Task

<u>Screen/Page</u>

entity

input field

Button

'$session variable'

Relationship

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Task Decomposition with Abstract Code:

Searching for vehicles/Display Main Menu

Abstract Code

- (Initial state of the application and upon ***Return to Main Menu*** button clicks.)
- Clear all input fields
- Disable additional features unless the user is already login('$UserType' is not null or anonymous).
- Show ***search*** and ***login*** button on the **<u>Main Menu screen</u>**
- Query for information of counts of **Vehicle** using Vehicle.VIN, show this information as the total number of vehicles available for purchase in the system in the **<u>Main Menu screen</u>**
- Find available choices of searching input fields (Vehicle type, using **Vehicle**.type, Manufacturer, using **Vehicle**.Manufacturer, Model year, using **Vehicle**.Model and

Vehicle.Year, Color, using **Vehicle**.Color) and fill available choices in the dropdowns for input fields in the **Main Menu screen**

- All users are able to fill in **List price** and **Keyword** input fields. Users also are able to select a **vehicle type**/**Manufacturer**/**Model**/**Year**/**Color/VIN(if enabled)** from the dropdown list in each input field in the **Main Menu screen**
- Upon:
  - Click the ***search*** button:
    - Read **Type**, **manufacturer**, **model**, **year**, **color**, **list price**, **keyword, VIN(if enabled)** input fields from the **Main Menu screen**
    - if data is valid and if there are **Vehicle** that matches the search criteria:
      - Display the matching **Vehicle** as a list sorted by **Vehicle**.VIN in ascending order on **Main Menu screen**
      - Session variable '$vehiclevin' = Vehicle.VIN
      - Users are allowed to select an individual result from the list. If the user selects a **Vehicle**:
        - Jump to the **View Vehicle Details** task.
    - Otherwise, display the message "Sorry, it looks like we don't have that in stock!" on the **Main Menu screen**
  - Click the ***login*** button: Jump to the **Login** task:
    - If '$UserType' returned:
      - '$UserType'=='Inventory clerks', enable ***Add Vehicle*** button and **new vehicle form** on **Main Menu screen**
      - '$UserType'=='Salespeople', enable input field **VIN** in searching criteria on **Main Menu screen**
      - '$UserType'=='Service Writer', enable ***repair form*** button on **Main Menu screen**
      - '$UserType'=='Managers', enable ***report*** button, input field **VIN** in searching criteria, option to filter by soldvehicles, unsold vehicles, or all vehicles, Dropdown on **Main Menu screen**
      - '$UserType'=='Roland Around', enable all the features on **Main Menu screen**
  - Click the ***Add Vehicle*** button:
    - User will fill the **VIN**, **vehicle type**, **invoice price**, etc., along with the **date** it was added to inventory in **new vehicle form** on **Main Menu screen**.
    - Read those values from input fields and if Data is valid and **VIN** does not already exist as a Vehicle.VIN:
      - Inert new **Vehicle** instance with those values, then clear any success/error message, display a success message, '$vehiclevin' = **VIN** and call the **View Vehicle Details** task.
  - Click the ***repair form*** button: Jump to the **Repair** task
  - Click the ***report*** button: Read the choice from the report dropdown menu on **Main Menu screen** then call the corresponding report task

View Vehicle Details

Abstract Code

- User selected on Vehicle from the list on the **Main Menu screen**
- Display **Detail Page** Screen
- Enable link to ***sell the vehicle*** on **Detail Page** Screen if '$UserType'=='Salespoeple'

