

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

“JnanaSangama”, Belgaum -590014, Karnataka.



LAB REPORT on

Object Oriented Analysis and Design

Submitted by

Siri Chandan Sai Kolukula(1BM19CS212)

in partial fulfillment for the award of the degree of
BACHELOR OF ENGINEERING
in
COMPUTER SCIENCE AND ENGINEERING



B.M.S. COLLEGE OF ENGINEERING

(Autonomous Institution under VTU)

BENGALURU-560019

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B. M. S. College of Engineering,

Bull Temple Road, Bangalore 560019

(Affiliated To Visvesvaraya Technological University, Belgaum)

Department of Computer Science and Engineering



CERTIFICATE

This is to certify that the Lab work entitled “Object Oriented Analysis And Design Lab” carried out by **Siri Chandan Sai Kolukula(1BM19CS212)**, who is bonafide student of **B. M. S. College of Engineering**. It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum during the academic year 2021- 2022. The Lab report has been approved as it satisfies the academic requirements in respect of a **Object Oriented Modelling and Design- (20CS6PCOMD)** work prescribed for the said degree.

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Course Outcome

CO4	Ability to conduct practical experiment to solve a given problem using Unified Modeling language.
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1. College Information System

Problem statement:

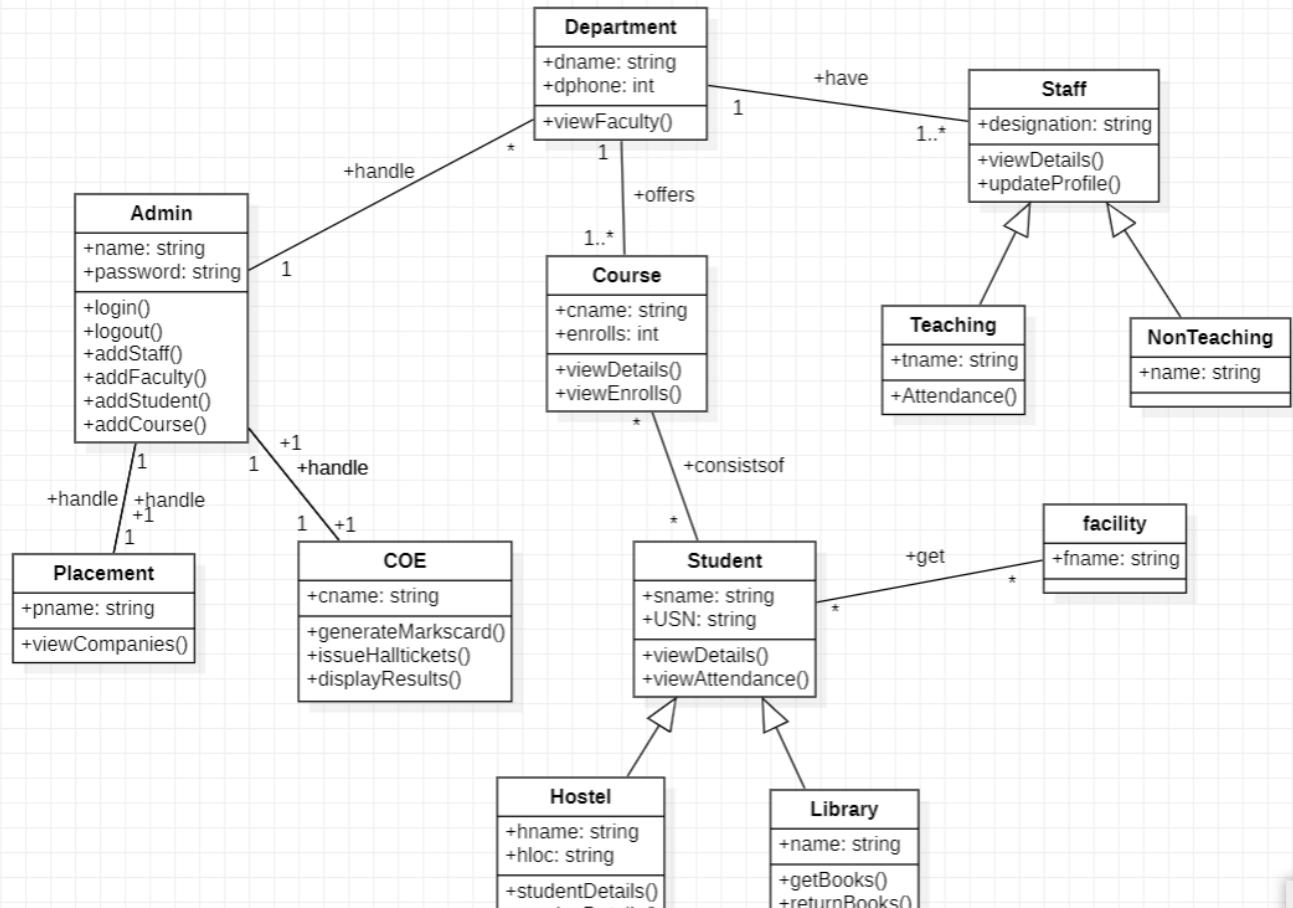
Design UML diagrams for College Information System with system requirements specification.

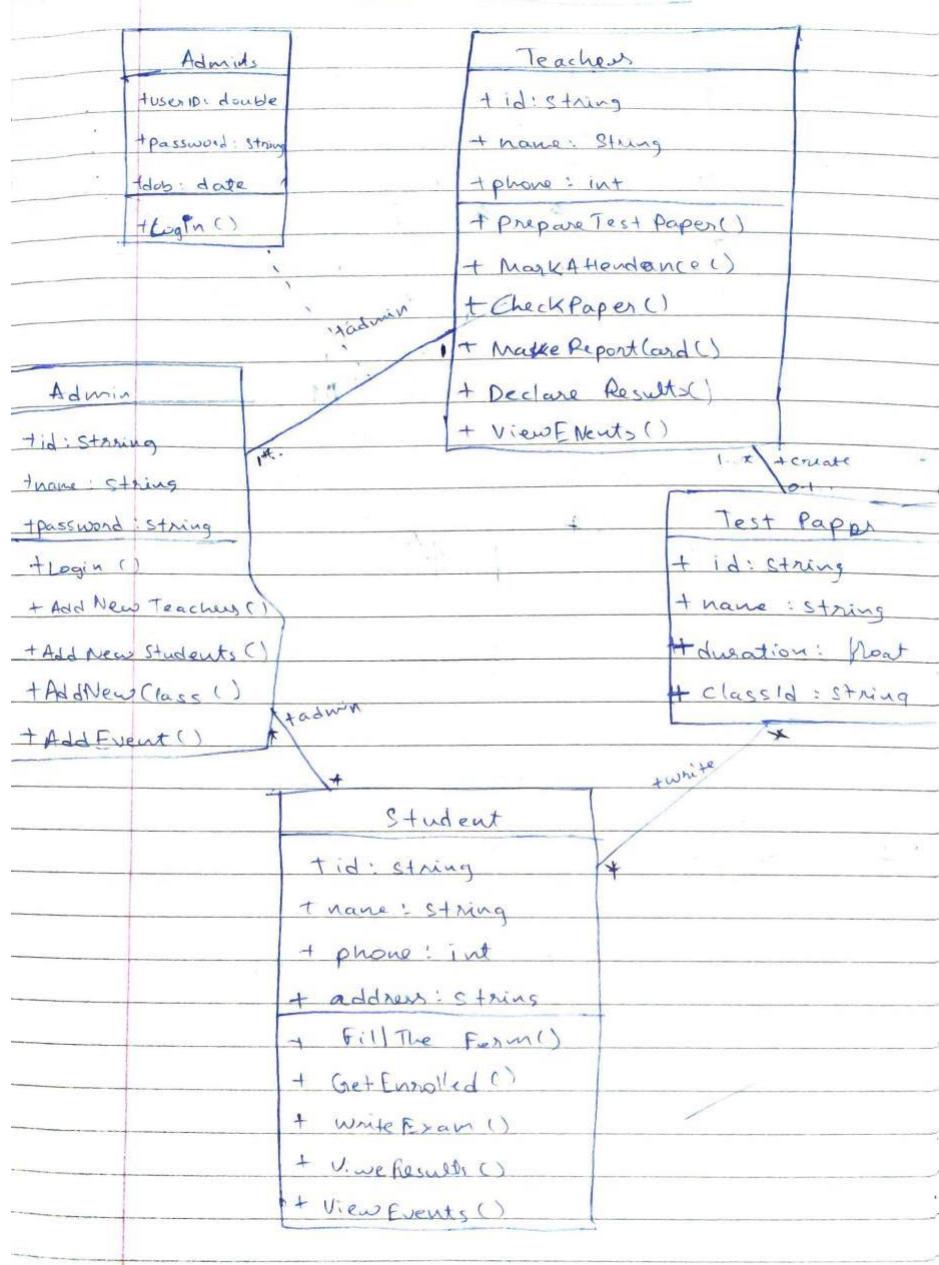
Software Requirements Specification (SRS):

A centralized approach and system for managing, storing, accessing and updating all the information and details present in relevance to students, and teaching and non-teaching faculty, increasing efficiency and convenience of information management in educational institutions.

- Educational institutions should be able to add, edit and view student personal details, like name, age, gender, email, phone number, address and so on.
- Educational institutions should be able to add, edit and view student academic details, like USN, department, semester and registered courses.
- Faculty should be able to view all student personal details, and should be able to view and edit internal evaluation marks and attendance of students.
- The COE office should be able to view all student details, and view and edit internal and examination marks, and publish results.
- Placement section should be able to view all student details, and add companies coming to the campus for placements.
- Management section should be able to view, add and edit teaching and non-teaching staff details.
- Students should not be allowed to edit their personal or academic details.
- The system should be convenient and easy to use by students, management and faculty.
- The system should be a reliable source of information viewing (most importantly, academic grades) for students, COE and faculty.

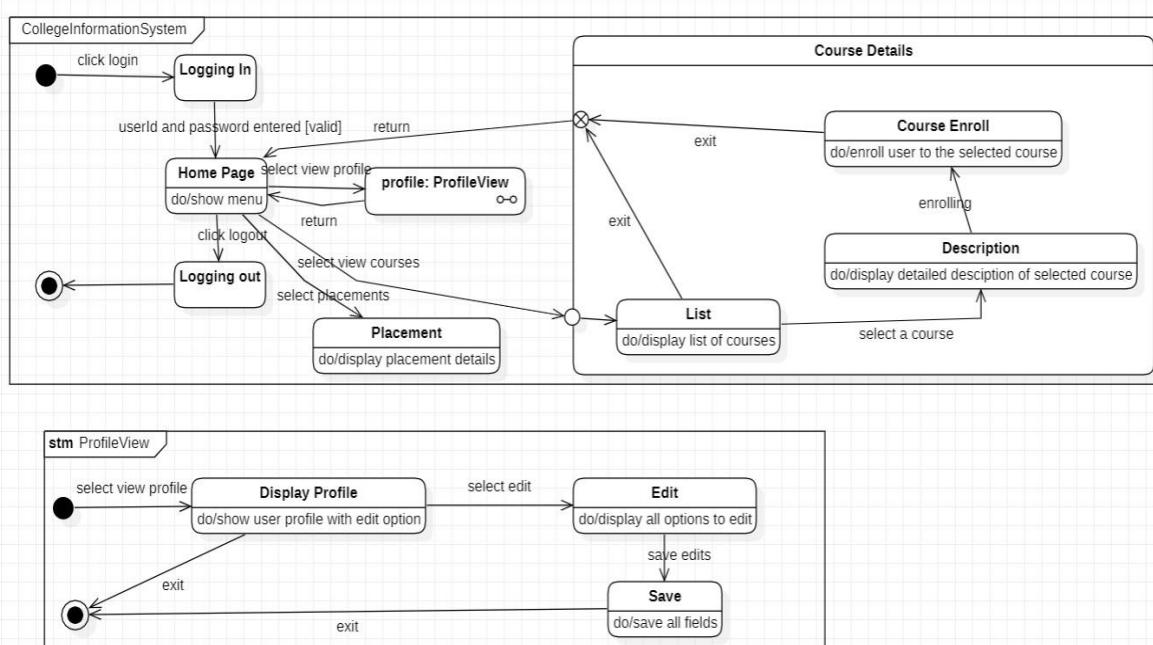
Advanced Class Diagram:

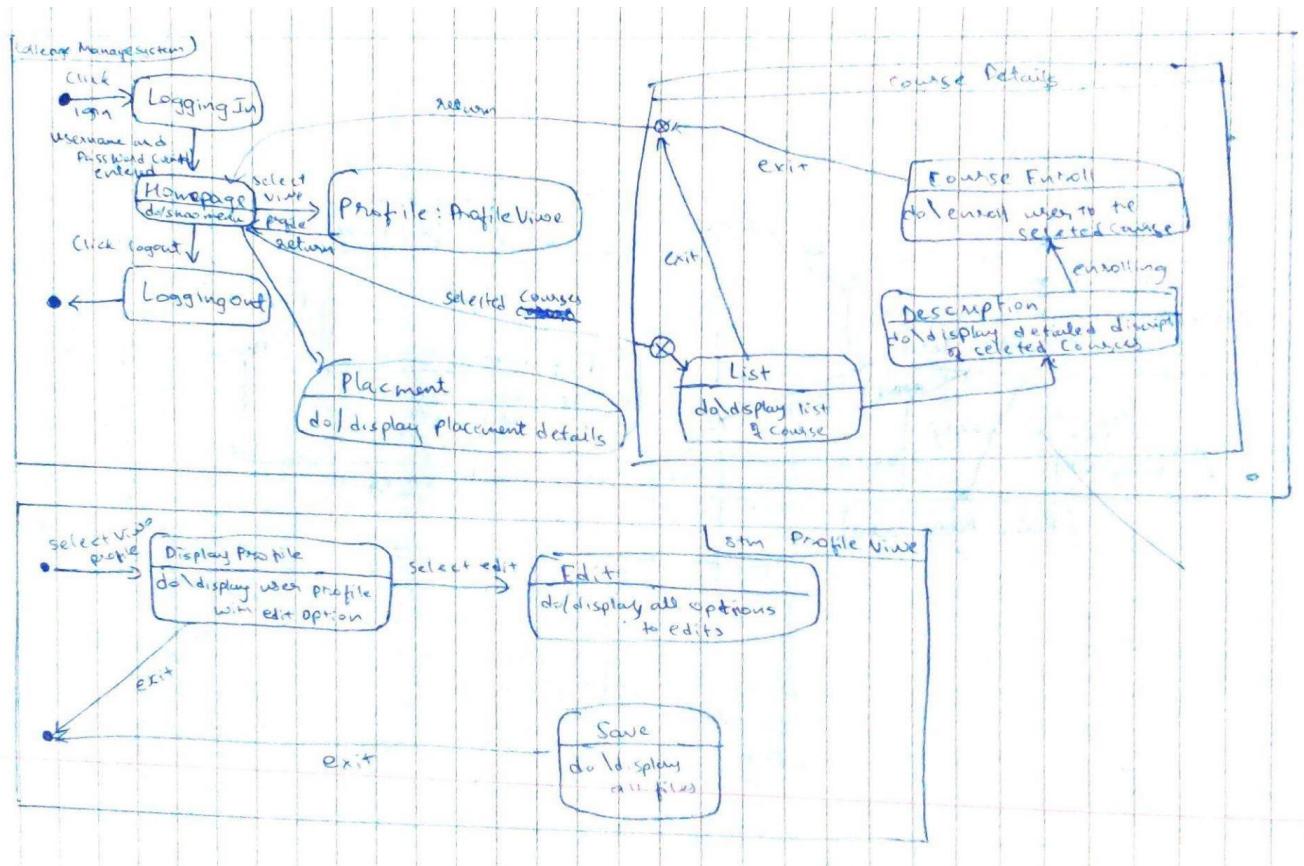




Advance state diagram:

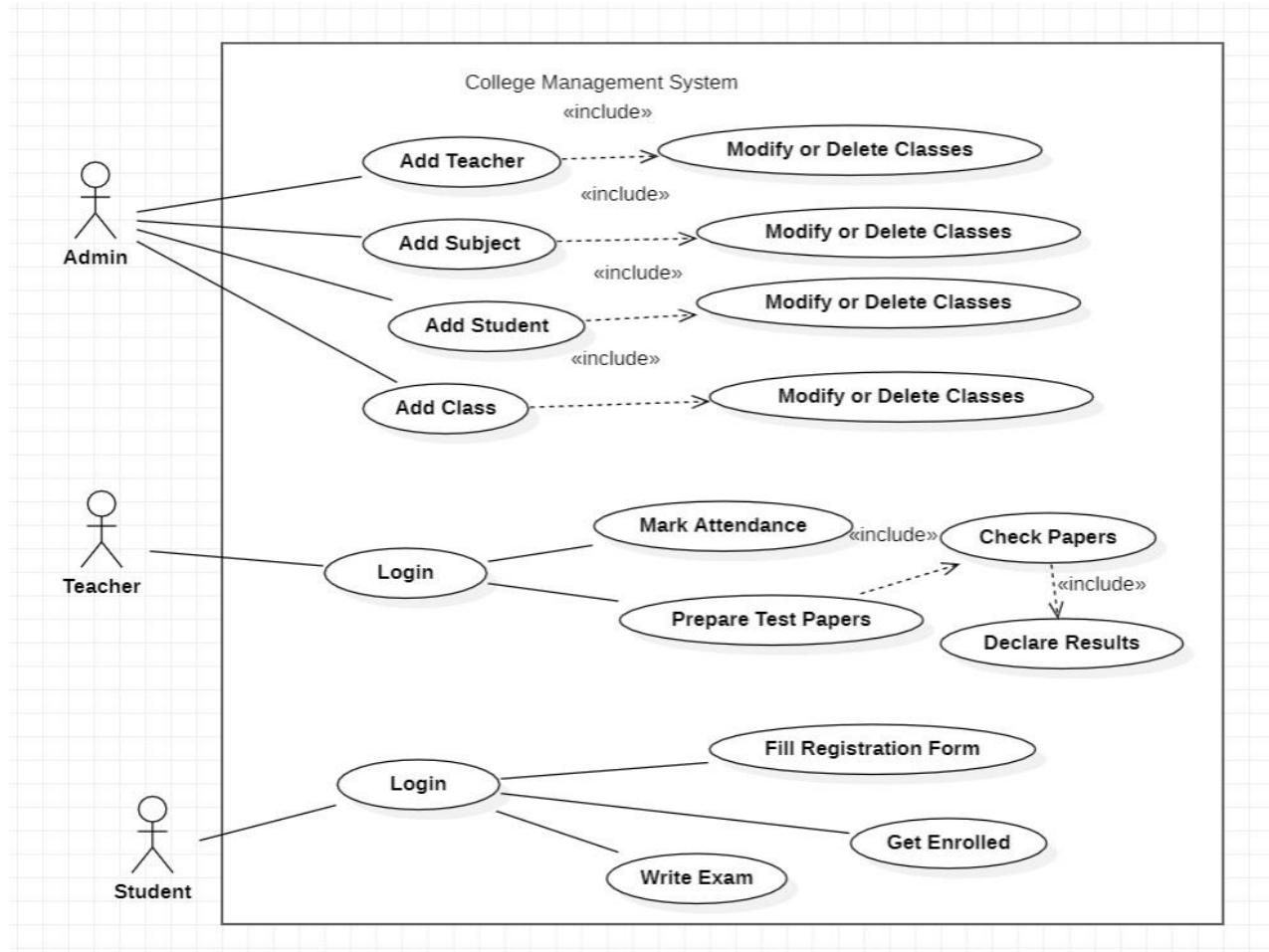
The advanced state diagram depicted below contains one nested state and one submachine, which on successful login shows the course details and profile View procedure of student. It contains initial state and termination state with Courses as a nested state including the required simple states. It also has a submachine state named Profile View with initial, termination state along with simple states; Display profile, Edit, Save.

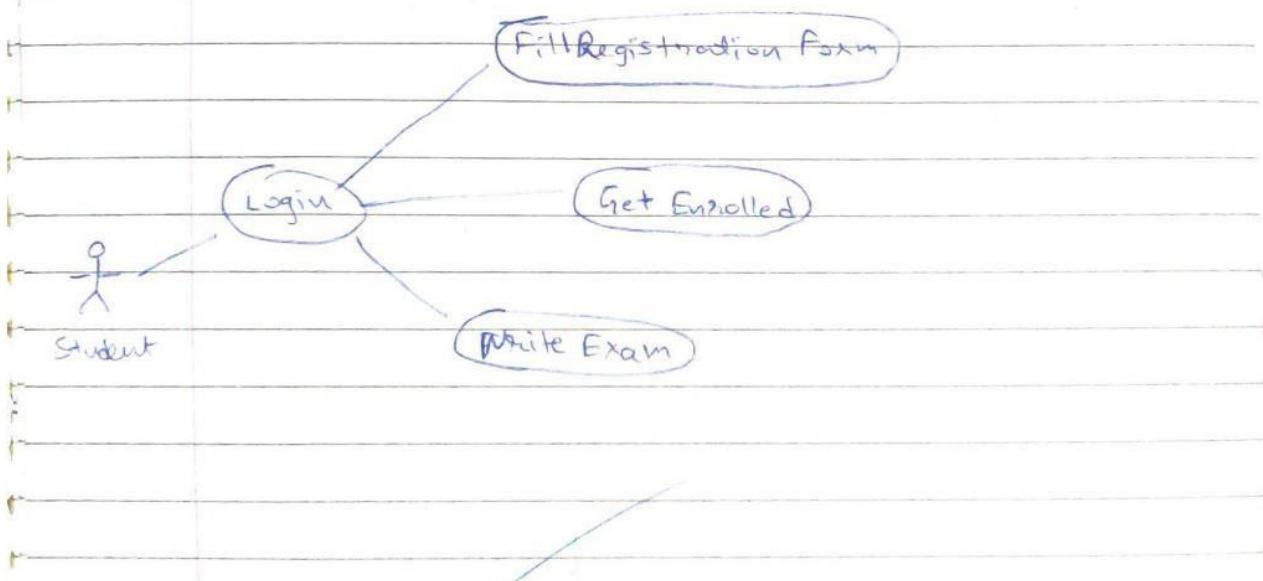
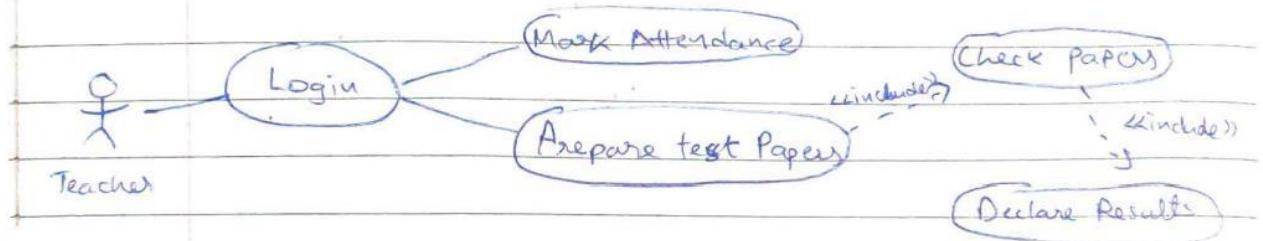
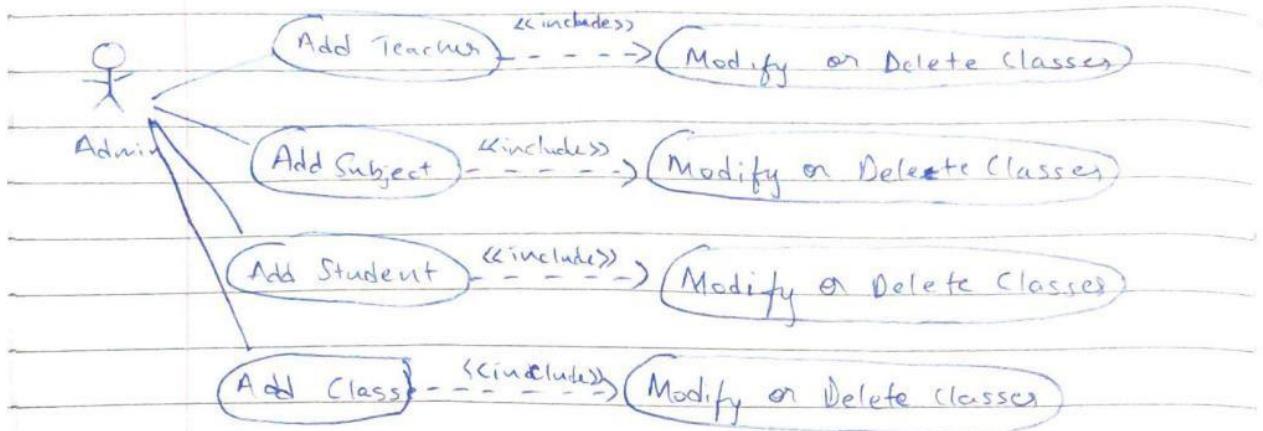




Advance use case diagram

The advanced use case diagram has extra functionalities which includes extends, includes and generalization. The show available books use case extends view books use case, view events use case includes add events and remove events, issue books use case includes verify student and check availability of book.

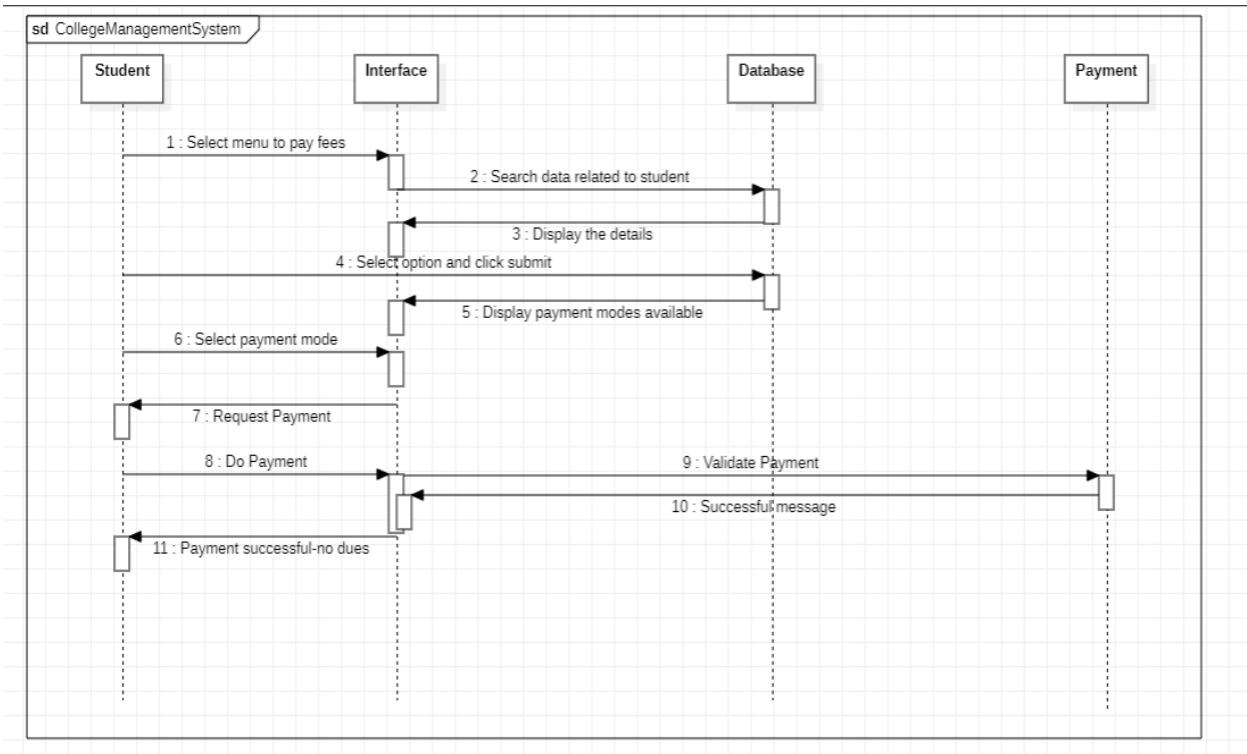


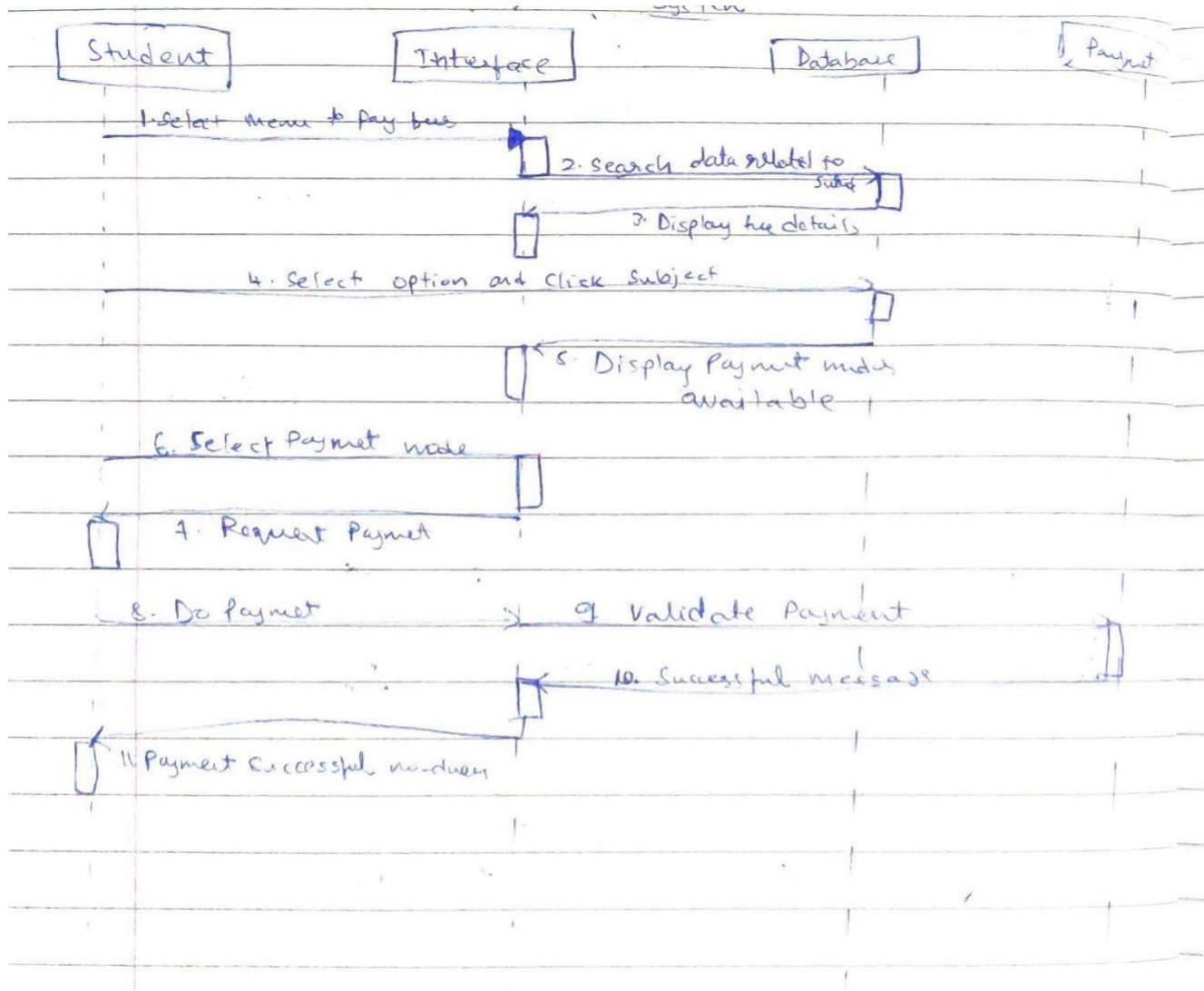


Advance sequence diagram

The lifeline is the dotted line and the rectangles represent the period of time the object is executing and is hence called activation.

