1.- Create the following database (with name ApplyingToCollege) with the following schema and data:

STUDENTS (id, name, surname, mark, size_high_school)

COLLEGES (name, state, enrollment)

APPLIES (sid*, college*, major, decision)

STUDENTS:

id	name	surname	mark	size_high_school
123	Amy	Smith	3.9	1000
234	Bob	Taylor	3.6	1500
345	Craig	Davis	3.5	500
456	Doris	Roberts	3.9	1000
543	Craig	Wilder	3.4	2000
567	Edward	Norton	2.9	2000
654	Amy	Cooper	3.9	1000
678	Fay	Laurence	3.8	200
765	Jay	Farlong	2.9	1500
789	Gary	Oldman	3.4	800
876	Irene	Lopez	3.9	400
987	Helen	Karlson	3.7	800

COLLEGES:

name	state	enrollment
Berkeley	CA	36000
Cornell	NY	21000
MIT	MA	10000
Stanford	CA	15000

APPLIES:

sid	college	major	decision
123	Berkeley	CS	1
123	Cornell	EE	1
123	Stanford	CS	1
123	Stanford	EE	0
234	Berkeley	biology	0
345	Cornell	bioengineering	0
345	Cornell	CS	1
345	Cornell	EE	0
345	MIT	bioengineering	1
543	MIT	CS	0
678	Stanford	history	1
765	Cornell	history	0
765	Cornell	psychology	1
765	Stanford	history	1
876	MIT	biology	1
876	MIT	marine biology	0
876	Stanford	CS	0
987	Berkeley	CS	1
987	Stanford	CS	1

```sql
create database ApplyingToCollege;
use ApplyingToCollege;

create table COLLEGES(
        name VARCHAR(10) primary key,
        state VARCHAR(2),
        enrollment int) Engine = InnoDB;

create table STUDENTS(
        id int primary key,
        name VARCHAR(20),
        surname VARCHAR(20),
        mark real,
        size_high_school int) Engine = InnoDB;

create table APPLIES(
        sid int,
    college VARCHAR(10),
    major VARCHAR(20),
    decision boolean,
    primary key (sid, college, major),
    foreign key (sid) references STUDENTS(id),
    foreign key (college) references COLLEGES(name)) Engine = InnoDB;
```

insert into STUDENTS values (123, 'Amy', 'Smith', 3.9, 1000);
insert into STUDENTS values (234, 'Bob', 'Taylor', 3.6, 1500);
insert into STUDENTS values (345, 'Craig', 'Davis', 3.5, 500);
insert into STUDENTS values (456, 'Doris', 'Roberts', 3.9, 1000);
insert into STUDENTS values (567, 'Edward', 'Norton', 2.9, 2000);
insert into STUDENTS values (678, 'Fay', 'Laurence', 3.8, 200);
insert into STUDENTS values (789, 'Gary', 'Oldman', 3.4, 800);
insert into STUDENTS values (987, 'Helen', 'Karlson', 3.7, 800);
insert into STUDENTS values (876, 'Irene', 'Lopez', 3.9, 400);
insert into STUDENTS values (765, 'Jay', 'Farlong', 2.9, 1500);
insert into STUDENTS values (654, 'Amy', 'Cooper', 3.9, 1000);
insert into STUDENTS values (543, 'Craig', 'Wilder', 3.4, 2000);

insert into COLLEGES values ('Stanford', 'CA', 15000);
insert into COLLEGES values ('Berkeley', 'CA', 36000);
insert into COLLEGES values ('MIT', 'MA', 10000);
insert into COLLEGES values ('Cornell', 'NY', 21000);