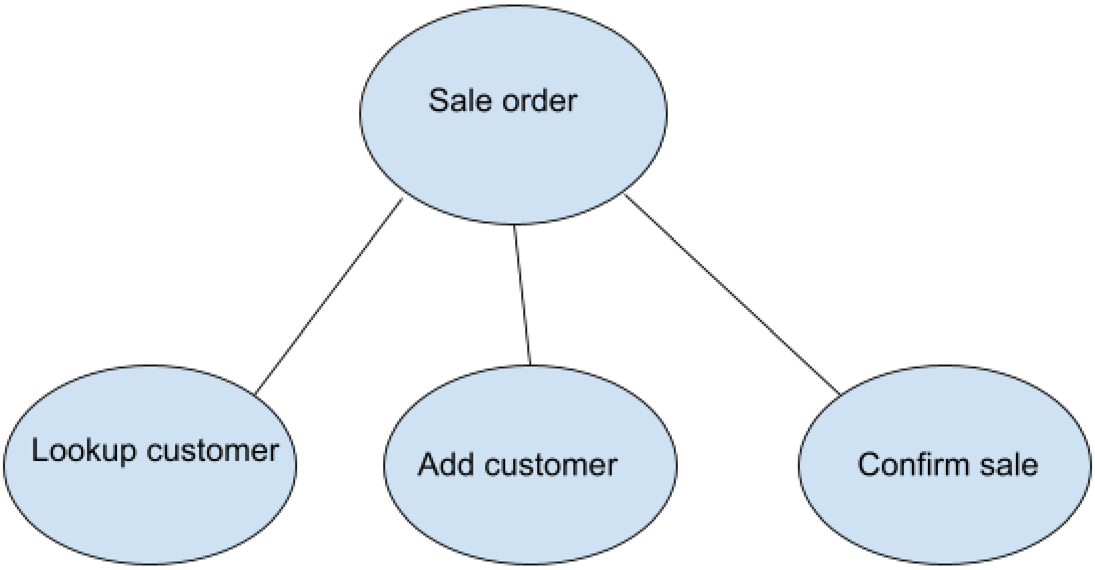
- Query for information about the **Vehicle** and it’s details using ‘$vehiclevin’ from the HTTP Session/Cookie.:
    - Display ‘$vehiclevin’ on the **Detail Page**
    - Find and display the **Vehicle**.Type on the **Detail Page**
    - Find and display the attributes of the **Vehicle**.Type on the **Detail Page**
    - Find and display the **Vehicle**.Model and Vehicle.Year on the **Detail Page**
    - Find and display the **Vehicle**.Manufacturer on the **Detail Page**
    - Find and display the **Vehicle**.Color on the **Detail Page**
    - Find **Vehicle**.InvoicePrice and display invoice price times 125% as list price on the **Detail Page**
    - Find and display the **Vehicle**.VDescription on the **Detail Page**
    - If ‘$UserType’==‘Inventory clerks’:
        - Find and display the **Vehicle**.invoiceprice on the **Detail Page**
- Upon:
    - Click ***sell the vehicle*** link: Call the **sales order** task.
    - Click ***Return to Main Menu*** button: Call the **Display Main Menu** task.

Login

Abstract Code

- User click ***login*** button on the **Main Menu screen**
- Display **Login form** Screen
- User enters username, password input fields.
- If data validation is successful for both username and password, then:
    - When ***Enter*** button is clicked:
        - If User record is found but password not match **User**.password:
            - Go back to **Login form**, with error message.
        - else:
            - Find the User using combination of User.username and User.password
            - Find the User.Type of the User and Store login information as session variable ‘$UserType’
            - Call the Display Main Menu task with ‘$UserType’.
        - Else username and password input fields are invalid, display Login form, with error message.

Sales order



Abstract Code:

- user click ***sell the vehicle*** on **Detail Page**
- **Sales order Form** is Displayed.
- user will fill the customer profile inputs field showed on **Sales order Form**:
  - if customer is an individual: fill their **first** and **last names**, along with their **driver's license number**
  - if customer is a business: fill the business' **tax identification number** and **business name**, along with the **name of a primary contact** and their **title**
- user will fill the transaction detail field including: **Vehicle's VIN**, **sold price**, **sold date**
- upon:
  - click the ***lookup*** button on **Sales order Form**: run the **lookup customer** task by query customer with **driver's license number or tax identification number**
    - if a customer is not found:
      - Read customer profile input fields, and call **Add customer** task.
  - click the confirm sale button on **Sales order Form**: run the **confirm sale** task by query vehicle's invoice price by reading and using **Vehicle's VIN**
    - if **sold price** is less than or equal to 95% of **Vehicle**.invoiceprice:
      - Display error massage of rejecting sale.
    - Otherwise, insert new **sale** instance with those values including **sold price**, **sold date**, customer **driver's license number** or **tax identification number**, **Vehicle's VIN**, **SalesPerson's Name.** Display a success message.
  - Click ***Return to Main Menu*** button: Call the **Display Main Menu** task.

