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CSE-4A

PROGRAM 5: AIRLINE FLIGHT DATABASE

Consider the following database that keeps track of airline flight information:

FLIGHTS(flno: integer, from: string, to: string, distance: integer, departs: time, arrives: time, price: integer)
AIRCRAFT(aid: integer, aname: string, cruisingrange: integer)
CERTIFIED(eid: integer, aid: integer)
EMPLOYEES(eid: integer, ename: string, salary: integer)
Note that the Employees relation describes pilots and other kinds of employees as well; Every pilot is certified for some aircraft, and only pilots are certified to fly.

Write each of the following queries in SQL.

i. Find the names of aircraft such that all pilots certified to operate them have salaries more than Rs.80,000.
ii. For each pilot who is certified for more than three aircrafts, find the eid and the maximum cruisingrange of the aircraft for which she or he is certified.
iii. Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru to Frankfurt.
iv. For all aircraft with cruisingrange over 1000 Kms, find the name of the aircraft and the average salary of all pilots certified for this aircraft.
v. Find the names of pilots certified for some Boeing aircraft.
vi. Find the aids of all aircraft that can be used on routes from Bengaluru to New Delhi.
vii. A customer wants to travel from Bangalore to Kolkata New with no more than two changes of flight. List the choice of departure times from Madison if the customer wants to arrive in Kolkata by 6 p.m.

SQL> select * from Flights;

FLNO	FFROM	TO	DISTANCE	DEPARTS	ARRIVES	PRICE
101	Bangalore	Delhi	2500	13-MAY-05 07.15.31.000000 AM	13-MAY-05 07.15.31.000000 A	5000
102	Bangalore	Lucknow	3000	05/05/13 07:15:31.000000	05/05/13 11:15:31.000000	6000
103	Lucknow	Delhi	500	05/05/13 12:15:31.000000	05/05/13 17:15:31.000000	3000
107	Bangalore	Frankfurt	8000	05/05/13 07:15:31.000000	05/05/13 22:15:31.000000	60000
104	Bangalore	Frankfurt	8500	05/05/13 07:15:31.000000	05/05/13 23:15:31.00000	75000
105	Kolkata	Delhi	3400	05/05/13 07:15:31.000000	05/05/13 09:15:31.000000	7000

SQL> select * from Aircraft;

AID	ANAME	CRUISINGRANGE
101	747	3000
102	Boeing	900
103	647	800
104	Dreamliner	10000
105	Boeing	3500
106	707	1500
107	Dream	120000

7 rows selected.

SQL> select * from Certified;

EID	AID
701	101
701	102
701	106
701	105
702	104
703	104
704	104
702	107
703	107
704	107
702	101

EID	AID
703	105
704	105
705	103

14 rows selected.

SQL> select * from Employees;

EID	ENAME	SALARY
701	A	50000
702	B	100000
703	C	150000
704	D	90000
705	E	40000
706	F	60000
707	G	90000

7 rows selected.

```
CREATE DATABASE AIRLINE_FLIGHT_DATABASE;

USE AIRLINE_FLIGHT_DATABASE;


CREATE TABLE FLIGHTS

(
```

```
        flno int,
        ffrom varchar(40),
        tto varchar(40),
    distance int,
    departs datetime,
    arrives datetime,
    price int,
    primary key(flno)
);

CREATE TABLE AIRCRAFT
(
        aid int,
        aname varchar(40),
        cruisingrange int,
        primary key(aid)
);

CREATE TABLE EMPLOYEES
(
        eid int,
        ename varchar(40),
        salary int,
        primary key(eid)
);

CREATE TABLE CERTIFIED
(
        eid int,
         aid int,
        FOREIGN KEY(aid) REFERENCES AIRCRAFT(aid),
```

```
        FOREIGN KEY(eid) REFERENCES EMPLOYEES(eid)
);
```

