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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)

EMPLOYEE (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 cruising range 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 cruising range 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 Madison to New York with no more than two changes of flight. List the
choice of departure times from Madison if the customer wants to arrive in New York by 6 p.m.

viii. Print the name and salary of every non-pilot whose salary is more than the average salary for pilots.

CODE:

```
create database airline;
use airline;
CREATE TABLE flights(
flno Int,
`from` Varchar(20),
`to` Varchar(20),
distance INT,
departs time,
arrives time,
```

```sql
price Int,
PRIMARY KEY(flno) );
 CREATE TABLE aircraft(
 aid INT,
 aname VARCHAR(20),
 cruisingrange INT,
PRIMARY KEY (aid) );

CREATE TABLE employees(
 eid INT,
 ename Varchar(20),
 salary INT,
 PRIMARY KEY (eid) );

CREATE TABLE certified(
eid INT,
aid INT,
PRIMARY KEY (eid,aid),
FOREIGN KEY (eid) REFERENCES employees (eid),
FOREIGN KEY (aid) REFERENCES aircraft (aid) );

show tables;

INSERT INTO flights (flno,`from`,`to`,distance,departs,arrives,price) VALUES
(1,'Bangalore','Chennai',360,'08:45','10:00',10000),
(2,'Bangalore','Delhi',1700,'12:15','15:00',37000),
(3,'Bangalore','Kolkata',1500,'15:15','05:25',30000),
(4,'Mumbai','Delhi',1200,'10:30','12:30',28000),
(5,'Bangalore','New york',14000,'05:45','02:30',90000),
(6,'Delhi','Chicago',12000,'10:00','05:45',95000),
(7,'Bangalore','Frankfurt',15000,'12:00','06:30',98000),
(8,'Madison','New york',1500,'10:15','14:25',30000);
SELECT * FROM flights;

INSERT INTO aircraft (aid,aname,cruisingrange) values
        (1,'Airbus 380',1000),
        (2,'Boeing 737',4000),
        (3,'Lockheed',5500),
        (4,'Airbus A220',9500),
        (5,'Boeing 747',800),
        (6,'Douglas DC3',900);
SELECT * FROM aircraft;

INSERT INTO employees (eid,ename,salary) VALUES
```

```
(1,'Zoya',95000),
(2,'Akshay',65000),
(3,'Niveditha',70000),
(4,'Safan',45000),
(5,'Peter',95000),
(6,'Nayan',100000),
(7,'Ajay',50000);
SELECT * FROM employees;

INSERT INTO certified (eid,aid) VALUES
(1,1),
(1,3),
(1,4),
(5,4),
(5,3),
(1,2),
 (2,6),
(2,5),
(4,5),
(6,4),
(6,3),
(3,6),
(3,2);
SELECT * FROM certified;
```

#i. 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
WHERE A.Aid IN (SELECT C.aid
FROM Certified C, Employees E
WHERE C.eid = E.eid AND
NOT EXISTS ( SELECT *
FROM Employees E1
WHERE E1.eid = E.eid AND E1.salary < 80000 ));
```

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

```
SELECT C.eid, MAX(A.cruisingrange)
FROM Certified C, Aircraft A
WHERE C.aid = A.aid
GROUP BY C.eid
HAVING COUNT(*) > 3;
```

#iii. Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru toFrankfurt.
SELECT DISTINCT e.ename
FROM employees e
WHERE e.salary<
(SELECT MIN(f.price)
FROM flights f
WHERE f.from='Bangalore' AND f.to='Frankfurt');

#iv. For all aircraft with cruising range over 1000 Kms, find the name of the aircraft and the average salary of all pilots certified for this aircraft.
SELECT a.aid,a.aname,AVG(e.salary)
FROM aircraft a,certified c,employees e
WHERE a.aid=c.aid
AND c.eid=e.eid
AND a.cruisingrange>1000
GROUP BY a.aid,a.aname;

#v. Find the names of pilots certified for some Boeing aircraft.
SELECT distinct e.ename
FROM employees e,aircraft a,certified c
WHERE e.eid=c.eid AND c.aid=a.aid AND a.aname like 'Boeing%';

#vi. 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 MIN(f.distance)
FROM flights f
WHERE f.from='Bangalore' AND f.to='Delhi');

#vii. A customer wants to travel from Madison to New York with no more than two changes of flight. List the choice of departure times from Madison if the customer wants to arrive in New York by 6 p.m.
SELECT F.departs
FROM Flights F WHERE F.flno IN (SELECT F0.flno
FROM Flights F0
WHERE F0.from = 'Madison' AND F0.to = 'New york' AND F0.arrives < '18:00');

#viii. Print the name and salary of every non-pilot whose salary is more than the average salary for pilots.0
SELECT E.ename, E.salary
FROM Employees E

WHERE E.eid NOT IN (SELECT DISTINCT C.eid
FROM Certified C)
AND E.salary > (SELECT AVG (E1.salary)
FROM Employees E1
WHERE E1.eid IN
(SELECT DISTINCT C1.eid
FROM Certified C1));

OUTPUT:

