G.NARAYANAMMA INSTITUTE OF TECHNOLOGY AND SCIENCE

INFORMATION TECHNOLOGY

DATABASE MANAGEMENT SYSTEM LAB

CASESTUDY ON TRAFFIC MANAGEMENT SYSTEM

Submitted by:

Name : M.Siri varshini
Rollno : 23251A1217
Branch : IT-A

```
SQL> create table driver(driver_id int primary key,name
varchar2(20) not null,license_number varchar2(10)not null);

Table created.

SQL> insert into driver
values(&driver_id,'&name','&license_number');
Enter value for driver_id: 1
Enter value for name: ravi
Enter value for license_number: ABC123456
old   1: insert into driver
values(&driver_id,'&name','&license_number')
new   1: insert into driver values(1,'john doe','ABC123456')

1 row created.

SQL> /
Enter value for driver_id: 2
Enter value for name: teja
Enter value for license_number: XYZ987654
old   1: insert into driver
values(&driver_id,'&name','&license_number')
new   1: insert into driver values(2,'jane','XYZ987654')

1 row created.

SQL> /
Enter value for driver_id: 3
Enter value for name: krish
Enter value for license_number: QWE345678
old   1: insert into driver
values(&driver_id,'&name','&license_number')
new   1: insert into driver values(3,'mike','QWE345678')

1 row created.

SQL> /
Enter value for driver_id: 4
Enter value for name: manoj
Enter value for license_number: RST112233
old   1: insert into driver
values(&driver_id,'&name','&license_number')
new   1: insert into driver values(4,'sarah','RST112233')
```

```
1 row created.

SQL> /
Enter value for driver_id: 5
Enter value for name: roshan
Enter value for license_number: HJK556677
old   1: insert into driver
values(&driver_id,'&name','&license_number')
new   1: insert into driver values(5,'emily','HJK556677')

1 row created.

SQL> select * from driver;

 DRIVER_ID NAME                 LICENSE_NU
---------- -------------------- ----------
         1 ravi                 ABC123456
         2 teja                 XYZ987654
         3 krish                QWE345678
         4 manoj                RST112233
         5 roshan        HJK556677

SQL> create table vehicle(vehicle_id int primary key,driver_id
int,vehicle_type varchar2(10) not null,license_plate
varchar2(10) not null,foreign key (driver_id) references
driver(driver_id));

Table created.

SQL> insert into vehicle
values(&vehicle_id,&driver_id,'&vehicle_type','&license_plate');
Enter value for vehicle_id: 1
Enter value for driver_id: 1
Enter value for vehicle_type: car
Enter value for license_plate: XYZ-1234
old   1: insert into vehicle
values(&vehicle_id,&driver_id,'&vehicle_type','&license_plate')
new   1: insert into vehicle values(1,1,'car','XYZ-1234')

1 row created.

SQL> /
Enter value for vehicle_id: 2
Enter value for driver_id: 1
```

```
Enter value for vehicle_type: motorcycle
Enter value for license_plate: ABC-5678
old   1: insert into vehicle
values(&vehicle_id,&driver_id,'&vehicle_type','&license_plate')
new   1: insert into vehicle values(2,1,'motorcycle','ABC-5678')

1 row created.

SQL> /
Enter value for vehicle_id: 3
Enter value for driver_id: 2
Enter value for vehicle_type: truck
Enter value for license_plate: DEF-9101
old   1: insert into vehicle
values(&vehicle_id,&driver_id,'&vehicle_type','&license_plate')
new   1: insert into vehicle values(3,2,'truck','DEF-9101')

1 row created.

SQL> /
Enter value for vehicle_id: 4
Enter value for driver_id: 2
Enter value for vehicle_type: car
Enter value for license_plate: GHI-1121
old   1: insert into vehicle
values(&vehicle_id,&driver_id,'&vehicle_type','&license_plate')
new   1: insert into vehicle values(4,2,'car','GHI-1121')

1 row created.

SQL> /
Enter value for vehicle_id: 5
Enter value for driver_id: 3
Enter value for vehicle_type: van
Enter value for license_plate: JKL-3141
old   1: insert into vehicle
values(&vehicle_id,&driver_id,'&vehicle_type','&license_plate')
new   1: insert into vehicle values(5,3,'van','JKL-3141')

1 row created.

SQL> /
Enter value for vehicle_id: 6
Enter value for driver_id: 3
```

```
Enter value for vehicle_type: car
Enter value for license_plate: MNO-5161
old   1: insert into vehicle
values(&vehicle_id,&driver_id,'&vehicle_type','&license_plate')
new   1: insert into vehicle values(6,3,'car','MNO-5161')

1 row created.

SQL> /
Enter value for vehicle_id: 7
Enter value for driver_id: 4
Enter value for vehicle_type: motorcycle
Enter value for license_plate: PQR-7181
old   1: insert into vehicle
values(&vehicle_id,&driver_id,'&vehicle_type','&license_plate')
new   1: insert into vehicle values(7,4,'motorcycle','PQR-7181')

1 row created.

SQL> /
Enter value for vehicle_id: 8
Enter value for driver_id: 5
Enter value for vehicle_type: truck
Enter value for license_plate: STU-9202
old   1: insert into vehicle
values(&vehicle_id,&driver_id,'&vehicle_type','&license_plate')
new   1: insert into vehicle values(8,5,'truck','STU-9202')

1 row created.

SQL> /
Enter value for vehicle_id: 9
Enter value for driver_id: 1
Enter value for vehicle_type: car
Enter value for license_plate: VWX-1322
old   1: insert into vehicle
values(&vehicle_id,&driver_id,'&vehicle_type','&license_plate')
new   1: insert into vehicle values(9,1,'car','VWX-1322')

1 row created.

SQL> /
Enter value for vehicle_id: 10
Enter value for driver_id: 2
```

```
Enter value for vehicle_type: van
Enter value for license_plate: YZA-2332
old   1: insert into vehicle
values(&vehicle_id,&driver_id,'&vehicle_type','&license_plate')
new   1: insert into vehicle values(10,2,'van','YZA-2332')

1 row created.

SQL> select * from vehicle;

VEHICLE_ID  DRIVER_ID VEHICLE_TY LICENSE_PL
---------- ---------- ---------- ----------
         1          1 car        XYZ-1234
         2          1 motorcycle ABC-5678
         3          2 truck      DEF-9101
         4          2 car        GHI-1121
         5          3 van        JKL-3141
         6          3 car        MNO-5161
         7          4 motorcycle PQR-7181
         8          5 truck      STU-9202
         9          1 car        VWX-1322
        10          2 van        YZA-2332

10 rows selected.

SQL> create table violationrecord(violation_id int primary
key,driver_id int,fine_amt number(10,2),foreign key (driver_id)
references driver(driver_id));

Table created.

SQL> insert into violationrecord
values(&violation_id,&driver_id,&fine_amt);
Enter value for violation_id: 1
Enter value for driver_id: 1
Enter value for fine_amt: 100
old   1: insert into violationrecord
values(&violation_id,&driver_id,&fine_amt)
new   1: insert into violationrecord values(1,1,100)

1 row created.

SQL> /
Enter value for violation_id: 2
```

```
Enter value for driver_id: 1
Enter value for fine_amt: 200
old   1: insert into violationrecord
values(&violation_id,&driver_id,&fine_amt)
