The primary objective of this database is to systematically manage and organize data for a breakdown company. Each member registers with the company, and the database handles the complexity of members owning multiple vehicles by linking each vehicle to its respective member. This facilitates efficient management of service requests and maintenance histories.

The database also streamlines the assignment and tracking of breakdown incidents, logging details such as the vehicle involved, the assigned engineer, and the time and location of the breakdown. This helps in providing timely assistance and analyzing breakdown patterns to optimize resource allocation. Integrating member, vehicle, and engineer data into a unified system ensures high organization, accuracy, and accessibility, which is crucial for delivering exceptional service and maintaining a competitive edge.

Task 1: Create Tables

Create the following tables with the specified columns:

Member Table:

- Member_ID (Primary Key): int
- First_Name: varchar(20)
- Last_Name: varchar(20)
- Member_Location: varchar(20)
- Member_Age: int

Vehicle Table:

- Vehicle_Registration (Primary Key): varchar(10)
- Vehicle_Make: varchar(10)
- Vehicle_Model: varchar(10)
- Member_ID (Foreign Key): int

Engineer Table:

- Engineer_ID (Primary Key): int
- First_Name: varchar(20)
- Last_Name: varchar(20)

Breakdown Table:

- Breakdown_ID (Primary Key): int
- Vehicle_Registration (Foreign Key): varchar(10)
- Engineer_ID (Foreign Key): int
- Breakdown_Date: date
- Breakdown_Time: time
- Breakdown_Location: varchar(20)

Using the ALTER command, set the foreign keys

Members

Member_ID	First_Name	Last_Name	Member_Location	Member_Age
1	John	Doe	New York	32
2	Jane	Smith	Los Angeles	27
3	Mark	Jones	Chicago	45
4	Emily	Davis	Houston	30
5	Luke	Brown	Phoenix	38
6	Sophia	White	Dallas	29
7	Liam	Taylor	Miami	41
8	Olivia	Green	San Diego	36
9	James	Harris	Denver	33
10	Mia	Robinson	Atlanta	25

Engineers

Engineer_ID	First_Name	Last_Name
1	Ethan	Williams
2	Olivia	Miller
3	Sophia	Clark
4	Noah	Walker

Vehicles

Vehicle_Registration	Vehicle_Make	Vehicle_Model	Member_ID
ABC1234	Toyota	Corolla	1
XYZ5678	Ford	Mustang	2
DEF1111	Honda	Civic	3
GHI2222	Chevy	Cruze	4
JKL3333	BMW	X5	5
MNO4444	Audi	A4	1
PQR5555	Mercedes	C300	2
STU6666	Nissan	Altima	3
VWX7777	Hyundai	Elantra	6
YZA8888	Tesla	Model S	7
BCD9999	Kia	Sportage	8
EFG1112	Subaru	Forester	9
HIJ1212	Jeep	Wrangler	10
KLM1414	Mazda	CX-5	4
NOP1515	Honda	Accord	5
QRS1616	Chevy	Malibu	6
TUV1717	Nissan	Sentra	7
WXY1818	Ford	Explorer	8
ZAB1919	Volvo	XC90	9
CDE2020	Lexus	RX350	10

Breakdowns

Breakdow_ID	Vehicle_Registration	Engineer_ID	Breakdown_Date	Breakdown_Time	Breakdown_Location
1	ABC1234	1	2024-09-10	10:30:00	New York
2	XYZ5678	2	2024-09-10	11:00:00	Los Angeles
3	DEF1111	3	2024-09-10	12:30:00	Chicago
4	GHI2222	4	2024-09-15	14:00:00	Houston
5	JKL3333	1	2024-09-18	09:45:00	Phoenix
6	MNO4444	2	2024-09-25	08:20:00	New York
7	PQR5555	3	2024-09-28	11:15:00	Los Angeles
8	STU6666	4	2024-09-30	15:30:00	Chicago
9	ABC1234	2	2024-10-10	09:30:00	New York
10	XYZ5678	3	2024-10-15	13:30:00	Los Angeles
11	DEF1111	4	2024-10-20	14:45:00	Chicago
12	MNO4444	1	2024-10-22	16:20:00	New York
13	JKL3333	2	2024-10-25	17:00:00	Phoenix
14	VWX7777	3	2024-11-01	08:00:00	Dallas
15	YZA8888	4	2024-11-05	09:00:00	Miami
16	BCD9999	1	2024-11-10	10:30:00	San Diego
17	EFG1112	2	2024-11-15	14:00:00	Denver
18	HIJ1212	3	2024-11-18	11:00:00	Atlanta
19	KLM1414	4	2024-11-20	15:45:00	Houston
20	NOP1515	1	2024-11-25	16:30:00	Phoenix

