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## Abstract Code and SQL

### Main Menu

- Display the first name, last name, and role of the Privileged [User](#)
- Show the ***Search Vehicle*** button, push to go to **Search Vehicle** form
- If the user is a [Service Writer](#):
  - Show the ***View/Add/Update Repair*** button, push to go to **View/Add/Update Repair** task
- If the user is an [Inventory Clerk](#):
  - Show the ***Add Vehicle*** button, push to go to **Add Vehicle** task
- If the user is a [Manager](#):
  - Show the ***Sales by Color Report*** button to the **View Sales by Color Report** task
  - Show the ***Sales by Type Report*** button to the **View Sales by Type Report** task
  - Show the ***Sales by Manufacturer Report*** button to the **View Sales by Manufacturer Report** task
  - Show the ***Gross Customer Income Report*** button to the **View Gross Customer Income Report** task
  - Show the ***Repairs Report*** button to the **View Repairs by Manufacturer/Type/Model Report** task
  - Show the ***Below Cost Sales Report*** button to the **View Below Cost Sales Report** task
  - Show the ***Average Time in Inventory Report*** button to the **View Average Time in Inventory Report** task
- If the user is the [Owner](#):
  - All buttons above will be shown
- Push ***Cancel*** to return to close the page

```
-- Find the role of the user
-- Owner table is not necessary because the owner's username is in all the table
WITH ManagersRole AS
    (SELECT Username, 'Manager' AS Role FROM Managers),
InventoryClerksRole AS
    (SELECT Username, 'InventoryClerk' AS Role, FROM InventoryClerks),
SalespeopleRole AS
    (SELECT Username, 'Salesperson' AS Role FROM Salespeople),
ServiceWritersRole AS
    (SELECT Username, 'ServiceWriter' AS Role FROM ServiceWriters)
SELECT Username, R.Role FROM PrivilegedUsers AS PU
JOIN (ManagersRole UNION InventoryClerksRole
     UNION SalespeopleRole UNION ServiceWritersRole) AS R
ON PU.Username = R.Username
WHERE Username = '$Username';
```

## Login

- User clicks **Sign in** button on **Vehicle Search** form.
  - User enters *username* ('\$UserID'), *password* ('\$Password') in the input fields and clicks **Enter** button.

```
SELECT Password
FROM PrivilegedUsers WHERE Username = '$Username';
```

- If *email* and *password* inputs are invalid:
  - Raise message “Invalid input”
- Else, the *username* and *password* inputs are valid:
  - If User record is found but the password != '\$Password':
    - Go back to **Login** form, with an error message “Wrong password”.
  - Else:
    - Store login information as session variable '\$UserID'.
    - **Vehicle Search** Form page shows the login information
    - Go to the **Main Menu**

## Search Vehicle

(Subtask: **search vehicle and view result**)

- Display the total number of unsold **Vehicles** available for purchase

```
SELECT COUNT(*) AS TotalVehiclesForSale FROM Vehicles
INNER JOIN SalesEvents ON SalesEvents.Vin = Vehicles.Vin;
```

- User optionally enters *keyword* ('\$Keyword') input field;
- User optionally enters *price* ('\$Price') input field;
- User optionally selects an option from dropdown menus for “Vehicle type”, “Manufacturer”, “Model year”, “Color”

```
-- Create drop down menus
SELECT ManufacturerName FROM Manufacturer;

SELECT Color FROM Colors;

-- Since Type is not allowed to saved as an attribute, create the type list by hand
SELECT 'Car' AS Type UNION SELECT 'SUV' UNION SELECT 'Truck'
UNION SELECT 'Convertible' UNION SELECT 'Van MiniVan';

SELECT DISTINCT ModelYear FROM Vehicles
ORDER BY ModelYear DESC;
```

- Show a **Sign in** button to the **Login** task
  - If the user is a Privileged user
  - User enters VIN ('\$VIN') input field.

- If the **Privileged User** is a **Manager** or **Owner**:

```
-- Check if the user is a manager, assign a boolean variable '$IsManager'
SELECT '$Username' IN (SELECT Username FROM managers);
```

- The user has the option to filter by sold vehicles, unsold vehicles, or all vehicles.
- Clicked the **Search** button;
- If find **Vehicles** meet the search criteria;
  - Go to the **Search Result Page** form.
    - Display VIN, Vehicle type, Model Year, Manufacturer, Model, color(s) and List price of all unsold **Vehicles** match the criteria.
    - Sort the result by VIN ascending

```
-- First, assign the "type" to vehicles; Second, search the table with the given possible inputs '$Type',
-- '$Manufacturer', '$ModelYear', '$MaxPrice', '$MinPrice', '$Color', or '$Keyword', get "Search Result" subquery
-- "CASE WHEN" statement is added to check if the searching condition is assigned, if not, pass a TRUE
-- Thrid: use the "CASE WHEN THEN...ELSE" to consider three situations in one query:
-- a. Non-login user: show the unsold results;
-- b. login user except manager and owner: show unsold result and allow to search by Vin;
-- c. Manager or owner: show the sold/unsold/all result and allow to search by Vin
-- managers or owner can filter the result with variable '$filter': 'Sold', 'Unsold', or NULL
```

```
With TypeInfo AS (
  SELECT Vin, 'Car' AS Type FROM Cars
  UNION SELECT Vin, 'SUV' AS Type FROM SUVs
  UNION SELECT Vin, 'Van MiniVan' AS Type FROM VanMiniVans
  UNION SELECT Vin, 'Truck' AS Type FROM Trucks
  UNION SELECT Vin, 'Convertible' AS Type FROM Convertibles
),
SearchResult AS
(
  SELECT Vehicles.Vin, T.Type, ModelYear, Manufacturer, ModelName AS Model,
    C.VColors AS Colors, InvoicePrice * 1.25 AS ListPrice, S.SaleDate
  FROM Vehicles
  LEFT OUTER JOIN
    (SELECT Vin, GROUP_CONCAT(Colors SEPARATOR ' ') AS VColors
     FROM VehicleColors GROUP BY Vin
    ) AS C ON C.Vin = Vehicles.Vin
  LEFT OUTER JOIN SalesEvents AS S ON S.Vin = Vehicles.Vin
  JOIN TypeInfo AS T ON T.Vin = Vehicles.Vin
  WHERE TRUE AND
    (CASE WHEN '$Type' IS NOT NULL
     THEN Type = '$Type' ELSE TRUE END)
  AND
    (CASE WHEN '$Manufacturer' IS NOT NULL
     THEN Manufacturer = '$Manufacturer' ELSE TRUE END)
  AND
    (CASE WHEN '$ModelYear' IS NOT NULL
     THEN ModelYear = '$ModelYear' ELSE TRUE END)
  AND
    (CASE WHEN '$MaxPrice' IS NOT NULL
```

```

        THEN ListPrice <= '$MaxPrice' ELSE TRUE END)
AND
    (CASE WHEN '$MinPrice' IS NOT NULL
    THEN ListPrice >= '$MinPrice' ELSE TRUE END)
AND
    (CASE WHEN '$Color' IS NOT NULL
    THEN '$Color' IN C.VColor ELSE TRUE END)
AND
    (CASE WHEN '$Keyword' IS NOT NULL
    THEN Manufacturer LIKE '%$Keyword%' OR Model LIKE '%$Keyword%'
    OR ModelYear LIKE '%$Keyword%' OR Description LIKE '%$Keyword%'
    ELSE TRUE END)
)
CASE WHEN '$Username' = IS NULL
    THEN SELECT Vin, Type, ModelYear, Manufacturer, Model, Colors, ListPrice
    FROM SearchResult
    WHERE SaleDate IS NULL
WHEN '$Username' = IS NOT NULL AND '$IsManager' = FALSE
    THEN SELECT Vin, Type, ModelYear, Manufacturer, Model, Colors, ListPrice
    FROM SearchResult
    WHERE SaleDate IS NULL
    AND (CASE WHEN '$Vin' IS NOT NULL
        THEN Vin = '$Vin' ELSE TRUE END)
ELSE
    SELECT Vin, Type, ModelYear, Manufacturer, Model, Colors, ListPrice
    FROM SearchResult
    WHERE TRUE AND
        (CASE WHEN '$filter' = 'Sold'
        THEN SaleDate IS NOT NULL
        WHEN '$filter' = 'Unsold'
        THEN SaleDate IS NULL
        ELSE TRUE END)
    AND
        (CASE WHEN '$Vin' IS NOT NULL
        THEN Vin = '$Vin'
        ELSE TRUE END)
END
ORDER BY Vin
AS MainTable;