insert into APPLIES values (123, 'Stanford', 'CS', true);
insert into APPLIES values (123, 'Stanford', 'EE', false);
insert into APPLIES values (123, 'Berkeley', 'CS', true);
insert into APPLIES values (123, 'Cornell', 'EE', true);
insert into APPLIES values (234, 'Berkeley', 'biology', false);
insert into APPLIES values (345, 'MIT', 'bioengineering', true);
insert into APPLIES values (345, 'Cornell', 'bioengineering', false);
insert into APPLIES values (345, 'Cornell', 'CS', true);
insert into APPLIES values (345, 'Cornell', 'EE', false);
insert into APPLIES values (678, 'Stanford', 'history', true);
insert into APPLIES values (987, 'Stanford', 'CS', true);
insert into APPLIES values (987, 'Berkeley', 'CS', true);
insert into APPLIES values (876, 'Stanford', 'CS', false);
insert into APPLIES values (876, 'MIT', 'biology', true);
insert into APPLIES values (876, 'MIT', 'marine biology', false);
insert into APPLIES values (765, 'Stanford', 'history', true);
insert into APPLIES values (765, 'Cornell', 'history', false);
insert into APPLIES values (765, 'Cornell', 'psychology', true);
insert into APPLIES values (543, 'MIT', 'CS', false);

2.- Show me ids, names, surnames, and marks of the students with mark > 3.6.

id	name	surname	mark
123	Amy	Smith	3.9
456	Doris	Roberts	3.9
654	Amy	Cooper	3.9
678	Fay	Laurence	3.8
876	Irene	Lopez	3.9
987	Helen	Karlson	3.7

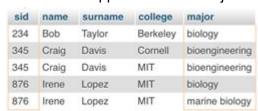3.- Show me student names, surnames, and majors that they have applied to. Sort the results by name and surname.

name ▲ 2	surname ▲ 1	major
Craig	Davis	bioengineering
Craig	Davis	CS
Craig	Davis	bioengineering
Craig	Davis	EE
Jay	Farlong	psychology
Jay	Farlong	history
Jay	Farlong	history
Helen	Karlson	CS
Helen	Karlson	CS
Fay	Laurence	history
Irene	Lopez	marine biology
Irene	Lopez	CS
Irene	Lopez	biology
Amy	Smith	CS
Amy	Smith	EE
Amy	Smith	EE
Amy	Smith	CS
Bob	Taylor	biology
Craig	Wilder	CS

4. Show me names, surnames, marks and application decision of students with size_high_school < 1000 applying to CS at Stanford.

name	surname	mark	decision
Irene	Lopez	3.9	0
Helen	Karlson	3.7	1

5. Show me all large campuses (enrollment>20000) with CS applicants.

name
Berkeley
Cornell

6.- Show me applicants to bio majors.

sid	name	surname	college	major
234	Bob	Taylor	Berkeley	biology
345	Craig	Davis	Cornell	bioengineering
345	Craig	Davis	MIT	bioengineering
876	Irene	Lopez	MIT	biology
876	Irene	Lopez	MIT	marine biology

7. Show the weighted scores on 10 points (now weighted on 5 points).

id	name	surname	mark	Wmark
123	Amy	Smith	3.9	7.8
234	Bob	Taylor	3.6	7.2
345	Craig	Davis	3.5	7
456	Doris	Roberts	3.9	7.8
543	Craig	Wilder	3.4	6.8
567	Edward	Norton	2.9	5.8
654	Amy	Cooper	3.9	7.8
678	Fay	Laurence	3.8	7.6
765	Jay	Farlong	2.9	5.8
789	Gary	Oldman	3.4	6.8
876	Irene	Lopez	3.9	7.8
987	Helen	Karlson	3.7	7.4

8. Scale the marks considering the size of the high school (mark*(high_school_size/1000)). Show the weighted scores on 5 and 10 points.

id	name	surname	mark	ScaledOver5	ScaledOver10
123	Amy	Smith	3.9	3.9	7.8
234	Bob	Taylor	3.6	5.4	10.8
345	Craig	Davis	3.5	1.75	3.5
456	Doris	Roberts	3.9	3.9	7.8
543	Craig	Wilder	3.4	6.8	13.6
567	Edward	Norton	2.9	5.8	11.6
654	Amy	Cooper	3.9	3.9	7.8
678	Fay	Laurence	3.8	0.76	1.52
765	Jay	Farlong	2.9	4.35	8.7
789	Gary	Oldman	3.4	2.72	5.44
876	Irene	Lopez	3.9	1.56	3.12
987	Helen	Karlson	3.7	2.9600000000000004	5.920000000000001

9. Show me the average mark of all students applying to CS (you must think that the same student could apply for CS in many Universities). Clue: wrong average 3.714285714285714, right average 3.6800000000000006.