new   1: insert into violationrecord values(2,1,200)

1 row created.

SQL> /
Enter value for violation_id: 3
Enter value for driver_id: 2
Enter value for fine_amt: 150
old   1: insert into violationrecord
values(&violation_id,&driver_id,&fine_amt)
new   1: insert into violationrecord values(3,2,150)

1 row created.

SQL> /
Enter value for violation_id: 4
Enter value for driver_id: 2
Enter value for fine_amt: 300
old   1: insert into violationrecord
values(&violation_id,&driver_id,&fine_amt)
new   1: insert into violationrecord values(4,2,300)

1 row created.

SQL> /
Enter value for violation_id: 5
Enter value for driver_id: 3
Enter value for fine_amt: 250
old   1: insert into violationrecord
values(&violation_id,&driver_id,&fine_amt)
new   1: insert into violationrecord values(5,3,250)

1 row created.

SQL> /
Enter value for violation_id: 6
Enter value for driver_id: 3
Enter value for fine_amt: 350
old   1: insert into violationrecord
values(&violation_id,&driver_id,&fine_amt)
```

```
new   1: insert into violationrecord values(6,3,350)

1 row created.

SQL> /
Enter value for violation_id: 7
Enter value for driver_id: 4
Enter value for fine_amt: 400
old   1: insert into violationrecord
values(&violation_id,&driver_id,&fine_amt)
new   1: insert into violationrecord values(7,4,400)

1 row created.

SQL> /
Enter value for violation_id: 8
Enter value for driver_id: 5
Enter value for fine_amt: 120
old   1: insert into violationrecord
values(&violation_id,&driver_id,&fine_amt)
new   1: insert into violationrecord values(8,5,120)

1 row created.

SQL> /
Enter value for violation_id: 9
Enter value for driver_id: 5
Enter value for fine_amt: 180
old   1: insert into violationrecord
values(&violation_id,&driver_id,&fine_amt)
new   1: insert into violationrecord values(9,5,180)

1 row created.

SQL> /
Enter value for violation_id: 10
Enter value for driver_id: 1
Enter value for fine_amt: 220
old   1: insert into violationrecord
values(&violation_id,&driver_id,&fine_amt)
new   1: insert into violationrecord values(10,1,220)

1 row created.
```

```
SQL> select * from violationrecord
  2  ;

VIOLATION_ID  DRIVER_ID   FINE_AMT
------------ ---------- ----------
           1          1        100
           2          1        200
           3          2        150
           4          2        300
           5          3        250
           6          3        350
           7          4        400
           8          5        120
           9          5        180
          10          1        220

10 rows selected.

SQL> create table trafficincident(incident_id int primary
key,driver_id int,loc varchar2(10) not null,incident_date date
not null, foreign key(driver_id) references driver(driver_id));

Table created.

SQL> insert into trafficincident
values(&incident_id,&driver_id,'&loc','&incident_date');
Enter value for incident_id: 1
Enter value for driver_id: 1
Enter value for loc: downtown
Enter value for incident_date: 15-jan-2023
old   1: insert into trafficincident
values(&incident_id,&driver_id,'&loc','&incident_date')
new   1: insert into trafficincident values(1,1,'downtown','15-
jan-2023')

1 row created.

SQL> /
Enter value for incident_id: 2
Enter value for driver_id: 1
Enter value for loc: mainstreet
Enter value for incident_date: 10-feb-2023
old   1: insert into trafficincident
values(&incident_id,&driver_id,'&loc','&incident_date')
```

```
new   1: insert into trafficincident
values(2,1,'mainstreet','10-feb-2023')

1 row created.

SQL> /
Enter value for incident_id: 3
Enter value for driver_id: 2
Enter value for loc: city park
Enter value for incident_date: 05-mar-2023
old   1: insert into trafficincident
values(&incident_id,&driver_id,'&loc','&incident_date')
new   1: insert into trafficincident values(3,2,'city park','05-
mar-2023')

1 row created.

SQL> /
Enter value for incident_id: 4
Enter value for driver_id: 2
Enter value for loc: freeway
Enter value for incident_date: 20-apr-2023
old   1: insert into trafficincident
values(&incident_id,&driver_id,'&loc','&incident_date')
new   1: insert into trafficincident values(4,2,'freeway','20-
apr-2023')

1 row created.

SQL> /
Enter value for incident_id: 5
Enter value for driver_id: 3
Enter value for loc: uptown
Enter value for incident_date: 18-may-2023
old   1: insert into trafficincident
values(&incident_id,&driver_id,'&loc','&incident_date')
new   1: insert into trafficincident values(5,3,'uptown','18-
may-2023')

1 row created.

SQL> /
Enter value for incident_id: 6
Enter value for driver_id: 3
```

```
Enter value for loc: riverside
Enter value for incident_date: 25-jun-2023
old   1: insert into trafficincident
values(&incident_id,&driver_id,'&loc','&incident_date')
new   1: insert into trafficincident values(6,3,'riverside','25-
jun-2023')

1 row created.

SQL> /
Enter value for incident_id: 7
Enter value for driver_id: 4
Enter value for loc: airport
Enter value for incident_date: 30-jul-2023
old   1: insert into trafficincident
values(&incident_id,&driver_id,'&loc','&incident_date')
new   1: insert into trafficincident values(7,4,'airport','30-
jul-2023')

1 row created.

SQL> /
Enter value for incident_id: 8
Enter value for driver_id: 5
Enter value for loc: highway
Enter value for incident_date: 11-aug-2023
old   1: insert into trafficincident
values(&incident_id,&driver_id,'&loc','&incident_date')
new   1: insert into trafficincident values(8,5,'highway','11-
aug-2023')

1 row created.

SQL> /
Enter value for incident_id: 9
Enter value for driver_id: 5
Enter value for loc: market
Enter value for incident_date: 16-sep-2023
old   1: insert into trafficincident
values(&incident_id,&driver_id,'&loc','&incident_date')
new   1: insert into trafficincident values(9,5,'market','16-
sep-2023')

1 row created.
```

```
SQL> /
Enter value for incident_id: 10
Enter value for driver_id: 1
Enter value for loc: beach
Enter value for incident_date: 05-oct-2023
old   1: insert into trafficincident
values(&incident_id,&driver_id,'&loc','&incident_date')
new   1: insert into trafficincident values(10,1,'beach','05-
oct-2023')

1 row created.

SQL> select * from trafficincident;

INCIDENT_ID  DRIVER_ID LOC        INCIDENT_
---------- ---------- ---------- ---------
         1          1 downtown   15-JAN-23
         2          1 mainstreet 10-FEB-23
         3          2 city park  05-MAR-23
         4          2 freeway    20-APR-23
         5          3 uptown     18-MAY-23
         6          3 riverside  25-JUN-23
         7          4 airport    30-JUL-23
         8          5 highway    11-AUG-23
         9          5 market     16-SEP-23
        10          1 beach      05-OCT-23

10 rows selected.
```

