

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY**  
“JnanaSangama”, Belgaum -590014, Karnataka.



**LAB REPORT**  
**on**  
**Object Oriented Analysis and Design**

*Submitted by*

**R Tarun Kumar (1BM19CS229)**

*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**  
**April-2022 to July-2022**

**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 “**LAB COURSE Object Oriented Analysis and Design**” carried out by **R Tarun Kumar(1BM19CS229)**, who is bona fide 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 an **Object Oriented Analysis and Design - (20CS6PCOMD)** work prescribed for the said degree.

**Dr. Nandhini Vineeth**  
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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 -

a) SRS:

### Problem Statement :

Manual college systems were paper based and difficult to maintain, expensive, more manpower required and unable to handle large records, the previous system was not efficient, not effective and there were issues of redundancy and consistency.

### SRS :

We maintain day to day information, updates of students and employees. We manage information of book, Question paper also helps in quick and easy access.

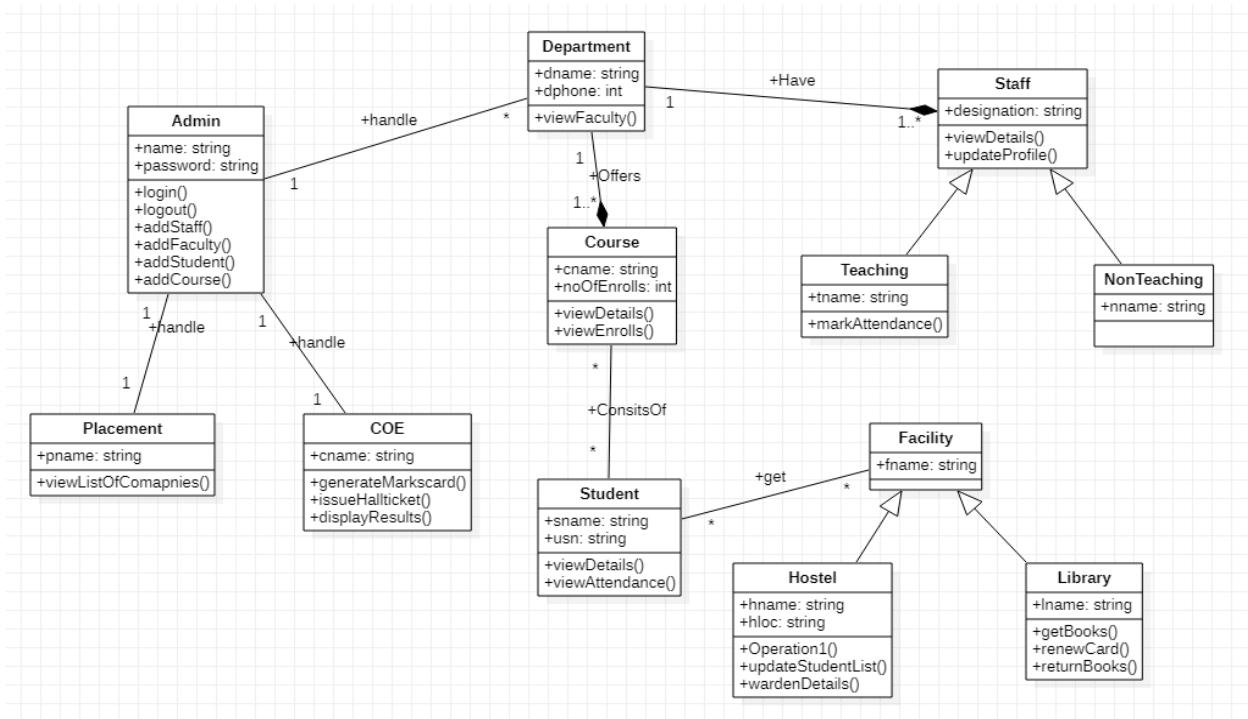
- \* Educational Institutions should be able to add, edit and view student personal details .PKe, name, age, gender, email, phone no, address
- \* Educational Institutions should be able to add, edit and view student academic details .PKe, USN, department, semester & registered courses.
- \* Faculty should be able to view all student personal details and should be able to view and edit internal evaluation marks and attendance of students.

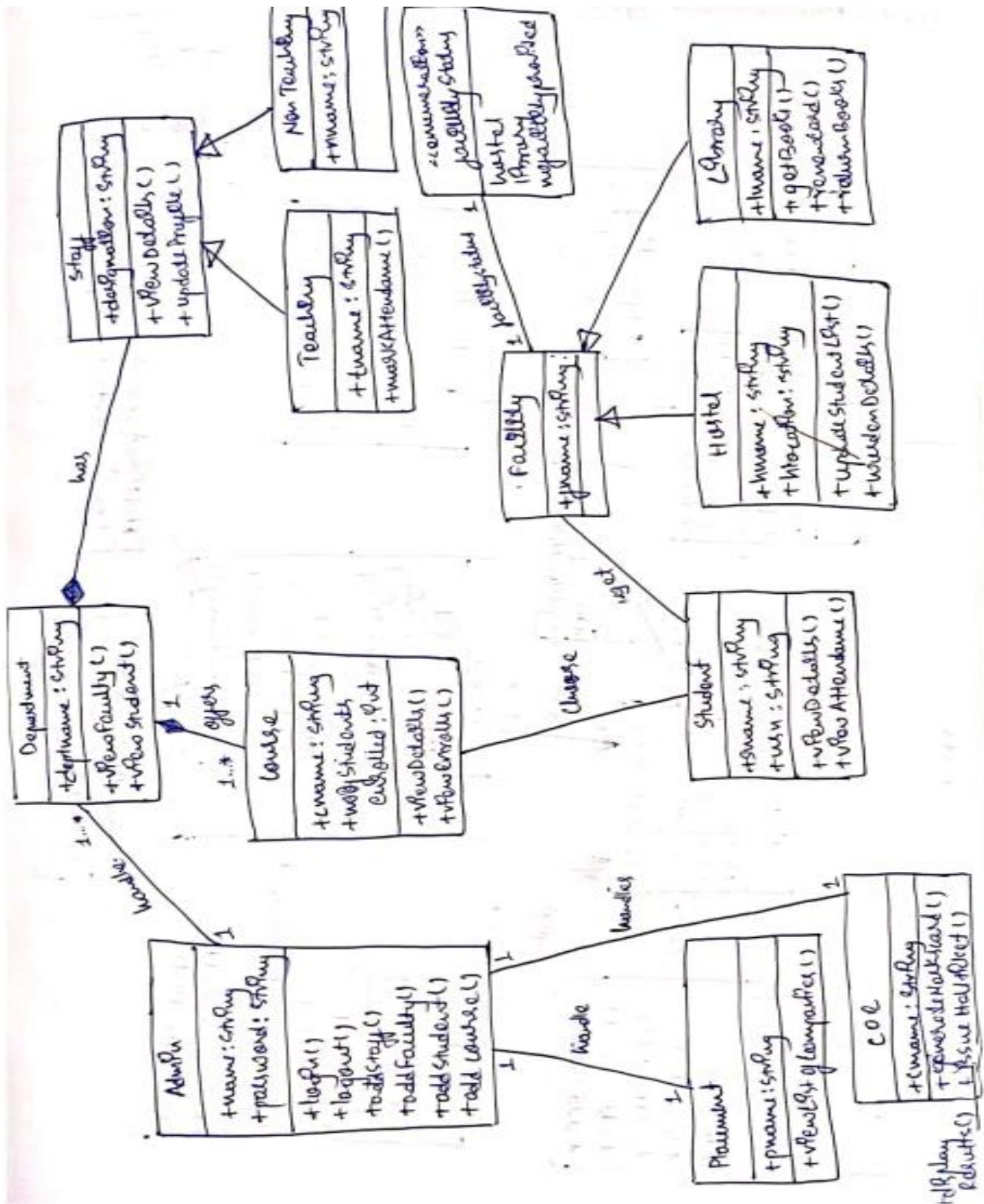
- \* COE office should be able to view all student details and view and edit internal and examination marks and publish results.

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- \* placement section should be able to view all student details, and add companies coming to campus for placements.
- \* management section should be able to view, add and edit teaching and non-teaching staff details.
- \* Student 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 reliable source of information pending for students, COE and faculty.

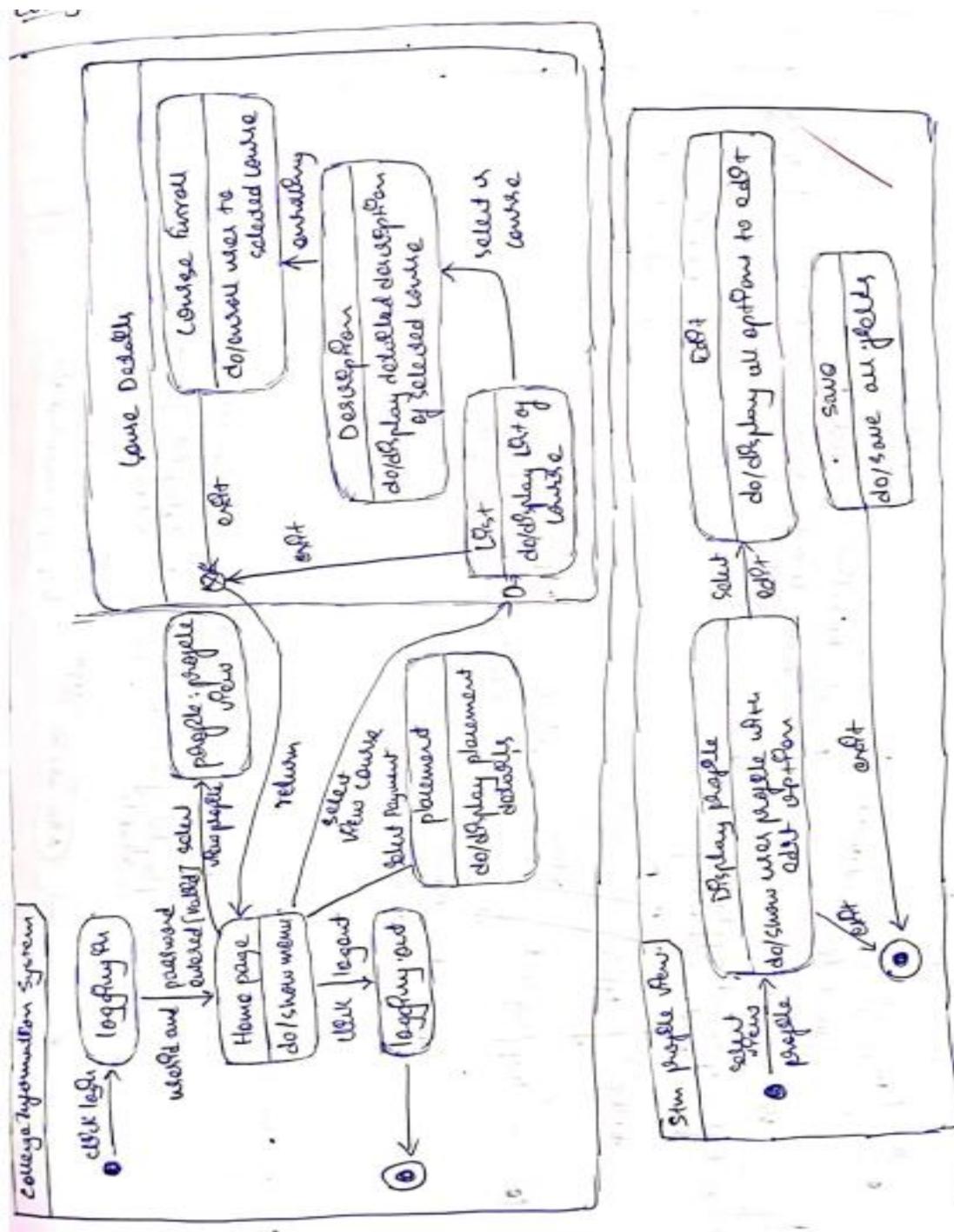
b) Advance Class Diagram:

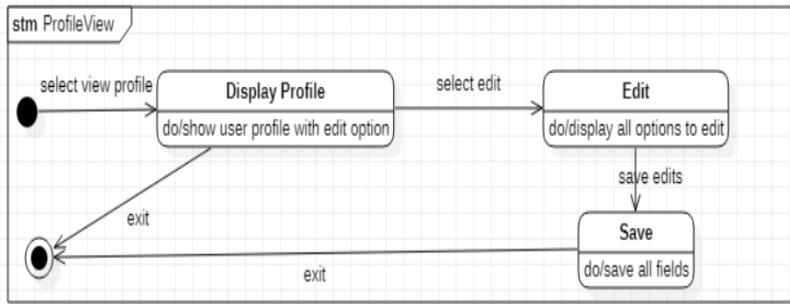
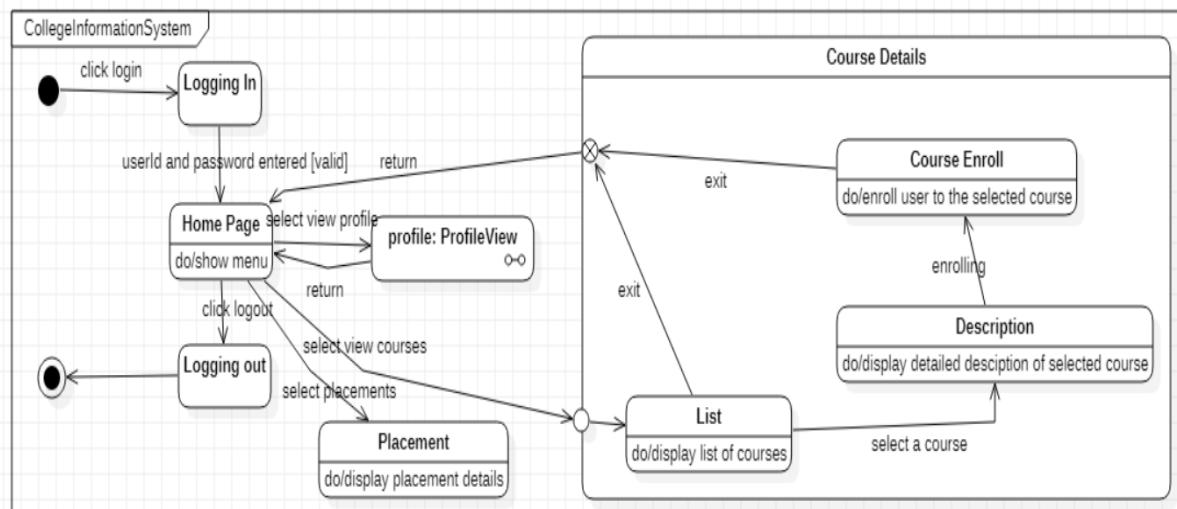




c) Advance State Diagram:

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.



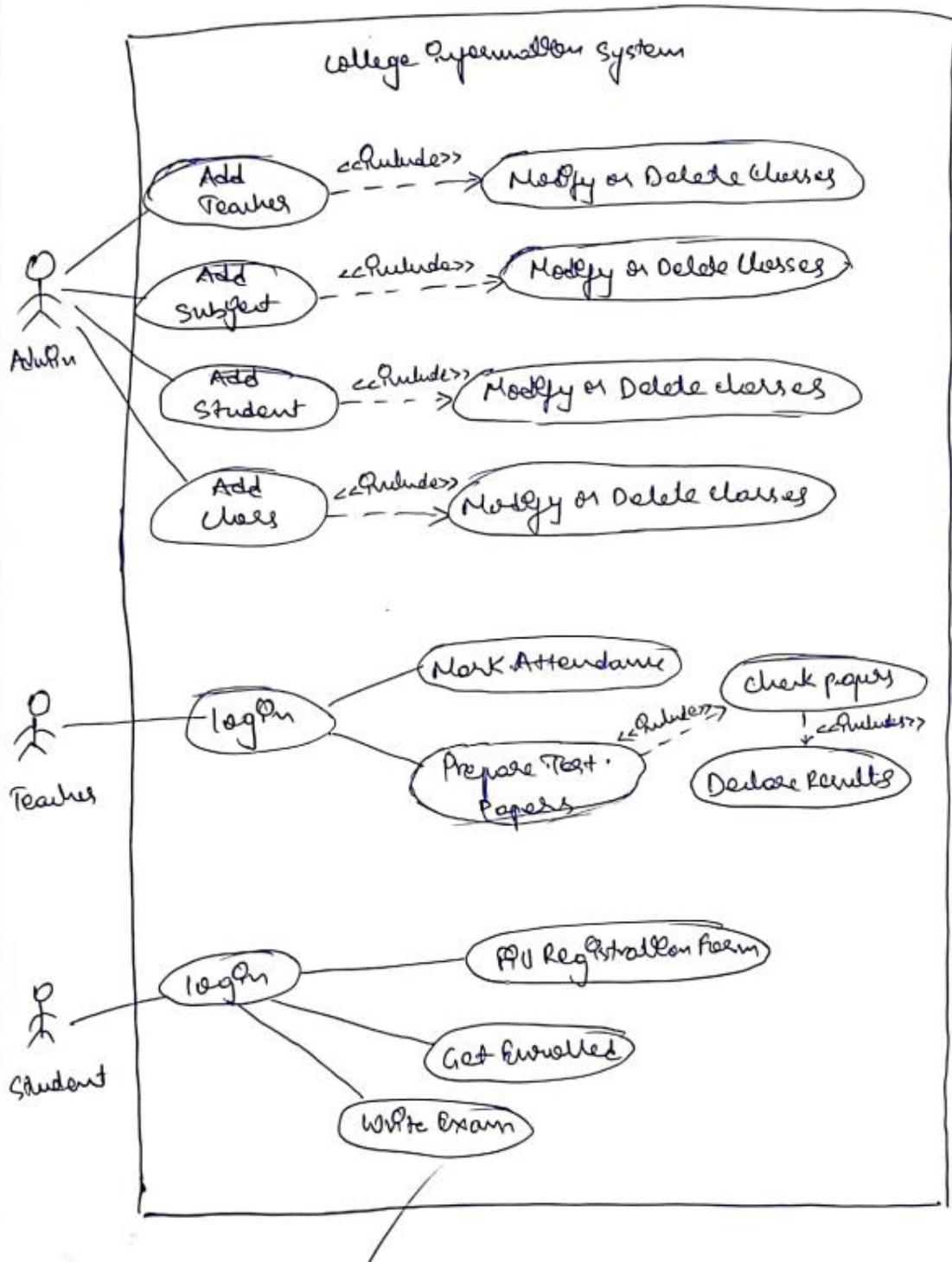


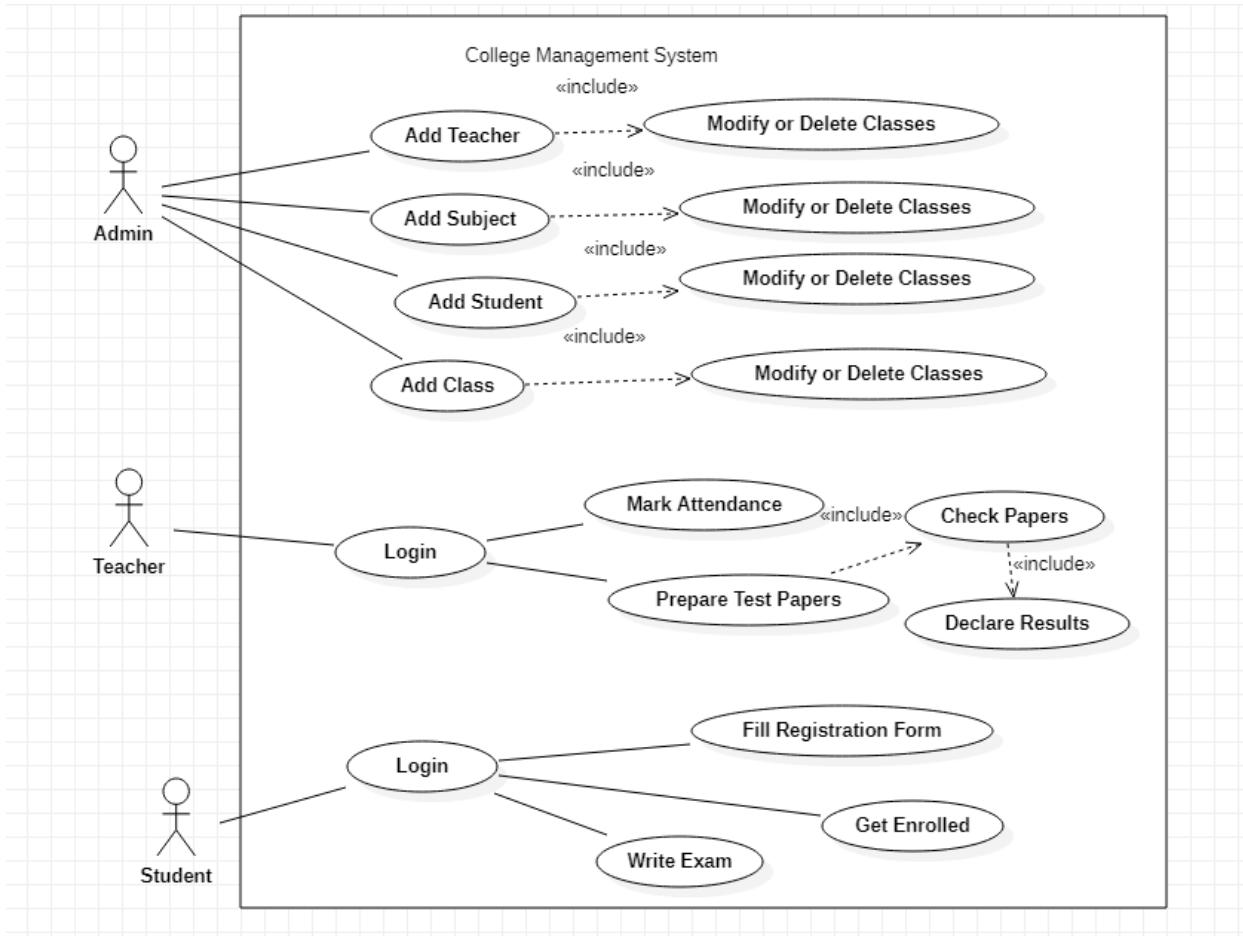
#### d) Advance Use Case Diagram:

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.

