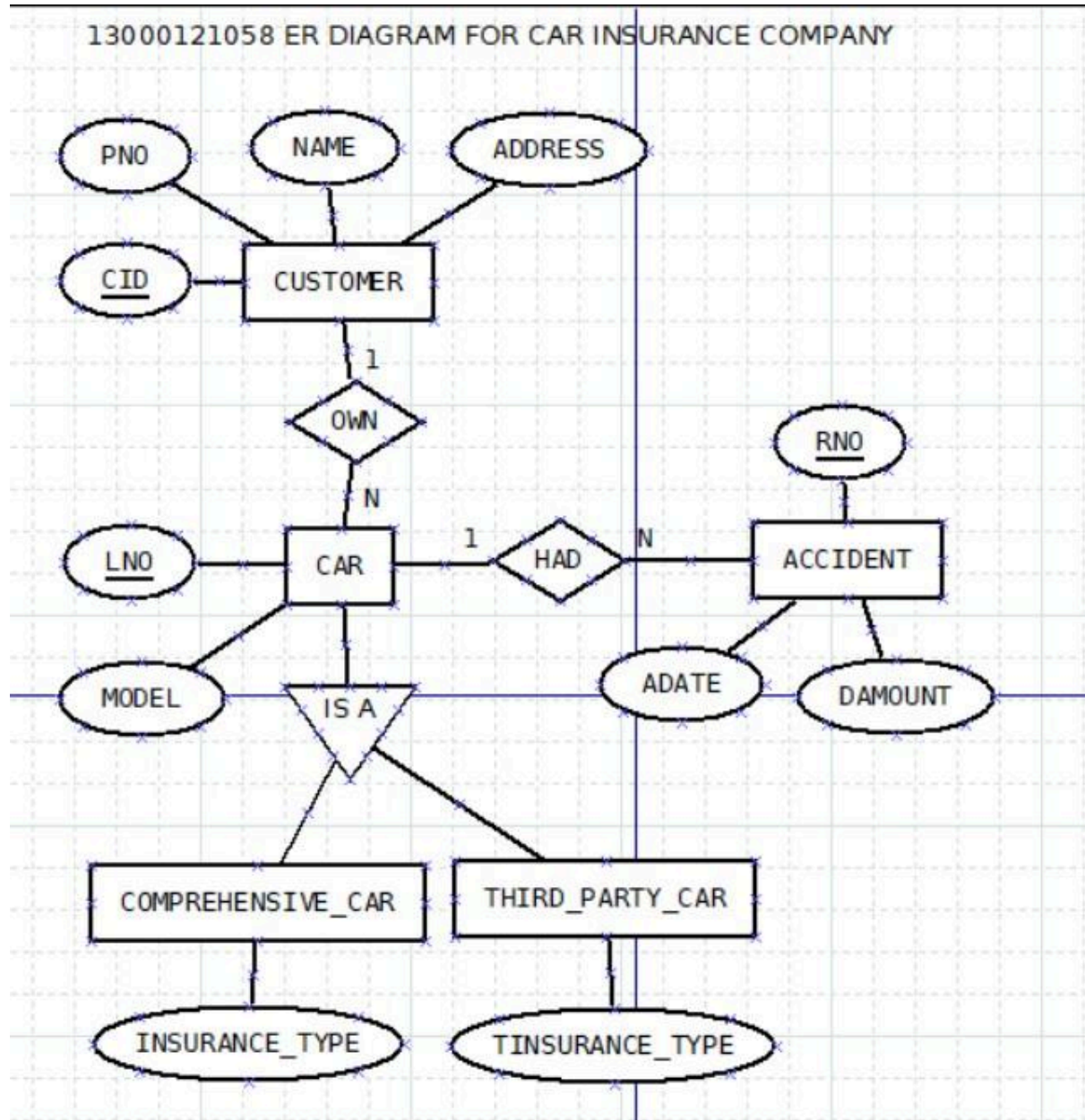
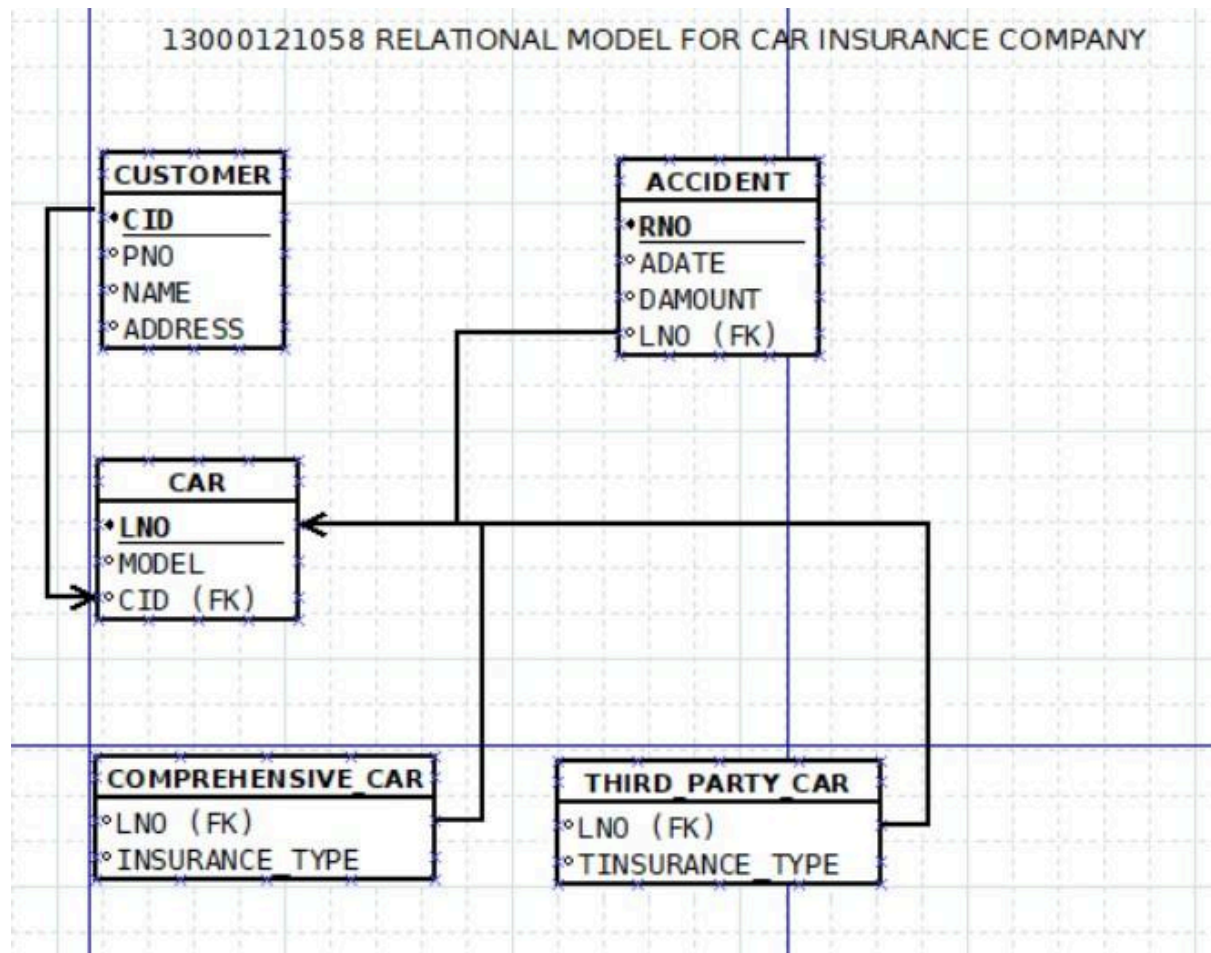


