

ARM Limited

CS262-Design Document



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1 Project Description

We are facing not just a challenging business environment but a rapidly changing one. There is always room for improvement. Running a Distribution System without a proper application can lead to many problems. In the warehouse, by not managing your stock count, cost price changes and not being able to view your stock position can have drastic consequences. The company has no way of knowing how much stock is left in your warehouses and how much you've sold out. If you don't know how much you have left, you can't restock your inventory which will cause delays and frustrate your customers. It is important to track your inventory so that you can plan ahead effectively. The company is unable to keep a record of its employees, day-to-day sales and profits, customer information and transportation cost. Searching a 10-year-old record for the company is extremely challenging. Speed is also critical when ensuring that you get the correct items picked, packed and distributed to the correct address and client. Understanding the right approach to solving these challenges is essential for distributors to adapt, transform and differentiate themselves in this new challenging business landscape.

We are all aware that we live in an increasing electronic world. Simply put if the Distribution Company is not using a proper, well-managed application then it is facing commercial suicide. So, our Project aims to develop such an application for the Company that can address all the above problems and help the company improve the distribution system and management of the company processes. The administrator of the application is the General Manager of the company. He can hire the company employees (sales agent and inventory workers), riders (to deliver the packages) and an inventory Supervisor. He is in the charge of each module. Each employee would have their individual accounts. The inventory Supervisor is in charge of the warehouse, keeping the record of the product as being delivered by the Manufacturing Company. The sales agent will deal with the clients, their orders and assign the area to the riders. The rider would be given a specific area in which he would have to deliver all the goods and complete all its orders in the given time. Further bonuses will be given according to the performances at the end of the month.

The Distribution Company that we have plumped for is the Shoe Distribution Company. A well-recognized shoe Manufacturing Company ADIDAS is our manufacturer. The implementation of this application will work with a company called ARM. As a distribution company we deliver the products to numerous retailers, wholesalers, concept stores, buyers and agents all over the Lahore. It operates on its own as it is an independent company establishing a connection between the products and the client.

The Record and performance are also evaluated automatically in order to provide the appraisal. The company established the excellent track record for the best customer satisfaction. As a footwear sourcing company, we also provide sustainable material sourcing options to help our clients choose a greener path. An organization's main focus must be to satisfy its customers and in order to do so we are providing a cancellation policy for the client and email verification after the order had been sent to them. For every order the rider takes from the shopkeeper are verified and accepted by the Sales agent. In case of unavailability, the Inventory Supervisor takes care of that and order new stock after the approval of the Manager. The client should

place the minimum required order otherwise order could not be placed.

Sometimes, the rider doesn't deliver the parcel to the exact location. So, to overcome this problem we provide the rider with the exact location of client on our own designed application map that will be a replica of Google Maps. The rider also uses Google Maps to auto fill the address of the shopkeeper. To deliver the products to the shopkeepers,

There is also a proper system of buying and assigning the company delivering trucks to each rider by the Company's Sales Agent. The application also maintains the daily attendance of the employees, the scheduling of the riders and fuel consumption cost. The Manager can produce analytical and table reports of different activities.

Our system is cited as the most efficient tool that is at the company's disposal.

The application offers four modes.

- Manager authorized mode.
- Sales Agent authorized mode.
- Inventory Supervisor mode
- Rider authorized mode

For the application to work, we have assumed that each employee would have an email account. It is not mandatory for the client to have an email ID but CNIC of the client is compulsory. Moreover, this project is constrained by use of Laptop or any other desktop device. Sales Agent, Manager, Inventory Supervisor and rider are equipped with above mentioned devices at all times.

2 Project Features:

Previous	Updated
User interface screen will be operated according to the role of the person who signs in.	User interface screen will be operated according to the role of the person who signs in.
Client can pay in installments or pay in advance.	Client can pay in advance.
Rider will be informed with the stock availability during placing orders. If the required order of the client is out of stock, order could not be placed and an email would be sent to the Inventory Supervisor to inform about stock unavailability.	Rider could only see the products that are available in the stock.
Sales Agent will assign the location of decided area to the Rider. The order will be delivered the very next day.	Not available.
Rider could only deliver limited number of orders in a single day.	Rider could deliver any number of order in a single day.

Attendance of all employees.	Attendance of all the employees.
None	Email would be sent to reset password.
None	Facility of Google Maps.
None	Notification panel for the user.

3 Technology Stack

Language	Python
IDEs	1.Visual Studio Community 2.Visual Studio Code
Libraries	googlemaps(4.7.3) matplotlib (3.6.2) mysql(0.0.3) mysql-connector-python(8.0.31) pandas(1.5.0) PyQt5(5.15.7) PyQt5-Qt5(5.15.2) PyQtWebEngine(5.15.6) PyQtWebEngine-Qt5(5.15.2) Requests(2.28.1)

4 Project Actors

Actor Name	Manager
Actor Type	Primary
Description	Manager can hire and fire employees to the Company. He can view all the records or monthly reports and stock. He also has to check the performances at all times, check inventory. He gives monthly incentives to all the employees according to their performance.

Actor Name	Inventory Supervisor
Actor Type	Primary
Description	This system will also have an inventory supervisor. He will manage inventory in the warehouse and will notify the general manager whenever a new order should be made. He can buy stock from the supplier after the approval of the General Manager. He will provide authorization to the rider after checking the stock from the warehouse.

Actor Name	Sales Agent
Actor Type	Primary
Description	Sales Agent will also have an account of its own. He will keep a track of all the orders of the riders and their information. He will assign a specific area to a specific rider. He can also update the location of riders. He will send out email to the client after the delivery of the product.

Actor Name	Rider
Actor Type	Primary
Description	The Rider has most of the responsibilities in the system. Rider will take order from the shopkeepers and deliver the order afterwards. Rider is able to see the products when creating an order. He can view the history of his delivered orders and can also view pending orders (to be delivered). He will send out email to sale agent about the order placement. He can add and update the client data.

Actor Name	FBR
Actor Type	Off-Stage Actor
Description	FBR collect tax from companies from their earned profits under the tax ordinance law, 2001. It is pertinent for all registered companies to pay tax to work legally across country.

5 Use Cases

5.1 Use Case 1 (Login):

Use Case ID	U01
Name	Login
Actor	The Manager, Rider, Inventory Supervisor, and Sales agent.
Description	It describes how the user logs into the Distribution System application.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1.The user opens the application. 2.The system asks the actor to enter his email ID and password assigned by the company. 3.He enters the above details. 4.The system validates the entered details and logs the actor into the system. <p>Base Flow:</p> <ol style="list-style-type: none"> 2a.The actor enters an invalid email and/or password. <ol style="list-style-type: none"> 1.The actor enters an invalid email and/or password. <ol style="list-style-type: none"> 1a. The actor cancels the login. 1b. The actor resets the password.

5.2 Use Case 2 (Reset Password):

Use Case ID	U02
Name	Reset Password
Actor	The Manager, Rider, Inventory Supervisor and Sales agent.
Description	If the user forgets his/her password, they can reset it.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1.The user opens the application. 2.He enters the email and password. 3.He clicks on login. 4.A message box appears containing the message "Not matched in Data Base". 5.He clicks on forget password. 6.After clicking, he receives an email containing the new password. Repeats step 1-3 7.Successfully login in the main page.

5.3 Use Case 3 (Add Employee)

Use Case ID	U03
Name	Add Employee
Actor	The Manager
Description	The Manager can add a new employee to the company. It could either be the rider, sales agent, workers or the inventory supervisor. He would take the name, email, CNIC, address, phone number, bank account of the employee. After filling out the details, he will give them a password and status and a base salary depending upon the status.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1.A person arrives at company. 2.Fill out the form to give interview. 3.After passing interview, the person will officially be company's employee. 4.To give him access to the application, the Manager logs into his system. 5.The manager will register that employee by entering all his details. 6.The Manager enters the employee's name. 7.The Manager enters the employee's CNIC. 8.The Manager enters the employee's e-mail. 9.The Manager enters the employee's address. 10.The Manager selects the employee's status from the combo Box. 11.The Manager enters the employee's bank account. 12.The Manager enters the employee's telephone number. 13.The Manager enters the employee's age. 14.The System validates the above given details.

	<p>15. After entering all his information, Manager generates a User ID and login password that is assigned to the employee.</p> <p>16. The System generates basic salary depending upon the status.</p> <p>Flow</p> <p>Alternative Flow:</p> <ul style="list-style-type: none"> 4a. The Manager forgets the password. <ul style="list-style-type: none"> 1. The Manager clicks a button to recover the account. 3-5a. The employee is a simple inventory worker. <ul style="list-style-type: none"> 1. The employee will not be given any account, as there is no portal for inventory workers. 6a. The Manager enters invalid name. <ul style="list-style-type: none"> 1. The System demands to enter name containing only alphabets. 7a. The Manager enters an invalid CNIC. <ul style="list-style-type: none"> 1. The System demands enter CNIC containing only a 13-digit integer. 8a. The Manager enters invalid e-mail. <ul style="list-style-type: none"> 1. The System demands to enter E-mail that contains @ in the format.
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5.4 Use Case 4 (Update Employee):

Use Case ID	U04
Name	Update Employee
Actor	The Manager
Description	The Manager is able to update employees by clicking the button that list the employees and then select the employee whose information needs to be update.
Flow	<p>Basic Flow:</p> <ol style="list-style-type: none"> 1. The Manager logs into the system. 2. An employee comes to him and asks to change some information about him. 3. The Manager clicks on the button and gets the list of all the employees of the company. 4. The Manager searches for that particular employee. <p>Alternative Flow:</p> <ol style="list-style-type: none"> 1a. The Manager forgets the password. <ol style="list-style-type: none"> 1. The Manager clicks on a button to recover the account 4a. The employee name does not found in the data base. <ol style="list-style-type: none"> 1. The Manager performs an override operation (Add employee)

5.5 Use Case 5 (Delete Employee):

Use Case ID	U05
Name	Delete Employee
Actor	The Manager
Description	The Manager gets to fire the employee by deleting his information from the Database or when any employee leaves the company.
Flow	<p>Basic Flow:</p> <ol style="list-style-type: none"> 1. The Manager logs into the system. 2. An employee comes to the Manager and asks to resign. 3. The Manager clicks on delete employee option. 4. The Manager gets the list of all the employees of the company. 5. The Manager searches for that particular employee. 6. The System validates the given name of the employee. 7. The Manager clicks and deletes that employee. <p>Alternative Flow:</p> <ol style="list-style-type: none"> 1a. The Manager forgets the password. <ol style="list-style-type: none"> 1. The Manager clicks on a button to recover the account 2a. The Manager fires an employee. <ol style="list-style-type: none"> Repeats 3-6 (Basic Flow) 5a. The employee is a rider. <ol style="list-style-type: none"> 1. The vehicle associated with the rider is now free.

5.6 Use Case 6 (Add Vehicle):

Use Case ID	U06
Name	Add Vehicle
Actor	The Manager
Description	The Manager buys a new vehicle for the riders to deliver the products to the clients.
Flow	<p>Basic Flow:</p> <ol style="list-style-type: none"> 1. The Company bought a new vehicle. 2. The Manager logs into the system. 3. The Manager clicks on the button of add vehicle. 4. The Manager selects the truck model from combo Box. 5. The Manager enters fuel average of that truck. 6. The Manager enters the truck number. 7. The Manager enters the price of that truck. 8. The System validates the above details. 9. Clicks add. 11. Vehicle information is added to the vehicle report by the System. <p>Alternative Flow:</p> <ol style="list-style-type: none"> 2a. The Manager forgets the password. <ol style="list-style-type: none"> 1. The Manager clicks on a button to recover the account. 5a. The Manager enters an invalid format. <ol style="list-style-type: none"> 1. The System demands to enter only float values. 6a. The Manager enters an invalid number. <ol style="list-style-type: none"> 1. The System demands to enter three capital alphabets and three- or four-digit integer after that 7a. The Manager enters an invalid price. <ol style="list-style-type: none"> 1. The System demands to enter only integer values.

5.7 Use Case 7 (Deduct Fuel Money):

Use Case ID	U07
Name	Deduct Fuel Money
Actor	The Manager
Description	The rider will send a report to the Manager on a weekly or daily basis about the fuel consumption depending. Depending upon that report money will be deducted from the company account automatically by the confirmation of the Manager.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1. The rider opens the fuel report. 2. Adds all the information about fuel consumption.

Flow	3.After clicking sent report, the Manager will receive the report. 4.The Manager will open finance module and will delete the total amount of money spend on fuel of each vehicle.
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5.8 Use Case 8 (Check attendance):

Use Case ID	U08
Name	Check attendance
Actor	The Manager
Description	The manager gets to check the daily attendance of each employee that works in the company.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1. The Manager logs into the system. 2. The Manager clicks to see attendance of all employees. 3. A table gets displayed with employee name, status and his attendance. <p>Alternative Flow:</p> <ol style="list-style-type: none"> 1a. The Manager forgets the password. <ol style="list-style-type: none"> 1. The Manager clicks on a button to recover the account. 3a. The owner asks for a report of attendance. <ol style="list-style-type: none"> 1. The Managers exports the table into a.csv file.

5.9 Use Case 9 (Give Salaries):

Use Case ID	U09
Name	Give Salaries
Actor	The Manager
Description	The Manager is in the charge of giving salaries to all the employees.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1.The Manager logged into the system. 2.He clicks on the Finance button and from the dropdown menu, he selects "Salaries". 3.Now he can view the all the employees and the salary that is needed to be paid to them. 4.When the manager clicks pay button, money will be transferred to their account and deducted from the company account. 5.A message box will be shown of successfully transaction of money. 6.An email would be sent out to the employee being paid. <p>Alternative flow:</p> <ol style="list-style-type: none"> 4a.Company account does not have enough money to pay the employees. <ol style="list-style-type: none"> 1.He will debit into the company account. 2.He requests the employee to get paid in installments.

5.10 Use Case 10 (Give Bonuses)

Use Case ID	U10
Name	Give Bonus
Actor	The Manager
Description	The Manager give bonuses to riders and sales agent depending upon their monthly performances based upon bar chart.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1.The Manager logged into the system. 2.He clicks on the Finance button and from the dropdown menu, he selects "Salaries". 3.Two bar graphs will be shown to him. First will be of the rider performances based on their total orders and sales agent depending upon the working days. 4.He will select the employee and click on Bonus button. 5.A pop up will be shown in which he will input the bonus amount ranging from 10 thousand to 20 for rider and 5 to 10 thousand for the sales agent. 6.He clicks on pay and the money will be transferred to the employee.

5.11 Use Case 11 (Tracking Financial record):

Use Case ID	U11
Name	Tracking Financial record
Actor	The Manager
Description	The Manager gets to view all the reports of the company and available balance in the company account
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1. The Manager logs into the system 2. The Manager clicks on the Finance button and from the dropdown menu; the Manager selects "Company account". 3. Analytical reports will be shown to the Manager containing: <ul style="list-style-type: none"> • Total Salaries • Fuel Consumption • Bonuses • Warehouse Expense • Stock Expense • Vehicles 4. The Manager exports these into .csv files. 5. The Manager also sees the company's total money. <p>Alternative Flow:</p> <ol style="list-style-type: none"> 1a. The Manager forgets the password. 1. The Manager clicks on a button to recover the account.

5.12 Use Case 12 (Buy Stock):

Use Case ID	U12
Name	Buy Stock
Actor	Inventory Supervisor
Description	Inventory Supervisor will be able to buy the products according to its requirement. Before placing the order, he will get confirmation from the manager through the email and we are assuming the products will be reached after one day and check-in by inventory manager. Moreover, manager can also buy stock.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1. Supervisor logs into the system. 2. Supervisor clicks the Buy stock button in the side bar menu. 3. Buy Stock page is shown to the Supervisor. 4. Inventory Supervisor places the order by filling the information. 5. Inventory Supervisor enters the name of the product. 6. Inventory Supervisor enters the size. 7. Inventory Supervisor enters the quantity. 8. Inventory Supervisor selects the category from the combo Box. 9. Inventory Supervisor selects colour from combo Box. 10. Inventory Supervisor enters the price of single product. 12. The System validates the above details. 13. After this, price of individual product and the price of total placed order will be shown to him. 14. The manager will receive the confirmation email from the supervisor. It is upon him whether he confirms the order or he cancels the order. 15. When Inventory Supervisor receives the confirmation email from the manager then the confirmed order will be placed. 16. The order will be added in the stock after one day. <p>Alternative Flow:</p> <ol style="list-style-type: none"> 1a. Inventory Supervisor forgets the password. <ol style="list-style-type: none"> 1. Inventory Supervisor clicks on a button to recover the account. 4a. Inventory Supervisor has to buy another product at the same time. <ol style="list-style-type: none"> 1. Inventory Supervisor clicks on 'Add to cart' for the previous order. 2. It will be added to the cart shown on the right side of screen. 3. Inventory Supervisor enters the details of the next order. 4. Goes to cart and click on request order. 7a. Inventory Supervisor selects the quantity '1'. <ol style="list-style-type: none"> 1. The System demands that he cannot place the order when he buys product less than a certain quantity. 10a. Inventory Supervisor enters invalid price. <ol style="list-style-type: none"> 1. The System demands to enter only float values. 15a. Inventory Supervisor receives the rejection email from the manager. <ol style="list-style-type: none"> 1. He will cancel the order.

5.13 Use Case 13 (Update Stock):

Use Case ID	U13
Name	Update Stock
Actor	Inventory Supervisor
Description	Inventory supervisor will be able to update the stock when the order will be delivered by the rider. He can also view the pending orders and the completed orders.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1. The rider comes to the warehouse to pick up his order. 2. Supervisor logs into the system. 3. Supervisor clicks on the 'Update stock' button. 4. A table is displayed that contains all the available stock in the warehouse. 5. Inventory Supervisor enters the order number that is required by the rider. 6. Automatically these things will be deducted from the warehouse stock. <p>Alternative Flow:</p> <ol style="list-style-type: none"> 5a. The order required by the rider is not available in the warehouse stock. 1. The rider will be unable to take the order from the shopkeeper that is not available in the warehouse. 5b. Inventory Supervisor enters an invalid format. 1. The System demands to enter number in integers with ''. 2. The System demands to enter number of order present in the database.

5.14 Use Case 14 (Confirm Stock):

Use Case ID	U14
Name	Confirm Stock
Actor	The Manager
Description	Manager gives the approval of what to buy from the supplier or what not.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1. The inventory Supervisor has to buy some stock. 2. He requests the manager for approval. 3. Supervisor sent an email to Manager. 4. The Manager logs into the system. 5. Manager clicks on the 'Notifications' button . 6. The Manager views the order. 7. The Manager clicks on accept. 8. Automatically these things will be added from the warehouse stock after one day. <p>Alternative Flow:</p> <ol style="list-style-type: none"> 7a. The Manager clicks on decline. 1. The inventory Supervisor gets notification that the order has been declined by the Manager..

5.15 Use Case 15 (Mark Attendance):

Use Case ID	U15
Name	Mark Attendance
Actor	Inventory Supervisor, Rider, Sales Agent
Description	The actor marks his/her daily attendance and the report is send to the Manager.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1. The actor logs into the System. 2. The actor goes to attendance section. 3. Marks the actor attendance. 4. Press OK. 5. The System saves and makes a report of attendance. 6. Automatically a report will be generated and send out to the Manager. 7. The System updates the date the next day. <p>Alternative Flow:</p> <ol style="list-style-type: none"> 1a. The actor forgets the password. <ol style="list-style-type: none"> 1. The actor clicks on a button to recover the account. 1b. The actor does not have an account (inventory worker). <ol style="list-style-type: none"> 1. The inventory Supervisor clicks on attendance. 2. A table is displayed that contains all the workers under inventory Supervisor. 3. Inventory Supervisor marks their attendance along with his own.

5.16 Use Case 16 (View Stock):

Use Case ID	U16
Name	View Stock
Actor	Inventory Supervisor
Description	The Supervisor gets to see available stock in warehouse for any purpose.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1. The Supervisor logs into the System. 2. Inventory Supervisor clicks on View stock button to know how much stock is available in the warehouse. 3. A table is displayed to him. <p>Alternative Flow:</p> <ol style="list-style-type: none"> 1a. Inventory Supervisor forgets the password. <ol style="list-style-type: none"> 1. Inventory Supervisor clicks on a button to recover the account.

