

DBMS WEEK-7

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

FLIGHTS (fno: 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)

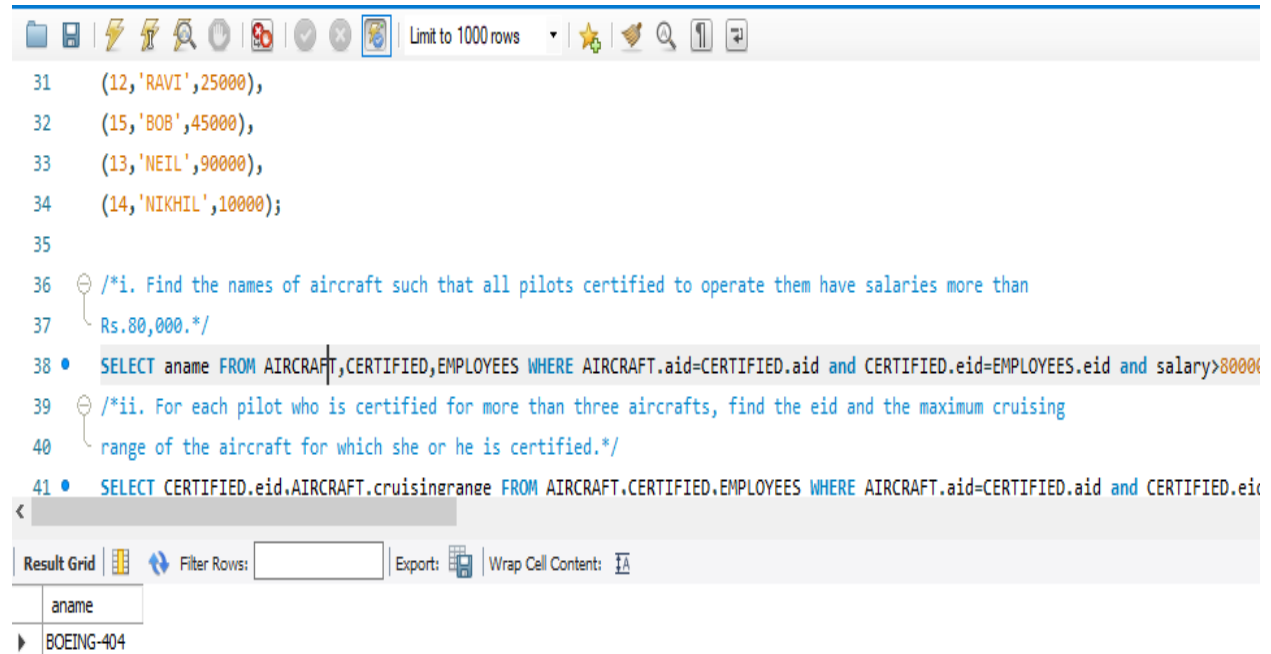
Note that the Employees relation describes pilots and other kinds of employees as well; Every pilot is certified for some aircraft, and only pilots are certified to fly.

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.

OUTPUT:

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



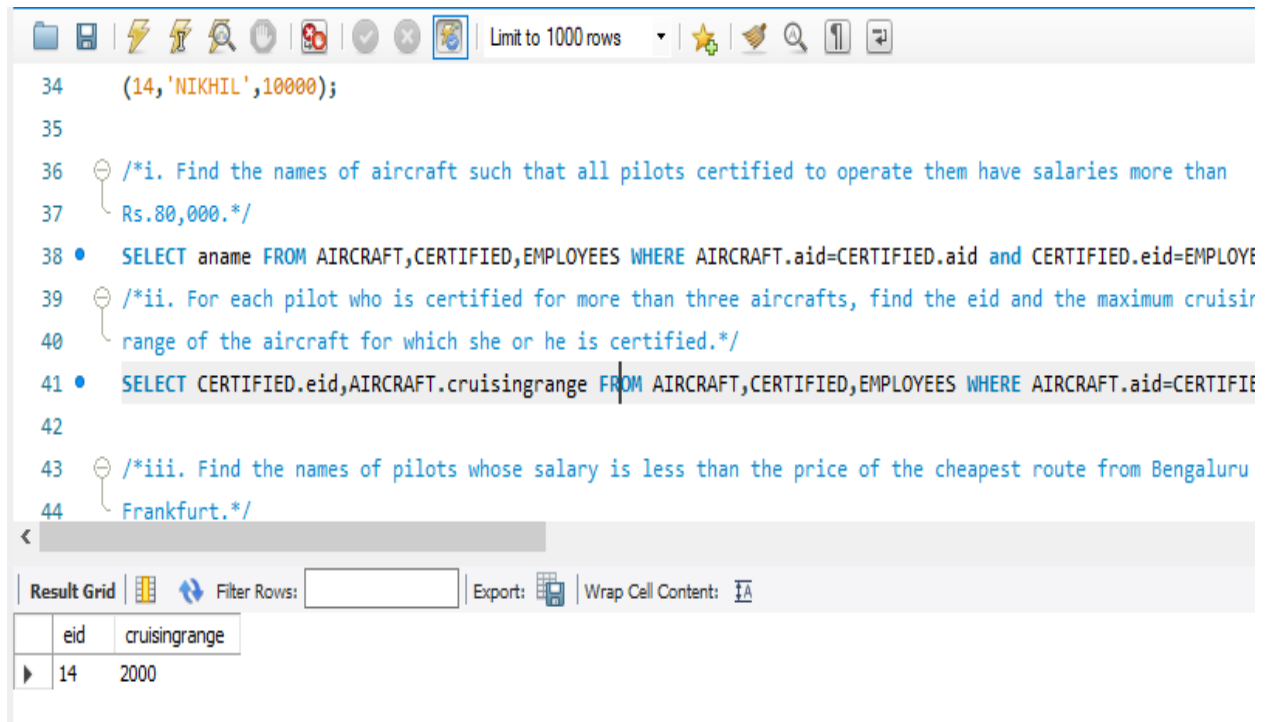
The screenshot shows a SQL IDE interface. The top toolbar includes icons for file operations, execution, and search. The query editor contains the following SQL code:

```
31 (12, 'RAVI', 25000),
32 (15, 'BOB', 45000),
33 (13, 'NEIL', 90000),
34 (14, 'NIKHIL', 10000);
35
36 /*i. Find the names of aircraft such that all pilots certified to operate them have salaries more than
37 Rs.80,000.*/
38 • SELECT aname FROM AIRCRAFT, CERTIFIED, EMPLOYEES WHERE AIRCRAFT.aid = CERTIFIED.aid and CERTIFIED.eid = EMPLOYEES.eid and salary > 80000;
39 /*ii. For each pilot who is certified for more than three aircrafts, find the eid and the maximum cruising
40 range of the aircraft for which she or he is certified.*/
41 • SELECT CERTIFIED.eid, AIRCRAFT.cruisingrange FROM AIRCRAFT, CERTIFIED, EMPLOYEES WHERE AIRCRAFT.aid = CERTIFIED.aid and CERTIFIED.eid = EMPLOYEES.eid
```

The bottom toolbar includes a "Result Grid" button, a "Filter Rows" input field, an "Export" button, and a "Wrap Cell Content" checkbox. The result grid shows the following data:

aname
BOEING-404

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.



