

All questions will be discussed.

1. Consider the following database schema.

```
create table Students (
    stuid integer,
    name varchar(50) not null,
    primary key (stuid)
);

create table Presenters (
    week integer check (week > 0),
    qnum integer not null check (qnum > 0),
    stuid integer,
    primary key (week,stuid),
    foreign key (stuid) references Students (stuid)
);
```

The **Students** relation maintains information about students, and the **Presenters** relation maintains information about students who have presented solutions for tutorial questions. Specifically, a tuple (w, q, s) in **Presenters** relation means that the student with stuid s presented tutorial question number q in week w .

Assume that there are tutorial classes every week starting from week 1. The next tutorial class will be in week $W + 1$, where W is the maximum *week* value in **Presenters** relation.

Write a SQL query for each of the following questions. Remove duplicate records from all results.

- (a) Find all students who have presented the most often.
- (b) Find all stuid pairs (s_1, s_2) such that $s_1 < s_2$ and both students have presented in the same week for at least 5 different weeks.
- (c) Find all students who did not present for any three consecutive weeks.
- (d) This question considers how to choose presenters for the next tutorial.

Given a student with stuid s , let $numQ(s)$ denote the total number of questions that s has presented so far, and let $lastWk(s)$ denote the most recent week number that s has presented. If s has not presented at all, then $numQ(s) = 0$ and $lastWk(s) = 0$.

Given two students with stuids s_1 and s_2 , s_1 has a higher priority than s_2 if one of the following conditions hold:

1. $numQ(s_1) < numQ(s_2)$,
2. $(numQ(s_1) = numQ(s_2))$ and $(lastWk(s_1) < lastWk(s_2))$, or
3. $(numQ(s_1) = numQ(s_2))$ and $(lastWk(s_1) = lastWk(s_2))$, and $(s_1 < s_2)$

Find a set of two students S to be presenters for the next tutorial such that none of the students in $(Students - S)$ has higher priority than any of the students in S .