TABLE1:**DRIVER**(PARENT TABLE)

```
SQL> select * from driver;

DRIVER_ID NAME                 LICENSE_NU
---------- -------------------- ----------
         1 ravi                 ABC123456
         2 teja                 XYZ987654
         3 krish                QWE345678
         4 manoj                RST112233
         5 roshan               HJK556677

5 rows selected.
```

TABLE1: **VEHICLE**

```
SQL> select * from vehicle;

VEHICLE_ID  DRIVER_ID VEHICLE_TY LICENSE_PL
---------- ---------- ---------- ----------
         1          1 car        XYZ-1234
         2          1 motorcycle ABC-5678
         3          2 truck      DEF-9101
         4          2 car        GHI-1121
         5          3 van        JKL-3141
         6          3 car        MNO-5161
         7          4 motorcycle PQR-7181
         8          5 truck      STU-9202
         9          1 car        VWX-1322
        10          2 van        YZA-2332

10 rows selected.
```

TABLE1:**VIOLATIONRECORD**

```
SQL> select * from violationrecord;

VIOLATION_ID  DRIVER_ID   FINE_AMT
------------ ---------- ----------
           1          1        100
           2          1        200
           3          2        150
           4          2        300
           5          3        250
           6          3        350
           7          4        400
           8          5        120
           9          5        180
          10          1        220

10 rows selected
```

TABLE1: **TRAFFICINCIDENT**

```
SQL> select * from trafficincident;

INCIDENT_ID  DRIVER_ID LOC        INCIDENT_
----------- ---------- ---------- ---------
```

```
         1          1 downtown   15-JAN-23
         2          1 mainstreet 10-FEB-23
         3          2 city park  05-MAR-23
         4          2 freeway    20-APR-23
         5          3 uptown     18-MAY-23
         6          3 riverside  25-JUN-23
         7          4 airport    30-JUL-23
         8          5 highway    11-AUG-23
         9          5 market     16-SEP-23
        10          1 beach      05-OCT-23

10 rows selected.
```

SQL QURIES

CONCATENATION:

```
SQL> select violation_id||fine_amt from violationrecord;

VIOLATION_ID||FINE_AMT
--------------------------------------------------------------------
----------------
1100
2200
3150
4300
5250
6350
7400
8120
9180
10220

10 rows selected.
```