5.17 Use Case 17 (Deliver Order):

Use Case ID	U17
Name	Deliver Order
Actor	Rider
Description	The rider will reach his location of shopkeeper and deliver his order. He receives the remaining payable amount of the shopkeeper.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1. Rider logs into the system. 2. Rider clicks to view which order he has to deliver today. 3. Rider arrives at warehouse. 4. Rider picks up the order. 5. Rider reaches at his destined location. 6. Rider delivers the order to the shopkeeper. 7. Shopkeeper pays the remaining amount. 8. Rider enters the paid amount and mark tick on that client; assuring that the order has been delivered. <p>Alternative Flow:</p> <ol style="list-style-type: none"> 1a. Rider forgets his password. <ol style="list-style-type: none"> 1. Rider clicks on a button to recover the account. 8a. The client is already an existing customer of the company. <ol style="list-style-type: none"> 1. The client pays the total amount of the order. <ol style="list-style-type: none"> 1a. The client asks the rider to pay later. <ol style="list-style-type: none"> 1. Rider enters the amount of that client into the cash book

5.18 Use Case 18 (Make Report Cost):

Use Case ID	U18
Name	Make Report Cost
Actor	Inventory Supervisor
Description	Inventory supervisor can report holding, carrying and total costs. He will calculate the selling cost of the product after calculating all the company expenses.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1. Supervisor when click on the Report Cost button, the UI screen containing the inputs will be shown. 2. He will fill out all the inputs like Product buying cost, Company expenses, Government Tax, Profit percentage, etc. and then click on the calculate button. 3. After clicking the calculate button the selling price of this product will be shown and that product will be delivered to the customer at that price

5.19 Use Case 19 (Take Order):

Use Case ID	U19
Name	Take Order
Actor	Rider
Description	Rider will reach his assigned location and take order from the Shop Keeper. The information taken by the rider will reach to the sales agent and then sales agent will perform its certain actions.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1. Rider reaches the Shop Keeper. 2. Rider logs into the system. 3. Rider presses the Take Order button. 4. Take Order screen opens and he takes the order details. 5. Rider selects the product category from the combo Box. 6. Rider chooses the name of the available products of that category. 7. Rider enters the quantity. 8. Rider chooses a colour from the combo Box. 9. Rider chooses the available size of that product from the combo Box. 10. The System displays the price of a single product. 11. The System displays the total amount to be paid. 12. Rider presses the place order button. 13. The information will be delivered to the sales agent. 14. The receipt gets generated on which the total payment will be shown. 15. Customer pays the advance. 16. Rider enters the paid amount by the client into the system. <p>Alternative Flow:</p> <ol style="list-style-type: none"> 2a. Rider forgets the password. <ol style="list-style-type: none"> 1. Rider clicks on a button to recover the account. 4a. Required order of the client is not available in stock. <ol style="list-style-type: none"> 1. Rider sends an email to the Supervisor about the unavailability of hspace1em the product. 2. Rider tells the client about the unavailability. 3. Client places a new order. 3a. Client cancels to place any order. 7a. Rider enters an invalid quantity. <ol style="list-style-type: none"> 1. The System demands for the quantity to be in integers. 2. The System demands for the quantity to be greater than 10. 15a. The client is already an existing customer of the company. <ol style="list-style-type: none"> 1. The client can/cannot pay the advance

5.20 Use Case 20 (Add Client):

Use Case ID	U20
Name	Add Client
Actor	Rider
Description	Rider will reach his assigned location and take details from the Shop Keeper. The information taken by the rider will reach to the sales agent and then sales agent will perform its certain actions.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1. Rider reaches the Shop Keeper and presses the button to take order. 2. Take Order screen will open where he can see all the products available with their prices. 3. Rider adds the information of the client. 4. Rider enters the name of the client. 5. Rider enters the CNIC of the client. 6. Rider enters the email of the client. 7. Rider enters the address of the shop from Google Maps. 8. Rider enters the number of the client. 9. Rider selects the area of the shop from the combo Box. 10. Rider enters the shop name. 11. The System validates the above details. 12. Then the client has been created and the rider takes the order. <p>Alternative Flow:</p> <ol style="list-style-type: none"> 1a. The rider forgets the password. <ol style="list-style-type: none"> 1. Rider clicks on a button to recover the account 3a. The client is already an existing customer of the company. <ol style="list-style-type: none"> 1. Rider just enters the CNIC and the remaining information is automatic fills out. 1a. Two or more shops are registered on the same CNIC. <ol style="list-style-type: none"> 1. Combo Box will appear on the address from which the rider selects the required address. 4a. Rider enters the invalid name. <ol style="list-style-type: none"> 1. The System demands to enter names containing only alphabets. 5a. Rider enters invalid CNIC. <ol style="list-style-type: none"> 1. The System demands to enter CNIC containing only 13 digit integer. 6a. Rider enters invalid e-mail. <ol style="list-style-type: none"> 1. The System demands to enter an e-mail that contains @ in the format. 7a. Address is not available on Google Maps. <ol style="list-style-type: none"> 1. The rider chooses the nearest location to the shop. 8a. Rider enters an invalid phone number. <ol style="list-style-type: none"> 1. The System demands to enter the number that contains only 11 digit integer.

5.21 Use Case 21 (Cancel Order):

Use Case ID	U21
Name	Cancel Order
Actor	Rider
Description	The rider can check the orders created. He has an option to view all the pending orders that have to be delivered in the given amount of time. He can also cancel the order if asked by the customer.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1. The rider logs in to the system. 2. Rider clicks the button to check the to-do-list. 3. After clicking, all the order that have not been delivered to the required customers will be shown to rider. 4. Rider is taking order and at that time, opens this window, rider will also have an option to delete or cancel the order. <p>Alternative flow:</p> <ol style="list-style-type: none"> 1a. The rider forgets his password. <ol style="list-style-type: none"> 1. He clicks on 'Forgot Password' to recover his account. 6a. The shopkeeper wants to cancel half, less than half or more from the order he just placed. <ol style="list-style-type: none"> 1. When rider clicks on the 'cancel' button of that order, he will be displayed the quantity which he can increment or decrement according to the wish of the shopkeeper 6b. The shopkeeper wants to cancel half, less than half or more from the order he placed at the time of delivery. <ol style="list-style-type: none"> 1. A message box will be shown that the client cannot cancel his order now. 1a. He insists on cancel the order and refuse to receive. <ol style="list-style-type: none"> 1. When rider clicks on the 'cancel' button of that order, 10% will be deducted from the advanced payment of the order. 2. The order is delivered back to the warehouse and gets added in the stock.

5.22 Use Case 22 (To do List):

Use Case ID	U22
Name	To Do list
Actor	Rider
Description	The rider can check the orders created. He has an option to view all the pending orders that have to be delivered in the given amount of time.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1.The rider logged in to the system. 2.He clicks the button to check the to-do-list. 3.After clicking, all the order that have not been delivered to the required customers will be shown to him. 4.He can click on any specific pending order to check its details. 5.Remaining delivery time of all orders is also shown on the right side. 6.He clicks on tick button when the order is delivered and payment is received. <p>Alternative flow:</p> <ol style="list-style-type: none"> 1a. The rider forgets his password. 1.He clicks on 'Forgot Password' to recover his account.

5.23 Use Case 23 (Assign Location):

Use Case ID	U23
Name	Assign Location
Actor	Sales Agent
Description	Sales Agent will assign the location to all the riders on weekly basis.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1.The sales agent logged into the system. 2.He clicks on the assign location button in side bar menu and the screen will be shown to him. 3.He will select the rider from the dropdown. 4.He can then select the location from the drop down and clicks on the assign button . The location will be assigned. 5.He can also view a data grid that show the details of all the riders with their locations assigned <p>Alternative Flow:</p> <ol style="list-style-type: none"> 1a. The sales agent forgot its password. 1.The sales agent clicks on "Forgot Password" to recover his account.

5.24 Use Case 24 (Track Order):

Use Case ID	U24
Name	Track Order
Actor	Sales Agent
Description	Sales Agent has the power to view all the riders current and previous orders history.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1.The Sales Agent logged into the system. 2.He clicks on the track order button to get the information about an order. 3.He selects the name of the riders from the dropdown menu. 4.The agent gets to view the rider and all his delivered orders and pending orders. <p>Alternative flow:</p> <ol style="list-style-type: none"> 1a. The rider forgets his password. 1.He clicks on 'Forgot Password' to recover his account.

5.25 Use Case 25 (Add Fuel Details):

Use Case ID	U25
Name	Add Fuel Details
Actor	The Rider
Description	The rider is also assigned a vehicle by the Manager. The rider adds the Refueling date in the report of fuel consumption. The cost of each day and number of kilometers the vehicle is driven are also added into the report.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1. The First thing Rider does in the morning is arriving at the gas station. 2. Rider asks the pump employee to fill the gas. 3. Rider logs into the system. 4. Rider clicks on the fuel report. 5. Rider adds truck number at the top only for one time and fuel cost per litre. 6. The System displays the current date. 7. The Rider enters kilometre being shown on the vehicle's odometer. 8. The Rider enters total volume of fuel in litres. 9. The System calculates the cost. 10. The System validates the given details. 11. Rider clicks on update and the report is send to the Sales agent. 12. The Sales agent validates the report. 13. Report is sent to the Manager. <p>Alternative flow:</p> <ol style="list-style-type: none"> 5a. The Rider enters an invalid truck number. 1. Sales Agent will check either it is the same vehicle that has been assigned to rider or not.

5.26 Use Case 26 (Find Route):

Use Case ID	U26
Name	Find route
Actor	Rider
Description	The rider reaches the location where the order is to be delivered using the application map and Google map.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1. The rider logs into the system. 2. Rider clicks the button to check the to-do-list. 3. Rider views all the orders that are needed to be delivered. 4. Rider clicks on any particular that rider is going to deliver. 5. Rider clicks on the location of that order. 6. The application map opens providing him with the shortest path to that area. <p>Alternative Flow:</p> <ol style="list-style-type: none"> 1a. The rider forgets the portal password. <ol style="list-style-type: none"> 1. Rider clicks on a button to recover the account.

5.27 Use Case 27 (View Cashbook):

Use Case ID	U27
Name	View Cashbook
Actor	Sales Agent
Description	The sales Agent gets to see which clients have not paid the order amount and send out an email to remind them after 15 days.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none"> 1. The Sales Agent logs into the system. 2. Sales Agent clicks on 'Clients'. 3. A table is displayed containing all clients and their due amount of money. 4. Sales agents click on the email button to send them a reminder <p>Alternative Flow:</p> <ol style="list-style-type: none"> 1a. Sales Agent forgets the password. <ol style="list-style-type: none"> 1. Sales Agent clicks on a button to recover the account. 3a. Client has zero due amounts. <ol style="list-style-type: none"> 1. Email option gets removed

5.28 Use Case 28 (Assign Vehicle):

Use Case ID	U28
Name	Assign Vehicle
Actor	Sales Agent
Description	Sales Agent will assign vehicles to all the riders
Flow	<p>Base Flow:</p> <ol style="list-style-type: none">1. The Sales agent logs into the system.2. Sales Agent clicks on the assign vehicle button in sidebar menu and the screen will be shown to Sales Agent.3. Sales Agent will select the rider from the dropdown.4. Sales Agent selects the vehicle from the drop-down and clicks on the assign button.5. The vehicle will be assigned. <p>Alternative Flow:</p> <ol style="list-style-type: none">1a. The sales agent forgot the password.<ol style="list-style-type: none">1. The sales agent clicks on a button to recover the account.3a. Rider already has an assigned vehicle.<ol style="list-style-type: none">1. An error message will be displayed.

5.29 Use Case 29 (View Order History):

Use Case ID	U29
Name	View Order History
Actor	Rider
Description	The rider can check the orders created. He has an option to view all the orders that have been delivered to the required clients.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none">1. The rider logged in to the system.2. Rider clicks the view the history of all the orders that have been delivered.3. A table is displayed to him accounting all the information. <p>Alternative Flow:</p> <ol style="list-style-type: none">1a. The rider forgets the password.<ol style="list-style-type: none">1. Rider clicks on a button to recover the account.

5.30 Use Case 30 (View Notifications):

Use Case ID	U30
Name	View Notifications
Actor	Sales Agent, Inventory supervisor
Description	The Sales Agent and Inventory supervisor can check the notifications related to the confirmed and pending orders.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none">1. The Actor logged in to the system.2. Actor clicks the notification button.3. A table is displayed to them accounting all the information related to the confirmed and pending orders and also notifications related to their job from the manager. <p>Alternative Flow:</p> <ol style="list-style-type: none">1a. The Actor forgets the password. 1. Actor clicks on a button to recover the account.

5.31 Use Case 31 (View Dashboard):

Use Case ID	U31
Name	View Dashboard
Actor	Sales Agent, Manager
Description	The Sales Agent and Manager can see the dashboard that is the visual display of all of their data. Its primary intention is to provide information at a glance.
Flow	<p>Base Flow:</p> <ol style="list-style-type: none">1. The actor logged in to the system.2. Actor clicks the notification button.3. A Dashboard is displayed to them that is the visual display of all of their data. Its primary intention is to provide information at a glance. <p>Alternative Flow:</p> <ol style="list-style-type: none">1a. The actor forgets the password. 1. Actor clicks on a button to recover the account.

6 User Interface

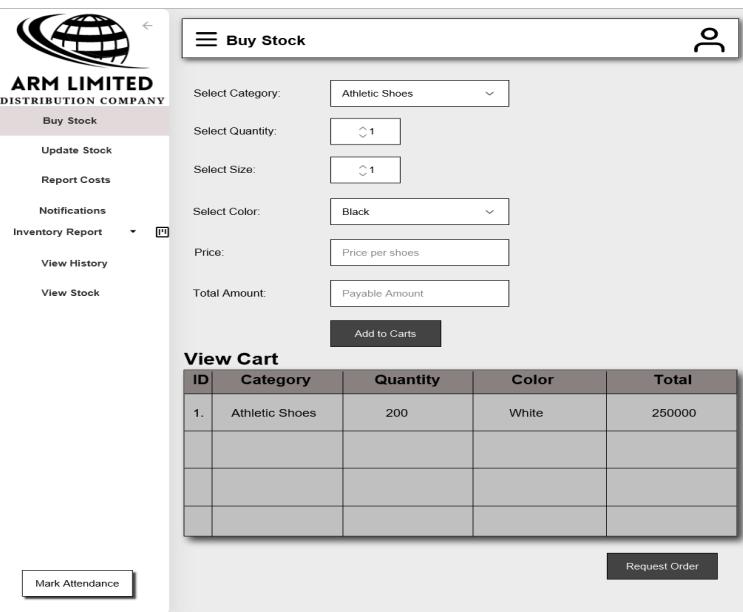
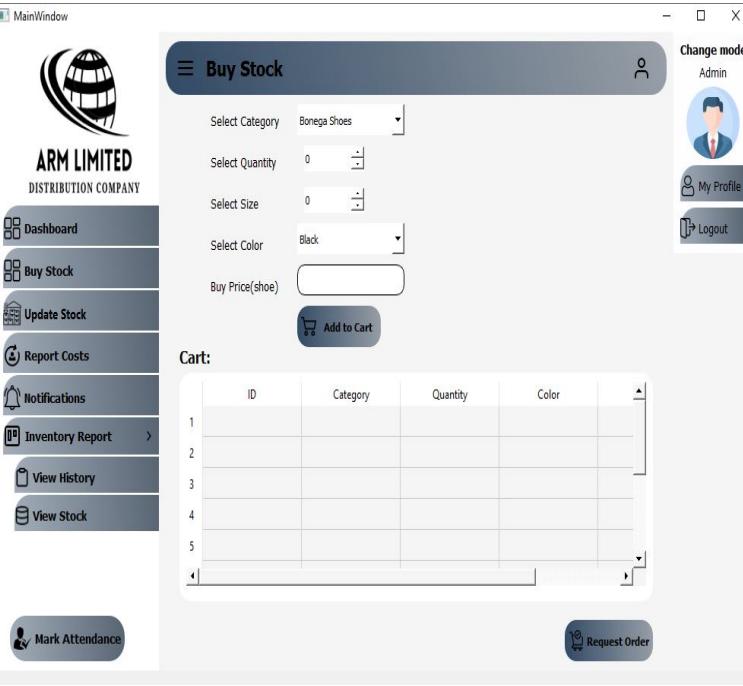
Interface ID	I01
Name	Add Employee
LinkedUseCase	U03
UI Screen	
UI Screen (Implemented)	
Validators	<ol style="list-style-type: none"> 1. Name: Name should be entered in string. 2. Phone Number: It would be of string type with minimum 11 words. 3. Age: It would be of int type ranges from 0 to 120. 4. Bank Account: It should be input of integers with atleast 15 numbers. 5. CNIC: CNIC will be of string type with 13 characters. 6. Category: Manager can either select Rider, Supervisor, Sales agent. 7. Email: Email will be validated with @gmail.com and it is of string type. 8. Salary: It is of int type. 9. ID: It is of string type. 10. Password: It is of string type.
Changes	1. The addition progress bar of employee has not been added in the UI.

Interface ID	I02
Name	Update Employee
LinkedUseCase	U04
UI Screen	
UI Screen (Implemented)	

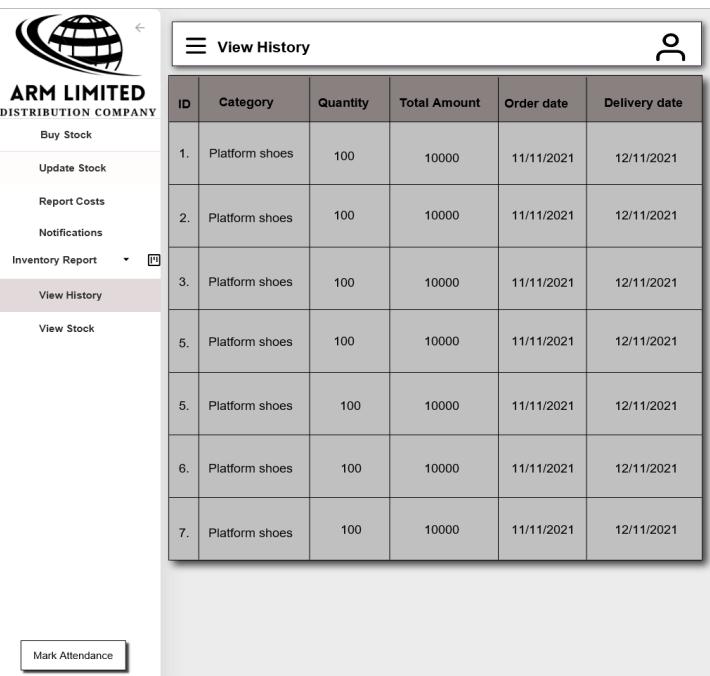
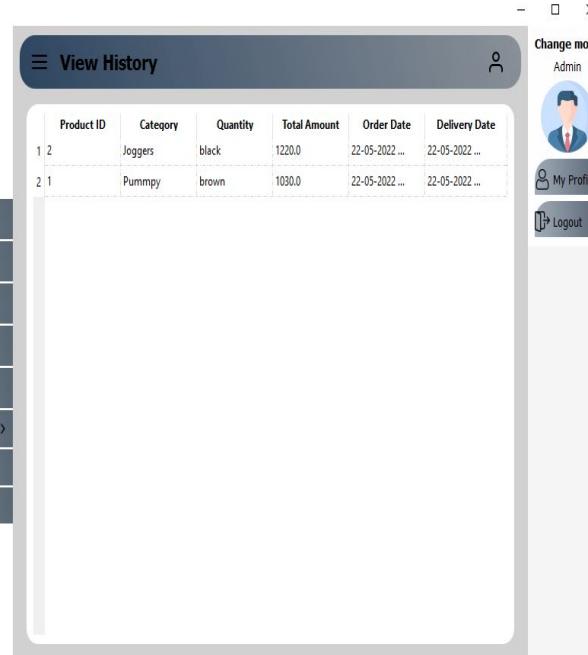
Validators	<ol style="list-style-type: none"> 1. Name: Name should be entered in string. 2. Phone Number: It would be of string type with minimum 11 words. 3. Age: It would be of int type ranges from 0 to 120. 4. Bank Account: It should be input of integers with atleast 15 numbers. 5. CNIC: CNIC will be of string type with 13 characters. 6. Category: Manager can either select Rider, Supervisor, Sales agent. 7. Email: Email will be validated with @gmail.com and it is of string type. 8. Salary: It is of int type. 9. ID: It is of string type. 10. Password: It is of string type.
Changes	<ol style="list-style-type: none"> 1. The update and delete option are displayed at the bottom rather than inside the table.