ASSIGNMENT 6

i.Design an ER diagram for an application that models a car-insurance company whose customers own one or more cars each. Analyse the requirements by identifying the entities, attributes, relationships, keys, constraints etc. Apply extended entity-relationship features to the design. Defend your design with proper assumptions and justifications. Map the ER model into a relational model.





ASSUMPTIONS

1. A Customer can own more than one car. This indicates a one-to-many relationship between the 'CUSTOMER' entity and the 'CAR' entity, established by the 'CID' attribute in the 'CAR' table, which serves as a foreign key referencing the 'CID' attribute in the 'CUSTOMER' table.
2. A car can be owned by one customer at a time. This reflects the one-to-many relationship between the 'CUSTOMER' entity and the 'CAR' entity, enforced by the 'CID' attribute in the 'CAR' table, which references the 'CID' attribute in the 'CUSTOMER' table.
3. A car can have multiple accidents. This indicates a one-to-many relationship between the 'CAR' entity and the 'ACCIDENT' entity, represented by the 'LNO' attribute in the 'ACCIDENT' table, which acts as a foreign key referencing the 'LNO' attribute in the 'CAR' table.
4. For a particular accident, the record number is allotted for one car only. This reflects a one-to-one relationship between the 'ACCIDENT' entity and the 'CAR' entity, with each accident entity associated with only one car entity. This is enforced by the 'LNO' attribute in the 'ACCIDENT' table, which acts as a foreign key referencing the 'LNO' attribute in the 'CAR' table. The 'RNO' attribute in the 'ACCIDENT' table serves as the primary key, uniquely identifying each accident record.
5. A car can be comprehensive or third party depending on the type of insurance it has. This implies a classification of cars based on their insurance type, with two subtypes: Comprehensive Car and Third-Party Car. The ER diagram can represent this using the subtype-supertype relationship feature, where 'CAR' is the supertype entity and