ALIAS NAME:

```
SQL> select violation_id||fine_amt as fine_vid from
violationrecord;

FINE_VID
--------------------------------------------------------------------
----------------
1100
2200
3150
4300
5250
6350
7400
8120
9180
10220

10 rows selected.
```

UNIQUE():

```
SQL> select unique(driver_id) from trafficincident;

 DRIVER_ID
----------
         1
         2
         4
         5
         3
```

DISTINCT:

```
SQL> select distinct driver_id from vehicle;

 DRIVER_ID
----------
         1
         2
         4
         5
         3
```

RENAME:

```
SQL> rename violationrecord to violation;

Table renamed.

SQL> select * from violationrecord;
select * from violationrecord
              *
ERROR at line 1:
ORA-00942: table or view does not exist


SQL> select * from violation;

VIOLATION_ID  DRIVER_ID   FINE_AMT
------------ ---------- ----------
           1          1        100
           2          1        200
           3          2        150
           4          2        300
```

```
         5          3        250
         6          3        350
         7          4        400
         8          5        120
         9          5        180
        10          1        220

10 rows selected.
```

DESCRIPTION OF TABLE:DRIVER:

```
SQL> desc driver;
 Name                                      Null?    Type
 ----------------------------------------- -------- ------------
----------------
 DRIVER_ID                                 NOT NULL NUMBER(38)
 NAME                                      NOT NULL VARCHAR2(20)
 LICENSE_NUMBER                            NOT NULL VARCHAR2(10)
```

DESCRIPTION OF TABLE:VEHICLE:

```
SQL> desc vehicle;
 Name                                      Null?    Type
 ----------------------------------------- -------- ------------
----------------
 VEHICLE_ID                                NOT NULL NUMBER(38)
 DRIVER_ID                                          NUMBER(38)
 VEHICLE_TYPE                              NOT NULL VARCHAR2(10)
 LICENSE_PLATE                             NOT NULL VARCHAR2(10)
```

DESCRIPTION OF TABLE:VIOLATION:

```
SQL> desc violation;
 Name                                      Null?    Type
 ----------------------------------------- -------- ------------
----------------
 VIOLATION_ID                              NOT NULL NUMBER(38)
 DRIVER_ID                                          NUMBER(38)
 FINE_AMT                                           NUMBER(10,2)
```

DESCRIPTION OF TABLE:TRAFFICINCIDENT:

```
SQL> desc trafficincident;
```

```
 Name                                      Null?    Type
 ----------------------------------------- -------- ------------
----------------
 INCIDENT_ID                               NOT NULL NUMBER(38)
 DRIVER_ID                                          NUMBER(38)
 LOC                                       NOT NULL VARCHAR2(10)
 INCIDENT_DATE                             NOT NULL DATE

SQL> alter table trafficincident modify(loc varchar2(15));

Table altered.

SQL> desc trafficincident;

 Name                                      Null?    Type
 ----------------------------------------- -------- ------------
----------------
 INCIDENT_ID                               NOT NULL NUMBER(38)
 DRIVER_ID                                          NUMBER(38)
 LOC                                       NOT NULL VARCHAR2(15)
 INCIDENT_DATE                             NOT NULL DATE

SQL> alter table driver rename column name to dname;

Table altered.

SQL> desc driver;

 Name                                      Null?    Type
 ----------------------------------------- -------- ------------
----------------
 DRIVER_ID                                 NOT NULL NUMBER(38)
 DNAME                                     NOT NULL VARCHAR2(20)
 LICENSE_NUMBER                            NOT NULL VARCHAR2(10)

SQL> alter table violation add(violation_type varchar2(10));

Table altered.

SQL> desc violation;

 Name                                      Null?    Type
 ----------------------------------------- -------- ------------
----------------
```

```
 VIOLATION_ID                                        NOT NULL NUMBER(38)
 DRIVER_ID                                                    NUMBER(38)
 FINE_AMT                                                     NUMBER(10,2)
 VIOLATION_TYPE                                               VARCHAR2(10)

SQL> alter table violation drop column violation_type;

Table altered.

SQL> desc violation;

 Name                                      Null?    Type
 ----------------------------------------- -------- ------------
----------------
 VIOLATION_ID                              NOT NULL NUMBER(38)
 DRIVER_ID                                          NUMBER(38)
 FINE_AMT                                           NUMBER(10,2)

SQL> update driver set dname='roshh' where driver_id=5;

1 row updated.

SQL> select * from driver;

 DRIVER_ID DNAME                LICENSE_NU
---------- -------------------- ----------
         1 ravi                 ABC123456
         2 teja                 XYZ987654
         3 krish                QWE345678
         4 manoj                RST112233
         5 roshh                HJK556677

SQL> select driver_id,license_number from driver;

 DRIVER_ID LICENSE_NU
---------- ----------
         1 ABC123456
         2 XYZ987654
         3 QWE345678
         4 RST112233
         5 HJK556677

SQL> select violation_id,fine_amt from violation;
```

```
VIOLATION_ID   FINE_AMT
------------ ----------
           1        100
           2        200
           3        150
           4        300
           5        250
           6        350
           7        400
           8        120
           9        180
          10        220

10 rows selected.
```

CLAUSES

- **GROUPBY:**

```
SQL> select count(fine_amt) from violationrecord group by
driver_id;

COUNT(FINE_AMT)
---------------
              3
              2
              1
              2
              2
```

- **HAVING:**

```
SQL> select driver_id,max(fine_amt) from violationrecord having
max(fine_amt)>300 group by driver_id;

 DRIVER_ID MAX(FINE_AMT)
---------- -------------
         4           400
         3           350
```

