Ders Kodu:BIMU3064
Ders Adı:VERİ TABANI YÖNETİM SİSTEMLERİ
İsim: Oğuzhan Kuşlar
Kullanilan Veritabanı Sistemi: MySQL

VERİTABANI ŞEMASI

Student (sid, name, did, noOfCourses, GPA)// ogrenci(ogrenci-no, adi, bolum-no, dersSayisi)
Take (sid, cid, grade) // ders-al(ogrenci-no, ders-kodu, notu)
Course (cid, title, credits, did, noOfStudents)// ders(ders-kodu, adi, kredisi, bolum-no, ogrSayisi)
Department (did, name, noOfStudents) // bolum(bolum-no, adi, ogrSayisi)
Teacher (tid, name, placeOfBirth, did) // hoca(hoca-no, adi, dogum-yeri, bolum-no)
Teach (tid, cid) // ders-ver(hoca-no, ders-kodu)

1. BÖLÜM TABLO OLUŞTURMA VE TABLOLARA RASTGELE KAYITLAR EKLEME İŞLEMLERİ:

```
CREATE TABLE Department
 (did INTEGER(5) not null,
 name VARCHAR(30) not null,
 noOfStudents INTEGER,
 primary key(did));

CREATE TABLE Course
 (cid INTEGER(5) not null,
 title VARCHAR(30) not null,
 credits INTEGER(2),
 did INTEGER(5),
 noOfStudents INTEGER,
 foreign key (did) references Department(did),
 primary key(cid));

CREATE TABLE Student
 (sid INTEGER(5) not null,
 name VARCHAR(30) not null,
 did INTEGER(5),
 noOfCourses INTEGER,
 GPA FLOAT,
 foreign key(did) references Department(did),
 primary key(sid));

CREATE TABLE Take
 (sid INTEGER(5) not null,
 cid INTEGER(5) not null,
 grade FLOAT,
 foreign key (sid) references Student(sid),
 foreign key (cid) references Course(cid),
 primary key (sid,cid));

CREATE TABLE Teacher
 (tid INTEGER(5) not null,
 name VARCHAR(30) not null,
 placeOfBirth VARCHAR(50),
 did INTEGER(5),
 foreign key (did) references Department(did),
 primary key(tid));

CREATE TABLE Teach
 (tid INTEGER(5) not null,
 cid INTEGER(5) not null,
 foreign key (tid) references Teacher(tid),
 foreign key (cid) references Course(cid),
 primary key (tid,cid));

INSERT INTO Department(did,name) VALUES (1,'Comp. Eng.');
INSERT INTO Department(did,name) VALUES (2,'Elec. Eng.');
INSERT INTO Department(did,name) VALUES (3,'Env. Eng.');
INSERT INTO Department(did,name) VALUES (4,'Ind. Eng.');

INSERT INTO Student(sid,name,did) VALUES (1,'Ali Turan', 1);
INSERT INTO Student(sid,name,did) VALUES (2,'Ahmet Buyuk', 1);
INSERT INTO Student(sid,name,did) VALUES (3,'Leyla Sahin', 1);
INSERT INTO Student(sid,name,did) VALUES (4,'Can Turkoglu', 2);
INSERT INTO Student(sid,name,did) VALUES (5,'Ali KURT',  2);
INSERT INTO Student(sid,name,did) VALUES (6,'Talat Sanli', 3);
INSERT INTO Student(sid,name,did) VALUES (7,'Ayse KURT', 3);
INSERT INTO Student(sid,name,did) VALUES (8,'Turgut Cemal', 4);
INSERT INTO Student(sid,name,did) VALUES (9,'Oznur Gunes', 2);
INSERT INTO Student(sid,name,did) VALUES (10,'Pelin Tugay', 4);
INSERT INTO Student(sid,name,did) VALUES (11,'Savas Tan', 4);

INSERT INTO Course(cid,title,credits,did) VALUES (1,'database',3,1);
INSERT INTO Course(cid,title,credits,did) VALUES (2,'operating
system',3,1);
INSERT INTO Course(cid,title,credits,did) VALUES (3,'Introduction to
Programming',4,1);
INSERT INTO Course(cid,title,credits,did) VALUES (4,'introduction to
electronic',2,2);