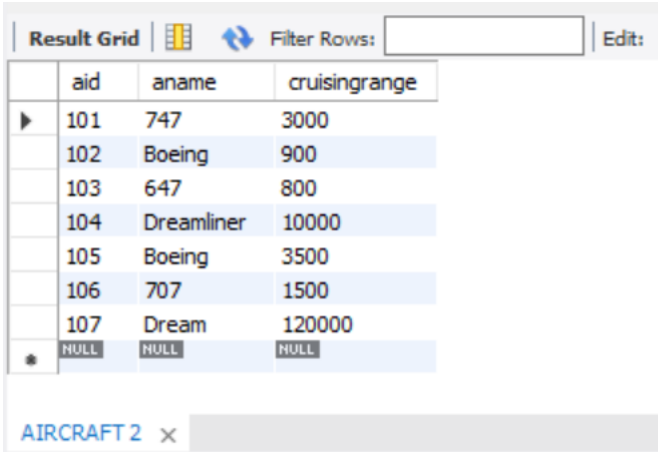
```
INSERT INTO FLIGHTS
VALUES (101,"Bangalore","Delhi",2500,'2005-05-13:07:15:31.000000','2005-05-13:07:15:31.000000',5000),
(102,"Bangalore","Lucknow",3000,'2013-05-05:07:15:31.000000','2013-05-05:11:15:31.000000',6000),
(103,"Lucknow","Delhi",500,'2013-05-05:12:15:31.000000','2013-05-05:17:15:31.000000',3000),
(107,"Bangalore","Frankfurt",8000,'2013-05-05:07:15:31.000000','2013-05-05:22:15:31.000000',60000),
(104,"Bangalore","Frankfurt",8500,'2013-05-05:07:15:31.000000','2013-05-05:23:15:31.000000',75000),
(105,"Kolkata","Delhi",3400,'2013-05-05:07:15:31.000000','2013-05-05:09:15:31.000000',7000);
SELECT * FROM FLIGHTS;
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

flno	ffrom	tto	distance	departs	arrives	price
101	Bangalore	Delhi	2500	2005-05-13 07:15:31	2005-05-13 07:15:31	5000
102	Bangalore	Lucknow	3000	2013-05-05 07:15:31	2013-05-05 11:15:31	6000
103	Lucknow	Delhi	500	2013-05-05 12:15:31	2013-05-05 17:15:31	3000
104	Bangalore	Frankfurt	8500	2013-05-05 07:15:31	2013-05-05 23:15:31	75000
105	Kolkata	Delhi	3400	2013-05-05 07:15:31	2013-05-05 09:15:31	7000
107	Bangalore	Frankfurt	8000	2013-05-05 07:15:31	2013-05-05 22:15:31	60000
NULL	NULL	NULL	NULL	NULL	NULL	NULL

FLIGHTS 1 ×

```
INSERT INTO AIRCRAFT
VALUES (101,747,3000),(102,"Boeing",900),(103,647,800),(104,"Dreamliner",10000),
        (105,"Boeing",3500),(106,707,1500),(107,"Dream",120000);
SELECT * FROM AIRCRAFT;
```

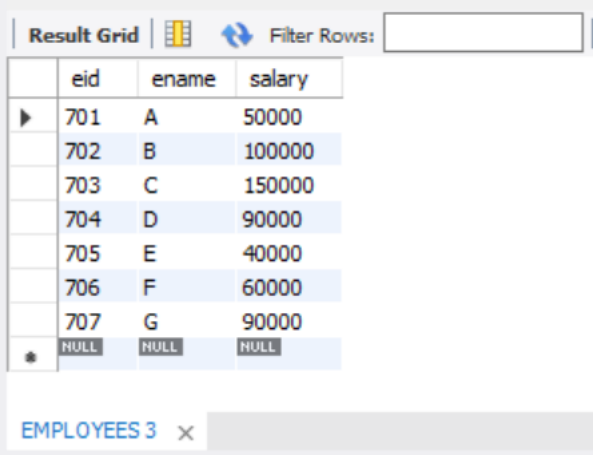


Result Grid | Filter Rows: | Edit:

aid	aname	cruisingrange
101	747	3000
102	Boeing	900
103	647	800
104	Dreamliner	10000
105	Boeing	3500
106	707	1500
107	Dream	120000
NULL	NULL	NULL

AIRCRAFT 2