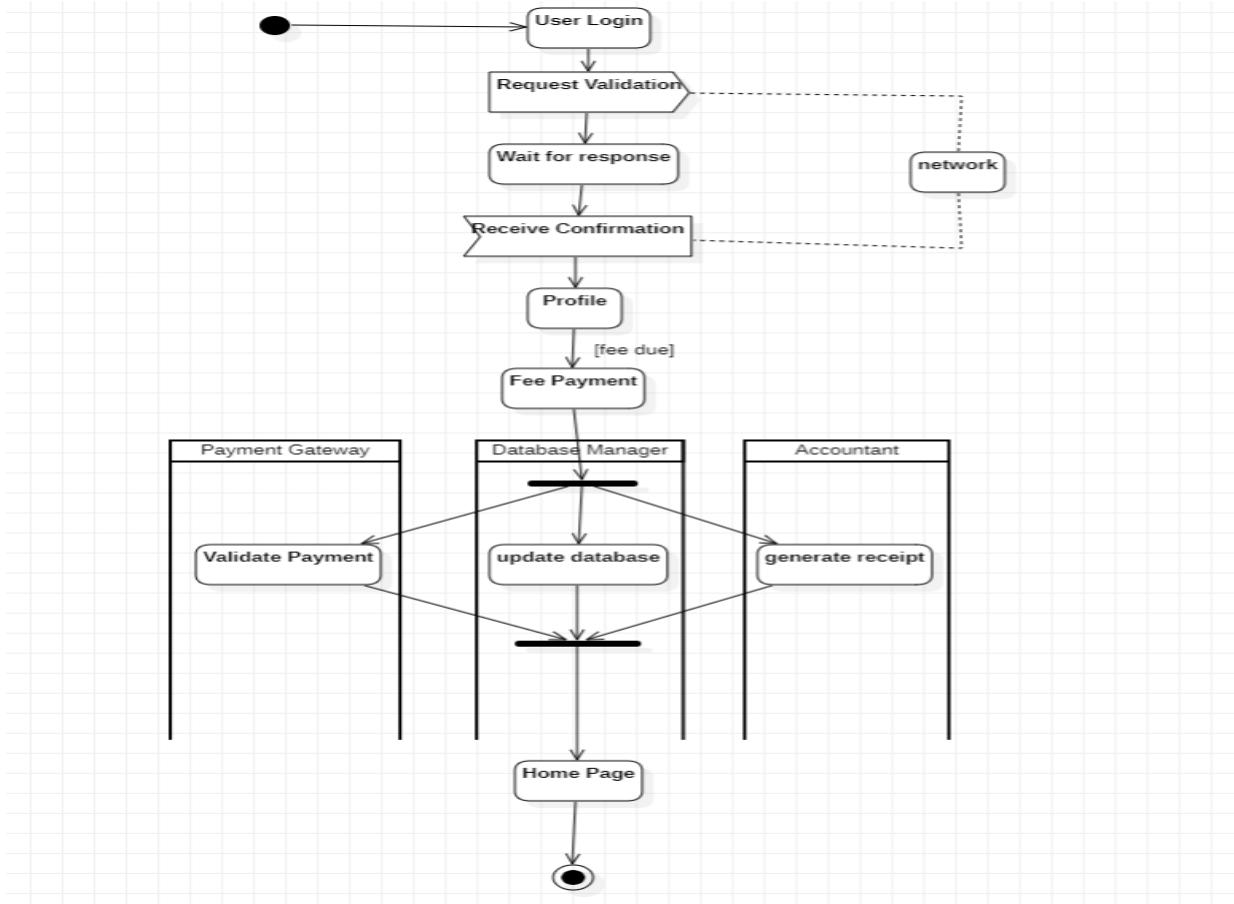
The recursive function of verify is shown by double activation rectangle of verify payment and successful message.

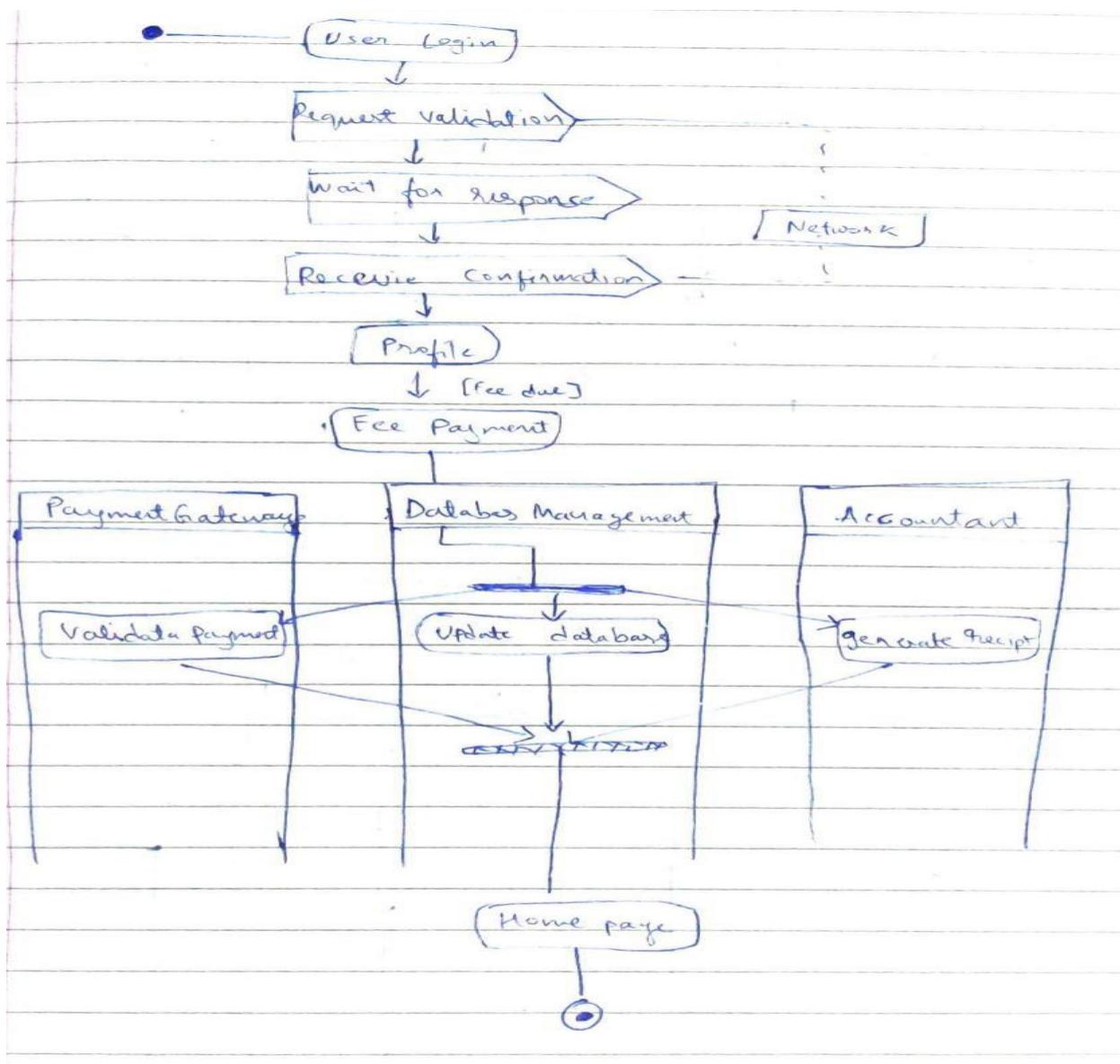




Advance activity diagram:

The advanced activity diagram starts from initiation and then user login activity where a signal is sent to the network for request validation and upon confirmation the control flows to profile and then fee payment activity. There are three swim-lanes for Payment gateway, Database manager and accountant where validate payment, update database and generate receipt respectively. Then the control flows to the home page and then termination activities.





2. Hostel Management System

Problem statement:

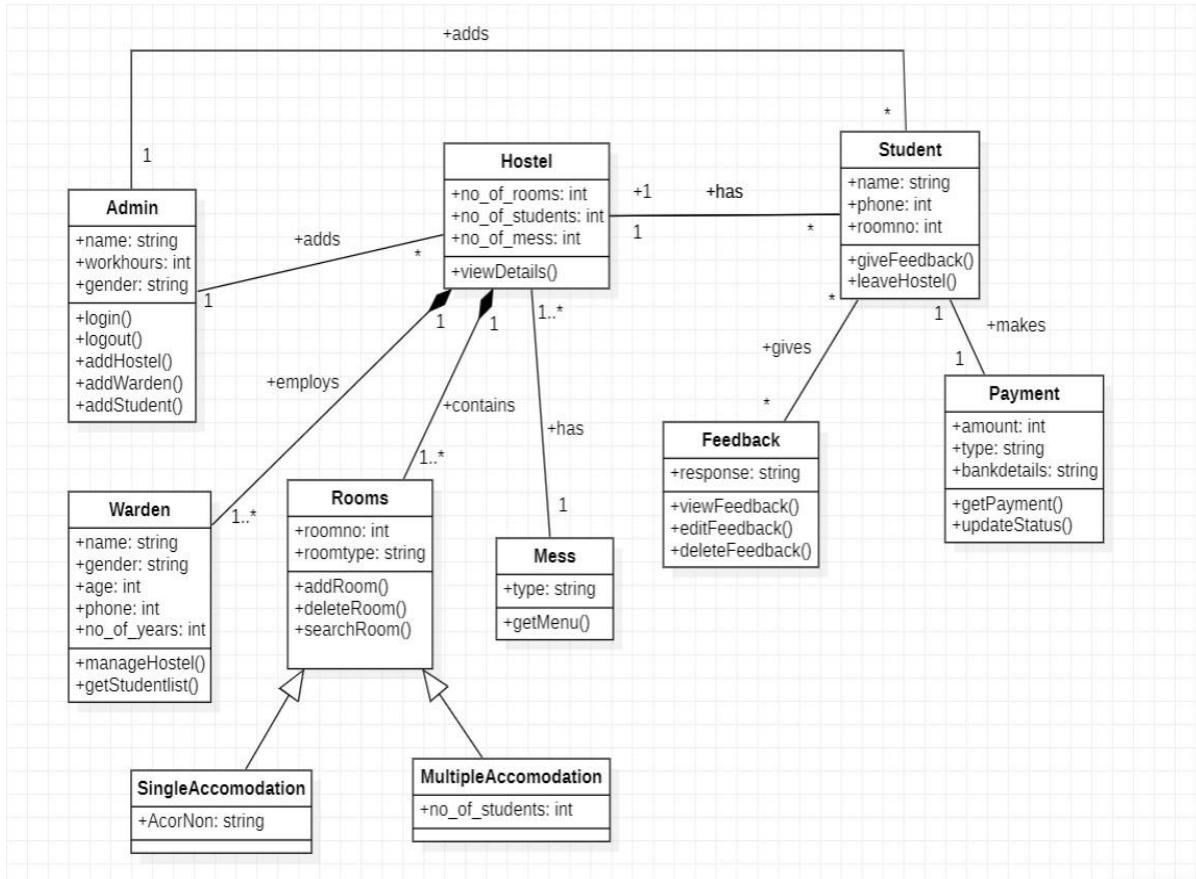
Design UML diagrams for Hostel Management System with system requirements specification.

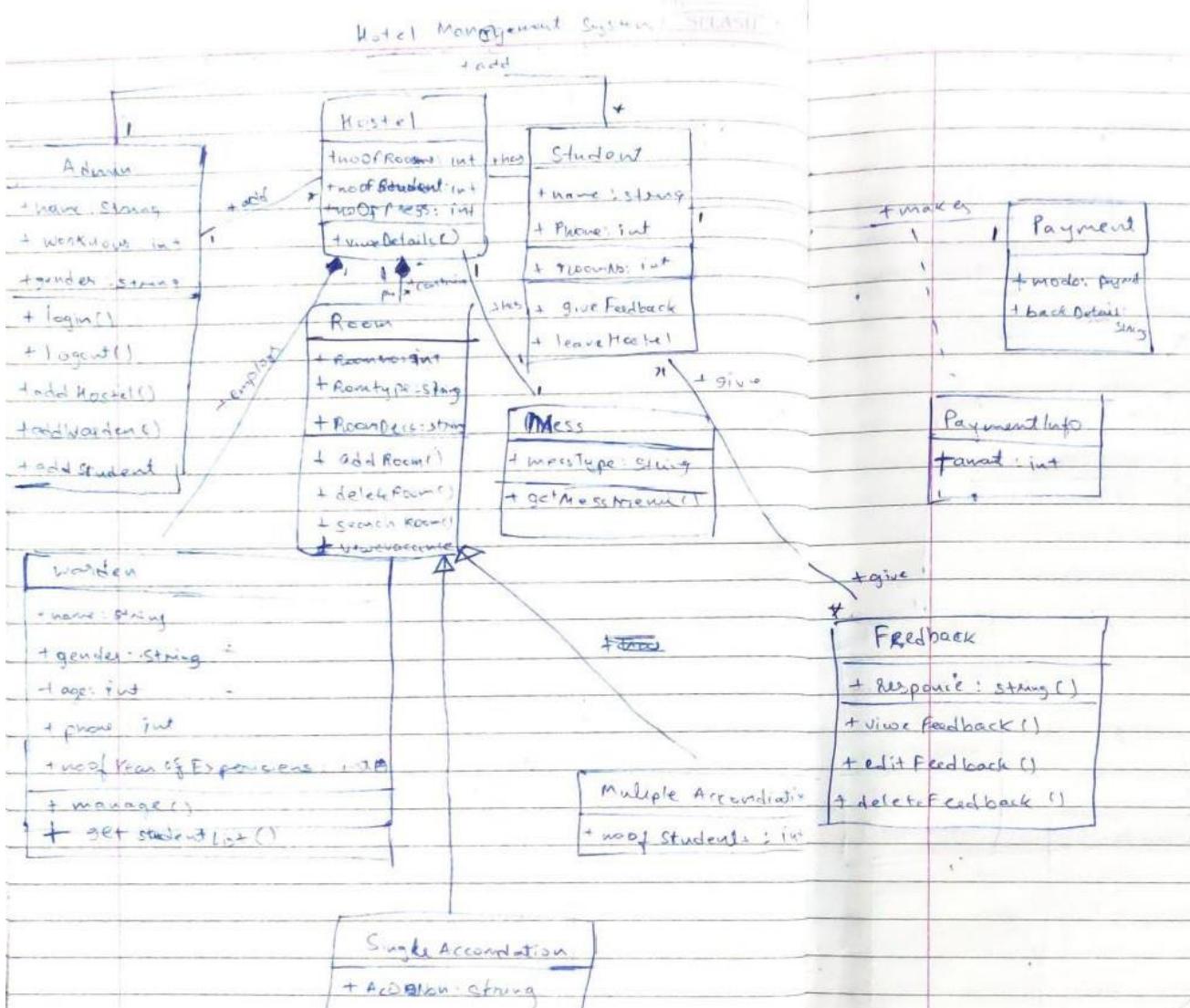
Software Requirements Specification (SRS):

The purpose of the Hostel Management System is to carry out different operations of a hostel. This system will provide ease of use to the staff of the hostel by performing all work on computers. It helps to manage student and staff records.

- Admin can login using credentials provided to him.
- Admin can allot room to students.
- Students can login using the credential provided and can give feedback about staff.
- Admin can review the feedback provided by students.
- Admin can appoint staff.
- Students can provide message feedback.
- Mess managers can review the mess feedback.
- Mess manager can update the menu list.
- Admin can assign work to staff members.
- The system should be easy to handle.
- System should give expected performance results.
- The response time should be small.

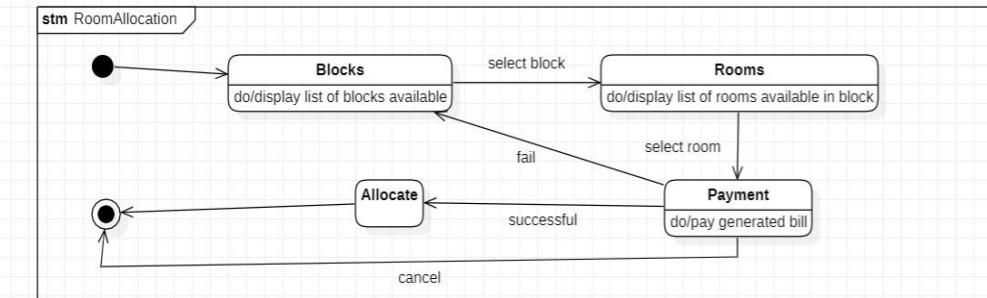
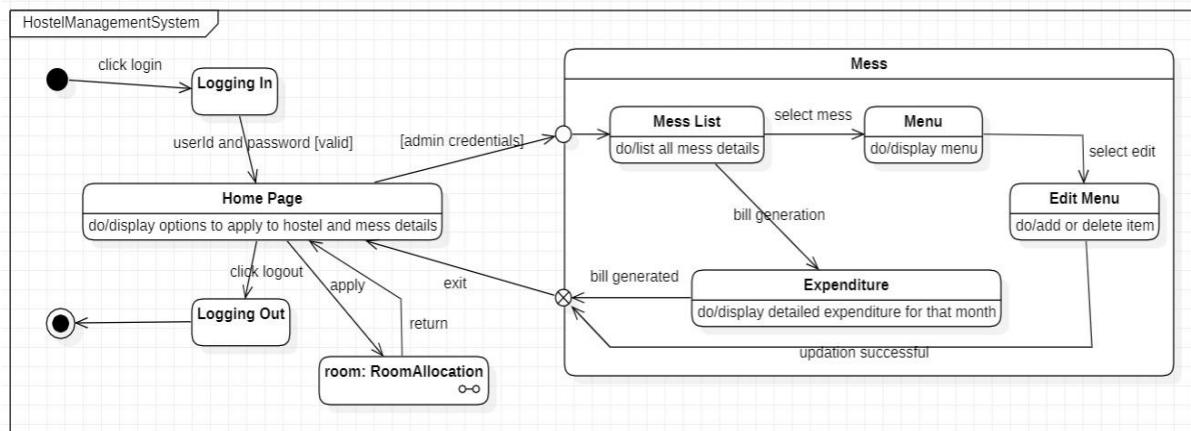
Advanced Class Diagram:

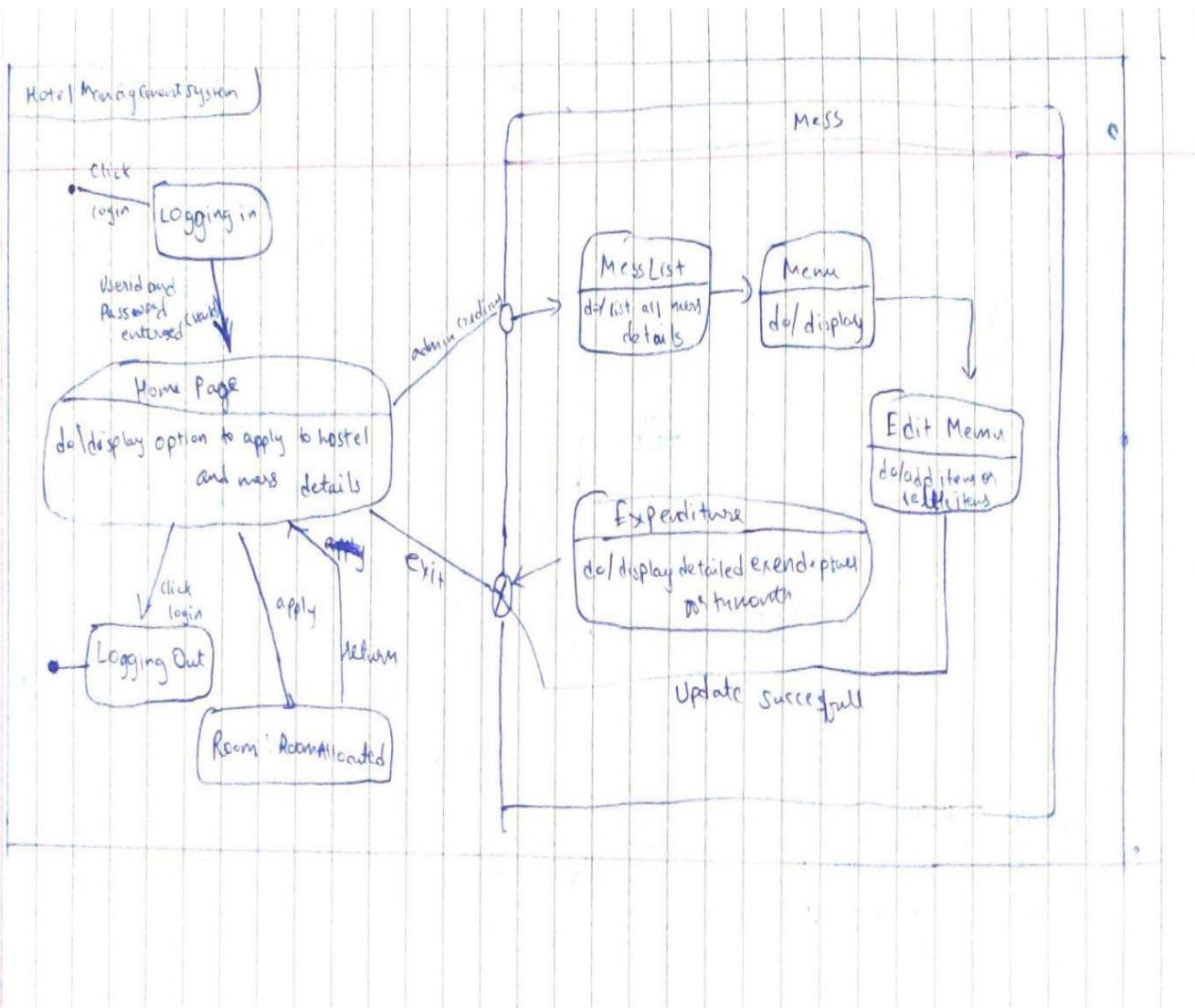




Advance state diagram:

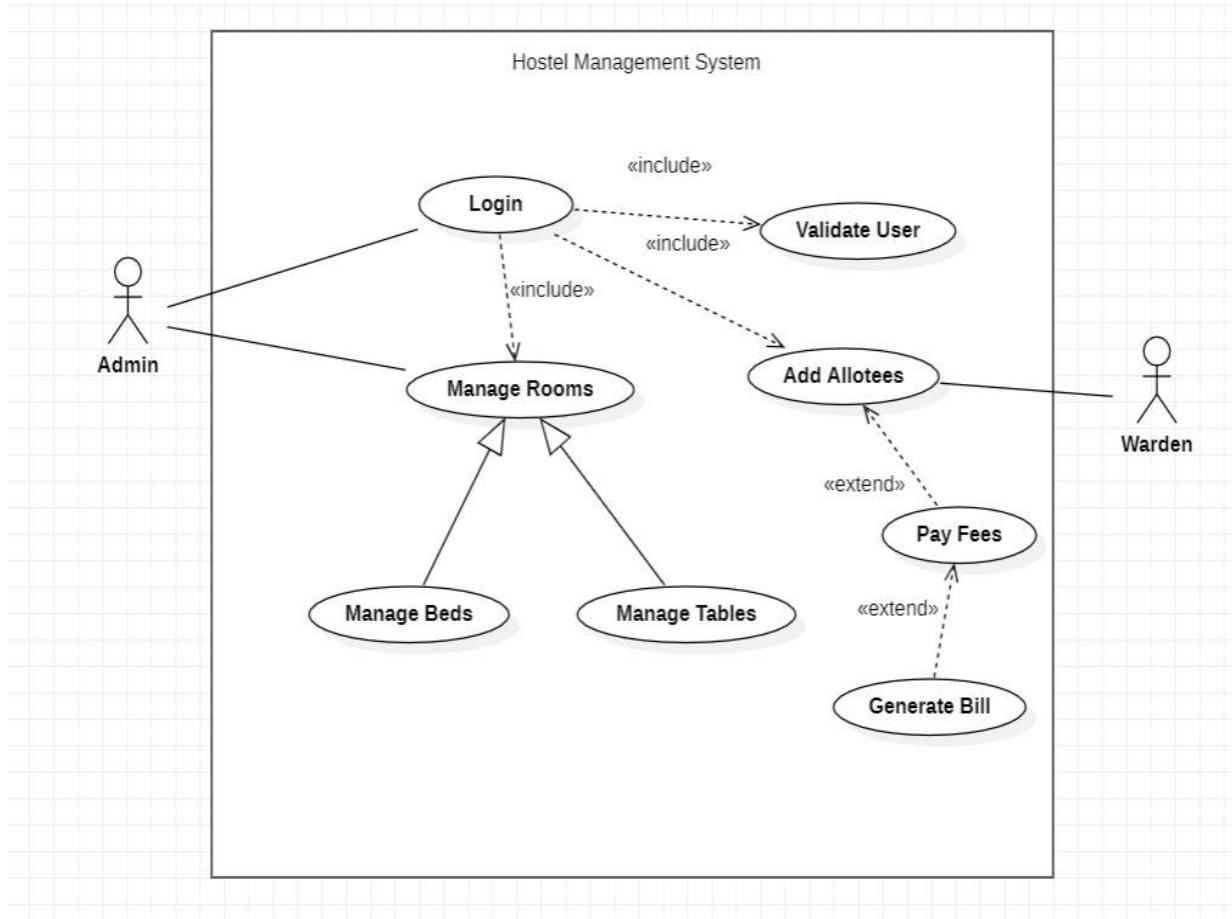
The advanced state diagram depicted below contains one nested state and one submachine, which on successful login shows the mess details and room allocation procedure. It contains initial state and termination state with Mess as a nested state including the required simple states. It also has a submachine state named Room Allocation with initial, termination state along with simple states; Blocks, Rooms, Allocate, Payment.

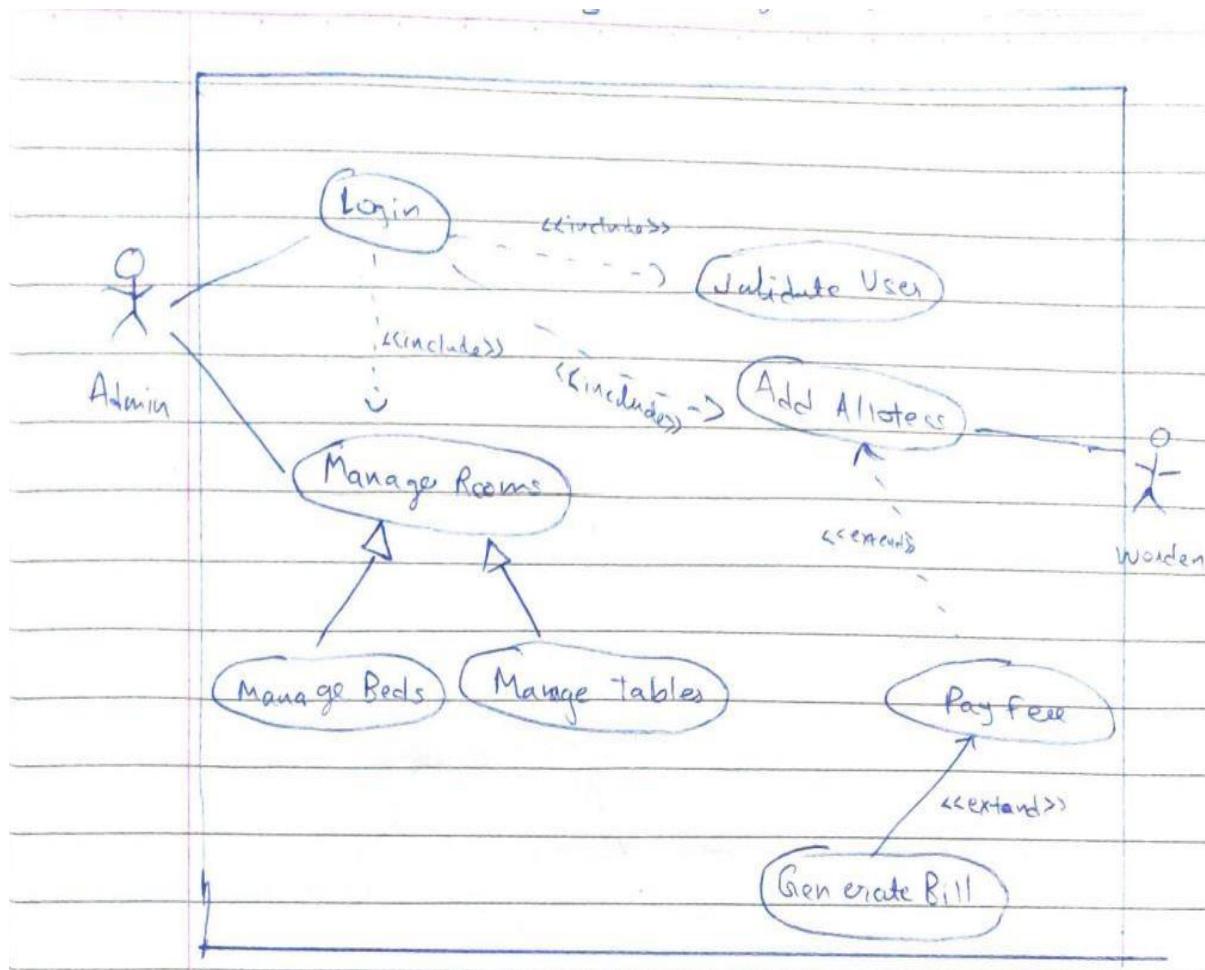




Advance use case diagram:

The advanced use case diagram has extra functionalities which includes extends, includes and generalization. The edit hostel info use case extends add room use case, collect fee use case includes verify student, add room use case includes delete room use case.