Interface ID	I03																																																
Name	Give Salary and Bonus																																																
LinkedUseCase	U09, U10																																																
UI Screen	<p>The screenshot shows a table titled "Give Salary and Bonuses" with the following data:</p> <table border="1"> <thead> <tr> <th>ID</th> <th>Name</th> <th>Status</th> <th>Basic Salary</th> <th>Give Bonus</th> <th>Paid</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Rayan Rasheed</td> <td>Rider</td> <td>25000</td> <td><input type="button" value="View Performance"/> <input type="button" value="Bonus: 1"/></td> <td><input checked="" type="checkbox"/> Pay</td> </tr> <tr> <td></td> <td>Mukarram Ali</td> <td>Sales Agent</td> <td>25000</td> <td><input type="button" value="View Performance"/> <input type="button" value="Bonus: 1"/></td> <td><input checked="" type="checkbox"/> Pay</td> </tr> <tr> <td></td> <td>Ammad Aslam</td> <td>Supervisor</td> <td>25000</td> <td><input type="button" value="View Performance"/> <input type="button" value="Bonus: 1"/></td> <td><input checked="" type="checkbox"/> Pay</td> </tr> <tr> <td></td> <td>Rayan Rasheed</td> <td>Rider</td> <td>25000</td> <td><input type="button" value="View Performance"/> <input type="button" value="Bonus: 1"/></td> <td><input checked="" type="checkbox"/> Pay</td> </tr> <tr> <td></td> <td>Mukarram Ali</td> <td>Sales Agent</td> <td>25000</td> <td><input type="button" value="View Performance"/> <input type="button" value="Bonus: 1"/></td> <td><input checked="" type="checkbox"/> Pay</td> </tr> <tr> <td></td> <td>Ammad Aslam</td> <td>Supervisor</td> <td>25000</td> <td><input type="button" value="View Performance"/> <input type="button" value="Bonus: 1"/></td> <td><input checked="" type="checkbox"/> Pay</td> </tr> <tr> <td></td> <td>Ammad Aslam</td> <td>Supervisor</td> <td>25000</td> <td><input type="button" value="View Performance"/> <input type="button" value="Bonus: 1"/></td> <td><input checked="" type="checkbox"/> Pay</td> </tr> </tbody> </table>	ID	Name	Status	Basic Salary	Give Bonus	Paid	1.	Rayan Rasheed	Rider	25000	<input type="button" value="View Performance"/> <input type="button" value="Bonus: 1"/>	<input checked="" type="checkbox"/> Pay		Mukarram Ali	Sales Agent	25000	<input type="button" value="View Performance"/> <input type="button" value="Bonus: 1"/>	<input checked="" type="checkbox"/> Pay		Ammad Aslam	Supervisor	25000	<input type="button" value="View Performance"/> <input type="button" value="Bonus: 1"/>	<input checked="" type="checkbox"/> Pay		Rayan Rasheed	Rider	25000	<input type="button" value="View Performance"/> <input type="button" value="Bonus: 1"/>	<input checked="" type="checkbox"/> Pay		Mukarram Ali	Sales Agent	25000	<input type="button" value="View Performance"/> <input type="button" value="Bonus: 1"/>	<input checked="" type="checkbox"/> Pay		Ammad Aslam	Supervisor	25000	<input type="button" value="View Performance"/> <input type="button" value="Bonus: 1"/>	<input checked="" type="checkbox"/> Pay		Ammad Aslam	Supervisor	25000	<input type="button" value="View Performance"/> <input type="button" value="Bonus: 1"/>	<input checked="" type="checkbox"/> Pay
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UI Screen (Implemented)	<p>The screenshot shows a table titled "Salary and Bonus" with the following data:</p> <table border="1"> <thead> <tr> <th>ID</th> <th>Name</th> <th>Status</th> <th>Basic Salary</th> <th>Paid Status</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>mukarramali623...</td> <td>John</td> <td>30000</td> <td>Paid</td> </tr> <tr> <td>2</td> <td>ammadaslam199...</td> <td>AMMAD</td> <td>100000</td> <td>Un Paid</td> </tr> </tbody> </table> <p>Below the table, there is a "Select Employee:" dropdown set to "AMMAD" and a "Give Bonus (Optional):" text input field.</p>	ID	Name	Status	Basic Salary	Paid Status	1	mukarramali623...	John	30000	Paid	2	ammadaslam199...	AMMAD	100000	Un Paid																																	
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2	ammadaslam199...	AMMAD	100000	Un Paid																																													
Validators	<ol style="list-style-type: none"> 1. Searching: Searching will be according to the name of the employee. 2. Checkbox: If the salary is paid then it will be checked otherwise it will be unchecked. 3. Bonus: It should be of int type. 																																																
Changes	<ol style="list-style-type: none"> 1. We have added the option of selecting the employee whose salary is to be paid and pay option below. 2. Giving Bonus option is also displayed at the bottom. 																																																

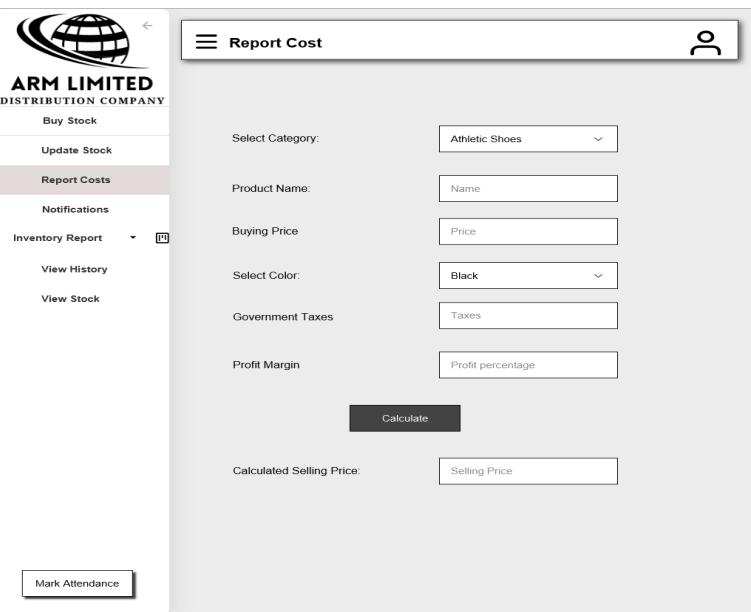
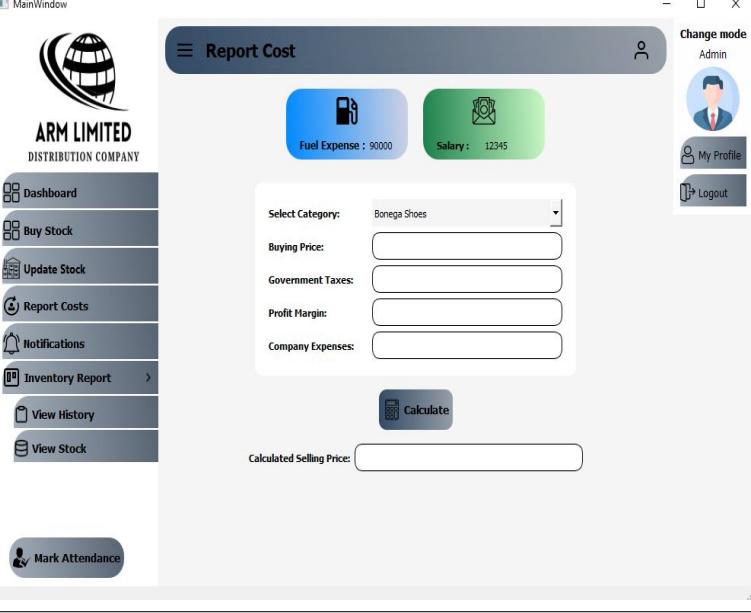
Interface ID	I04
Name	Company account
LinkedUseCase	U11,U07
UI Screen	<p>The screenshot shows the 'Company Account' screen with the following details:</p> <ul style="list-style-type: none"> Header: Company Account Left Sidebar: <ul style="list-style-type: none"> ARM LIMITED DISTRIBUTION COMPANY logo Navigation menu: Dashboard, Add Employee, Update Employee, Add Vehicle, Check Attendance, Notifications, Account and Finance (selected), Give Salary and Bonus, Company Account. Summary Statistics: <ul style="list-style-type: none"> Total Salaries: pkr 123,456,78 Fuel Consumption: pkr 123,456,78 Bonuses: pkr 123,456,78 Warehouse Expense: pkr 123,456,78 Stock Expense: pkr 123,456,78 Vehicle: pkr 123,456,78 Bottom Controls: <ul style="list-style-type: none"> Select category to deduct: new value 1 Total Amount: 2222222 Deduct From Account Company Total: 22222222
UI Screen (Implemented)	<p>The screenshot shows the 'Company Account' screen with the following details:</p> <ul style="list-style-type: none"> Header: Company Account Left Sidebar: <ul style="list-style-type: none"> ARM LIMITED DISTRIBUTION COMPANY logo Navigation menu: Dashboard, Add Employee, Update Employee, Add Vehicle, Check Attendance, Notifications, Account and Finance (selected), Salary and Bonus, Company Account. Summary Statistics: <ul style="list-style-type: none"> Total Salaries: 1234 Fuel Consumption: 1234 Bonuses: 1234 Warehouse Expenses: 1234 Stock Expense: 1234 Vehicle: 1234 Bottom Controls: <ul style="list-style-type: none"> Select Category to Deduct: dropdown menu Total Amount: input field Deduct From Account button Company Total: input field
Validators	<ol style="list-style-type: none"> Select Category: It is of dropdown menu that contains the value of string type. Company Total: It contain the company total in int.

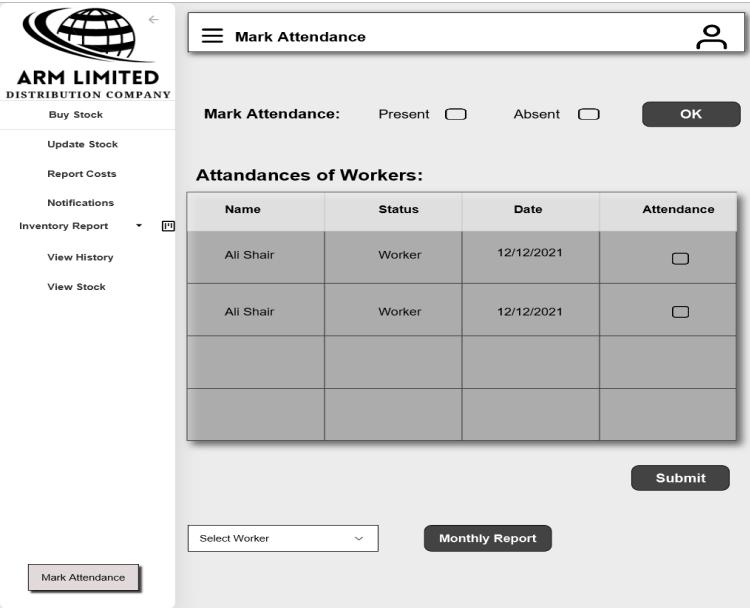
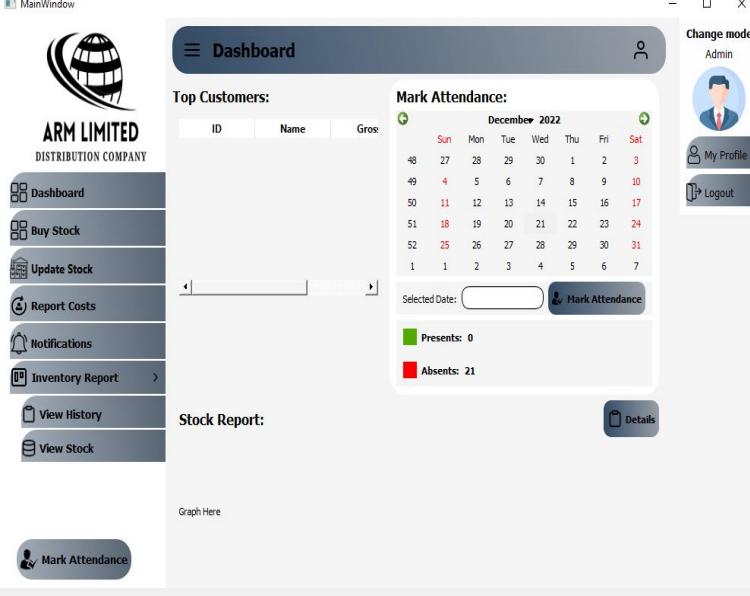
Interface ID	I05
Name	Buy Stock
LinkedUseCase	U12
UI Screen	
UI Screen (Implemented)	
Validators	<ol style="list-style-type: none"> Select Quantity: It is int type. Select Size: It is int type Price: It is of int type Total Amount: It is of int type

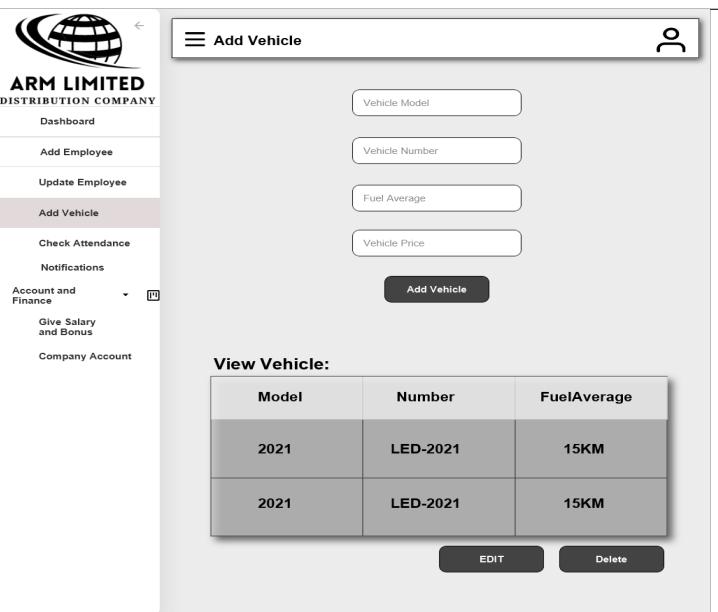
Interface ID	I06
Name	Update Stock
LinkedUseCase	U13
UI Screen	
UI Screen (Implemented)	
Validators	1. Check out button will be working when the order will be delivered.
Changes	<p>1. We have one more table in the UI.</p> <p>2. First table is the checkout table. When the deleted is deleted from the stock. Click on checkout button.</p> <p>3. Second table is the check in table. When the product is added into the stock. Click on check in button.</p>

Interface ID	107																																										
Name	View History																																										
LinkedUseCase																																											
UI Screen	 <table border="1"> <thead> <tr> <th>ID</th> <th>Category</th> <th>Quantity</th> <th>Total Amount</th> <th>Order date</th> <th>Delivery date</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Platform shoes</td> <td>100</td> <td>10000</td> <td>11/11/2021</td> <td>12/11/2021</td> </tr> <tr> <td>2.</td> <td>Platform shoes</td> <td>100</td> <td>10000</td> <td>11/11/2021</td> <td>12/11/2021</td> </tr> <tr> <td>3.</td> <td>Platform shoes</td> <td>100</td> <td>10000</td> <td>11/11/2021</td> <td>12/11/2021</td> </tr> <tr> <td>5.</td> <td>Platform shoes</td> <td>100</td> <td>10000</td> <td>11/11/2021</td> <td>12/11/2021</td> </tr> <tr> <td>6.</td> <td>Platform shoes</td> <td>100</td> <td>10000</td> <td>11/11/2021</td> <td>12/11/2021</td> </tr> <tr> <td>7.</td> <td>Platform shoes</td> <td>100</td> <td>10000</td> <td>11/11/2021</td> <td>12/11/2021</td> </tr> </tbody> </table>	ID	Category	Quantity	Total Amount	Order date	Delivery date	1.	Platform shoes	100	10000	11/11/2021	12/11/2021	2.	Platform shoes	100	10000	11/11/2021	12/11/2021	3.	Platform shoes	100	10000	11/11/2021	12/11/2021	5.	Platform shoes	100	10000	11/11/2021	12/11/2021	6.	Platform shoes	100	10000	11/11/2021	12/11/2021	7.	Platform shoes	100	10000	11/11/2021	12/11/2021
ID	Category	Quantity	Total Amount	Order date	Delivery date																																						
1.	Platform shoes	100	10000	11/11/2021	12/11/2021																																						
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6.	Platform shoes	100	10000	11/11/2021	12/11/2021																																						
7.	Platform shoes	100	10000	11/11/2021	12/11/2021																																						
UI Screen (Implemented)																																											

Interface ID	I08																																																								
Name	View Stock																																																								
LinkedUseCase	U16																																																								
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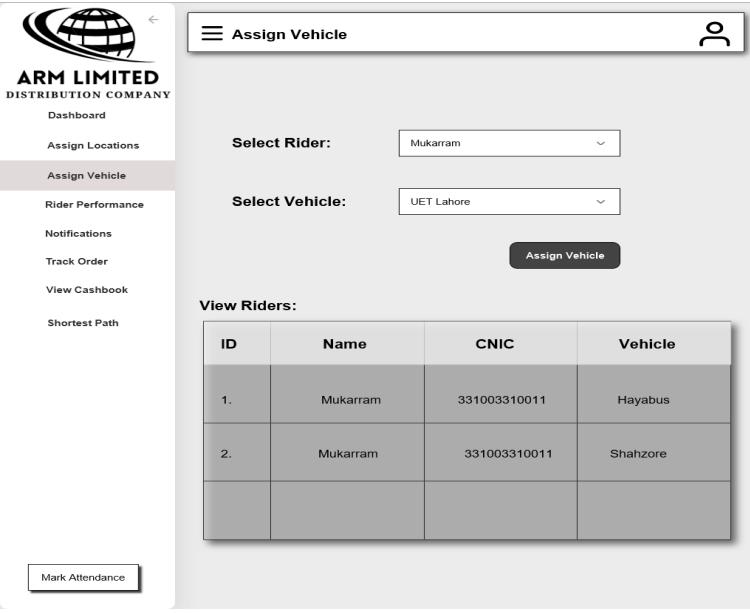
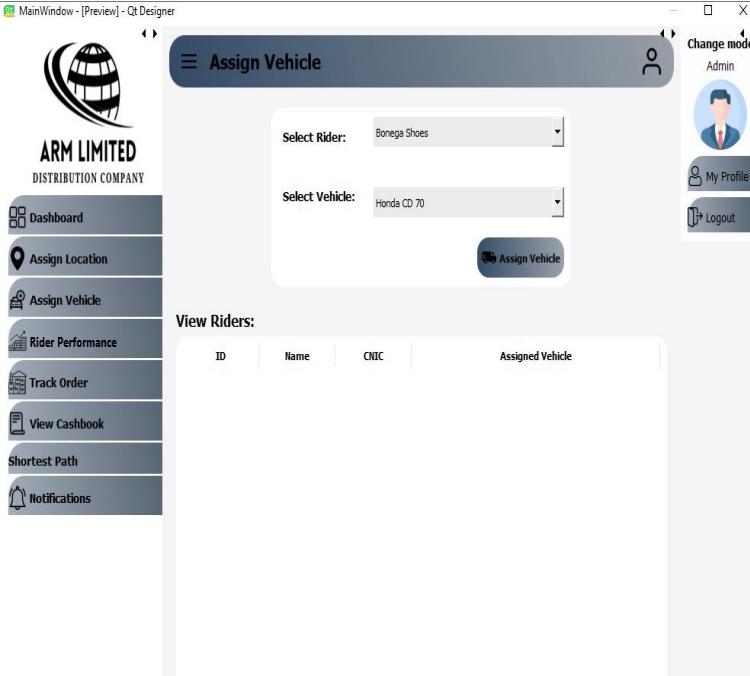
Interface ID	I09
Name	Report Costs
LinkedUseCase	U18
UI Screen	
UI Screen (Implemented)	
Validators	<ol style="list-style-type: none"> 1. Name is of string type. 2. Price is of int type 3. Taxes are of float type. 4. Profit margin is also of float type. 5. Selling price is also of float type.
Changes	<ol style="list-style-type: none"> 1. We have added two cards at the top to display the fuel and salary expenses.

