRIMARY KEY (`Student_ID`), KEY `SSN` (`SSN`), CONSTRAINT `student_ibfk_1` FOREIGN KEY (`SSN`) REFERENCES `person` (`SSN`)) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci

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-After the creation of the data,I inserted about 22 values in person,Here is an example

1 row inserted. (Query took 0.0050 seconds.)

```
INSERT INTO Person (SSN, First_name, Last_name, B_day, B_month, B_year, Gender, Religion, Street_no, Street_city) VALUES (1234567899, 'Ahmed', 'Mohamed', 2, 3, 1999,
'Male', 'Muslim', 1234, 'Alexandria');
```

[Edit inline] [Edit] [Create PHP code]

1 row inserted. (Query took 0.0058 seconds.)

```
INSERT INTO Person (SSN, First_name, Last_name, B_day, B_month, B_year, Gender, Religion, Street_no, Street_city) VALUES (234567890, 'Fatima', 'Ali', 5, 11, 2001,
'Female', 'Muslim', 2345, 'Cairo');
```

[Edit inline] [Edit] [Create PHP code]

1 row inserted. (Query took 0.0031 seconds.)

```
INSERT INTO Person (SSN, First_name, Last_name, B_day, B_month, B_year, Gender, Religion, Street_no, Street_city) VALUES (345678901, 'Youssef', 'Ibrahim', 15, 6, 2000,
'Male', 'Muslim', 3456, 'Giza');
```

[Edit inline] [Edit] [Create PHP code]

1 row inserted. (Query took 0.0031 seconds.)

```
INSERT INTO Person (SSN, First_name, Last_name, B_day, B_month, B_year, Gender, Religion, Street_no, Street_city) VALUES (456789012, 'Mariam', 'Hassan', 7, 9, 2002,
'Female', 'Muslim', 4567, 'Alexandria');
```

[Edit inline] [Edit] [Create PHP code]

Then I will add some of them as students,The people who are born before 2000

	SSN	First_name	Middle_name	Last_name	B_day	B_month	B_year	Gender	Religion	Street_no	Street_city	Enrolled_dept
Edit Copy Delete	123450987	Hala	NULL	Mahmoud	12	10	1998	Female	Muslim	1234	Alexandria	FCDS
Edit Copy Delete	123456789	Ahmed	NULL	mohsen	1	1	2000	Male	None	123	Alexandria	FCDS
Edit Copy Delete	234569871	Jihad	NULL	Mohammed	19	2	1999	Male	Muslim	2345	Cairo	FCDS
Edit Copy Delete	345678901	Youssef	NULL	Ibrahim	15	6	2000	Male	Muslim	3456	Giza	FCDS
Edit Copy Delete	456783210	Ahmed	NULL	Ali	13	2	1999	Male	Muslim	4567	Alexandria	FCDS
Edit Copy Delete	567890123	Khaled	NULL	Abdullah	20	12	1998	Male	Muslim	5678	Cairo	FCDS
Edit Copy Delete	567894321	Nada	NULL	Hamdy	22	11	2000	Female	Muslim	5678	Cairo	FCDS
Edit Copy Delete	789012345	Ali	NULL	Khalid	3	7	1999	Male	Muslim	7890	Alexandria	FCDS
Edit Copy Delete	789016543	Aisha	NULL	Abdullah	17	3	1998	Female	Muslim	7890	Alexandria	FCDS
Edit Copy Delete	901234567	Omar	NULL	Hamza	29	1	2000	Male	Muslim	9012	Giza	FCDS
Edit Copy Delete	901238765	Rana	NULL	Hassan	4	4	2000	Female	Muslim	9012	Giza	FCDS
Edit Copy Delete	1234567892	Ahmed	NULL	Mohamed	2	3	1999	Male	Muslim	1234	Alexandria	NULL
Edit Copy Delete	1234567899	Ahmed	NULL	Mohamed	2	3	1999	Male	Muslim	1234	Alexandria	FCDS

```
INSERT INTO student (SSN,Student_ID,Tuition_fees,CGPA) VALUES(123450987,20223579,5000,3.5),(123456789,20224497,5000,3),
(234569871,20222205,5000,3.9),(345678901,20224156,25000,2.4),(456783210,20221578,5000,2.9),(567890123,20221542,5000,2.3),
(567894321,20221987,25000,3.0),(789012345,20229835,5000,3.6),(789016543,20224275,5000,1.9),(901234567,20221737,5000,3.1),
(901238765,20221934,5000,2.87),(1234567892,20221237,25000,3.9),(1234567899,20228972,5000,3.2);
```

	Student_ID	SSN	CGPA	Tuition_fees
Edit Copy Delete	1001	123456789	3.5	5000
Edit Copy Delete	20221237	1234567892	3.9	25000
Edit Copy Delete	20221542	567890123	2.3	5000
Edit Copy Delete	20221578	456783210	2.9	5000
Edit Copy Delete	20221737	901234567	3.1	5000
Edit Copy Delete	20221934	901238765	2.87	5000
Edit Copy Delete	20221987	567894321	3	25000
Edit Copy Delete	20222205	234569871	3.9	5000
Edit Copy Delete	20223579	123450987	3.5	5000
Edit Copy Delete	20224156	345678901	2.4	25000
Edit Copy Delete	20224275	789016543	1.9	5000
Edit Copy Delete	20224497	123456789	3	5000
Edit Copy Delete	20228972	1234567899	3.2	5000
Edit Copy Delete	20229835	789012345	3.6	5000