`Comprehensive_Car` and `Third_Party_Car` are the subtypes. The subtype entities (`Comprehensive_Car` and `Third_Party_Car`) are associated with the `CAR` entity through foreign key constraints. Subtype-specific attributes (`INSURANCE_TYPE` for both subtypes) differentiate between them.

ii. Create tables, populate with data and construct queries (advanced) in SQL to extract information from the car insurance company's database.

Consider a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents.

```
CREATE TABLE CUSTOMER (
  CID VARCHAR2(8) PRIMARY KEY CONSTRAINT C1 CHECK(CID LIKE 'C%'),
  NAME VARCHAR2(20),
  ADDRESS VARCHAR2(20),
  PNO VARCHAR2(20));
```

```
SQL> CREATE TABLE CUSTOMER (
  2     CID VARCHAR2(8) PRIMARY KEY CONSTRAINT C1 CHECK(CID LIKE 'C%'),
  3     NAME VARCHAR2(20),
  4     ADDRESS VARCHAR2(20),
  5     PNO VARCHAR2(20)
  6 );
```

Table created.

```
CREATE TABLE CAR (
  LNO VARCHAR2(10) PRIMARY KEY ,
  MODEL VARCHAR2(20),
  CID VARCHAR2(8),
  CONSTRAINT CARFK1 FOREIGN KEY (CID) REFERENCES CUSTOMER(CID) ON
DELETE CASCADE);
```

```
SQL> CREATE TABLE CAR (
  2     LNO VARCHAR2(10) PRIMARY KEY ,
  3     MODEL VARCHAR2(20),
  4     CID VARCHAR2(8),
  5     CONSTRAINT CARFK1 FOREIGN KEY (CID) REFERENCES CUSTOMER(CID)
  6 );
```

Table created.

```
SQL> DESC CAR;
```

Name	Null?	Type
LNO	NOT NULL	VARCHAR2(10)
MODEL		VARCHAR2(20)
CID		VARCHAR2(8)

```
SQL> █
```

```
CREATE TABLE ACCIDENT (
  RNO VARCHAR2(10) PRIMARY KEY,
  LNO VARCHAR2(10),
  ADATE DATE,
  DAMOUNT NUMBER(10, 2),
  CONSTRAINT AFK1 FOREIGN KEY (LNO) REFERENCES CAR(LNO) ON DELETE
CASCADE);
```

```
SQL> CREATE TABLE ACCIDENT (
2     RNO VARCHAR2(10) PRIMARY KEY,
3     LNO VARCHAR2(10),
4     ADATE DATE,
5     DAMOUNT NUMBER(10, 2),
6     CONSTRAINT AFK1 FOREIGN KEY (LNO) REFERENCES CAR(LNO)
7 );
```

Table created.

```
SQL> DESC ACCIDENT;
```

Name	Null?	Type
RNO	NOT NULL	VARCHAR2(10)
LNO		VARCHAR2(10)
ADATE		DATE
DAMOUNT		NUMBER(10,2)

```
SQL> █
```

```
CREATE TABLE Comprehensive_Car (
LNO VARCHAR2(10),
INSURANCE_TYPE VARCHAR2(20),
CONSTRAINT CCFK1 FOREIGN KEY (LNO) REFERENCES CAR(LNO) ON DELETE
CASCADE);
```

```
SQL> CREATE TABLE Comprehensive_Car (
2     LNO VARCHAR2(10),
3     INSURANCE_TYPE VARCHAR2(20),
4     CONSTRAINT CCFK1 FOREIGN KEY (LNO) REFERENCES CAR(LNO)
5 );
```