Interface ID	I10
Name	Mark Attendance Supervisor
LinkedUseCase	U15
UI Screen	
UI Screen (Implemented)	
Validators	<ol style="list-style-type: none"> Supervisor must check one of the check box i.e. present or absent then he will be able to mark attendance. Attendance of workers is marked by clicking the check box in front of them. He can click the submit button when all the attendances are marked Monthly report button will work when the worker is selected from dropdown
Changes	<ol style="list-style-type: none"> This screen has been deleted as there are no workers in the project. The inventory will mark his attendance from the calendar showing in the Dashboard.

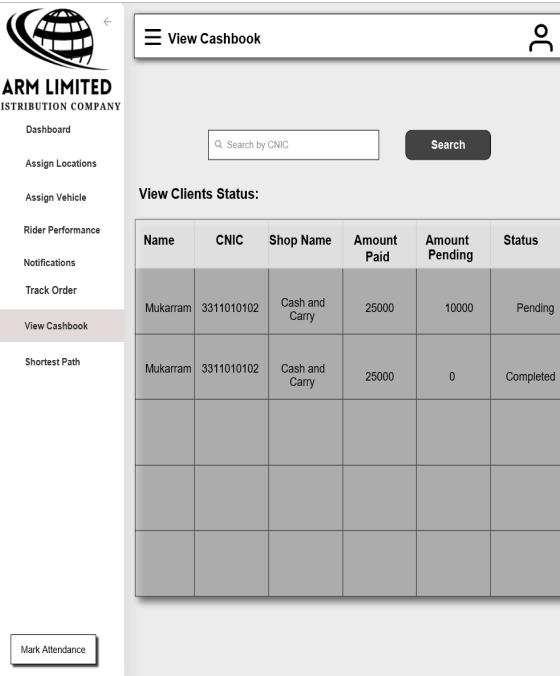
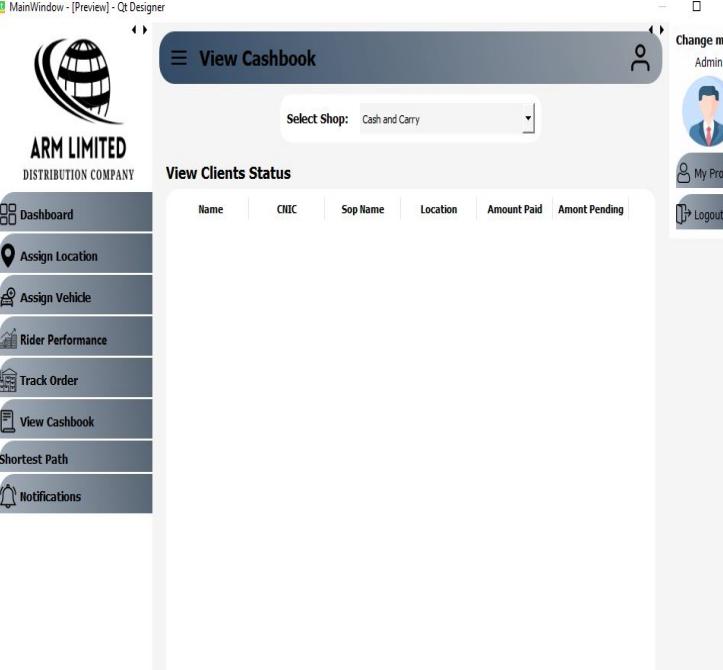
Interface ID	I11
Name	Add Vehicle
LinkedUseCase	U06
UI Screen	
UI Screen (Implemented)	
Validators	<ol style="list-style-type: none"> Model is of int type Vehicle number is of string type. Fuel average is of float type. Vehicle price is of int type.

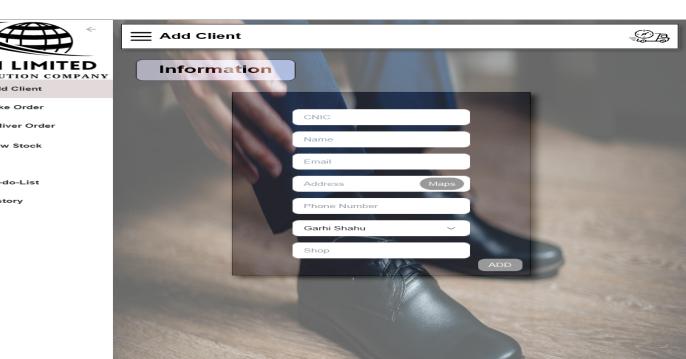
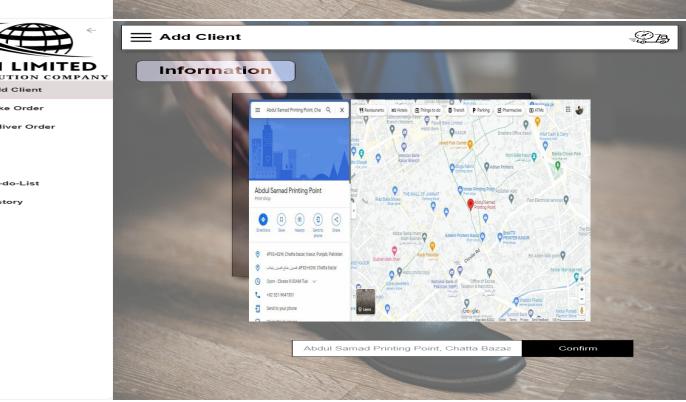
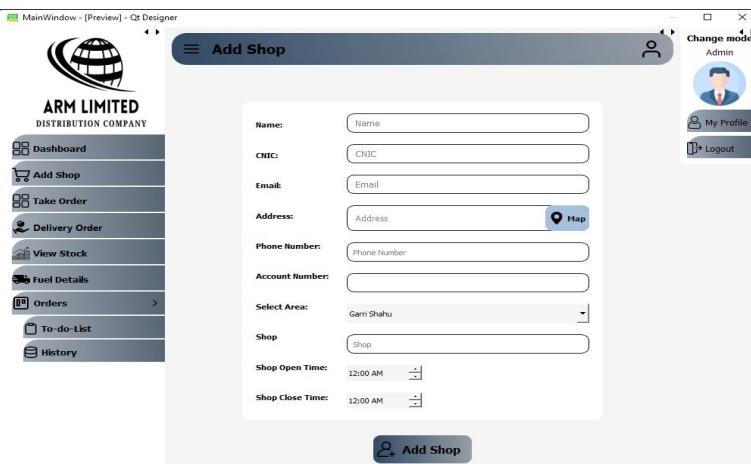
Interface ID	I12																								
Name	Check Attendance																								
LinkedUseCase	U08																								
UI Screen	<table border="1"> <thead> <tr> <th>Name</th> <th>Status</th> <th>Date</th> <th>Attendance</th> </tr> </thead> <tbody> <tr> <td>Ali Sharif</td> <td>Rider</td> <td>12/12/2021</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Maaz Iftikhar</td> <td>Sales Agent</td> <td>12/12/2022</td> <td><input type="checkbox"/></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Select Employee: Rider Monthly Report</p>	Name	Status	Date	Attendance	Ali Sharif	Rider	12/12/2021	<input type="checkbox"/>	Maaz Iftikhar	Sales Agent	12/12/2022	<input type="checkbox"/>												
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Employee	2022-12-21	2022-12-22	2022-12-23	2022-12-24	202																				
1 ammad	P	P																							
2 John	P																								
Validators	<ol style="list-style-type: none"> Manager can select only employees from the dropdown menu and can check its monthly attendance report 																								

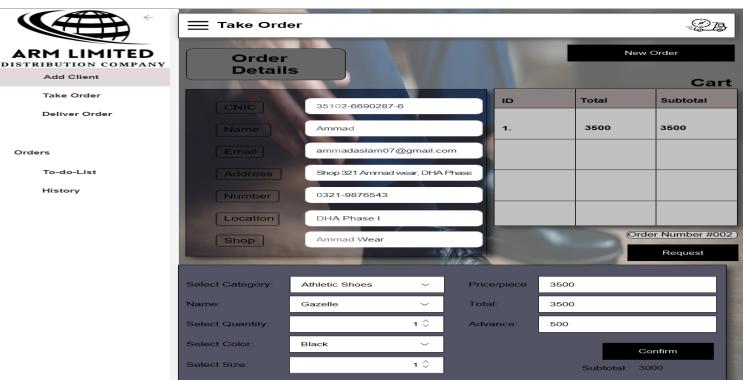
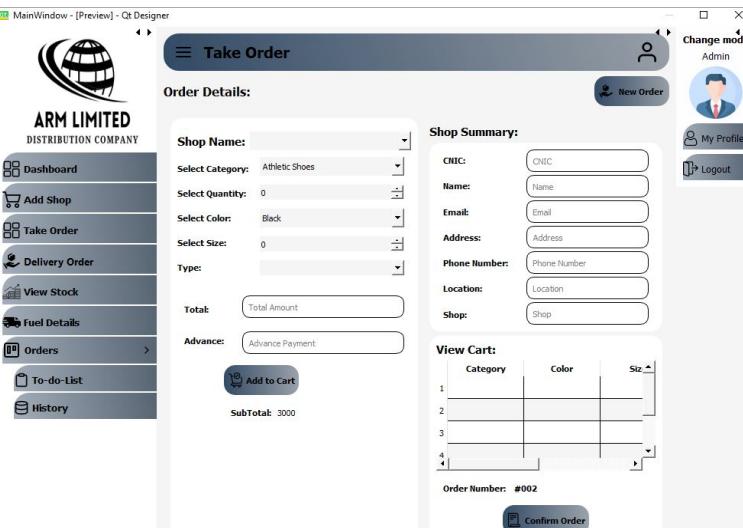
Interface ID	I13
Name	Assign Location
LinkedUseCase	U23
UI Screen	
UI Screen (Implemented)	
Validators	<ol style="list-style-type: none"> Rider name will be selected from the dropdown menu that is of string type. Location will be of string type selected from dropdown. Assign Location button will work when both these Inputs are filled.

Interface ID	I14												
Name	Assign Vehicle												
LinkedUseCase	U28												
UI Screen	 <table border="1" data-bbox="644 635 1171 846"> <thead> <tr> <th>ID</th> <th>Name</th> <th>CNIC</th> <th>Vehicle</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Mukarram</td> <td>331003310011</td> <td>Hayabus</td> </tr> <tr> <td>2.</td> <td>Mukarram</td> <td>331003310011</td> <td>Shahzore</td> </tr> </tbody> </table>	ID	Name	CNIC	Vehicle	1.	Mukarram	331003310011	Hayabus	2.	Mukarram	331003310011	Shahzore
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UI Screen (Implemented)													
Validators	<ol style="list-style-type: none"> Rider name will be selected from the dropdown menu that is of string type. Vehicle will be of string type selected from dropdown. Assign Vehicle button will work when both these Inputs are filled. 												

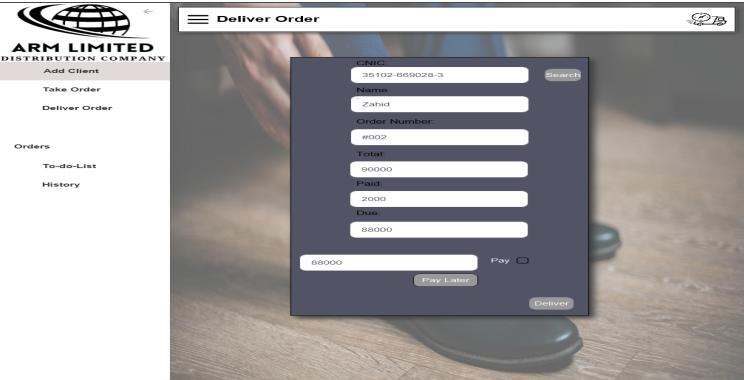
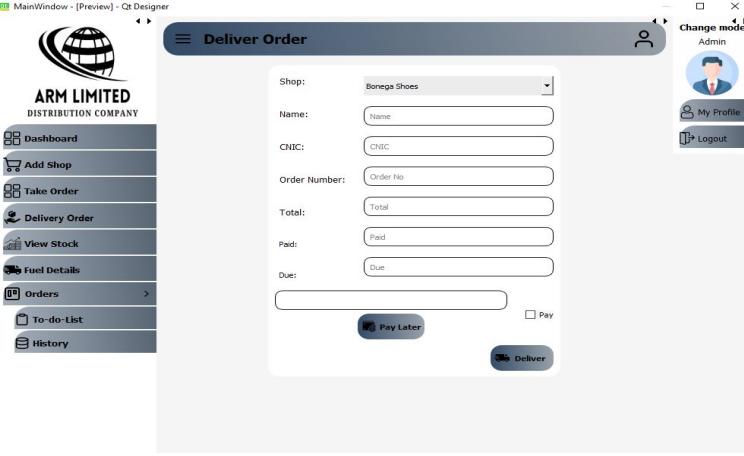
Interface ID	I15
Name	Track Order
LinkedUseCase	U24
UI Screen	
UI Screen (Implemented)	
Validators	<ol style="list-style-type: none"> Rider name will be selected from the dropdown menu that is of string type. View History button will work when the Inputs are filled.

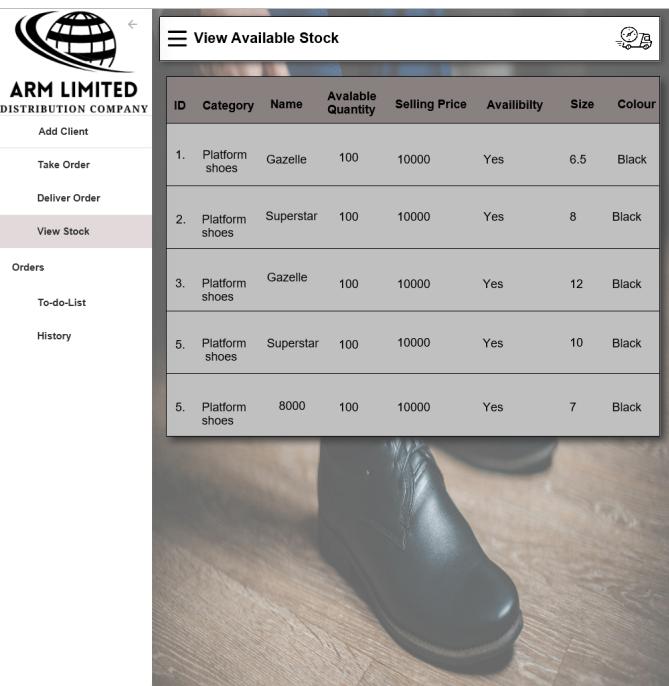
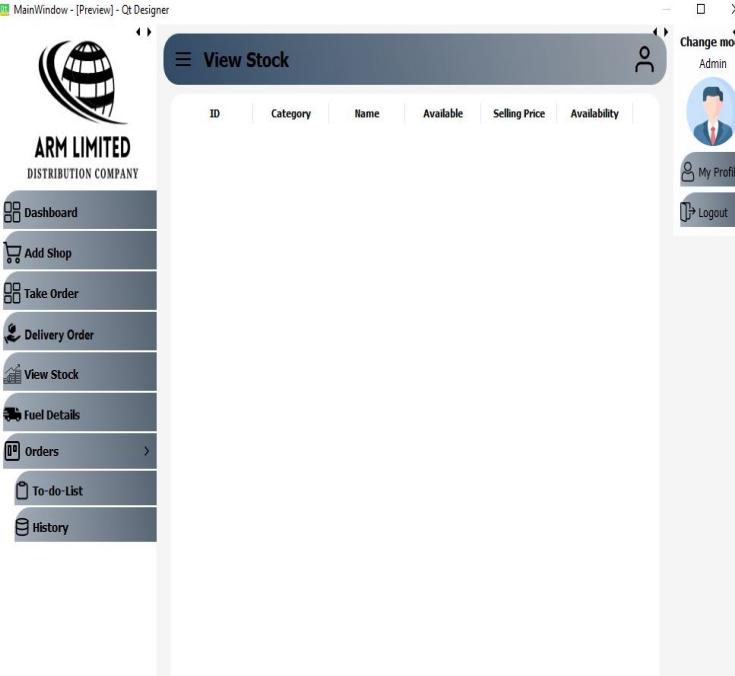
Interface ID	I16																														
Name	View Cashbook																														
LinkedUseCase	U27																														
UI Screen	 <p>The screenshot shows the 'View Cashbook' interface for ARM LIMITED. On the left, a sidebar menu includes options like Dashboard, Assign Locations, Assign Vehicle, Rider Performance, Notifications, Track Order, and View Cashbook (which is highlighted). Below the sidebar is a search bar with a placeholder 'Search by CNIC' and a 'Search' button. The main area is titled 'View Clients Status:' and contains a table with columns: Name, CNIC, Shop Name, Amount Paid, Amount Pending, and Status. Two rows of data are visible:</p> <table border="1"> <thead> <tr> <th>Name</th> <th>CNIC</th> <th>Shop Name</th> <th>Amount Paid</th> <th>Amount Pending</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>Mukarram</td> <td>3311010102</td> <td>Cash and Carry</td> <td>25000</td> <td>10000</td> <td>Pending</td> </tr> <tr> <td>Mukarram</td> <td>3311010102</td> <td>Cash and Carry</td> <td>25000</td> <td>0</td> <td>Completed</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>At the bottom left is a 'Mark Attendance' button.</p>	Name	CNIC	Shop Name	Amount Paid	Amount Pending	Status	Mukarram	3311010102	Cash and Carry	25000	10000	Pending	Mukarram	3311010102	Cash and Carry	25000	0	Completed												
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UI Screen (Implemented)	 <p>The screenshot shows the implemented 'View Cashbook' interface. The layout is similar to the design, featuring a sidebar with various menu items and a main content area with a table for client status. The table data is identical to the design screenshot.</p>																														
Validators	1. Search button will work when cnic input will be filled.																														

Interface ID	I17
Name	Add Client
LinkedUseCase	U20
UI Screen	 
UI Screen (Implemented)	
Validators	<ol style="list-style-type: none"> Cnic is of string type and its length is 13. Name is of string type and should be greater than 2 characters. Email is of string type and should contain "@". Address is of string type. Phone Number is of string type and its length is 11 characters. Location is of string type. Shop name is of string type.
Changes	<ol style="list-style-type: none"> Two additional Time Edits are added to take the opening and closing time of the shop.