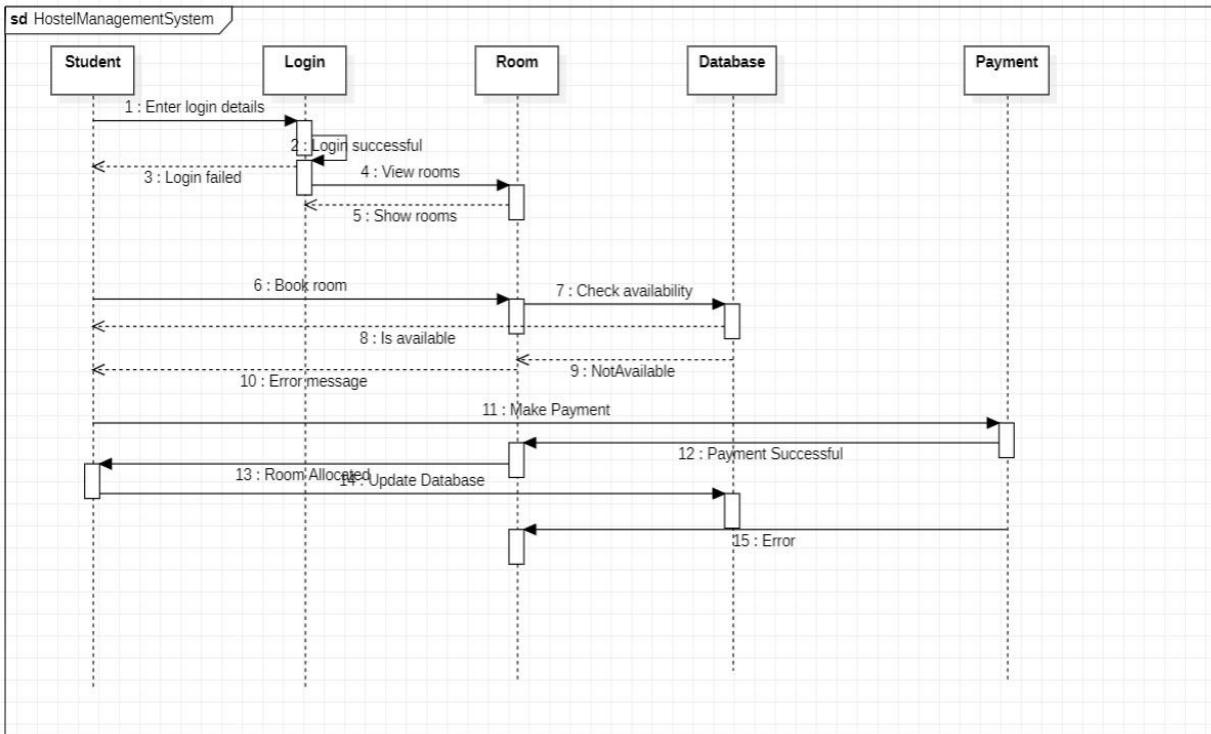


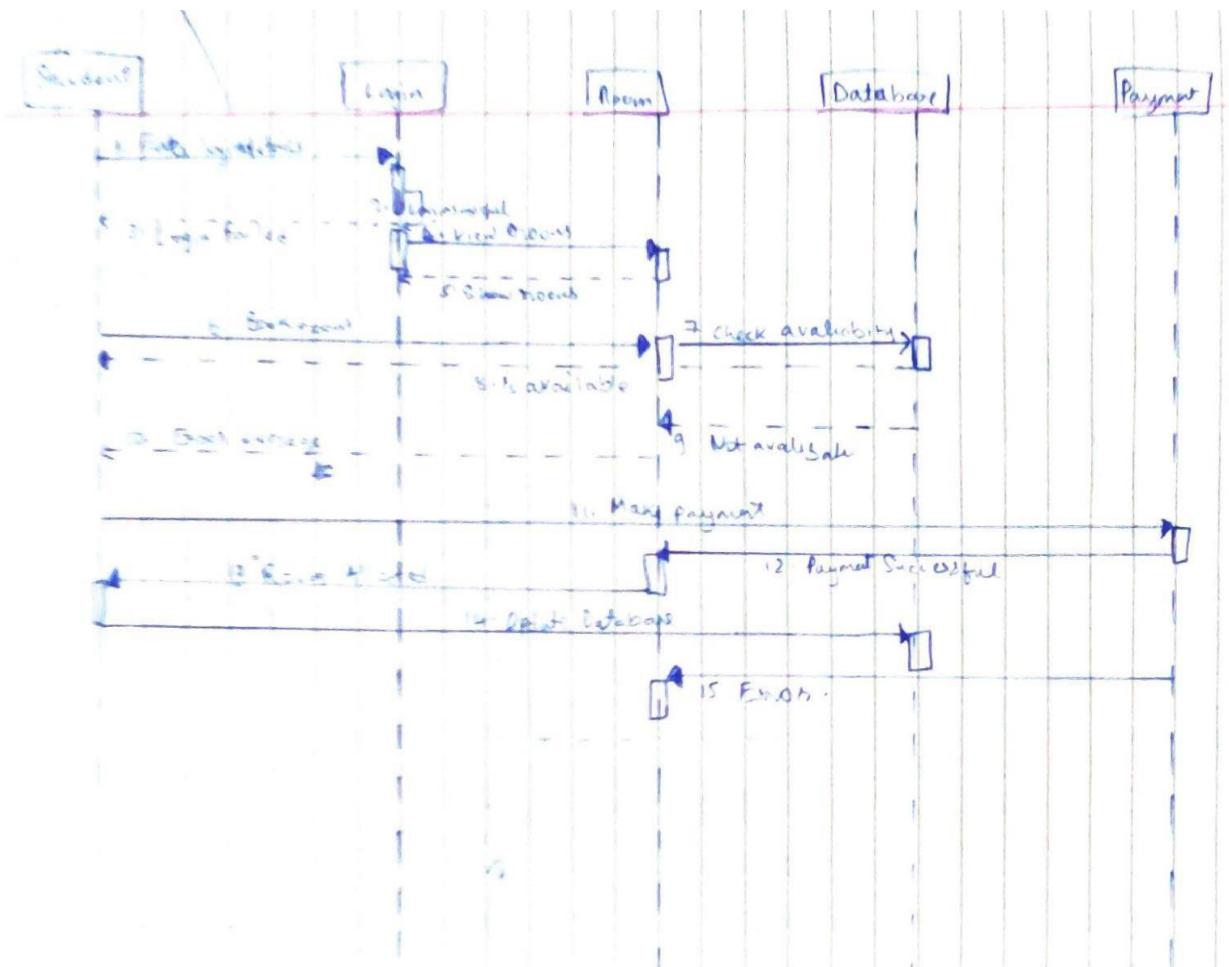
Advance sequence diagram:

The lifeline is the dotted line and the rectangles represent the period of time the object is executing and is hence called activation.

The Login actor has self-message to check with the registration of the student.

Async and sync signal replies (dotted line) are used to reply back with specificity to the object.

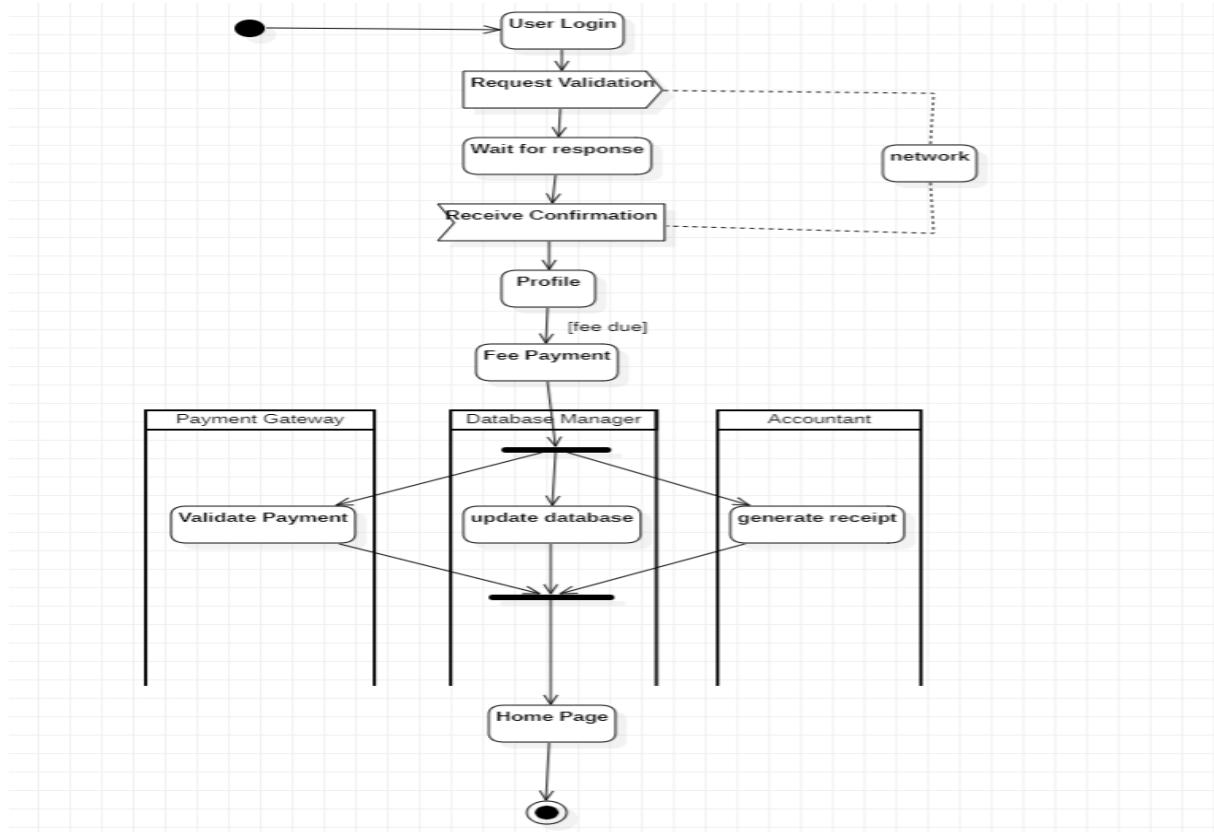




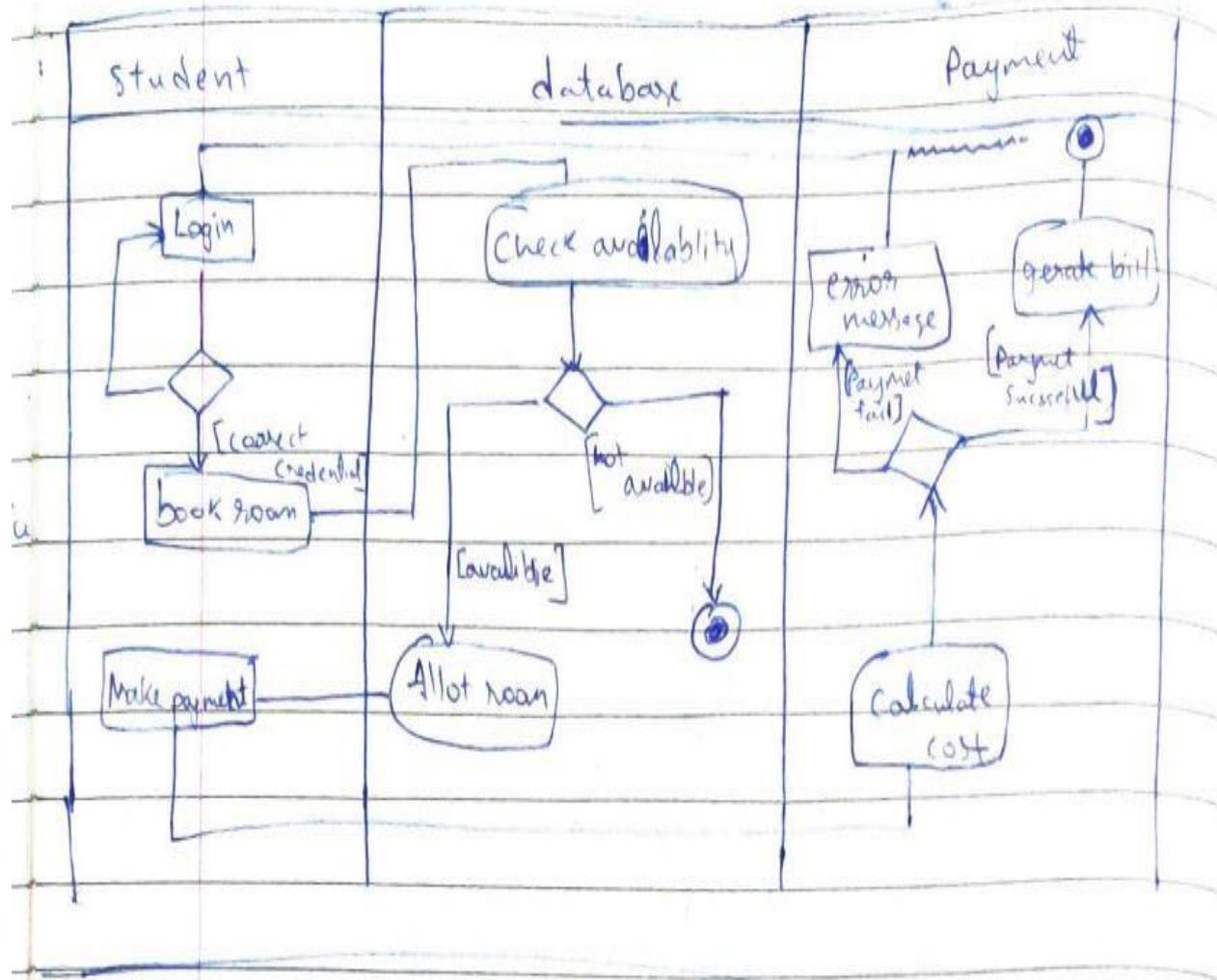
Advance activity diagram

The advanced activity diagram starts from initiation and then in the student swim-lane, student login activity where a signal is sent to the network for request validation and upon confirmation the control flows to profile and then book room activity. There are three swim-lanes namely student, database, payment where validate student, update database and confirm payment respectively.

Then the control flows to the home page and then termination activities.



Hostel management



3.Stock Maintenance System

Problem statement:

Design UML diagrams for Stock Maintenance System provided with system requirements specification.

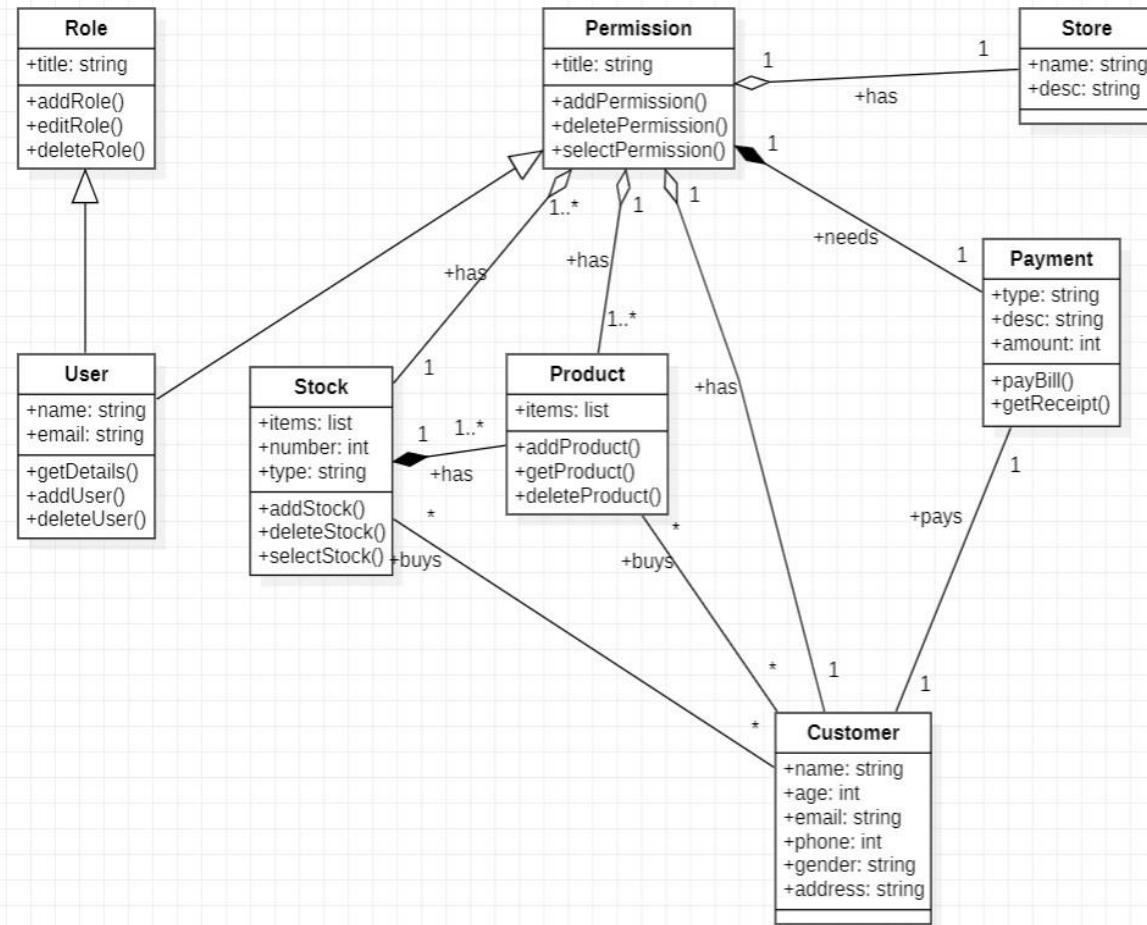
Software Requirements Specification (SRS):

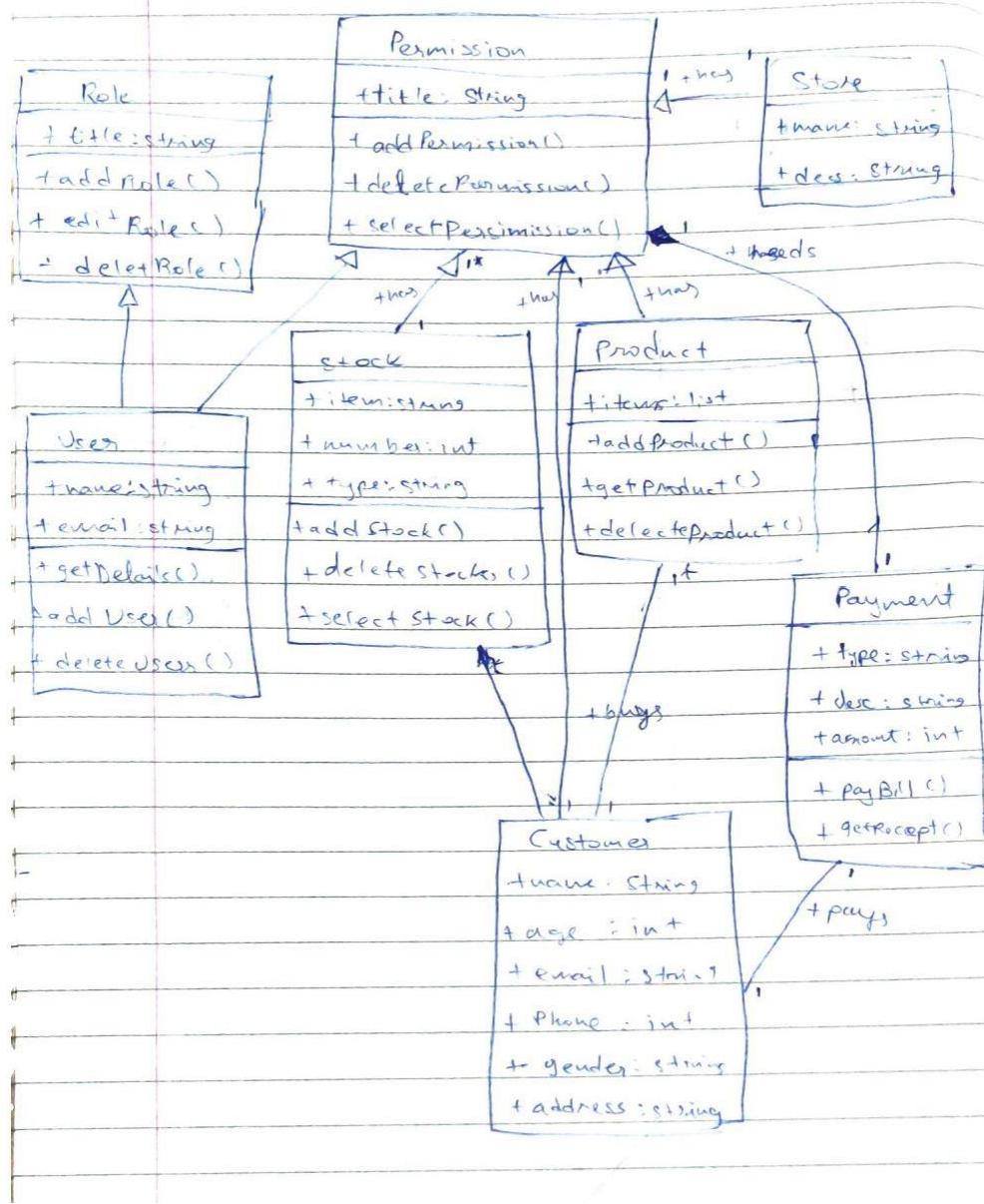
The stock maintenance system will allow the employees to record information of the items available in the store and generate reports based on the total amount of sales. The new system will have a windows-based desktop interface to allow employees to enter the information of sales, purchase orders, change employee preferences and create reports. The system retains information on all the items in the shop. The system retains the records of the cost, expiry date, vendor details, discount, quantity. The employee maintains the information of the sale of the item. He can add the items at the right time and update the database. The customer can view the availability of the required items and the price of the items. The customer can just view them but cannot make any changes.

The process of the stock maintenance system is that the customer logs in to the particular site to place the order for the customer product. The stock maintenance system is described sequentially through steps

- The customer logs in to the particular site.
- They fill the customer details.
- They place the orders for their product.
- The vendor logs in and views the customer details and orders

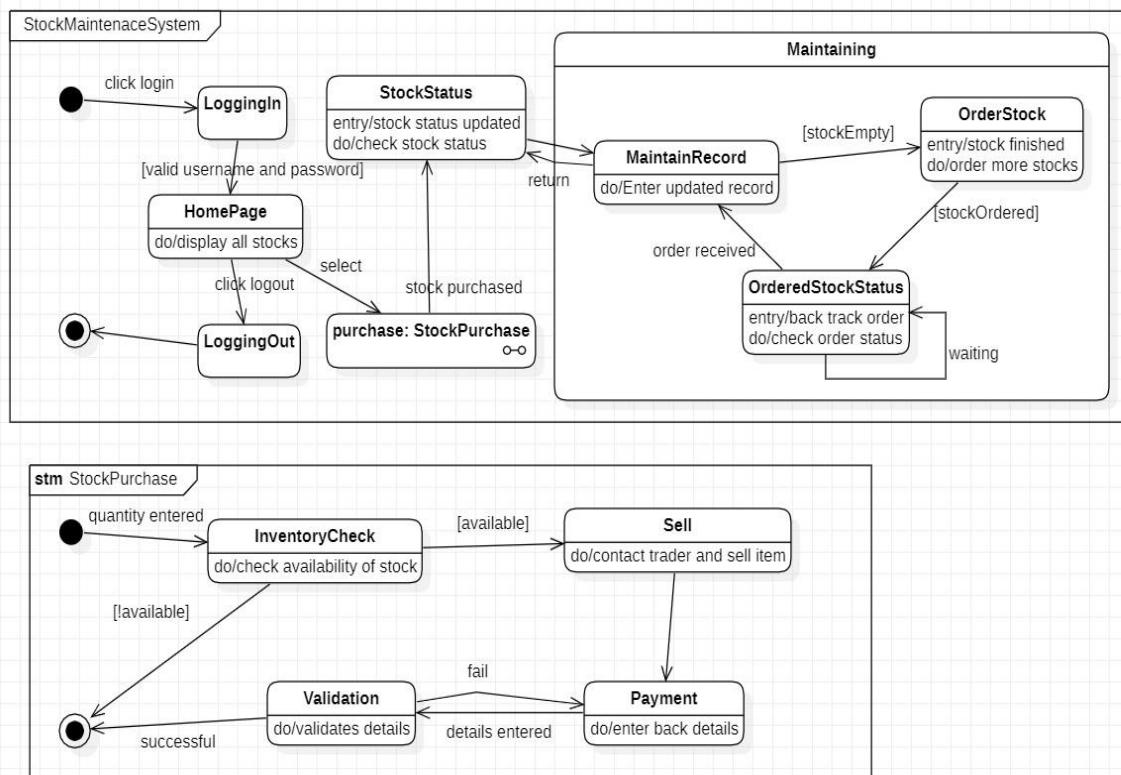
Advanced Class Diagram:

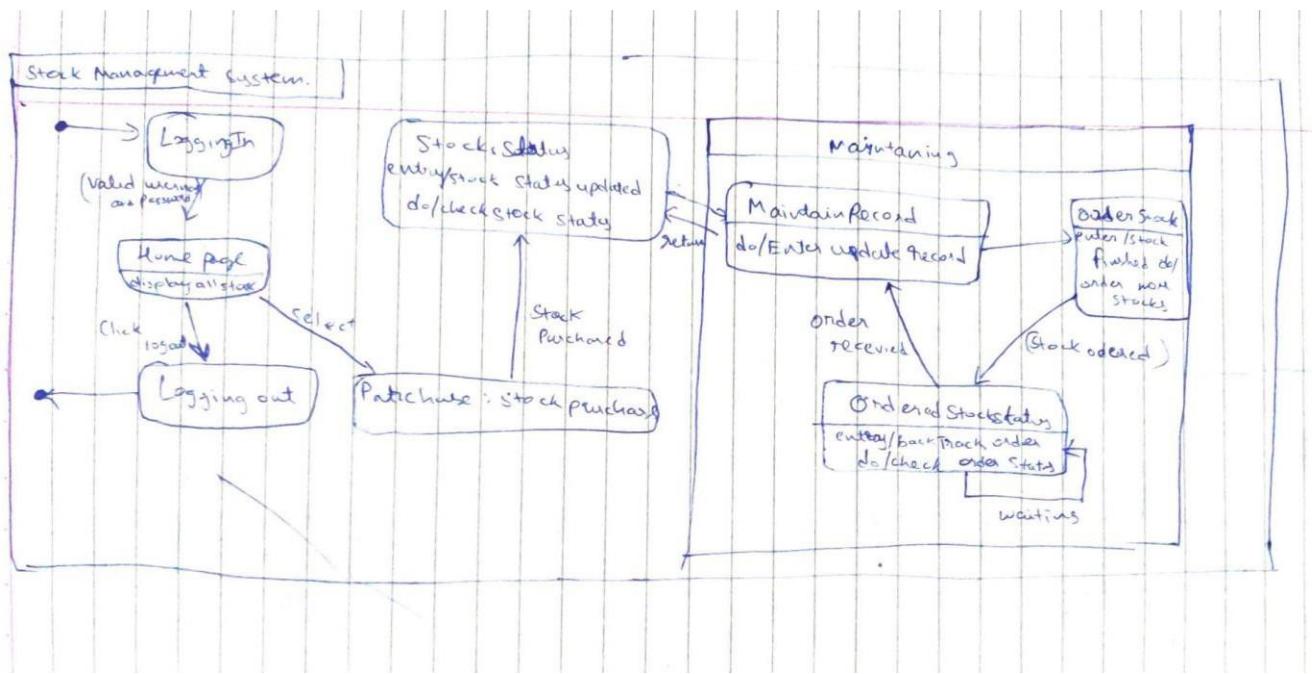




Advance state diagram:

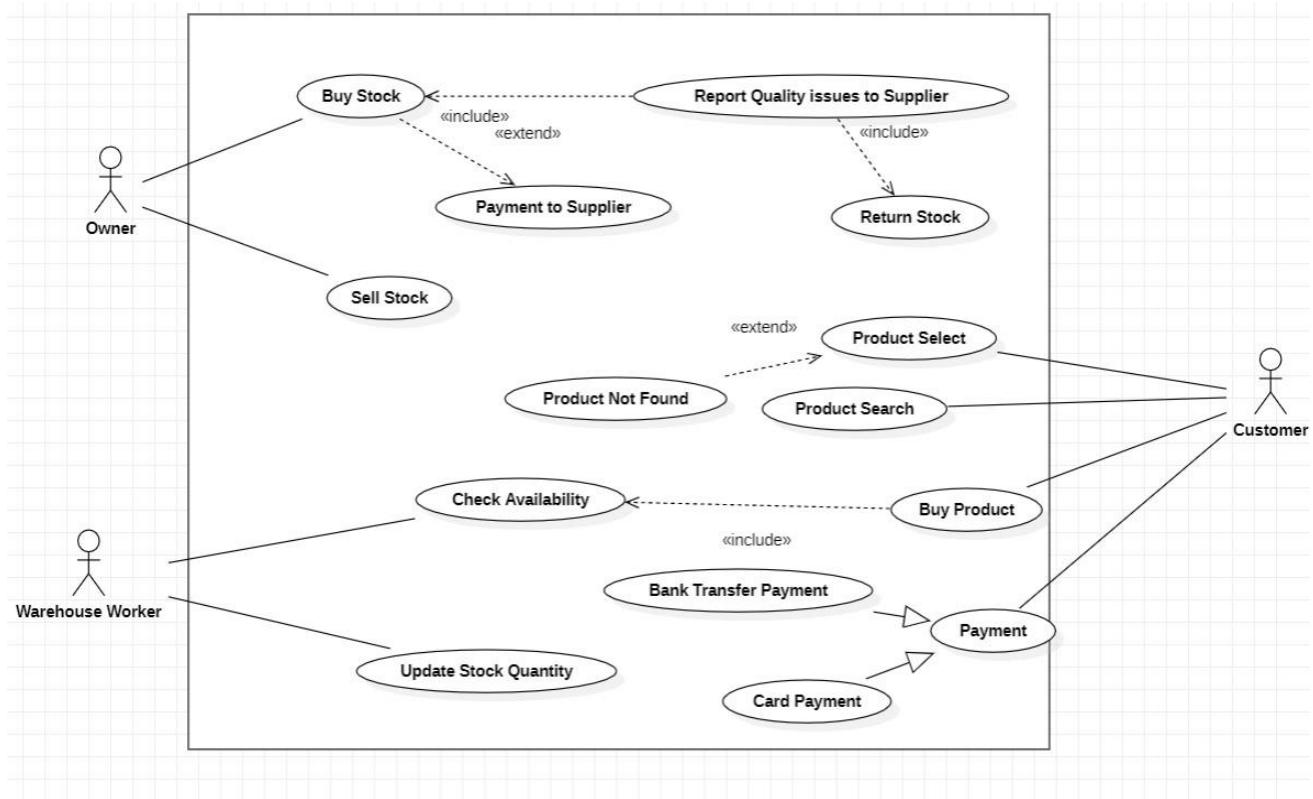
The advanced state diagram depicted below contains one nested state and one submachine, which on successful login shows the Stock Status details and Stock Purchase procedure. It contains initial state and termination state with Maintaining as a nested state including the required simple states. It also has a submachine state named Stock Purchase with initial, termination state along with simple states; Inventory check, Sell, Payment, Validation.