Table created.

```
SQL> DESC COMPREHENSIVE_CAR;
```

Name	Null?	Type
LNO		VARCHAR2(10)
INSURANCE_TYPE		VARCHAR2(20)

```
SQL> █
```

```
CREATE TABLE Third_Party_Car (
LNO VARCHAR2(10),
TINSURANCE_TYPE VARCHAR(50),
CONSTRAINT TPCFK1 FOREIGN KEY (LNO) REFERENCES CAR(LNO) ON DELETE
CASCADE);
```

```
SQL> CREATE TABLE Third_Party_Car (
2     LNO VARCHAR2(10),
3     TINSURANCE_TYPE VARCHAR(50),
4     CONSTRAINT TPCFK1 FOREIGN KEY (LNO) REFERENCES CAR(LNO)
5 );
```

Table created.

```
SQL> DESC THIRD_PARTY_CAR;
```

Name	Null?	Type
LNO		VARCHAR2(10)
TINSURANCE_TYPE		VARCHAR2(50)

```
SQL> █
```

iii. Enter at least 5 sets of records in each table form created in part (ii).

INSERT ALL

INTO CUSTOMER VALUES ('C1', 'ARKA', 'AC-13', '9330450430')

INTO CUSTOMER VALUES ('C2', 'RAMU', 'BD-20', '8910062339')

INTO CUSTOMER VALUES ('C3', 'JADU', 'CC-21', '9007523577')

INTO CUSTOMER VALUES ('C4', 'SIDD', 'CC-10', '7014561289')


```
INTO CUSTOMER VALUES ('C5', 'JOHN', 'EF-13', '8910120012')
SELECT * FROM DUAL;
```

```
SQL> INSERT ALL
  2 INTO CUSTOMER VALUES ('C1', 'ARKA', 'AC-13', '9330450430')
  3 INTO CUSTOMER VALUES ('C2', 'RAMU', 'BD-20', '8910062339')
  4 INTO CUSTOMER VALUES ('C3', 'JADU', 'CC-21', '9007523577')
  5 INTO CUSTOMER VALUES ('C4', 'SIDD', 'CC-10', '7014561289')
  6 INTO CUSTOMER VALUES ('C5', 'JOHN', 'EF-13', '8910120012')
  7 SELECT * FROM DUAL;
```

5 rows created.

```
SQL> SELECT * FROM CUSTOMER;
```

CID	NAME	ADDRESS	PNO
C1	ARKA	AC-13	9330450430
C2	RAMU	BD-20	8910062339
C3	JADU	CC-21	9007523577
C4	SIDD	CC-10	7014561289
C5	JOHN	EF-13	8910120012

```
SQL> █
```

```
INSERT ALL
INTO CAR VALUES ('AIAPC2010', 'Toyota Camry', 'C1')
INTO CAR VALUES ('AIDPC2010', 'Scorpio', 'C2')
INTO CAR VALUES ('AICPC2010', 'Ford Mustang', 'C3')
INTO CAR VALUES ('AIEPC2010', 'Chevrolet Cruze', 'C4')
INTO CAR VALUES ('AIBPC2010', 'BMW X5', 'C5')
SELECT * FROM DUAL;
```

```
SQL> INSERT ALL
  2 INTO CAR VALUES ('AIAPC2010', 'Toyota Camry', 'C1')
  3 INTO CAR VALUES ('AIDPC2010', 'Scorpio', 'C2')
  4 INTO CAR VALUES ('AICPC2010', 'Ford Mustang', 'C3')
  5 INTO CAR VALUES ('AIEPC2010', 'Chevrolet Cruze', 'C4')
  6 INTO CAR VALUES ('AIBPC2010', 'BMW X5', 'C5')
  7 SELECT * FROM DUAL;
```

5 rows created.

```
SQL> SELECT * FROM CAR;
```

LNO	MODEL	CID
AIAPC2010	Toyota Camry	C1
AIDPC2010	Scorpio	C2
AICPC2010	Ford Mustang	C3
AIEPC2010	Chevrolet Cruze	C4
AIBPC2010	BMW X5	C5

```
SQL> █
```

```
INSERT ALL
```

```

INTO ACCIDENT VALUES ('FIR001', 'AIAPC2010', TO_DATE('19-03-2024',
'DD-MM-YYYY'), 15000.00)
INTO ACCIDENT VALUES ('FIR002', 'AIDPC2010', TO_DATE('20-03-2024',
'DD-MM-YYYY'), 20000.00)
INTO ACCIDENT VALUES ('FIR003', 'AICPC2010', TO_DATE('21-03-2024',
'DD-MM-YYYY'), 18000.00)
INTO ACCIDENT VALUES ('FIR004', 'AIEPC2010', TO_DATE('22-03-2024',
'DD-MM-YYYY'), 22000.00)
INTO ACCIDENT VALUES ('FIR005', 'AIBPC2010', TO_DATE('23-03-2010',
'DD-MM-YYYY'), 25000.00)
SELECT * FROM DUAL;