INSERT INTO Course(cid,title,credits,did) VALUES (5,'statistic',4,4);
INSERT INTO Course(cid,title,credits,did) VALUES (6,'circuit
theory',3,2);
INSERT INTO Course(cid,title,credits,did) VALUES (7,'introduction to
environment',3,3);
INSERT INTO Course(cid,title,credits,did) VALUES (8,'operation
research',3,4);
INSERT INTO Course(cid,title,credits,did) VALUES (9,'summer
practice',2,4);
INSERT INTO Course(cid,title,credits,did) VALUES (10,'summer
practice',3,3);
INSERT INTO Course(cid,title,credits,did) VALUES (11,'summer
practice',3,1);
INSERT INTO Course(cid,title,credits,did) VALUES (12,'summer
practice',3,2);

INSERT INTO Teacher VALUES (1,'Selami Durgun', 'amasya',1);
INSERT INTO Teacher VALUES (2,'Cengiz Tahir', 'istanbul',1);
INSERT INTO Teacher VALUES (3,'Derya Seckin', 'mersin',1);
INSERT INTO Teacher VALUES (4,'Dogan Gedikli', 'istanbul',2);
INSERT INTO Teacher VALUES (5,'Ayten Kahraman', 'istanbul',3);
INSERT INTO Teacher VALUES (6,'Tahsin Ugur', 'izmir',4);
INSERT INTO Teacher VALUES (7,'Selcuk Ozan', 'amasya',4);

INSERT INTO Teach VALUES(1,1);
INSERT INTO Teach VALUES(3,2);
INSERT INTO Teach VALUES(2,3);
INSERT INTO Teach VALUES(4,4);
INSERT INTO Teach VALUES(7,5);
INSERT INTO Teach VALUES(4,6);
INSERT INTO Teach VALUES(5,7);
INSERT INTO Teach VALUES(6,8);
INSERT INTO Teach VALUES(7,9);
INSERT INTO Teach VALUES(5,10);
INSERT INTO Teach VALUES(1,11);
INSERT INTO Teach VALUES(4,12);
INSERT INTO teach VALUES(1,12);
INSERT INTO teach VALUES(1,10);
INSERT INTO teach VALUES(1,8);

INSERT INTO Take VALUES(1,1,3);
INSERT INTO Take VALUES(1,3,2.5);
INSERT INTO Take VALUES(1,4,3.5);
INSERT INTO Take VALUES(1,6,3);
INSERT INTO Take VALUES(1,9,4);
INSERT INTO Take VALUES(1,10,3);
INSERT INTO Take VALUES(2,1,4);
INSERT INTO Take VALUES(2,2,4);
INSERT INTO Take VALUES(2,3,4);
INSERT INTO Take VALUES(2,4,4);
INSERT INTO Take VALUES(2,5,4);
INSERT INTO Take VALUES(2,6,4);
INSERT INTO Take VALUES(2,7,4);
INSERT INTO Take VALUES(2,8,4);
INSERT INTO Take VALUES(2,9,4);
INSERT INTO Take VALUES(2,10,3);
INSERT INTO Take VALUES(2,11,4);
INSERT INTO Take VALUES(3,1,4);
INSERT INTO Take VALUES(3,2,4);
INSERT INTO Take VALUES(3,3,4);
INSERT INTO Take VALUES(3,4,4);
INSERT INTO Take VALUES(3,5,4);
INSERT INTO Take VALUES(3,6,4);
INSERT INTO Take VALUES(3,7,4);
INSERT INTO Take VALUES(3,8,4);
INSERT INTO Take VALUES(3,9,4);
INSERT INTO Take VALUES(3,10,3);
INSERT INTO Take VALUES(3,11,3.5);
INSERT INTO Take VALUES(4,1,2.5);
INSERT INTO Take VALUES(4,5,1.5);
INSERT INTO Take VALUES(5,11,3.5);
INSERT INTO Take VALUES(5,1,3);
INSERT INTO Take VALUES(5,5,1.5);
INSERT INTO Take VALUES(6,2,4);
INSERT INTO Take VALUES(7,5,1.5);
INSERT INTO Take VALUES(7,1,2.5);
INSERT INTO Take VALUES(7,8,1.5);
INSERT INTO Take VALUES(7,2,3);
INSERT INTO Take VALUES(8,2,3.5);
INSERT INTO Take VALUES(8,7,1.5);
INSERT INTO Take VALUES(10,2,4);
INSERT INTO Take VALUES(10,8,3);
INSERT INTO Take VALUES(11,8,1);
```

2.BÖLÜM SORGULAR VE CEVAPLARI:

SORGU 1: Tüm öğrencilerin ağırlıklı not ortalamalarını (GPA) bir alt sorguyla hesaplayıp güncelleyiniz.