Repair

Abstract Code

- User click ***repair form*** button on the **Main Menu screen**
- Partial **repair form** is displayed.
- User will fill the **VIN** input field.
- If data validation is successful for **VIN**, then:
  - When ***Enter*** button is clicked: run **search vin** task.
    - If the **VIN** does not match a **Vehicle**.VIN in the database:
      - Display an error message
    - Otherwise, the rest of the **repair form** will be displayed:

- Run **View Vehicle Details** task, the results will be displayed on **repair form screen**
- Check if the **Vehicle** is associated with a **repair** order.
  - If no repairs are open for the **Vehicle**:
    - display **add repair button**
    - run **add repair** task after user click ***add repair*** button
      - Insert new **repair** order instance with **odometer reading** input field filled by user
      - click the ***lookup*** button on **Sales order Form**: run the **lookup customer** task by query customer with **driver's license number or tax identification number**
        - if a customer is not found:
          - Read customer profile input fields, and call **Add customer** task. add the customer to the system for repair order
        - otherwise, add the customer to the system for repair order
      - User are allowed to fill the inputs field of **labor charge** and **parts**:
        - input field **quantity**, **vendor**, **part number**, **price** can be filled by user.
        - If Data is valid and user click ***add parts*** button, insert new parts instance with those values with the service writer's name, display a success message, Otherwise, display an appropriate error message. run **add part task to** add the part to current **repair** order
        - if ***add labor charge*** button is clicked, add the labor charge to current **repair** order
  - Otherwise, upon:
    - click ***updating labor charges*** button: read input field labor charges and run **update repair** task
    - click ***adding parts*** button: read input field for parts and run **add part** task
    - click ***completing*** button: add **repair**.completiondate to current **repair** as current date
- Click ***Return to Main Menu*** button: Call the **Display Main Menu** task.

Sales by Color

Abstract Code

- Called from the **Main Menu screen**
- Query for information about each **Sale**, find the **Sale**.PurchaseDate and corrsponding sold **Vehicle**.color using **Vehicle**.VIN. **Sale** and **Vehicle** are related by **transfers ownership of**

relationship. Count the number of **Sale** based on the different periods (**Sale**.PurchaseDate) and group the count by different colors. Put count and color data in a table:
  - Each color is one row.
  - Columns are the count of sales.
  - Columns including sales in the previous 30 days, sales in the previous year, sales overall time.
  - If a color does not have any sales, it is shown with a value of “0”.
- Display the table in the **Sales by Color report**
- Click ***Return to Main Menu*** button: Call the **Display Main Menu** task.

Sales by Type

Abstract Code

- Called from the **Main Menu screen**
- Query for information about each **Sale**, find the **Sale**.PurchaseDate and corrsponding sold **Vehicle**.type using **Vehicle**.VIN. **Sale** and **Vehicle** are related by **transfers ownership of** relationship. Count the number of **Sale** based on the different periods (**Sale**.PurchaseDate) and group the count by different types. Put count and type data in a table:
  - Each type is one row.
  - Columns are the count of sales.
  - Columns including sales in the previous 30 days, sales in the previous year, sales overall time.
  - If a type does not have any sales, it is shown with a value of “0”.
- Display the table in the **Sales by Type report**
- Click ***Return to Main Menu*** button: Call the **Display Main Menu** task.