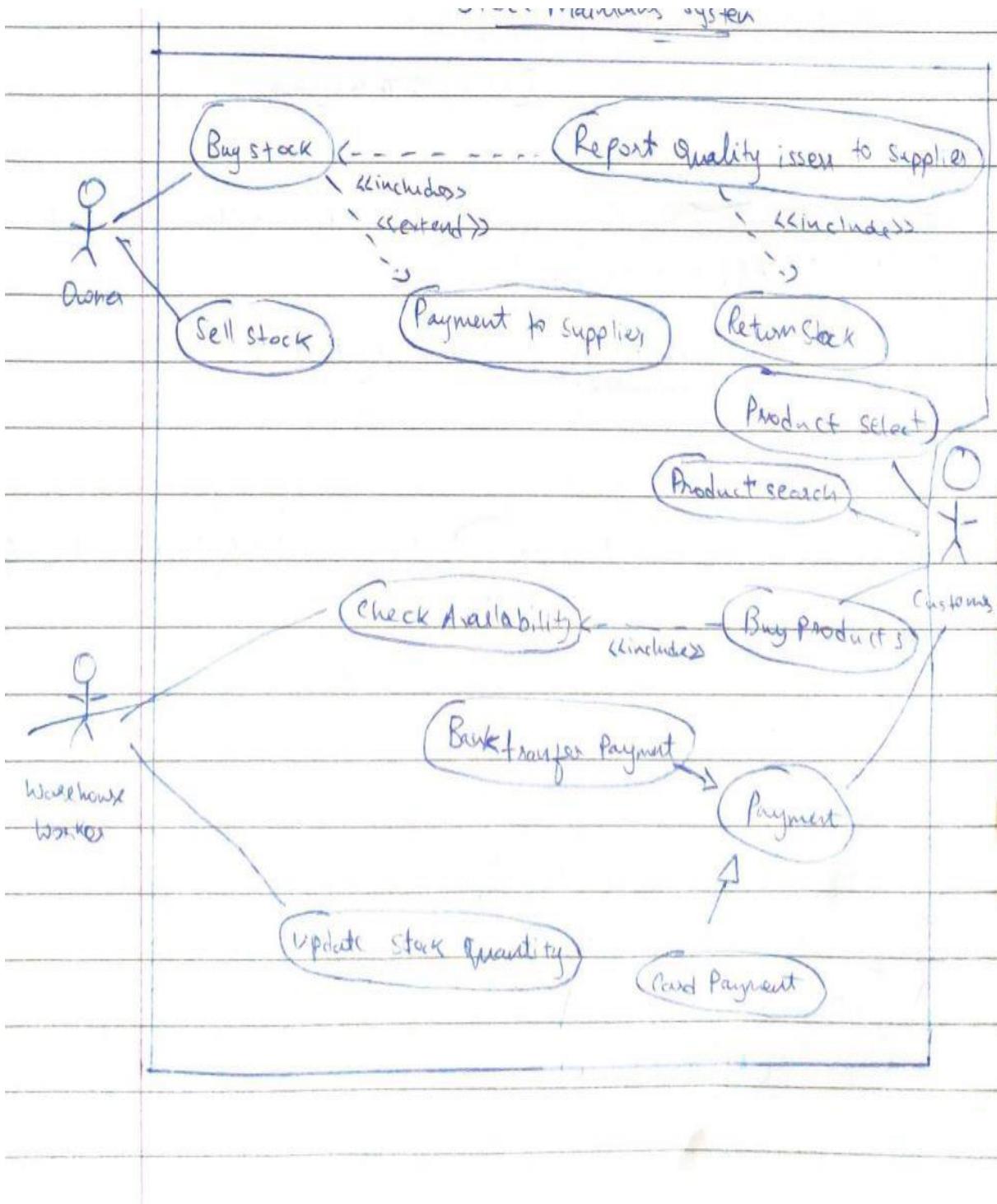




Advance use case diagram

The advanced use case diagram has extra functionalities which includes extends, includes and generalization. The stock level use case extends place order use case, detective shipment use case extends check quality criteria use case , shipment error use case extends receive shipment with bill use case, pay bill use case includes track order use case.

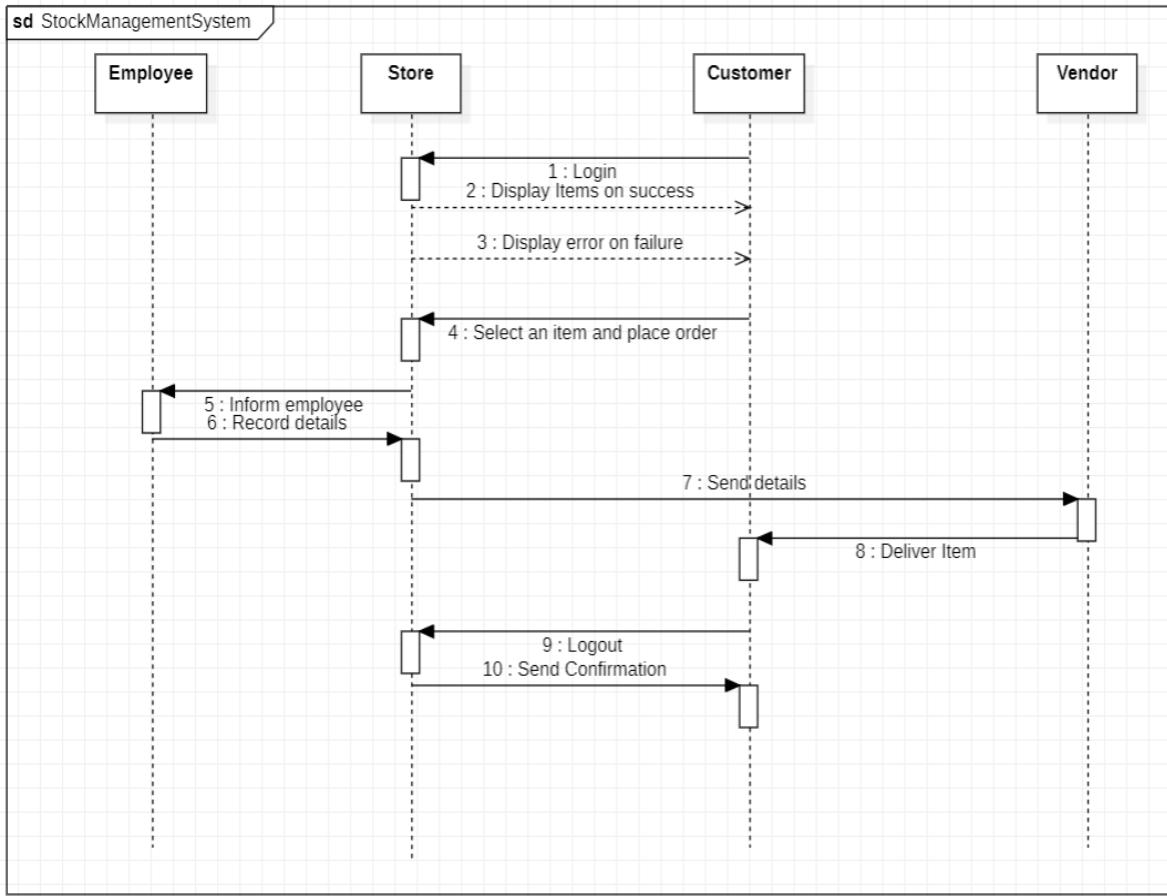


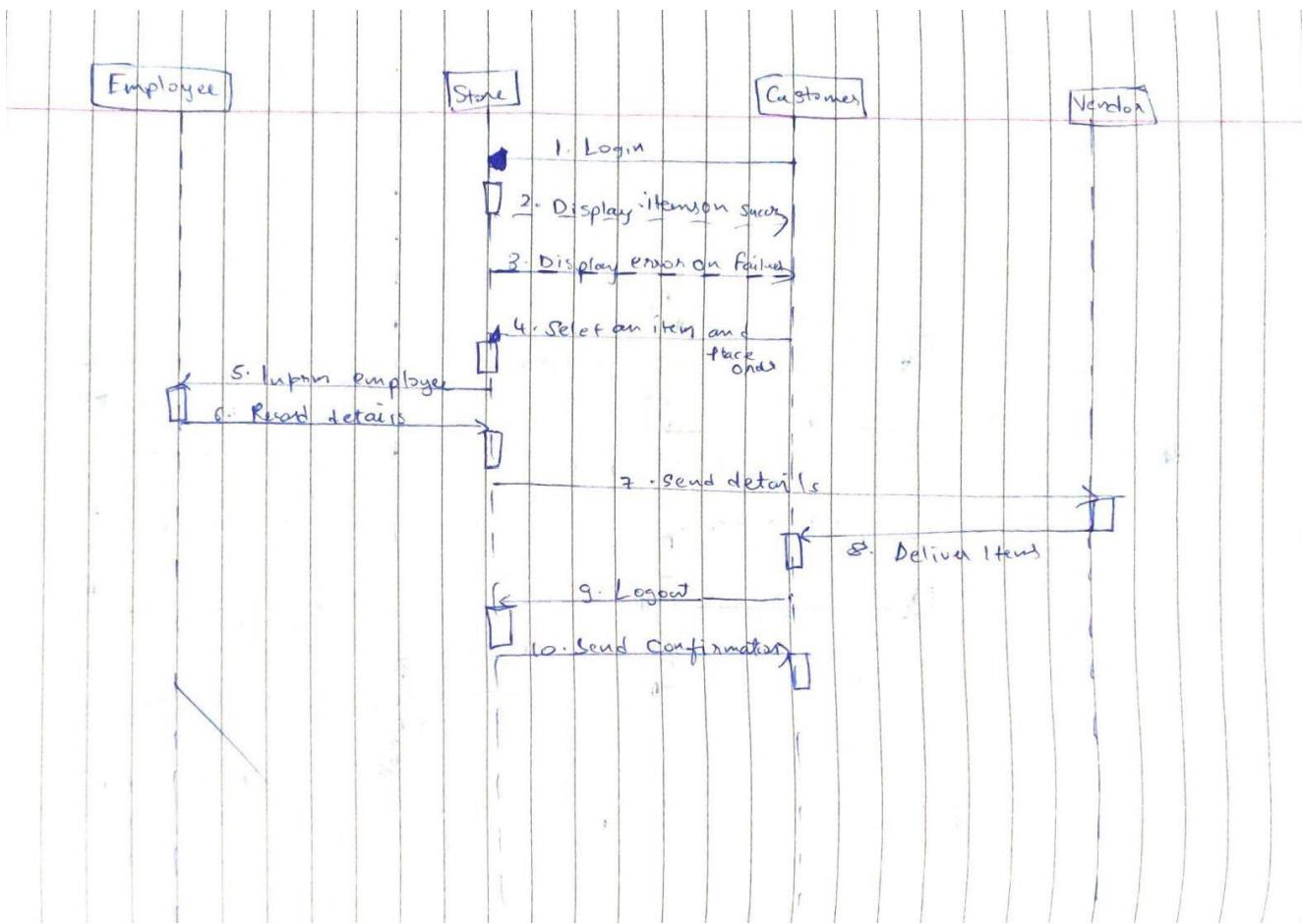


Advance sequence diagram:

The lifeline is the dotted line and the rectangles represent the period of time the object is executing and is hence called activation.

Create message signal is used to indicate the display of failure in any failure situation.

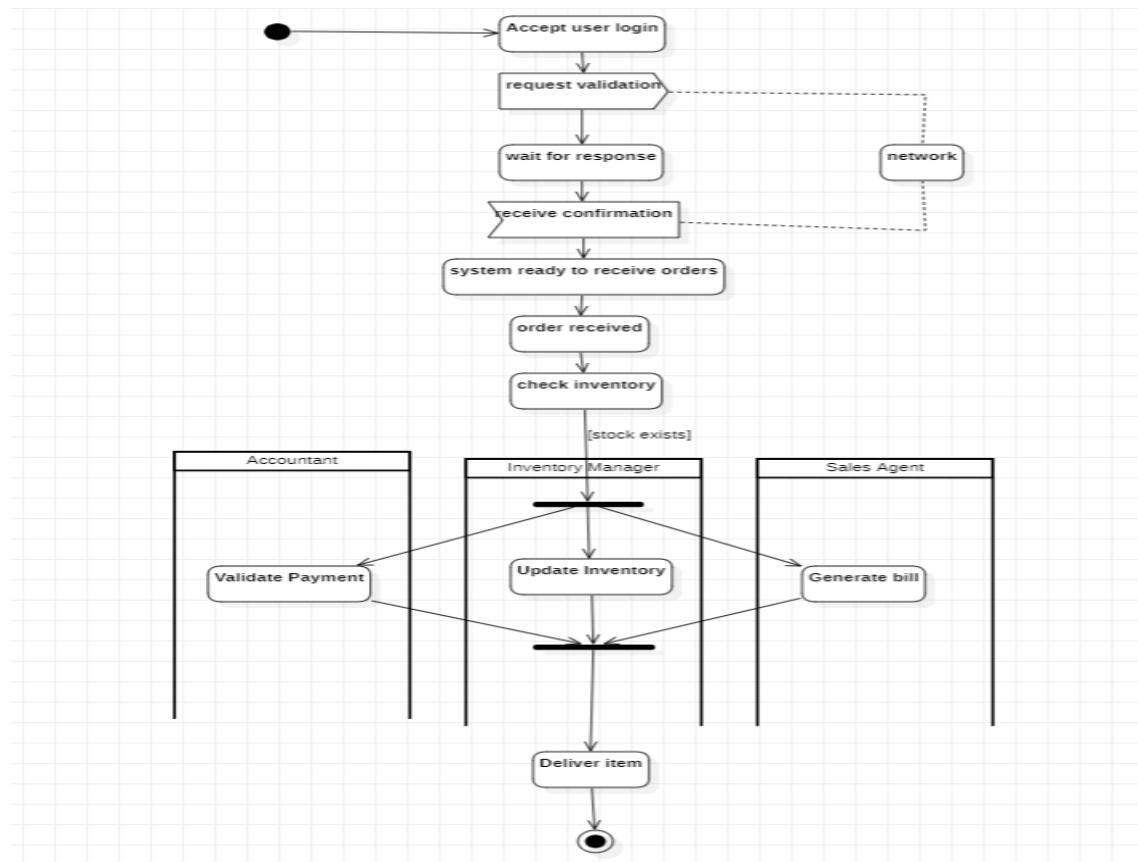


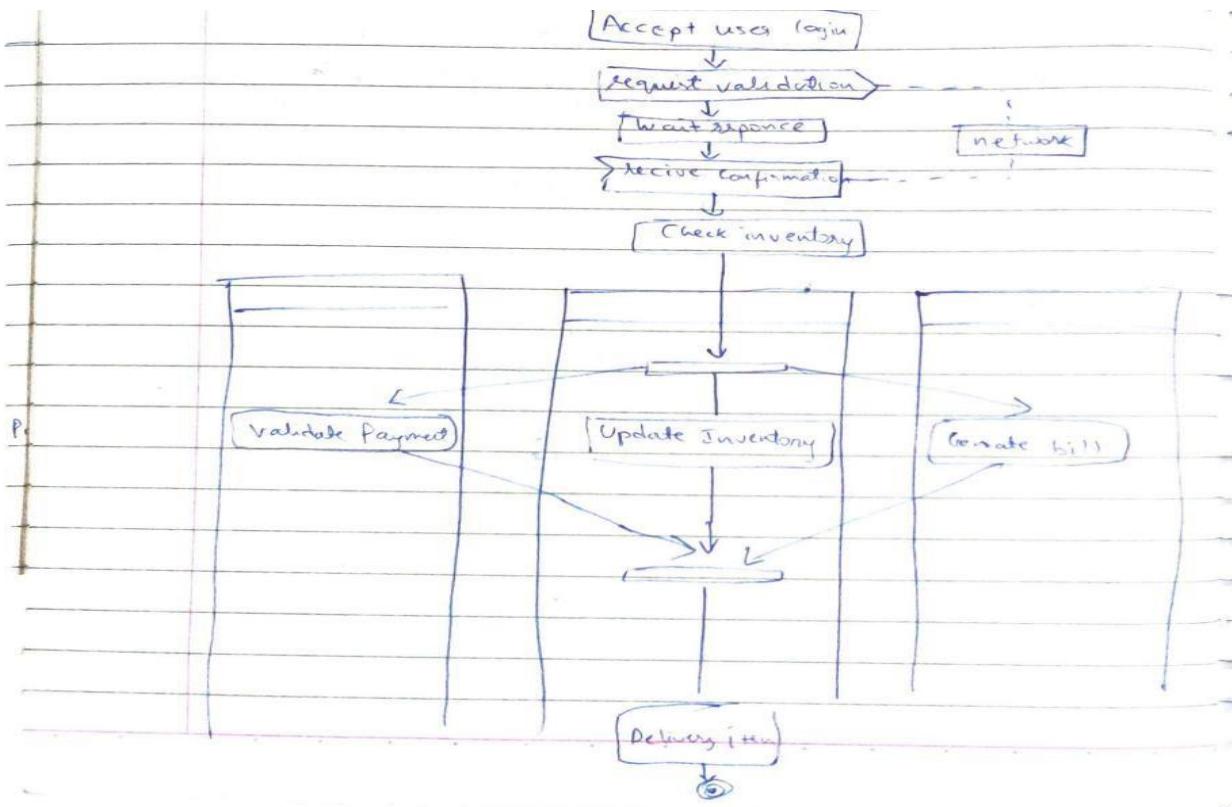


Advance activity diagram:

The advanced activity diagram starts from initiation and then user login activity where a signal is sent to the network for request validation and upon confirmation the control flows to order received and then check inventory activity. There are three swim-lanes namely inventory manager, accountant and sale agent where update inventory, update payment and generate bill respectively.

Then the control flows to the home page and then termination activities.





4. Coffee Vending Machine

Problem statement:

Design UML diagrams for Coffee Vending Machine with system requirements specification.

Software Requirements Specification (SRS):

The Objective of the system is to prepare a coffee vending machine for commercial purposes. The system will be able to prepare coffee by processing all its required ingredients. Users will be provided with sophisticated and easy to use user interfaces.

There are many different types of coffee makers using a number of different brewing principles, in the most common devices, coffee grounds are placed in a paper or metal filter inside a funnel, which is set over a glass or ceramic coffee pot, a cooking pot in the kettle family. Cold water is poured into a separate chamber, which is then heated up to the boiling point, and directed into the funnel.

- Cash Box:Knows amount of money put in; Give change; Knows price of coffee; Turns front panel on and off.
- Front panel:Captures selection; Knows what to mix in each; Instructs mixer when to mix.
- Mixer:Knows how to talk to the dispensers.
- Dispenser [cup-, coffee powder-, sugar-, creamer-, water-]:Knows how to dispense a fixed amount, knows when it is empty.

Features:

- Small carbon footprint
- Energy saving advanced power management system
- Comprehensive drink range
- Simple user interface
- One touch servicing Working:

Coffee vending machines are quite simple and basic. The way they work is not too different to how a tabletop coffee machine or even a drip coffee machine operates. If you think about it, making coffee is simply adding together coffee beans or grounds to hot water and mixing with milk and sugar, that's exactly what a hot drink vending machine does.

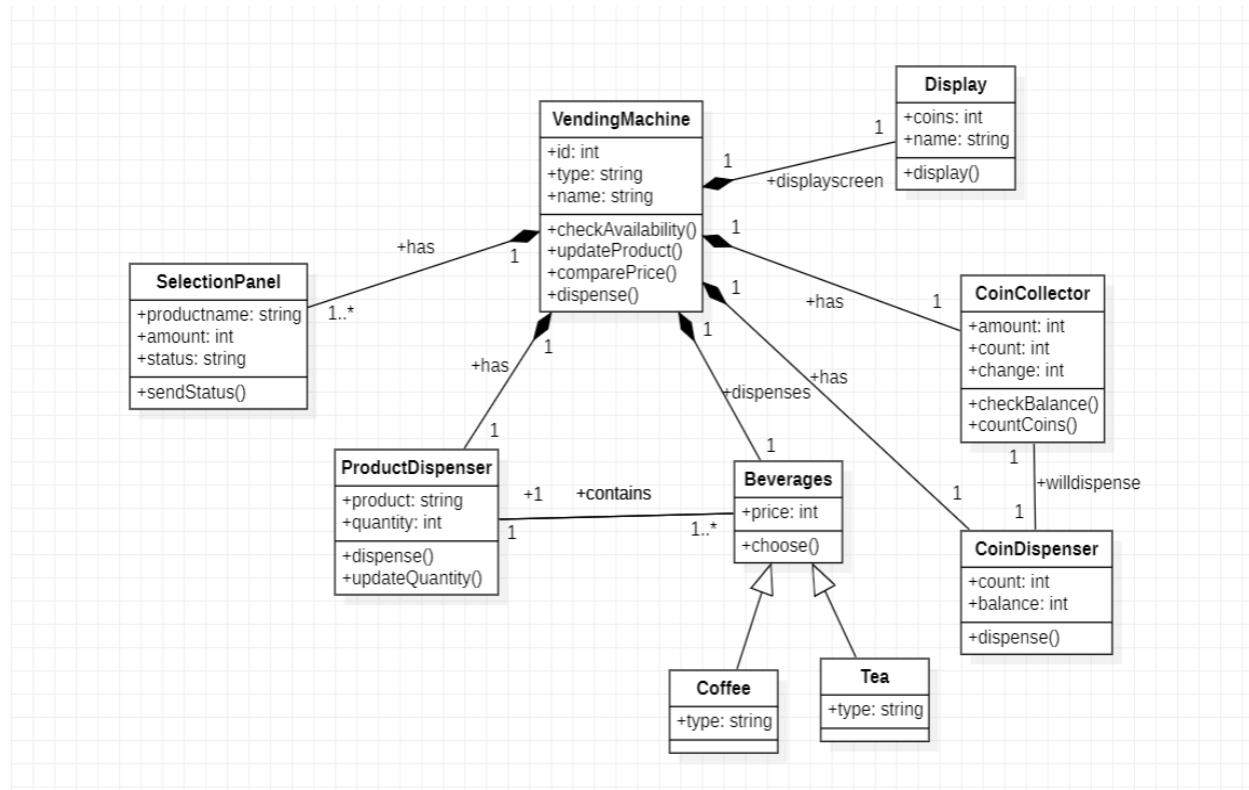
Functions:

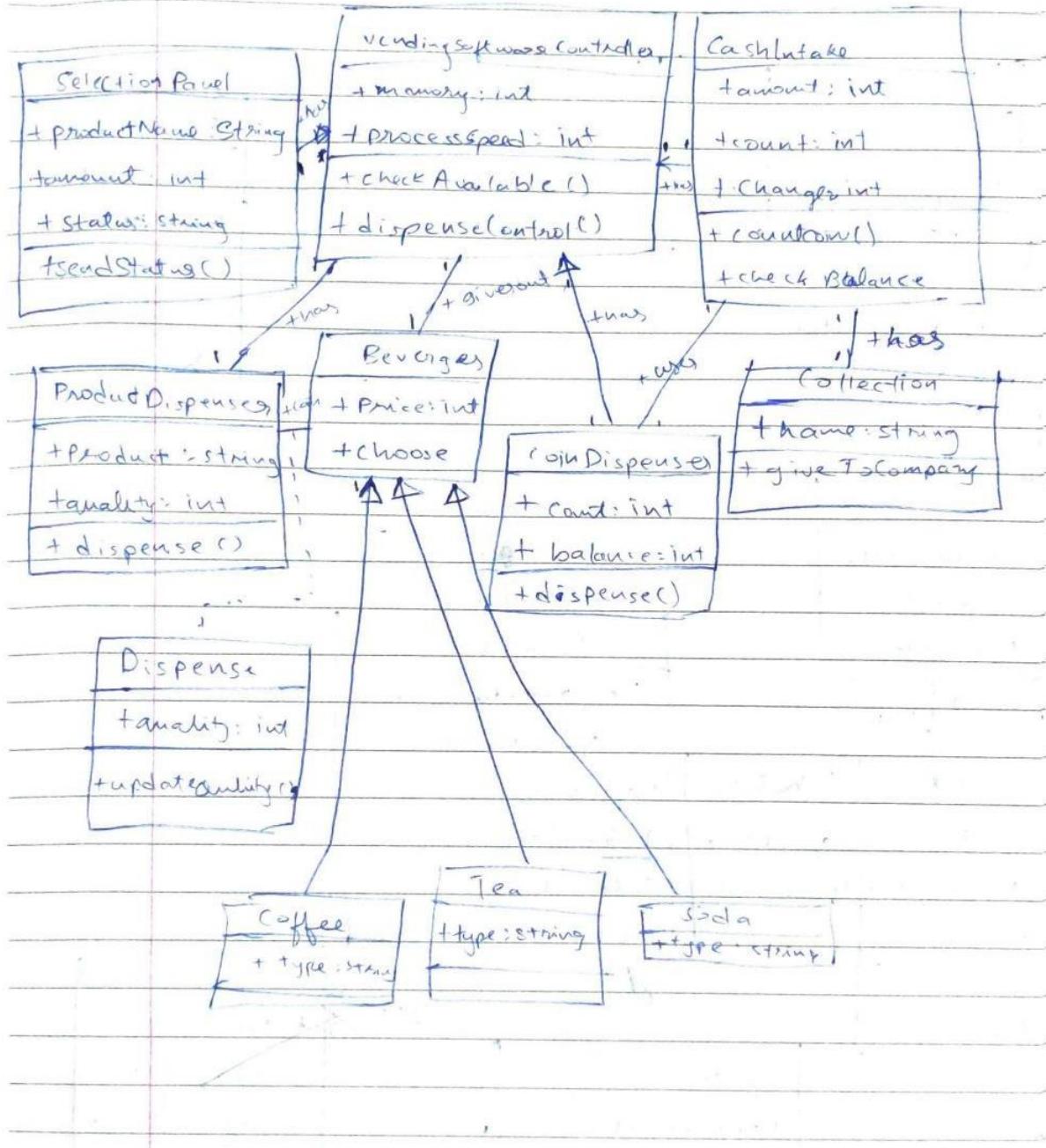
- Add heat:to heat the coffee we have 3 options. We could use a heating element where the water gravity fed into a tubular heating element, external to the water reservoir, and boiled out. Secondly, we could use a submersible heating element placed inside of the water reservoir to heat all of the water at once. Thirdly, we could use an external hot plate to heat one or multiple walls of the water reservoir and thus heat the water through surface convection.
- Direct Water:The fluids could be directed from the water reservoir to their final destination via tubing, gravity reed, and pump.

- Contain Water/Coffee: To contain the water and coffee we could use one reservoir, two reservoirs or a funnel. If one reservoir was used for both the water and coffee container, our design would be a percolating or French press coffeemaker.
- Reduce Noise: To reduce the overall noise we consider two options: noise dampening material and internal brew mechanism. To lessen the noise produced by our designs we could fill or cover the outer shell of a noise dampening material. We could also keep the brew mechanism, whether it is drip spout.

Maintenance: When it comes to the ways in which coffee vending machines work, it's not all about the coffee, it's also about the upkeep and maintenance of the machine. With regular visits, suppliers should empty the cash drawer, reconcile the proceeds against sales, empty the waste grounds, refill ingredients and cups, and generally undertake any work to both the interior and exterior to keep everything running smoothly, such as ensuring there's no build up of dirt around the exterior buttons that could cause them to stick, and making sure nothing is blocking the internal sensors that could prevent some ingredients from being added to the mixing chamber.

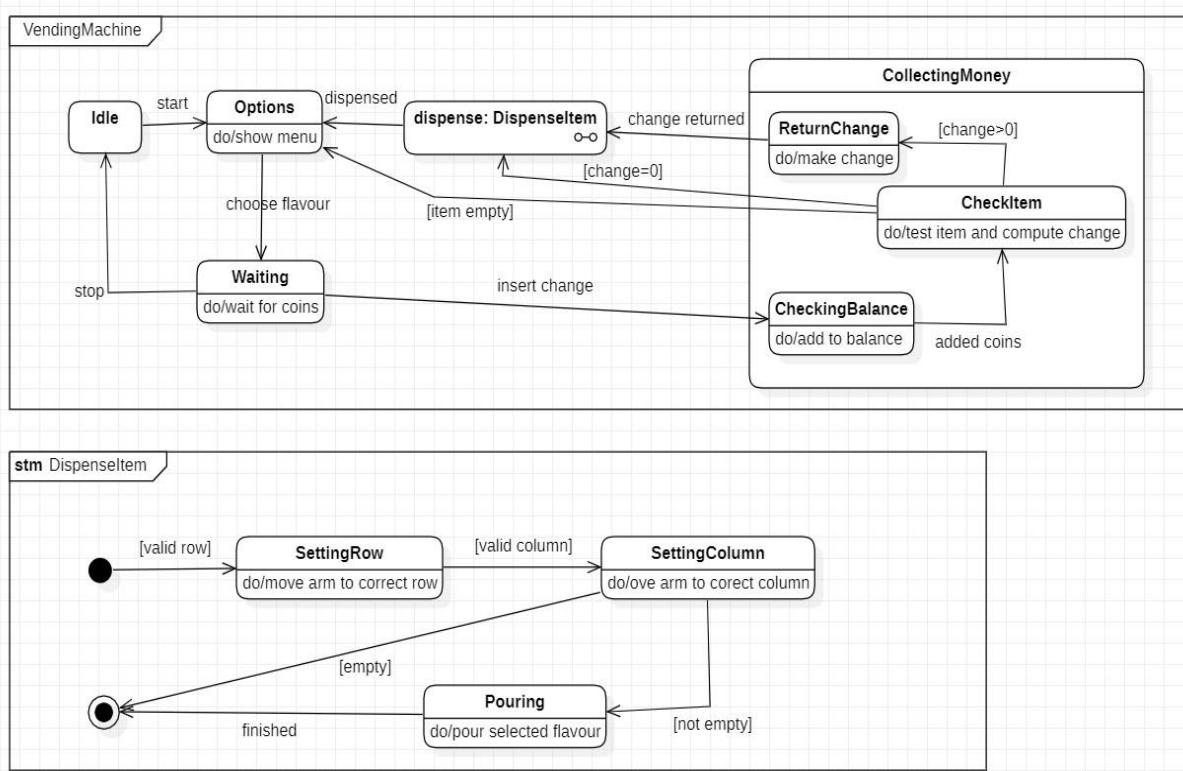
Advanced Class Diagram:

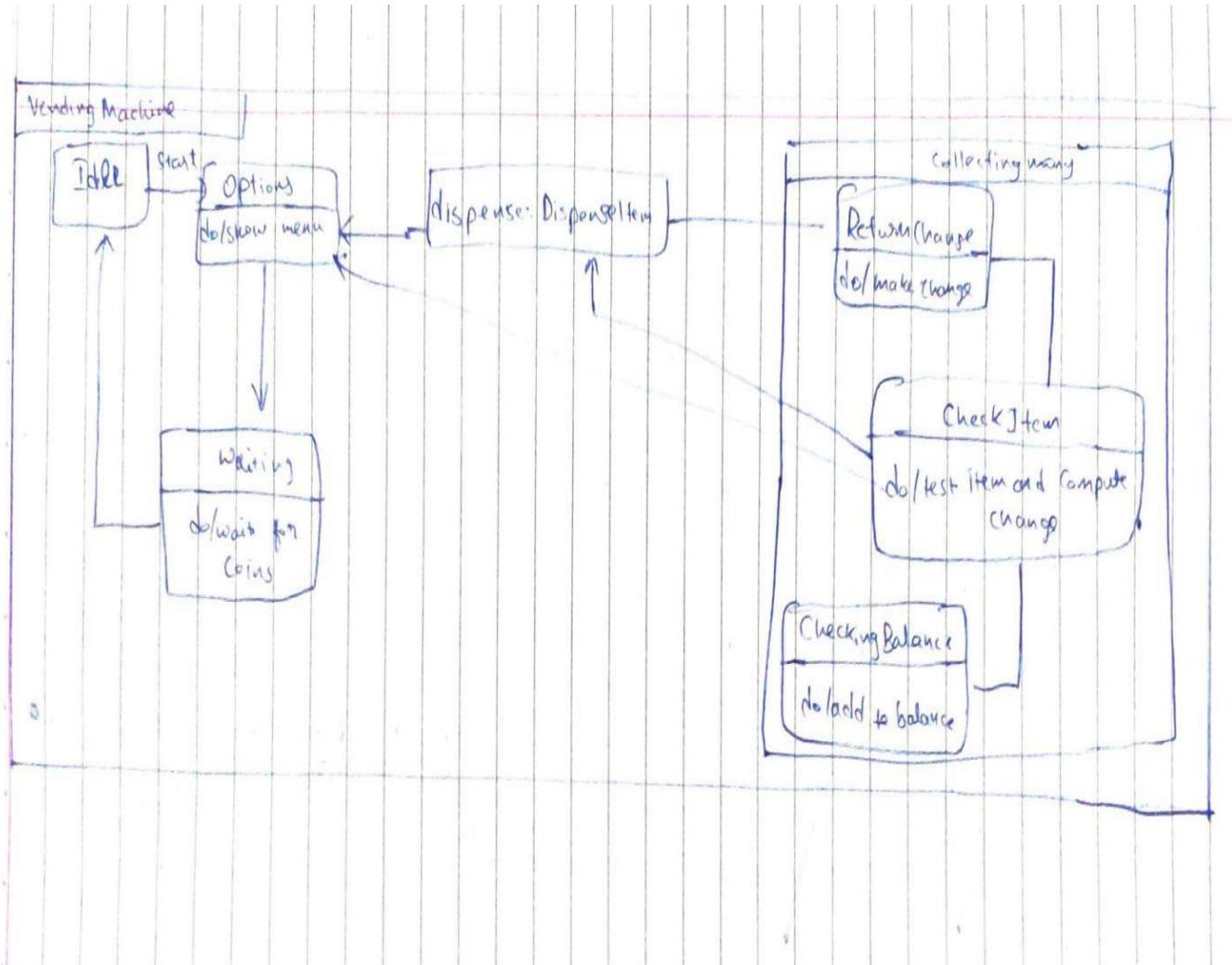




Advance state diagram:

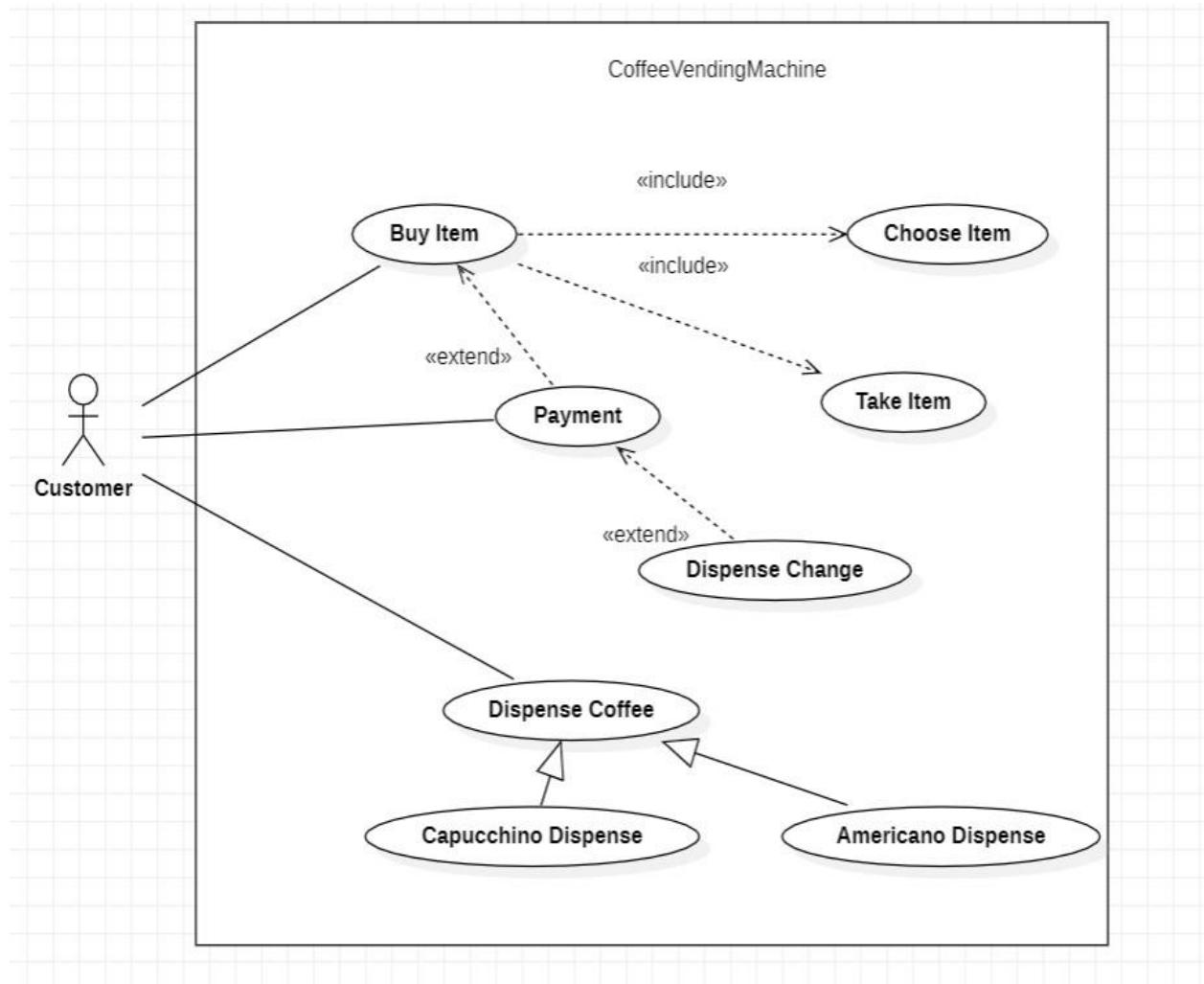
The advanced state diagram depicted below contains one nested state and one submachine, which on successful login shows the Collecting Money procedure and Dispense Item procedure. It contains initial state and termination state with Collecting Money as a nested state including the required simple states. It also has a submachine state named Dispense Item with initial, termination state along with simple states; Setting Row, Setting Column, Pouring.

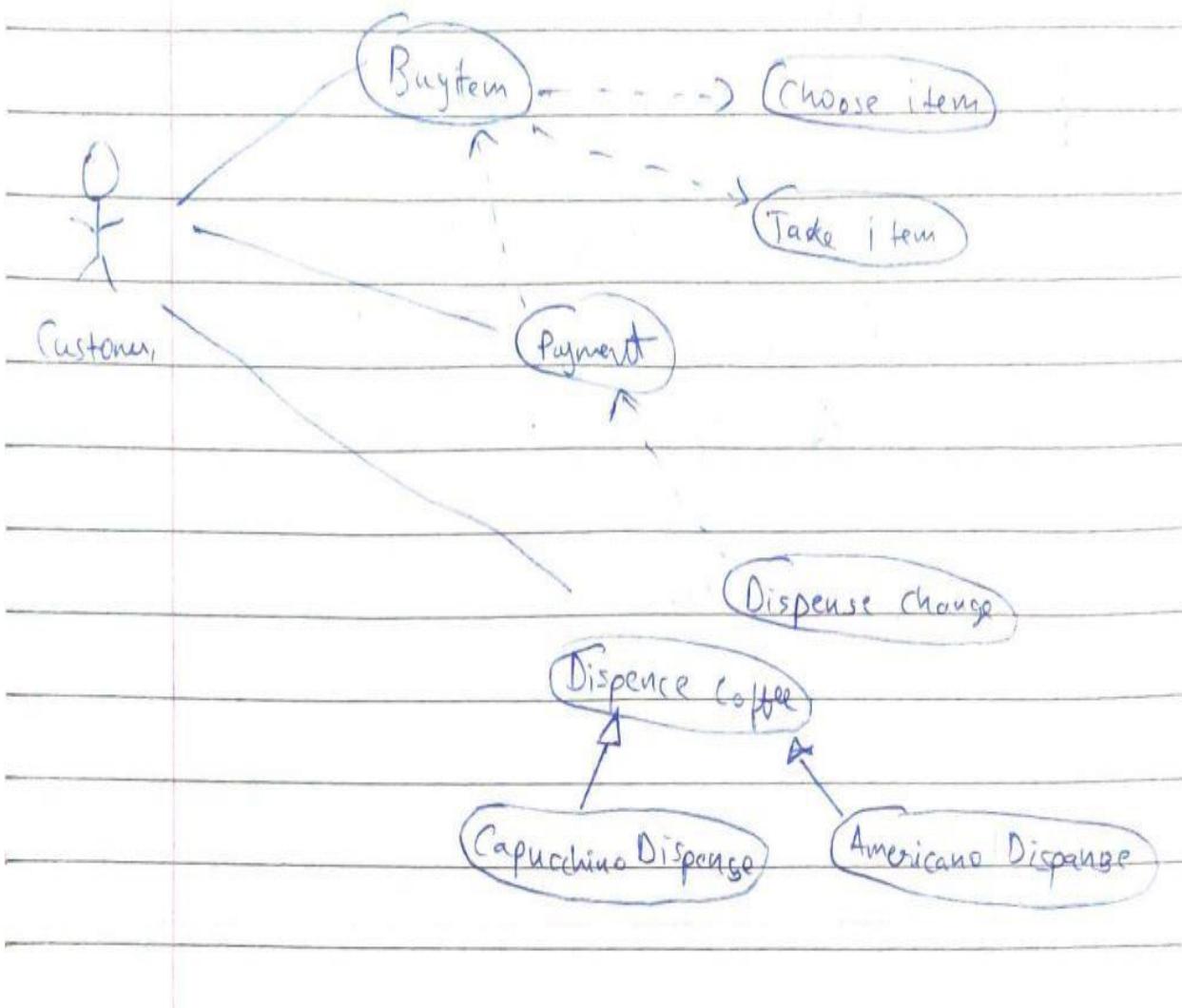




Advance use case diagram:

The advanced use case diagram has extra functionalities which includes extends, includes and generalization. The dispense change use case extends payment use case, payment use case extends buy item use case, buy item use case includes choose item and take item use case. Capuccino dispense and Americano dispense is generalized to super class dispense coffee.





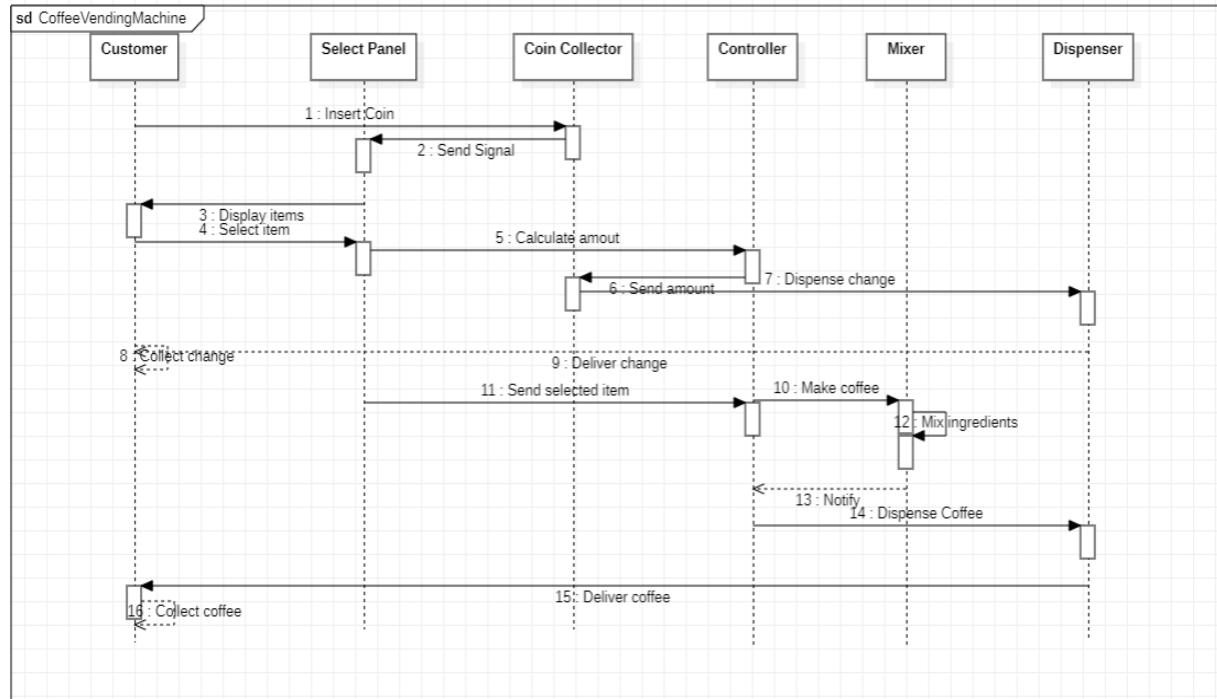
Advance sequence diagram:

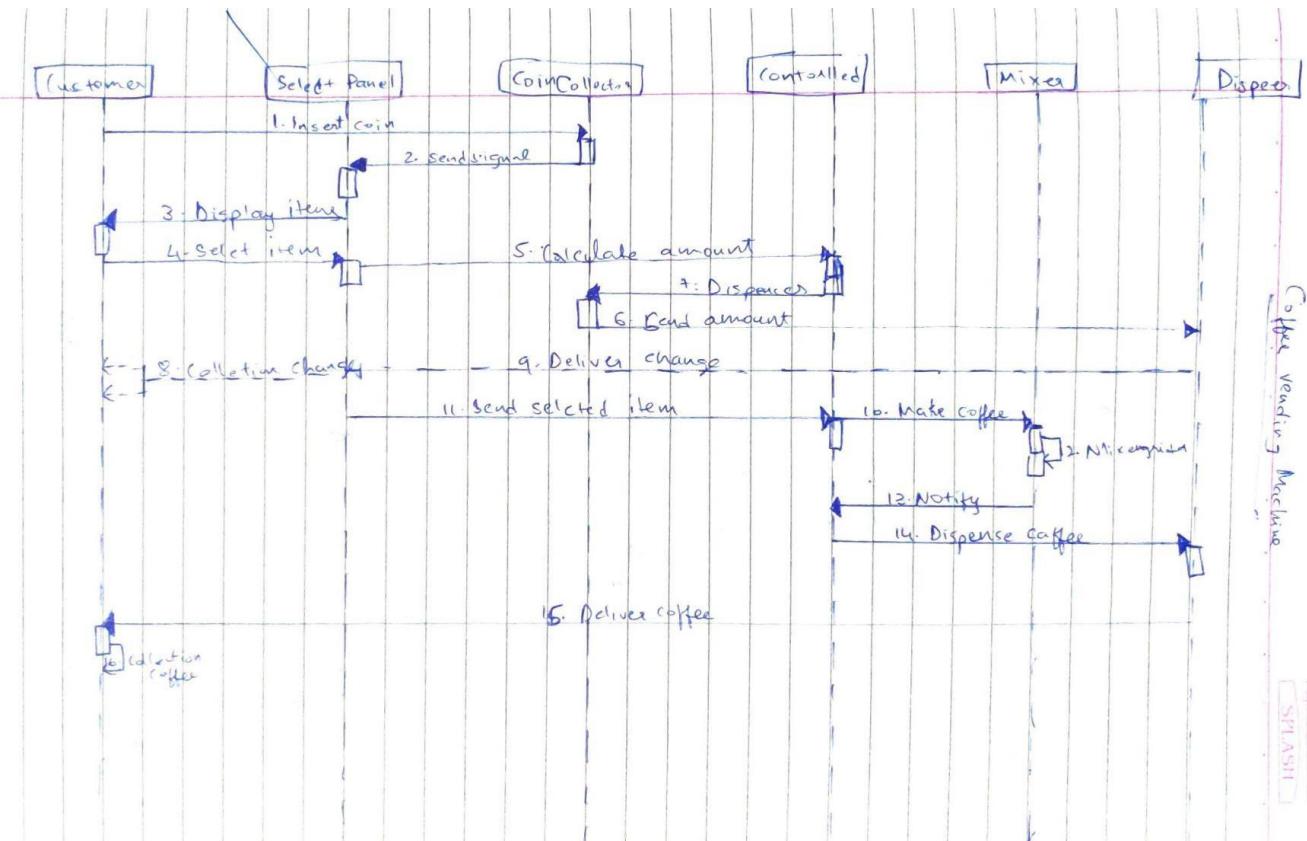
The lifeline is the dotted line and the rectangles represent the period of time the object is executing and is hence called activation.

The recursive function of customize is shown by double activation rectangle of customize and verifycoins.

The passive object Printer is created when the customer asks for printing and is destroyed (turned off) after sending the receipt.

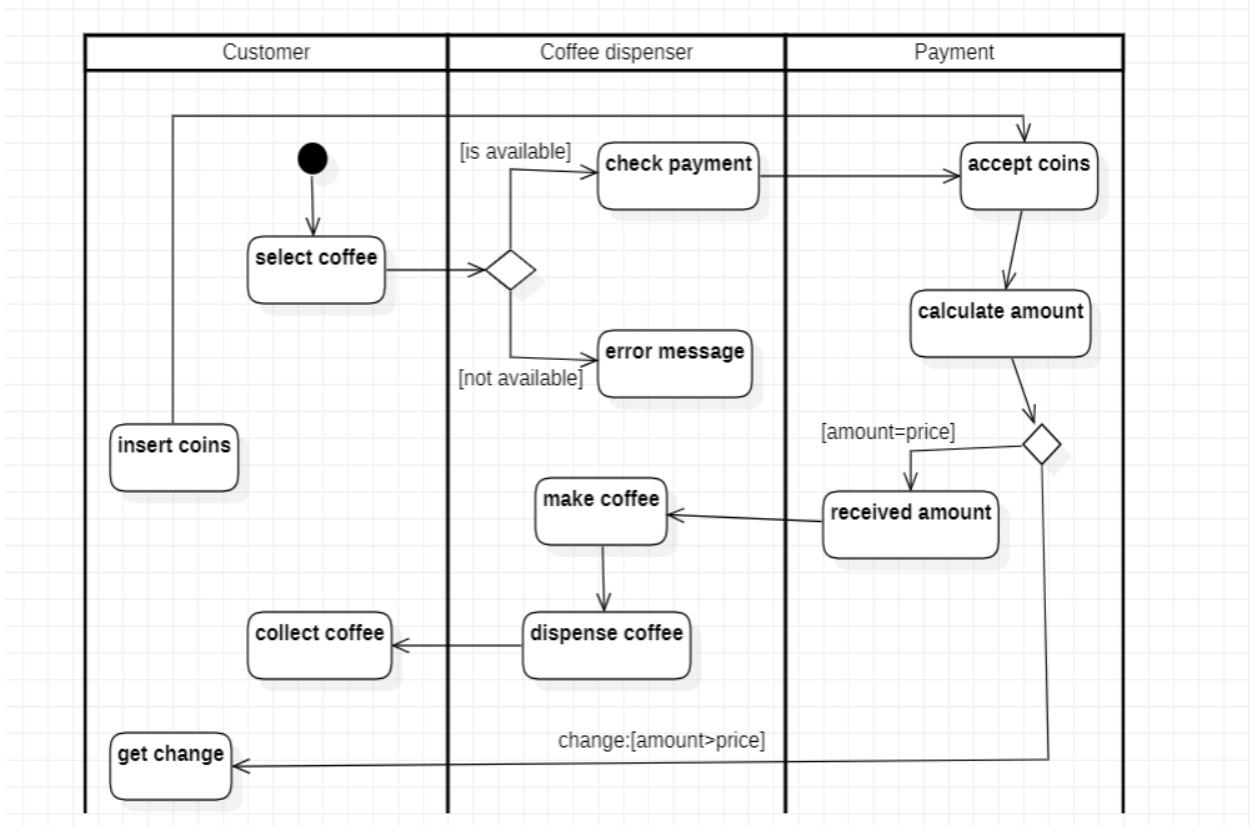
A time constraint of 1 to 10 seconds is given for depositing coins by the customer in the vending machine.

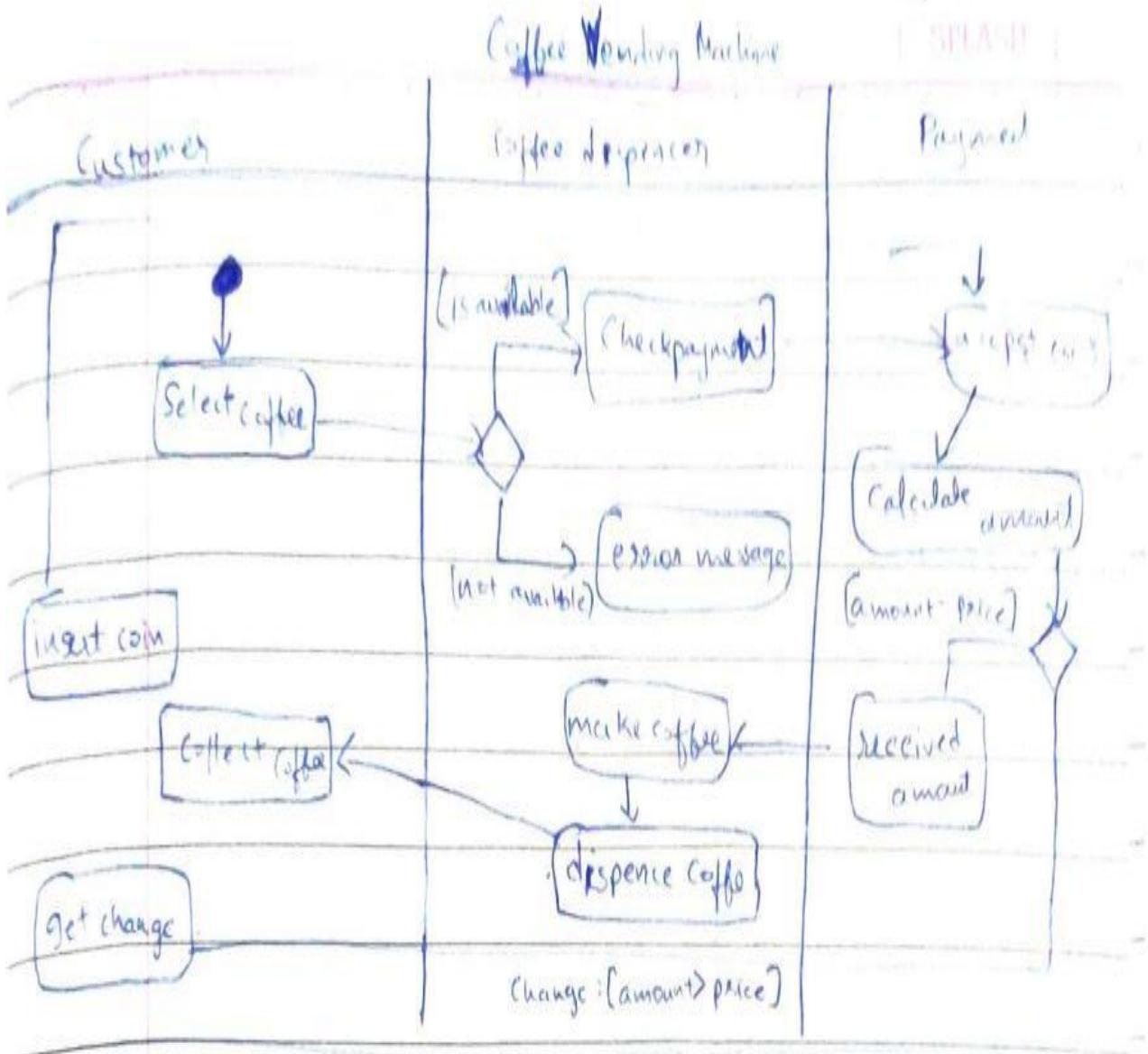




Advance activity diagram:

The advanced activity diagram starts from initiation and in the customer swim-lane, customer login activity where a signal is sent to the network for request validation and upon confirmation the control flows to order received and then check inventory activity. There are three swim-lanes namely customer, coffee dispenser and payment where customer perform operations like order coffee, dispenses coffee and collect coins respectively. Then the control flows to the home page and then termination activities.





5. Online Shopping System

Problem statement:

Design UML diagrams for Online Shopping System with system requirements specification.

Software Requirements Specification (SRS):

The online shopping system allows the users and vendors to exchange products remotely and reduces the amount of cost and time substantially. The software provides the following facilities to the customers:

- Facilitates easy shopping online anywhere with free shipping (conditions apply).
- Provides information about the products in categories
- Can avail the facility of purchasing second hand products
- Can reserve if the particular product is not available
- Customers are provided with up to date information on the products available
- Provides email facility for future correspondence
- Provides backup facility
- Can add nearly ten products to their shopping cart at a time

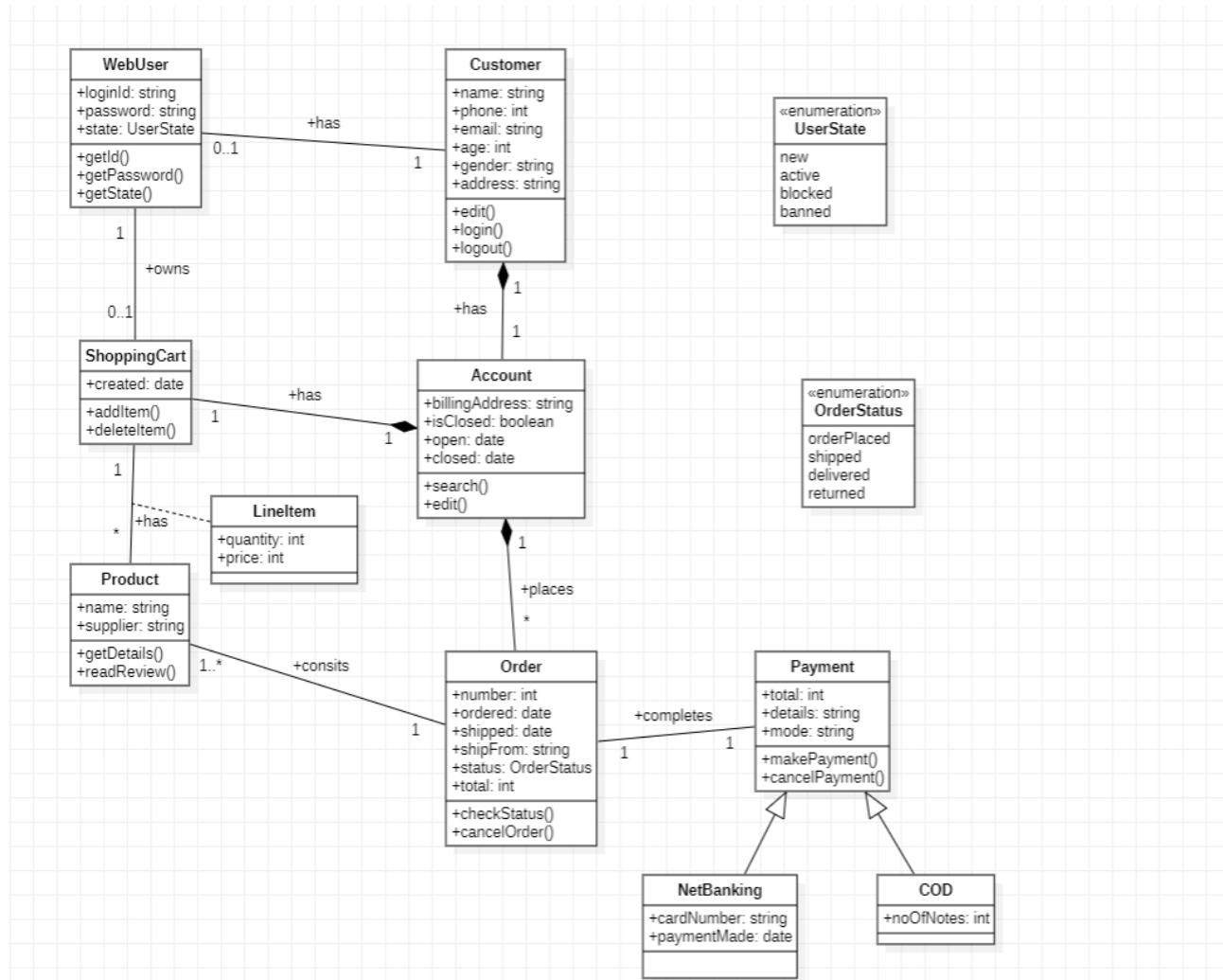
The software will not provide the following facilities to the customers:

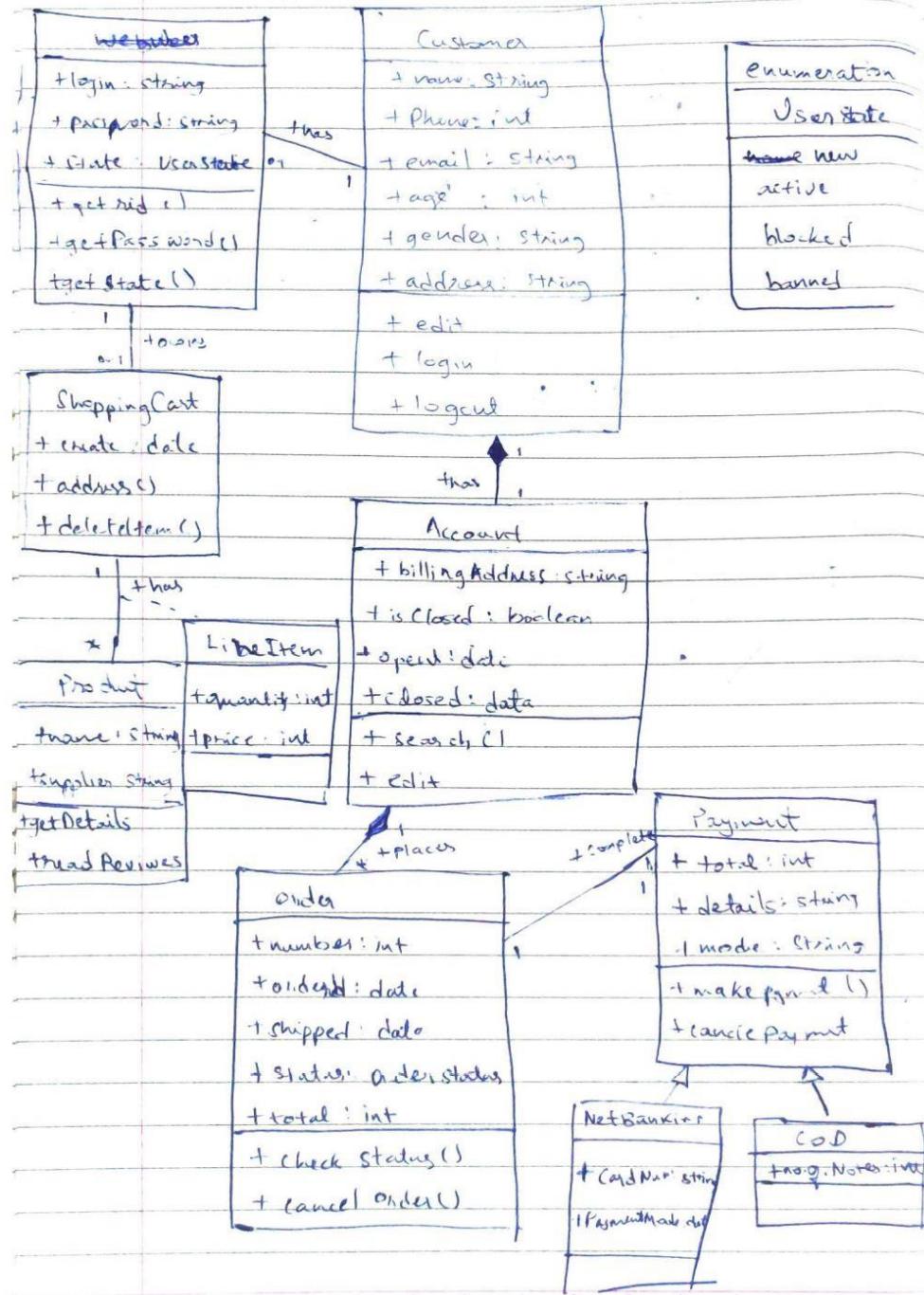
- Cannot reserve the product for more than two days.
- Cannot reserve more than two products
- Responsibility of damages
- The product cannot be changeable once confirmed

