

Automobile Dealership Database Management System

by GitHub/Afrokk

The programmatic implementation of the Automobile Dealership DBMS involves multiple queries through functions. The program utilizes the *sqlite3* library for C to work with the *sqlite* database. Here's an overview and look at the working of the program.

Compilation & Initial Menu:

The main code, *Main.c*, can be compiled by running `gcc Main.c -o Main -l sqlite3` command.

```
● → 3150A5 (main) gcc Main.c -o Main -l sqlite3
○ → 3150A5 (main) ./Main
Connected to the database successfully.

Welcome to the Automobile Dealership DBMS

----- MENU -----

-- CRUD Operations --
1) Add a New Vehicle
2) Add a New Lot in the Inventory
3) Add a New Customer
4) Add a New Salesman
5) Add a New Mechanic
6) Add a New Work Order

7) Delete a Field
8) Update a Field

9) Display All Vehicles
10) Display All Lots
11) Display All Customers
12) Display All Salesmen
13) Display All Mechanics
14) Display All Work Orders

-- Queries --
15) Run a Query
Press 0 to Exit.

Please Choose an Option from the Menu: █
```

The program presents a number of CRUD (Create, Read, Update, Delete) operations on startup. The database can be fully manipulated through this menu, from deleting, updating, and adding, to creating new entries. Each individual field is updatable too.

The program asks for all the details needed from the user, as required, dynamically. All the memory management is manually taken care of, so it's extremely efficient. Here's an overview:

1- Add a New Vehicle:

```
Please Choose an Option from the Menu: 1

---- Add a New Vehicle ----

Enter the Dealership VIN (NUMBERS ONLY!15): 921849123
Enter the Manufacturer: Toyota
Enter the Model Year: 1992
Enter the Vehicle Name: Supra
Optional field, Enter 0 if you don't have a Trim Level.
Enter the Trim Level: RZ
Enter the Body Type: Coupe
Enter the Color: Black
Enter the Mileage: 120000
Optional field, Enter 0 if the vehicle does not belong to a customer.
Enter the Customer ID: 0
Optional field, Enter 0 if the vehicle does not have an assigned mechanic.
Enter the Mechanic ID: 0
Optional field, Enter 0 if the vehicle is not in for work.
Enter the Work Order ID: 12
Optional field, Enter 0 if the vehicle does not belong to the dealership.
Enter the Inventory Lot Number: 0
Optional field, Enter 0 if the vehicle does not have an assigned salesman.
Enter the Salesman ID: 0

Vehicle Added Successfully.
```

2- Add a New Lot

```
Please Choose an Option from the Menu: 2

---- Add a New Lot ----

Enter the number of vehicles in the new Lot: 3

Lot Added Successfully.
```

3- Add a New Customer

```
Please Choose an Option from the Menu: 3

---- Add a New Customer ----

Enter the Customer's Name: John Cena
Enter the Customer's Phone Number: 219-231-5321
Enter the Salesman ID: 5

New Customer Added Successfully.
```

4- Add a New Salesman

```
---- Add a New Salesman ----

Enter the Salesman's Name: Ken Ching

New Salesman Added Successfully.
```

5- Add a New Mechanic

```
Please Choose an Option from the Menu: 5

---- Add a New Mechanic ----

Enter the Mechanic's Name: Marshall Su
Enter 0 if the mechanic has no work assigned.
Enter the Assigned Work ID: 5

New Mechanic Added Successfully.
```

6- Add a New Work Order

```
Please Choose an Option from the Menu: 6
```

```
---- Add a New Work Order ----
```

```
Enter the Quoted Price: 1250
```

```
Optional field, Enter 0 if there are no Work Details.
```

```
Enter the Work Details (Max 220 Characters): Head Gasket Replacement
```

```
Work Order Added Successfully.
```

7- Delete a Field

```
Please Choose an Option from the Menu: 7
```

```
---- Remove a Field ----
```

```
What would you like to remove?
```

1. Remove a Customer
2. Remove a Salesman
3. Remove a Mechanic
4. Remove a Work Order
5. Remove a Vehicle
6. Return to Main Menu

```
Enter your choice: 2
```

```
Enter the Salesman ID to remove: 9
```

```
Salesman Removed Successfully.
```

8- Update a Field

Please Choose an Option from the Menu: 8

---- Update a Field ----

What Table would you like to Update a Field in?