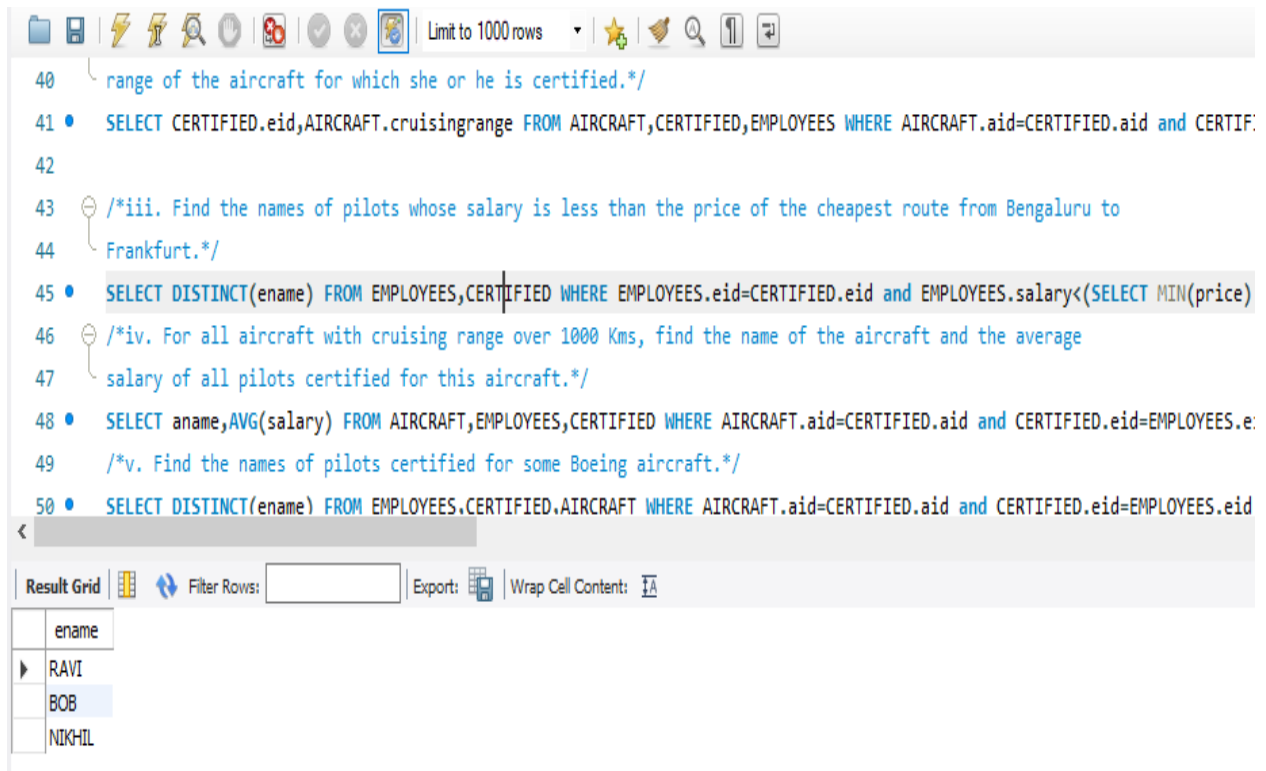
The screenshot shows a SQL IDE interface. The top toolbar includes icons for file operations, execution, and a 'Limit to 1000 rows' dropdown. The query editor contains the following SQL code:

```
34 (14, 'NIKHIL', 10000);
35
36 /*i. Find the names of aircraft such that all pilots certified to operate them have salaries more than
37 Rs.80,000.*/
38 • SELECT aname FROM AIRCRAFT, CERTIFIED, EMPLOYEES WHERE AIRCRAFT.aid = CERTIFIED.aid and CERTIFIED.eid = EMPLOYEES.eid;
39
40 /*ii. For each pilot who is certified for more than three aircrafts, find the eid and the maximum cruising
41 range of the aircraft for which she or he is certified.*/
42
43 • SELECT CERTIFIED.eid, AIRCRAFT.cruisingrange FROM AIRCRAFT, CERTIFIED, EMPLOYEES WHERE AIRCRAFT.aid = CERTIFIED.aid and CERTIFIED.eid = EMPLOYEES.eid;
44
45 /*iii. Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru
46 Frankfurt.*/
```

Below the query editor is a 'Result Grid' section. It includes a 'Filter Rows' input field, an 'Export' button, and a 'Wrap Cell Content' checkbox. The result grid displays the following data:

eid	cruisingrange
14	2000

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



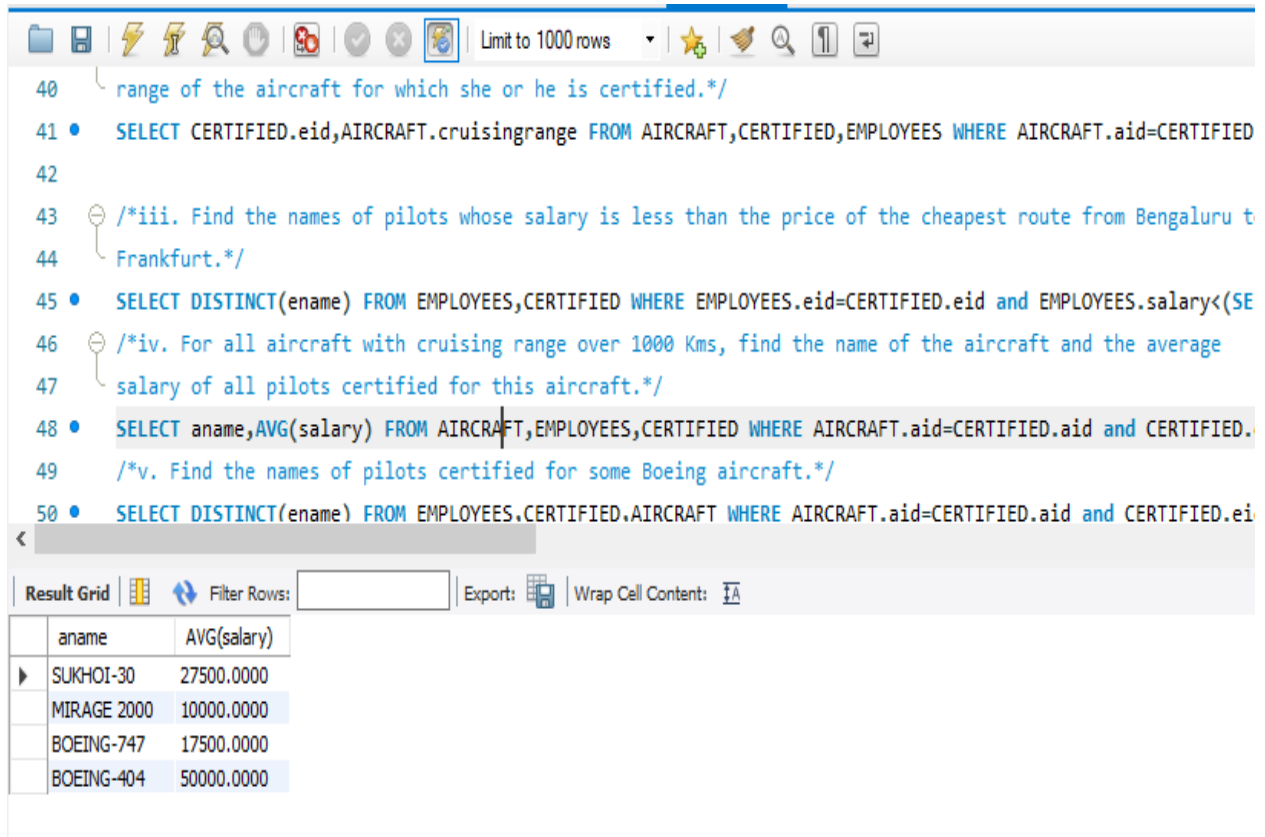
The screenshot shows a SQL IDE interface. The top toolbar includes icons for file operations, execution, and a 'Limit to 1000 rows' dropdown. The query editor contains the following SQL code:

```
40  range of the aircraft for which she or he is certified.*/
41  • SELECT CERTIFIED.eid,AIRCRAFT.cruisingrange FROM AIRCRAFT,CERTIFIED,EMPLOYEES WHERE AIRCRAFT.aid=CERTIFIED.aid and CERTIF:
42
43  /*iii. Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru to
44  Frankfurt.*/
45  • SELECT DISTINCT(ename) FROM EMPLOYEES,CERTIFIED WHERE EMPLOYEES.eid=CERTIFIED.eid and EMPLOYEES.salary<(SELECT MIN(price)
46  /*iv. For all aircraft with cruising range over 1000 Kms, find the name of the aircraft and the average
47  salary of all pilots certified for this aircraft.*/
48  • SELECT aname,AVG(salary) FROM AIRCRAFT,EMPLOYEES,CERTIFIED WHERE AIRCRAFT.aid=CERTIFIED.aid and CERTIFIED.eid=EMPLOYEES.e:
49  /*v. Find the names of pilots certified for some Boeing aircraft.*/
50  • SELECT DISTINCT(ename) FROM EMPLOYEES,CERTIFIED,AIRCRAFT WHERE AIRCRAFT.aid=CERTIFIED.aid and CERTIFIED.eid=EMPLOYEES.eid
```

Below the query editor is a 'Result Grid' section with a 'Filter Rows' input field, an 'Export' button, and a 'Wrap Cell Content' checkbox. The result grid displays the following data:

ename
RAVI
BOB
NIKHIL

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.