```

--Save it to MainTable for the check mark in box, which cannot be written in one query

- Indicate if the keyword matches the description on a check box X mark.

```

-- select which vehicles need to check mark to show the description matched
SELECT Vin FROM MainTable
INNER JOIN Vehicles ON Vehicles.Vin = MainTable.Vin
WHERE Vehicles.Description LIKE '%$Keyword%';

```

- If no Vehicles meet the search criteria;
  - An error message “Sorry, it looks like we don’t have that in stock!” is displayed.

- Go back to the **Search Vehicle** form.

(Subtask: **view vehicle details**)

- User Clicks on an individual search result and display the following information in the **Search Vehicle Detail Page** form:

- Display VIN, vehicle type, attributes for that vehicle type, Model Year, Model Name, Manufacturer, color(s), list price, and description.

```
-- Assume the Vin of the vehicles is '$Vin'
-- 1. Develop the subquery for the vehicle's information except for the type and the type's attribute called Details
-- 2. Join the Details table with the specific attribute table of the its type
```

With Details AS

```
(
    SELECT V.Vin, ModelYear, ModelName AS Model, Manufacturer,
           1.25*InvoicePrice AS ListPrice, C.VColors AS Color, Description,
    FROM Vehicles AS V
    LEFT OUTER JOIN
        (SELECT Vin, GROUP_CONCAT(Colors SEPARATOR ' ') AS VColors
         FROM VehicleColors GROUP BY Vin
        ) AS C ON C.Vin = V.Vin
    WHERE V.Vin = '$Vin';
)
CASE WHEN '$Vin' IN (SELECT Vin FROM Cars )
    THEN SELECT Details.*, 'Car' AS Type, CA.NumOfDoors FROM Details
    INNER JOIN Cars AS CA ON CA.Vin = Details.Vin
WHEN '$Vin' IN (SELECT Vin FROM SUVs )
    THEN SELECT Details.*, 'SUV' AS Type, SU.DrivetrainType, SU.NunberOfCupholders
    FROM Details INNER JOIN SUVs AS SU ON SU.Vin = Details.Vin
WHEN '$Vin' IN (SELECT Vin FROM VanMiniVans )
    THEN SELECT Details.*, 'Van MiniVan' AS Type, VA.HasDriverSideBackDoor FROM Details
    INNER JOIN VanMiniVans AS VA ON VA.Vin = Details.Vin
WHEN '$Vin' IN (SELECT Vin FROM Trucks )
    THEN SELECT Details.*, 'Truck' AS Type, TR.CargoCoverType, TR.NumberOfRearAxles,
    TR.CargoCapacity FROM Details
    INNER JOIN TRUCK AS TR ON TR.Vin = Details.Vin
ELSE
    SELECT Details.*, 'Convertible' AS Type, CO.RoofType, CO.BackSeatCount FROM Details
    INNER JOIN Convertibles AS CO ON CO.Vin = Details.Vin
END
```

- If user is a Salesperson or the Owner:

```
-- Check if the user is a salesperson, if yes we need to show the sale car button
SELECT '$Username' IN (SELECT Username FROM Salespeople);
```

- Display a ***Sale Vehicle*** button behind each vehicle to go to the **Sales Order** form
- If user is a Manager or Owner:

```
-- Check if the user is a manager
SELECT '$Username' IN (SELECT Username FROM Managers);
```

- Find the [Inventory Clerk](#) associated with the Vehicle

```
-- get the name of the inventory clerk
SELECT CONCAT(FirstName, ' ', LastName) AS ClerkName
FROM PrivilegedUser
INNER JOIN (SELECT ClerkUsername FROM Vehicles WHERE Vin = '$Vin') AS V
ON Username = V.ClerkUsername;
```

- Display the Inventory Clerk's name, the invoice price, and the date added
- If the [Vehicle](#) is sold:
  - Find the [Sales Event](#); Get the sale date, sale price
  - Find the [Customer](#) associated with the Sales Event; Get the information
  - Find the [Salesperson](#); Get the Salesperson's name
  - Display all the Customer information (except the Key), list price, sale price, sales date, and the Salesperson's 's name.

```
-- Sales Section
-- Develop a subquery to union the person and business table first, called CustomerInfo
With CustomerInfo AS
(
  SELECT CONCAT(P.FirstName, ' ', P.LastName) AS Name, NULL AS ContactName,
  NULL AS ContactTitle, C.Phone AS Phone, C.Email AS Email, P.CustomerID,
  CONCAT(C.Street, ' ', C.City, ' ', C.State, ' ', C.Zipcode) AS Address
  FROM Persons AS P
  INNER JOIN Customers AS C ON P.CustomerID = C.CustomerID
UNION ALL
  SELECT Name, (ContactFName, ' ', ContactLName) AS ContactName,
  ContactTitle, C.Phone AS Phone, C.Email AS Email, B.CustomerID,
  CONCAT(C.Street, ' ', C.City, ' ', C.State, ' ', C.Zipcode) AS Address
  FROM Business AS B
  INNER JOIN Customers AS C ON B.CustomerID = C.CustomerID
)
SELECT SalePrice, SaleDate, CONCAT(SA.FirstName, ' ', SA.LastName) AS SalespersonName
CustomerInfo.Name, CustomerInfo.ContactName, CustomerInfo.ContactTitle,
CustomerInfo.Phone, CustomerInfo.Email, CustomerInfo.Address
FROM SalesEvents
INNER JOIN Salespeople AS SP ON SP.Username = SalesEvent.Username
INNER JOIN CustomerInfo ON SalesEvent.CustomerID = CustomerInfo.CustomerID
WHERE SalesEvents.Vin = '$Vin';
```