CEVAP:

```
UPDATE student S
SET GPA = (SELECT P.GPA
              FROM (SELECT sid, SUM(grade*credits)/SUM(credits) GPA
                       FROM course,take
                       WHERE course.cid=take.cid GROUP BY sid) P
              WHERE P.sid = S.sid);



SELECT * FROM student //KONTROL
+-----+--------------+------+-------------+---------+
| sid | name         | did  | noOfCourses | GPA     |
+-----+--------------+------+-------------+---------+
|   1 | Ali Turan    |    1 |        NULL | 3.07143 |
|   2 | Ahmet Buyuk  |    1 |        NULL |     3.9 |
|   3 | Leyla Sahin  |    1 |        NULL |    3.85 |
|   4 | Can Turkoglu |    2 |        NULL | 1.92857 |
|   5 | Ali KURT     |    2 |        NULL |    2.55 |
|   6 | Talat Sanli  |    3 |        NULL |       4 |
|   7 | Ayse KURT    |    3 |        NULL | 2.07692 |
|   8 | Turgut Cemal |    4 |        NULL |     2.5 |
|   9 | Oznur Gunes  |    2 |        NULL |    NULL |
|  10 | Pelin Tugay  |    4 |        NULL |     3.5 |
|  11 | Savas Tan    |    4 |        NULL |       1 |
+-----+--------------+------+-------------+---------+
```

SORGU 2: Bölümlerin hepsinde ders veren hocaların kayıtlarını listeyeyiniz.

CEVAP:

```
SELECT P.*
FROM teacher P
WHERE NOT EXISTS (SELECT DISTINCT did
                         FROM course
                             EXCEPT
                         SELECT DISTINCT did
                         FROM teach T, course C
                         WHERE T.cid = C.cid AND T.tid = P.tid);
```

```
+-----+---------------+--------------+------+
| tid | name          | placeOfBirth | did  |
+-----+---------------+--------------+------+
|   1 | Selami Durgun | amasya       |    1 |
+-----+---------------+--------------+------+
```

SORGU 3: Hocaların verdiği ders sayılarının ortalamasının altında ders veren hocaların
"tid, name, verdiği ders sayısı ve derslerini alan öğrencilerin sayılarını" listeleyiniz.

CEVAP:

```
WITH dersSayi(tid,dersSayisi) AS (SELECT tid,COUNT(cid) FROM teach GROUP
BY tid),
      ortalamaDers(ort) AS (SELECT AVG(dersSayisi) FROM dersSayi),
      ogrSayi(tid,ogrSayisi) AS (SELECT tid,COUNT(tid)
            FROM teach, take
            WHERE take.cid = teach.cid
            GROUP BY tid)
SELECT t.tid,t.name,dersSayi.dersSayisi,ogrSayi.ogrSayisi
FROM dersSayi,ortalamaDers,teacher t,ogrSayi
WHERE dersSayi.tid=t.tid
      AND dersSayisi>ortalamaDers.ort
      AND ogrSayi.tid = t.tid;
```

```
+-----+---------------+------------+-----------+
| tid | name          | dersSayisi | ogrSayisi |
+-----+---------------+------------+-----------+
|   1 | Selami Durgun |          5 |        17 |
|   4 | Dogan Gedikli |          3 |         6 |
+-----+---------------+------------+-----------+
```

SORGU 4: Kredisi > 3 olan ve en fazla 20 öğrencinin aldığı derslerin "tid, ogrenci sayısı, not ortalama"larını dersi alan öğrenci sayısına göre artan, dersteki notların ortalamasına göre azalan sırada listeleyiniz.

CEVAP:

```
WITH table1(cid,ogrSayisi) AS (SELECT course.cid, COUNT(*) ogrSayisi
            FROM course, take
            WHERE take.cid = course.cid AND credits > 3
            GROUP BY cid
            HAVING ogrSayisi < 20),
        table2(cid,notOrtalamasi) AS (SELECT cid,AVG(grade)
            FROM take
            GROUP BY cid)
SELECT table1.*,table2.notOrtalamasi
FROM table1,table2
WHERE table1.cid = table2.cid
ORDER BY notOrtalamasi DESC, ogrSayisi ASC;
```

```
 +-----+-----------+---------------+
| cid | ogrSayisi | notOrtalamasi |
+-----+-----------+---------------+
|   3 |         3 |           3.5 |
|   5 |         5 |           2.5 |
+-----+-----------+---------------+
```

SORGU 5: Aldığı tüm derslerdeki notu o dersteki (kendi notu hariç olmak üzere) notların ortalamasından yüksek olan öğrencilerin sid'lerini listeleyiniz.