- **ORDER BY:**

```
SQL> select * from driver order by name;
```

```
 DRIVER_ID NAME                 LICENSE_NU
---------- -------------------- ----------
         3 krish                QWE345678
         4 manoj                RST112233
         1 ravi                 ABC123456
         5 roshan               HJK556677
         2 teja                 XYZ987654
```

- **WHERE:**

```
SQL>select * from vehicle where driver_id=3;

VEHICLE_ID  DRIVER_ID VEHICLE_TY LICENSE_PL
---------- ---------- ---------- ----------
         5          3 van        JKL-3141
         6          3 car        MNO-5161
```

LIKE OPERATOR

```
SQL> select * from driver where dname like 't%';

 DRIVER_ID DNAME                LICENSE_NU
---------- -------------------- ----------
         2 teja                 XYZ987654

SQL> select * from driver where dname like '%h';

 DRIVER_ID DNAME                LICENSE_NU
---------- -------------------- ----------
         3 krish                QWE345678
         5 roshh                HJK556677

SQL> select * from driver where dname like '_a%';

 DRIVER_ID DNAME                LICENSE_NU
---------- -------------------- ----------
         1 ravi                 ABC123456
         4 manoj                RST112233

SQL> select count(incident_id) from trafficincident;
```

AGRIGATE FUNCTIONS:

```
COUNT(INCIDENT_ID)
```

```
------------------
                10

SQL> select max(fine_amt) from violationrecord;

MAX(FINE_AMT)
-------------
          400

SQL> select min(fine_amt) from violationrecord;

MIN(FINE_AMT)
-------------
          100

SQL> select sum(fine_amt) from violationrecord;

SUM(FINE_AMT)
-------------
         2270
SQL> select avg(fine_amt) from violationrecord;

AVG(FINE_AMT)
-------------
          227
```

SET OPERATIONS:

- **UNION:**

```
SQL> select vehicle_id,driver_id,vehicle_type from vehicle union
select incident_id,driver_id,loc from trafficincident;

VEHICLE_ID  DRIVER_ID VEHICLE_TY
---------- ---------- ----------
         1          1 car
         1          1 downtown
         2          1 mainstreet
         2          1 motorcycle
         3          2 city park
         3          2 truck
         4          2 car
         4          2 freeway
         5          3 uptown
```

```
         5          3 van
         6          3 car
         6          3 riverside
         7          4 airport
         7          4 motorcycle
         8          5 highway
         8          5 truck
         9          1 car
         9          5 market
        10          1 beach
        10          2 van

20 rows selected.
```

- **UNIONALL:**

```
SQL> select vehicle_id,driver_id,vehicle_type from vehicle union
all select incident_id,driver_id,loc from trafficincident;

VEHICLE_ID  DRIVER_ID VEHICLE_TY
---------- ---------- ----------
         1          1 car
         2          1 motorcycle
         3          2 truck
         4          2 car
         5          3 van
         6          3 car
         7          4 motorcycle
         8          5 truck
         9          1 car
        10          2 van
         1          1 downtown
         2          1 mainstreet
         3          2 city park
         4          2 freeway
         5          3 uptown
         6          3 riverside
         7          4 airport
         8          5 highway
         9          5 market
        10          1 beach

20 rows selected.
```

- **INTERSECT:**

```
SQL> select vehicle_id,driver_id,vehicle_type from vehicle
intersect select incident_id,driver_id,loc from trafficincident;

no rows selected
```

- **MINUS:**

```
SQL> select vehicle_id,driver_id,vehicle_type from vehicle minus
select incident_id,driver_id,loc from trafficincident;

VEHICLE_ID  DRIVER_ID VEHICLE_TY
---------- ---------- ----------
         1          1 car
         2          1 motorcycle
         3          2 truck
         4          2 car
         5          3 van
         6          3 car
         7          4 motorcycle
         8          5 truck
         9          1 car
        10          2 van

10 rows selected.
```

SUB QURIES:

```
SQL> select * from violation where fine_amt>(select
avg(fine_amt) from violation);

VIOLATION_ID  DRIVER_ID   FINE_AMT
------------ ---------- ----------
           4          2        300
           5          3        250
           6          3        350
           7          4        400

SQL> select * from trafficincident where incident_date>(select
incident_date from trafficincident where incident_id=3);

INCIDENT_ID  DRIVER_ID LOC             INCIDENT_
----------- ---------- --------------- ---------
```

```
         4          2 freeway         20-APR-23
         5          3 uptown          18-MAY-23
         6          3 riverside       25-JUN-23
         7          4 airport         30-JUL-23
         8          5 highway         11-AUG-23
         9          5 market          16-SEP-23
        10          1 beach           05-OCT-23

7 rows selected.

SQL> select * from violation where fine_amt<>(select
min(fine_amt) from violation);

VIOLATION_ID  DRIVER_ID   FINE_AMT
------------ ---------- ----------
           2          1        200
           3          2        150
           4          2        300
           5          3        250
           6          3        350
           7          4        400
           8          5        120
           9          5        180
          10          1        220

9 rows selected.

SQL> select * from vehicle where driver_id in(select driver_id
from violation where driver_id=1 or driver_id=2);

VEHICLE_ID  DRIVER_ID VEHICLE_TY LICENSE_PL
---------- ---------- ---------- ----------
         9          1 car        VWX-1322
         2          1 motorcycle ABC-5678
         1          1 car        XYZ-1234
        10          2 van        YZA-2332
         4          2 car        GHI-1121
         3          2 truck      DEF-9101

6 rows selected.

SQL> select incident_id,loc from trafficincident where driver_id
not in(select driver_id from violation where driver_id=1 or
driver_id=2);
```

```
INCIDENT_ID LOC
----------- ---------------
          9 market
          8 highway
          6 riverside
          5 uptown
          7 airport
```

