**Vehicle**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Nullable** |
| ManufacturerName | String | Not Null |
| MName | String | Not Null |
| Model | String | Not Null |
| Year | String | Not Null |
| InvoicePrice | Float(money) | Not Null |
| Color | List<string> | Not Null |
| VDescription | String | Nullable |
| VIN | String | Not Null |

**Customer**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Nullable** |
| Address | String | Not Null |
| PhoneNumber | String | Not Null |
| EmailAddress | String | Nullable |

**Repair**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Nullable** |
| RDescription | String | Not Null |
| CompletionDate | Date | Not Null |
| OdometerReading | Float | Not Null |
| LaborCharges | Float | Not Null |
| VehicleCustomerStartDate | Date | Not Null |

**Part**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Nullable** |
| PartNumber | String | Not Null |
| VendorName | String | Not Null |
| Quantity | Integer | Not Null |
| Price | Float (money) | Not Null |

**Sale**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Types** | **Nullable** |
| PurchaseDate | Date | Not Nullabe |
| SoldPrice | Float (money) | Not Nullabe |
| SalesPerson | String | Not Nullabe |
| ListPrice | Float (money) | Not Nullabe |

**Individual**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Types** | **Nullable** |
| Firstname | String | Not Nullable |
| LastName | String | Not Nullable |
| DriverLicenseNumber | String | Not Nullable |

**Business**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Nullable** |
| TIN | String | Not Nullable |
| BName | String | Not Nullable |
| PrimaryContact | String | Nullable |
| PCName | String | Nullable |
| Title | String | Nullable |

**Car**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Nullable** |
| NumberofDoors | Integer | Not Nullable |

**Convertible**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Nullable** |
| RoofType | String | Not Nullable |
| BackSeatCount | Integer | Not Nullable |

**Van**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Nullable** |
| VHasDriverSideBackDoor | Boolean | Not Nullable |

**Minivan**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Nullable** |
| MHasDriverSideBackDoor | Boolean | Not Nullable |

**Truck**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Nullable** |
| CargoCapacity | Integer | Not Nullable |
| CargoCoverType | Integer | Not Nullable |
| NumberOfRearAxles | Integer | Not Nullable |

**SUV**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Data Type** | **Nullable** |
| DriveTrainType | String | Not Nullable |
| NumberOfCupholders | Integer | Not Nullable |

**Business Logic Constraints**

**Functionality and Users**

1. Distinct categories of users include: inventory clerks, who add vehicles to inventory; salesperson, who will only have access to searching available inventory and entering sales transactions; service writers who enter repair details; managers who can view inventory, sales transactions, repair history, and reports; owner - Roland - who has access to everything and can perform any activity in the system.

**Vehicle**

1. Vehicles are tracked based on characteristics
2. Manufacturer name stored and list is not static. List should be updated from within database.
3. Model, name, model year free-form entered by user with restriction that model years cannot exceed the current year plus one.
4. Year entered must include century digits.
5. Invoice price includes dollars and cents.
6. Vehicle may have multiple colors.
7. List of colors is limited to: Aluminum, Beige, Black, Blue, Brown, Bronze, Claret, Copper, Cream, Gold, Gray, Green, Maroon, Metallic, Navy, Orange, Pink, Purple, Red, Rose, Rust, Silver, Tan, Turquoise, White, Yellow.
8. Optional description that contains accessories or equipment the vehicle has or any other information.

**Customer**

1. Customers can be either individual person or business.
2. Email address is optionally provided.
3. Business tax identification number is similar to Social Security number and assumed unique.

**Sales**

1. List price is 125% of invoice price which can be negotiated by customers to sold price. Could sell at higher price based on market conditions.
2. Buyer (customer) can purchase several vehicles, and if purchased at same time, should be handled as separate sales transactions.

**Repair**

1. Each repair must be associated with a vehicle.
2. Cannot be assumed that a repair for a vehicle is for the customer that originally bought it.
3. Date repair was completely could be same date as the start date or later, but not before.
4. Vehicle will never have more than one repair starting on the same date, and a repair must be completed before a new one can be started.
5. Total cost of repair is sum of cost of all parts used for repair and labor charges.