- If the [Vehicle](#) has been repaired:
  - Find the [Repair Events](#); Get the start date, end date, labor cost, part cost, and total cost
  - Find the [Customers](#) associated with the Repair Events; Get the Customer's name
  - Find the [Service Writer](#) associated with the Repair Events; Get the name
  - Show a "Repair" section, Display the Customers' name, the Service Writer's name, start date, end date, labor cost, part cost, and total cost.

```

-- Repair Section
With CustomerInfo AS
(
    SELECT CONCAT(P.FirstName, ' ', P.LastName) AS Name , P.CustomerID
    FROM Persons AS P
UNION ALL
    SELECT Name , B.CustomerID
    FROM Business AS B
)
SELECT CustomerInfo.Name, CONCAT(SW.FirstName, ' ', SW.LastName) AS ServiceWriterName,
R.StartDate, R.EndDate, R.Laborchange, IFNULL(PA.PartCost, 0) AS PartCost,
    (IFNULL(PA.PartCost, 0) + R.LaborCharge) AS TotalCostTotalCost
FROM RepairEvents AS R
LEFT JOIN
    (SELECT Vin, StartDate, SUM(QuantityUsed * Price) AS PartCost
    FROM Parts GROUP BY Vin, StartDate) AS PA
ON R.Vin = PA.Vin AND R. StartDate = PA.StartDate
    WHERE RepairEvents.Vin = '$Vin'
INNER JOIN ServiceWriters AS SW ON SW.Username = R.Username
INNER JOIN CustomerInfo ON R.CustomerID = CustomerInfo.CustomerID;

```

- Push **Cancel**: Close this page and return to the search vehicle page

## Add Vehicle

- Inventory clerk or Owner clicks on the **Add Vehicle** button from the **Main Menu** form
- Enter *VIN, manufacturer, model name, model year, invoice price, colors, description*
- Select *type* in the drop-down menu
  - Enter the *specific attribute* of the type

```

--create drop down menus
SELECT ManufacturerName FROM Manufacturer;

SELECT Color FROM Colors;

SELECT 'Car' AS Type UNION SELECT 'SUV' UNION SELECT 'Truck'
UNION SELECT 'Convertible' UNION SELECT 'Van MiniVan';

```

- If information is incomplete or invalid:
  - Raise message “Incomplete or invalid information, please enter again”
- Else:
  - Add a new instance in [Vehicles](#)
  - The list price will be 125% \* invoice price
  - Save the current date to date added

```

-- check whether the '$ModelYear' is valid
SELECT '$ModelYear' <= YEAR(GETDATE()) + 1;
-- Create new vehicle tuple

```



```

INTO Vehicles (Vin, Manufacturer, ModelName, ModelYear, DateAdded, InvoicePrice, Description) VALUES
('$Vin', '$Manufacturer', '$ModelName', '$ModelYear', '$DateAdded', '$InvoicePrice', '$Description');

-- Assume the type of the vehicle is '$Type', create new tuple of specific type
CASE WHEN '$Type' = 'Car'
      THEN INSERT INTO Cars (Vin, NumOfDoors) VALUES ('$Vin', '$NumOfDoors')
WHEN '$Type' = 'SUV'
      THEN INSERT INTO SUVs (Vin, DrivetrainType, NumberOfCupholders
) VALUES ('$Vin', '$ DrivetrainType ', '$ NumberOfCupholders')
WHEN '$Type' = 'Van MiniVan'
      THEN INSERT INTO VanMinVans (HasDriverSideBackDoor) VALUES
('$Vin', '$HasDriverSideBackDoor ')
WHEN '$Type' = 'Convertible'
      THEN INSERT INTO Convertibles (Vin, RoofType, BackSeatCount) VALUES ('$Vin',
'$RoofType ', '$ BackSeatCount ')
ELSE
      INSERT INTO Trucks (Vin, CargoCoverType, NumberOfRearAxles, CargoCapacity) VALUES
('$Vin', '$CargoCoverType', '$NumberOfRearAxles', '$CargoCapacity')
END;

```

- Return to the **Add Vehicle** form

## Search/Add Customer

- User can only access this task by pushing button in **Service Writer Form** or **Sales Order Form**
- (Subtask: **search customer**)
- User selects **Customer** type: *person* or *business*, push **Confirm** to continue
  - If person, enter *license* and push **Search**:
    - Find the **person** using the license
    - Display First Name, Last Name, License, Address, Phone Number, Email
  - If business, user enter *Tax Identification Number* and push **Search**:
    - Find the **business** using the Tax Identification Number
    - Display Name, Tax Identification Number, Contact Name, Contact Title, Address, Phone Number, Email

```

-- Assume '$CustomerType' is either 'Person' or 'Business'
-- Combine the two types of customer into one query
-- 1. Union the person and business table, and filter by customer type '$CustomerType'
-- 2. and id '$Input' for either License or TaxNum

SELECT Name, Id, ContactName, ContactTitle, Address, Phone, Email, CustomerID
FROM
(
  SELECT CONCAT(P.FirstName, ' ', P.LastName) AS Name, P.License AS Id, C.CustomerID,
  NULL AS ContactName, NULL AS ContactTitle, C.Phone, C.Email,
  CONCAT(C.Street, ' ', C.City, ' ', C.State, ' ', C.Zipcode) AS Address
  FROM Persons AS P
  INNER JOIN Customers AS C ON P.CustomerID = C.CustomerID
UNION ALL
  SELECT Name, TaxNum AS Id, C.CustomerID,

```

```

(ContactFName, ' ', ContactLName) AS ContactName, ContactTitle, C.Phone, C.Email,
CONCAT(C.Street, ' ', C.City, ' ', C.State, ' ', C.Zipcode) AS Address
FROM Business AS B
INNER JOIN Customers AS C ON B.CustomerID = C.CustomerID
)
WHERE CustomerType = '$CustomerType' AND Id = '$Input'
AS MainTable2

```

- If not found:
  - raise message “Not Found”
- Push ***Search Again*** to return to select customer type
- Push ***Confirm Customer:***
  - Return to the **Service Writer Form** or **Sales Order Form**; And display “Customer Confirmed” on the form

```

-- pass the CustomerID to the Repair/Sale task
SELECT CustomerID FROM MainTable2

```

(Subtask: **add new customer**)

- Push the ***Add New Customer*** button
- User selects **Customer** type: *person* or *business*
- If **Person**, enter:
  - *First Name, Last Name, License, Address, Phone Number, Email*
- If **Business**, enter:
  - *Name, Tax Identification Number, Contact Name, Contact Title, Address, Phone Number, Email*
- Push ***Add*** button:
  - If information is completed and valid:
    - Add a new instance of **Customer** with the information
  - Else:
    - raise message “Invalid or incomplete information”

```

-- Create new customer No need to insert customer id, which is auto generated
INSERT INTO Customers (Street, City, State, ZipCode, Email, PhoneNum) VALUES ('$Street', '$City', '$State', '$ZipCode', '$Email', '$PhoneNum');

--get the surrogate key as '$CustomerID', which will be passed to repair/sales task as well
SELECT LAST_INSERT_ID();

--if add a person customer
INSERT INTO Persons (License, FirstName, LastName, CustomerID) VALUES ('$License', '$FirstName', '$LastName', '$CustomerID');

-- if add a business customer
INSERT INTO Business (TaxNum, Name, ContactFName, ContactLName, ContactTitle, CustomerID) VALUES ('$TaxNum', '$Name', '$ContactFName', '$ContactLName', '$ContactTitle', '$CustomerID');

```

- Push ***Confirm Customer:***
  - Return to the **Service Writer Form** or **Sales Order Form**; And display “Customer Confirmed” on the form
- Push ***Cancel*** :

○ close the form; return to the **Service Writer Form** or **Sales Order Form** without selecting a customer