The software provides the following facilities to the merchants:

- Facilitates easy bidding facility
- Provides complete information about the customers
- Provides complete information about their products
- Can avail the facility of email correspondence and avail the brand catalog facility

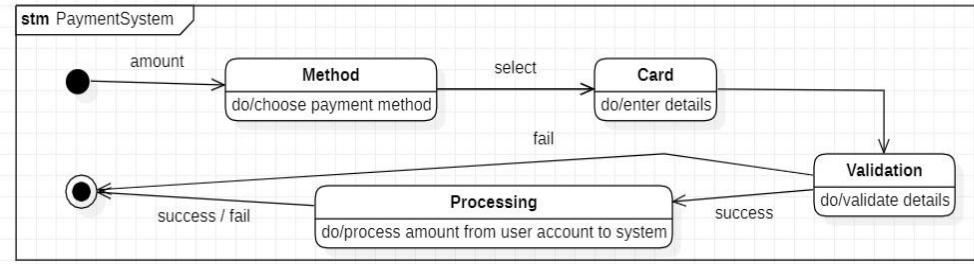
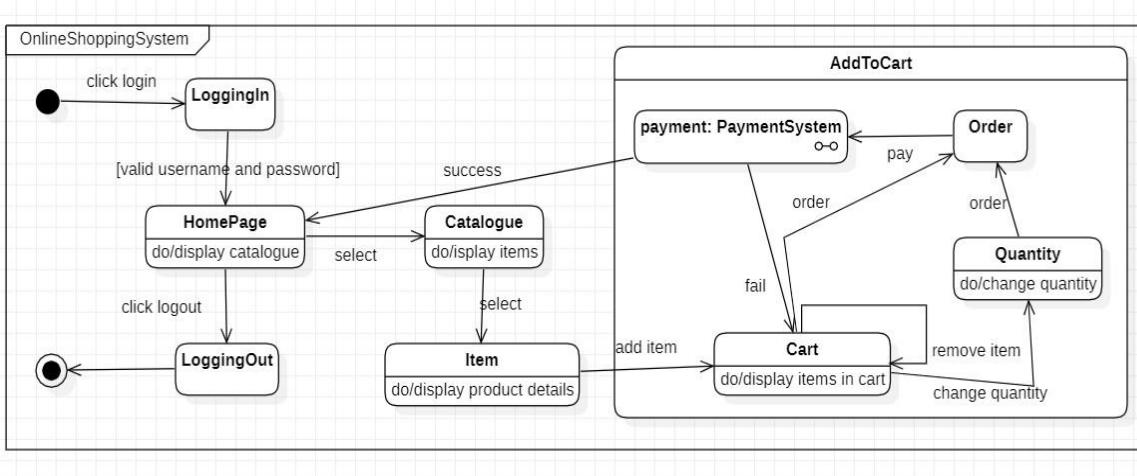
Advanced Class Diagram:

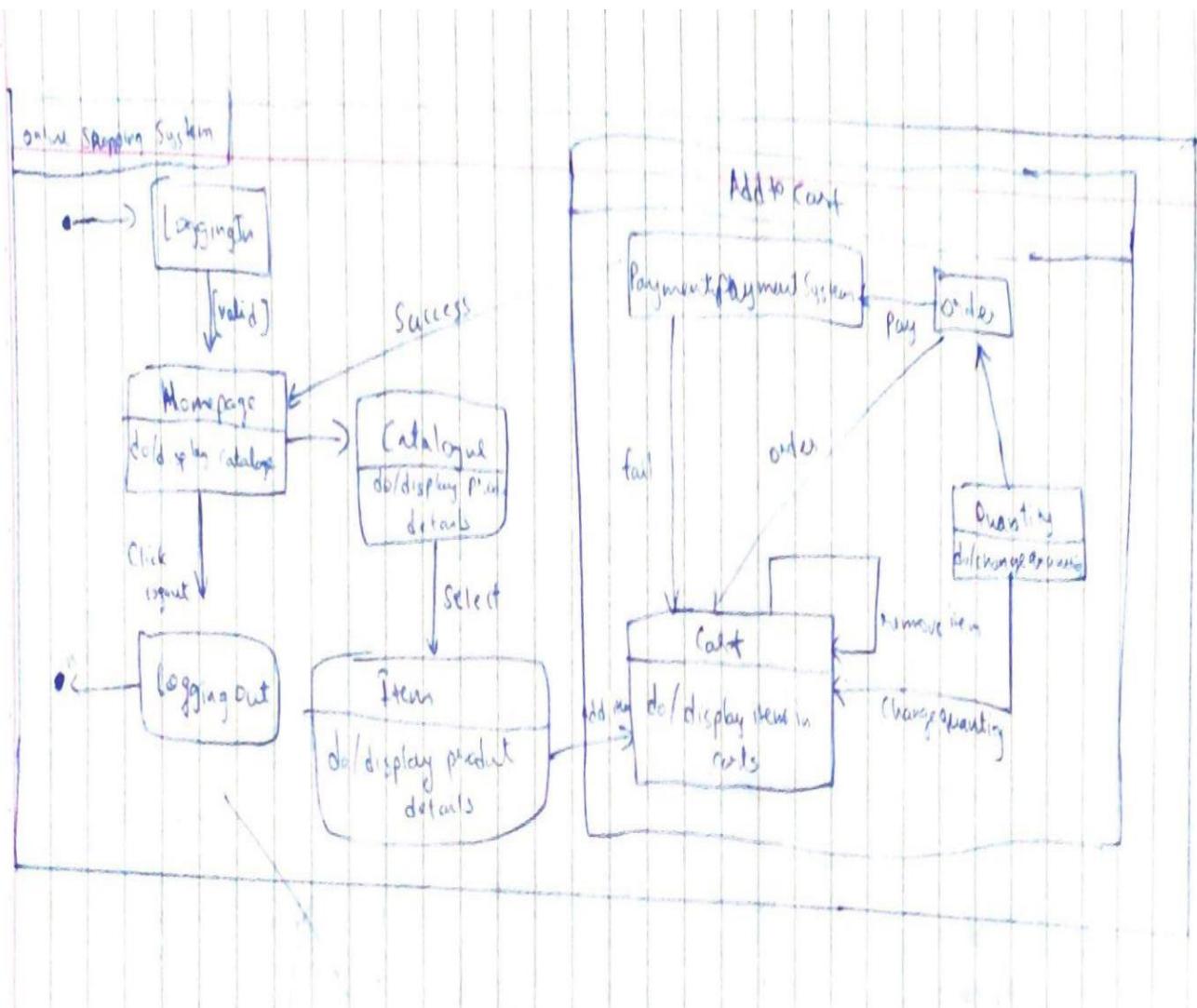




Advance state diagram:

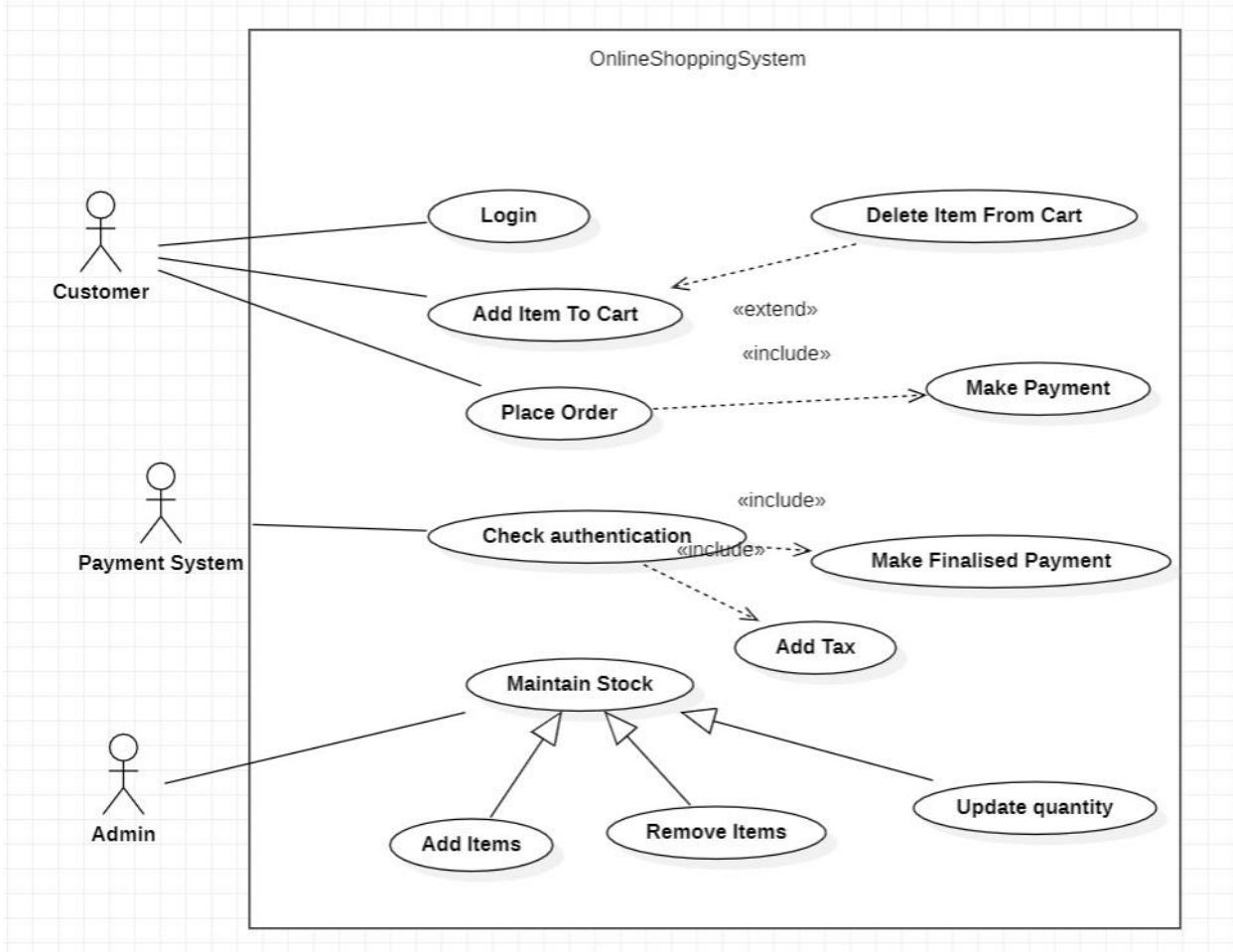
The advanced state diagram depicted below contains one nested state and one submachine, which on successful login shows the Add To Cart procedure and Payment System procedure. It contains initial state and termination state with Add To Cart as a nested state including the required simple states. It also has a submachine state named Payment System with initial, termination state along with simple states; Method, Card, Validation, Processing.



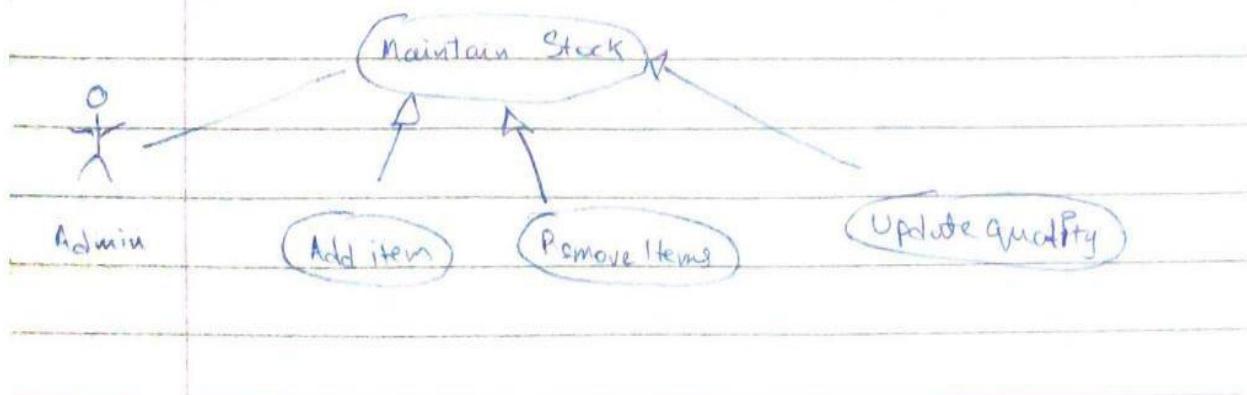
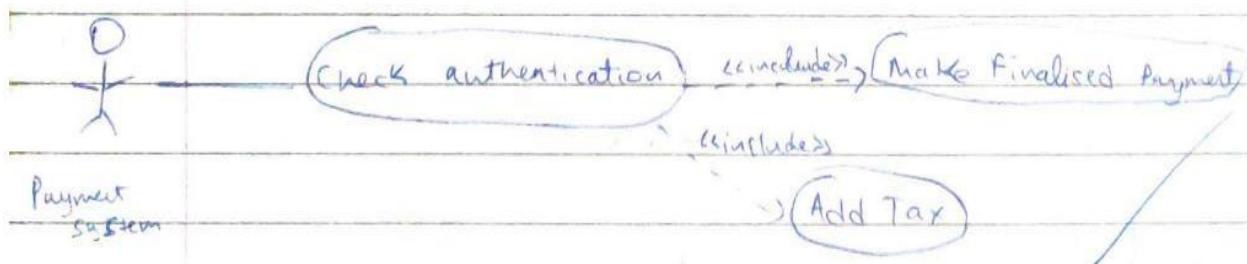
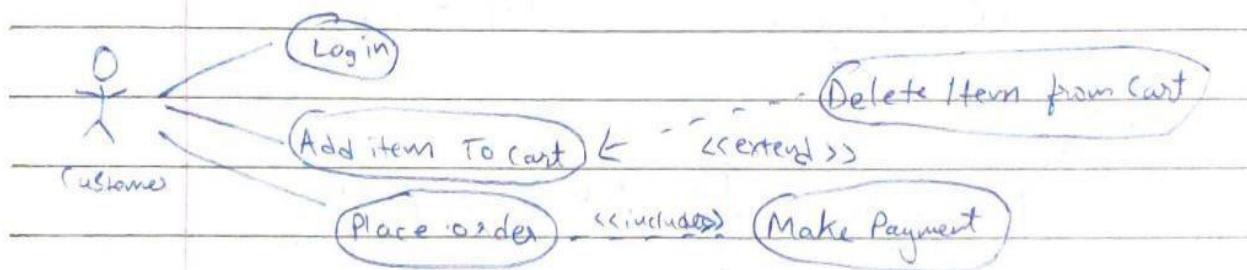


Advance use case diagram:

The advanced use case diagram has extra functionalities which includes extends, includes and generalization. The delete from cart use case extends add item to cart use case, place order use case includes make payment use case, check authentication use case includes make finalized payment.



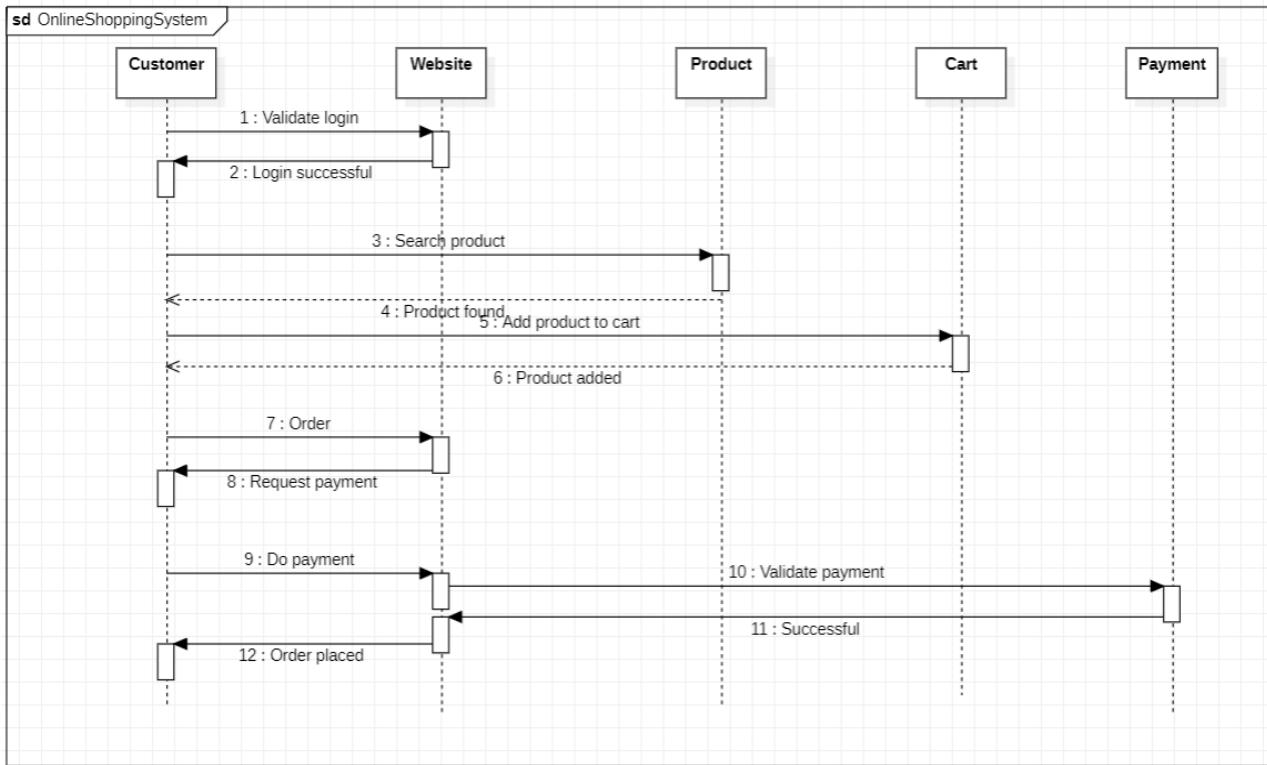
UML Use Case Diagram

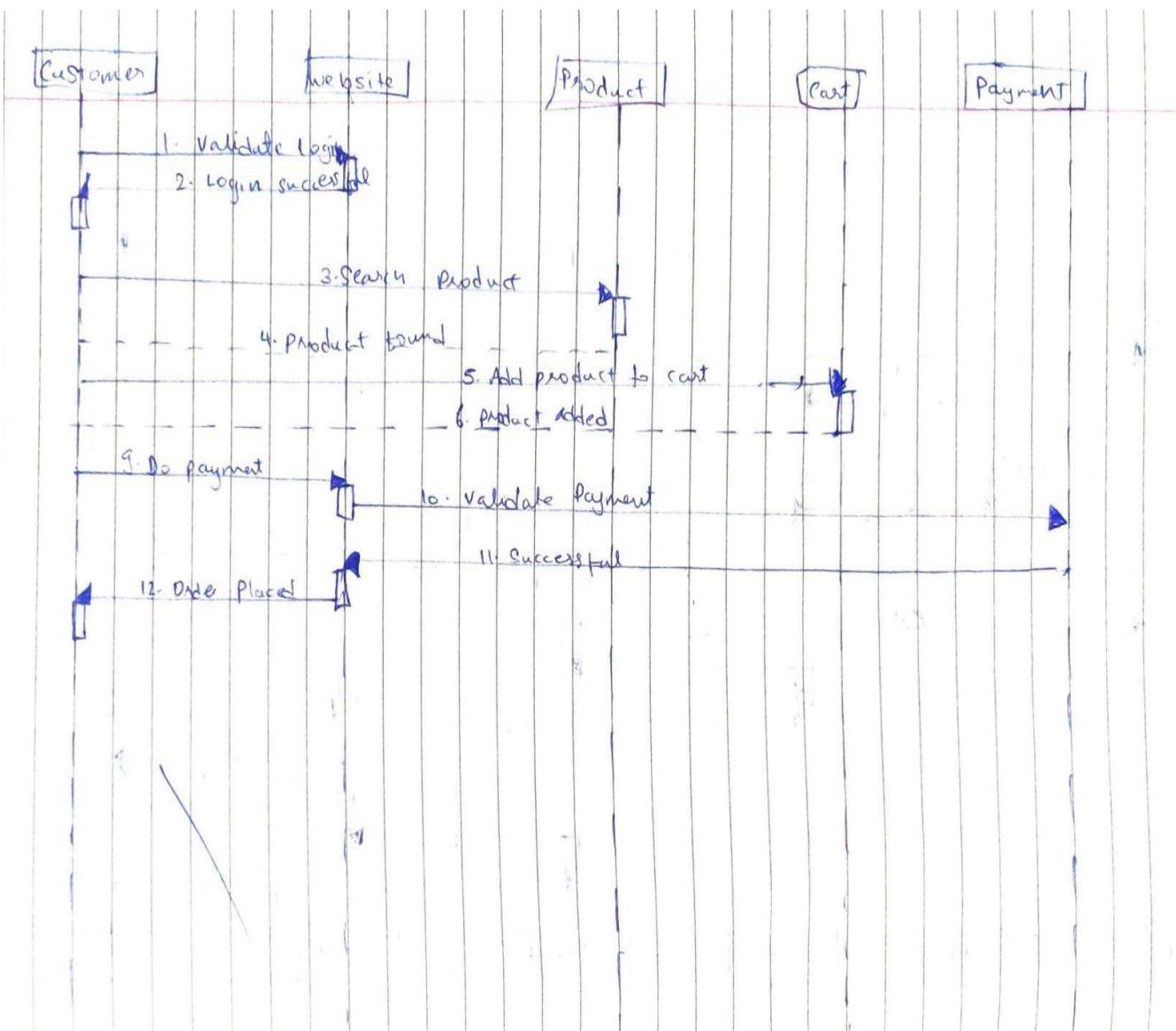


Advance sequence diagram:

The lifeline is the dotted line and the rectangles represent the period of time the object is executing and is hence called activation.

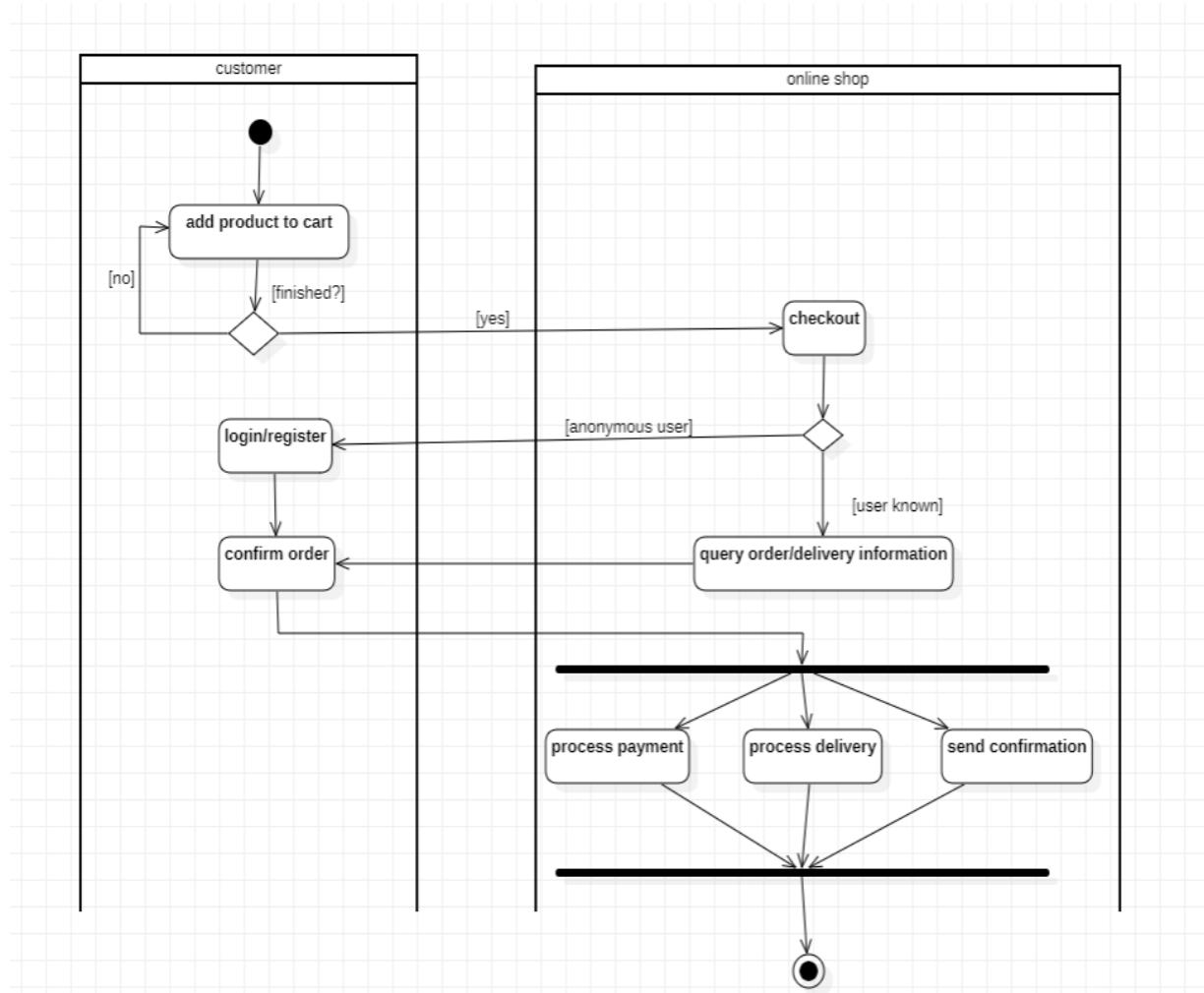
Reply message is used to return back to lifelines with the required message.

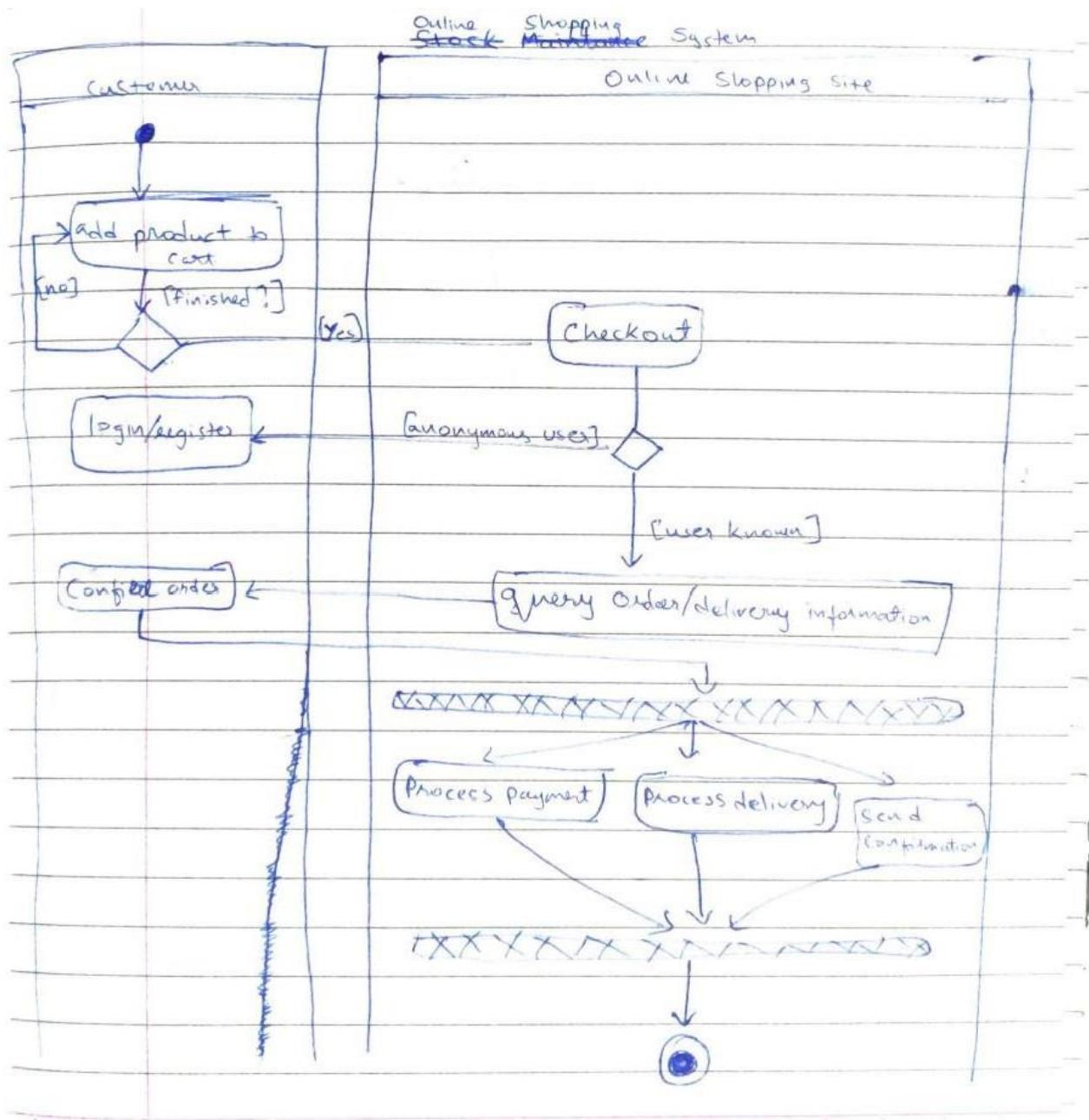




Advanced activity diagram:

The advanced activity diagram starts from initiation and in the customer swim-lane, the customer login activity where a signal is sent to the network for request validation and upon confirmation the control flows to add product and checkout activity. There are two swim-lanes namely customer and online shop where it confirms the order and delivery, payment process respectively. Then the control flows to the home page and then termination activities.





6. Railway reservation system

Problem statement:

Design UML diagrams for Railway Reservation System with system requirements specification.