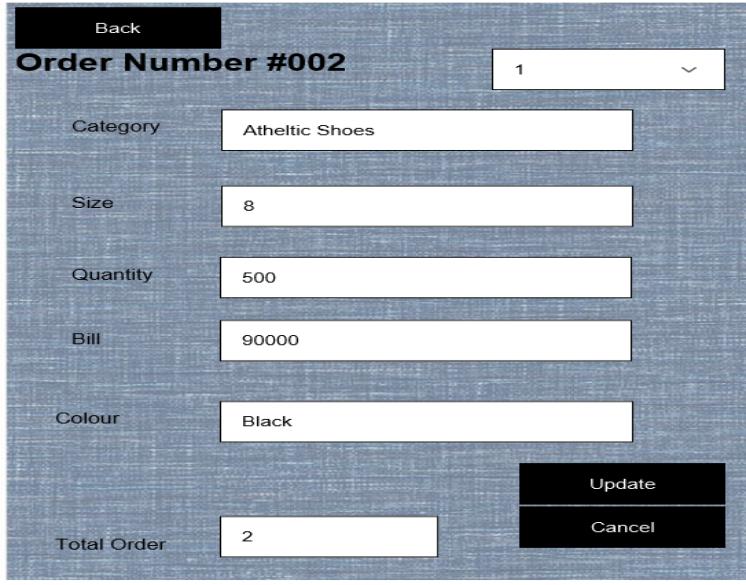
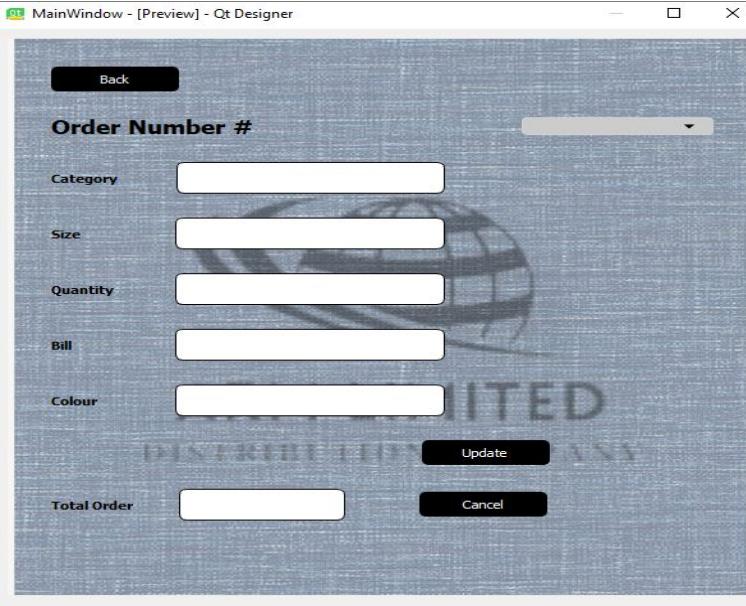
Interface ID	I18
Name	Take Order Rider
LinkedUseCase	U19
UI Screen	 <p>The screenshot shows the 'Take Order' screen for 'ARM LIMITED DISTRIBUTION COMPANY'. The 'Order Details' section includes fields for CNIC (36102-6660287-6), Name (Aminad), Email (aminadaslam07@gmail.com), Address (Shop 321 Armad Wear, DHA Phase I), Number (0321-9876543), Location (DHA Phase I), and Shop (Armad Wear). The 'Cart' section shows one item: ID 1, Total 3600, Subtotal 3600. Below this, a product selection form is displayed for 'Athletic Shoes' (Gazelle) with a quantity of 1 and a price of 3600. The total amount is 3600.</p>
UI Screen (Implemented)	 <p>The screenshot shows the 'Take Order' screen with a more detailed 'Order Details' section. It includes dropdowns for Shop Name (Athletic Shoes), Select Category (Athletic Shoes), Select Quantity (0), Select Color (Black), Select Size (0), Total (Total Amount), and Advance (Advance Payment). To the right, a 'Shop Summary' section contains fields for CNIC, Name, Email, Address, Phone Number, Location, and Shop. A 'View Cart' section shows a table with columns for Category, Color, and Size, containing four items. The total amount is 3000.</p>
Validators	<ol style="list-style-type: none"> CNIC is of string type and its length is 13. Name is of string type Email is of string type and should contain "@". Address is of string type. Phone Number is of string type and its length is 11 characters. Location is of string type. Shop name is of string type. Select Category: Category must be selected from drop down that is of string type.

Validators	<p>9. Select Name: Name must be selected from drop down that is of string type 10. Quantity is of int type. 11. Select Color: Color must be selected from drop down that is of string type 12. Size is of int type and should be greater than zero. 13. Price is of int type. 14. Total Amount is of int type. 15. Advance Amount is of int type. 16. Confirm button will work when all these inputs are filled.</p>
Changes	<p>1. Alignment of boxes is different in UI. 2. Email sending screen has been deleted as the only those products will be shown to rider that are available.</p>

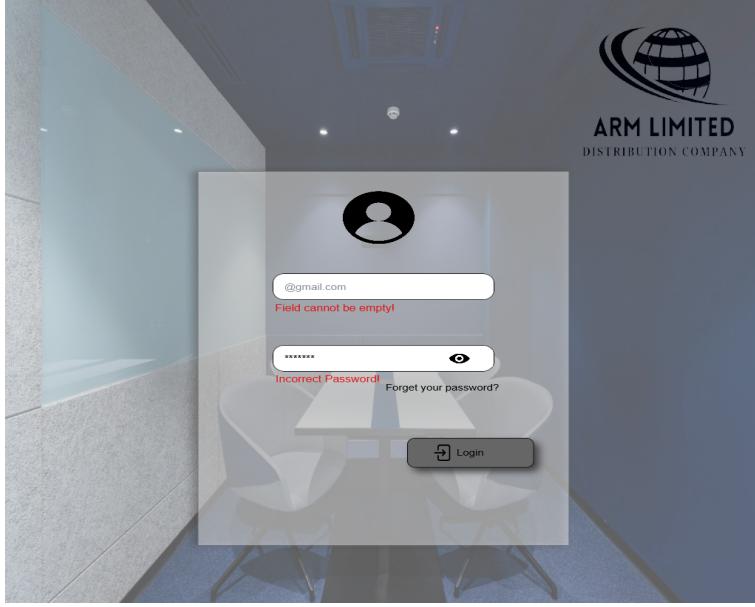
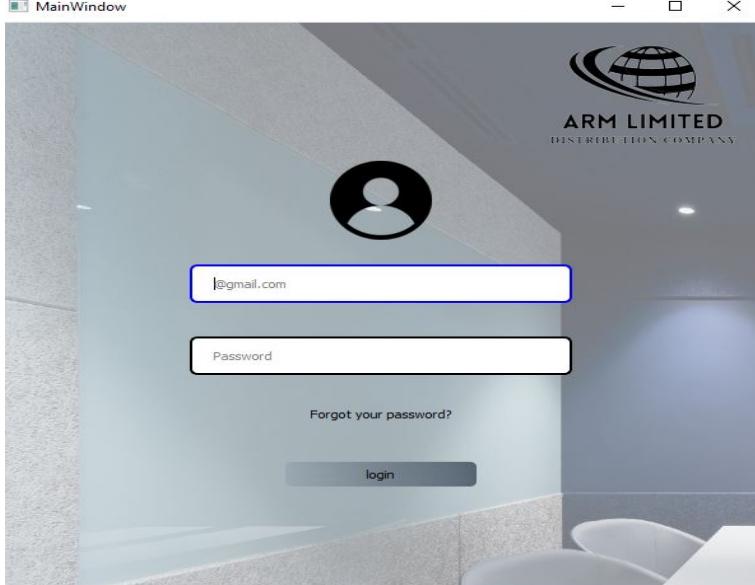
Interface ID	I19
Name	Deliver Order
LinkedUseCase	U17
UI Screen	
UI Screen (Implemented)	
Validators	<ol style="list-style-type: none"> Cnic is of string type and its length is 13. Name is of string type. Order number is of string type. Total is of int type. Paid amount is of int type. Due amount is of int type.

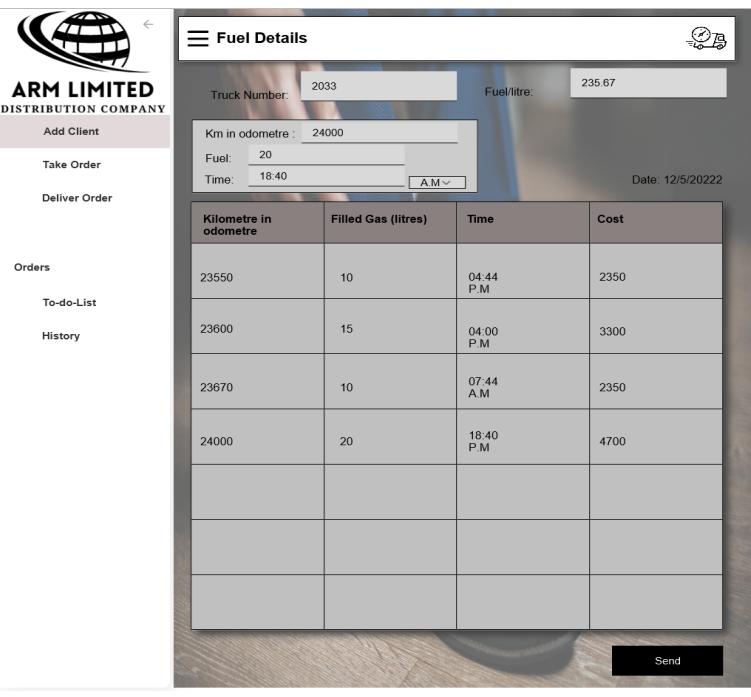
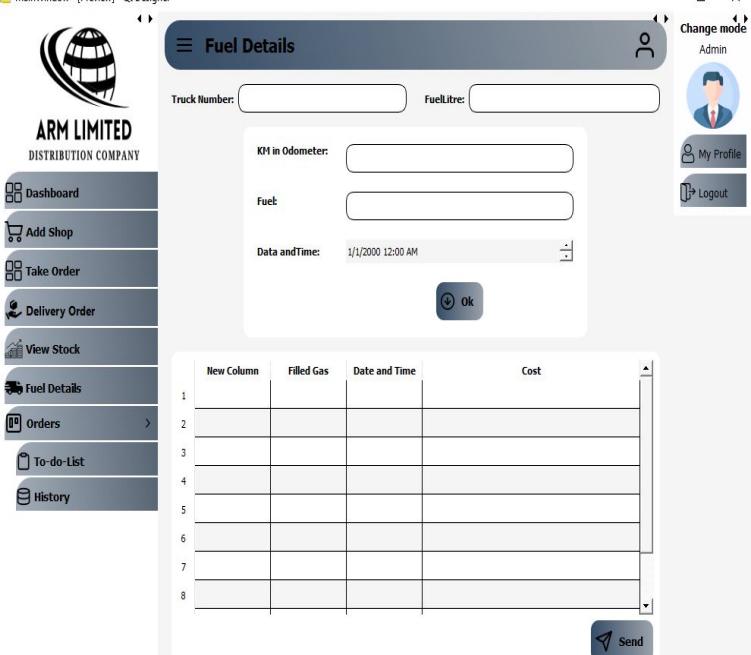
Interface ID	I20																																																	
Name	View Stock																																																	
LinkedUseCase	U16																																																	
UI Screen	 <p>The screenshot shows a user interface titled "View Available Stock". At the top left is the logo "ARM LIMITED DISTRIBUTION COMPANY". On the left side, there is a vertical sidebar with the following menu items:</p> <ul style="list-style-type: none"> Add Client Take Order Deliver Order View Stock (This item is highlighted with a grey background) Orders To-do-List History <p>The main content area displays a table with the following data:</p> <table border="1"> <thead> <tr> <th>ID</th> <th>Category</th> <th>Name</th> <th>Available Quantity</th> <th>Selling Price</th> <th>Availability</th> <th>Size</th> <th>Colour</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Platform shoes</td> <td>Gazelle</td> <td>100</td> <td>10000</td> <td>Yes</td> <td>6.5</td> <td>Black</td> </tr> <tr> <td>2.</td> <td>Platform shoes</td> <td>Superstar</td> <td>100</td> <td>10000</td> <td>Yes</td> <td>8</td> <td>Black</td> </tr> <tr> <td>3.</td> <td>Platform shoes</td> <td>Gazelle</td> <td>100</td> <td>10000</td> <td>Yes</td> <td>12</td> <td>Black</td> </tr> <tr> <td>5.</td> <td>Platform shoes</td> <td>Superstar</td> <td>100</td> <td>10000</td> <td>Yes</td> <td>10</td> <td>Black</td> </tr> <tr> <td></td> <td></td> <td></td> <td>8000</td> <td>100</td> <td>10000</td> <td>Yes</td> <td>7</td> <td>Black</td> </tr> </tbody> </table> <p>Below the table, there is a photograph of a black leather boot on a wooden floor.</p>	ID	Category	Name	Available Quantity	Selling Price	Availability	Size	Colour	1.	Platform shoes	Gazelle	100	10000	Yes	6.5	Black	2.	Platform shoes	Superstar	100	10000	Yes	8	Black	3.	Platform shoes	Gazelle	100	10000	Yes	12	Black	5.	Platform shoes	Superstar	100	10000	Yes	10	Black				8000	100	10000	Yes	7	Black
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5.	Platform shoes	Superstar	100	10000	Yes	10	Black																																											
			8000	100	10000	Yes	7	Black																																										
UI Screen (Implemented)	 <p>The screenshot shows the "View Stock" window from Qt Designer. The interface includes:</p> <ul style="list-style-type: none"> A title bar with the text "View Stock". A header row with columns labeled: ID, Category, Name, Available, Selling Price, Availability. A central table area where rows of data are displayed, corresponding to the entries in the first screenshot. A sidebar on the left with the following menu items: <ul style="list-style-type: none"> Dashboard Add Shop Take Order Delivery Order View Stock (This item is highlighted with a grey background) Fuel Details Orders > (with a right-pointing arrow) To-do-List History A user profile section on the right showing a profile picture, the text "Admin", and buttons for "My Profile" and "Logout". 																																																	
Validators																																																		

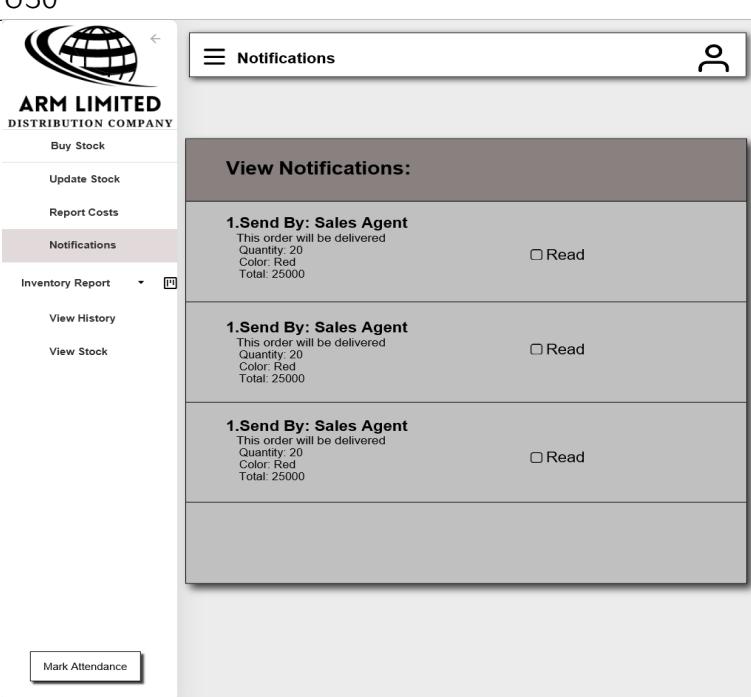
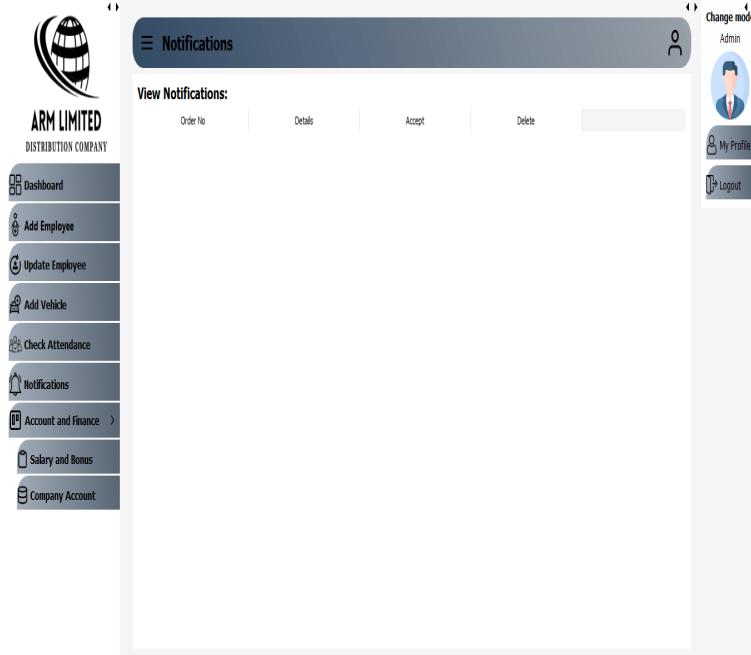
Interface ID	I21																																																								
Name	To Do List																																																								
LinkedUseCase	U22																																																								
UI Screen	<table border="1"> <thead> <tr> <th>ID</th> <th>Client</th> <th>Order No.</th> <th>Ordered date</th> <th>Location</th> <th>Status</th> <th>Amount</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Ammad</td> <td>001</td> <td>11/11/2021</td> <td>DHA Phase II</td> <td>Pending</td> <td>10000</td> </tr> <tr> <td>2.</td> <td>Ali</td> <td>009</td> <td>11/11/2021</td> <td>DHA Phase II</td> <td>Pending</td> <td>10000</td> </tr> <tr> <td>3.</td> <td>Tatu</td> <td>002</td> <td>11/11/2021</td> <td>DHA Phase II</td> <td>Pending</td> <td>10000</td> </tr> <tr> <td>5.</td> <td>Hashim</td> <td>110</td> <td>11/11/2021</td> <td>DHA Phase II</td> <td>Pending</td> <td>10000</td> </tr> <tr> <td>5.</td> <td>Zubair</td> <td>880</td> <td>11/11/2021</td> <td>DHA Phase II</td> <td>Pending</td> <td>10000</td> </tr> <tr> <td>6.</td> <td>Bilal</td> <td>004</td> <td>11/11/2021</td> <td>DHA Phase II</td> <td>Pending</td> <td>10000</td> </tr> <tr> <td>7.</td> <td>Zahid</td> <td>010</td> <td>11/11/2021</td> <td>DHA Phase II</td> <td>Pending</td> <td>10000</td> </tr> </tbody> </table>	ID	Client	Order No.	Ordered date	Location	Status	Amount	1.	Ammad	001	11/11/2021	DHA Phase II	Pending	10000	2.	Ali	009	11/11/2021	DHA Phase II	Pending	10000	3.	Tatu	002	11/11/2021	DHA Phase II	Pending	10000	5.	Hashim	110	11/11/2021	DHA Phase II	Pending	10000	5.	Zubair	880	11/11/2021	DHA Phase II	Pending	10000	6.	Bilal	004	11/11/2021	DHA Phase II	Pending	10000	7.	Zahid	010	11/11/2021	DHA Phase II	Pending	10000
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UI Screen (Implemented)																																																									
Validators	1. Order number is of string type and it is mandatory to cancel the order.																																																								
Changes	1. The view location button has been added outside the table.																																																								

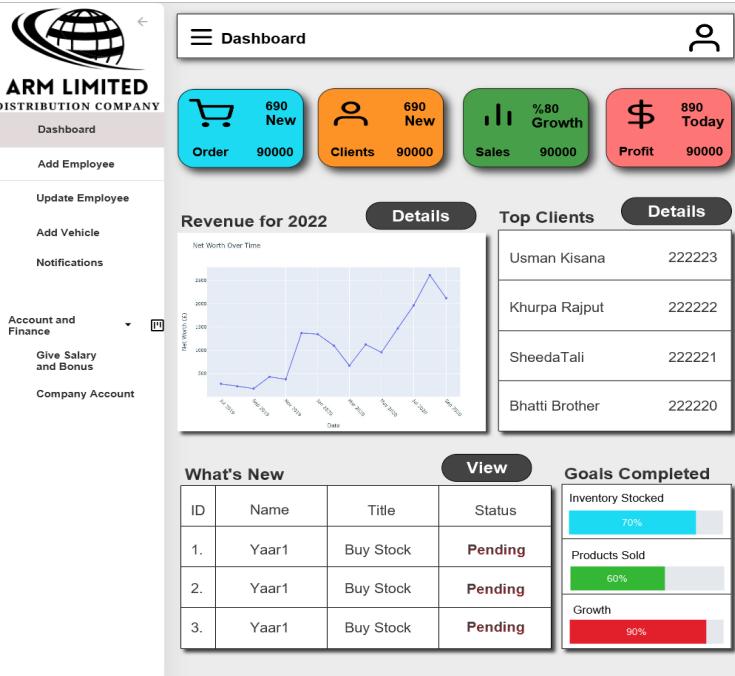
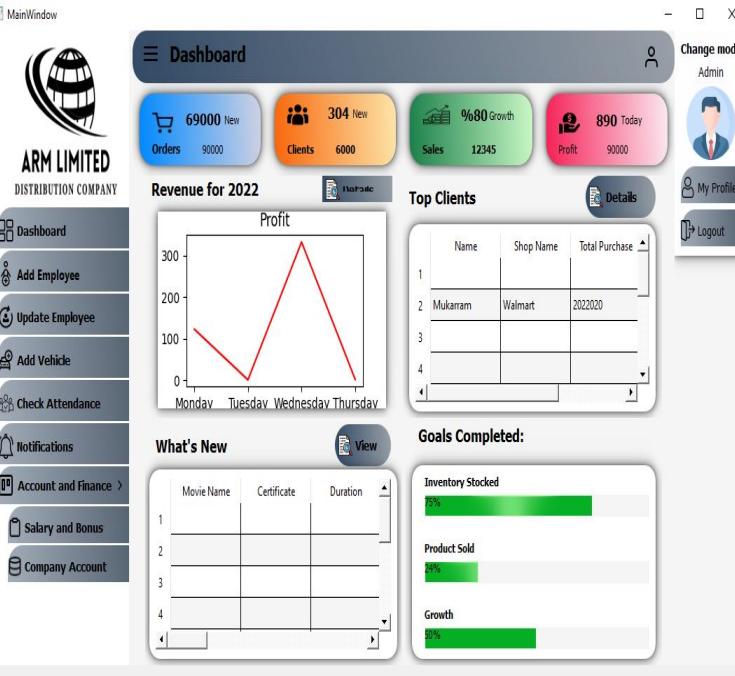
Interface ID	I22
Name	Cancel Order
LinkedUseCase	U21
UI Screen	 <p>Back</p> <p>Order Number #002</p> <p>Category: Athletic Shoes</p> <p>Size: 8</p> <p>Quantity: 500</p> <p>Bill: 90000</p> <p>Colour: Black</p> <p>Total Order: 2</p> <p>Update</p> <p>Cancel</p>
UI Screen (Implemented)	 <p>Back</p> <p>Order Number #</p> <p>Category</p> <p>Size</p> <p>Quantity</p> <p>Bill</p> <p>Colour</p> <p>Total Order</p> <p>Update</p> <p>Cancel</p>
Validators	<ol style="list-style-type: none"> 1. Category is of string type. 2. Size is of int type and should be greater than zero. 3. Quantity is of int type and should be greater than zero. 4. Bill is of int type and should be greater than zero. 5. Color is of string type. 6. Cancel or update button will work when all of these inputs are filled otherwise an error will be shown.