The screenshot shows a SQL IDE interface. The top toolbar includes icons for file operations, execution, and a 'Limit to 1000 rows' dropdown. The SQL editor contains the following code:

```
40 range of the aircraft for which she or he is certified.*/
41 • SELECT CERTIFIED.eid,AIRCRAFT.cruisingrange FROM AIRCRAFT,CERTIFIED,EMPLOYEES WHERE AIRCRAFT.aid=CERTIFIED
42
43 /*iii. Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru t
44 Frankfurt.*/
45 • SELECT DISTINCT(ename) FROM EMPLOYEES,CERTIFIED WHERE EMPLOYEES.eid=CERTIFIED.eid and EMPLOYEES.salary<(SE
46 /*iv. For all aircraft with cruising range over 1000 Kms, find the name of the aircraft and the average
47 salary of all pilots certified for this aircraft.*/
48 • SELECT aname,AVG(salary) FROM AIRCRAFT,EMPLOYEES,CERTIFIED WHERE AIRCRAFT.aid=CERTIFIED.aid and CERTIFIED.
49 /*v. Find the names of pilots certified for some Boeing aircraft.*/
50 • SELECT DISTINCT(ename) FROM EMPLOYEES,CERTIFIED,AIRCRAFT WHERE AIRCRAFT.aid=CERTIFIED.aid and CERTIFIED.ei
```

Below the editor is the 'Result Grid' section, which includes a 'Filter Rows' input field, an 'Export' button, and a 'Wrap Cell Content' checkbox. The results are displayed in a table:

	aname	AVG(salary)
▶	SUKHOI-30	27500.0000
	MIRAGE 2000	10000.0000
	BOEING-747	17500.0000
	BOEING-404	50000.0000

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

Limit to 1000 rows

43 /*iii. Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru to
44 Frankfurt.*/
45 • SELECT DISTINCT(ename) FROM EMPLOYEES,CERTIFIED WHERE EMPLOYEES.aid=CERTIFIED.aid and EMPLOYEES.salary<(SELECT MIN(price) FROM
46 /*iv. For all aircraft with cruising range over 1000 Kms, find the name of the aircraft and the average
47 salary of all pilots certified for this aircraft.*/
48 • SELECT aname,AVG(salary) FROM AIRCRAFT,EMPLOYEES,CERTIFIED WHERE AIRCRAFT.aid=CERTIFIED.aid and CERTIFIED.aid=EMPLOYEES.aid AN
49 /*v. Find the names of pilots certified for some Boeing aircraft.*/
50 • SELECT DISTINCT(ename) FROM EMPLOYEES,CERTIFIED,AIRCRAFT WHERE AIRCRAFT.aid=CERTIFIED.aid and CERTIFIED.aid=EMPLOYEES.aid AND
51 /*vi. Find the aids of all aircraft that can be used on routes from Bengaluru to New Delhi.*/
52 • SELECT DISTINCT(aid) FROM AIRCRAFT,FLIGHTS WHERE AIRCRAFT.cruisingrange>=(SELECT FLIGHTS.distance FROM FLIGHTS WHERE flights.f
53 /*vii. A customer wants to travel from bangalore to mumbai with no more than two changes of flight. List

Result Grid Filter Rows: Export: Wrap Cell Content:

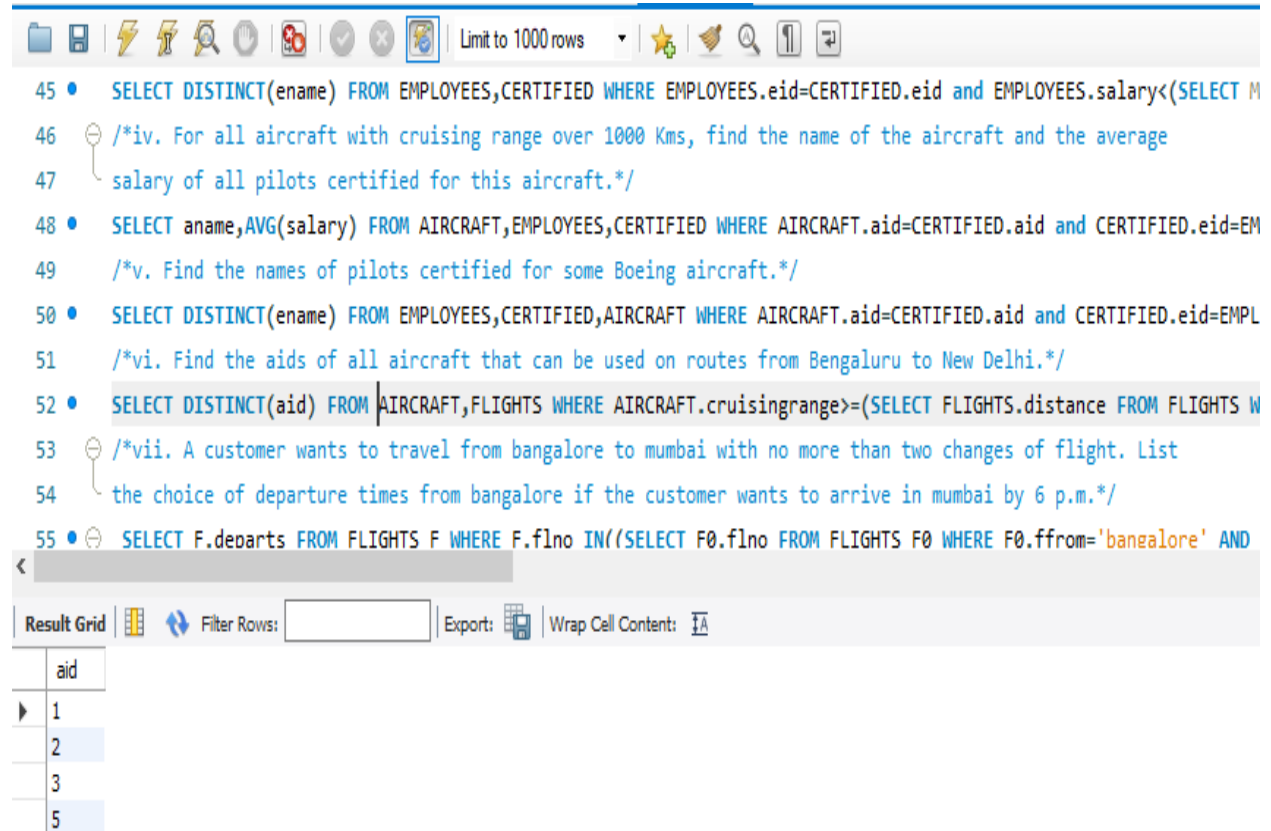
ename

RAVI

NIKHIL

NEIL

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



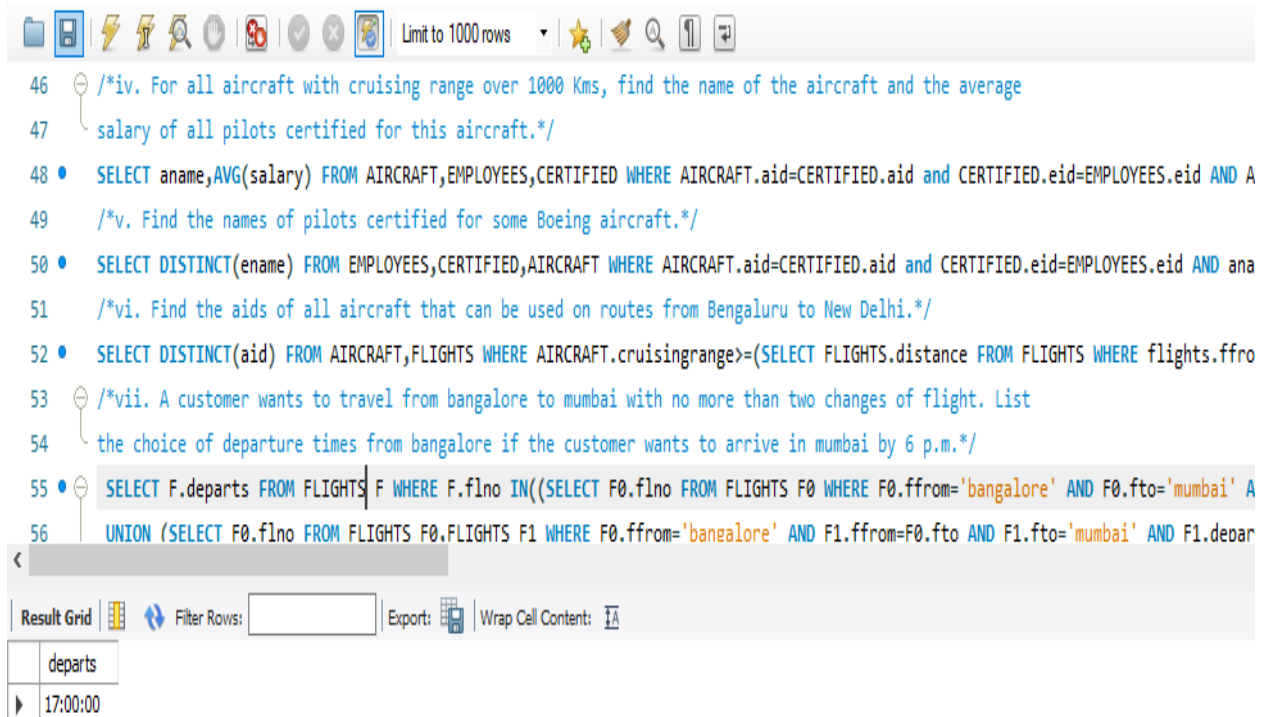
The screenshot shows a SQL IDE interface. The top toolbar includes icons for file operations, execution, and a 'Limit to 1000 rows' dropdown. The query editor contains the following SQL code:

```
45 • SELECT DISTINCT(ename) FROM EMPLOYEES,CERTIFIED WHERE EMPLOYEES.eid=CERTIFIED.eid and EMPLOYEES.salary<(SELECT M
46 /*iv. For all aircraft with cruising range over 1000 Kms, find the name of the aircraft and the average
47 salary of all pilots certified for this aircraft.*/
48 • SELECT aname,AVG(salary) FROM AIRCRAFT,EMPLOYEES,CERTIFIED WHERE AIRCRAFT.aid=CERTIFIED.aid and CERTIFIED.eid=EM
49 /*v. Find the names of pilots certified for some Boeing aircraft.*/
50 • SELECT DISTINCT(ename) FROM EMPLOYEES,CERTIFIED,AIRCRAFT WHERE AIRCRAFT.aid=CERTIFIED.aid and CERTIFIED.eid=EMPL
51 /*vi. Find the aids of all aircraft that can be used on routes from Bengaluru to New Delhi.*/
52 • SELECT DISTINCT(aid) FROM AIRCRAFT,FLIGHTS WHERE AIRCRAFT.cruisingrange>=(SELECT FLIGHTS.distance FROM FLIGHTS W
53 /*vii. A customer wants to travel from bangalore to mumbai with no more than two changes of flight. List
54 the choice of departure times from bangalore if the customer wants to arrive in mumbai by 6 p.m.*/
55 • SELECT F.departs FROM FLIGHTS F WHERE F.flno IN((SELECT F0.flno FROM FLIGHTS F0 WHERE F0.ffrom='bangalore' AND
```

Below the query editor is a 'Result Grid' section. It includes a 'Filter Rows' input field, an 'Export' button, and a 'Wrap Cell Content' checkbox. The result grid displays a single column labeled 'aid' with the following values:

aid
1
2
3
5

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.