1. Customer
2. Salesman
3. Mechanic
4. Work Order
5. Vehicle
6. Return to Main Menu

Enter your choice: 3

Which Field in Mechanic Table would you like to Update?

1. Name
2. Assigned Work
3. Return to Main Menu

Enter your choice: 1

Enter the Mechanic ID to Update: 9

Enter the New Mechanic Name: Edward II

Mechanic Name Updated Successfully.

9- Display All Vehicles

Please Choose an Option from the Menu: 9

Retrieved Data:

```
VIN = 214475
Manufacturer = Ferrari
ModelYear = 2022
Name = F8 Tributo
TrimLevel = (null)
BodyType = Coupe
Color = Red
Mileage = 200
SalesmanID = 1
CustomerID = (null)
InventoryLotNumber = 1
MechanicID = (null)
WorkOrderID = (null)

VIN = 2415232
Manufacturer = Lexus
ModelYear = 2015
Name = RX450h
TrimLevel = Executive
BodyType = SUV
Color = White
Mileage = 120000
SalesmanID = 2
CustomerID = (null)
InventoryLotNumber = 2
MechanicID = (null)
WorkOrderID = (null)

VIN = 5552132
Manufacturer = BMW
ModelYear = 2023
Name = M5
TrimLevel = Competition
BodyType = Sedan
Color = Yellow
Mileage = 200
```

10- Display All Lots

Please Choose an Option from the Menu: 10

Retrieved Data:

LotNumber	NumVehicles
1	2
2	2
3	2
4	2
5	2
6	2
7	3

11- Display All Customers

Please Choose an Option from the Menu: 11

Retrieved Data:

CustomerID = 1
Name = Hope Song
PhoneNumber = 123-456-6891
Salesman = 0

CustomerID = 2
Name = Afrokk Khan
PhoneNumber = 123-563-3251
Salesman = 0

CustomerID = 3
Name = Eigor Dyatlov
PhoneNumber = 123-423-2132
Salesman = 0

CustomerID = 4
Name = John Deer
PhoneNumber = 123-421-2314
Salesman = 0

CustomerID = 5
Name = Usman Jabbar

8- Display All Salesmen

```
Please Choose an Option from the Menu: 12
```

```
Retrieved Data:
```

SalesmanID	SalesmanName
1	London Gail
2	Janette Frankie
3	Antonietta Mac
4	Rick James
5	Kandace Nelly
6	Phil Raylene
7	Anson Prunella
8	Frankie Lianne

All other "Display All" options work in the same way, they display all the data in the specified table.

13- Queries

The 15th option takes the user to the Queries sub-menu, which allows for 12 preset queries and the ability to run any custom SQL query on the database as well.

Here's the **Query Menu**:

```
Please Choose an Option from the Menu: 15
```

```
----- QUERY MENU -----
```

1. Display Vehicles by Specific Body Type
2. Display Number of Vehicles by Manufacturer
3. List Vehicles in the Workshop and their Work Orders
4. List Mechanics and their assigned tasks.
5. List Mechanics and the Vehicles they worked on.
6. List Total Number of Vehicles in the Inventory.
7. Display Customers with their Vehicle Details.
8. Display Workshop Customers, their Vehicle Details and Quoted Price.
9. Display Average Mileage of Vehicles in the Dealership.
10. Display Total Number of Vehicles in the Dealership.
11. Display Total Number of Vehicles in the Shop by Body Type.
12. Display Cars Waiting for Work.

```
13. Run a Custom SQL Query:
```

```
0. Return to Main Menu
```

```
Enter your choice: █
```


1- Display Vehicles by Body Type

```
Enter your choice: 1
Enter the Body Type: SUV

Here are all the SUV Vehicles:

2015  Lexus  RX450h  Executive  SUV  White
2019  Toyota  Venza  XLE  SUV  Black
2019  Jeep  Wrangler  Rubicon  SUV  Red
2023  Tesla  Model X  Plaid+  SUV  Blue
1994  Toyota  Land Cruiser  VXL  SUV  Beige

Query Executed Successfully.
```

2- Display Number of Vehicles by Manufacturer

```
Enter your choice: 2
Manufacturer = Acura
NumVehicles = 1

Manufacturer = BMW
NumVehicles = 1

Manufacturer = Chevrolet
NumVehicles = 1

Manufacturer = Ferrari
NumVehicles = 1

Manufacturer = Ford
NumVehicles = 2

Manufacturer = Jaguar
NumVehicles = 1

Manufacturer = Jeep
```