PSEUDO COLUMNS:

```
SQL> select rowid,driver.* from driver;

ROWID              DRIVER_ID DNAME                LICENSE_NU
------------------ --------- -------------------- ----------
AAAFEKAABAAALARAAA          1 ravi                 ABC123456
AAAFEKAABAAALARAAB          2 teja                 XYZ987654
AAAFEKAABAAALARAAC          3 krish                QWE345678
AAAFEKAABAAALARAAD          4 manoj                RST112233
AAAFEKAABAAALARAAE          5 roshh                HJK556677

SQL> select rownum,driver.* from driver;

    ROWNUM  DRIVER_ID DNAME                LICENSE_NU
---------- ---------- -------------------- ----------
         1          1 ravi                 ABC123456
         2          2 teja                 XYZ987654
         3          3 krish                QWE345678
         4          4 manoj                RST112233
         5          5 roshh                HJK556677

SQL> select rownum,driver.* from driver where rownum<=4 minus
select rownum,driver.* from driver where rownum<=2;

    ROWNUM  DRIVER_ID DNAME                LICENSE_NU
---------- ---------- -------------------- ----------
         3          3 krish                QWE345678
         4          4 manoj                RST112233
```

JOINS:

- **INNER JOIN:**

```
SQL> select
vehicle.driver_id,vehicle.vehicle_type,trafficincident.driver_id
,trafficincident.loc from vehicle,trafficincident where
vehicle.driver_id=trafficincident.driver_id;

 DRIVER_ID VEHICLE_TY  DRIVER_ID LOC
---------- ---------- ---------- ----------
         1 car                 1 downtown
         1 motorcycle          1 downtown
         1 car                 1 downtown
         1 car                 1 mainstreet
         1 motorcycle          1 mainstreet
         1 car                 1 mainstreet
         2 van                 2 city park
         2 car                 2 city park
         2 truck               2 city park
         2 van                 2 freeway
         2 car                 2 freeway
         2 truck               2 freeway
         3 car                 3 uptown
         3 van                 3 uptown
         3 car                 3 riverside
         3 van                 3 riverside
         4 motorcycle          4 airport
         5 truck               5 highway
         5 truck               5 market
         1 car                 1 beach
         1 motorcycle          1 beach
         1 car                 1 beach

22 rows selected.
```

- **LEFT OUTER JOIN:**

```
SQL> SELECT d.DRIVER_ID, d.NAME, v.VEHICLE_ID, v.VEHICLE_TYpe,
v.LICENSE_Plate FROM driver d LEFT JOIN vehicle v ON d.DRIVER_ID
= v.DRIVER_ID;

 DRIVER_ID NAME                 VEHICLE_ID VEHICLE_TY LICENSE_PL
---------- -------------------- ---------- ---------- ----------
         1 ravi                          1 car        XYZ-1234
         1 ravi                          2 motorcycle ABC-5678
         2 teja                          3 truck      DEF-9101
         2 teja                          4 car        GHI-1121
```

```
         3 krish                            5 van         JKL-3141
         3 krish                            6 car         MNO-5161
         4 manoj                            7 motorcycle  PQR-7181
         5 roshan                           8 truck       STU-9202
         1 ravi                             9 car         VWX-1322
         2 teja                            10 van         YZA-2332

10 rows selected.
```

- **RIGHT OUTER JOIN:**

```
SQL> select v.vehicle_type,v.driver_id ,t.loc,t.driver_id from
vehicle v right join trafficincident t on
v.driver_id=t.driver_id;

VEHICLE_TY  DRIVER_ID LOC         DRIVER_ID
---------- ---------- ---------- ----------
car                 1 beach               1
car                 1 mainstreet          1
car                 1 downtown            1
motorcycle          1 beach               1
motorcycle          1 mainstreet          1
motorcycle          1 downtown            1
truck               2 freeway             2
truck               2 city park           2
car                 2 freeway             2
car                 2 city park           2
van                 3 riverside           3
van                 3 uptown              3
car                 3 riverside           3
car                 3 uptown              3
motorcycle          4 airport             4
truck               5 market              5
truck               5 highway             5
car                 1 beach               1
car                 1 mainstreet          1
car                 1 downtown            1
van                 2 freeway             2
van                 2 city park           2

22 rows selected.
```

- **FULL OUTER JOIN:**

```
SQL> SELECT d.DRIVER_ID, d.NAME, v.VEHICLE_ID, v.VEHICLE_TYpe,
v.LICENSE_PLate FROM driver d full outer JOIN vehicle v ON
d.DRIVER_ID = v.DRIVER_ID;

 DRIVER_ID NAME                 VEHICLE_ID VEHICLE_TY LICENSE_PL
---------- -------------------- ---------- ---------- ----------
         1 ravi                          1 car        XYZ-1234
         1 ravi                          2 motorcycle ABC-5678
         2 teja                          3 truck      DEF-9101
         2 teja                          4 car        GHI-1121
         3 krish                         5 van        JKL-3141
         3 krish                         6 car        MNO-5161
         4 manoj                         7 motorcycle PQR-7181
         5 roshan                        8 truck      STU-9202
         1 ravi                          9 car        VWX-1322
         2 teja                         10 van        YZA-2332

10 rows selected.
```