**Anonymous Access**

1. Allow for searching vehicles without login.
2. Initial state of application should be to open the search page with an option to login and display total number of vehicles for purchase.
3. Searchable based on vehicle type, manufacture, model year, color, list price (greater and/or less than an entered value), keyword (which searches manufacturer, model year, model name, and description and returns matches).
4. Use dropdown menus for fields other than keyword or list price - just allow for selecting single value and only return unsold vehicles.
5. If no vehicle meet search criteria display message stating “Sorry, it looks like we don’t have that in stock!”.
6. Return following attributes for each vehicle in search results: VIN, Vehicle Type, Model Year, Manufacturer, Model, Colors (if multiple colors return a single row with all colors listed), List Price, If entered keyword matched the description via checkbox or the like.
7. Results sorted by VIN in ascending order.
8. Optionally allow for user to sort or filter results by other columns.
9. Users can select individual results which will open a detail page that includes the above attributes, but not invoice price, and a description for selected result.

**Privileged Access**

1. No interface for creating or registering users and granting privileges as this will be done manually.
2. Login using username and password. After logging in will update to include access to appropriate functionality.
3. Common functionality - look up and add customers, but only available when performing various transactions and is not independently accessible.
4. Lookup by driver’s license or tax ID.
5. If no result found, option to add customer and based on customer type the appropriate filed should be put into the system.

**Inventory Clerks**

1. After inventory clerk logins in, given access to “Add Vehicle” button or link, that will allow them to add new vehicles.
2. New vehicle form will gather relevant details along with the date it was added to inventory.
3. After submitting the data and successfully adding the vehicle to the database, clerk will be taken to the detail page for vehicle.
4. View similar to detail page shown to public users and should show same information but include fields for the invoice price.
5. After vehicle added, it is immediately available for sale and can be found from searching.

**Salespeople**

1. After logging in, on search page, with same layout as a public search, start with added option to search by VIN. Upon loading detail page, salesperson see same details as customers with an added button or link to sell vehicle that will load the sales order form.
2. Sales order form allows salespeople to look up a customer (or add them) and confirm the sale by entering sold price and sold date.
3. If sold price is less than or equal to 95% of invoice price, the system will eject the same.

**Service Writer**

1. Service writers enter details of repairs into the system. After login, have link or button to open repair form where enter VIN. If vehicle has not been sold or VIN does not match, error message is displayed, other wise the rest of repair form will be displayed.
2. Repair form should show same details as in above search result details.
3. If no repairs are open, repair form will allow user to start a new repair.
4. Odometer reading should be entered, and current date will be stored as the start date.
5. Service writer will be prompted to search for the customer associated with the repair. This may not be customer who originally purchased vehicle, may be necessary for the service writer to add a new customer to the system for the repair.
6. After creating the repair, form should allow service writer to enter labor charges and to add parts. When adding parts, relevant details entered by service writer.
7. Should perform basic input validation.
8. If vehicle has unfinished repair, repair form will only allow for updating labor charges, adding parts, or completing repair. Updates to labor charges cannot be less than previous value. Upon choosing complete repair, current date is stored on the repair as the completion date.

**Managers**

1. Have view-only access to all information along with reports.
2. After logging in, start on search screen similar to inventory clerk and salespeople.
3. Additionally have option to filter by sold vehicles, unsold vehicles, or all vehicles.
4. See all information on vehicle detail page including inventory clerk that added vehicle, invoice price, and date it was added.
5. If sold, has access to buyer’s contact information (except driver’s license/taxID number), list price, sold price, sales date, and salesperson’s first and last name.
6. Repairs, if any, displayed under Repairs section and list of customer name (first, last for individual, or company name for companies), service writer who entered repair, repair’s start date, end date, labor charges, parts cost, and total cost.

**Roland Around**

1. Complete access and able to vies all information and reports and do any activity.
2. Sales order form allows Roland to enter sold prices that are less than or equal to 95% of the invoice price, and repair form will allow him to update the labor charges on a repair to a value less than their previous value.