CEVAP:

```
WITH table1(cid,krediToplam,sayi) AS
           (SELECT take.cid, SUM(grade), COUNT(*)
            FROM take GROUP BY cid),
       table2(sid,cid,krediToplam,sayi) AS
           (SELECT t1.sid,table1.*
            FROM take t1, table1
            WHERE t1.cid=table1.cid
            AND t1.grade > (table1.krediToplam-t1.grade) / (sayi-1))
SELECT m1.sid
FROM (SELECT sid, COUNT(cid) c
           FROM table2 GROUP BY sid) m1,
       (SELECT sid, COUNT(cid) c
           FROM take GROUP BY sid) m2
WHERE m2.sid = m1.sid AND m1.c=m2.c;

+-----+
| sid |
+-----+
|   6 |
|  10 |
+-----+
```

SORGU 6: Bölümlerin "did, öğrenci sayılarını ve bölümdeki öğrencilerin notlarının ortalamalarını" listeleyiniz.

CEVAP:

```
SELECT did, (SELECT P.sayi
      FROM (SELECT did, COUNT(sid) sayi FROM student GROUP BY did) P
      WHERE P.did = d.did) "ogrenci sayisi",
      (SELECT M.ort
      FROM (SELECT did, AVG(GPA) ort FROM student GROUP BY did) M
      WHERE M.did=d.did) ogrenciNotOrtalama
FROM department d;

+-----+----------------+--------------------+
| did | ogrenci sayisi | ogrenciNotOrtalama |
+-----+----------------+--------------------+
|   1 |              3 | 3.6105169455210366 |
|   2 |              3 |  2.239285707473755 |
|   3 |              2 | 3.0384615659713745 |
|   4 |              3 | 2.3333333333333335 |
+-----+----------------+--------------------+
```

SORGU 7: En az iki farklı hocadan yada iki farklı bölümden ders alan öğrencilerin kayıtlarını listeleyiniz.

ADIM1 EN AZ İKİ HOCADAN DERS ALAN ÖĞRENCİLER:

```
SELECT s.* FROM student s WHERE (SELECT COUNT(DISTINCT teach.tid) FROM
teach, take
      WHERE teach.cid=take.cid AND take.sid = s.sid GROUP BY sid) > 1;
+-----+---------------+------+-------------+---------+
| sid | name          | did  | noOfCourses | GPA     |
+-----+---------------+------+-------------+---------+
|   1 | Ali Turan    |    1 |        NULL | 3.05882 |
|   2 | Ahmet Buyuk  |    1 |        NULL | 3.90909 |
|   3 | Leyla Sahin  |    1 |        NULL | 3.86364 |
|   4 | Can Turkoglu |    2 |        NULL | 1.92857 |
|   5 | Ali KURT     |    2 |        NULL |    2.55 |
|   7 | Ayse KURT    |    3 |        NULL | 2.07692 |
|   8 | Turgut Cemal |    4 |        NULL |     2.5 |
|  10 | Pelin Tugay  |    4 |        NULL |     3.5 |
|  11 | Savas Tan    |    4 |        NULL |       1 |
+-----+--------------+------+-------------+---------+
```

ADIM2 EN AZ İKİ BÖLÜMDEN DERS ALAN ÖĞRENCİLER:

```
SELECT s.* FROM student s WHERE (SELECT COUNT(DISTINCT course.did) FROM
take, course
      WHERE take.cid = course.cid AND s.sid = take.sid GROUP BY sid) > 1;
+-----+--------------+------+-------------+---------+
| sid | name         | did  | noOfCourses | GPA     |
+-----+--------------+------+-------------+---------+
|   1 | Ali Turan    |    1 |        NULL | 3.05882 |
|   2 | Ahmet Buyuk  |    1 |        NULL | 3.90909 |
|   3 | Leyla Sahin  |    1 |        NULL | 3.86364 |
|   4 | Can Turkoglu |    2 |        NULL | 1.92857 |
|   5 | Ali KURT     |    2 |        NULL |    2.55 |
|   7 | Ayse KURT    |    3 |        NULL | 2.07692 |
|   8 | Turgut Cemal |    4 |        NULL |     2.5 |
|  10 | Pelin Tugay  |    4 |        NULL |     3.5 |
+-----+--------------+------+-------------+---------+
```