```
INSERT INTO  EMPLOYEES
VALUES (701,"A",50000),(702,"B",100000),(703,"C",150000),(704,"D",90000),
        (705,"E",40000),(706,"F",60000),(707,"G",90000);
SELECT * FROM EMPLOYEES;
```

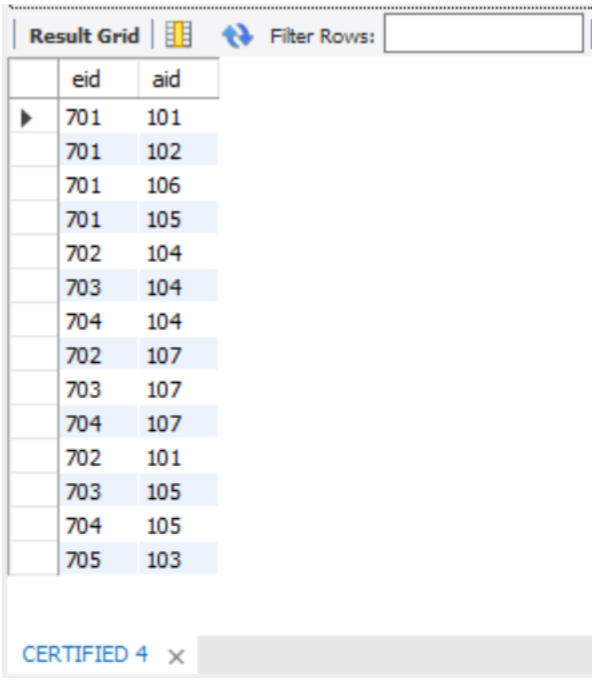


Result Grid | Filter Rows:

eid	ename	salary
701	A	50000
702	B	100000
703	C	150000
704	D	90000
705	E	40000
706	F	60000
707	G	90000
NULL	NULL	NULL

EMPLOYEES 3

```
INSERT INTO CERTIFIED
VALUES (701,101),(701,102),(701,106),(701,105),(702,104),(703,104),(704,104),(702,107),
        (703,107),(704,107),(702,101),(703,105),(704,105),(705,103);
SELECT * FROM CERTIFIED;
```



Result Grid | Filter Rows:

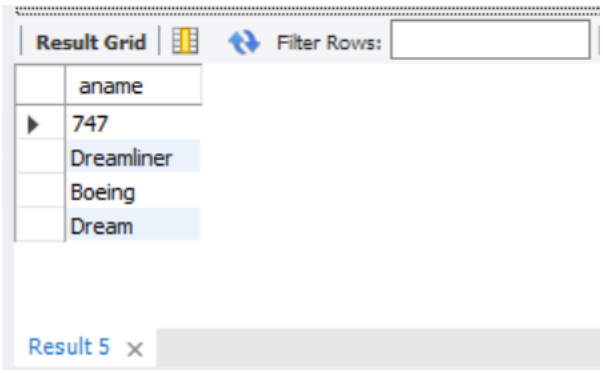
eid	aid
701	101
701	102
701	106
701	105
702	104
703	104
704	104
702	107
703	107
704	107
702	101
703	105
704	105
705	103

CERTIFIED 4 ×

a.Find the names of aircraft such that all pilots certified to operate them have salaries more than Rs.80,000.