Then I will add new persons to add them as assistants :

```
INSERT INTO Person (SSN, First_name, Last_name, B_day, B_month, B_year, Gender, Religion, Street_no, Street_city)
VALUES (123446789, 'Abdulrahman', 'Ali', 10, 5, 1998, 'Male', 'Muslim', 123, 'Alexandria');

INSERT INTO Person (SSN, First_name, Last_name, B_day, B_month, B_year, Gender, Religion, Street_no, Street_city)
VALUES (234537890, 'Mohamed', 'Ahmed', 15, 2, 1995, 'Male', 'Muslim', 456, 'Cairo');

INSERT INTO Person (SSN, First_name, Last_name, B_day, B_month, B_year, Gender, Religion, Street_no, Street_city)
VALUES (342678901, 'Nouran', 'Hassan', 20, 9, 1997, 'Female', 'Muslim', 789, 'Giza');

INSERT INTO Person (SSN, First_name, Last_name, B_day, B_month, B_year, Gender, Religion, Street_no, Street_city)
VALUES (451789012, 'Mariam', 'Sabahy', 8, 6, 1999, 'Female', 'Muslim', 1011, 'Helwan');

INSERT INTO Person (SSN, First_name, Last_name, B_day, B_month, B_year, Gender, Religion, Street_no, Street_city)
VALUES (564890123, 'Youssef', 'Alwan', 3, 1, 1994, 'Male', 'Christian', 1213, 'Maadi');
```

```
17 INSERT INTO Assistant (SSN, Diploma_specialization)
18 VALUES (123446789, 'Math');
19
20 INSERT INTO Assistant (SSN, Diploma_specialization)
21 VALUES (234537890, 'Math');
22
23 INSERT INTO Assistant (SSN, Diploma_specialization)
24 VALUES (342678901, 'Math');
25
26 INSERT INTO Assistant (SSN, Diploma_specialization)
27 VALUES (451789012, 'Computer science');
28
29 INSERT INTO Assistant (SSN, Diploma_specialization)
30 VALUES (564890123, 'Computer science');
```

	SSN	Diploma_specialization
Edit Copy Delete	451789012	Computer science
Edit Copy Delete	564890123	Computer science
Edit Copy Delete	123446789	Math
Edit Copy Delete	234537890	Math
Edit Copy Delete	342678901	Math

Then I want to add the people who are not students or assistants as a doctors, excuse me for the logical error in birth dates :)

```
SELECT p.*
FROM Person p
LEFT JOIN Student s ON p.SSN = s.SSN
LEFT JOIN Assistant a ON p.SSN = a.SSN
WHERE s.SSN IS NULL AND a.SSN IS NULL;
```

SSN	First_name	Middle_name	Last_name	B_day	B_month	B_year	Gender	Religion	Street_no	Street_city	Enrolled_dept
234561098	Mohammed	*NULL*	Amin	30	7	2001	Male	Muslim	2345	Cairo	FCDS
234567890	Fatima	*NULL*	Ali	5	11	2001	Female	Muslim	2345	Cairo	FCDS
345672109	Heba	*NULL*	Abdul	9	9	2002	Female	Muslim	3456	Giza	FCDS
456789012	Mariam	*NULL*	Hassan	7	9	2002	Female	Muslim	4567	Alexandria	FCDS
678901234	Nour	*NULL*	Salem	11	8	2001	Female	Muslim	6789	Giza	FCDS
678905432	Ahmed	*NULL*	Adel	8	6	2001	Male	Muslim	6789	Giza	FCDS
890123456	Sara	*NULL*	Fathi	18	5	2002	Female	Muslim	8901	Cairo	FCDS
890127654	Mohammed	*NULL*	Khalid	28	12	2002	Male	Muslim	8901	Cairo	FCDS

Then I wrote this line of code to indicate that masters_specializaition attribute in doctor is not defined in person and I will write it manually.

```
INSERT INTO Doctor (SSN, masters_specialization)
SELECT p.SSN, 'N/A' AS masters_specialization
FROM Person p
LEFT JOIN Student s ON p.SSN = s.SSN
LEFT JOIN Assistant a ON p.SSN = a.SSN
WHERE s.SSN IS NULL AND a.SSN IS NULL;
```

←T→				SSN	masters_specialization
☐	Edit	Copy	Delete	890127654	Calclus
☐	Edit	Copy	Delete	345672109	Computer science
☐	Edit	Copy	Delete	678901234	Data mining
☐	Edit	Copy	Delete	890123456	Database
☐	Edit	Copy	Delete	456789012	Machine learning
☐	Edit	Copy	Delete	234567890	Math
☐	Edit	Copy	Delete	234561098	Programming
☐	Edit	Copy	Delete	678905432	Regression