Sales by Manufacturer

Abstract Code

- Called from the **Main Menu screen**
- Query for information about each **Sale**, find the **Sale**.PurchaseDate and corrsponding sold **Vehicle**.Manufacturer using **Vehicle**.VIN. **Sale** and **Vehicle** are related by **transfers ownership of** relationship. Count the number of **Sale** based on the different periods (**Sale**.PurchaseDate) and group the count by different Manufacturers. Put count and Manufacturer data in a table:
  - Each Manufacturer is one row.
  - Columns are the count of sales.
  - Columns including sales in the previous 30 days, sales in the previous year, sales overall time.
  - If a type does not have any sales, it will not be put on the table.
- Display the table in the **Sales by Type report**
- Click ***Return to Main Menu*** button: Call the **Display Main Menu** task.

Gross Customer Income

Abstract Code

- Called from the **Main Menu screen**
- Query for information about all **Sale** and **Repair**, group **Sale** and **Repair** the by **Customer**’s driver’s license number or tax identification number. And sum **Sale**.soldprice and **Repair** total cost as gross income for each **Customer** ID. Both **Sale** and **Repair** has relationship with

Customer. Sort Customer ID by gross income and keep the largest 15 one. Find and Place all following data for each one of 15 Customer in a list:

        - **Customer**'s name
        - The date of the first sale or repair start date
        - the date of the most recent sale or repair start date
        - The number of sales
        - The number of repairs
        - the Gross income
    - The list of **customer**s will be by gross income descending and by last sale/repair start date descending.
    - Display the list in the **Gross Customer Income report**
    - User are able to select one ***customer's name*** in the list. If User click one of the ***customer's name***: Jump to **View Drill-Down** task with selected **Customer.** and their **sale** and **repair** which can be get from the table that group **sale** and **repair** by customer.
- Click ***Return to Main Menu*** button: Call the **Display Main Menu** task.

View Drill-Down Customers

Abstract Code

- User selected a customers from the list on the **Gross Customer Income report**
- Retreve the Customer ID, Sales, repairs from the **Gross Customer Income** task.
- Find and place all following data in a list, each row is for one **Sale**:
    - **Sale**.SoldDate
    - **Sale**.SoldPrice
    - Find the **Vehicle** associated with **Sale**, and get the **Vehicle**.VIN
    - **Vehicle**.manufactuer
    - **Vehicle**.model
    - **Sale**.salespersonname
- The listing should be sorted by sale date descending and VIN ascending
- Display the list in the **section for vehicle sales** on the **Drill-Down Screen**
- Find and place all following data in a list, each row is for one **Repair**:
    - **repair**.startdate
    - **repair**.completedate if available
    - Find the **Vehicle** associated with **Repair**, and get the **Vehicle**.VIN
    - **repair.**odometer
    - **repair**.labor cost
    - parts cost
    - total cost
    - the service writer who opened the repair
- This listing should be sorted by start date descending, end date descending, and VIN ascending; however, any incomplete repairs should be listed before completed ones with the same sorting criteria.
- Display the list in the **section for repairs** on the **Drill-Down Screen**
- Click ***Return to Main Menu*** button: Call the **Display Main Menu** task.

Repairs by Manufacturer/Type/Model

Abstract Code

- Called from the **Main Menu screen**

- Query for information about each **Repair**, Count the number of **Repair**, the sum of all parts cost, the sum of all labor cost, and the sum of total repair costs, including any repairs in progress for each **Vehicle**.Manufacturer. The **Vehicle**.Manufacturer is found by using **Vehicle**.VIN associate with each **repair**.
- Populate these data in a list where each row is for one **Vehicle**.Manufacturer, Manufacturers whose vehicles do not have any repairs should be listed on this list, and the list should be sorted by manufacturer name ascending.
- Display the list on **Repairs by Manufacturer/Type/Model screen**
- Users are able to select one manufacturer's name from the list
    - Run **Drill-down** task with the manufacturer's name

View Drill-Down Manufacturer

Abstract Code

- User select a manufacturer from the list on the **Repairs by Manufacturer/Type/Model screen**
- Retrieve the manufacturer, **Vehicle**, **repairs** from the **Repairs by Manufacturer/Type/Model** task.
- Find and place all following data in a list, each row is for one **Vehicle**.Type:
    - repair count
    - parts costs
    - labor costs
    - total costs
- Find and place all following data in a list, each row is for one **Vehicle**.model:
    - repair count
    - parts costs
    - labor costs
    - total costs
- Lists are sorted by repair count descending(by vehicle type sorted first, and then detail rows sorted).
- Display the list on the **Drill-Down Screen**
- Click ***Return to Main Menu*** button: Call the **Display Main Menu** task.