# ① College Information System

User Case

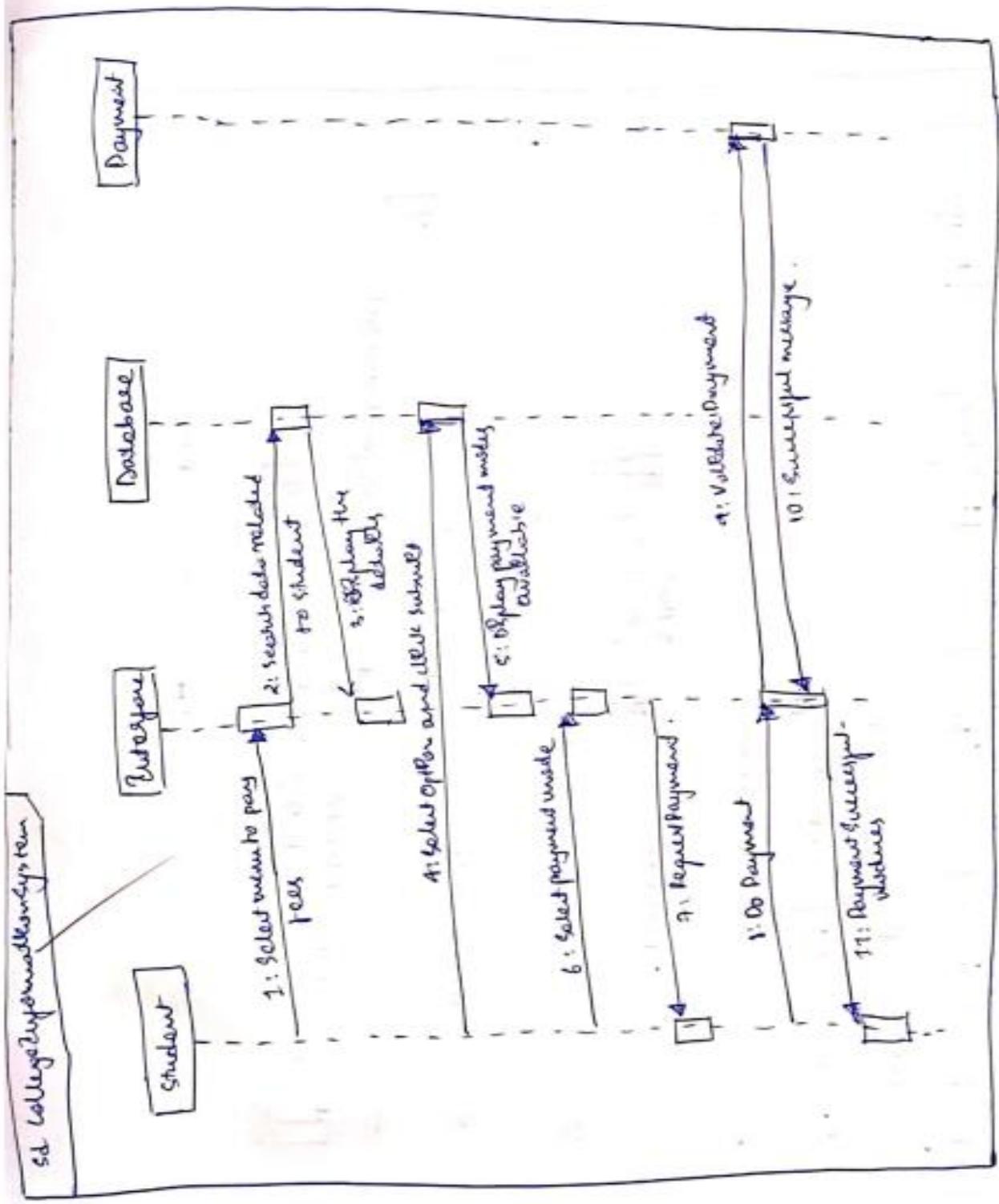


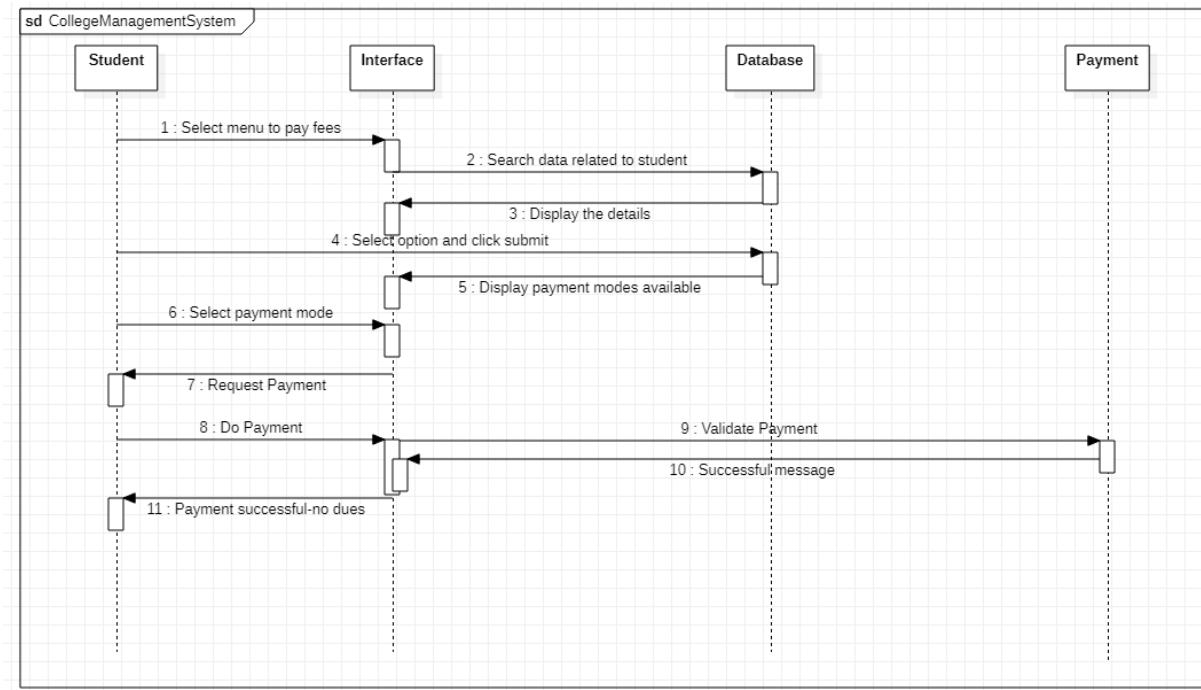


#### e) Sequence Diagram:

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.