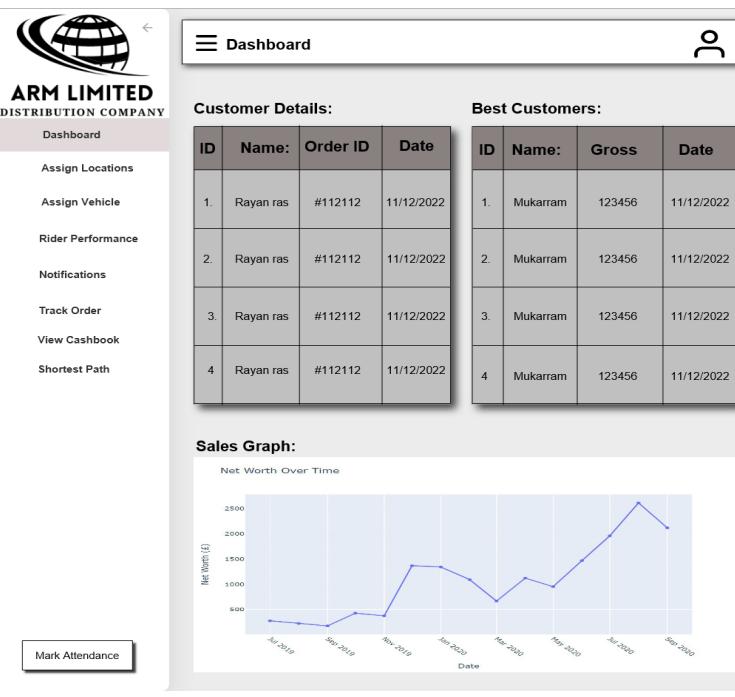
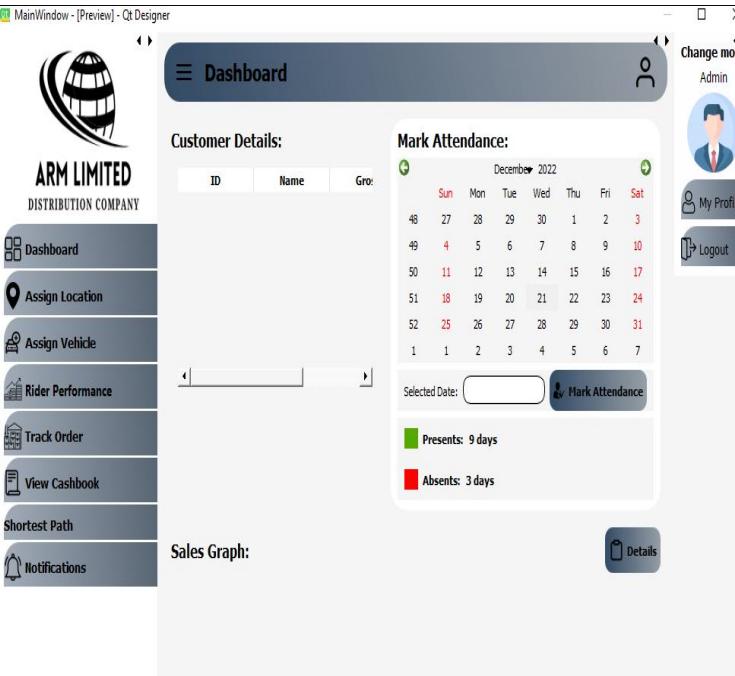
Interface ID	I23																																																								
Name	View Order History																																																								
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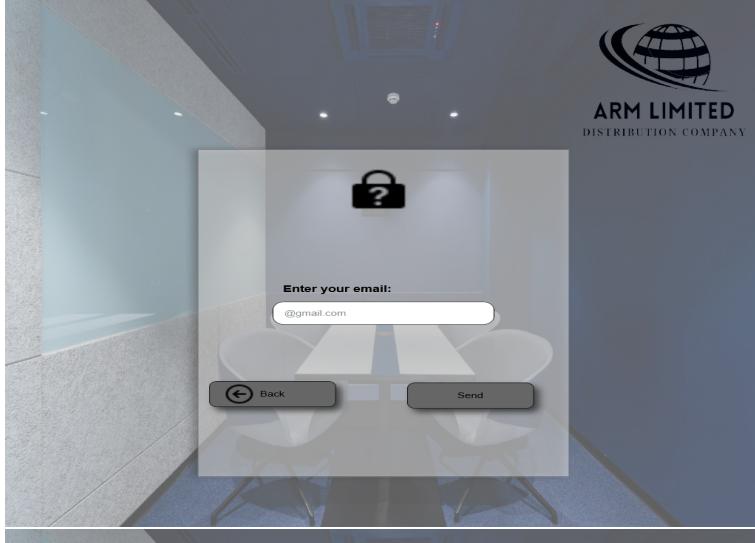
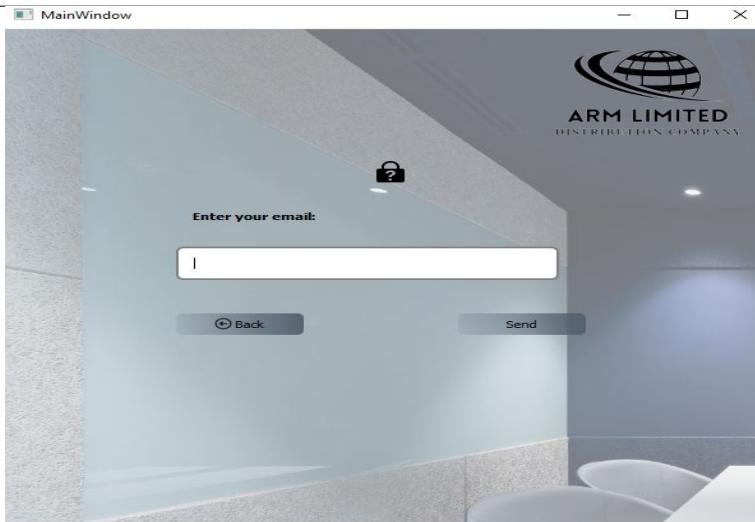
Interface ID	I24
Name	Login
LinkedUseCase	U01
UI Screen	
UI Screen (Implemented)	
Validators	<ol style="list-style-type: none"> Email cannot be empty and must contain @gmail.com and it is of string type. Password length should be greater than 8 characters and it is of string type. Login button will work when both these inputs are filled.

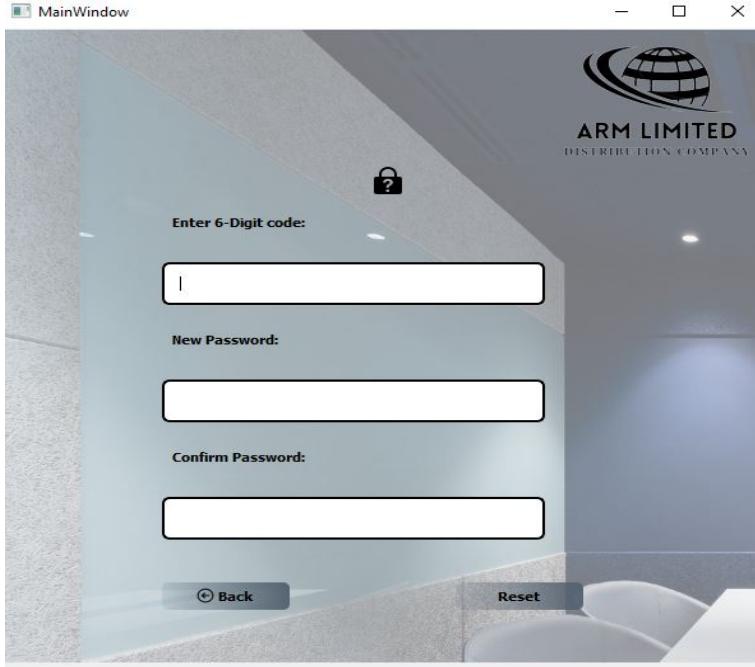
Interface ID	I25
Name	Add Fuel Details Rider
LinkedUseCase	U25
UI Screen	
UI Screen (Implemented)	
Validators	<ol style="list-style-type: none"> KM in odometer is of int type and should be greater than zero. Time is of string type. Fuel is of int type and should be greater than zero.

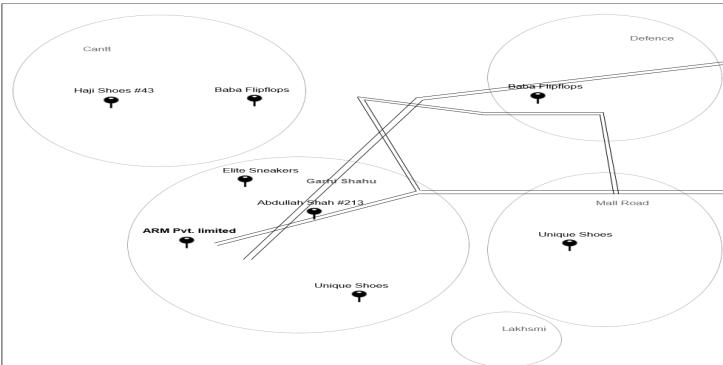
Interface ID	I26
Name	Notifications
LinkedUseCase	U30
UI Screen	 <p>The mockup shows a sidebar with 'ARM LIMITED DISTRIBUTION COMPANY' logo and menu items: Buy Stock, Update Stock, Report Costs, Notifications (selected), Inventory Report, View History, and View Stock. A 'Mark Attendance' button is at the bottom. The main area is titled 'View Notifications:' and lists three notifications from 'Sales Agent'. Each notification includes a checkbox labeled 'Read'. The details for each notification are: 1. Send By: Sales Agent, This order will be delivered, Quantity: 20, Color: Red, Total: 25000; 2. Send By: Sales Agent, This order will be delivered, Quantity: 20, Color: Red, Total: 25000; 3. Send By: Sales Agent, This order will be delivered, Quantity: 20, Color: Red, Total: 25000.</p>
UI Screen (Implemented)	 <p>The screenshot shows the same layout as the mockup, but with a different design. The sidebar has icons for Dashboard, Add Employee, Update Employee, Add Vehicle, Check Attendance, Notifications (selected), Account and Finance, Salary and Bonus, and Company Account. The main area is titled 'Notifications' and shows a table with columns: Order No, Details, Accept, and Delete. On the right, there's a user profile section with 'Change mode' (Admin), 'My Profile', and 'Logout' buttons.</p>
Validators	

Interface ID	I27
Name	Manager Dashboard
LinkedUseCase	U31
UI Screen	 <p>The screenshot shows the Manager Dashboard for ARM LIMITED. The top navigation bar includes a globe icon, the company logo, and a user profile icon. Below the header are four summary cards: 'Order' (90000), 'Clients' (90000), 'Sales' (90000), and 'Profit' (90000). A main section displays 'Revenue for 2022' with a line chart titled 'Net Worth Over Time'. To the right, there are sections for 'Top Clients' (listing Usman Kisana, Khurpa Rajput, SheedaTali, and Bhatti Brother) and 'Goals Completed' (Inventory Stocked at 70%, Products Sold at 60%, and Growth at 90%). On the left, a sidebar lists navigation items: Dashboard, Add Employee, Update Employee, Add Vehicle, Notifications, Account and Finance (with sub-options Give Salary and Bonus, Company Account), and a dropdown menu.</p>
UI Screen (Implemented)	 <p>The screenshot shows the implemented Manager Dashboard, which appears nearly identical to the original design. It features the same layout with the company logo, user profile, and four summary cards. The 'Revenue for 2022' chart shows a peak in profit on Wednesday. The 'Top Clients' section and 'Goals Completed' section also reflect the same data as the original. The left sidebar contains the same navigation items as the original screenshot.</p>
Validators	

Interface ID	I28
Name	Sales Agent Dashboard
LinkedUseCase	U31
UI Screen	 <p>The screenshot shows the 'Dashboard' screen for ARM LIMITED. On the left is a sidebar with links: Dashboard, Assign Locations, Assign Vehicle, Rider Performance, Notifications, Track Order, View Cashbook, and Shortest Path. The main area has three sections: 'Customer Details' (table with 4 rows), 'Best Customers' (table with 4 rows), and 'Sales Graph' (line chart titled 'Net Worth Over Time' showing fluctuations from July 2020 to September 2020). A 'Mark Attendance' button is at the bottom left.</p>
UI Screen (Implemented)	 <p>The screenshot shows the 'MainWindow - [Preview] - Qt Designer' window. The UI is identical to the original screenshot, but includes a 'Change mode' dropdown set to 'Admin' and a user profile icon. The 'Mark Attendance' section now displays a monthly calendar for December 2022 with red numbers indicating absences. Below the calendar are buttons for 'Selected Date:' (with a date input field), 'Mark Attendance', 'Presents: 9 days', and 'Absents: 3 days'. A 'Logout' button is also present.</p>
Validators	
Changes	<ol style="list-style-type: none"> A table has been removed. Attendance mark calendar has been shown on the right instead.

Interface ID	I29
Name	Reset Password
LinkedUseCase	U02
UI Screen	 The image shows a mobile application interface for password reset. At the top right is the 'ARM LIMITED' logo. A central modal window has a lock icon at the top. It contains the text 'Enter your email:' followed by an input field containing '@gmail.com'. Below the input field are two buttons: 'Back' on the left and 'Send' on the right.
UI Screen (Implemented)	 This image shows the same mobile application interface as above, but the 'Send' button has been clicked, triggering a transition. The modal now displays fields for a '6-Digit Code', 'New Password' (with a note 'Must be 8-digit'), and 'Confirm Password'. The 'Back' and 'Reset' buttons remain at the bottom.
UI Screen (Implemented)	 This image shows the final step of the password reset process. The modal now contains an input field with the letter 'I'. The 'Back' and 'Send' buttons are still present at the bottom. The window title bar indicates it is a 'MainWindow'.

UI Screen (Implemented)	
Validators	<ol style="list-style-type: none"> 1. Email cannot be empty and must contain @gmail.com and it is of string type. 2. Send button will work when the email is entered. 3. 6 digit-code must be valid. 4. Password length should be greater than 8 characters and it is of string type. 5. New password and confirm password must match 6. Reset button will work when all the inputs are filled correctly.

Interface ID	I30
Name	Find Route
LinkedUseCase	U26
UI Screen	
Validators	
Changes	<ol style="list-style-type: none"> 1. Google Maps UI will be shown instead of application build map.

7 Classes

Class Name	Software/ Domain	Is Abstract (Yes/No)	Is Singleton (Yes/No)	Is the class will have parametrized constructor (Yes/No)
Manager	Domain	No	No	Yes
SalesAgent	Domain	No	No	Yes
InventorySupervisor	Domain	No	No	Yes
Rider	Domain	No	No	Yes
User	Software	No	No	Yes
Employee	Software	Yes	No	No
UserCrud	Software	No	Yes	No
Shop	Software	No	No	Yes
Shopkeeper	Software	No	No	Yes
Account	Software	No	No	Yes
Location	Software	No	No	No
AttendDate	Software	No	No	Yes
Attendance	Software	No	No	Yes
AttendanceRecord	Software	No	Yes	No
ProductList	Software	No	No	Yes
Shoe	Software	No	No	Yes
Order	Software	No	No	Yes
OrderLine	Software	No	Yes	No
Inventory	Software	No	Yes	No
Bill	Software	No	No	Yes
Installment	Software	No	No	Yes
Vehicle	Software	No	No	Yes
VehicleCrud	Software	No	Yes	No

8 Object Oriented Features

8.1 Composition:

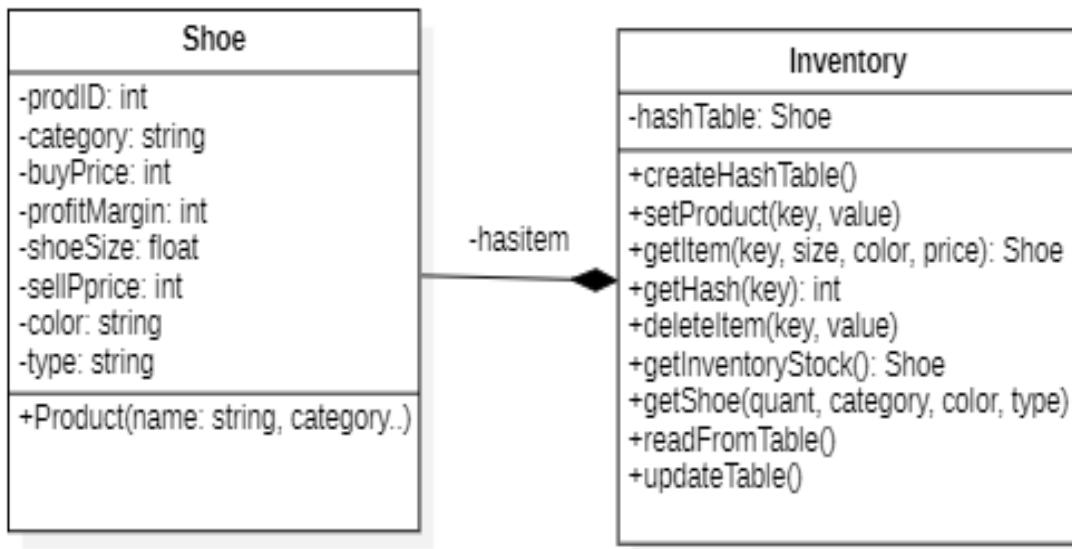


Figure 1: Example 1: Composition between Shoe and ProductList.