## Add Sales

- Salespeople push a button on **Search Vehicle Detail Page**
- Find the **Vehicle** selected in **Search Vehicle** task
- Push a **Customer** button to prompt the **Search/Add Customer** form to find **Customer**
- Enter: the *sale price* ('\$SalePrice')
- Push **Confirm Button**
  - If the '\$SalePrice' is not valid:
    - raise message "Invalid Entry"
  - If the '\$SalePrice' is not higher than 95% of the invoice price, and the user is not Roland Around:
    - raise message "Price too low"

```
-- check the invoice price
SELECT InvoicePrice > 0.95 * '$SalePrice' FROM Vehicles
WHERE Vin = '$Vin';
```

```
-- check if the user is the owner
SELECT Username = '$Username' FROM Owner;
```

- Else:
  - Update the Sold attribute of **Vehicle** from Unsold to Sold
  - Add a new **Sales Event** instance with '\$SalePrice'
  - Save the current date as Sale date of the **Sales Event**

```
-- Create new sales event, assume Vin is '$Vin', Customer ID is '$CustomerID'
-- salesperson username '$Username', he/she enter the '$SalePrice'
-- Get the date of today as SaleDate
INSERT INTO SalesEvents (Vin, SaleDate, SalePrice, CustomerID, Username) VALUES ('$Vin', (SELECT
GETDATE()), '$SalePrice', '$CustomerID', '$Username');
```

- Display a message "Sale has been successfully added"
  - Close this **form**; go to the **Search Vehicle Detail Page** form
- Push **Cancel** :
  - go to the **Search Vehicle Detail Page** Form without filing the sales

## View/Add/Update Repair

- Service Writer or Owner push button ***View/Add/Update Repair*** on the **Main Menu**

(Subtask: **lookup vehicle**)

- User enter the *VIN* ('\$VIN') and push **Search** button,
- If '\$VIN' is not found, raise an error message "VIN is not found".
- If '\$VIN' is for an unsold Vehicle, raise message "Unsold Vehicle"
- Else, Display VIN, Vehicle type, Model Year, model name, manufacturer, and colors of the sold **Vehicles**.

```
-- Check whether the Vin is in the sold vehicles
SELECT ('$Vin' IN (SELECT Vin FROM SalesEvent) );

--If yes, then see the detail of the vehicles
With TypeInfo AS (
    SELECT Vin, 'Car' AS Type FROM Cars
    UNION SELECT Vin, 'SUV' AS Type FROM SUVs
    UNION SELECT Vin, 'Van MiniVan' AS Type FROM VanMiniVans
    UNION SELECT Vin, 'Truck' AS Type FROM Trucks
    UNION SELECT Vin, 'Convertible' AS Type FROM Convertibles
),
SELECT Vehicles.Vin, T.Type, ModelYear, Manufacturer, ModelName AS Model,
    C.VColors AS Colors
FROM Vehicles
JOIN (SELECT Vin, GROUP_CONCAT(Colors SEPARATOR ' ') AS VColors
    FROM VehicleColors GROUP BY Vin
    ) AS C ON C.Vin = Vehicles.Vin
JOIN TypeInfo AS T ON T.Vin = Vehicles.Vin
WHERE Vehicles.Vin = '$Vin' ;
```

Push **Search Again** to go back to search

- Push **Confirm** to check the repair event of this vehicle
- 

(Subtask: **view open repair event**)

- Find the Open **Repair Event** associated with the Vehicle
- Find the **Needs** and **Parts** associated with Repair Event
- Display the labor cost, total cost, odometer, start date, parts number, parts quantity

```
--Search if there is any incomplete repairs with '$Vin'
SELECT '$Vin' IN (SELECT Vin FROM RepairEvents WHERE EndDate IS NULL);

-- If yes, show the detail
SELECT R.Vin, R.StartDate, R.Odometer, R.LaborCharge, IFNULL(PA.PartCost, 0) AS PartCost,
    (IFNULL(PA.PartCost, 0) + LaborCharge) AS TotalCost
FROM RepairEvents AS R
LEFT JOIN (SELECT Vin, StartDate, SUM(QuantityUsed * Price) AS PartCost
    FROM Parts GROUP BY Vin, StartDate) AS PA
ON RepairEvents.Vin = PA.Vin AND RepairEvents.StartDate = PA.StartDate
WHERE RepairEvents.Vin = '$Vin' AND EndDate IS NULL;
```

(Subtask: **add a repair event**)

- If no open Repair Event exists, the user push **Add New Repair**;
  - Push a **Customer** button to the **Search/Add Customer** form to find or add **Customer**
  - The user enters the *odometer*
  - User push **Add Repair**:
    - If the information is not completed or invalid:
      - Raise a message “Invalid or incomplete information”
    - Else,

- Add a new **Repair Event** instance entered information;
- Save the status of **Repair Event** is “Open”;
- Save the current date as the start date;

```
-- Subtask create new repair event, assume Vin is '$Vin', Customer ID is '$CustomerID'
-- service writer username '$Username'
INSERT INTO RepairEvents (Vin, StartDate, EndDate, LarborCharge, Odometer, Description, CustomerID, Username) VALUES ('$Vin', (SELECT GETDATE()), NULL, '0.00', '0', NULL, '$CustomerID', '$Username');
```

- Push **Continue** Go to **update repair event**
- Push **Cancel**, No Repair Event added, display the **Add New Repair** button on the form

(Subtask: **update Repair Event**)

- If there is an open **Repair Event**, Push **Update** button
  - User optionally enter a *description* in the input field
  - User optionally enter a new *labor cost* ('\$labor cost') in an input field
  - Push **OK** button following the input field
    - If '\$labor cost' not higher than original and the user is not Owner, or the data is not valid:
      - Raise a message “Invalid entry, Please enter again”

```
-- check the if the new labor charge higher than the old labor charge
SELECT LaborCharge < '$LaborCharge' AS OldCharge
FROM RepairEvents WHERE Vin = '$Vin' AND StartDate = '$StartDate';
```

```
-- check if the user is the owner
SELECT Username = '$Username' FROM Owner;
```

- Else:
  - Update labor cost, total cost

```
--Subtask update repair event, assume '$LaborCharge', '$Odometer', '$Description' are entered by the user
UPDATE RepairEvents
SET LarborCharge = '$LaborCharge', Odometer = '$Odometer', Description = '$Description'
WHERE Vin = '$Vin' AND StartDate = '$StartDate';
```

- **view open repair event**
  - User optionally enter the *quantity, vendor, part number, price* of **Parts** in an input field
  - Push **OK** button following the input field
    - If the information is valid:
      - Update information

```
--If user add parts '$Vin', '$StartDate' are the primary key of the RepairEvents tuple
--'$Number', '$Price', '$QuantityUsed' are entered by the user
INSERT INTO Parts (Vin, StartDate, Price, Number, QuantityUsed) VALUES ('$Vin', '$StartDate', '$Price', '$Number', '$QuantityUsed');
```

```
--If the user update the quantity used of parts, '$NewQuantityUsed' is entered by the user
UPDATE Parts
SET QuantityUsed = '$NewQuantityUsed'
WHERE Vin = '$Vin' AND StartDate = '$StartDate' AND Number = '$Number';
```