```

```

SQL> INSERT ALL
  2 INTO ACCIDENT VALUES ('FIR001', 'AIAPC2010', TO_DATE('19-03-24', 'DD-MM-YYYY'), 15000.00)
  3 INTO ACCIDENT VALUES ('FIR002', 'AIDPC2010', TO_DATE('20-03-24', 'DD-MM-YYYY'), 20000.00)
  4 INTO ACCIDENT VALUES ('FIR003', 'AICPC2010', TO_DATE('21-03-24', 'DD-MM-YYYY'), 18000.00)
  5 INTO ACCIDENT VALUES ('FIR004', 'AIEPC2010', TO_DATE('22-03-24', 'DD-MM-YYYY'), 22000.00)
  6 INTO ACCIDENT VALUES ('FIR005', 'AIBPC2010', TO_DATE('23-03-24', 'DD-MM-YYYY'), 25000.00)
  7 SELECT * FROM DUAL;

```

5 rows created.

```
SQL> SELECT * FROM ACCIDENT;
```

RNO	LNO	ADATE	DAMOUNT
FIR001	AIAPC2010	19-MAR-24	15000
FIR002	AIDPC2010	20-MAR-24	20000
FIR003	AICPC2010	21-MAR-24	18000
FIR004	AIEPC2010	22-MAR-24	22000
FIR005	AIBPC2010	23-MAR-24	25000

```
SQL> █
```

INSERT ALL

```

INTO Comprehensive_Car VALUES ('AIAPC2010', 'Comprehensive1')
INTO Comprehensive_Car VALUES ('AIDPC2010', 'Comprehensive2')
INTO Comprehensive_Car VALUES ('AICPC2010', 'Comprehensive3')
INTO Comprehensive_Car VALUES ('AIEPC2010', 'Comprehensive3')
INTO Comprehensive_Car VALUES ('AIBPC2010', 'Comprehensive1')
SELECT * FROM DUAL;

```

```

SQL> INSERT ALL
  2 INTO Comprehensive_Car VALUES ('AIAPC2010', 'Comprehensive1')
  3 INTO Comprehensive_Car VALUES ('AIDPC2010', 'Comprehensive2')
  4 INTO Comprehensive_Car VALUES ('AICPC2010', 'Comprehensive3')
  5 INTO Comprehensive_Car VALUES ('AIEPC2010', 'Comprehensive3')
  6 INTO Comprehensive_Car VALUES ('AIBPC2010', 'Comprehensive1')
  7 SELECT * FROM DUAL;

```

5 rows created.

```
SQL> SELECT * FROM COMPREHENSIVE_CAR;
```

LNO	INSURANCE_TYPE
AIAPC2010	Comprehensive1
AIDPC2010	Comprehensive2
AICPC2010	Comprehensive3
AIEPC2010	Comprehensive3
AIBPC2010	Comprehensive1

```
SQL> █
```

```

INSERT ALL
INTO Third_Party_Car VALUES ('AIAPC2010', 'Third-Party1')
INTO Third_Party_Car VALUES ('AIDPC2010', 'Third-Party1')
INTO Third_Party_Car VALUES ('AICPC2010', 'Third-Party3')
INTO Third_Party_Car VALUES ('AIEPC2010', 'Third-Party2')
INTO Third_Party_Car VALUES ('AIBPC2010', 'Third-Party2')
SELECT * FROM DUAL;

```

```

SQL> INSERT ALL
  2 INTO Third_Party_Car VALUES ('AIAPC2010', 'Third-Party1')
  3 INTO Third_Party_Car VALUES ('AIDPC2010', 'Third-Party1')
  4 INTO Third_Party_Car VALUES ('AICPC2010', 'Third-Party3')
  5 INTO Third_Party_Car VALUES ('AIEPC2010', 'Third-Party2')
  6 INTO Third_Party_Car VALUES ('AIBPC2010', 'Third-Party2')
  7 SELECT * FROM DUAL;