Then I noticed that there is no doctor_ssn attribute in lectures and also in sections,so I added them to be able to put lectures and sections by doctor and assistant name by identifying a foreign key to the doctor ssn,assistant ssn to get their names.

```
ALTER TABLE lectures
ADD COLUMN doctor_ssn INT,
ADD CONSTRAINT fk_lectures_doctor
FOREIGN KEY (doctor_ssn) REFERENCES doctor (doctor_ssn) ON DELETE CASCADE;
```

MySQL returned an empty result set (i.e. zero rows). (Query took 0.0005 seconds.)

```
ALTER TABLE lectures ADD COLUMN doctor_ssn INT, ADD CONSTRAINT fk_lectures_doctor FOREIGN KEY (doctor_ssn) REFERENCES doctor (doctor_ssn) ON DELETE CASCADE;
```

```
ALTER TABLE sections
ADD COLUMN assistant_ssn INT,
ADD CONSTRAINT fk_sections_assistant
FOREIGN KEY (assistant_ssn) REFERENCES assistant (assistant_ssn) ON DELETE CASCADE;
```

MySQL returned an empty result set (i.e. zero rows). (Query took 0.0015 seconds.)

```
ALTER TABLE sections ADD COLUMN assistant_ssn INT, ADD CONSTRAINT fk_sections_assistant FOREIGN KEY (assistant_ssn) REFERENCES assistant (assistant_ssn) ON DELETE CASCADE;
```

For the reality,I made a doctor_ssn column in courses table and connected it to doctor_ssn in doctor table,then I will insert each doctor ssn to each course

```
ALTER TABLE courses
ADD COLUMN doctor_ssn INT,
ADD CONSTRAINT fk_doctor_ssn
FOREIGN KEY (doctor_ssn)
REFERENCES doctor (doctor_ssn);
```

```
UPDATE courses
SET doctor_ssn = 123451212
WHERE Course_id = 1;
UPDATE courses
```

Repeat for all the courses,This is the final look

	Course_id	Credits	C_name	Pre_requests	doctor_ssn
Edit Copy Delete	1	3	Calculus	*NULL*	123451212
Edit Copy Delete	2	4	Computer science	*NULL*	890123456
Edit Copy Delete	3	4	Data mining	Introduction to Computer Science	234561098
Edit Copy Delete	4	3	Database	Calculus I	234567890
Edit Copy Delete	5	4	Machine learning	Data Structures and Algorithms	345672109
Edit Copy Delete	6	4	Math 0	Calculus I	456789012
Edit Copy Delete	7	4	programming	Introduction to Computer Science	678901234
Edit Copy Delete	8	4	regression	Data Structures and Algorithms	678905432

Then I will connect doctor_ssn in lectures to doctor_ssn in courses,same thing with course_id,to be able to set realistic lectures table

```
ALTER TABLE lectures
ADD CONSTRAINT fk_lecturers_doctor_ssn
  FOREIGN KEY (doctor_ssn)
  REFERENCES courses (doctor_ssn);

ALTER TABLE lectures
ADD CONSTRAINT fk_lectures_Course_id
  FOREIGN KEY (Course_id)
  REFERENCES courses (Course_id);
```

```
INSERT INTO lectures (Lec_time, Lec_place, Lec_date, Course_id, doctor_ssn)
VALUES ('09:00:00', 'Room 101', '2022-01-01', 1, 123451212);

INSERT INTO lectures (Lec_time, Lec_place, Lec_date, Course_id, doctor_ssn)
VALUES ('14:30:00', 'Room 202', '2022-02-15', 2, 890123456);

INSERT INTO lectures (Lec_time, Lec_place, Lec_date, Course_id, doctor_ssn)
VALUES ('10:00:00', 'Room 303', '2022-03-03', 3, 234561098);

INSERT INTO lectures (Lec_time, Lec_place, Lec_date, Course_id, doctor_ssn)
VALUES ('11:00:00', 'Room 404', '2022-04-15', 4, 234567890);

INSERT INTO lectures (Lec_time, Lec_place, Lec_date, Course_id, doctor_ssn)
VALUES ('13:00:00', 'Room 505', '2022-05-01', 5, 345672109);
```

←T→				Lec_Time	Lec_place	Lec_date	Course_id	doctor_ssn
☐	Edit	Copy	Delete	09:00:00	Room 101	2022-01-01	1	123451212
☐	Edit	Copy	Delete	10:00:00	Room 303	2022-03-03	3	234561098
☐	Edit	Copy	Delete	10:30:00	Room 707	2022-07-04	7	678901234
☐	Edit	Copy	Delete	11:00:00	Room 404	2022-04-15	4	234567890
☐	Edit	Copy	Delete	13:00:00	Room 505	2022-05-01	5	345672109
☐	Edit	Copy	Delete	14:00:00	Room 808	2022-08-20	8	678905432
☐	Edit	Copy	Delete	14:30:00	Room 202	2022-02-15	2	890123456
☐	Edit	Copy	Delete	15:00:00	Room 606	2022-06-10	6	456789012

To avoid repeating,same thing will happen to sections table.

Thanks For Your Patience,I Hope You Like my project