- **view open repair event**
- Else:
  - raise message “Invalid or incomplete information”
- Push ***Save for Later***
  - Update information of the **Repair Event** and the **Needs**
  - Status of the **Repair Event** is “Open”.
  - **view open repair event**
- Push ***Save and Close Repair***
  - Update the **Repair Event** and **Needs**
  - Status of **Repair Event** is “Close”
  - Save the current date of **Repair Event** as end date

--If the close the repair event

UPDATE **RepairEvents**

SET EndDate = (SELECT GETDATE())

WHERE Vin = '\$Vin' AND StartDate = '\$StartDate';

- Close the **form** and return to main menu
- Push ***Cancel***:
  - No Information updated and return to the main menu

## View Sales by Color Report

- Page open by clicking on ***Sales by Color Report*** button from the **Main Menu**
- Get the sold date from **Sale Events**; Get the last sold date in all the **Sales Events**
- Find the sold **Vehicles** of each Sales Event; Get the colors of the **Vehicles**
- Display a table with three columns: “Sales within 30 days”, “Sales within last year”, “All time sales”
- Aggregate number of sold **Vehicles** by color, where sold date <= last sold date - 30, as **Last 30 days' sales**
- Aggregate number of sold **Vehicles** by color, where sold date <= last sold date - 365, as **Last year sales**
- Aggregate number of all sold **Vehicles** by color, as **All time sales**
- In all the aggregations, if the vehicle colors have multiple values:
  - Aggregate the number to the row “multiple” separately
- If no **Vehicle** sold in a color in each aggregation:
  - Assign “0” to the value for that color
- Display the **Last 30 days sales** in the first column
- Display the **Last year sales** in the second column
- Display the **All time sales** color in the third column

-- Get '\$LastSaleDate' , same process at the beginning of Sales by type and by manufacturer

-- Actually this can be nested in the main query, but may cause confusion

SELECT MAX(SaleDate) FROM SalesEvent;

-- 1. Find the Vehicles with single color, and those with multiple colors

- 2. For the single color vehicles, get the sales count of month, year, and all time by color
- 3. Join the result of month year, all time for single color vehicles
- 4. Union the single color table with the row "multiple" with the sale of month year and all time

With SingleColorSoldVehicles AS

```
(
    SELECT SalesEvent.Vin, SaleDate, VehicleColors.Colors AS Color
    FROM SalesEvents
    INNER JOIN VehicleColors ON VehicleColors.Vin = SalesEvents.Vin
    WHERE SalesEvents.Vin IN
    (SELECT VIN FROM
        (Vin, Count(*) AS ColorCount
        FROM VehicleColors
        GROUP BY Vin HAVING ColorCount = 1)
    ),
MultiColorSoldVehicles AS
(
    SELECT Vin, SaleDate FROM SalesEvents
    WHERE Vin NOT IN
    (SELECT VIN FROM SingleColorSoldVehicles)
),
SingleColorVehicleMonthSalesByColor AS
(
    SELECT Color, Count(*) AS SaleCount FROM SingleColorSoldVehicles
    WHERE '$LastSaleDate' - SaleDate <= 30
    GROUP BY Color
),
SingleColorVehicleYearSalesByColor AS
(
    SELECT Color, Count(*) AS SaleCount FROM SingleColorSoldVehicles
    WHERE '$LastSaleDate' - SaleDate <= 365
    GROUP BY Color
),
SingleColorVehicleAllTimeSalesByColor AS
(
    SELECT Color, Count(*) AS SaleCount FROM SingleColorSoldVehicles
    GROUP BY Color
)
SELECT DISTINCT C.Color,
    IFNULL (M.SaleCount,0) AS MonthlySales,
    IFNULL (Y.SaleCount,0) AS YearSales,
    IFNULL (A.SaleCount,0) AS AllTimeSales
FROM Colors AS C
LEFT OUTER JOIN SingleColorVehicleMonthSalesByColor AS M
    ON C.Color = M.Color
LEFT OUTER JOIN SingleColorVehicleYearSalesByColor AS Y
    ON C.Color = Y.Color
LEFT OUTER JOIN SingleColorVehicleAllTimeSalesByColor AS A
    ON V.Color = A.Color
UNION ALL
SELECT 'Multiple' AS Color,
```

```
(SELECT COUNT(*) FROM MultiColorSoldVehicles
  WHERE '$ LastSaleDate' - SaleDate <= 30) AS MonthlySales,
(SELECT COUNT(*) FROM MultiColorSoldVehicles
  WHERE '$ LastSaleDate' - SaleDate <= 365) AS YearSales,
(SELECT COUNT(*) FROM MultiColorSoldVehicles) AS AllTimeSales
ORDER BY Color;
```

- Push *Close* to return to Main Menu

## View Sales by Type Report

- Page open by pushing *Sales by Type Report* button on Main Menu
- Get the sold dates from [Sale Events](#); Get the last sold date in all the [Sales Events](#)
- Find the sold [Vehicles](#) of each Sales Event; Get the type of each Vehicle
- Display a table with three columns: “Sales within 30 days”, “Sales within last year”; “All time sales”
  - Aggregate number of sold [Vehicles](#) by type, where sold date <= last sold date - 30, as Last 30 days' sales
  - Aggregate number of sold [Vehicles](#) by type, where sold date <= last sold date - 365, as Last year sales
  - Aggregate number of all sold [Vehicles](#) by type, as All time sales
  - If no [Vehicle](#) sold in a color in each aggregation:
    - Assign “0” to the value for that type
- Display the Last 30 days sales in the first column
- Display the Last year sales in the second column
- Display the All time sales color in the third column

```
-- Similar to the sales by color
-- 1.Assign type to the vehicles, then develop the VehiclesWithType subquery
-- 2.Get the sale count of month, year, all time by type
-- 3.Create a column with all types by hand, in case some types have no sales at all
-- 4.Join the month, year, all time sales
```

```
With TypeInfo AS (
  SELECT Vin, 'Car' AS Type FROM Cars
  UNION SELECT Vin, 'SUV' AS Type FROM SUVs
  UNION SELECT Vin, 'Van MiniVan' AS Type FROM VanMiniVans
  UNION SELECT Vin, 'Truck' AS Type FROM Trucks
  UNION SELECT Vin, 'Convertible' AS Type FROM Convertibles
),
VehiclesWithType AS
(
  SELECT Vs.Vin, T.Type FROM Vehicles AS Vs
  JOIN TypeInfo AS T ON T.Vin = Vs.Vin
),
TypeSoldVehicles AS
(
  SELECT SalesEvents.Vin, VT.SaleDate, VT.Type FROM SalesEvents
  INNER JOIN VehiclesWithType AS VT ON SalesEvents .Vin = VT.Vin
),
VehicleMonthSalesByType AS
```



```

(
    SELECT Type, Count(*) AS SaleCount FROM TypeSoldVehicles
    WHERE '$LastSaleDate' - SaleDate <= 30
    GROUP BY Type
),
VehicleYearSalesByType AS
(
    SELECT Type, Count(*) AS SaleCount FROM TypeSoldVehicles
    WHERE '$LastSaleDate' - SaleDate <= 365
    GROUP BY Color
),
VehicleAllTimeSalesByType AS
(
    SELECT Type, Count(*) AS SaleCount FROM TypeSoldVehicles
    GROUP BY Type
),
AllTypes AS (
    SELECT 'Car' AS Type UNION SELECT 'SUV' UNION SELECT 'Truck'
    UNION SELECT 'Convertible' UNION SELECT 'Van MiniVan'
)
SELECT T.Type,
    IFNULL (M.SaleCount,0) AS MonthlySales,
    IFNULL (Y.SaleCount,0) AS YearSales,
    IFNULL (A.SaleCount,0) AS AllTimeSales
FROM AllTypes AS T
LEFT OUTER JOIN VehicleMonthSalesByType AS M ON T.Type = M.Type
LEFT OUTER JOIN VehicleMonthSalesByType AS Y ON T.Type = Y.Type
LEFT OUTER JOIN VehicleAllTimeSalesByType AS A ON T.Type = A.Type
ORDER BY Type;