```

5 rows created.

```
SQL> SELECT * FROM THIRD_PARTY_CAR;
```

LNO	TINSURANCE_TYPE
AIAPC2010	Third-Party1
AIDPC2010	Third-Party1
AICPC2010	Third-Party3
AIEPC2010	Third-Party2
AIBPC2010	Third-Party2

```
SQL> █
```

iv. Write and run the following SQL queries for your database:

a. Find the total number of people who owned cars that were involved in accidents in 2010.

```

SELECT COUNT(C.CID) FROM CUSTOMER C
JOIN CAR CA ON CA.CID=C.CID
JOIN ACCIDENT A ON A.LNO = CA.LNO
WHERE EXTRACT(YEAR FROM A.ADATE)=2010;

```

```

SQL> SELECT COUNT(C.CID) FROM CUSTOMER C
  2 JOIN CAR CA ON CA.CID=C.CID
  3 JOIN ACCIDENT A ON A.LNO = CA.LNO
  4 WHERE EXTRACT(YEAR FROM A.ADATE)=2010;

```

COUNT(C.CID)
1

```
SQL> █
```

b. Find the number of accidents in which the cars belonging to "XYZ" were involved.

```
SELECT COUNT(*) AS Total_Accidents
FROM ACCIDENT A
JOIN CAR CA ON A.LNO = CA.LNO
JOIN CUSTOMER C ON CA.CID = C.CID
WHERE C.NAME = 'XYZ';
```

```
SQL> SELECT COUNT(*) AS Total_Accidents
2 FROM ACCIDENT A
3 JOIN CAR CA ON A.LNO = CA.LNO
4 JOIN CUSTOMER C ON CA.CID = C.CID
5 WHERE C.NAME = 'XYZ';
```

```
TOTAL_ACCIDENTS
-----
0
```

```
SQL> █
```

c. Add a new accident to the database; assume any values for required attributes.

```
INSERT INTO ACCIDENT (RNO, LNO, ADATE, DAMOUNT)
VALUES ('FIR006', 'AIAPC2010', TO_DATE('12-02-2010', 'DD-MM-YYYY'), 20000.00);
```

```
SQL> INSERT INTO ACCIDENT (RNO, LNO, ADATE, DAMOUNT)
2 VALUES ('FIR006', 'AIAPC2010', TO_DATE('12-02-2010', 'DD-MM-YYYY'), 20000.00);
```

1 row created.

```
SQL> SELECT * FROM ACCIDENT;
```

RNO	LNO	ADATE	DAMOUNT
FIR001	AIAPC2010	19-MAR-24	15000
FIR002	AIDPC2010	20-MAR-24	20000
FIR003	AICPC2010	21-MAR-24	18000
FIR004	AIEPC2010	22-MAR-24	22000
FIR005	AIBPC2010	23-MAR-10	25000
FIR006	AIAPC2010	12-FEB-10	20000

6 rows selected.

```
SQL> █
```

d. Delete the model 'Scorpio' belonging to "ABC".

```
DELETE FROM CAR WHERE MODEL = 'Scorpio' AND CID = 'ABC';
```

```
SQL> DELETE FROM CAR WHERE MODEL = 'Scorpio' AND CID = 'ABC';
```

0 rows deleted.

```
SQL> █
```


e.Update the damage amount for the car with licence number “AIBPC2010” in the accident with report number “FIR271” to Rs. 5000.

```
SQL> SELECT * FROM ACCIDENT;
```

RNO	LNO	ADATE	DAMOUNT
FIR001	AIAPC2010	19-MAR-24	15000
FIR002	AIDPC2010	20-MAR-24	20000
FIR003	AICPC2010	21-MAR-24	18000
FIR004	AIEPC2010	22-MAR-24	22000
FIR271	AIBPC2010	23-MAR-10	25000
FIR272	AIAPC2010	12-FEB-10	20000

6 rows selected.

```
SQL> UPDATE ACCIDENT
2 SET DAMOUNT = 5000
3 WHERE RNO = 'FIR271' AND LNO = 'AIBPC2010';
```

1 row updated.

```
SQL> SELECT * FROM ACCIDENT;
```

RNO	LNO	ADATE	DAMOUNT
FIR001	AIAPC2010	19-MAR-24	15000
FIR002	AIDPC2010	20-MAR-24	20000
FIR003	AICPC2010	21-MAR-24	18000
FIR004	AIEPC2010	22-MAR-24	22000
FIR271	AIBPC2010	23-MAR-10	5000
FIR272	AIAPC2010	12-FEB-10	20000

6 rows selected.

```
SQL> █
```