

Roll no :-220950320020

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PG - DAC SEPTEMBER 2022

Module Name :- DATABASE TECHNOLOGIES

Assignment-1

A university DB contains information about professors (identified by SIN) and courses (identified by course ID). Professors teach courses; each of the following situations concerns the Teaches relationship set.

List all candidate keys of the Teaches relationship set. a. Professors can teach the same course in several semesters, and each offering must be recorded. b. Professors can teach the same course in several semesters, but only the most recent such offering needs to be records. Assume the above Situation (b) applies in all subsequent situations.

List all the keys possible in each of the following situations.

a. Every professor teaches a course, and every course is taught by some professor. b. Every professor teaches exactly one course, and every course is taught by exactly one professor.

Answers:-

1a) Entity sets

- professor: with SIN underlined as the primary key,
- course: with CID underlined as the primary key,
- semester: with SID underlined as the primary key.

Relationship set

- teaches : associates professor, course and semester. No other attributes. The cardinality constraint is m-to- m. There is a single candidate key of the teaches relationship: {SIN, CID, SID}. The participation constraint can be anything; let say that it is total on professor and course entity sets.

1b) Semester does not need to be an entity set here. Teaches is a binary relation between professor and course. Semester is attribute of teaches. The key o f teaches is {SIN, CID}.

1c) This means total participation from professors and total participation from courses. Because it is still m-to-m, the candidate key remains {SIN, CID}.

1d) This time the relationship is 1-to-1. There are now two candidate keys: either {SIN} or {CID}.

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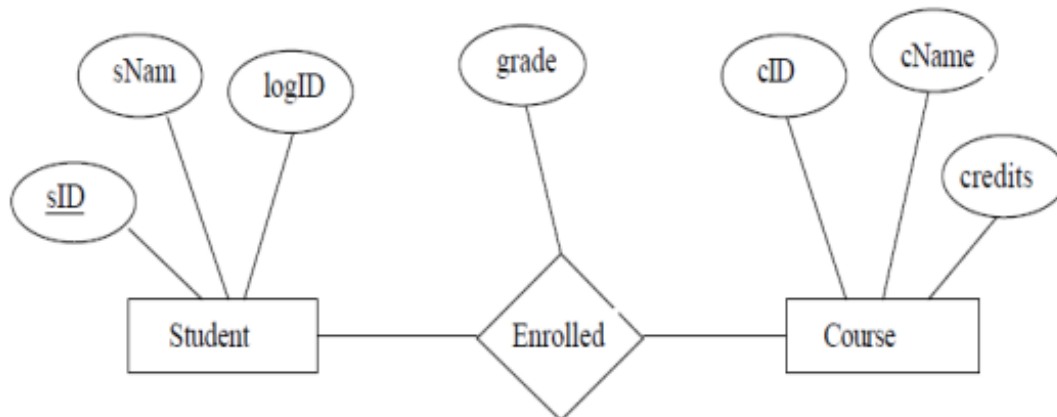
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ER Diagram:



Output-

```
MySQL 8.0 Command Line Client
mysql> create database university;
Query OK, 1 row affected (0.18 sec)

mysql> show databases;
+-----+
| Database |
+-----+
| assignments |
| cdac |
| information_schema |
| mysql |
| performance_schema |
| pgdaccsep |
| sys |
| university |
+-----+
8 rows in set (0.27 sec)

mysql> use university;
Database changed
mysql> CREATE TABLE PROFESSORS
-> (SIN VARCHAR(30) PRIMARY KEY,
-> PID INT(10),
->
-> PNAME VARCHAR(20),
-> ADDRESS VARCHAR(40),
-> PHONENO INT(13));
Query OK, 0 rows affected, 2 warnings (0.28 sec)

mysql> show warnings;
+-----+
| Level | Code | Message |
+-----+
| Warning | 1681 | Integer display width is deprecated and will be removed in a future release. |
| Warning | 1681 | Integer display width is deprecated and will be removed in a future release. |
+-----+
2 rows in set (0.00 sec)

mysql> INSERT INTO PROFESSORS VALUES('102',1002,'SADHU SREENIVAS','HYDERABAD',78526315),('103',1003,'RADHIKA MAM','BANGLORE',78955321);
Query OK, 2 rows affected (0.19 sec)
Records: 2 Duplicates: 0 Warnings: 0

mysql> CREATE TABLE COURSES
-> (CID INT(20),
```