```

- Push *Close* to return to **Main Menu**

## View Sales by Manufacturer Report.

- Page open by pushing ***Sales by Manufacturer Report*** button on **Main Menu**
- Get the sold dates from [sale events](#); Get the last sold date in all the [Sales Events](#)
- Find the sold [Vehicles](#) of each Sales Event; Get the manufacturer of each Vehicle
- Display a table with three column: “Sales within 30 days”, “Sales within last year”; “All time sales”
  - Aggregate number of sold [Vehicles](#) by manufacturer, where sold date <= last sold date - 30, as Last 30 days sales
  - Aggregate number of sold [Vehicles](#) by manufacturer, where sold date <= last sold date - 365, as Last year sales
  - Aggregate number of all sold [Vehicles](#) by manufacturer, as All time Sales
  - If no Vehicle sold in a color in each aggregation:
    - Assign “0” to the value for that type
  - If all three values of a manufacturer is “0”:
    - Remove the row of the manufacturer
- Display the Last 30 days sales in the first column
- Display the Last year sales in the second column
- Display the All time Sales color in the third column

-- Similar to the two tables above. But need to exclude rows with 0 sale in three columns

With ManuSoldVehicles AS

```
(
    SELECT SalesEvents.Vin, SaleDate, Vehicles.Manufacturer FROM SalesEvents
    INNER JOIN Vehicles ON Vin
),
```

VehicleMonthSalesByManu AS

```
(
    SELECT Manufacturer, Count(*) AS SaleCount FROM ManuSoldVehicles
    WHERE '$LastSaleDate' - SaleDate <= 30
    GROUP BY Manufacturer
),
```

VehicleYearSalesByManu AS

```
(
    SELECT Manufacturer, Count(*) AS SaleCount FROM ManuSoldVehicles
    WHERE '$LastSaleDate' - SaleDate <= 365
    GROUP BY Manufacturer
),
```

VehicleAllTimeSalesByManu AS

```
(
    SELECT Manufacturer, Count(*) AS SaleCount FROM ManuSoldVehicles
    GROUP BY Manufacturer
),
```

```
SELECT ManufacturerName,
    IFNULL (M.SaleCount,0) AS MonthlySales,
    IFNULL (Y.SaleCount,0) AS YearSales,
    IFNULL (A.SaleCount,0) AS AllTimeSales
FROM Manufacturer AS Manu
LEFT OUTER JOIN VehicleMonthSalesByManu AS M
    ON Manu.ManufacturerName = M.Manufacturer
LEFT OUTER JOIN VehicleMonthSalesByManu AS Y
    ON Manu.ManufacturerName = Y.Manufacturer
LEFT OUTER JOIN VehicleAllTimeSalesByManu AS A
    ON Manu.ManufacturerName = A.Manufacturer
WHERE AllTimeSales != 0 OR YearSales != 0 OR MonthSales != 0
ORDER BY ManufacturerName;
```

- Push *Close* to return to Main Menu

## View Gross Customer Income Report

- Page open by pushing *Gross Customer Income Report* button on Main Menu
- Get the name of **Customers**:
  - If **Person**: get first name + last name
  - Else: get **Business** name

(Subtask: **look up customer sales overview**)

- Find the **Sales Events** associated with customers; Get the sale price, sold date of the **Sales Events**
  - Sum the sale price by customer as customer sales income
  - Aggregate the number of sales by customer as customer sales number
  - Get the max and min of sale date of customers

(Subtask: **look up customer repair overview**)

- the [Repair Events](#) associated with customers; Get the repair cost, start date of the [Repair Events](#)
  - Sum the repair cost by customer as customer repair income
  - Aggregate the number of repairs by customer as customer repair number
  - Get the max and min of repair start date of customers
- Get the total gross incomes by customer repair income + customer sales income
- Get the date of first sale/repair by min(first sold date, first repair date)
- Get the date of last sale/repair by max(last sold date, last repair date)
- Sort the result by total gross incomes descending and by date of last sale/repair descending
- Display the first 15 result of customers' name, date of first sale/repair, date of last sale/repair, total gross incomes in rows

```
-- Create three subqueries: customer info, sales info, repair info
-- Join them on Customer ID

WITH CustomerInfo AS
(
    SELECT CustomerID, CONCAT(FirstName, ' ', LastName) AS Name FROM Persons AS P
    UNION ALL
    SELECT CustomerID, Name FROM Business
)
SalesInfo AS
(
    SELECT CustomerID, SUM(SalePrice) AS SalesIncome, Count(*) AS SalesNumber,
    MAX(SalesDate) AS LastSalesDate, MIN(SalesDate) AS FirstSalesDate
    FROM SalesEvents
    GROUP BY CustomerID
)
RepairInfo AS
(
    SELECT CustomerID, SUM(LaborCharge) + SUM(IFNULL(PA.PartCost,0) ) AS RepairIncome,
    Count(*) AS RepairNumber, MAX(RepairEvents.StartDate) AS LastRepairDate,
    MIN(RepairEvents.StartDate) AS FirstRepairDate
    FROM RepairEvents
    LEFT JOIN
        (SELECT Vin, StartDate, SUM(QuantityUsed * Price) AS PartCost
        FROM Parts GROUP BY Vin, StartDate) AS PA
    ON RepairEvents.Vin = PA.Vin AND RepairEvents.StartDate = PA.StartDate
    GROUP BY CustomerID
)
SELECT C.Name, MIN(R.FirstRepairDate, S.FirstSalesDate) AS FirstDate,
    MAX(R.LastRepairDate, S.LastSalesDate) AS LastDate, S.SalesNumber, R.RepairNumber,
    IFNULL(R.RepairIncome,0) + IFNULL(S.SalesIncome,0) AS TotalIncome
FROM CustomerInfo AS C
LEFT OUTER JOIN SalesInfo AS S ON C.CustomerID = S.CustomerID
LEFT OUTER JOIN RepairInfo AS R ON C.CustomerID = R.CustomerID
ORDER BY TotalIncome DESC, LastDate DESC
LIMIT 15;
```

- Push the **More Detail** button of a customer to open the drill-down
- Get the name of the selected customer

(Subtask: **Look up customer sales details**)

- Find **Sales Events** associated with the customer; Get sold date, sale price of **Sales Events**
- Find **Vehicles** of the Sales Events: Get VIN, model year, manufacturer, model name,
- Find **Salesperson** of the Sales Events: Get Salespeople's name
- Display the sale date, sale price, VIN, model year, manufacturer, model name, and Salesperson's name in rows
  - Sort by sale date descending and VIN ascending

```
--Sales section, assume the customer ID is '$ID'
SELECT SalesDate, SalePrice, V.Vin, V.ModelYear AS YEAR, V.Manufacturer,
       V.ModelName AS Model, CONCAT(PU.FirstName, ' ', PU.LastName) AS SalespersonName
FROM SalesEvent
LEFT JOIN Vehicles AS V ON V.Vin = SalesEvent.Vin
LEFT JOIN PrivilegedUsers AS PU ON PU.Username = SalesEvent.Username
WHERE SalesEvent.CustomerID = '$ID'
ORDER BY SalesDate DESC, Vin ASC;
```