**Reports**

1. Access via link, button, dropdown menu on initial search page.

**Sales by Color**

1. Data reviewed once/month.
2. Report will list number of vehicles for each color sold in previous 30 days, previous year, over ll time - starting from the last available sale date.
3. More colors than these three categories, colors should be the rows for the table fo the report.
4. If vehicle has multiple colors, should be classified as multiple and not included in the count of vehicles that have only one color.
5. If color has no sales, should be “0”.

**Sales by Type**

1. List vehicles sold by type in previous 30 days, previous year, and over all time, starting from last available sale date.
2. If type has no sales, should be “0”.

**Gross Customer Income**

1. Report will list for top 15 customers the gross, not net, income received from them via vehicle sales and/or repairs, including any repairs in progress.
2. Report has two parts - first part is listing top 15 customers and should provide name (first/lat for individuals or business name for business), date of the first sale or repair start date, date of their most recent sale or repairs tart date, there number of sales, number of repairs, and gross income (sales and total repair costs combined). List of customers will be by gross income descending and by last/sale date descending.
3. Second part is drill-down for selected customer - made accessible by clicking on appropriate link.
4. Drill down will have section for vehicle sales and section for repairs.
5. Vehicle sales section should list the following details from each sale: sale date, sold price, VIN, year, manufacturer, model, and salesperson name.
6. List should be sorted by sale date descending and VIN ascending.
7. Repair section should list the following details for each repair: start date, end date (if repair not finished, this should not display any value), the vIN of the repaired vehicle, odometer reading, parts cost, labor cost, total cost, and service writer who opened the repair.
8. List should be sorted by start date descending, end date descending, and VIN ascending - however any incomplete repairs should be listed before competed ones with the same sorting criteria.

**Repairs by Manufacturer/Type/Model**

1. Purpose is to identify repair trends by manufacturer, type, and model, and will have two parts.
2. First part will list for each manufacturer: condo of repairs, sum of all parts costs, sum of all labor costs, sum of total repair costs, including any repairs in progress.
3. Manufacturers who’s vehicles do not have any repairs should be listed on this report, and the report should be sorted by manufacturer name ascending.
4. From the first part, a drill-down for manufacturers that have repairs will be accessible via link or button.
5. Drill-down report will list a total for each vehicle type with repair count, parts costs, labor costs, and total costs.
6. Will also list further details for the vehicle type, with each model’s repair counts, parts costs, labor costs, and total costs.
7. Totals by vehicle type should be displayed before details of its model.
8. Models and/or vehicle types which do not have repairs should be excluded from this report.
9. Drill-down should be sorted by repair count descending (by vehicle type sorted first, and then detail rows sorted).

**Below Cost Sales**

1. Report used to track all sales of vehicles that were below the invoice price of the vehicle.
2. For each vehicle, should list date, invoice price of vehicle, sold price, sold price/invoice price ration as a percentage, customer’s name (as described above), and name of salesperson for the sale.
3. For a sale whose ration is less than or equal to 95%, background of that row should be highlighted red.
4. Sales should be listed by sales date descending and ratio descending.

**Average Time in Inventory**

1. This report, based on the difference between vehicle sales dates and when the vehicle was added to inventory, will display, by vehicle type, the average amount of time a vehicle remains in inventory, in days.
2. If no sales history, report should display N/A for that vehicle type.

**Parts Statistics**

1. List: vendor’s name, number of parts supplied by that vendor, and total dollar amount spent on parts.

**Monthly Sales**

1. Most frequently used report and has two parts.
2. First, a summary page, which lists for all sales transactions, by year and month, the total number of vehicles sold, the total sales income, the total net income (sold price less invoice price), and the sold price/invoice ration as a percentage.
3. If a year or month does not have sales data, can be excluded.
4. When ratio is greater than or equal to 125%, its row should be highlighted green.
5. If ratio less than or equal to 110%, highlight yellow.
6. Results ordered by year and month descending with the most recent year and month as the first result.
7. From each year/month result, a drill down report must be accessible. Based on the sales data for that year and month, drill down will display the top performing salesperson, by showing salesperson’s first and last name, number of vehicles they sold in that year and month and their total sales for that year and month.
8. Top sales person determined by sorting total vehicles descending followed by total sales descending.