Yunus Emre Ak / 1306150001
2.Odev (Vize sorularının çözümü) / Veritabanı Yönetim Sistemleri

```
-- Eski Tabloları Silme

DROP TABLE Teach CASCADE;
DROP TABLE Take CASCADE;
DROP TABLE Teacher CASCADE;
DROP TABLE Course CASCADE;
DROP TABLE Student CASCADE;
DROP TABLE Department CASCADE;

-- Tabloları Oluşturma

create table Department
 (did numeric(5) not null,
 name varchar(30) not null,
 primary key(did));

create table Student
 (sid numeric(5) not null,
 name varchar(30) not null,
 birthplace varchar(50),
 did numeric(5),
 foreign key (did) references Department(did),
 primary key(sid));

create table Course
 (cid numeric(5) not null,
 title varchar(30) not null,
 credits numeric(2),
 did  numeric(5),
 foreign key (did) references Department(did),
 primary key(cid));

create table Teacher
 (tid numeric(5) not null,
 name varchar(30) not null,
 placeOfBirth varchar(50),
 did numeric(5),
 foreign key (did) references Department(did),
 primary key(tid));

create table Take
 (sid numeric(5) not null,
 cid numeric(5) not null,
 grade float,
 foreign key (sid) references Student(sid),
 foreign key (cid) references Course(cid),
 primary key (sid,cid));

create table Teach
 (tid numeric(5) not null,
 cid numeric(5) not null,
 foreign key (tid) references Teacher(tid),
 foreign key (cid) references Course(cid),
 primary key (tid,cid));
```

```
-- Tablo Verilerini Ekleme


insert into Department values (1,  'Bilgisayar
Muhendisligi');
insert into Department values (2,  'Endustri
Muhendisligi');
insert into Department values (3,  'Elektrik
Muhendisligi');
insert into Department values (4,  'Kimya
Muhendisligi');
insert into Department values (5,  'Piskoloji');

insert into Student values (1,  'Ali
Dogan',   'istanbul', 1);
insert into Student values (2,  'Ahmet
buyuk','ankara', 1);
insert into Student values (3,  'Leyla
Sahin',  'izmir',   1);
insert into Student values (4,  'Can
Turkoglu','manisa',   2);
insert into Student values (5,  'Aziz
Keskin',  'istanbul', 2);
insert into Student values (6,  'Talat
Sanli',  'izmir',   3);
insert into Student values (7,  'Kamuran
Kece', 'adana',   3);
insert into Student values (8,  'Turgut
Cemal', 'bursa',   4);
insert into Student values (9,  'Oznur
Gunes','bolu',   2);
insert into Student values (10, 'Pelin
Tugay','izmir',  4);
insert into Student values (11, 'Savas
Tan','izmir',   4);

insert into Course values (1,  'Database
Systems', 3,  1);
insert into Course values (2,  'Operating
Systems',3,  1);
insert into Course values (3,  'Introduction to
Programming',  4,  1);
insert into Course values (4,  'introduction to
electronic',2, 2);
insert into Course values (5,  'statistic',4,  4);
insert into Course values (6,  'circuit theory',
3,   2);
insert into Course values (7,  'introduction to
environment',3,   3);
insert into Course values (8,  'operation
research',3, 4);
insert into Course values (9,  'summer practice',
2,   4);
insert into Course values (10,  'summer
practice',  3,  3);
```

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```
insert into Course values (11, 'summer
practice', 3, 1);
insert into Course 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 Teacher values (8, 'Bos
Adam', 'Rome', 1);

