PROGRAM 1: Student Database

1. Consider the following relations:

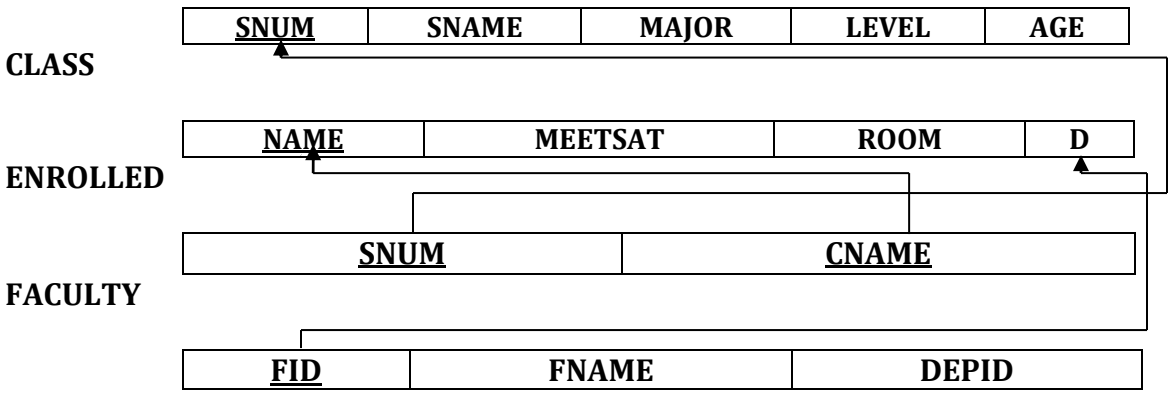
STUDENT (*snum:* integer, *sname:* string, *major:* string, *level:* string, *age:* integer)
CLASS (*name:* string, *meets at:* string, *room:* string, *d:* integer)
ENROLLED (*snum:* integer, *cname:* string)
FACULTY (*fid*: integer, *fname:* string, *deptid:* integer)

The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair such that the student is enrolled in the class. Level is a two character code with 4 different values (example: Junior: JR etc)
Design an ER model and schema diagram for the relations.

Write the following queries in SQL. No duplicates should be printed in any of the answers.

a) **Create the tables for the schemas provided with primary keys and foreign keys.**
b) **Insert five tuples of values to each table.**
c) **Find the names of all Juniors (level = JR) who are enrolled in a class taught by Prof. Harshith.**
d) **Find the names of all classes that either meet in room R128 or have five or more Students enrolled.**
e) **Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than five.**

SCHEMA DIAGRAM



a) Create the above tables for the schemas provided with primary keys and foreign keys.

```
SQL> CREATE TABLE STUDENT
(SNUM INT PRIMARY KEY,
 SNAME VARCHAR(20),
 MAJOR VARCHAR(20),
 LEVEL1 VARCHAR(2),
 AGE INT);
```

Table created.

```
SQL> CREATE TABLE FACULTY
(FID INT PRIMARY KEY,
 FNAME VARCHAR(20),
 DEPTID INT);
```

Table created.

```
SQL> CREATE TABLE CLASS
(NAME VARCHAR(20) PRIMARY KEY,
  MEETSAT VARCHAR(10),
  ROOM VARCHAR(10),
  D INT, FOREIGN KEY (D) REFERENCES FACULTY(FID));
```

Table created.

```
SQL> CREATE TABLE ENROLLED
(SNUM INT,
 CNAME VARCHAR(20),
 PRIMARY KEY(SNUM,CNAME),
 FOREIGN KEY (SNUM) REFERENCES STUDENT(SNUM),
 FOREIGN KEY (CNAME) REFERENCES CLASS(NAME));
```

Table created.

b) Insert five tuples of values to each table.

```
SQL> INSERT INTO STUDENT VALUES (&SNUM, '&SNAME', '&MAJOR', '&LEVEL1', &AGE);
SQL> INSERT INTO FACULTY VALUES (&FID, '&FNAME', &DEPTID);
SQL> INSERT INTO CLASS VALUES ('&NAME', '&MEETSAT', '&ROOM', &D);
SQL> INSERT INTO ENROLLED VALUES (&SNUM, '&CNAME');
```

Write the following queries in SQL. No duplicates should be printed in any of the answers.

c) Find the names of all Juniors (level = JR) who are enrolled in a class taught by Prof. Harshith

```
SQL> SELECT DISTINCT S.SNAME
FROM STUDENT S, CLASS C, ENROLLED E, FACULTY F
WHERE S.SNUM = E.SNUM AND E.CNAME = C.NAME AND C.D = F.FID AND
F.FNAME = 'Prof. Harshith' AND S.LEVEL = 'JR';
```

d) Find the names of all classes that either meet in room R128 or have five or more Students enrolled.

```
SQL> SELECT C.NAME
FROM CLASS C
WHERE C.ROOM = 'R128'
OR C.NAME IN (SELECT E.CNAME
FROM ENROLLED E
GROUP BY E.CNAME
HAVING COUNT (*) >= 5);
```

e) Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than five.

```
SQL> SELECT DISTINCT F.FNAME
FROM FACULTY F
WHERE 5 > (SELECT COUNT (E.SNUM)
FROM CLASS C, ENROLLED E
WHERE C.CNAME = E.CNAME
        AND C.FID = F.FID);
```