Below Cost Sales

Abstract Code

- Called from the **Main Menu screen**
- Query for information about each **Sale**, find the **Sale** that **Sale**.invoiceprice > **Sale**.soldprice. Find and place all following data in a list, each row is for one **Sale**:
    - **Sale**.completedate
    - **Sale**.invoice price
    - **Sale**.sold price
    - sold price/invoice price ratio as a percentage
    - **customer**.name. Retrieve customer's name by **customer** ID associate with **Sale**.
    - **Sale**.salesperson's name
- For a sale whose ratio is less than or equal to 95%, the background of that row should be highlighted red. Sales should be listed by sales date descending and ratio descending.
- Display the table in the **Below Cost Sales report**
- Click ***Return to Main Menu*** button: Call the **Display Main Menu** task.

Average Time in Inventory

Abstract Code

- Called from the **Main Menu screen**
- Query for information about each **Sale**, find the **Sale**.complete date. Find the Vehicle.Date using VehicleVIN associated with Sale. Calculate the difference between **Sale**.compolete date and **Vehicle**.Date as the amount of time a vehicle remains in inventory group by Vehicle.Type. Calculate and Put the average amount of time a vehicle remains in inventory in a list, each row is for one Vehicle.Type
- If a **vehicle**.type has no sales history, the report should display "N/A" for that **vehicle**.type.
- Display the table in the **Average Time in Inventory report**
- Click ***Return to Main Menu*** button: Call the **Display Main Menu** task.

Parts Statistics

Abstract Code

- Called from the **Main Menu screen**
- Query for information about each **Part**, find the **Part**.price and **Part**.quantity group by **Part**.vendorname. Calculate the total cost and total quantity of part for each **Part**.vendorname. Then put the vendor's name, the number of parts supplied by that vendor, and the total dollar amount spent on parts in a list.
- Display the list in the **Parts Statistics report**
- Click ***Return to Main Menu*** button: Call the **Display Main Menu** task.

Monthly Sales

Abstract Code

- Called from the **Main Menu screen**
- Query for information about **Sale**.
  - Group the Sale by year and month based on **Sale**.Date then calculate the count and sum for each group.
  - create a list which has:
    - the total number of vehicles sold, the total sales income, the total net income (calculate by using soldprice - invoice price), and the sold price/invoice price ratio as a percentage (such as 125%) for each year and month based on **Sale.**Date.
  - If a year or month does not have sales data, it can be excluded from this report.
  - When the ratio for a month is greater than or equal to 125%, its row should be highlighted with a green background. If the ratio is less than or equal to 110%, it should be highlighted with a yellow background.
  - The results will be ordered by year and month descending, with the most recent year and month as the first result.
  - Display the list on **Monthly Sales screen**
- Users are able to select one manufacturer's name from the list:
  - Run **Drill-down** task with the manufacturer's name

Monthly Sales Drill-Down

Abstract Code

- User select a month/year from the list on the **Monthly Sales screen**

- Retrieve the **sale**s in select month/year group from the **Monthly Sales** task.
- Group the **sale** by **sale**.salesperson then calculates the total vehicles and total sales for each **sale**.salesperson. sort the Sale.salesperson by total vehicles descending followed by total sales descending. The first **sale**.salesperson is the top salesperson
- Display the top salesperson on the **Monthly Sales Drill-Down Screen**
- Click ***Return to Main Menu*** button: Call the **Display Main Menu** task.