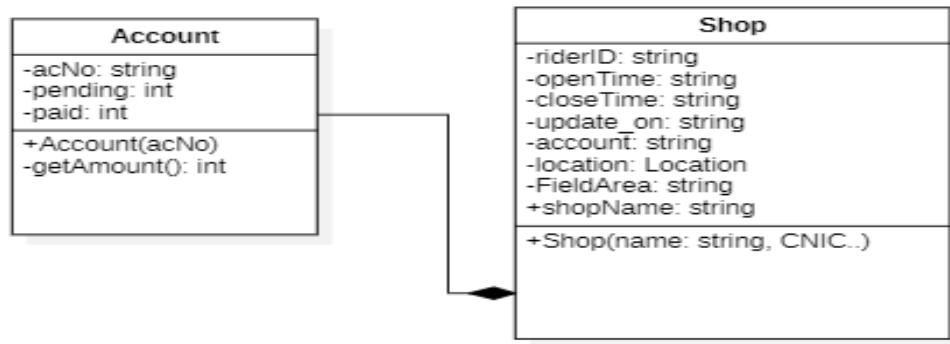


Figure 2: Example 2: Composition between Account and shop.

8.2 Inheritance:

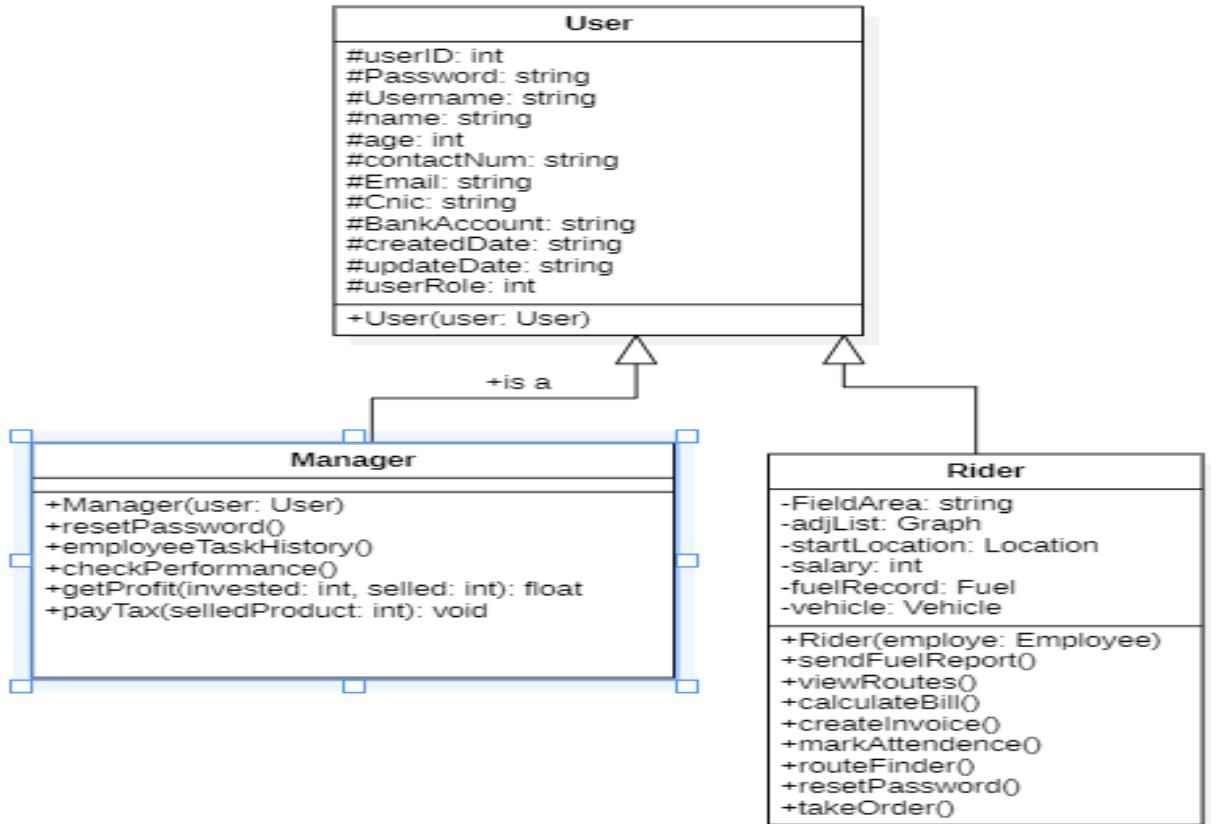


Figure 3: Example 1: Extending the User class from Manager and Employee and Rider.

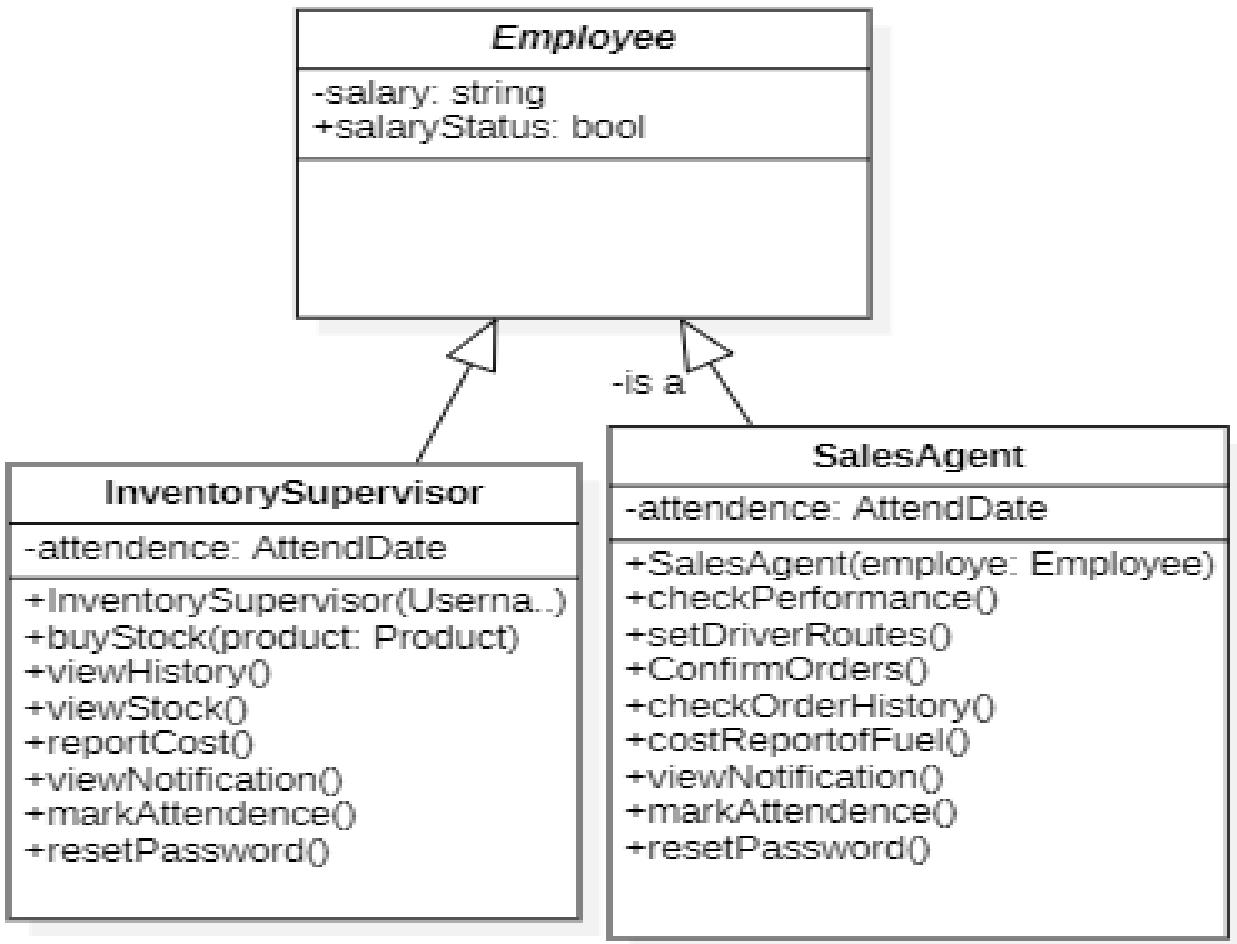


Figure 4: Example 2: Extending the employee from inventory supervisor, and sales agent.

8.3 Multi-Level Inheritance:

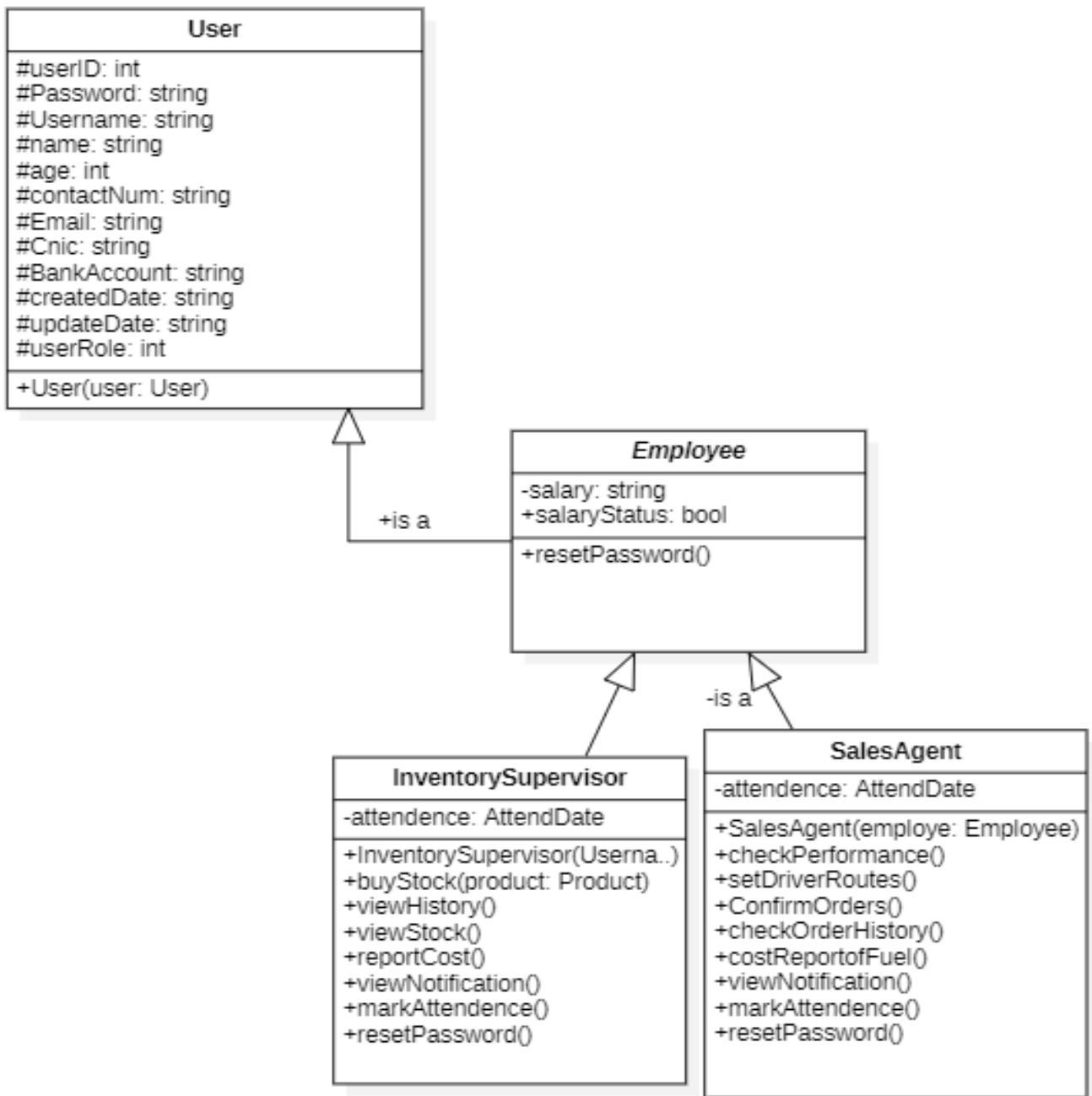


Figure 5: Example: Extending the User class from Employee and Employee from Inventory Supervisor, Sales Agent, and Rider class.

8.4 Polymorphism:

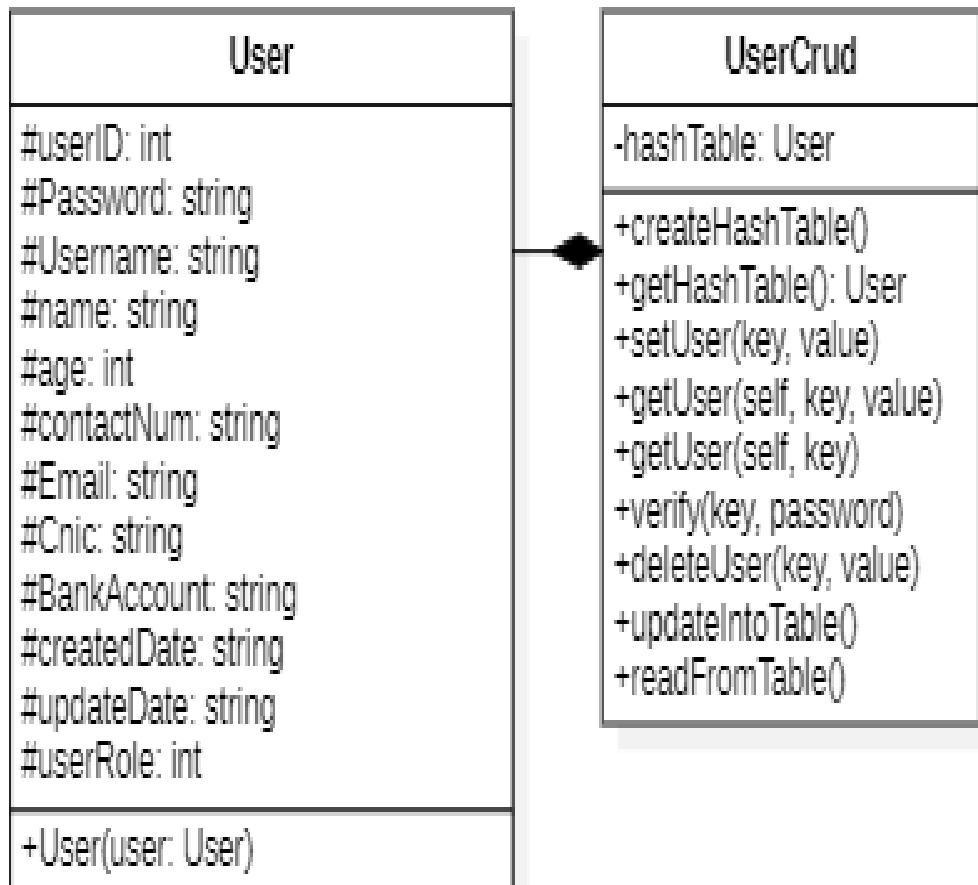
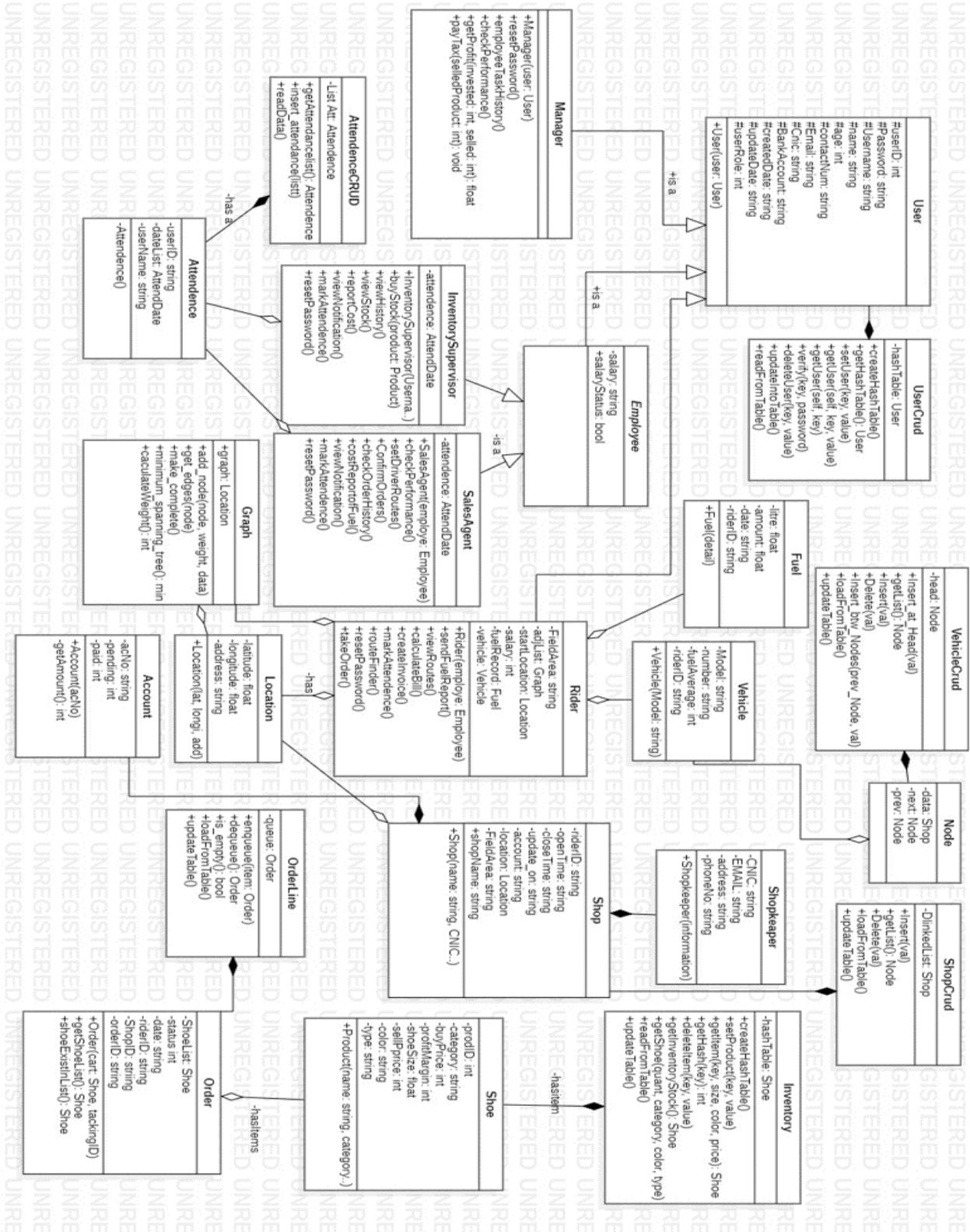


Figure 6: Example: Inventory Supervisor and Sales Agent share common properties using abstract function in super class and defining it in sub-classes.