Software Requirements Specification (SRS):

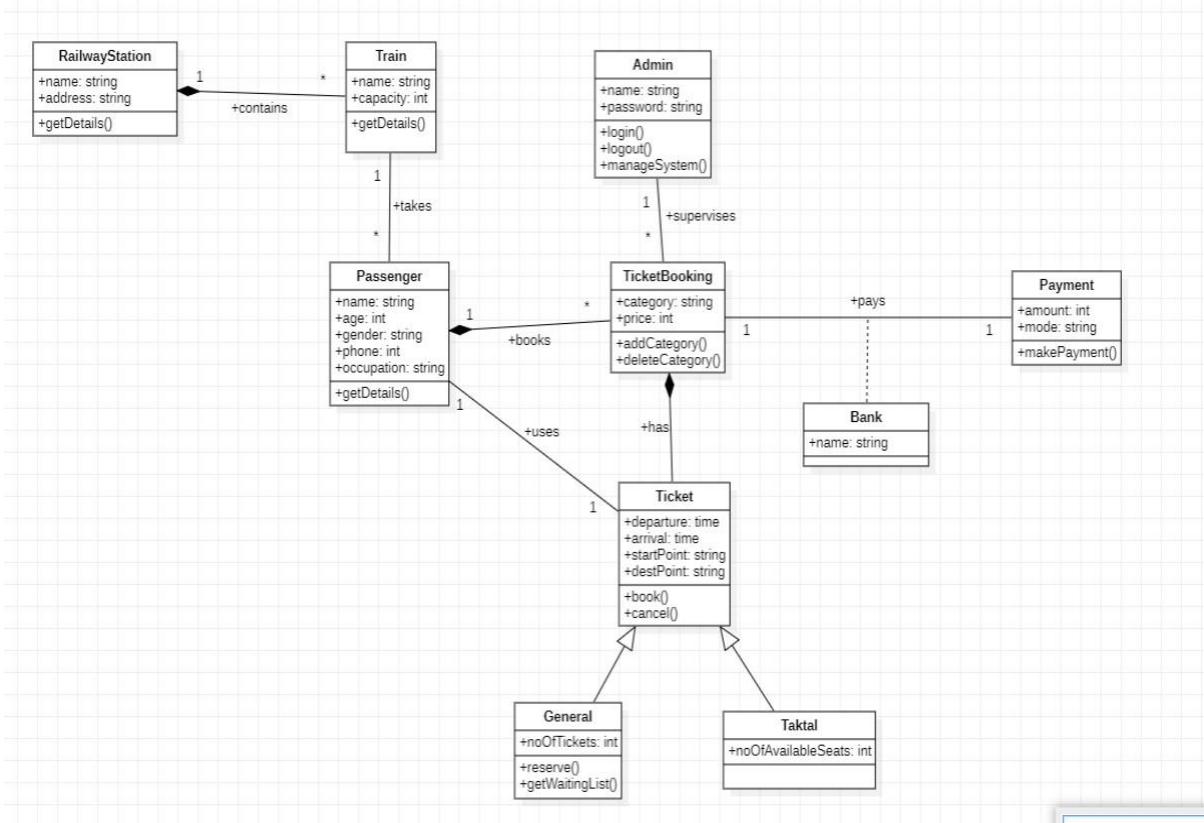
To develop a user-friendly Railway Reservation System to enable passengers to book tickets online and make payment online as well. Railway reservation system project which provides the train timing details, reservation, billing and cancellation on various types of reservation namely,

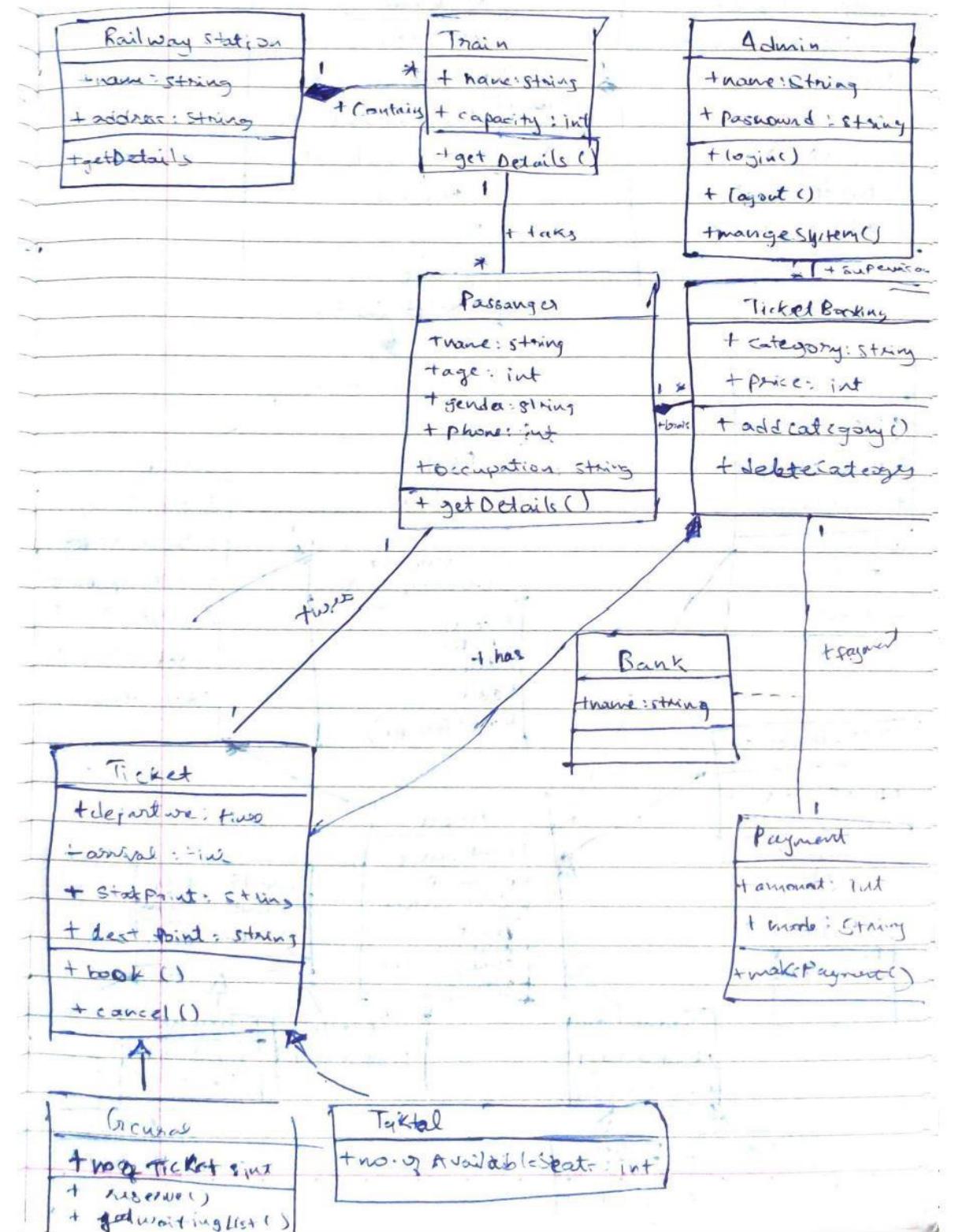
- Confirm Reservation for Seat.
- Reservation against Cancellation.
- Waiting list Reservation.
- Online Reservation.
- Tatkal Reservation

This system enables the Advance booking in any class, against general and ladies quota, on payment of fare in full for adults and children, a maximum of six berths/seats at a time, for journey between any two stations served by a train. It also provides details about

1. Timetable
2. Train Fares
3. Current status of reservation position
4. Train available between a pair of stations
5. Accommodation available for a train/date combination Types of tickets: General and Tatkaal.

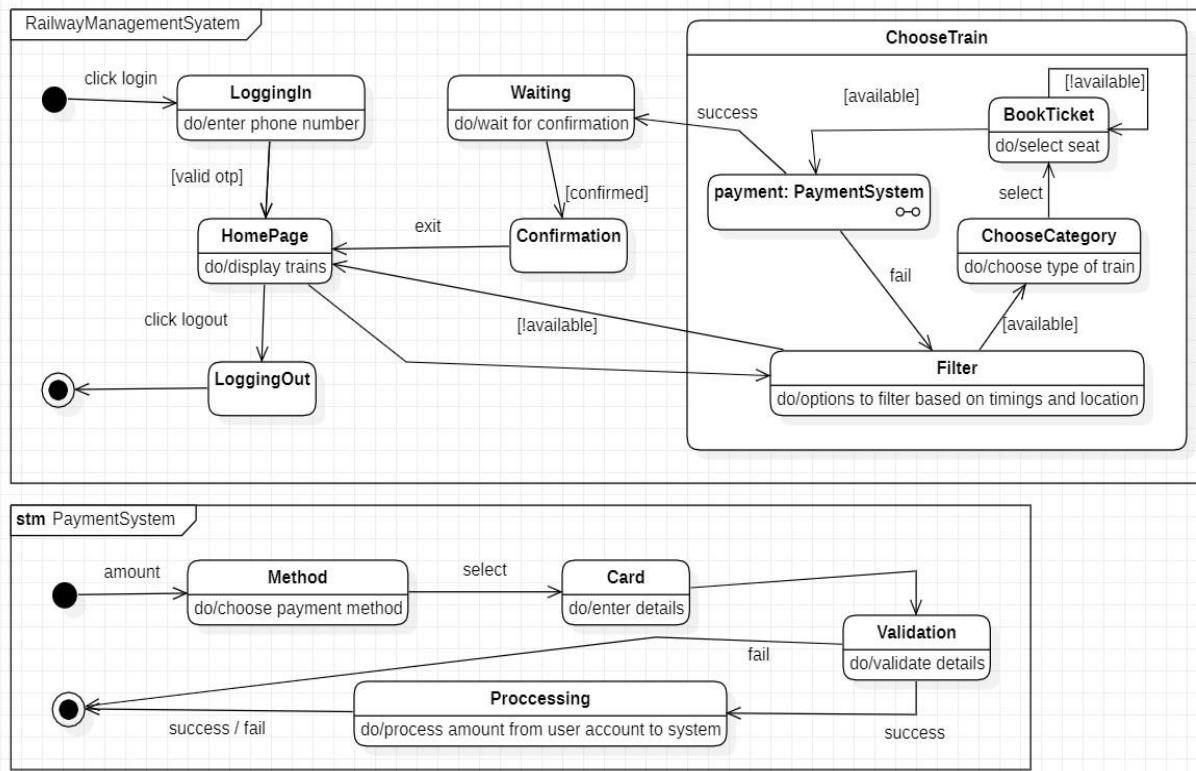
Advanced Class Diagram:

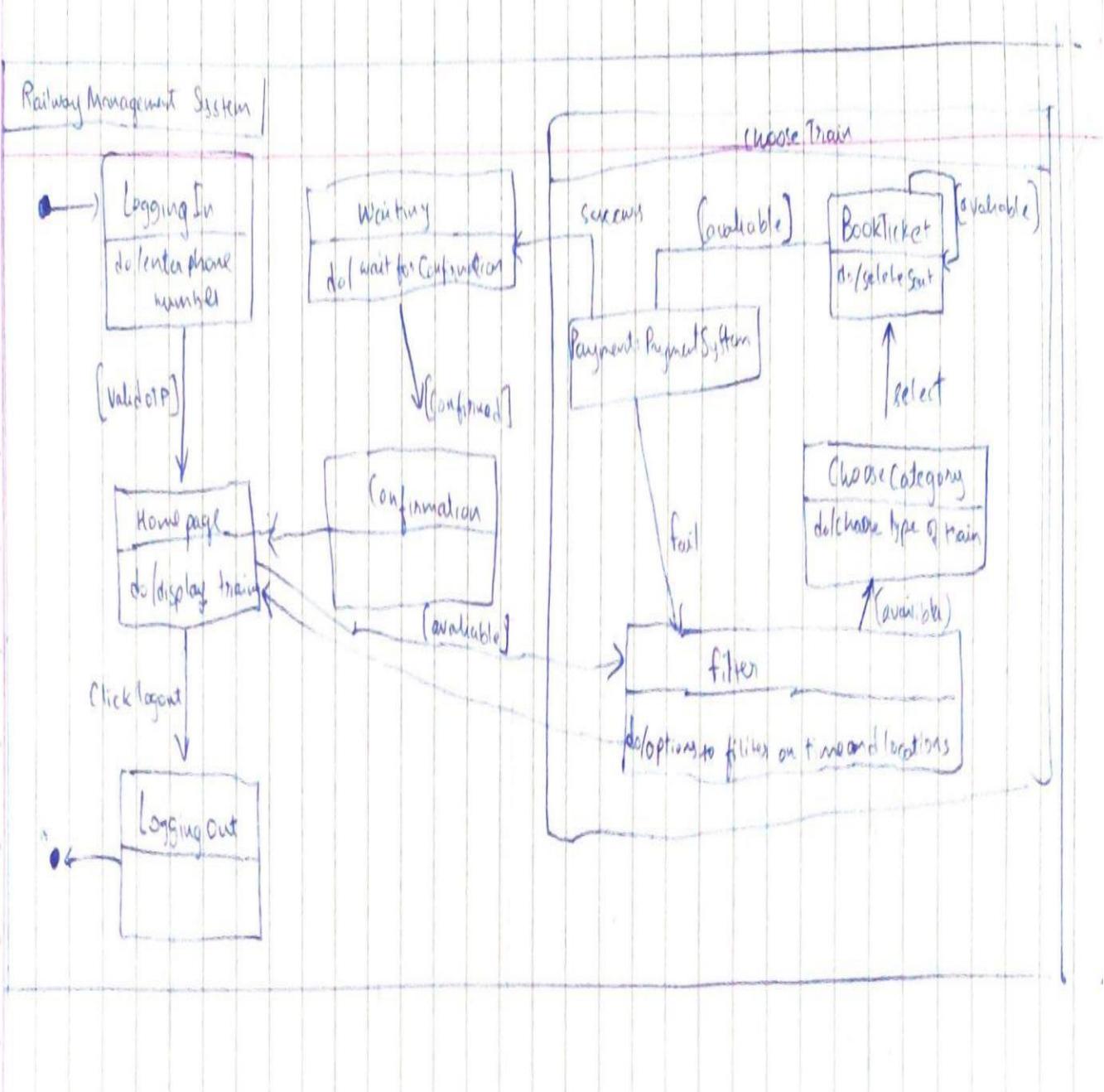




Advance state diagram:

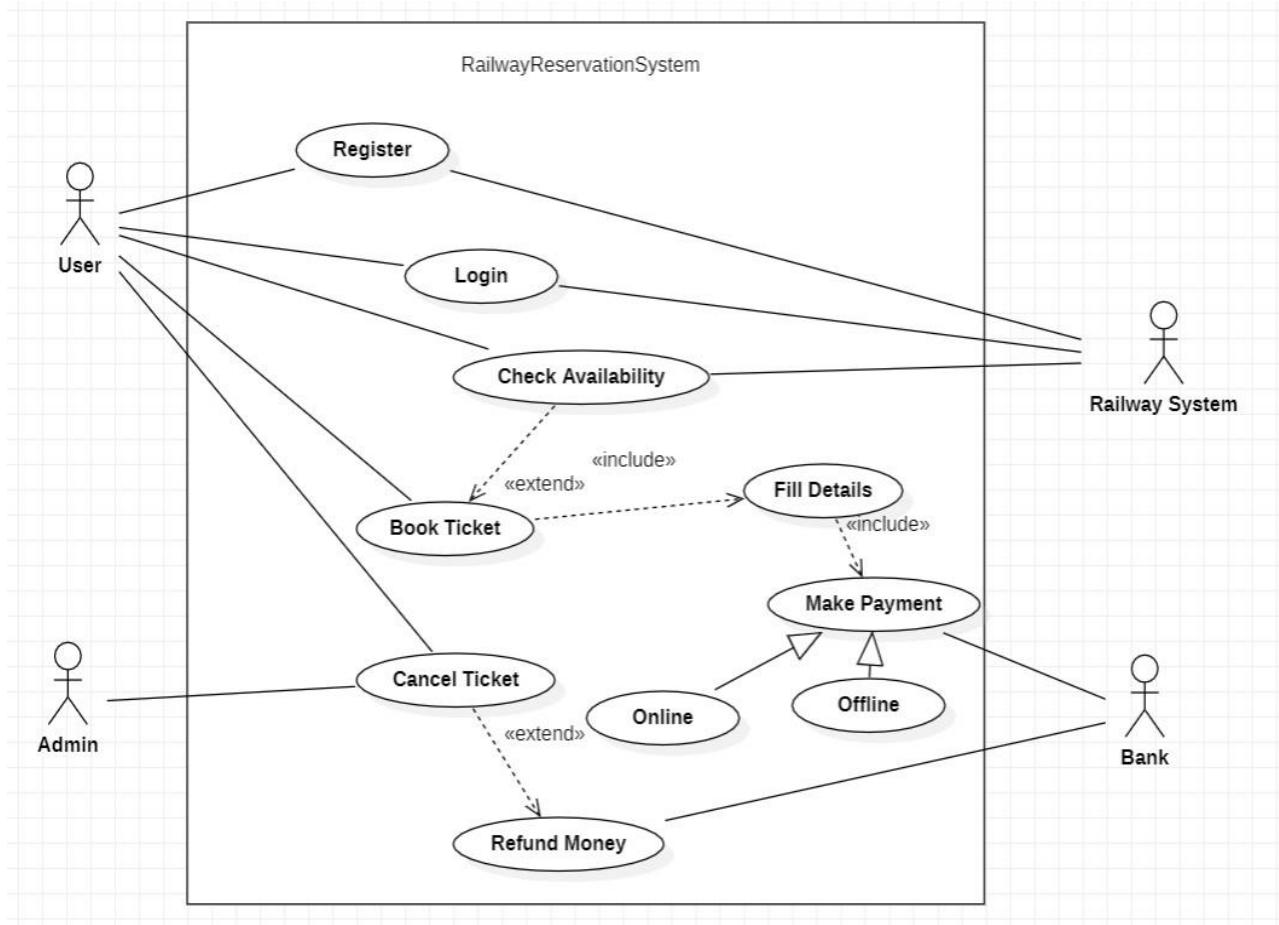
The advanced state diagram depicted below contains one nested state and one submachine, which on successful login shows the Choose Train details and Payment System procedure. It contains initial state and termination state with Choose Train as a nested state including the required simple states. It also has a submachine state named Payment System with initial, termination state along with simple states; Method, Card, Validation, Processing.

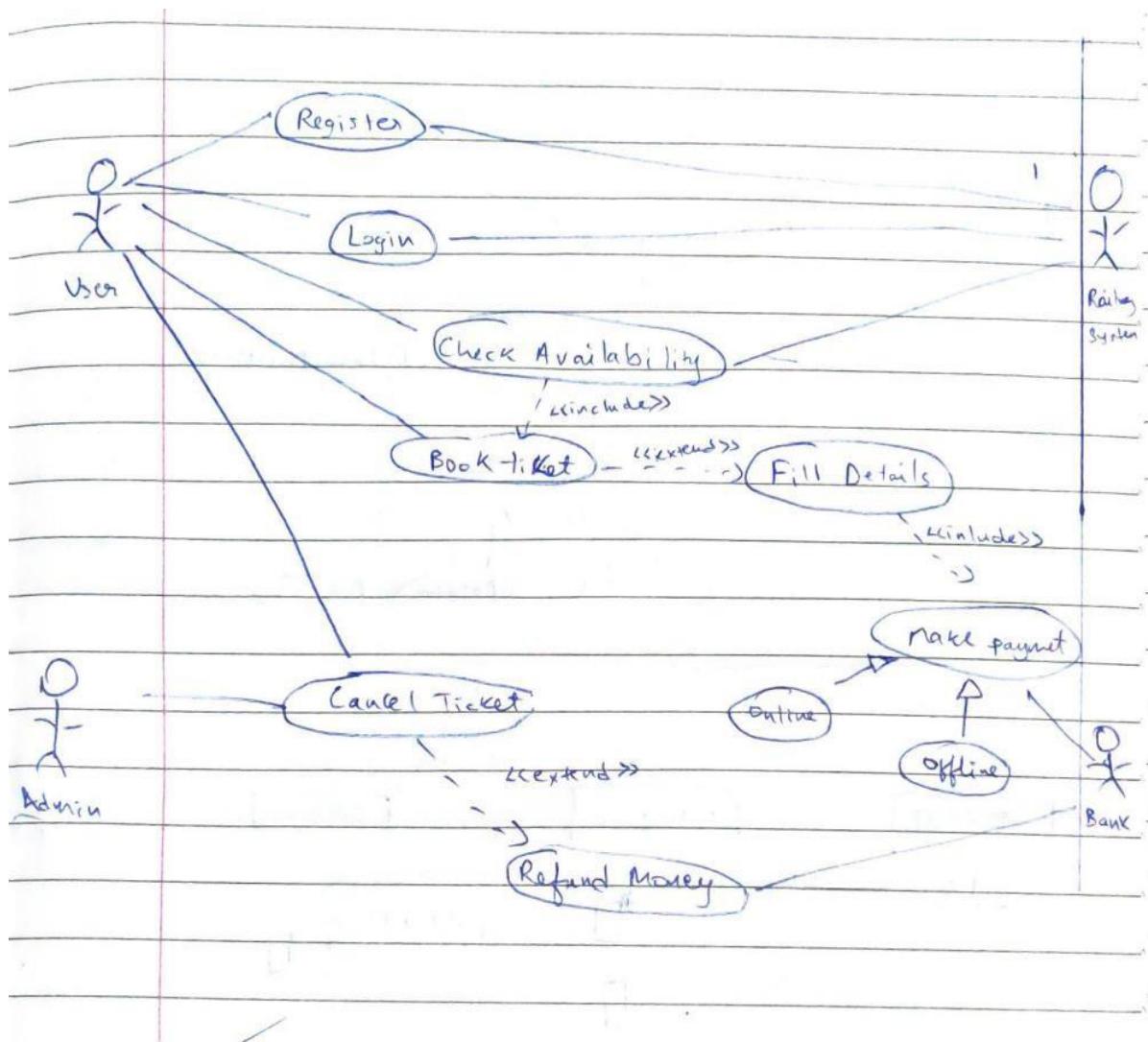




Advance use case diagram:

The advanced use case diagram has extra functionalities which includes extends, includes and generalization. The cancel ticket use case extends refund money use case, check availability use case extends book ticket use case, book ticket use case includes fill details use case, fill details use case includes make payment. Online and offline is generalized to super class make payment.

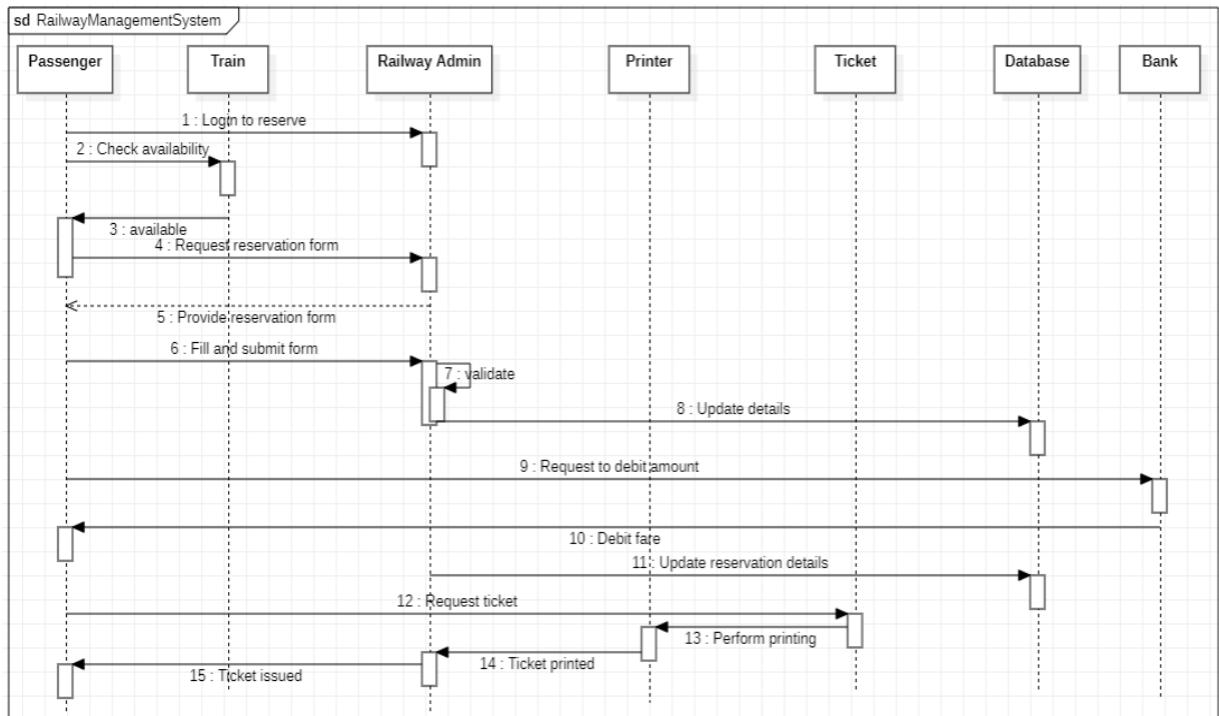


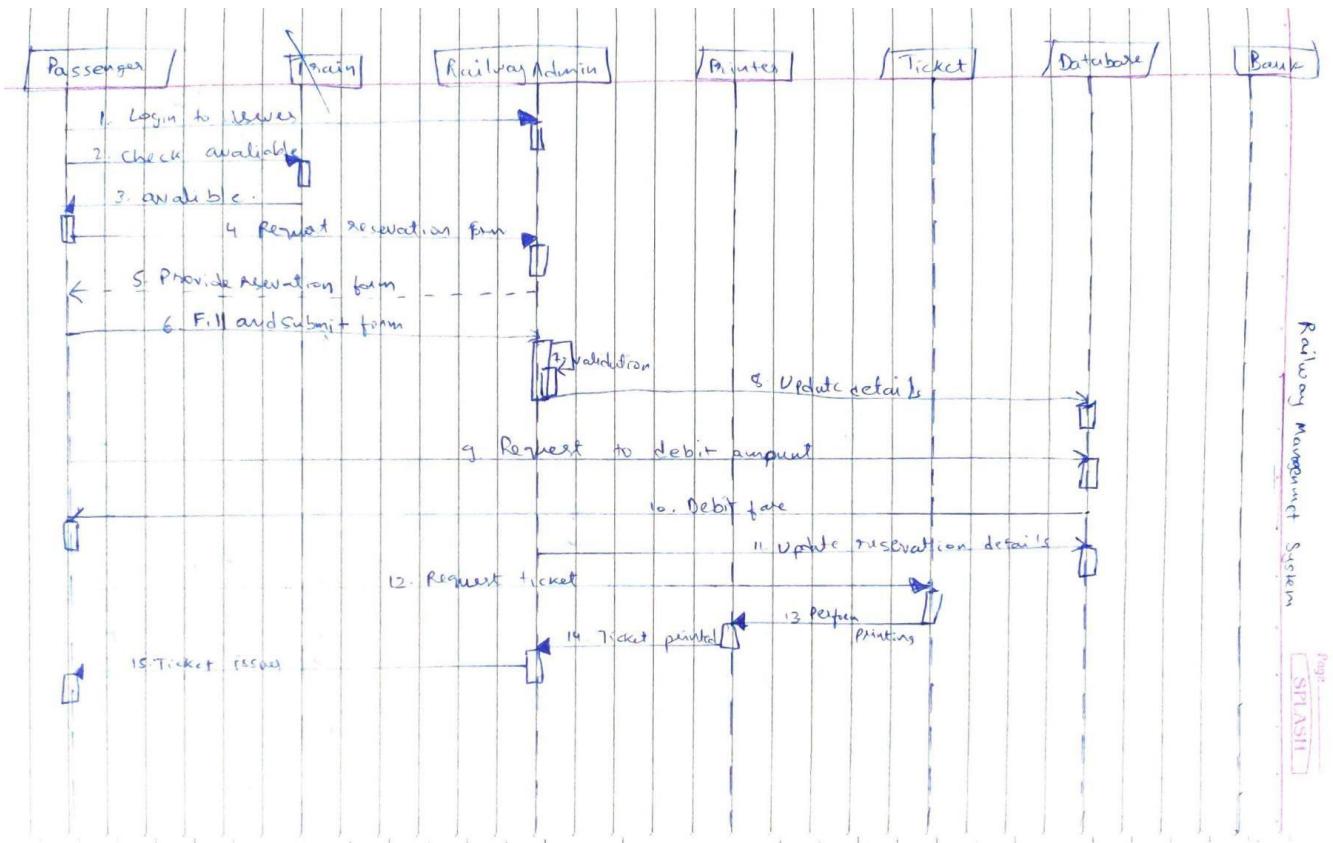


Advance sequence diagram:

The lifeline is the dotted line and the rectangles represent the period of time the object is executing and is hence called activation.

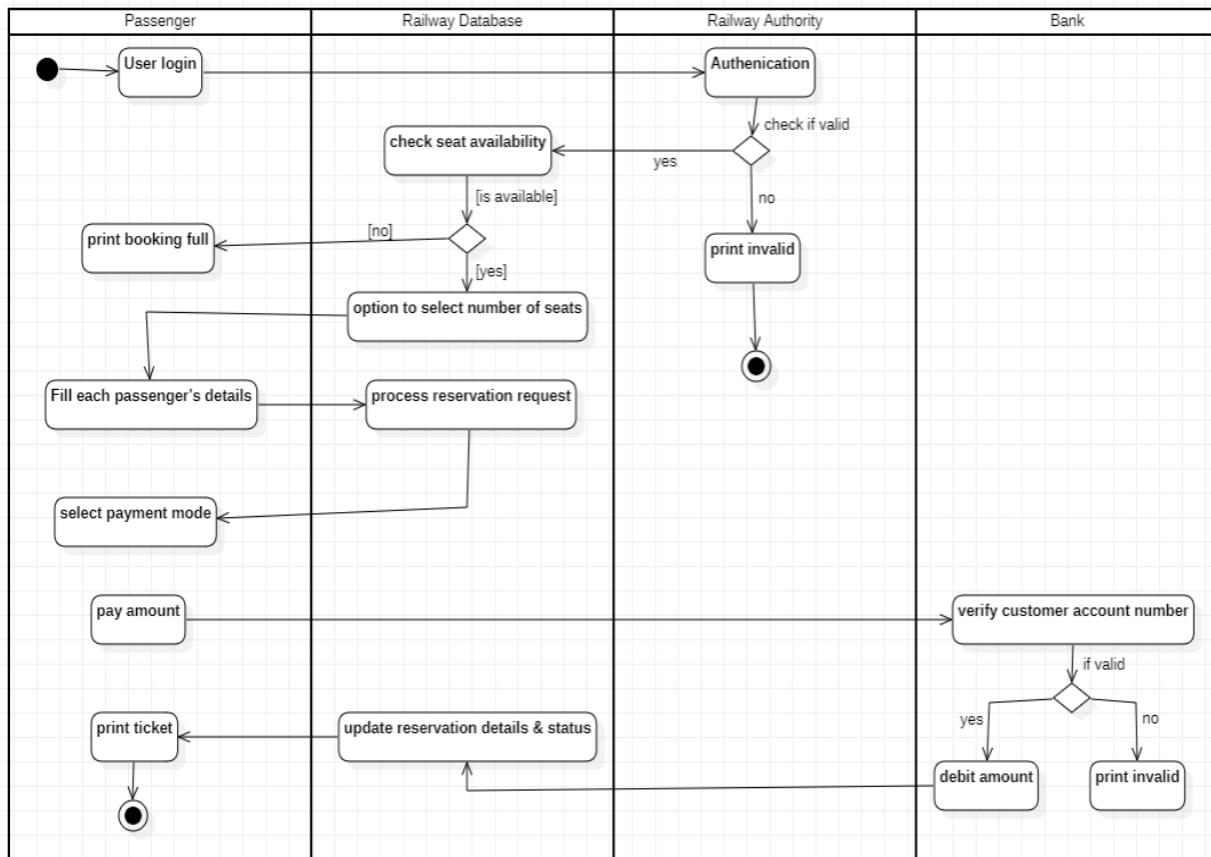
The recursive function of validation is shown by double activation rectangle of validation with self-transition and verify user. Reply message is used to return back to lifelines with the required message.





Advance activity diagram:

The advanced activity diagram starts from initiation and in the passenger swim-lane, the passengerlogin activity where a signal is sent to the network for request validation and upon confirmation thecontrol flows to check seat availability activity. There are four swim-lanes namely passenger, railway database, railway authority and bank where each one indicates the passenger operations.