(Subtask: **Look up customer repair details**)

- Find **Repair Events** of the customer; get start day, end day, odometer, part cost, labor cost, total cost
- Find the **Vehicles** associated with the Repair Events: get the VIN
- Find the **Service Writer** associated with the Repair Event: Get the Service Writer's name
- Display the start date, end date, VIN, odometer, part costs, labor cost, total cost Service Writer's name
  - Sort the result in repair start date descending, end date descending, VIN ascending
  - List incomplete **Repair Events** first
  - If end date is Null: do not show the end date

```
--Repair section, assume the customer ID is '$ID'
SELECT StartDate, EndDate, Odometer, LaborCharge, IFNULL(PA.PartCost,0) AS PartCost
       (IFNULL(PA.PartCost,0) + LaborCharge) AS TotalCharge,
       CONCAT(PU.FirstName, ' ', PU.LastName) AS ServiceWriterName
FROM RepairEvents
LEFT JOIN
       (SELECT Vin, StartDate, SUM(QuantityUsed * Price) AS PartCost
        FROM Parts GROUP BY Vin, StartDate) AS PA
ON RepairEvents.Vin = PA.Vin AND RepairEvents.StartDate = PA.StartDate
LEFT JOIN PrivilegedUsers AS PU ON PU.Username = RepairEvents.Username
WHERE RepairEvents.CustomerID = '$ID'
ORDER BY StartDate DESC, EndDate IS NULL, EndDate DESC, Vin ASC;
```

- Push **Cancel** to close the drill-down
- Push **Close** to return to **Main Menu**

## View Repairs by Manufacturer/Type/Model Report

- Page open by pushing **Repairs by Manufacturer/Type/Model Report** button on Main Menu  
(Subtask: **Look up Repair Overview**)
- Get the manufacturer, types, models of [Vehicles](#)
- Find [Repair Events](#) for the Vehicles; Get the total cost, labor cost, part cost in [Repair Events](#)
  - Aggregate the count of repairs, total cost, labor cost, and part cost by Vehicle
  - Aggregate the results of [Vehicle](#) by manufacturer as manufacturer repair count, manufacturer total cost, manufacturer labor cost, manufacturer part cost
- Sort the result by manufacturer ascending
- Display manufacturer repair count, manufacturer total cost, manufacturer labor cost, manufacturer part cost
- Include manufacturers if do not have records

-- Left out join to include all manufacturer

WITH RepairInfo AS

```
(
    SELECT RepairEvents.Vin, StartDate, V.Manufacturer, LaborCharge,
           IFNULL(PA.PartCost, 0) AS PartCost,
           (IFNULL(PA.PartCost, 0) + LaborCharge) AS PartLaborCost
    FROM RepairEvents
    LEFT JOIN
        (SELECT Vin, StartDate, SUM(QuantityUsed * Price) AS PartCost
         FROM Parts GROUP BY Vin, StartDate) AS PA
    ON RepairEvents.Vin = PA.Vin AND RepairEvents.StartDate = PA.StartDate
    LEFT JOIN Vehicles AS V ON RepairEvents.Vin = V.Vin
)
SELECT M.ManufacturerName, RR.TotalRepairCount, RR.TotalLaborCost, RR.TotalPartCost,
       RR.TotalLaborPartCost
FROM Manufacturer AS M
LEFT OUTER JOIN
    (Manufacturer, Count(*) AS TotalRepairCount,
     SUM(LaborCharge) AS TotalLaborCost, SUM(PartCost) AS TotalPartCost,
     SUM(PartLaborCost) AS TotalLaborPartCost
    FROM RepairInfo
    GROUP BY Manufacturer) AS RR
ON M.ManufacturerName = RR.Manufacturer
ORDER BY ManufacturerName;
```

(Subtask: **Look up Repair Details**)

- Push the **More Detail** button of each row to open drill down
- Find the [Vehicles](#) in the in manufacturer selected; Get the types and models of the [Vehicles](#)
  - Aggregate the results of [Vehicle](#) by type as type repair count, type total cost, type labor cost, type part cost
- Sort the result by type repair count descending
  - Aggregate the results of [Vehicle](#) by model as model repair count, model total cost, model labor cost, model part cost
  - Sort the result by model repair count descending of each type

- Display type repair count, type total cost, type labor cost, type part cost in rows
- Exclude types if do not have record
- After each type row, display model repair count, model total cost, model labor cost, model part cost
- Exclude types if do not have record

```
-- assume the selected manufacturer is '$Manu'
-- 1. Assign types to vehicles
-- 2. Create a repair info table for each repair event
-- 3. Union by-type and by-type-model

With TypeInfo AS (
    SELECT Vin, 'Car' AS Type FROM Cars
    UNION SELECT Vin, 'SUV' AS Type FROM SUVs
    UNION SELECT Vin, 'Van MiniVan' AS Type FROM VanMiniVans
    UNION SELECT Vin, 'Truck' AS Type FROM Trucks
    UNION SELECT Vin, 'Convertible' AS Type FROM Convertibles
),
VehiclesWithType AS
(
    SELECT Vs.Vin, ModelName, ModelYear, DateAdded, InvoicePrice, Manufacturer,
    ClerkUsername, Description, T.Type FROM Vehicles AS Vs
    JOIN TypeInfo AS T ON T.Vin = Vs.Vin
),
RepairInfo AS
(
    SELECT RepairEvents.Vin, StartDate, LaborCharge, IFNULL(PA.PartCost, 0) AS PartCost
    (IFNULL(PA.PartCost, 0) + LaborCharge) AS PartLaborCost,
    V.Type, V.Manufacturer, V.ModelName AS Model
    FROM RepairEvents
    LEFT JOIN
        (SELECT Vin, StartDate, SUM(QuantityUsed * Price) AS PartCost
        FROM Parts GROUP BY Vin, StartDate) AS PA
    ON RepairEvents.Vin = PA.Vin AND RepairEvents.StartDate = PA.StartDate
    JOIN VehiclesWithType AS V ON RepairEvent.Vin = V.Vin
)
SELECT Type, NULL AS Model, Count(*) AS TotalRepairCount,
    SUM(LaborCharge) AS TotalLaborCost, SUM(PartCost) AS TotalPartCost,
    SUM(PartLaborCost) AS TotalPartLaborCost
FROM RepairInfo
WHERE ManufacturerName = '$Manu'
GROUP BY Type
UNION ALL
SELECT Type, ModelName AS Model, Count(*) AS TotalRepairCount,
    SUM(LaborCharge) AS TotalLaborCost, SUM(PartCost) AS TotalPartCost,
    SUM(PartLaborCost) AS TotalPartLaborCost
FROM RepairInfo
WHERE ManufacturerName = '$Manu'
GROUP BY Type, Model
ORDER BY Type ASC, Model IS NULL, Model ASC;
```

- Push *Cancel* to close the drill-down
- Push *Close* to return to Main Menu

## View Below Cost Sales Report

- Page open by pushing *Below Cost Sales Report* button on Main Menu

(Subtask: **view below cost sales**)