AverageMark

3.6800000000000006

10. Show me the lowest mark of students applying to CS.

MinMark

3.4

11. Show me the number of colleges bigger than 15,000.

NumberOfColleges

2

12. Show me the number of students applying to Cornell (you must thing that students can apply to many majors in the same University). Clue: The right number should be 3.

13. Show me the number of applications to each college (sorted by college name).

college ▲ 1	count(*)
Berkeley	3
Cornell	6
MIT	4
Stanford	6

15. Show me the number of college enrollments by state.

state	sum(enrollment)
CA	51000
MA	10000
NY	21000

16. Show me the minimum and maximum marks of all the students.

myMark
2.9
3.9

17. Show me the difference between the maximum and the minimum marks of all the students.

B.myMark - A.myMark
1

18. Show me the number of colleges applied to by each student. Sort the results by student surname, student name and student id.

id	surname	name	count(distinct A.college)
345	Davis	Craig	2
765	Farlong	Jay	2
987	Karlson	Helen	2
678	Laurence	Fay	1
876	Lopez	Irene	2
123	Smith	Amy	3
234	Taylor	Bob	1
543	Wilder	Craig	1

19. Show me the number of colleges applied to by each student, including 0 for those who applied nowhere. CLUE: Do the union between to queries.

surname	name	id	count(distinct A.college)
Smith	Amy	123	3
Taylor	Bob	234	1
Davis	Craig	345	2
Wilder	Craig	543	1
Laurence	Fay	678	1
Farlong	Jay	765	2
Lopez	Irene	876	2
Karlson	Helen	987	2
Roberts	Doris	456	0
Norton	Edward	567	0
Oldman	Gary	789	0
Cooper	Amy	654	0

20. Do the last query sorting by student surname, student name and student id.

surname	name	id	count(distinct A.college)
Cooper	Amy	654	0
Davis	Craig	345	2
Farlong	Jay	765	2
Karlson	Helen	987	2
Laurence	Fay	678	1
Lopez	Irene	876	2
Norton	Edward	567	0
Oldman	Gary	789	0
Roberts	Doris	456	0
Smith	Amy	123	3
Taylor	Bob	234	1
Wilder	Craig	543	1

21. Show me the colleges with fewer than 5 applications. Show only the college name and sort the results by name. Do the exercise with a simple query.
In this result duplicate applications are considered:

college
Berkeley
MIT

In this result duplicate applications are not considered:

college
Berkeley
Cornell
MIT

Do both queries!

22. Show me colleges with fewer than 5 applications. Show only the college name and sort the results by name. Do the exercise using a subquery.
In this result duplicate applications are considered:

college
Berkeley
MIT

In this result duplicate applications are not considered:

college
Berkeley
Cornell
MIT

Do both queries!

23. Show me the majors whose applicant's maximum mark is below the average.
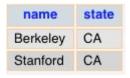
major
bioengineering
psychology

24. Show me IDs, names, and surnames of students applying to CS. Sort the results by student surname, student name and student id.

id	name	surname
345	Craig	Davis
987	Helen	Karlson
876	Irene	Lopez
123	Amy	Smith
543	Craig	Wilder

25. Show me the students who applied to CS but not EE. Sort the results by student surname, student name and student id.

id	name	surname
987	Helen	Karlson
876	Irene	Lopez
543	Craig	Wilder

26. Show me the colleges such that some other college is in the same state. Sort the results by state and college. It's mandatory to use EXISTS.