VIEWS:

```
SQL> create view violation1 as select driver_id,fine_amt from
violationrecord;

View created.

SQL> select * from violation1;

 DRIVER_ID   FINE_AMT
---------- ----------
         1        100
         1        200
         2        150
         2        300
         3        250
         3        350
         4        400
         5        120
         5        180
         1        220

10 rows selected.

SQL> drop view violation1;
```

```
View dropped.

SQL> create view incident1 as select * from trafficincident;

View created.

SQL> select * from incident1;

INCIDENT_ID  DRIVER_ID LOC             INCIDENT_
---------- ---------- --------------- ---------
          1          1 downtown        15-JAN-23
          2          1 mainstreet      10-FEB-23
          3          2 city park       05-MAR-23
          4          2 freeway         20-APR-23
          5          3 uptown          18-MAY-23
          6          3 riverside       25-JUN-23
          7          4 airport         30-JUL-23
          8          5 highway         11-AUG-23
          9          5 market          16-SEP-23
         10          1 beach           05-OCT-23

10 rows selected.

SQL> drop view incident1;

View dropped.
```

TRIGGERS:

TRIGGER-1:

```
create or replace trigger t_vio
after update
on violation
begin
     dbms_output.put_line('Updation done successfully');
end;
/
```

Output:

```
@ 'E:\dbms\trigger1.txt'
```

```
Trigger created.

SQL> update violation set fine_amt=fine_amt+50 where
driver_id=3;
Updation done successfully

2 rows updated.
```

TRIGGER-2:

```
create or replace trigger t_violation
after update
on violation
for each row
begin
     dbms_output.put_line('Updation done successfully');
end;
/
```

Output:

```
SQL> @ 'E:\dbms\trigger1.txt'

Trigger created.

SQL> update violation set fine_amt=fine_amt-50 where
driver_id=3;
Updation done successfully
Updation done successfully

2 rows updated.
```

TRIGGER-3:

```
SQL> create table vehicle_audit(user_name varchar2(10),operation
varchar2(10),time timestamp);

Table created.

create or replace trigger t_audit
after update
on vehicle
for each row
begin
     insert into vehicle_audit values(user,'update',sysdate);
```

```
end;
/
```

OUTPUT:

```
SQL> @ 'E:\dbms\trigger.sql'

Trigger created.

SQL> update vehicle set vehicle_type='car' where vehicle_id=8;

1 row updated.

SQL> update vehicle set driver_id=3 where vehicle_id=8;

1 row updated.

SQL> update vehicle set driver_id=3 where vehicle_id=9;

1 row updated.

SQL> select * from vehicle_audit;

USER_NAME  OPERATION  TIME
---------- ---------- ----------------------------------------
---------------------------------
SYSTEM     update     23-NOV-24 09.41.00.000000 PM
SYSTEM     update     23-NOV-24 10.04.24.000000 PM
SYSTEM     update     23-NOV-24 10.04.46.000000 PM
```

TRIGGER-4:

```
SQL> create table vehicle_audit1(old_vehicle_id
int,new_vehicle_id int,operation varchar2(20),old_vehicle_type
varchar2(10),new_vehicle_type varchar2(10));

Table created.

create or replace trigger t5
after update or insert or delete of vehicle_type
on vehicle
for each row
begin
     if inserting then
```

```
          insert into vehicle_audit1
values(NULL,:NEW.vehicle_id,'after
insert',NULL,:NEW.vehicle_type);
     end if;
     if deleting then
          insert into vehicle_audit1
values(:OLD.vehicle_id,NULL,'after
delete',:OLD.vehicle_type,NULL);
     end if;
     if updating then
          insert into vehicle_audit1
values(:OLD.vehicle_id,NULL,'after
update',:OLD.vehicle_type,:NEW.vehicle_type);
     end if;
end;
/
```

OUTPUT:

```
SQL> @ 'E:\dbms\audit_vehicle.sql'

Trigger created.

SQL> update vehicle set vehicle_type='bike' where vehicle_id=5;

1 row updated.

SQL> select * from vehicle_audit1;

OLD_VEHICLE_ID NEW_VEHICLE_ID OPERATION            OLD_VEHICL
NEW_VEHICL
-------------- -------------- -------------------- ---------- --
--------
             5                after update         van
bike

SQL> select * from vehicle;

VEHICLE_ID  DRIVER_ID VEHICLE_TY LICENSE_PL
---------- ---------- ---------- ----------
         1          1 car        XYZ-1234
         2          1 motorcycle ABC-5678
         3          2 van        DEF-9101
         4          2 truck      GHI-1121
```

```
         5          3 bike       JKL-3141
         6          3 car        MNO-5161
         7          4 motorcycle PQR-7181
         8          3 car        STU-9202
         9          3 truck      VWX-1322
        10          2 van        YZA-2332

10 rows selected.

SQL> insert into vehicle values(11,1,'cycle','YEP-146');

1 row created.

SQL> select * from vehicle_audit1;

OLD_VEHICLE_ID NEW_VEHICLE_ID OPERATION           OLD_VEHICL
NEW_VEHICL
-------------- -------------- -------------------- ---------- --
--------
             5                after update         van
bike
                           11 after insert
cycle

SQL> select * from vehicle;

VEHICLE_ID  DRIVER_ID VEHICLE_TY LICENSE_PL
---------- ---------- ---------- ----------
         1          1 car        XYZ-1234
         2          1 motorcycle ABC-5678
         3          2 van        DEF-9101
         4          2 truck      GHI-1121
         5          3 bike       JKL-3141
         6          3 car        MNO-5161
         7          4 motorcycle PQR-7181
         8          3 car        STU-9202
         9          3 truck      VWX-1322
        10          2 van        YZA-2332
        11          1 cycle      YEP-143

11 rows selected.

SQL> delete vehicle where vehicle_id=12;
```

```
1 row deleted.

SQL> select * from vehicle_audit1;

OLD_VEHICLE_ID NEW_VEHICLE_ID OPERATION            OLD_VEHICL
NEW_VEHICL
-------------- -------------- -------------------- ---------- --
--------
            12                after delete         cycle
             5                after update         van
bike
                           12 after insert
cycle

SQL> select * from vehicle;

VEHICLE_ID  DRIVER_ID VEHICLE_TY LICENSE_PL
---------- ---------- ---------- ----------
         1          1 car        XYZ-1234
         2          1 motorcycle ABC-5678
         3          2 van        DEF-9101
         4          2 truck      GHI-1121
         5          3 bike       JKL-3141
         6          3 car        MNO-5161
         7          4 motorcycle PQR-7181
         8          3 car        STU-9202
         9          3 truck      VWX-1322
        10          2 van        YZA-2332

10 rows selected.
```