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 Take values (1, 1, 75);
insert into Take values (1, 3, 62.5);
insert into Take values (1, 4, 75.5);
insert into Take values (1, 6, 75);
insert into Take values (1, 9, 100);
insert into Take values (1, 10, 75);
insert into Take values (2, 1, 68);
insert into Take values (2, 2, 100);
insert into Take values (2, 3, 4);
insert into Take values (2, 4, 100);
insert into Take values (2, 5, 23);
insert into Take values (2, 6, 100);
insert into Take values (2, 7, 13);
insert into Take values (2, 8, 100);
insert into Take values (2, 9, 100);
insert into Take values (2, 10, 75);
insert into Take values (2, 11, 100);
insert into Take values (3, 1, 100);
insert into Take values (3, 2, 65);
insert into Take values (3, 3, 88);
insert into Take values (3, 4, 71);
insert into Take values (3, 5, 100);
insert into Take values (3, 6, 34);
insert into Take values (3, 7, 23);
insert into Take values (3, 8, 100);
insert into Take values (3, 9, 31);
insert into Take values (3, 10, 75);
insert into Take values (3, 11, 75.5);
insert into Take values (4, 1, 62.5);
insert into Take values (4, 5, 33);
insert into Take values (5, 11, 75.5);
insert into Take values (5, 1, 75);
insert into Take values (5, 5, 33);
insert into Take values (6, 2, 100);
insert into Take values (7, 5, 33);
insert into Take values (7, 1, 62.5);
insert into Take values (7, 8, 33);
insert into Take values (7, 2, 75);
insert into Take values (8, 2, 75.5);
insert into Take values (8, 7, 30);
insert into Take values (9, 3, 21);
insert into Take values (9, 4, 23);
insert into Take values (10, 2,100);
insert into Take values (10, 8, 75);
insert into Take values (11, 8, 25);
```

-- Vize Soruları Çözümü

-- 1.Soru

```
-- Student tablosuna “birthDate INTEGER”
sütününu ekleyiniz (ALTER kullan)
ALTER TABLE Student ADD birtDate INTEGER;

-- 5 numaralı (did) bölüme ‘Samsun’ doğumlu ‘Ali
KURT’ adlı öğrenciyi ekleyiniz (INSERT kullan)
INSERT INTO Student (sid, name, birthPlace, did)
VALUES (12, 'Ali KURT', 'Samsun', 5);

-- Öğrencisi olmayan bölümleri Department
tablosundan siliniz. (DELETE kullan)
DELETE FROM Department d WHERE NOT EXISTS (
   SELECT * FROM Student s WHERE s.did = d.did
);

-- En az 10 adet öğrencinin aldığı derslerin kredisini
1 arttırınız. (UPDATE kullan)
UPDATE Course SET credits = credits + 1 WHERE
credits IN (
   SELECT credits FROM Course c, Take t WHERE
c.cid = t.cid
   GROUP BY (c.cid) HAVING count(sid) >= 10
);
```

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-- 2.Soru

```
-- Dersten alınan notların ortalaması 50'den yüksek olan derslerin ders kodunu
-- öğrenci sayılarını SQL ve RA ile listeleyiniz.
SELECT c.cid, count(sid) FROM Take t, Course c
WHERE t.cid=c.cid
GROUP BY c.cid HAVING AVG(grade) > 50;
```

```
 cid | count
-----+-------
  11 |     3
   4 |     4
   6 |     3
  10 |     3
   2 |     6
   1 |     6
   9 |     3
   8 |     5
```

-- 3.Soru

```
-- 'Ali KURT' adlı öğrencinin notlarının hepsinden daha yüksek bir nota sahip olan öğrencilerin
-- kayıtlarını SQL ve RA ile listeleyiniz. (&gt;= ALL kullan)
SELECT DISTINCT s.* FROM Student s, Take t
WHERE s.sid = t.sid AND
grade >= ALL(
   SELECT grade FROM Student s1, Take t1 WHERE
   t1.sid = s1.sid AND s1.name = 'Ali KURT'
);
```