```
35        (2,'Bangalore','Delhi',1700,'12:15','15:00',37000),
36        (3,'Bangalore','Kolkata',1500,'15:15','05:25',30000),
37        (4,'Mumbai','Delhi',1200,'10:30','12:30',28000),
38        (5,'Bangalore','New york',14000,'05:45','02:30',90000),
39        (6,'Delhi','Chicago',12000,'10:00','05:45',95000),
40        (7,'Bangalore','Frankfurt',15000,'12:00','06:30',98000),
41        (8,'Madison','New york',1500,'10:15','14:25',30000);
42 ●   SELECT * FROM flights;
```

flno	from	to	distance	departs	arrives	price
1	Bangalore	Chennai	360	08:45:00	10:00:00	10000
2	Bangalore	Delhi	1700	12:15:00	15:00:00	37000
3	Bangalore	Kolkata	1500	15:15:00	05:25:00	30000
4	Mumbai	Delhi	1200	10:30:00	12:30:00	28000
5	Bangalore	New york	14000	05:45:00	02:30:00	90000
6	Delhi	Chicago	12000	10:00:00	05:45:00	95000
7	Bangalore	Frankfurt	15000	12:00:00	06:30:00	98000
8	Madison	New york	1500	10:15:00	14:25:00	30000
NULL	NULL	NULL	NULL	NULL	NULL	NULL

flights 2 ×

```
47        (3,'Lockheed',5500),
48        (4,'Airbus A220',9500),
49        (5,'Boeing 747',800),
50        (6,'Douglas DC3',900);
51 ●   SELECT * FROM aircraft;
52
53 ●   INSERT INTO employees (eid,ename,salary) VALUES
54        (1,'Zoya',95000),
```

aid	aname	cruisingrange
1	Airbus 380	1000
2	Boeing 737	4000
3	Lockheed	5500
4	Airbus A220	9500
5	Boeing 747	800
6	Douglas DC3	900
NULL	NULL	NULL

aircraft 3 ×

```
56      (3,'Niveditha',70000),
57      (4,'Safan',45000),
58      (5,'Peter',95000),
59      (6,'Nayan',100000),
60      (7,'Ajay',50000);
61  ●   SELECT * FROM employees;
62
63  ●   INSERT INTO certified (eid,aid) VALUES
```

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

eid	ename	salary
1	Zoya	95000
2	Akshay	65000
3	Niveditha	70000
4	Safan	45000
5	Peter	95000
6	Nayan	100000
7	Ajay	50000
NULL	NULL	NULL

employees 4 ✕

```
74      (6,3),
75      (3,6),
76      (3,2);
77  ●   SELECT * FROM certified;
78
```

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

eid	aid
1	1
1	2
3	2
1	3
5	3
6	3
1	4
5	4
6	4
2	5
4	5
2	6
3	6
NULL	NULL

certified 5 ✕

```
80      #i. Find the names of aircraft such that all pilots certified to operate them have salaries more than Rs.80,000.
81 ●    SELECT DISTINCT A.aname
82      FROM Aircraft A
83      WHERE A.Aid IN (SELECT C.aid
84      FROM Certified C, Employees E
85      WHERE C.eid = E.eid AND
86      NOT EXISTS ( SELECT *
87      FROM Employees E1
88      WHERE E1.eid = E.eid AND E1.salary < 80000 ));
89
90      #ii. For each pilot who is certified for more than three aircrafts, find the eid and the maximum cruising range of
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

aname
Airbus 380
Boeing 737
Lockheed
Airbus A220

Aircraft 6 ✕

```
89
90      #ii. For each pilot who is certified for more than three aircrafts, find the eid and
91 ●    SELECT C.eid, MAX(A.cruisingrange)
92      FROM Certified C, Aircraft A
93      WHERE C.aid = A.aid
94      GROUP BY C.eid
95      HAVING COUNT(*) > 3;
96
97      #iii. Find the names of pilots whose salary is less than the price of the cheapest ro
98 ●    SELECT DISTINCT e.ename
99      FROM employees e
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

eid	MAX(A.cruisingrange)
1	9500

Result 7 ✕