```
SELECT distinct a.aname
FROM  AIRCRAFT a,EMPLOYEES e,CERTIFIED c

WHERE a.aid=c.aid and e.eid=c.eid and e.salary>80000;
```



Result Grid | Filter Rows:

aname
747
Dreamliner
Boeing
Dream

Result 5 ×

b.For each pilot who is certified for more than three aircrafts, find the eid and the maximum cruisingrange of the aircraft for which she or he is certified.

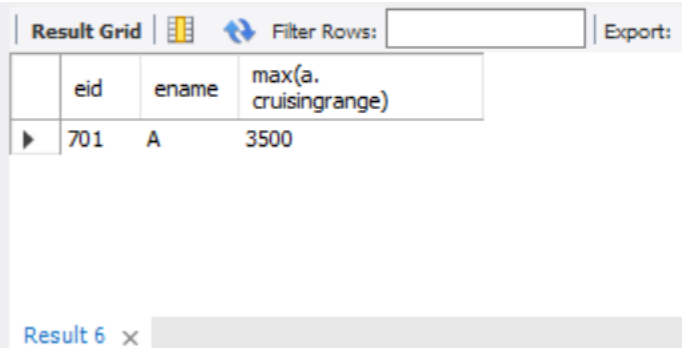
```
SELECT e.eid,e.ename,max(a. cruisingrange)

FROM EMPLOYEES e,CERTIFIED c,AIRCRAFT a

WHERE e.eid=c.eid and a.aid=c.aid

group by e.ename

having count(c.aid)>3;
```



c.Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru to Frankfurt.

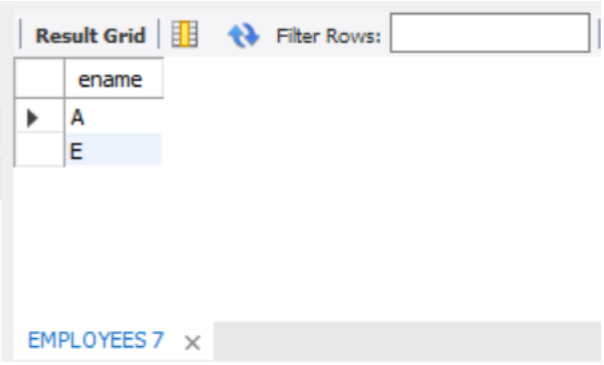
```
SELECT e.ename

FROM EMPLOYEES e

WHERE salary < (select min(price)

                from FLIGHTS

                where ffrom="Bangalore" and tto="Frankfurt");
```



d.For all aircraft with cruisingrange over 1000 Kms, find the name of the aircraft and the average salary of all pilots certified for this aircraft.

```
SELECT a.aname,a.cruisingrange,avg(e.salary)

FROM AIRCRAFT a,EMPLOYEES e,CERTIFIED c

WHERE c.eid=e.eid and c.aid=a.aid

group by a.aname

having a.cruisingrange > 1000;
```

Result Grid | Filter Rows:

aname	cruisingrange	avg(e.salary)
747	3000	75000.0000
Dreamliner	10000	113333.3333
707	1500	50000.0000
Dream	120000	113333.3333

Result 8

e.Find the names of pilots certified for some Boeing aircraft.

```
SELECT distinct e.ename
FROM EMPLOYEES e,CERTIFIED c,AIRCRAFT a
WHERE e.eid=c.eid and a.aid=c.aid and aname like "Boeing";
```

Result Grid | Filter Rows:

ename
A
C
D

Result 9

f.Find the aids of all aircraft that can be used on routes from Bengaluru to New Delhi.

```
SELECT a.aid
FROM AIRCRAFT a
WHERE a. cruisingrange >= (select distance
                           from FLIGHTS
                           where ffrom="Bangalore" and tto="Delhi");
```

Result Grid | Filter Rows:

aid
101
104
105
107
NULL

AIRCRAFT 10

g. A customer wants to travel from Bangalore to Kolkata New with no more than two changes of flight. List the choice of departure times from Madison if the customer wants to arrive in Kolkata by 6 p.m.

```
SELECT  f.ffrom,f.tto,f.arrives

FROM    FLIGHTS f

WHERE (f.ffrom="Bangalore" and f.tto=(select ffrom

                                     from FLIGHTS

                                     where tto="Kolkata")) or f.tto="Kolkata";
```