3- List Vehicles in the Workshop and their Work Orders

```
Enter your choice: 3
ModelYear = 2020
Manufacturer = Ford
Name = F-250
WorkDetails = Engine Rebuild

ModelYear = 1994
Manufacturer = Acura
Name = Legend
WorkDetails = Change Engine Oil

ModelYear = 2013
Manufacturer = Subaru
Name = Forester
WorkDetails = Suspension Rebuild

ModelYear = 2010
Manufacturer = Pontiac
```

4- List Mechanics and their Assigned Tasks

```
Enter your choice: 4
MechanicName = Kenny Bao
WorkDetails = Change Engine Oil

MechanicName = Alex Yaeko
WorkDetails = Suspension Rebuild

MechanicName = Peter Erast
WorkDetails = Fuel Injector Service

MechanicName = Gerrard Jace
WorkDetails = Modifications

MechanicName = Vincent Mitch
```

5- List mechanics and the Vehicles they worked on

```
Enter your choice: 5
MechanicName = Vincent Mitch
ModelYear = 2020
Manufacturer = Ford
Name = F-250

MechanicName = Kenny Bao
ModelYear = 1994
Manufacturer = Acura
Name = Legend

MechanicName = Alex Yaeko
ModelYear = 2013
Manufacturer = Subaru
Name = Forester

MechanicName = Gerrard Jace
```

6- List Total Number of Vehicles in the Inventory

```
Enter your choice: 6
Total Vehicles in Inventory = 15
```

7- Display Customers with their Vehicle Details.

```
Enter your choice: 7
CustomerName = John Deer
ModelYear = 2020
Manufacturer = Ford
VehicleName = F-250

CustomerName = Hope Song
ModelYear = 1994
Manufacturer = Acura
VehicleName = Legend

CustomerName = Eigor Dyatlov
ModelYear = 2013
Manufacturer = Subaru
VehicleName = Forester

CustomerName = Usman Jabbar
```

8- Display Workshop Customers, their Vehicle Details and Quoted Price

```
Enter your choice: 8
CustomerName = John Deer
ModelYear = 2020
Manufacturer = Ford
VehicleName = F-250
WorkDetails = Engine Rebuild
PriceQuote = 4500

CustomerName = Hope Song
ModelYear = 1994
Manufacturer = Acura
VehicleName = Legend
WorkDetails = Change Engine Oil
PriceQuote = 100

CustomerName = Eigor Dyatlov
ModelYear = 2013
Manufacturer = Subaru
VehicleName = Forester
WorkDetails = Suspension Rebuild
PriceQuote = 1200

CustomerName = Usman Jabbar
ModelYear = 2010
Manufacturer = Pontiac
```

9- Display Average Mileage of Vehicles in the Dealership

```
Enter your choice: 9
Average Mileage = 115836.833333333
Total Vehicles in for Service = 6
Total PriceQuote ($) = 7200
```

10- Display Total Number of Vehicles in the Dealership

```
Enter your choice: 10
Total Vehicles in Dealership = 20
```

11- Display Total Number of Vehicles in the Shop by Body Type

```
Enter your choice: 11
BodyType = Coupe
Vehicles in Dealership = 7

BodyType = Hatchback
Vehicles in Dealership = 1

BodyType = SUV
Vehicles in Dealership = 5

BodyType = Sedan
Vehicles in Dealership = 4

BodyType = Truck
Vehicles in Dealership = 2

BodyType = Wagon
Vehicles in Dealership = 1
```

12- Display Cars Waiting for Work.

```
Enter your choice: 12

Vehicles Waiting for Work:

ModelYear = 2010
Manufacturer = Pontiac
Name = G6
WorkDetails = Replace Control Arms
FreeMechanics = Max Onyx, Erma August
```

13- Run a Custom SQL Query

```
13. Run a Custom SQL Query:
0. Return to Main Menu

Enter your choice: 13
Enter an SQL Query to Exectute:
SELECT * FROM Customer WHERE CustomerID = 2;
CustomerID = 2
Name = Afrokk Khan
PhoneNumber = 123-563-3251
Salesman = 0
```

Goodbye Message:

```
Please Choose an Option from the Menu: 0

Thank you for using the Automobile Dealership DBMS. Goodbye!
→ 3150A5 (main) █
```

All the error handling, memory allocation and deallocation is managed and taken care of.