```
  sid |     name     | birthplace | did | birtdate
-----+--------------+------------+-----+----------
   1 | Ali Dogan    | istanbul   |   1 |
   2 | Ahmet buyuk  | ankara     |   1 |
   3 | Leyla Sahin  | izmir      |   1 |
   4 | Can Turkoglu | manisa     |   2 |
   5 | Aziz Keskin  | istanbul   |   2 |
   6 | Talat Sanli  | izmir      |   3 |
   7 | Kamuran Kece | adana      |   3 |
   8 | Turgut Cemal | bursa      |   4 |
   9 | Oznur Gunes  | bolu       |   2 |
  10 | Pelin Tugay  | izmir      |   4 |
  11 | Savas Tan    | izmir      |   4 |
```

-- 4.Soru

```
-- 'Database Systems' dersini alan fakat 'Operating Systems' dersini almayan öğrencilerin kayıtlarını RA
-- ve SQL ile listeleyiniz.
SELECT DISTINCT s.sid FROM Course c, Student s,
Take t WHERE s.sid = t.sid AND
t.cid = c.cid AND title='Database Systems' AND s.sid
NOT IN (
   SELECT s1.sid FROM Student s1, Take t1, Course
c1 WHERE
   s1.sid = t1.sid AND t1.cid = c1.cid AND
title='Operating Systems'
);
```

```
 sid
-----
   1
   4
   5
```

-- 5.Soru

```
-- 'Bilgisayar Mühendisliği' bölümünde çalışan ve ders vermeyen (teach tablosundan bakılacak)
-- hocaların kayıtlarını
-- Exists
SELECT t.* FROM Teacher t, Department d WHERE
t.did = d.did AND
d.name='Bilgisayar Muhendisligi' AND NOT EXISTS (
   SELECT * FROM Teach t1 WHERE t1.tid = t.tid
);
```

```
 tid |   name   | placeofbirth | did
-----+----------+--------------+-----
   8 | Bos Adam | Rome         |   1
```

```
-- In
SELECT t.* FROM Teacher t, Department d WHERE
t.did = d.did AND
d.name='Bilgisayar Muhendisligi' AND t.tid IN (
   (SELECT tid FROM Teacher) EXCEPT (SELECT tid
FROM Teach)
);
```

```
 tid |   name   | placeofbirth | did
-----+----------+--------------+-----
   8 | Bos Adam | Rome         |   1
```

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2-) $\Pi_{c.cid,\ count(grade)} \left(c.cid\ g_{AVG(grade)>50} \left(\sigma_{t.cid=c.cid} \left(\rho_t(Take) \times \rho_c(Course) \right) \right) \right)$

3-) $mygrade \leftarrow \Pi_{grade} \left(\sigma_{t1.sid=st.sid \wedge st.name='Ali\ Kurt'} \left(\rho_{st}(Student) \times \rho_{t2}(Take) \right) \right)$

$\Pi_{s.*} \left(\sigma_{s.sid=t.sid \wedge grade >= ALL(mygrade)} \left(\rho_s(Student) \times \rho_t(Take) \right) \right)$

4-) $os \leftarrow \Pi_{s1.sid} \left(\sigma_{s1.sid=t1.sid \wedge t1.cid=c1.cid \wedge title='Operating\ Systems'} \left(\rho_{s1}(Student) \times \rho_{t_1}(Take) \times \rho_{c1}(Course) \right) \right)$

$\Pi_{s.sid} \left(\sigma_{s.sid=t.sid \wedge t.cid=c.cid \wedge title='Database\ Systems' \wedge s.sid\ NOT\ IN\ (os)} \left(\rho_c(Course) \times \rho_s(Student) \times \rho_t(Take) \right) \right)$

5-) $\Pi_{t.*} \left(\sigma_{t.did=d.did \wedge d.name='Bilgisayar\ Mühendisliği'} \left(\rho_t(Teacher) \times \rho_d(Department) \right) \right) - \Pi_{t.*} \left(\sigma_{t.did=d.did \wedge d.name='Bilgisayar\ Mühendisliği' \wedge tedd=tdid} \left(\rho_t(Teacher) \times \rho_{te}(Teach) \times \rho_d(Department) \right) \right)$