## ① College Management System.

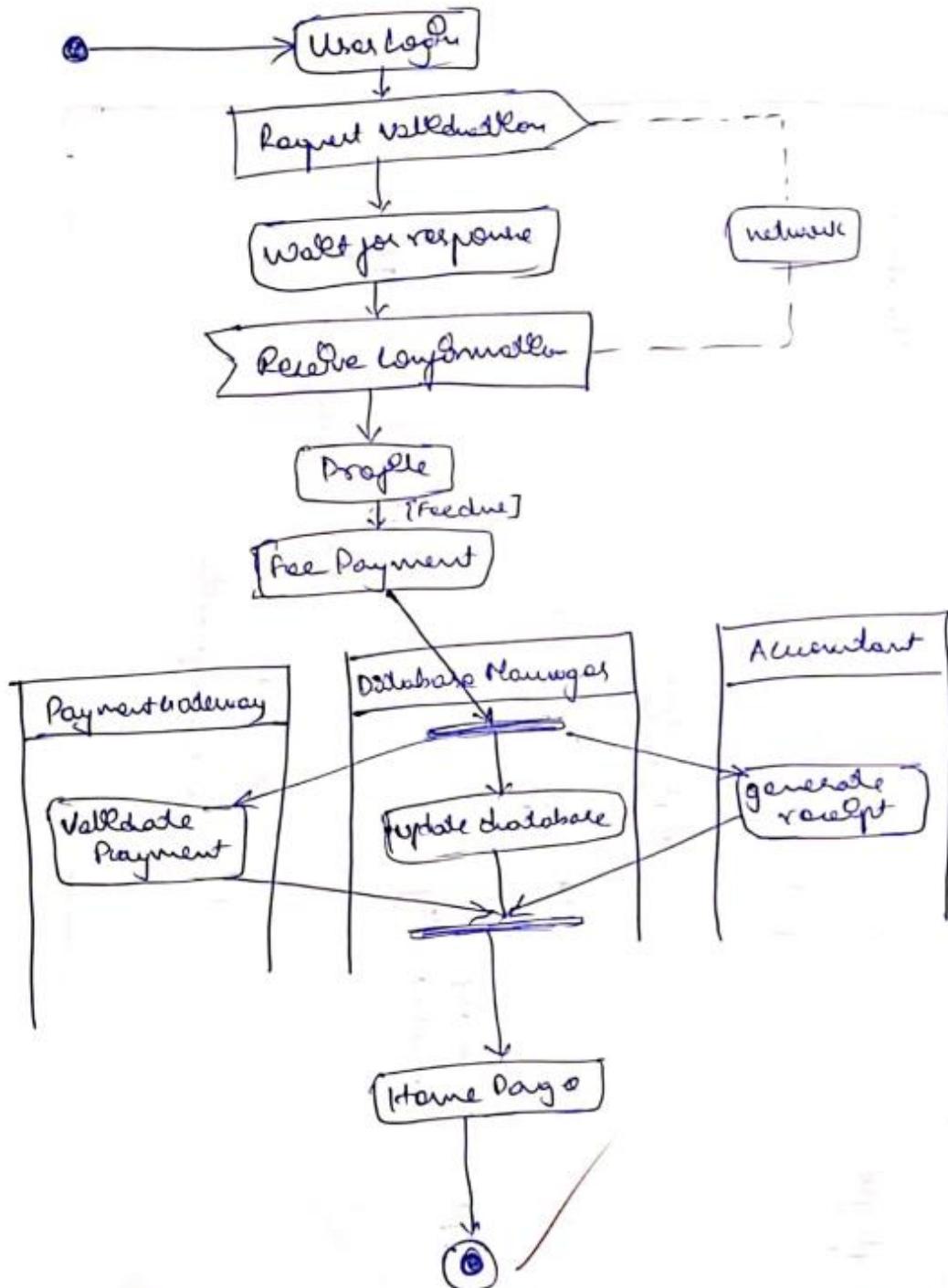


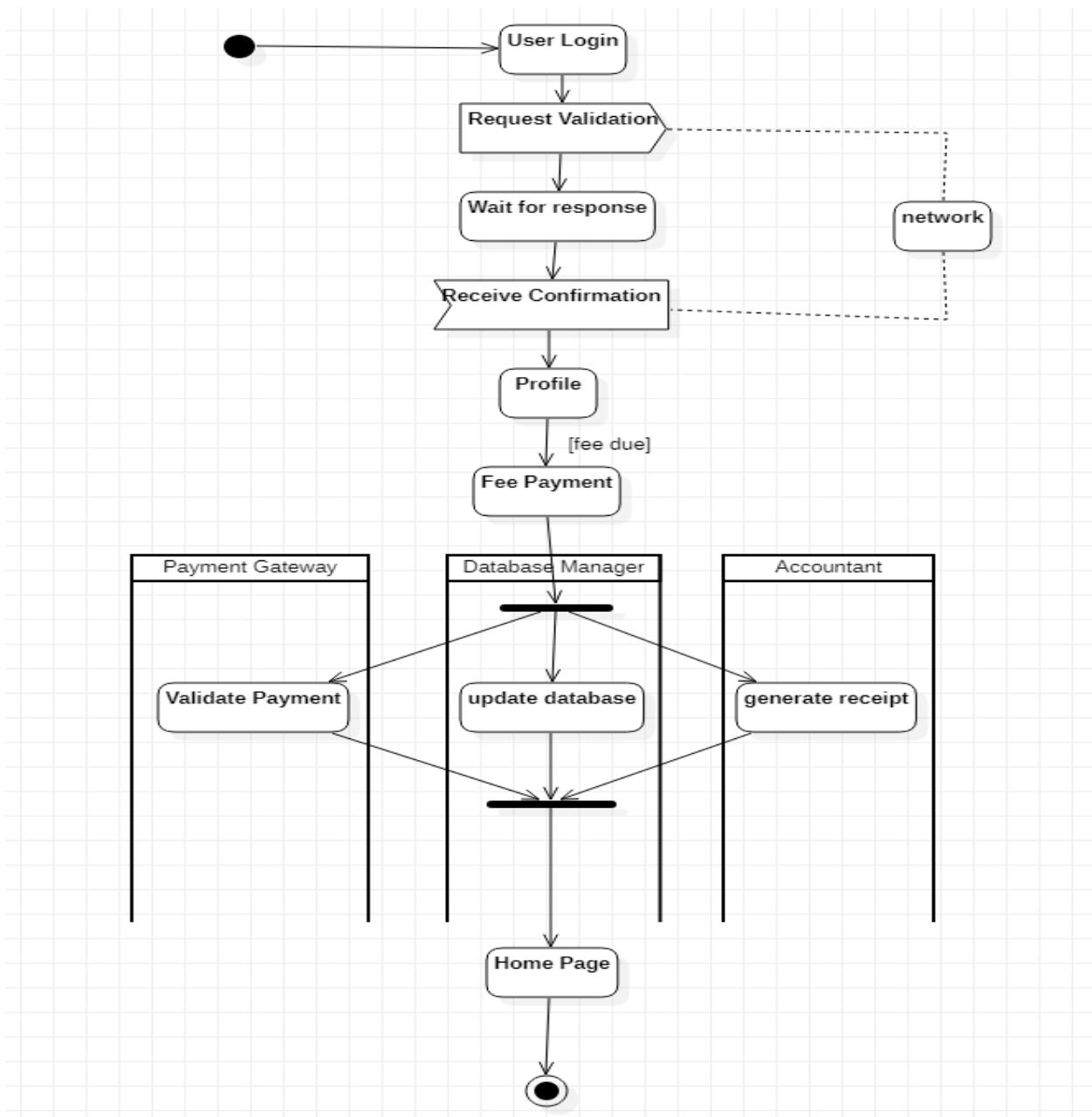


#### f) Activity Diagram:

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.

## ① College Management System





## **2. Hostel Management System-**

a) SRS:

## ② Hostel Management System

Problem Statement :

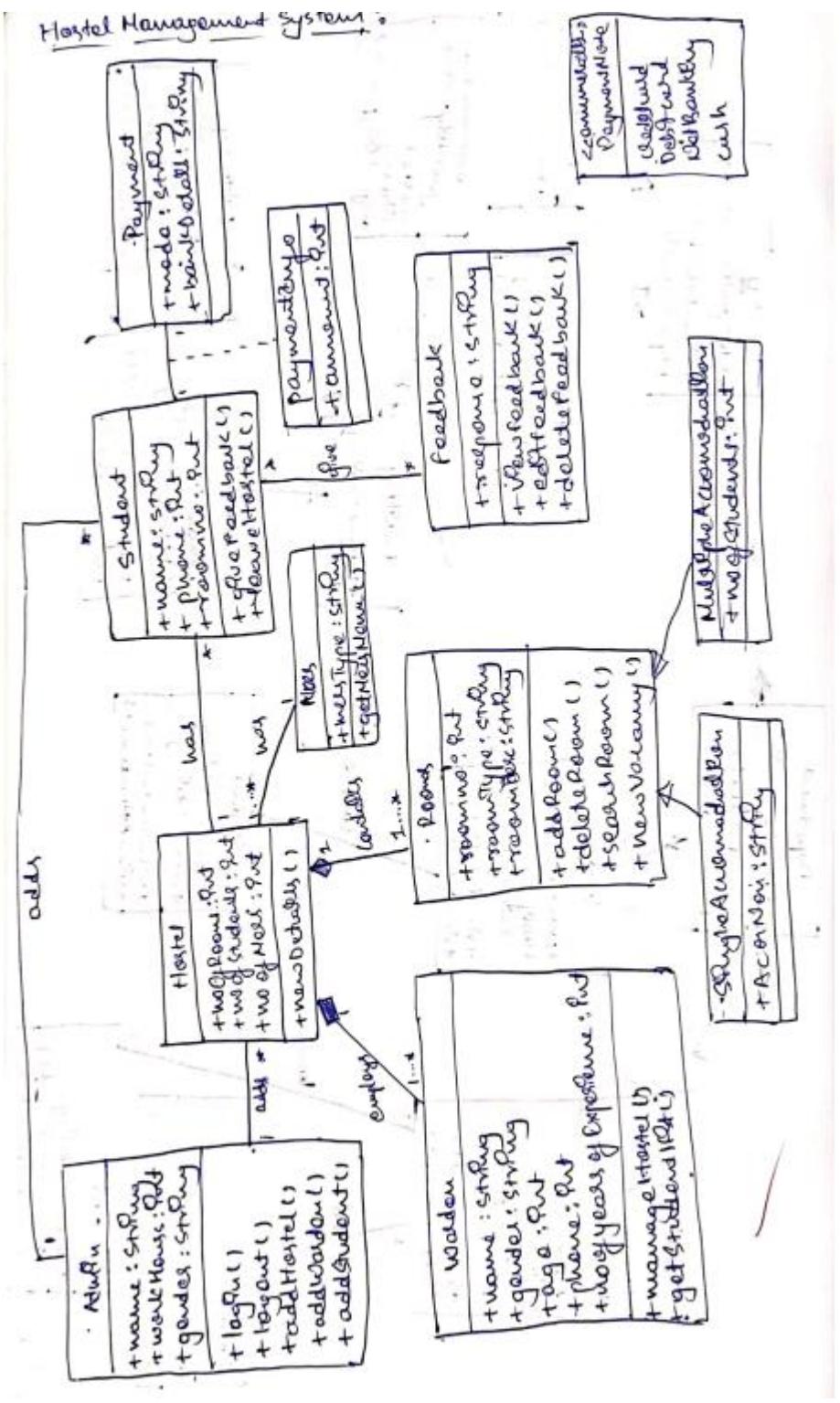
The hostel management system is to provide college students accommodation more effectively than the existing system. The existing system uses pen and paper is hard to manage hostel system.

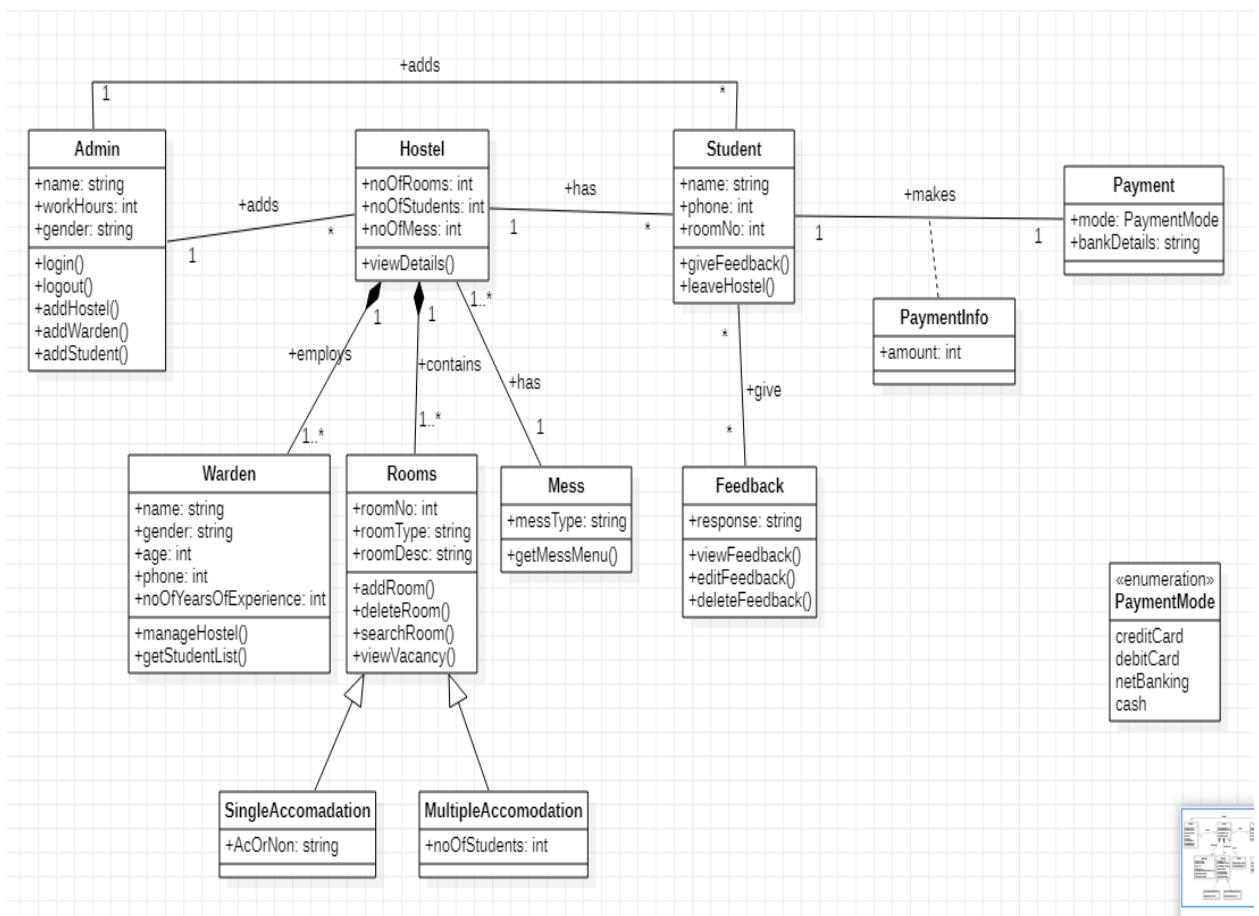
SPS :

The purpose of Hostel management system is to carry out different operations of a hostel. This system will provide ease, comfort of use to staff of hostel by performing all work on computer. It helps to manage student and staff record more effectively.