name	state
Berkeley	CA
Stanford	CA

27. Show me the name of the biggest college.

name
Berkeley

28. Show me the student (or students) with highest mark (using EXISTS).

name	surname	mark
Amy	Smith	3.9
Doris	Roberts	3.9
Irene	Lopez	3.9
Amy	Cooper	3.9

29. Show me the student with highest mark (using "where mark >= all")

name	surname	mark
Amy	Smith	3.9
Doris	Roberts	3.9
Irene	Lopez	3.9
Amy	Cooper	3.9

30. Show me the name of the college with the higher enrollment than all other colleges (using 'where enrollment > all').

name
Berkeley

31. Show me the name of the college with the higher enrollment than all other colleges (using 'not enrollment <= Any')

name
Berkeley

32. Show me the students not from the smallest high school.

id	name	surname	size_high_school
654	Amy	Cooper	1000
345	Craig	Davis	500
765	Jay	Farlong	1500
987	Helen	Karlson	800
876	Irene	Lopez	400
567	Edward	Norton	2000
789	Gary	Oldman	800
456	Doris	Roberts	1000
123	Amy	Smith	1000
234	Bob	Taylor	1500
543	Craig	Wilder	2000

33. Show me the application information order by student surname and name.

id	name	surname	1	college	major	decision
345	Craig	Davis		Cornell	CS	1
345	Craig	Davis		Cornell	EE	0
345	Craig	Davis		Cornell	bioengineering	0
345	Craig	Davis		MIT	bioengineering	1
765	Jay	Farlong		Cornell	psychology	1
765	Jay	Farlong		Stanford	history	1
765	Jay	Farlong		Cornell	history	0
987	Helen	Karlson		Stanford	CS	1
987	Helen	Karlson		Berkeley	CS	1
678	Fay	Laurence		Stanford	history	1
876	Irene	Lopez		MIT	marine biology	0
876	Irene	Lopez		Stanford	CS	0
876	Irene	Lopez		MIT	biology	1
123	Amy	Smith		Berkeley	CS	1
123	Amy	Smith		Stanford	EE	0
123	Amy	Smith		Cornell	EE	1
123	Amy	Smith		Stanford	CS	1
234	Bob	Taylor		Berkeley	biology	0
543	Craig	Wilder		MIT	CS	0

34. Show me the pairs of students with same mark (ordered by its marks descendent and surnames/names ascendent).

id	name	surname	mark	id	name	surname	mark
654	Amy	Cooper	3.9	876	Irene	Lopez	3.9
456	Doris	Roberts	3.9	654	Amy	Cooper	3.9
456	Doris	Roberts	3.9	876	Irene	Lopez	3.9
123	Amy	Smith	3.9	654	Amy	Cooper	3.9
123	Amy	Smith	3.9	876	Irene	Lopez	3.9
123	Amy	Smith	3.9	456	Doris	Roberts	3.9
543	Craig	Wilder	3.4	789	Gary	Oldman	3.4
567	Edward	Norton	2.9	765	Jay	Farlong	2.9

35. Show me a list of college names and student names together ordered by name.

```
+----------------+
| cName          |
+----------------+
| Amy Cooper     |
| Amy Smith      |
| Berkeley       |
| Bob Taylor     |
| Cornell        |
| Craig Davis    |
| Craig Wilder   |
| Doris Roberts  |
| Edward Norton  |
| Fay Laurence   |
| Gary Oldman    |
| Helen Karlson  |
| Irene Lopez    |
| Jay Farlong    |
| MIT            |
| Stanford       |
+----------------+
16 rows in set (0.00 sec)
```

36. Show me IDs of students who applied to both CS and EE.

sid
123
345

37. Show me IDs of students who applied to CS but not EE.

sid
987
543
876

38. Show me the students that don't belong to the smallest high school (use exists).

id	name	surname	size_high_school
123	Amy	Smith	1000
234	Bob	Taylor	1500
345	Craig	Davis	500
456	Doris	Roberts	1000
543	Craig	Wilder	2000
567	Edward	Norton	2000
654	Amy	Cooper	1000
765	Jay	Farlong	1500
789	Gary	Oldman	800
876	Irene	Lopez	400
987	Helen	Karlson	800

39. Show me id of the students who applied to CS but not EE (use 'any' and two subqueries).

id
543
876
987

40. Insert a new college with name 'UIB', in the state 'IB', and with size 11500.

41. Insert into APPLIES with college 'UIB', major 'IB', AND DECISION NULL all students who didn't apply anywhere. (Clue: insert with subselect).

42. Admit to UIB EE all students who were refused (decision=false) in EE elsewhere.