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MySQL 8.0 Command Line Client
mysql> CREATE TABLE COURSES
-> (CID INT(20),
-> CNAME VARCHAR(30),
-> CDURATION VARCHAR(30),
-> ^C
mysql> ;
ERROR:
No query specified

mysql> CREATE TABLE COURSES
-> (CID INT(20),
-> CDURATION VARCHAR(30),
-> CNAME VARCHAR(30),
-> SIN VARCHAR(30),
-> CONSTRAINT FK_SIN FOREIGN KEY (SIN) REFERENCES PROFESSORS(SIN));
Query OK, 0 rows affected, 1 warning (0.42 sec)

mysql> DESC COURSES;
+-----+-----+-----+-----+-----+-----+
| Field | Type | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| CID   | int  | YES  |     | NULL    |       |
| CDURATION | varchar(30) | YES  |     | NULL    |       |
| CNAME | varchar(30) | YES  |     | NULL    |       |
| SIN   | varchar(30) | YES  | MUL | NULL    |       |
+-----+-----+-----+-----+-----+-----+
4 rows in set (0.12 sec)

mysql> ALTER TABLE COURSES ADD CONSTRAINT COURSES_CID_PK PRIMARY KEY (CID);
Query OK, 0 rows affected (0.62 sec)
Records: 0 Duplicates: 0 Warnings: 0

mysql> DESC COURSES;
+-----+-----+-----+-----+-----+-----+
| Field | Type | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| CID   | int  | NO   | PRI | NULL    |       |
| CDURATION | varchar(30) | YES  |     | NULL    |       |
| CNAME | varchar(30) | YES  |     | NULL    |       |
| SIN   | varchar(30) | YES  | MUL | NULL    |       |
+-----+-----+-----+-----+-----+-----+
4 rows in set (0.00 sec)

mysql> INSERT INTO COURSES
```

```
mysql> INSERT INTO COURSES
-> VALUES
-> (501,'DAC','6-MONTHS','101'),
-> (503,'DMC','6-MONTHS','103'),
-> (502,'DBDA','6-MONTHS','102');
ERROR 1452 (23000): Cannot add or update a child row: a foreign key constraint fails (`university`.`courses`, CONSTRAINT `FK_SIN` FOREIGN KEY (`SIN`) REFERENCES `professors` (`SIN`))
mysql> INSERT INTO COURSES
-> VALUES
-> (501,'DAC','6-MONTHS','101'),
-> (503,'DMC','6-MONTHS','103'),
-> (502,'DBDA','6-MONTHS','102');
ERROR 1452 (23000): Cannot add or update a child row: a foreign key constraint fails (`university`.`courses`, CONSTRAINT `FK_SIN` FOREIGN KEY (`SIN`) REFERENCES `professors` (`SIN`))
mysql> INSERT INTO COURSES VALUES(1,'6 MONTHS','DAC','101');
ERROR 1452 (23000): Cannot add or update a child row: a foreign key constraint fails (`university`.`courses`, CONSTRAINT `FK_SIN` FOREIGN KEY (`SIN`) REFERENCES `professors` (`SIN`))
mysql> desc professors;
+-----+-----+-----+-----+-----+-----+
| Field | Type | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| SIN   | varchar(30) | NO   | PRI | NULL    |       |
| PID   | int       | YES  |     | NULL    |       |
| PNAME | varchar(20) | YES  |     | NULL    |       |
| ADDRESS | varchar(40) | YES  |     | NULL    |       |
| PHONENO | int       | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)

mysql> SELECT * FROM PROFESSORS;
+-----+-----+-----+-----+-----+
| SIN | PID | PNAME | ADDRESS | PHONENO |
+-----+-----+-----+-----+-----+
| 102 | 1002 | SADHU SREENIVAS | HYDERABAD | 78526315 |
| 103 | 1003 | RADHIKA MAM | BANGLORE | 78955321 |
+-----+-----+-----+-----+-----+
2 rows in set (0.02 sec)