- \* 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
- \* Students can provide more feedback.
- \* Mers manager can review the mers feedback
- \* mers manager can update mers IRs +
- \* 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.

b) Advance Class Diagram:

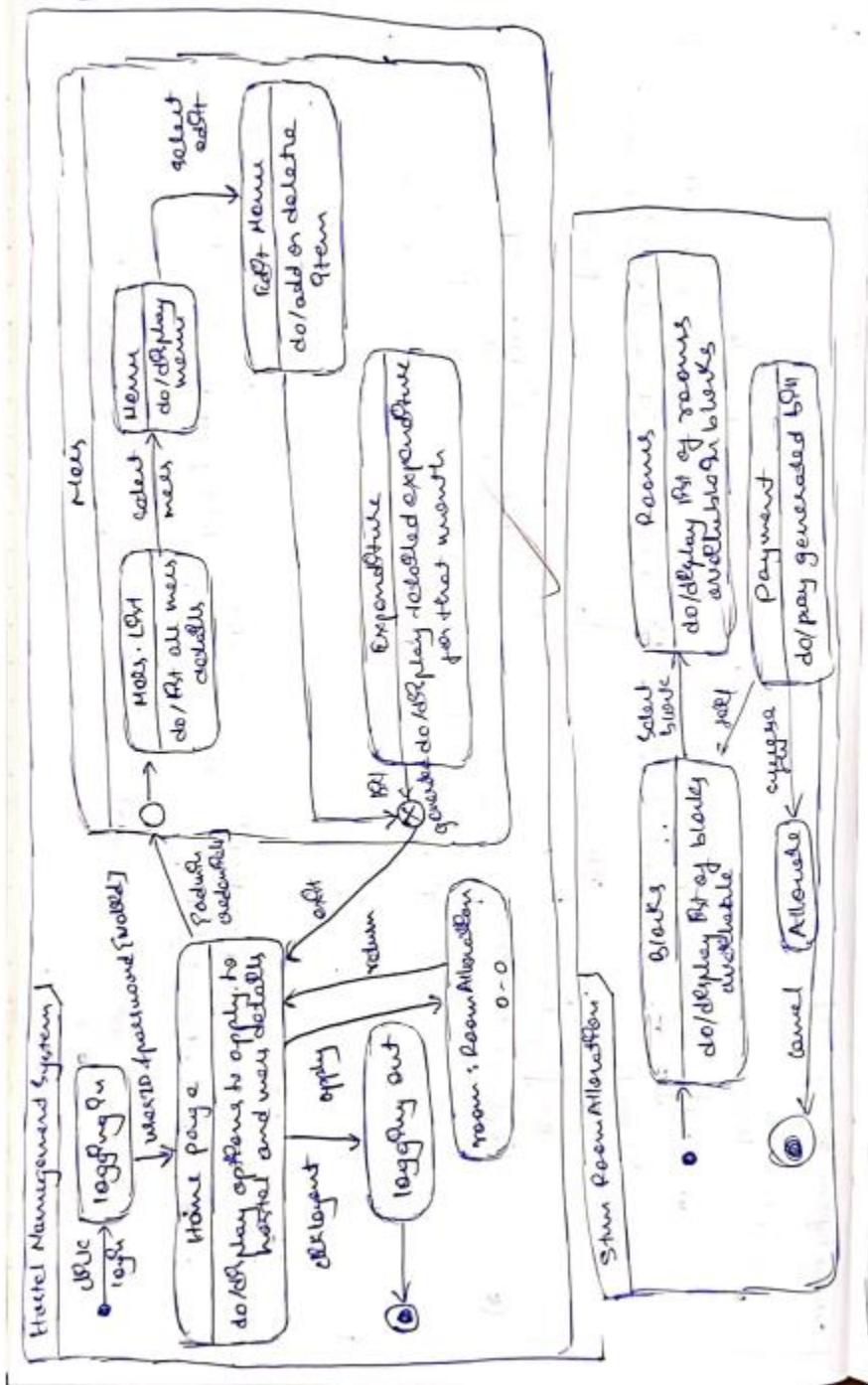


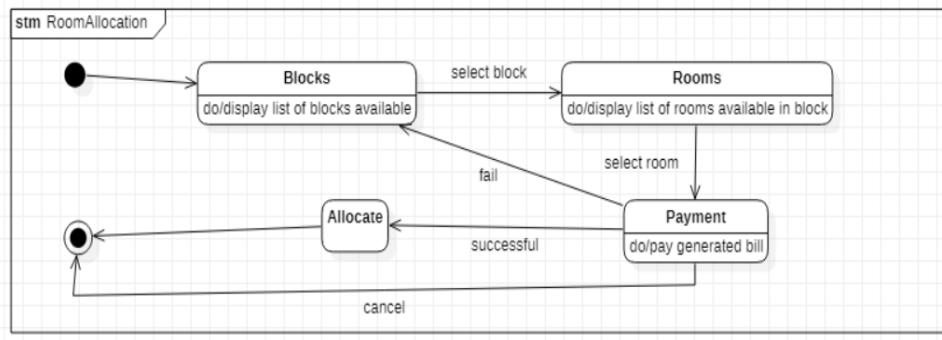
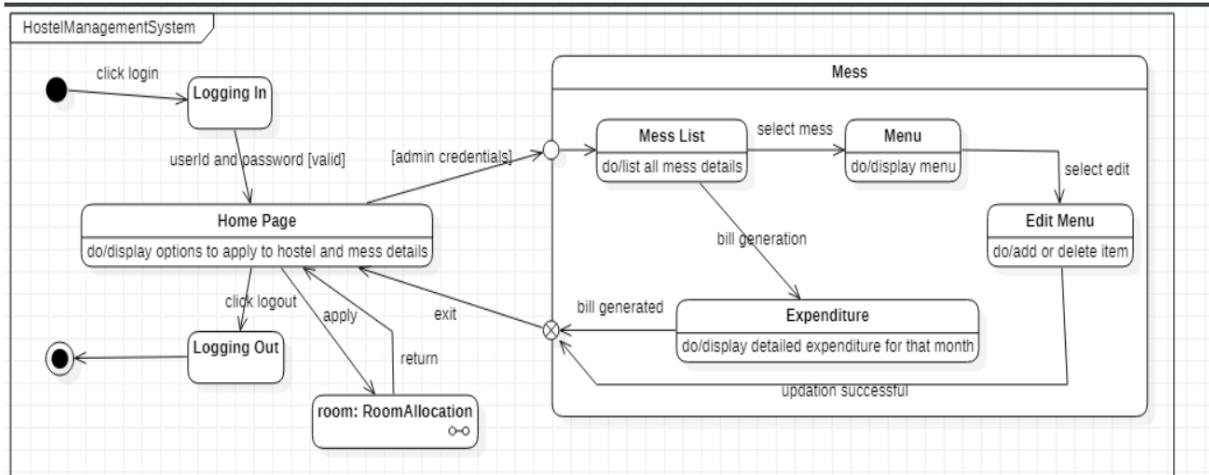


### c) Advance State Diagram:

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.

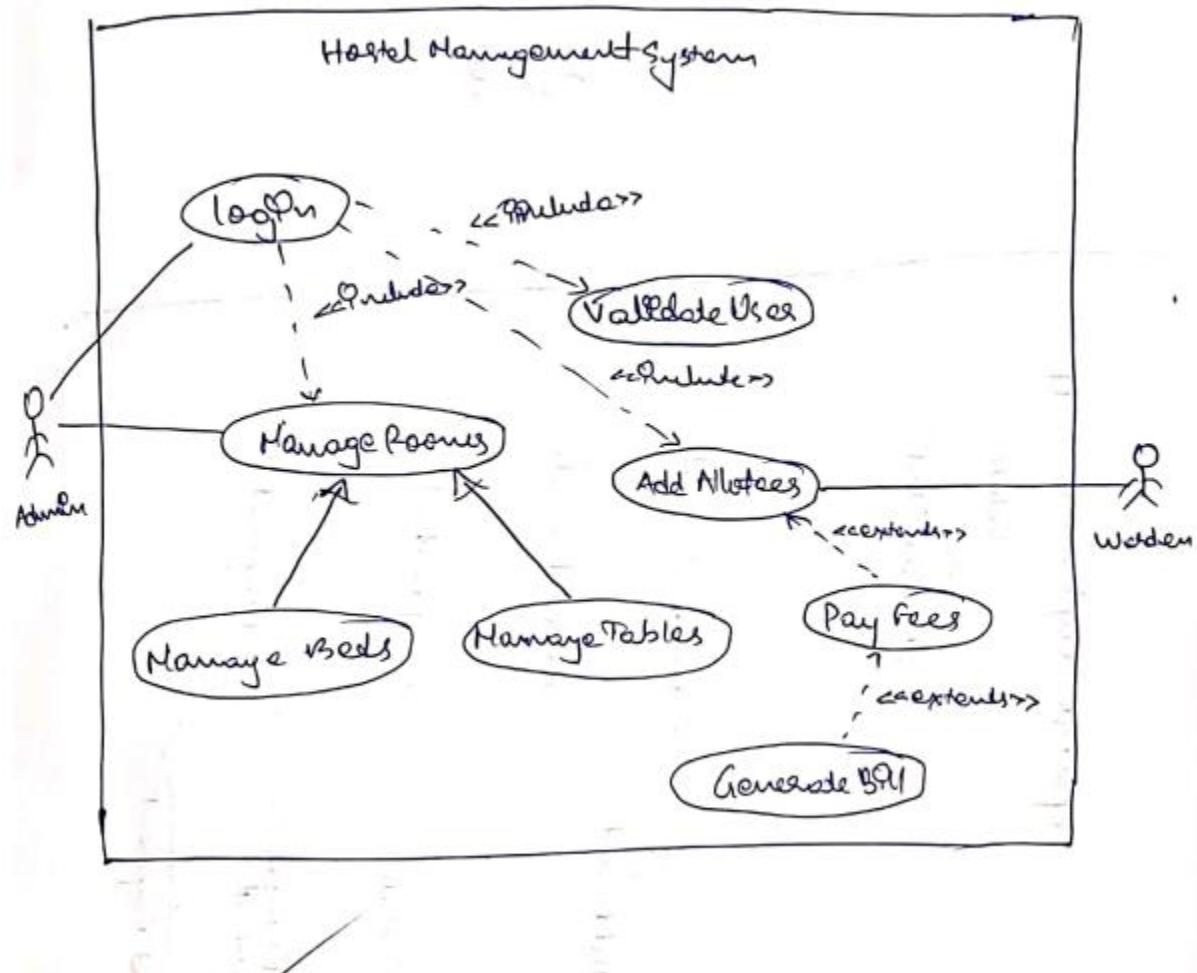
## Hostel Management System:

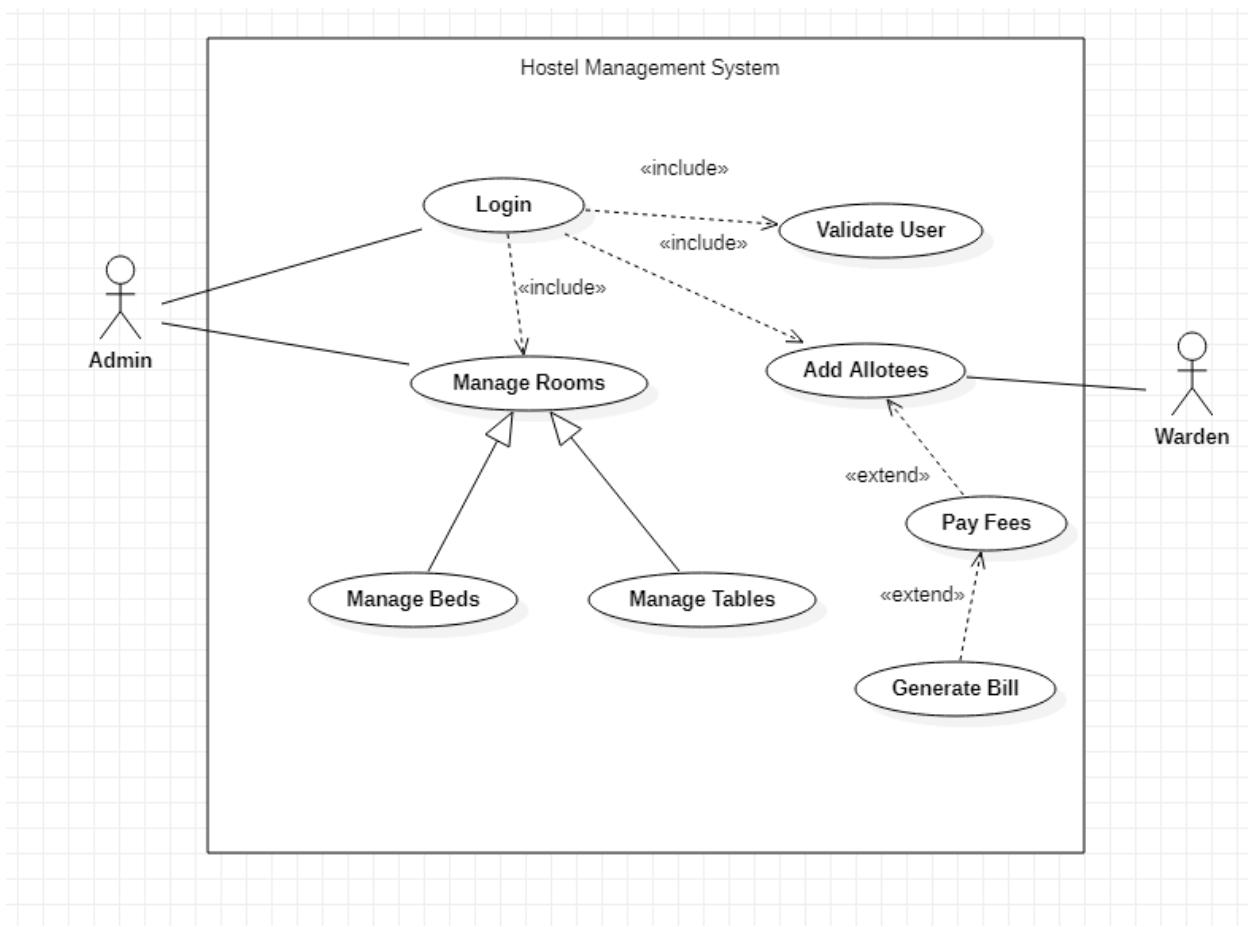




#### d) Advance Use Case Diagram:

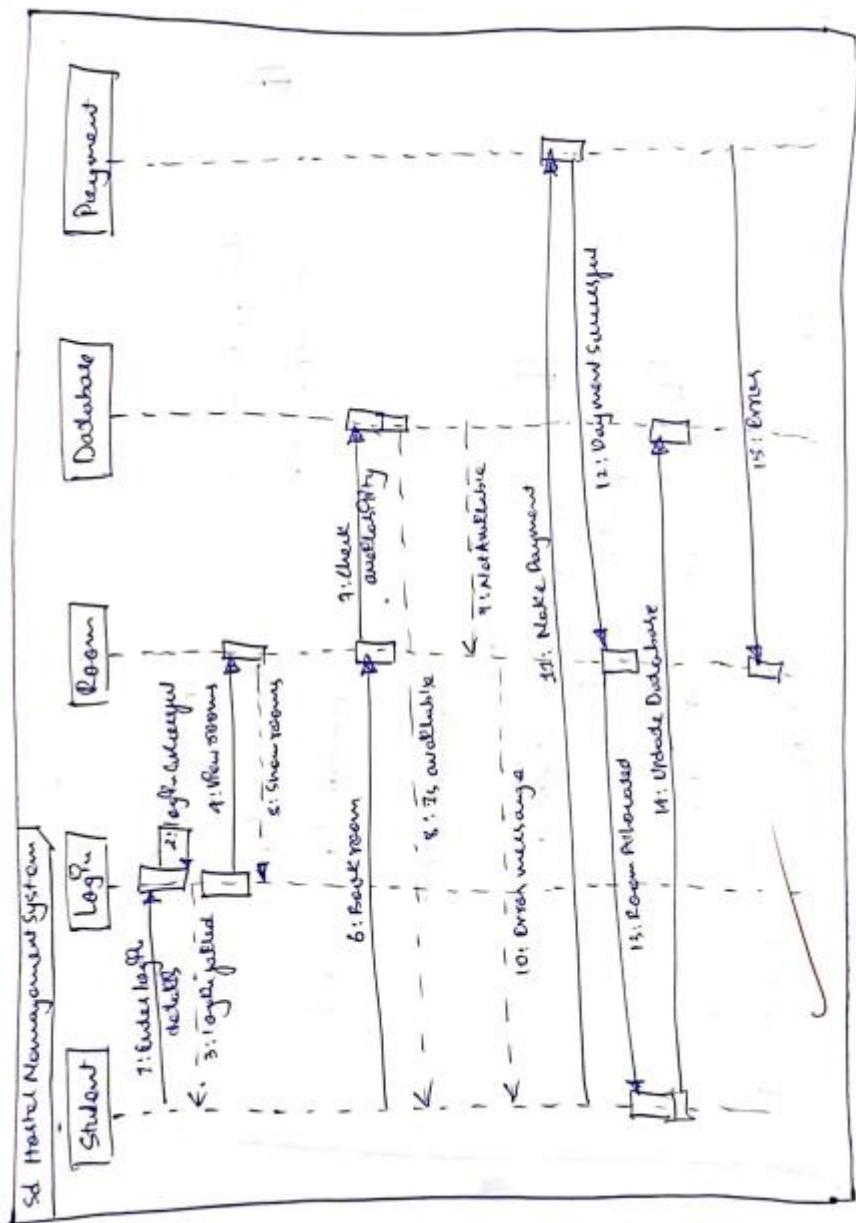
The advanced use case diagram has extra functionalities which includes extends, includes and generalization. The edit hostel info use case extends add room use case, collect fee use case includes verify student, add room use case includes delete room use case.

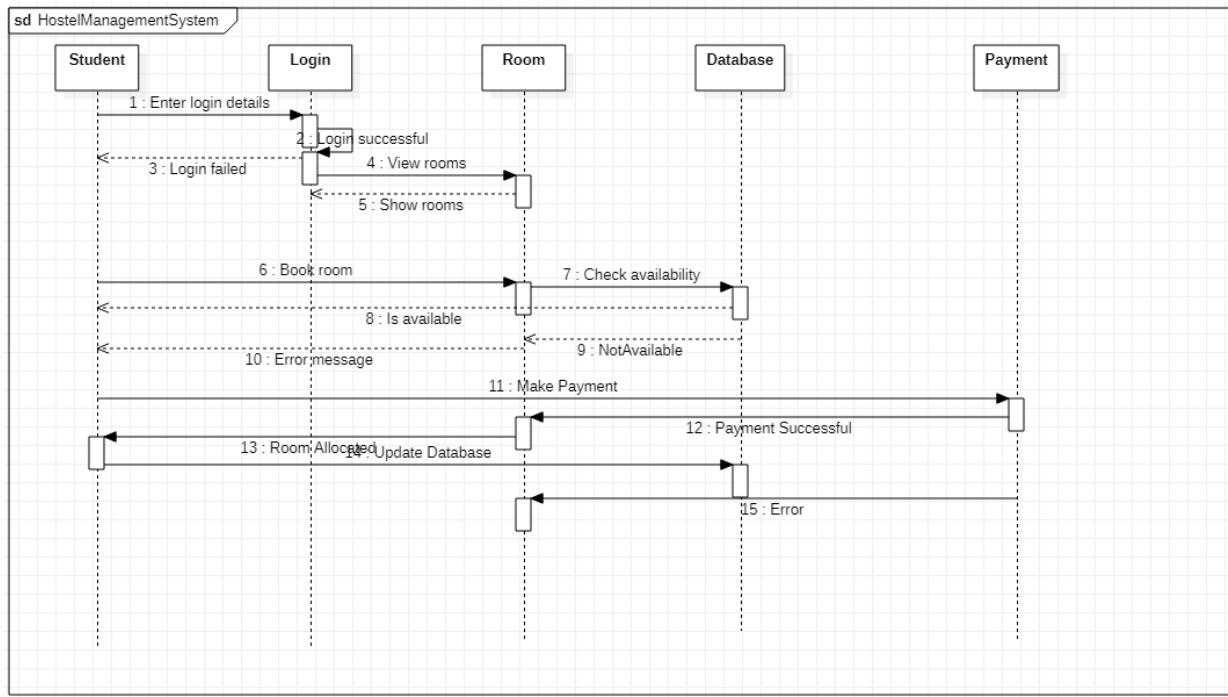




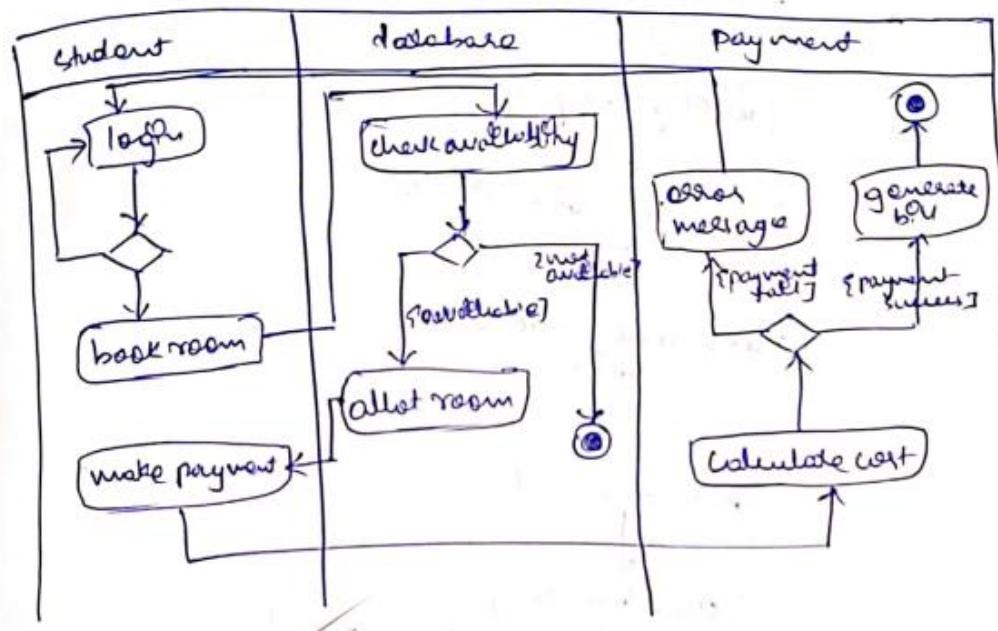
### e) Sequence Diagram:

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.

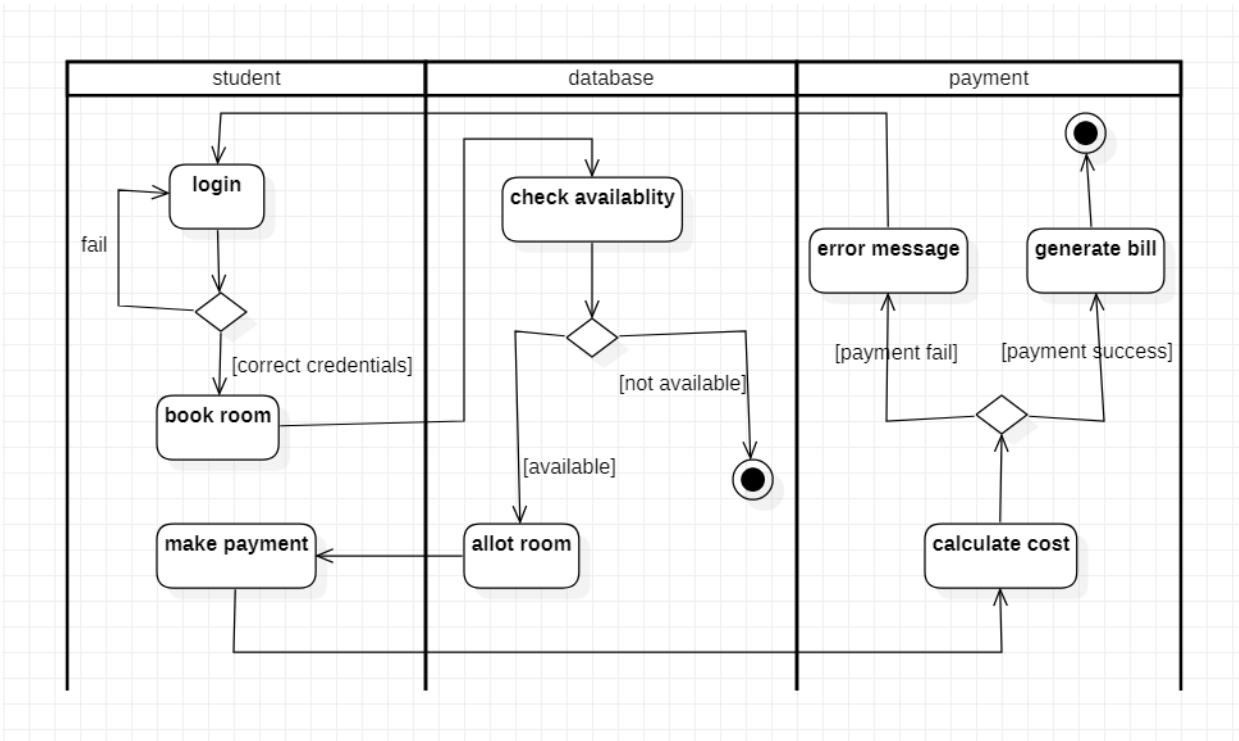




f) Activity Diagram:



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.