Task 3: Perform Queries

1. Retrieve the first 5 members from the Member table.
2. Retrieve 5 members starting from the 6th row.
3. List members who are older than 30 years.
4. Find members who live in either New York or Los Angeles.
5. Retrieve all vehicles where the make is either 'Toyota' or 'Honda'.
6. Find members whose age is between 25 and 40 years.
7. List vehicles whose registration number starts with the letter 'A'.
8. Find vehicles where the model ends with the number '5'.
9. List all engineers and order them alphabetically by their last name.
10. Retrieve all members and order them by age in descending order.
11. Count the total number of members in the Member table.
12. Retrieve all breakdowns that occurred in the year 2024.
13. Find breakdowns for vehicles with the registration 'ABC1234' or 'XYZ5678'.
14. List all vehicles with the make 'Ford'.
15. Find members whose first name starts with the letter 'J'.
16. Retrieve breakdowns that occurred before September 1, 2024.
17. List members whose last name contains 'son'.
18. Find breakdowns that occurred in locations containing 'New'.
19. Retrieve the youngest member in the Member table.
20. Retrieve the oldest member in the Member table.
21. Find vehicles owned by members who live in Los Angeles.
22. Retrieve all breakdowns handled by engineer with ID 1.
23. List all members who are younger than 35 years.
24. Find members who live in either Phoenix or Houston.
25. Retrieve vehicles where the model is either 'Civic' or 'Mustang'.
26. List members whose first name contains the letter 'a'.
27. Retrieve breakdowns that occurred between August 1, 2024, and August 31, 2024.
28. Find members whose age is not between 20 and 40 years.
29. List breakdowns that occurred after October 1, 2024.
30. Retrieve the top 3 oldest members from the Member table.

Medium Tasks (10)

1. Count the number of breakdowns for each vehicle.
2. Find members who own more than one vehicle.

3. Retrieve the total number of breakdowns handled by each engineer.
4. Group breakdowns by location and sort them by the total number of breakdowns in each location.
5. List vehicles owned by members who are younger than 30 years.
6. Retrieve all breakdowns and sort them by time in descending order.
7. Find all breakdowns for vehicles owned by members who live in New York.
8. Retrieve members who do not own any vehicles.
9. Find breakdowns that occurred in the same city where the vehicle owner resides.
10. Retrieve the total number of breakdowns handled by each engineer during 2024.

Difficult Tasks (10)

1. Retrieve a list of members along with their vehicles using a join.
2. Retrieve breakdown details along with the respective member details using a join.
3. Find members who own a vehicle but have never experienced a breakdown.
4. Retrieve vehicles along with the count of their breakdowns using a join and group by.
5. Find members whose vehicles have broken down more than twice.
6. Retrieve breakdowns where multiple vehicles broke down on the same day.
7. Count the total breakdowns handled by each engineer and label those who handled more than 5 breakdowns as 'Expert' and others as 'Beginner' using a CASE expression.
8. List all vehicles that have never had a breakdown using a subquery.
9. Find the average age of members whose vehicles have experienced at least one breakdown.
10. Retrieve the top 3 vehicles with the highest number of breakdowns, ordered by breakdown count.

Task 5: Research SQL Functions

Research the following SQL functions: AVG, MAX, MIN, and SUM. Explain with examples how each is used.

Task 6: Update and Delete Records

1. Update 3 records of your own choice from the Engineer table.
2. Delete 2 records of your own choice from the breakdown table.