mysql> SELECT * FROM COURSES;
Empty set (0.00 sec)

mysql> INSERT INTO COURSES
-> VALUES
```

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```
MySQL 8.0 Command Line Client
mysql> INSERT INTO COURSES
-> VALUES
-> (503,'DMC','6-MONTHS','103'),
-> (502,'DBDA','6-MONTHS','102');
Query OK, 2 rows affected (0.05 sec)
Records: 2 Duplicates: 0 Warnings: 0

mysql> SELECT * FROM COURSES;
+----+-----+-----+----+
| CID | CDURATION | CNAME | SIN |
+----+-----+-----+----+
| 502 | DBDA | 6-MONTHS | 102 |
| 503 | DMC | 6-MONTHS | 103 |
+----+-----+-----+----+
2 rows in set (0.00 sec)

mysql> SELECT * FROM COURSES WHERE SIN='101';
Empty set (0.03 sec)

mysql> INSERT INTO COURSES
-> VALUES
-> (503,'DMC','6-MONTHS','103'),
-> (502,'DBDA','6-MONTHS','102'),
-> (501,'DMC','6-MONTHS','102');
ERROR 1062 (23000): Duplicate entry '503' for key 'courses.PRIMARY'

mysql> INSERT INTO COURSES
-> VALUES
-> (503,'DMC','6-MONTHS','103'),
-> (502,'DBDA','6-MONTHS','102'),
-> (501,'DESD','6-MONTHS','102');
ERROR 1062 (23000): Duplicate entry '503' for key 'courses.PRIMARY'

mysql> INSERT INTO COURSES
-> VALUES
-> (503,'DMC','6-MONTHS','103'),
-> (502,'DBDA','6-MONTHS','102'),
-> (504,'DESD','6-MONTHS','102');
ERROR 1062 (23000): Duplicate entry '503' for key 'courses.PRIMARY'

mysql> DESC COURSES;
+----+-----+-----+----+-----+-----+
| Field | Type | Null | Key | Default | Extra |
+----+-----+-----+----+-----+-----+
| CID | int | NO | PRI | NULL | |
| CDURATION | varchar(30) | YES | | NULL | |
| CNAME | varchar(30) | YES | | NULL | |
| SIN | varchar(30) | YES | MUL | NULL | |
+----+-----+-----+----+-----+-----+
```

```
MySQL 8.0 Command Line Client
ERROR 1062 (23000): Duplicate entry '503' for key 'courses.PRIMARY'
mysql> DESC COURSES;
+----+-----+-----+----+-----+-----+
| Field | Type | Null | Key | Default | Extra |
+----+-----+-----+----+-----+-----+
| CID | int | NO | PRI | NULL | |
| CDURATION | varchar(30) | YES | | NULL | |
| CNAME | varchar(30) | YES | | NULL | |
| SIN | varchar(30) | YES | MUL | NULL | |
+----+-----+-----+----+-----+-----+
4 rows in set (0.00 sec)

mysql> SELECT * FROM COURSES;
+----+-----+-----+----+
| CID | CDURATION | CNAME | SIN |
+----+-----+-----+----+
| 502 | DBDA | 6-MONTHS | 102 |
| 503 | DMC | 6-MONTHS | 103 |
+----+-----+-----+----+
2 rows in set (0.00 sec)

mysql> INSERT INTO COURSES VALUES(504,'DESD','6 MONTHS','102');
Query OK, 1 row affected (0.04 sec)

mysql> SELECT * FROM COURSES;
+----+-----+-----+----+
| CID | CDURATION | CNAME | SIN |
+----+-----+-----+----+
| 502 | DBDA | 6-MONTHS | 102 |
| 503 | DMC | 6-MONTHS | 103 |
| 504 | DESD | 6 MONTHS | 102 |
+----+-----+-----+----+
3 rows in set (0.00 sec)

mysql> SELECT * FROM COURSES WHERE SIN=102;
+----+-----+-----+----+
| CID | CDURATION | CNAME | SIN |
+----+-----+-----+----+
| 502 | DBDA | 6-MONTHS | 102 |
| 504 | DESD | 6 MONTHS | 102 |
+----+-----+-----+----+
2 rows in set (0.06 sec)

mysql>
```