CEVAP:

```
SELECT S.*
FROM student S
WHERE (SELECT COUNT(DISTINCT teach.tid)
         FROM teach, take
         WHERE teach.cid=take.cid
         AND take.sid = S.sid
         GROUP BY sid) > 1
UNION
SELECT S.*
FROM student S
WHERE (SELECT COUNT(DISTINCT course.did)
         FROM take, course
         WHERE take.cid = course.cid
         AND s.sid = take.sid
         GROUP BY sid) > 1;

+-----+--------------+------+-------------+---------+
| sid | name         | did  | noOfCourses | GPA     |
+-----+--------------+------+-------------+---------+
|   1 | Ali Turan    |    1 |        NULL | 3.05882 |
|   2 | Ahmet Buyuk  |    1 |        NULL | 3.90909 |
|   3 | Leyla Sahin  |    1 |        NULL | 3.86364 |
|   4 | Can Turkoglu |    2 |        NULL | 1.92857 |
|   5 | Ali KURT     |    2 |        NULL |    2.55 |
|   7 | Ayse KURT    |    3 |        NULL | 2.07692 |
|   8 | Turgut Cemal |    4 |        NULL |     2.5 |
|  10 | Pelin Tugay  |    4 |        NULL |     3.5 |
|  11 | Savas Tan    |    4 |        NULL |       1 |
+-----+--------------+------+-------------+---------+
```

BOŞŞ SORGU 8:

```
ADIM1: CREATE VIEW A1 AS SELECT take.*,student.name,SUM(credits)
krediToplam FROM take, course, student WHERE take.cid=course.cid AND
student.sid=take.sid GROUP BY take.sid;


ADIM1: SELECT t.sid, SUM(c.credits) FROM course c, take t WHERE c.cid =
t.cid GROUP BY sid;

WITH aliAyse(sid) AS (SELECT sid FROM student s WHERE s.name='Ali KURT'
OR s.name='Ayse KURT'), krediToplam(sid,kredilerToplami) AS (SELECT
t.sid, SUM(c.credits) FROM course c, take t WHERE c.cid = t.cid GROUP BY
sid) SELECT * FROM krediToplam;
```

SORGU 9: Aynı notu 2 farklı dersten almamış yani tüm notları birbirinden farklı olan
öğrencilerin kayıtlarını listeyeyiniz

CEVAP:

```
SELECT S.*
FROM student S
WHERE NOT EXISTS (SELECT *
                         FROM take T
                         WHERE T.sid = S.sid
                         GROUP BY grade
                         HAVING COUNT(grade) > 1);
```

```
+-----+--------------+------+-------------+---------+
| sid | name         | did  | noOfCourses | GPA     |
+-----+--------------+------+-------------+---------+
|   4 | Can Turkoglu |    2 |        NULL | 1.92857 |
|   5 | Ali KURT     |    2 |        NULL |    2.55 |
|   6 | Talat Sanli  |    3 |        NULL |       4 |
|   8 | Turgut Cemal |    4 |        NULL |     2.5 |
|   9 | Oznur Gunes  |    2 |        NULL |    NULL |
|  10 | Pelin Tugay  |    4 |        NULL |     3.5 |
|  11 | Savas Tan    |    4 |        NULL |       1 |
+-----+--------------+------+-------------+---------+
```

SORGU 10: Girilmemiş yada verilmemiş notu olmayan öğrencileri listeleyiniz

CEVAP:

```
SELECT * FROM student WHERE GPA IS NOT NULL;

+-----+--------------+------+-------------+---------+
| sid | name         | did  | noOfCourses | GPA     |
+-----+--------------+------+-------------+---------+
|   1 | Ali Turan    |    1 |        NULL | 3.05882 |
|   2 | Ahmet Buyuk  |    1 |        NULL | 3.90909 |
|   3 | Leyla Sahin  |    1 |        NULL | 3.86364 |
|   4 | Can Turkoglu |    2 |        NULL | 1.92857 |
|   5 | Ali KURT     |    2 |        NULL |    2.55 |
|   6 | Talat Sanli  |    3 |        NULL |       4 |
|   7 | Ayse KURT    |    3 |        NULL | 2.07692 |
|   8 | Turgut Cemal |    4 |        NULL |     2.5 |
|  10 | Pelin Tugay  |    4 |        NULL |     3.5 |
|  11 | Savas Tan    |    4 |        NULL |       1 |
+-----+--------------+------+-------------+---------+
```