- Get sale price and sale date in [Sales Events](#)
- Find [Vehicles](#) associated with Sales Events; Get invoice price of [Vehicles](#)
- Select the Vehicles sold below cost by where(Vehicle.invoice price > Sales Event.sale price);
  - Get the price ratio by sale price/invoice price

(Subtask: **view detail of below cost sale**)

- Find [Customer](#) for the selected Vehicle
- If the customer is a [person](#):
  - get first name and last name
- Else:
  - get business name
- Find [Salesperson](#) for the selected Vehicles; Get the name of the [Salesperson](#)
- Sort the result by sale date descending and price ratio descending
- Display sale date, sale price, price ratio, customer name, Salesperson name in rows

```
SELECT S.SaleDate, S.SalePrice, V.InvoicePrice, (S.SalePrice / V.InvoicePrice) AS PriceRatio,
       C.Name AS CustomerName, COTCAT(P.FirstName, ' ', P.LastName) AS SalespersonName
FROM SalesEvents AS S
INNER JOIN Vehicles AS V ON V.Vin = S.Vin
INNER JOIN
(
    SELECT CustomerID, CONCAT(FirstName, ' ', LastName) AS Name FROM Persons
  UNION ALL
    SELECT CustomerID, Name FROM Business
) AS C ON C.CustomerID = S.CustomerID
INNER JOIN Salespeople AS P ON P.Username = S.Username
WHERE S.SalePrice < V.InvoicePrice
ORDER BY S.SaleDate DESC, PriceRatio DESC
AS MainTable3;
```

- If price ratio less than or equal to 95%:
  - Highlight background in red

```
--Get highlighted rows
SELECT * FROM MainTable3
WHERE PriceRatio <= 0.95;
```

- Push *Close* to return to Main Menu

## View Average Time in Inventory Report

- Page open by pushing *View Average Time in Inventory Report* button on Main Menu
- Get the sold date in [Sales Events](#)

- Find [Vehicles](#) associated with Sales Events; Get the date added and type of [Vehicles](#)
  - Get the inventory time of each sold [Vehicle](#) by sold date - date added
  - Average the inventory time by type, as type average inventory time
- Display type, type average inventory time in rows
- If no sales history:
  - Display type: "N/A"

```

With AllTypes AS (
    SELECT 'Car' AS Type UNION SELECT 'SUV' UNION SELECT 'Truck'
    UNION SELECT 'Convertible' UNION SELECT 'Van MiniVan'
),
TypeInfo AS (
    SELECT Vin, 'Car' AS Type FROM Cars
    UNION SELECT Vin, 'SUV' AS Type FROM SUVs
    UNION SELECT Vin, 'Van MiniVan' AS Type FROM VanMiniVans
    UNION SELECT Vin, 'Truck' AS Type FROM Trucks
    UNION SELECT Vin, 'Convertible' AS Type FROM Convertibles
)
SELECT AllTypes.Type, IFNULL(A.AveageTime, 'N/A') AS AverageTimeInInventory
FROM AllTypes
LEFT OUTER JOIN
    (SELECT T.Type, AVG(DateAdded - S.SaleDate+1) AS AverageTime
     FROM Vehicles
     INNER JOIN SalesEvents AS S ON A.Vin = S.Vin
     INNER JOIN TypeInfo AS T ON T.Vin = Vehicles.Vin
     GROUP BY Type) AS A
ON AllTypes.Type = A.Type
ORDER BY Type ASC;

```

- Push *Close* to return to **Main Menu**

## View Part Statistics Report

- Page open by pushing *Part Statistics Report* button on **Main Menu**
- Get the part price, vendor name in [Parts](#)
- Find the [Needs](#) for the Parts; Get the quantity used in [Needs](#)
  - Aggregate quantity used of each [Part](#) as part total quantity
  - Get the total cost of each part by part price \* part total quantity
  - Sum the part total quantity by vendor name, as vendor total part quantity
  - Sum the total cost of each part by part by vendor name, as total cost of vendor
- Display the vendor names, vendor total part quantity, and total cost of vendor

```

SELECT VendorName, SUM(QuantityUsed * Price) AS TotalCost,
    SUM(QuantityUsed) AS NumberOfPart
FROM Parts GROUP BY VendorName
ORDER BY TotalCost DESC;

```

- Push *Close* to return to **Main Menu**



## View Monthly Sales Report

- Page open by pushing **Monthly Sales Report** button on **Main Menu**

(Subtask: **view year and month sales**)

- Get the sale date, sale price in **Sales Events**
- Find the **Vehicle** associated with Sales Events; get the invoice price in **Vehicle**
  - Aggregate number of **Sales Events** by month and by year, as month/year sold vehicle count
  - Sum the invoice price by month/year as month/year invoice price
  - Sum the sale price by month/year as month/year sale income
  - Get the month/year net income by month/year sale price – month/year invoice price
  - Get the month/year ratio by month/year sale price / month/year invoice price
- If no sales in year/month:
  - Exclude the year/month
- Sort the result by year and month descending
- Display year, month, month/year sold vehicle count, month/year sale income, month/year net income or month/year ratio

```
SELECT Date_FORMAT(SaleDate, '%Y-%m') AS SaleYearMonth, COUNT(*) AS SaleCount,
       SUM(S.SalePrice) AS SaleIncome, SUM(S.SalePrice – V.InvoicePrice) AS SaleNetIncome,
       SUM(S.SalePrice) / SUM(V.InvoicePrice) AS SaleRatio
FROM SalesEvents AS S
INNER JOIN Vehicles AS V
ON V.Vin = S.Vin
GROUP BY SaleYearMonth
ORDER BY SaleYearMonth DESC
AS MainTable4;
```

- If month/year ratio greater than or equal to 125%:

```
--Get highlighted to green
SELECT * FROM MainTable4
WHERE SaleRatio >= 1.25;
```

- Highlight row in green background
- If month/ratio less than or equal to 110%:

```
--Get highlighted to yellow
SELECT * FROM MainTable4
WHERE SaleRatio <= 1.1;
```

- Highlight row in yellow background

(Subtask: **View salespeople performance**)

- Push the **More Detail** button of each month/year to open drill down
- Find the **Salespersons** of Sales Events; get the name of **Salespersons**
  - Aggregate the number of sales of each **Salesperson** by month/year as salesperson month/year sales count
  - Sum the sale price of **Salespersons** income by salesperson month/year income

- Sort the salesperson month/year sales count descending and by salesperson month/year income descending
- Display the Salesperson's name, salesperson month/year sales count, salesperson month/year income
- Push **Cancel** to close the drill-down

```
--if click on a year row, assume the SaleDate of the row is '$SaleYearMonth'
SELECT CONCAT(P.FirstName, ' ', P.LastName) AS SalespersonName, COUNT(*) AS SaleCount,
       SUM(S.SalePrice) AS SalespersonIncome
FROM SalesEvents AS S
INNER JOIN Salespeople AS P
ON P.Username = S.Username
WHERE YEAR( S.SaleDate) = YEAR('$SaleYearMonth')
      AND MONTH( S.SaleYearMonth) = MONTH('$SaleYearMonth')
GROUP BY P.Username
ORDER BY YearSaleCount DESC, SalespersonIncome DESC;
```

- Push **Close** to return to Main Menu