7. Graphics Editor

Problem statement:

Design UML diagrams for Graphics Editor with system requirements specification.

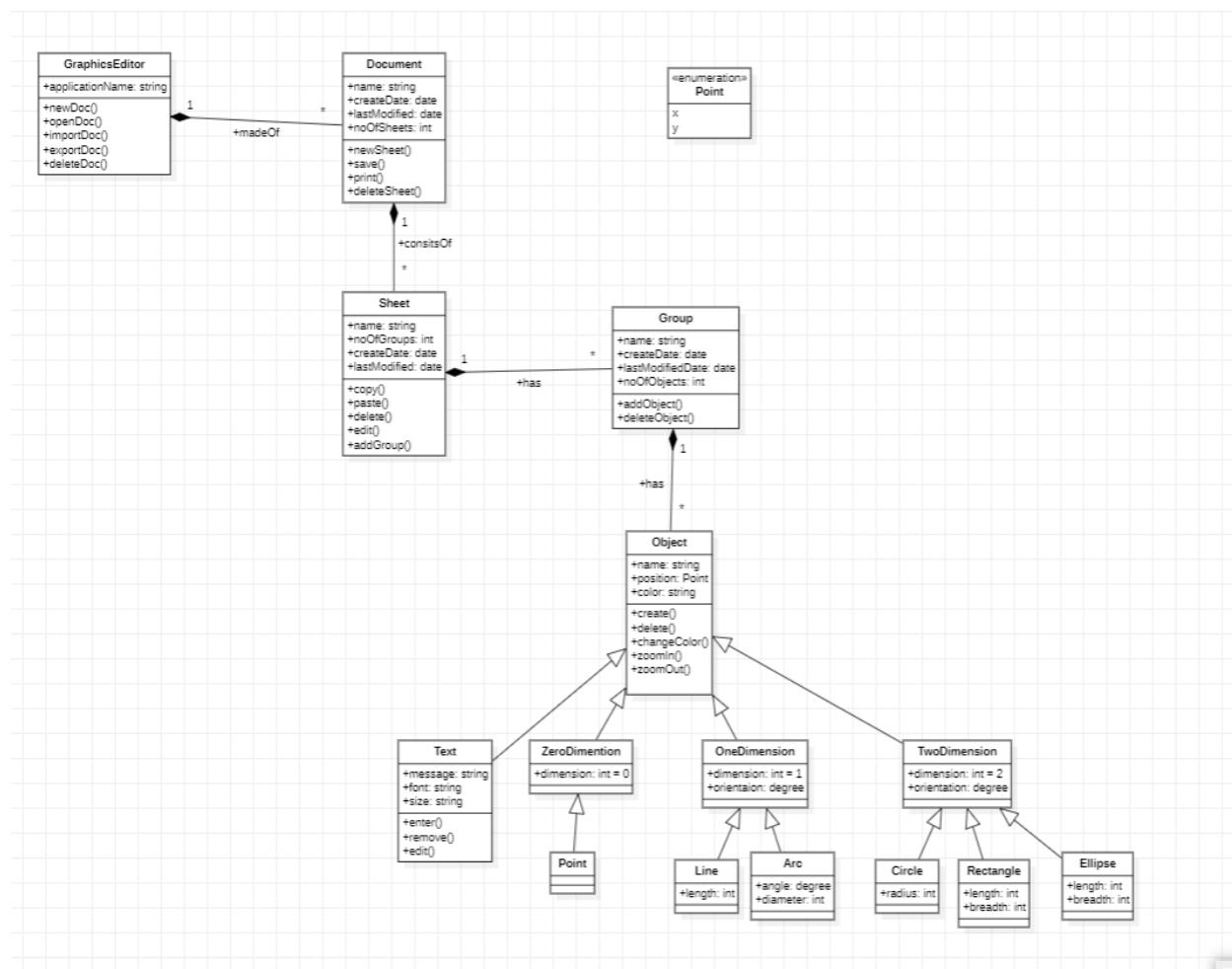
Software Requirements Specification (SRS):

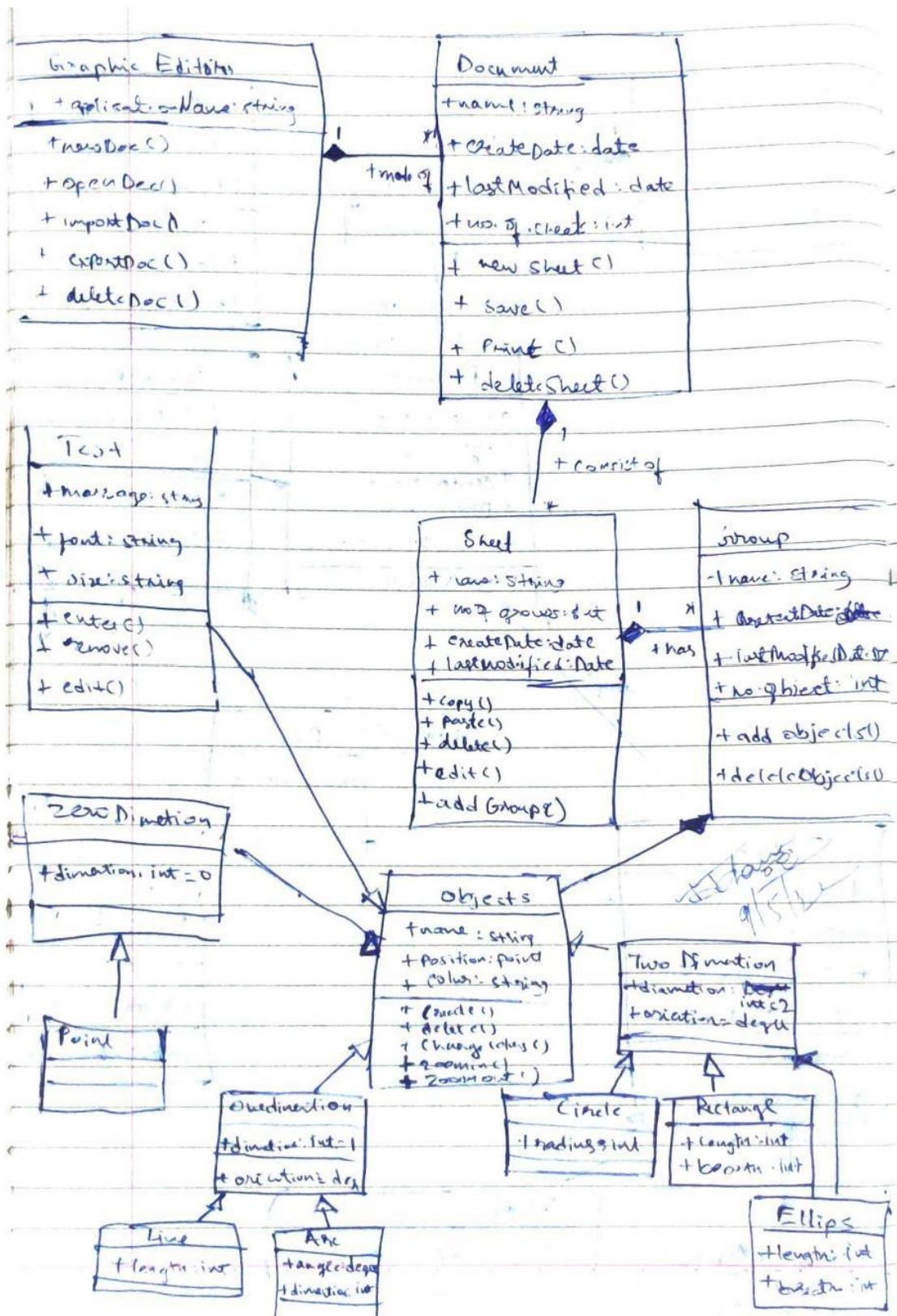
The graphics editor provides an Application Programmer's Interface that enables a programmer to develop their own graphical model editor for a specific type of model. This API in turn, relies on extending the Eclipse Graphical Editing Framework to provide an environment in which the editor functions, and the programmer can create a graphical editor and palette of shapes in order to modify an underlying model. The graphical editor provides an interface with which the programmer implements said editor for a given underlying model. Such an instance of the graphical editor allows a user to drag objects from a specified model into a working graphical diagram.

It should support following functionalities:

- It contains the toolbox which contains tools like: Line, Circle, Rectangle, Arc, Text, Draw, Eraser
- Color box or palette
- Standard toolbar with options for New, Open, Save, toolbox and Text Toolbox.
- One integrated view to users for toolbar, color box, menu, and graphic screen.
- Easy handling of tools for users.
- Ability to group several drawings into one i.e., complex drawing.
- Provision of zoom in and zoom out.
- Different shadings of line tool are provided

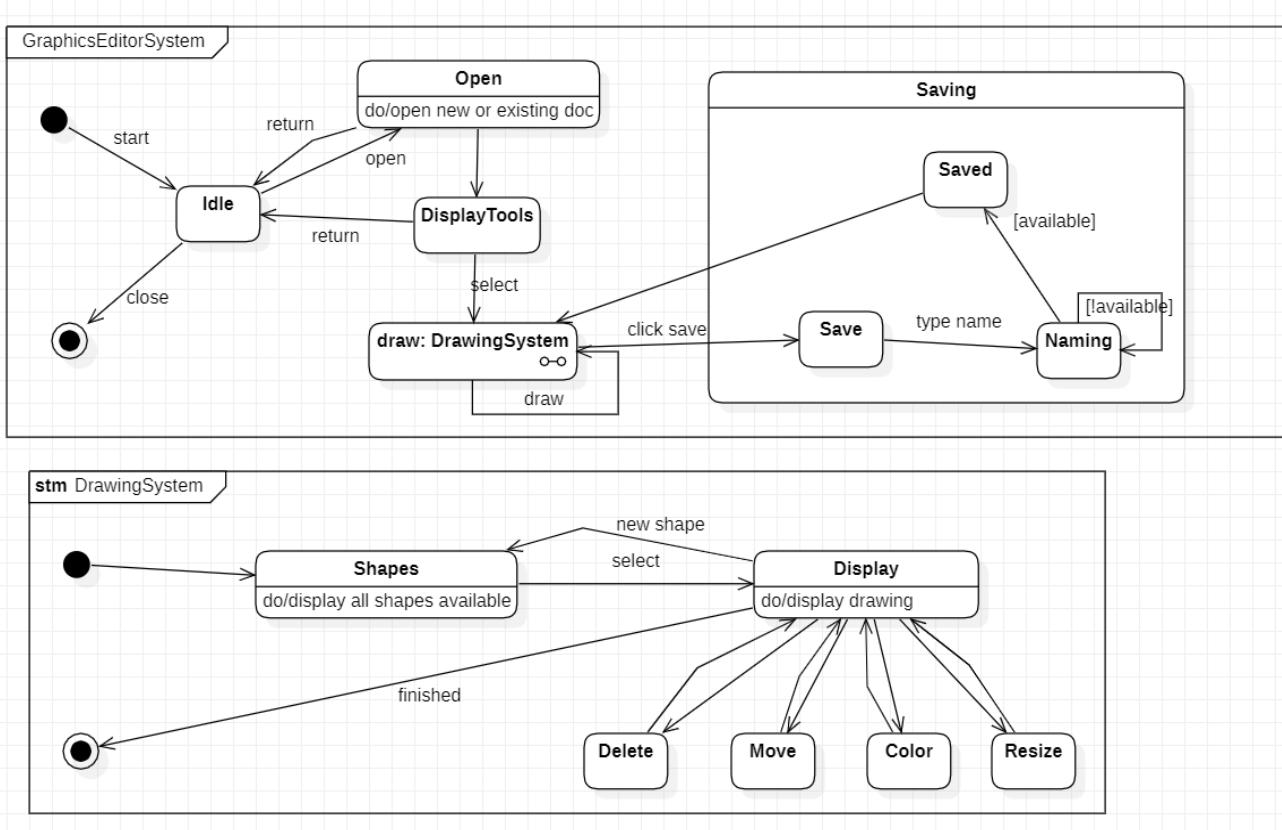
Advanced Class Diagram:

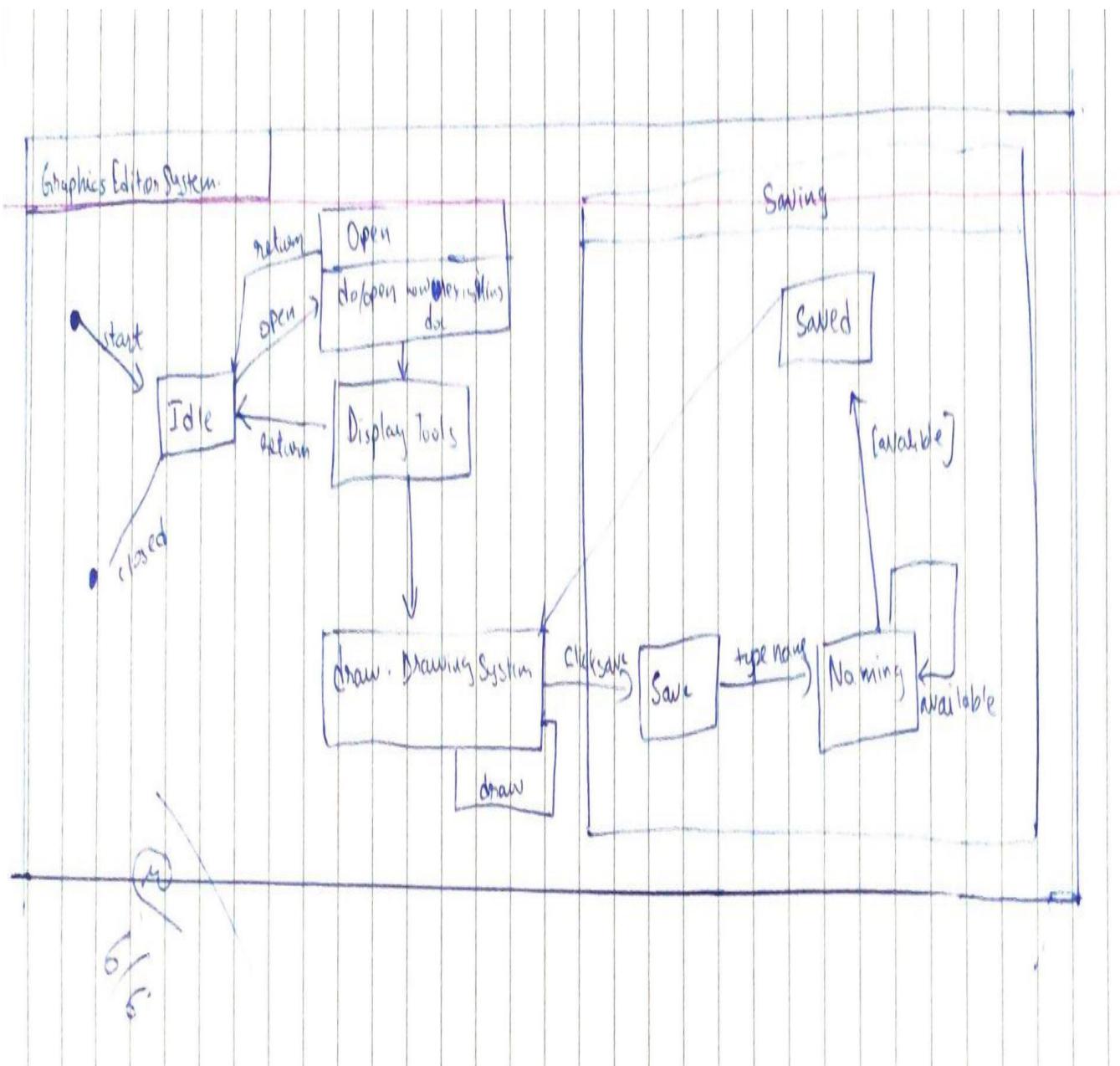




Advance state diagram:

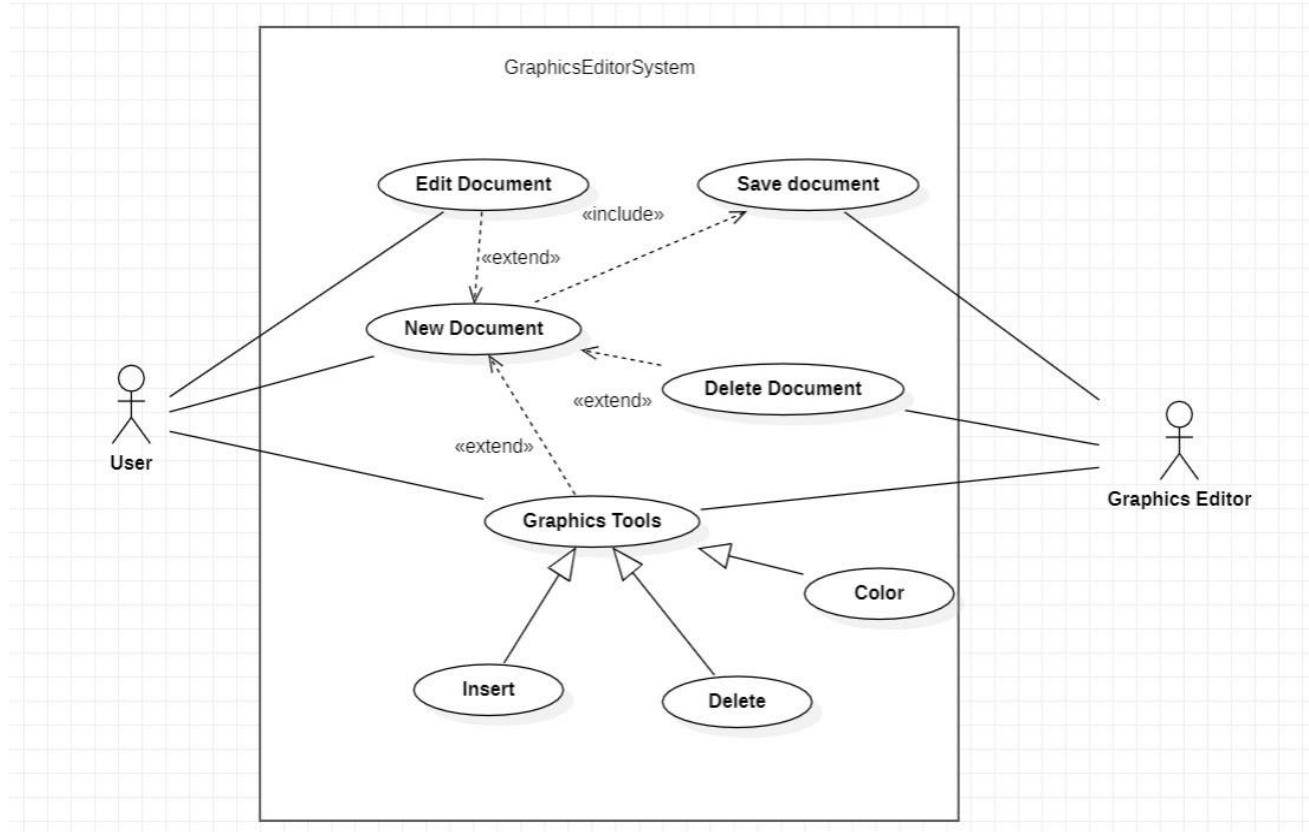
The advanced state diagram depicted below contains one nested state and one submachine, which on successful login shows the Saving procedure and Drawing System procedure. It contains initial state and termination state with Saving as a nested state including the required simple states. It also has a submachine state named Drawing System with initial, termination state along with simple states; Shapes, Display and format each shape.

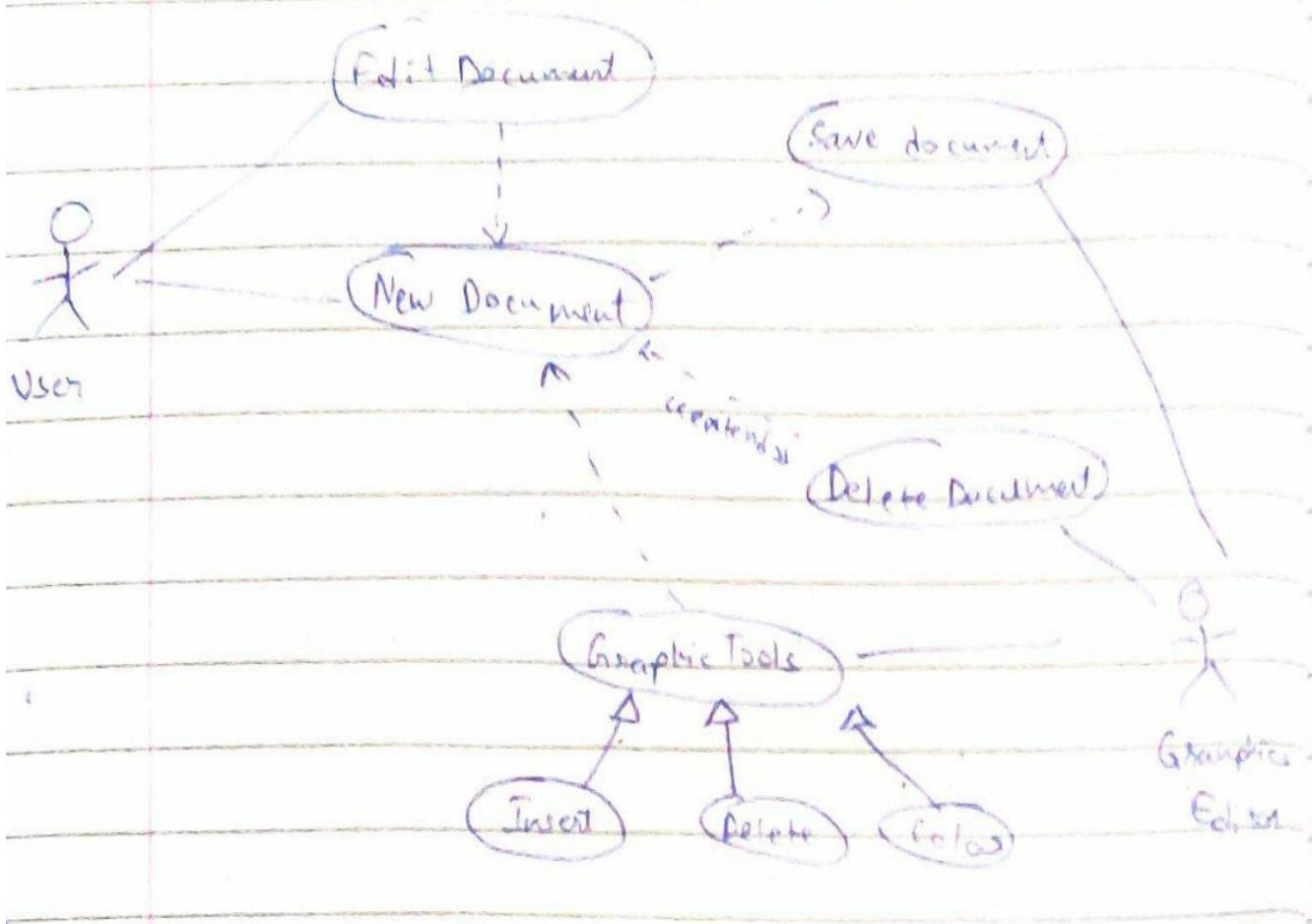




Advance use case diagram:

The advanced use case diagram has extra functionalities which includes extends, includes and generalization. The edit document use case extends new document use case, delete document use case extends new document use case, graphic tools use case extends new document use case, new document use case includes save document use case. Insert, delete and color is generalized to super class graphics tools.

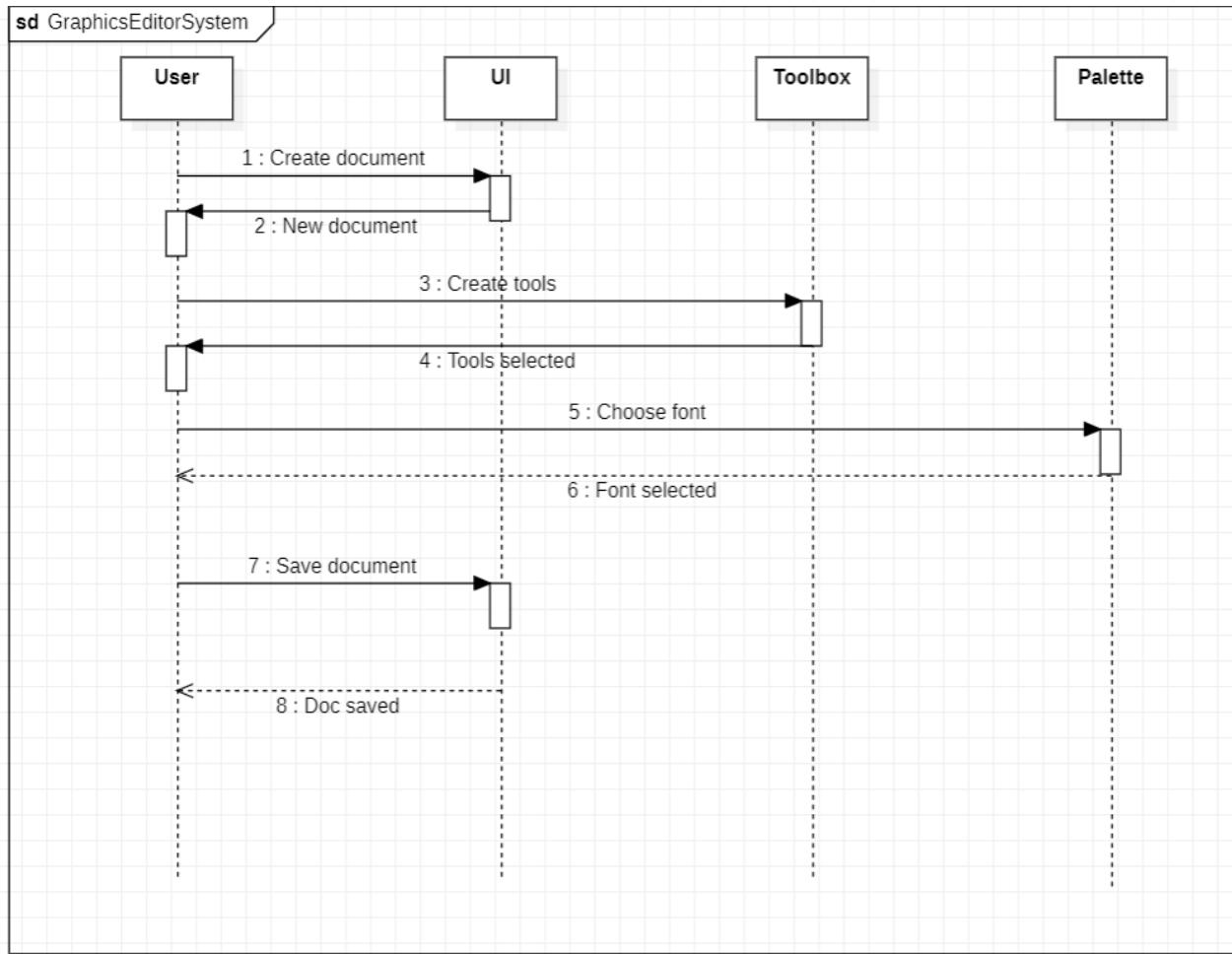


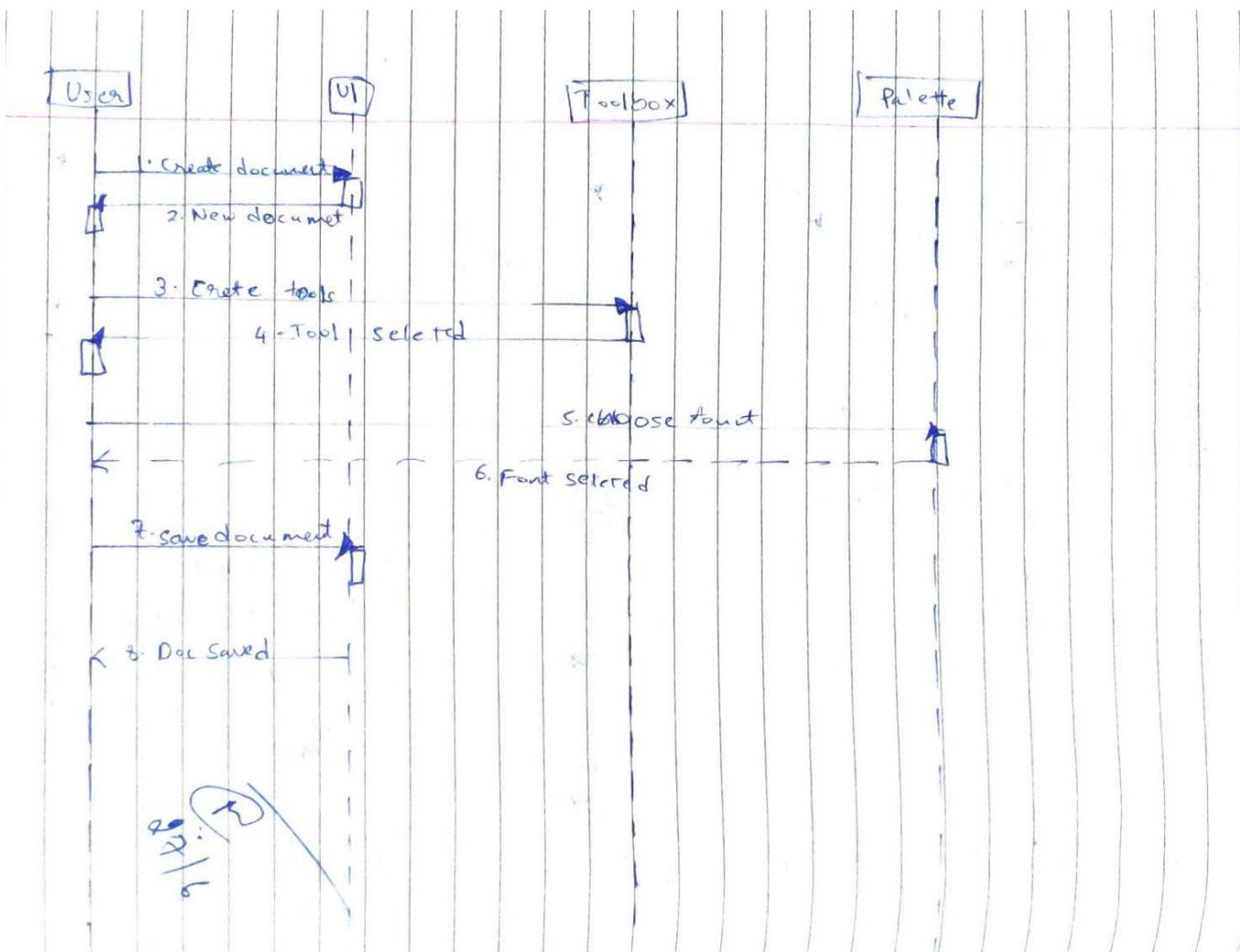


Advance sequence diagram:

The lifeline is the dotted line and the rectangles represent the period of time the object is executing and is hence called activation.

Reply message is used to return back to lifelines with the required message.





Advance activity diagram:

The advanced activity diagram starts from initiation and in the user swim-lane, the user login activity where a signal is sent to the network for request validation and upon confirmation the control flows to open file activity. There are two horizontal swim-lanes namely user and editor where each one indicates the user operations and drawing a diagram respectively. Then the control flows to the close file activity and then termination activities.