CURSORS:

CURSOR-1:

```
declare
     cursor c_vehicle is select * from vehicle;
begin
     for v_vehicle in c_vehicle
     loop
          dbms_output.put_line('**********');
          dbms_output.put_line('vehicle_id
is'||v_vehicle.vehicle_id);
```

```
          dbms_output.put_line('driver_id
is'||v_vehicle.driver_id);
          dbms_output.put_line('vehicle_type
is'||v_vehicle.vehicle_type);
          dbms_output.put_line('license_plate
is'||v_vehicle.license_plate);
     end loop;
end;
/
```

Output:

```
SQL> @ 'E:\dbms\cursor1.txt'
**********
vehicle_id is1
driver_id is1
vehicle_type iscar
license_plate isXYZ-1234
**********
vehicle_id is2
driver_id is1
vehicle_type ismotorcycle
license_plate isABC-5678
**********
vehicle_id is3
driver_id is2
vehicle_type istruck
license_plate isDEF-9101
**********
vehicle_id is4
driver_id is2
vehicle_type iscar
license_plate isGHI-1121
**********
vehicle_id is5
driver_id is3
vehicle_type isvan
license_plate isJKL-3141
**********
vehicle_id is6
driver_id is3
vehicle_type iscar
license_plate isMNO-5161
**********
```

```
vehicle_id is7
driver_id is4
vehicle_type ismotorcycle
license_plate isPQR-7181
**********
vehicle_id is8
driver_id is5
vehicle_type istruck
license_plate isSTU-9202
**********
vehicle_id is9
driver_id is1
vehicle_type iscar
license_plate isVWX-1322
**********
vehicle_id is10
driver_id is2
vehicle_type isvan
license_plate isYZA-2332

PL/SQL procedure successfully completed.
```

CURSOR-2:

```
declare
     cursor c_incident is select * from trafficincident;
begin
     for v_incident in c_incident
     loop
          dbms_output.put_line('**********');
          dbms_output.put_line('Incident_id
is'||v_incident.incident_id);
          dbms_output.put_line('driver_id
is'||v_incident.driver_id);
          dbms_output.put_line('Location is'||v_incident.loc);
          dbms_output.put_line('Incident_date
is'||v_incident.incident_date);
     end loop;
end;
/
```

Output:

```
SQL> @ 'E:\dbms\cursor2.txt'
```

```
**********
Incident_id is1
driver_id is1
Location isdowntown
Incident_date is15-JAN-23
**********
Incident_id is2
driver_id is1
Location ismainstreet
Incident_date is10-FEB-23
**********
Incident_id is3
driver_id is2
Location iscity park
Incident_date is05-MAR-23
**********
Incident_id is4
driver_id is2
Location isfreeway
Incident_date is20-APR-23
**********
Incident_id is5
driver_id is3
Location isuptown
Incident_date is18-MAY-23
**********
Incident_id is6
driver_id is3
Location isriverside
Incident_date is25-JUN-23
**********
Incident_id is7
driver_id is4
Location isairport
Incident_date is30-JUL-23
**********
Incident_id is8
driver_id is5
Location ishighway
Incident_date is11-AUG-23
**********
Incident_id is9
driver_id is5
Location ismarket
```

```
Incident_date is16-SEP-23
**********
Incident_id is10
driver_id is1
Location isbeach
Incident_date is05-OCT-23

PL/SQL procedure successfully completed.
```

CURSOR-3:

```
declare
     cursor c_violation is select * from violation;
begin
     for v_violation in c_violation
     loop
          dbms_output.put_line('**********');
          dbms_output.put_line('Violation_id is
'||v_violation.violation_id);
          dbms_output.put_line('driver_id is
'||v_violation.driver_id);
          dbms_output.put_line('Fine_amt is
'||v_violation.fine_amt);
          end loop;
end;
/
```

Output:

```
SQL> @ 'E:\dbms\cursor3.txt'
**********
Violation_id is 1
driver_id is 1
Fine_amt is 100
**********
Violation_id is 2
driver_id is 1
Fine_amt is 200
**********
Violation_id is 3
driver_id is 2
Fine_amt is 150
**********
Violation_id is 4
```

```
driver_id is 2
Fine_amt is 300
**********
Violation_id is 5
driver_id is 3
Fine_amt is 250
**********
Violation_id is 6
driver_id is 3
Fine_amt is 350
**********
Violation_id is 7
driver_id is 4
Fine_amt is 400
**********
Violation_id is 8
driver_id is 5
Fine_amt is 120
**********
Violation_id is 9
driver_id is 5
Fine_amt is 180
**********
Violation_id is 10
driver_id is 1
Fine_amt is 220

PL/SQL procedure successfully completed.
```