The screenshot shows a SQL IDE interface. The top toolbar includes icons for file operations, execution, and a 'Limit to 1000 rows' dropdown. The query editor contains the following SQL code:

```


46 /*iv. For all aircraft with cruising range over 1000 Kms, find the name of the aircraft and the average
47 salary of all pilots certified for this aircraft.*/
48 • SELECT aname,AVG(salary) FROM AIRCRAFT,EMPLOYEES,CERTIFIED WHERE AIRCRAFT.aid=CERTIFIED.aid and CERTIFIED.eid=EMPLOYEES.eid AND A
49 /*v. Find the names of pilots certified for some Boeing aircraft.*/
50 • SELECT DISTINCT(ename) FROM EMPLOYEES,CERTIFIED,AIRCRAFT WHERE AIRCRAFT.aid=CERTIFIED.aid and CERTIFIED.eid=EMPLOYEES.eid AND ana
51 /*vi. Find the aids of all aircraft that can be used on routes from Bengaluru to New Delhi.*/
52 • SELECT DISTINCT(aid) FROM AIRCRAFT,FLIGHTS WHERE AIRCRAFT.cruisingrange>=(SELECT FLIGHTS.distance FROM FLIGHTS WHERE flights.ffro
53 /*vii. A customer wants to travel from bangalore to mumbai with no more than two changes of flight. List
54 the choice of departure times from bangalore if the customer wants to arrive in mumbai by 6 p.m.*/
55 • SELECT F.departs FROM FLIGHTS F WHERE F.flno IN((SELECT F0.flno FROM FLIGHTS F0 WHERE F0.ffrom='bangalore' AND F0.fto='mumbai' A
56 UNION (SELECT F0.flno FROM FLIGHTS F0,FLIGHTS F1 WHERE F0.ffrom='bangalore' AND F1.ffrom=F0.fto AND F1.fto='mumbai' AND F1.depar

```

Below the query editor, the 'Result Grid' section shows the following data:

departs
17:00:00


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


 Limit to 1000 rows


```
50 • SELECT DISTINCT(ename) FROM EMPLOYEES,CERTIFIED,AIRCRAFT WHERE AIRCRAFT.aid=CERTIFIED.aid and CERTIFIED.eid=EMPLOYEES.eid AND aname LIKE '%80
51 /*vi. Find the aids of all aircraft that can be used on routes from Bengaluru to New Delhi.*/
52 • SELECT DISTINCT(aid) FROM AIRCRAFT,FLIGHTS WHERE AIRCRAFT.cruisingrange>=(SELECT FLIGHTS.distance FROM FLIGHTS WHERE flights.ffrom='bangalore
53 /*vii. A customer wants to travel from bangalore to mumbai with no more than two changes of flight. List
54 the choice of departure times from bangalore if the customer wants to arrive in mumbai by 6 p.m.*/
55 • SELECT F.departs FROM FLIGHTS F WHERE F.fln IN((SELECT F0.fln FROM FLIGHTS F0 WHERE F0.ffrom='bangalore' AND F0.fto='mumbai' AND EXTRACT(h
56 UNION (SELECT F0.fln FROM FLIGHTS F0,FLIGHTS F1 WHERE F0.ffrom='bangalore' AND F1.ffrom=F0.fto AND F1.fto='mumbai' AND F1.departs>F0.arrive
57 UNION (SELECT F0.fln FROM FLIGHTS F0,FLIGHTS F1,FLIGHTS F2 WHERE F0.ffrom='bangalore' AND F1.ffrom=F0.fto AND F2.ffrom=F1.fto AND F2.fto='m
58 /*viii. Print the name and salary of every non-pilot whose salary is more than the average salary for pilots.*/
59 • SELECT DISTINCT(ename),salary FROM EMPLOYEES WHERE EMPLOYEES.eid NOT IN(SELECT DISTINCT(CERTIFIED.eid) FROM CERTIFIED) AND EMPLOYEES.salary>(
60
```

<

Result Grid

 Filter Rows:

Export: 

Wrap Cell Content: 

	ename	salary
▶	RAMESH	70000