9 Detailed Object-Oriented Design:



10 User Interface Details

Interface Id	Text Box	Drop Down	Password Box	Table	Date Field	Buttons	Auto Complete	Radio Button	Check Box	Menu	Text Area	Progress Bar
I01	8	1	0	0	0	5	0	0	0	1	0	0
I02	8	0	0	1	3	5	0	0	0	1	0	0
I03	1	0	0	1	6	4	0	0	1	1	0	0
I04	2	1	0	0	0	3	0	0	0	1	0	0
I05	2	2	0	1	5	4	0	0	0	1	0	0
I06	0	0	0	1	2	3	0	0	0	1	0	0
I07	0	0	0	1	6	2	0	0	0	1	0	0
I08	0	0	0	1	7	3	0	0	0	1	0	0
I09	5	2	0	0	0	3	0	0	0	1	0	0
I10	0	1	0	1	4	5	0	0	3	1	0	0
I11	4	0	0	1	3	5	0	0	0	1	0	0
I12	0	1	0	1	4	3	0	0	1	1	0	0
I13	0	2	0	1	4	3	0	0	0	1	0	0
I14	0	2	0	1	4	3	0	0	0	1	0	0
I15	0	1	0	1	4	3	0	0	0	1	0	0
I16	1	0	0	1	6	3	0	0	0	1	0	0
I17	4	1	0	0	0	3	1	0	0	1	1	0
I18	16	5	0	1	3	5	6	0	0	1	1	0
I19	7	0	0	0	0	3	5	0	1	1	0	0
I20	0	0	0	1	8	0	0	0	0	1	0	0
I21	1	2	0	1	1	3	1	0	0	1	0	0
I22	6	1	0	0	0	3	6	0	0	0	0	0
I23	0	0	0	1	0	0	0	0	0	1	0	0
I24	1	0	1	0	0	2	0	0	0	0	0	0
I25	5	1	0	1	1	1	1	0	0	1	0	0
I26	0	0	0	1	2	2	0	0	0	1	0	0
I27	0	0	0	2	4	5	0	0	0	1	0	3
I28	0	0	0	2	4	2	0	0	0	1	0	0
I29	2	0	2	0	0	4	0	0	0	0	0	0
I30	0	0	0	0	0	0	0	0	0	0	0	0

11 Data Structure

Use Case Id	Data Structures Used	Justification for the usage of data structure
U01, U02	Hashing table	<p>As user objects are stored in Link list. Because manager do not know exact number of users.</p> <p>Following are justification for using link list:</p> <ol style="list-style-type: none">1.Insertion and deletion in easier than contiguous array.2.For storing large record, moving pointer in link list is easier than moving object itself.3.No memory wastage using link list.4.Time complexity for insert and delete using hash table is $O(1)$, and search in hashtable also table $O(1)$
U03, U04	Doubly LinkedList	<p>As user objects are stored in Link list. Because manager do not know exact number of users.</p> <p>Following are justification for using link list:</p> <ol style="list-style-type: none">1.Link list is dynamic data structure there will be no memory overflow.2.Insertion and deletion in easier than contiguous array3.For storing large record, moving pointer in link list is easier than moving object itself.4.Insertio and deletioon is in $O(1)$.

		Manager give salary to employees from company account. So, the employee who has given salary at last is showing in the top. As stack works on LIFO operation so salaries history is storing in stack using link list.
U09	Stack (using LinkedList)	<p>1.As stack using link list will shrink or grow as manager as needed.</p> <p>2.Their will be no memory usage as stack using link list grows as needed.</p> <p>3.No memory usage as it shrinks as needed.</p>
U08	BST	<p>Binary Search tree (AVL) tree will be used to keep track of employee having maximum attendance. Whereas, the rider also gets bonuses depending upon their number of completed orders and this record will be save in BST.</p> <p>Justification for using BST is because:</p> <p>1.In order traversal of BST would give sorted data in $O(n)$ time.</p> <p>2.It will reduce the time complexity for choosing the employee having maximum order from $O(n)$ which is case of using array to $O(1)$time.</p>
U05	LinkedList	<p>As user objects are stored in Link list. Because manager do not know exact number of users. Following are justification for using link list:</p> <p>1.Link list is dynamic data structure there will be no memory overflow when number of employees are increasing.</p> <p>2.Insertion and deletion in easier than contiguous array.</p> <p>3.For storing large record, moving pointer in link list is easier than shifting object itself.</p> <p>4.No memory wastage using link list.</p>
U06	LinkedList (doubly)	<p>Company will keep buying vehicles with the growth in the business and riders. So, vehicles keep on increasing or may be decrease because of some loss. So, we need a dynamic data structure that will keep record of vehicles.</p> <p>1.Insertion and deletion in easier than contiguous array.</p> <p>2.It is dynamic data structure. Hence, there will be no usage of memory as there is no need to pre-allocate the memory.</p> <p>3.Insertion and deletion are efficient as compared to array because it just moves the pointer instead to shifted object itself.</p> <p>4.As we are using doubly link list so insertion and deletion will be done in $O(1)$</p>

U12	ArrayList	<p>In buying stock, the user will exactly know how many items he wants to order to so using array is best option as access of specified product is easy from array.</p> <ul style="list-style-type: none"> 1.Array allocate contiguous memory location so it will provide random access to product. 2.It is good option to store fixed amount of data (orders). 3.As it has fixed size. Hence, no memory overflow will occur.
U20	Doubly LinkedList	<p>New added client will be stored in doubly LinkedList.</p> <ul style="list-style-type: none"> 1.Insertion and deletion in easier than contiguous array. 2.For storing large record, moving pointer in link list is easier than moving object itself. 3.No memory wastage using link list. 4.In doubly LinkedList the insertion and deletion will be in O(1).
U22	Queue	<p>As order to do from client is stored in queue to perform FIFO operation on it. So, it will use that stack to delete orderfrom queue.</p> <ul style="list-style-type: none"> 1.Using queue, we can process items in order. 2.Using queue, number of orders can be managed Ease.
U13	Hash Table, Doubly LinkedList	<p>As keeping the products and updating it require a fast lookup over the products. Following is use of given data structure:</p> <ul style="list-style-type: none"> 1.For large amount of data good hash function if used, hash table will take O(1) to search, delete and insert in its average case. 2.Doubly link list is using because insertion in doubly link list take O(1) as it has next and back both pointers. 3.Hash table store products in form of key value pair which will offer fast look up at large number of products.

U22	LinkedList	<p>We have to store ordered that has been completed. So, we will store in LinkedList.</p> <p>1.Link list is dynamic data structure there will be no memory overflow unless memory completely filled when number of orders are increasing.</p> <p>2.Insertion and deletion is easier than contiguous array.</p> <p>3.Deletion is efficient as compared to array because it just moves the pointer instead to shifted object itself in $O(n)$.</p>
U19	Queue using LinkList	<p>Order to do from client is stored in queue to perform FIFO operation on it. The ordered taken first will be delivered first from queue.</p> <p>1.Using queue, we can process items in order.</p> <p>2.As rider have to manage multiple orders from client so queue will be useful to manage order in order.</p> <p>3.Using queue, number of orders can be managed.</p>
U18	stack	<p>Sales agent will inform the latest status about that order from inventory manager, and rider.</p> <p>1.Stack use LIFO operation. So, the sales agent will know the latest status of order.</p> <p>2.Stack will maintain the order process by displaying latest status at top.</p>
U25	BST	<p>To store fuel details of a month or week. We will use BST.</p> <p>1.We will get fuel report according to date by In order walk.</p> <p>2.Time complexity for searching in accordance with date is $O(\lg n)$</p>
U26	Graph	<p>Graph can be used to represent paths.</p> <p>Minimum Spanning tree will represent the shortest path in weighted graph</p> <p>2.Graph will represent the route that rider will follow.</p>

12 Exceptions

Type of Exception	Why this exception will occur	Use Case Id in which exception could be occurred	How you will handle the exception
Login exception	Due to the user forgets his/her login password.	All Use Case Id's	Click on option of 'Forget your password'. An email will be sent to the user containing the new password.
Update Stock exception	If the inventory Supervisor tries to deceive the company.	U13	The inventory manager can press on checkout button of that order after a day (meaning the order has been delivered in the warehouse). Otherwise, a message box will be shown.
Stock Unavailability exception	If the required product by the client is not available in the warehouse.	U19	An email would be sent out to the inventory Supervisor to buy the required product. If the Supervisor buys it from the supplier, then it will be shown to the rider in the available product list.
Cancel-Order exception	If the user clicks on delete order button asked by the client when the delivery of that order is on the way.	U21	He would be shown a message box containing that the client cannot change or delete his order now.
Cancel-Order exception	If the client does not receive the delivery.	U21	The company will refund 90% of the advance payment of the order.
Insufficient-Balance exception	When the manager is paying salaries to the employees and the company account runs out of cash.	U9	The manager pays the employee in installments or after some days when orders get delivered and company gets cash.
Client-Email exception	When the rider is taking the information of client during placing his order and the client tells he doesnot have an email account.	U20	The email would be optional and all the report of the client will be dealt keeping the CNIC in consideration.

13 Data Storage

Data will be Stored in the following tables using sqlite.

13.1 Manager

Column ID	Entity
0	userID
1	userName
2	password
4	userRole
5	name
6	age
7	contactNum
8	Email
9	Cnic
10	bankAccount
11	resetToken
12	createdOn
13	updateOn

13.2 Employee

Column ID	Entity
0	userID
1	Username
2	Password
3	userRole
4	name
5	age
6	contactNum
7	Email
8	Cnic
9	BankAccount
10	Salary
11	Createdon
12	updateon
13	dateTime
14	SalaryStatus

13.3 Rider

Column ID	Entity
0	userID
1	Username
2	Password
3	userRole
4	name
5	age
6	contactNum
7	Email
8	Cnic
9	BankAccount
10	ResetToken
11	created _o n
12	updated _o n
13	time
14	latitude
15	longitude
16	fieldArea
17	VehicleNumber

13.4 Fuel

Column ID	Entity
1	litres
2	amount
3	date
4	riderID

13.5 Attendence

Column ID	Entity
0	userName
1	name
2	date
3	id

13.6 Vehicle

Column ID	Entity
0	Model
1	Number
2	fuelAverage
3	riderID

13.7 Shops

Column ID	Entity
0	riderID
1	name
2	Cnic
3	Email
4	latitude
5	longitude
6	address
7	phoneNum
8	accountNo
9	FieldArea
10	shopName
11	timeOpen
12	timeClose

13.8 Inventory

Column ID	Entity
0	prodCategory
1	buyPrice
2	profitMargin
3	shoeSize
4	selPrice
5	color
6	prodID
7	type

13.9 OrdersToDo

Column ID	Entity
0	prodCategory
1	buyPrice
2	profitMargin
3	shoeSize
4	selPrice
5	color
6	prodID
7	type
8	orderID
9	date
10	status
11	riderID
12	shopID

13.10 Stock Order CRUD

Column ID	Entity
0	prodCategory
1	buyPrice
2	profitMargin
3	shoeSize
4	selPrice
5	color
6	prodID
7	type
8	orderID
9	date
10	status

14 Email Sending

We are sending emails to different users on different occasions. All of them are listed below:

1. The Manager receives an email from the inventory Supervisor regarding the purchasing of the products from the supplier.
2. An email is also sent out by the Sales agent to the client when his order gets delivered.
3. An email is sent out to the user requesting for password update.
4. An email is also sent out when the rider is taking the order from the shopkeeper.
 - i. If the stock is available then it is sent out to the Sales agent for the confirming the order.

ii. If the stock is not available then to the inventory Supervisor.

14.1 Email 1:

Subject: Products Purchasing

Dear Manager,

Please check your notification for confirmation of the order 001 from ADIDAS New York.

The details are given below:

- Quantity: 1000 pieces
- Size: 8.5
- Color: Black
- Type: Flip Flops
- Price: 2000 per piece
- Total amount: 2000000

Kindly, let us know about the status of this order as soon as possible.

Thanks

Regards,

ABC

14.2 Email 2

Subject: Order have been Delivered

Dear Customer,

Your Order 2120 from ARM limited have been Delivered today. The order summary is:

- Quantity: 1000 pieces
- Size: 8.5
- Color: Black
- Type: Flip Flops
- Price: 2200 per piece

Subtotal: PKR 2200000

Taxes: PKR 0

Total: 222210000

Customer Information:

Ammad Aslam

Panorama Shop123

Lahore 55000

Pakistan

Thank you very much for your purchase. We look forward to do further Business with you.

14.3 Email 3

Subject: Forget Password

Dear User,

Your new password of the account is puy78992. Enter this now to have access to your account.

Regards,

ARM limited.

14.4 Email 4:

Email 4i:

Subject: Order Confirmation

Dear Sales Agent,

There has been a placement of order from Shop 99 Ali Shoes DHA, Phase I Lahore. The order details are:

- Quantity: 500 pieces
- Size: 8
- Color: Black
- Type: Flip Flops
- Price: 2500 per piece
- Total: 12500000

Kindly, give permission to place the order. Waiting for reply.

Rider Information

Abdullah Ali

0321-7893457

“ Area: DHA, Phase I Lahore

14.5 Email 4a

Subject: Order Unavailability

Dear Supervisor,

While placing order from Shop 99 Ali Shoes DHA, Phase I Lahore, the product was unavailable in the warehouse. The product details were:

- Size: 8
- Color: White
- Type: Sneakers
- Present Quantity in Warehouse: 10
- Required: 1200

Kindly, give notification of the availability of the stock.

Rider Information

Abdullah Ali

0321-7893457

“ Area: DHA, Phase I Lahore

15 Project Plan

This section should include the implementation plan and work division among the members. All the estimated dates should be before December 20, 2022 including report and presentation.

Use Case Id	Use Case Name	Member Name	Estimated Completion Date
U01	Login	Rayan	8 December
U02	Reset Password	Ammad	8 December
U03	Add Employee	Mukaram	9 December
U04	Update Employee	Mukaram	10 December
U05	Delete Employee	Ammad	10 December
U06	Add Vehicle	Rayan	11 December
U07	Deduct Fuel Money	Rayan	14 December
U08	Check attendance	Ammad	14 December
U09	Give Salaries	Rayan	15 December
U10	Give Bonus	Rayan	15 December
U11	Track Financial record	Ammad	16 December
U12	Buy Stock	Ammad	11 December
U13	Update Stock	Ammad	12 December
U14	Confirm Stock	Mukaram	13 December
U15	Mark Attendance	Mukaram	15 December
U16	View Stock	Ammad	12 December
U17	Determine Price	Mukaram	16 December
U18	Make Report Cost	Mukaram	16 December
U19	Take Order	Rayan	16 December
U20	Add Client	Rayan	14 December
U21	Cancel Order	Ammad	16 December
U22	To Do list	Ammad	16 December
U24	Track Order	Rayan	18 December
U25	Add Fuel Details	Mukaram	16 December
U26	Find Route	Rayan	19 December
U27	Assign Vehicle	Ammad	12 December
U28	Assign Location	Mukaram	14 December
U29	View Order History	Mukaram	18 December
U30	Deliver Order	Ammad	19 December

16 Analytical Reports

16.1 Customer Relation management report:

CRM analytical report will give us information about the customer who ordered the most expensive products. In addition, graph of the customer who ordered the most products this month.

16.2 Fuel report:

This report provides a table of the fuel information of the vehicle assigned to each rider. Each rider would have its own fuel report.

The screenshot shows a mobile application interface titled "Fuel Details". At the top, there are fields for "Truck Number" (2030) and "Fuel litres" (235.67). Below these are input fields for "Km in odometer" (24000), "Fuel" (20), and "Time" (18:40 AM). To the right, the date is displayed as 12/5/2022. A large table below lists fueling history with columns for Kilometre in odometre, Filled Gas (litres), Time, and Cost. The table contains four rows of data, with several more rows below them that are currently empty. A "Send" button is located at the bottom right of the screen.

Kilometre in odometre	Filled Gas (litres)	Time	Cost
23550	10	04:44 P.M	2350
23600	15	04:00 P.M	3300
23670	10	07:44 A.M	2350
24000	20	18:40 P.M	4700

Figure 7: Fuel report of rider

16.3 Sales and purchase Analytical report:

Analytical report display the analysis of the purchase orders raised against the suppliers daily.

16.4 Analytical Report Format:



ARM LIMITED
DISTRIBUTION COMPANY

- [Dashboard](#)
- [Assign Locations](#)
- [Assign Vehicle](#)
- [Rider Performance](#)
- [Notifications](#)
- [Track Order](#)
- [View Cashbook](#)
- [Shortest Path](#)
- [Mark Attendance](#)

≡
Dashboard


Customer Details:

ID	Name:	Order ID	Date
1.	Rayan ras	#112112	11/12/2022
2.	Rayan ras	#112112	11/12/2022
3.	Rayan ras	#112112	11/12/2022
4	Rayan ras	#112112	11/12/2022

Best Customers:

ID	Name:	Gross	Date
1.	Mukarram	123456	11/12/2022
2.	Mukarram	123456	11/12/2022
3.	Mukarram	123456	11/12/2022
4	Mukarram	123456	11/12/2022

Sales Graph:

Net Worth Over Time



Date	Net Worth (£)
Jul 2019	400
Aug 2019	350
Sep 2019	200
Oct 2019	500
Nov 2019	400
Dec 2019	1400
Jan 2020	1350
Feb 2020	1050
Mar 2020	700
Apr 2020	1100
May 2020	950
Jun 2020	1450
Jul 2020	2000
Aug 2020	2600
Sep 2020	2100

Figure 8: Dashboard of sales agent

80

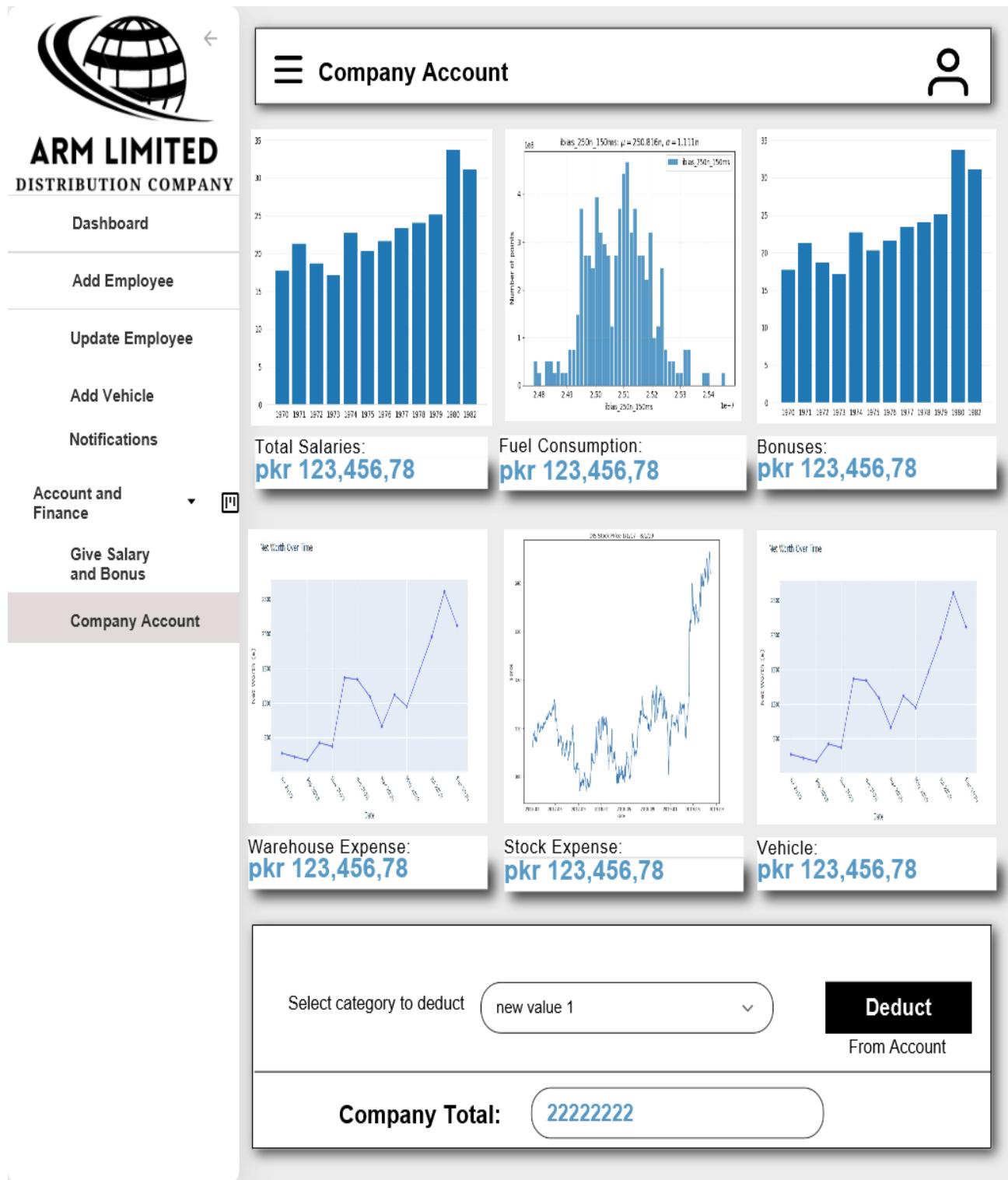


Figure 9: Company account of manager