```
95      HAVING COUNT(*) > 3;

96

97      #iii. Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru toFrankfurt.
98  ●   SELECT DISTINCT e.ename
99      FROM employees e
100     WHERE e.salary<
101     (SELECT MIN(f.price)
102     FROM flights f
103     WHERE f.from='Bangalore' AND f.to='Frankfurt');

104

105     #iv. For all aircraft with cruising range over 1000 Kms, find the name of the aircraft and the average salary of all
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: A

ename
Zoya
Akshay
Niveditha
Safan
Peter
Ajay

employees 8 ✕

```
104

105     #iv. For all aircraft with cruising range over 1000 Kms, find the name
106 ●   SELECT a.aid,a.aname,AVG(e.salary)
107     FROM aircraft a,certified c,employees e
108     WHERE a.aid=c.aid
109     AND c.eid=e.eid
110     AND a.cruisingrange>1000
111     GROUP BY a.aid,a.aname;

112

113     #v. Find the names of pilots certified for some Boeing aircraft.
114 ●   SELECT distinct e.ename
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: A

aid	aname	AVG(e.salary)
2	Boeing 737	82500.0000
3	Lockheed	96666.6667
4	Airbus A220	96666.6667

Result 9 ✕

```
113      #v. Find the names of pilots certified for some Boeing aircraft.
114 ●    SELECT distinct e.ename
115      FROM employees e,aircraft a,certified c
116      WHERE e.eid=c.eid AND c.aid=a.aid AND a.aname like 'Boeing%';
117
118      #vi. Find the aids of all aircraft that can be used on routes from Bengaluru
119 ●    SELECT a.aid
120      FROM aircraft a
121      WHERE a.cruisingrange>
122   ⊖  (SELECT MIN(f.distance)
123      FROM flights f
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

ename
Zoya
Niveditha
Akshay
Safan

Result 10 ✕

```
116      WHERE e.eid=c.eid AND c.aid=a.aid AND a.aname like 'Boeing%';
117
118      #vi. Find the aids of all aircraft that can be used on routes from Bengaluru to New Delhi.
119 ●    SELECT a.aid
120      FROM aircraft a
121      WHERE a.cruisingrange>
122   ⊖  (SELECT MIN(f.distance)
123      FROM flights f
124      WHERE f.from='Bangalore' AND f.to='Delhi');
125
126      #vii. A customer wants to travel from Madison to New York with no more than two changes of f
```

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

aid
2
3
4
NULL

aircraft 11 ✕

Limit to 1000 rows

```
122      (SELECT MIN(f.distance)
123         FROM flights f
124         WHERE f.from='Bangalore' AND f.to='Delhi');
125
126      #vii. A customer wants to travel from Madison to New York with no more than two changes
127 •    SELECT F.departs
128      FROM Flights F WHERE F.flno IN ( SELECT F0.flno
129         FROM Flights F0
130         WHERE F0.from = 'Madison' AND F0.to = 'New york' AND F0.arrives < '18:00' );
131
132      #viii. Print the name and salary of every non-pilot whose salary is more than the avera
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

	departs
▶	10:15:00

Flights 12 ✕

Limit to 1000 rows

```
132      #viii. Print the name and salary of every non-pilot whose salary is more than the average salary for pilots.0
133 •    SELECT E.ename, E.salary
134      FROM Employees E
135      WHERE E.eid NOT IN ( SELECT DISTINCT C.eid
136         FROM Certified C )
137      AND E.salary > ( SELECT AVG (E1.salary)
138         FROM Employees E1
139         WHERE E1.eid IN
140         ( SELECT DISTINCT C1.eid
141         FROM Certified C1 ) );
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

	ename	salary

Employees 13 ✕