### **3. Stock Maintenance System-**

a) SRS:

### ③ Stock Management System

#### Problem Statement:

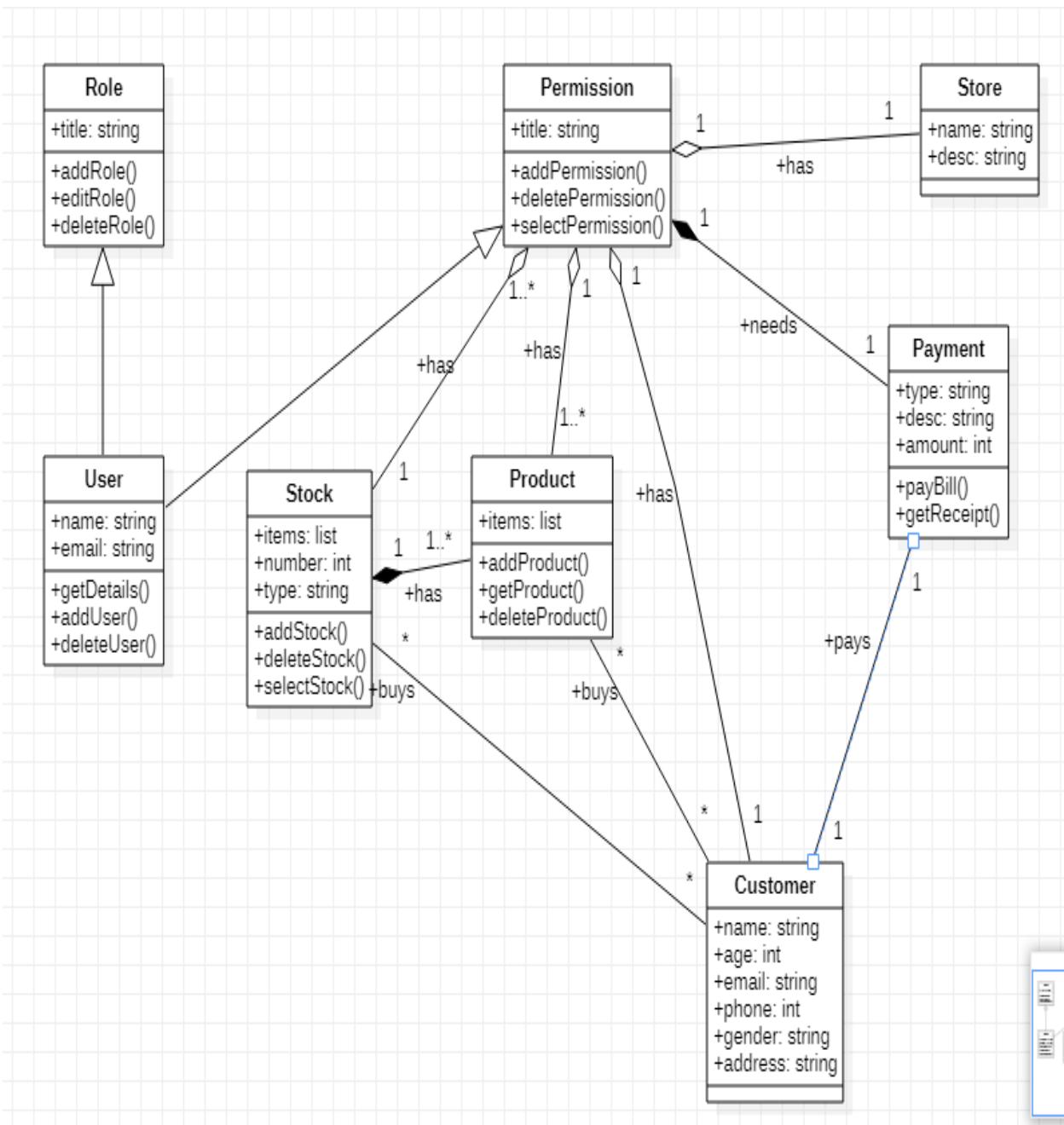
The existing stock management system does not have more features, stocks are not shown clearly and user interface is not good.

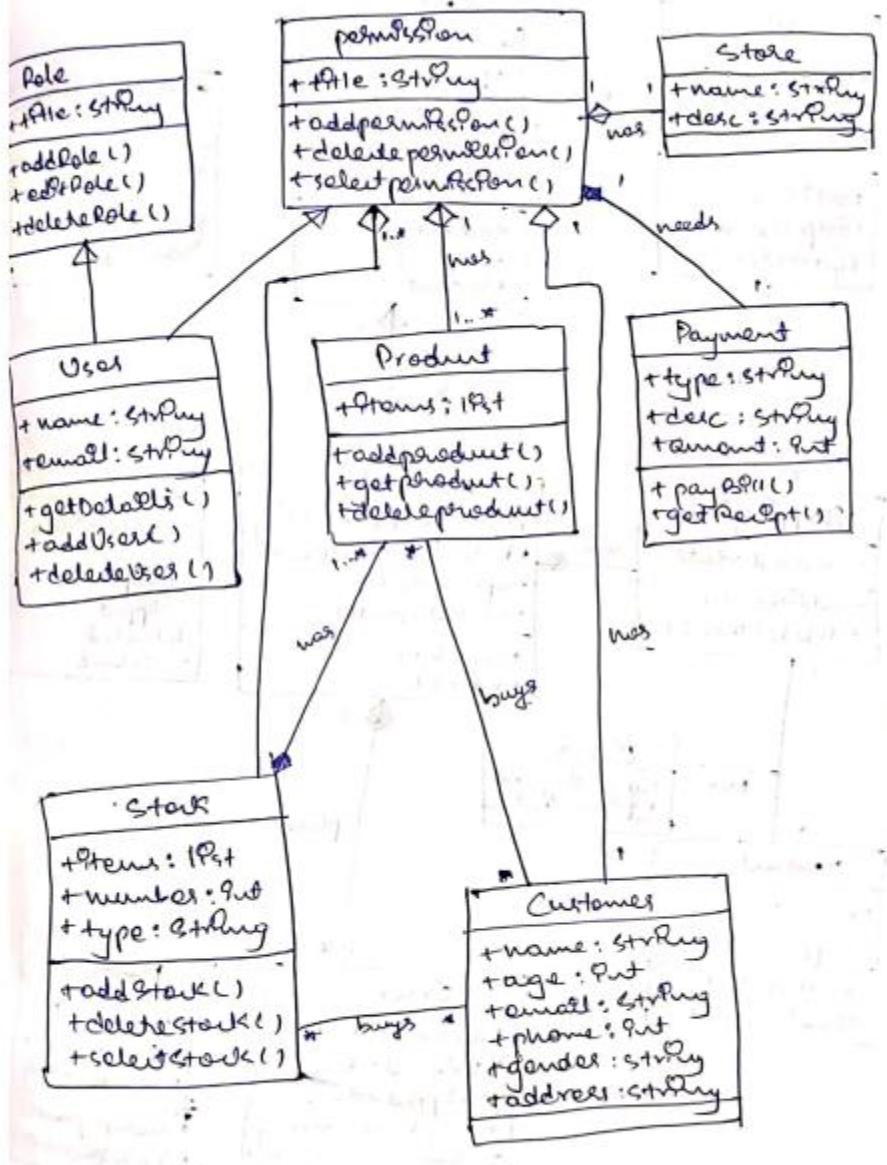
#### SRS:

The stock management system will allow the employees to view information of items available in store. The new system will have a windows-based desktop interface to allow employees to enter information of sales, purchase orders, change employee preferences and create reports. The system retains information on all items in shop.

- \* Owner has a manager <sup>who</sup> manages the inventory. The owner can order, sell stock. he can make payments, report quality items, return stock and track order.
- \* The manager maintains a ledger, does quality check and reports to owner
- \* In Inventory, we can add, remove, edit and search the inventory. we can calculate the required and expired stock.
- \* The order details contain details of order.
- \* The stock can be viewed, edited, added and removed.
- \* The supplier tracks order details and supplies the stock and receives payment
- \* A product is added, removed, modified. The details of product...

b) Advance Class Diagram:

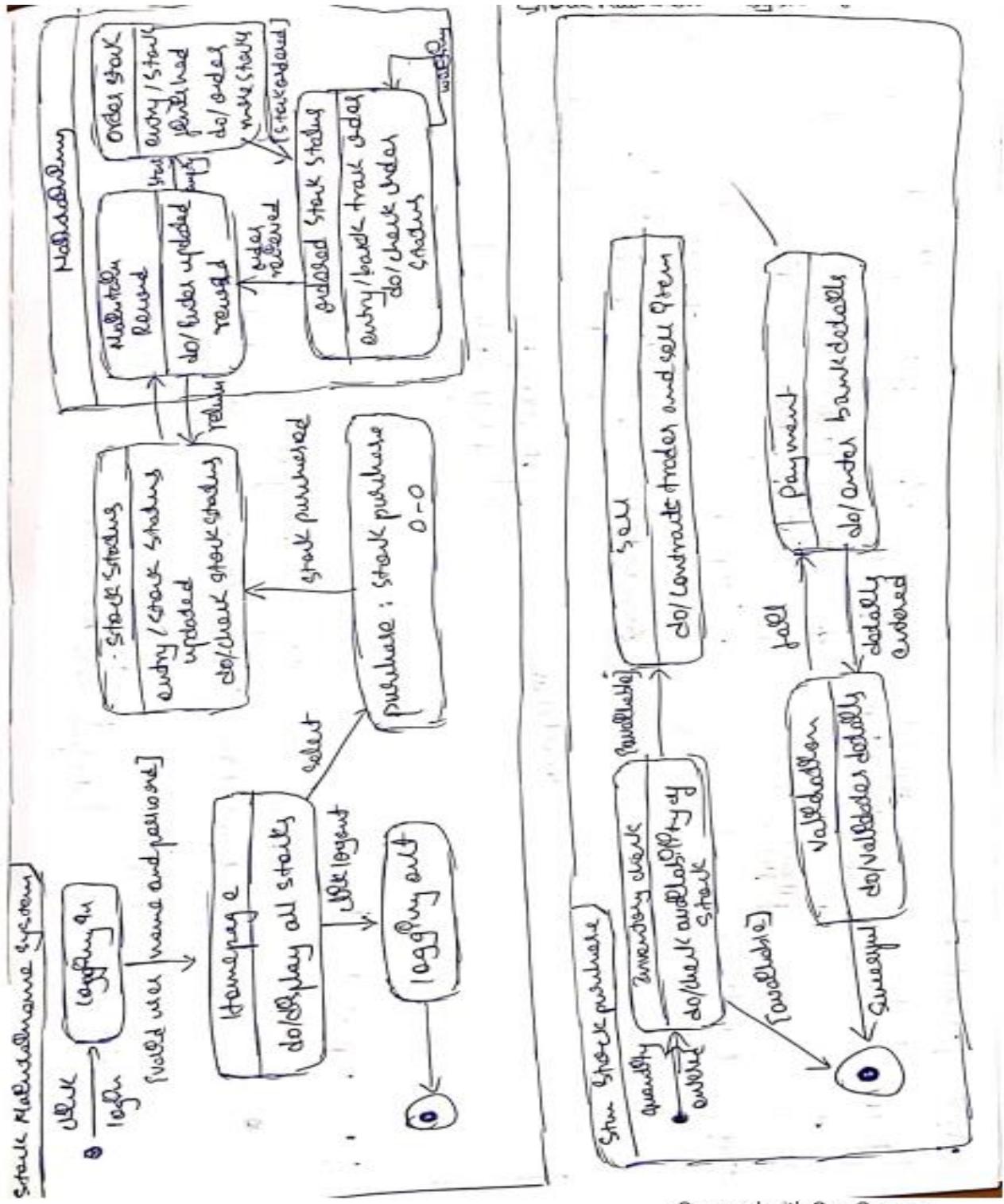




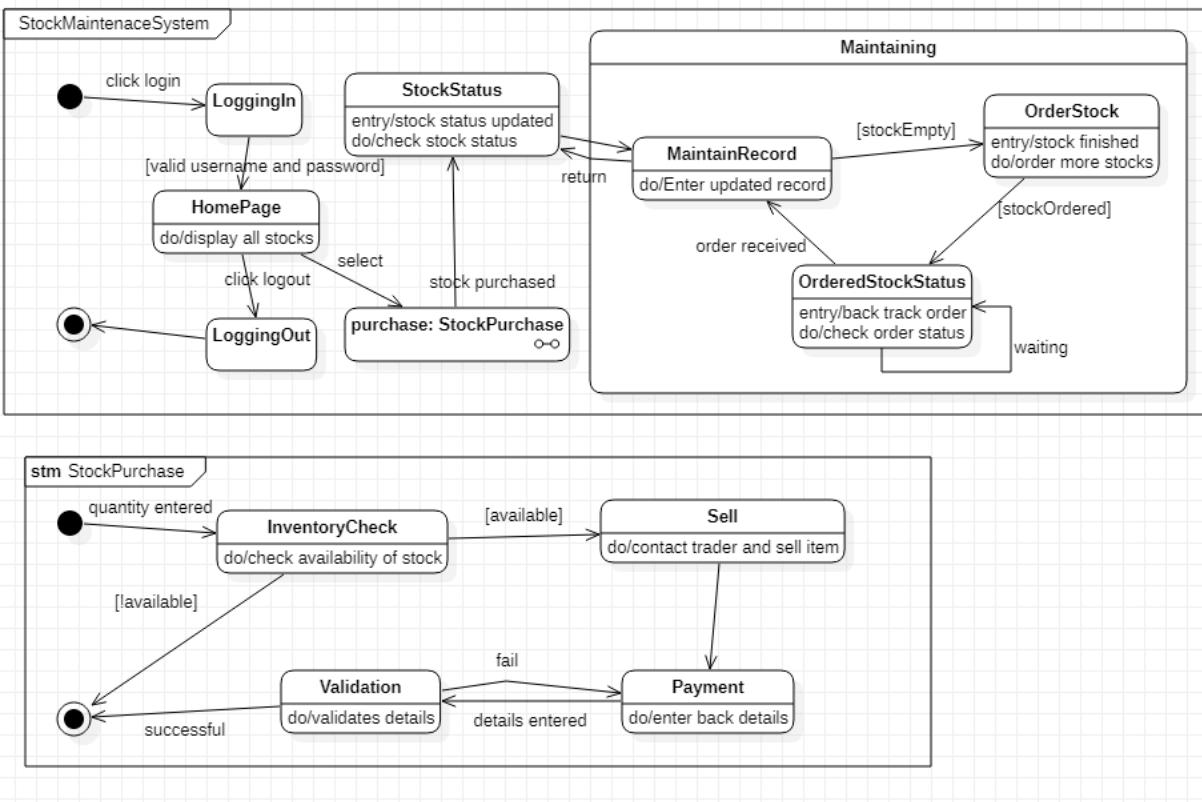
### c) Advance State Diagram:

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.

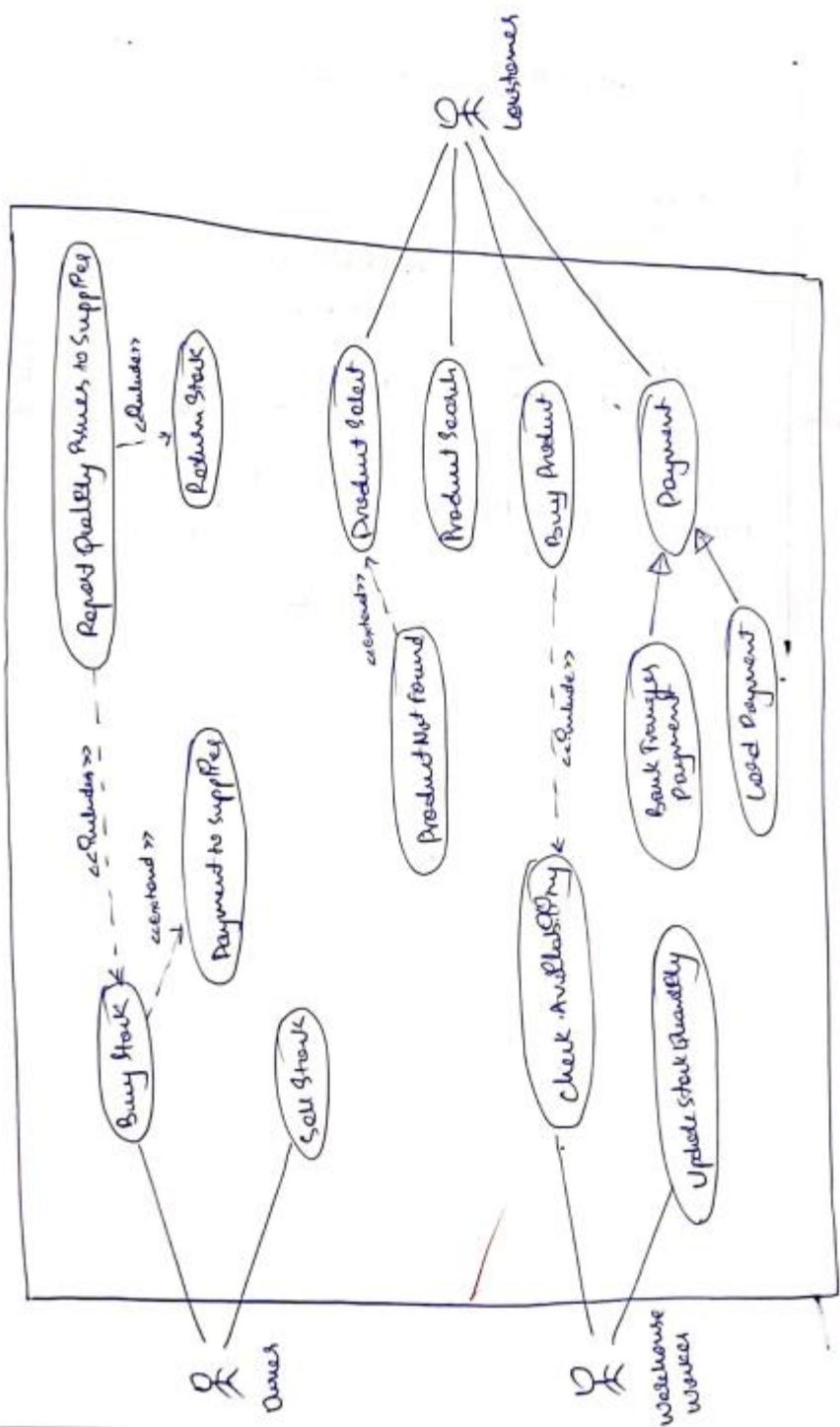


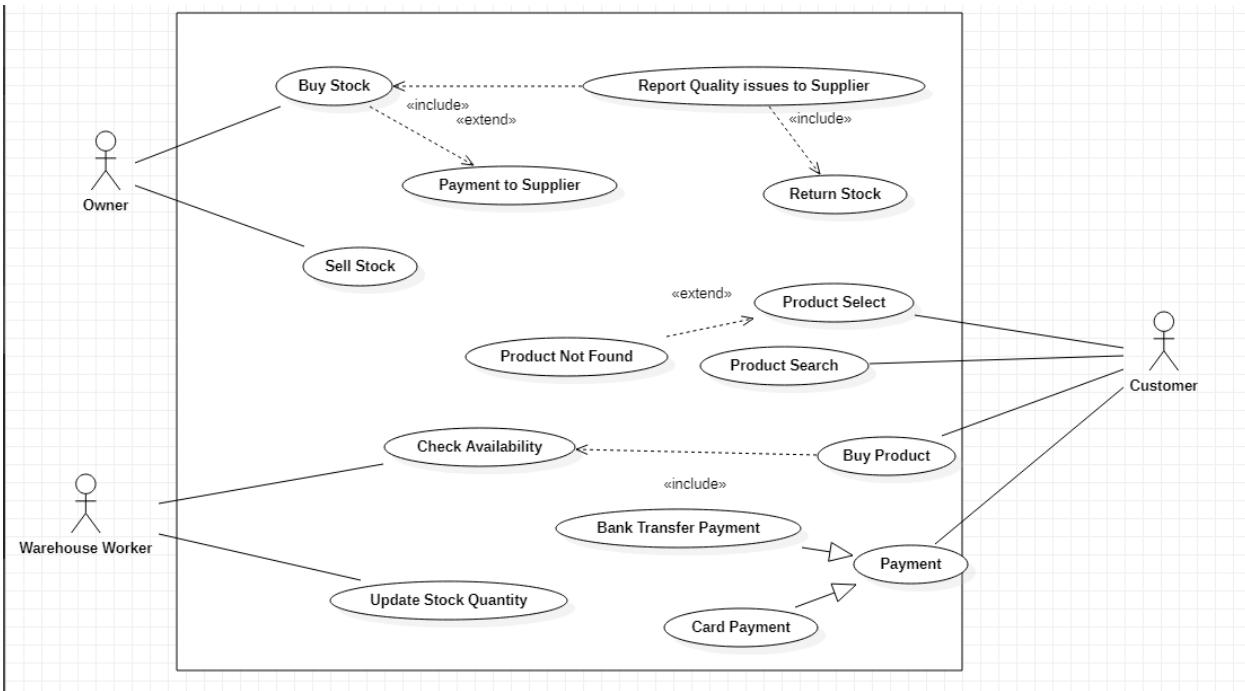
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#### d) Advance Use Case Diagram:

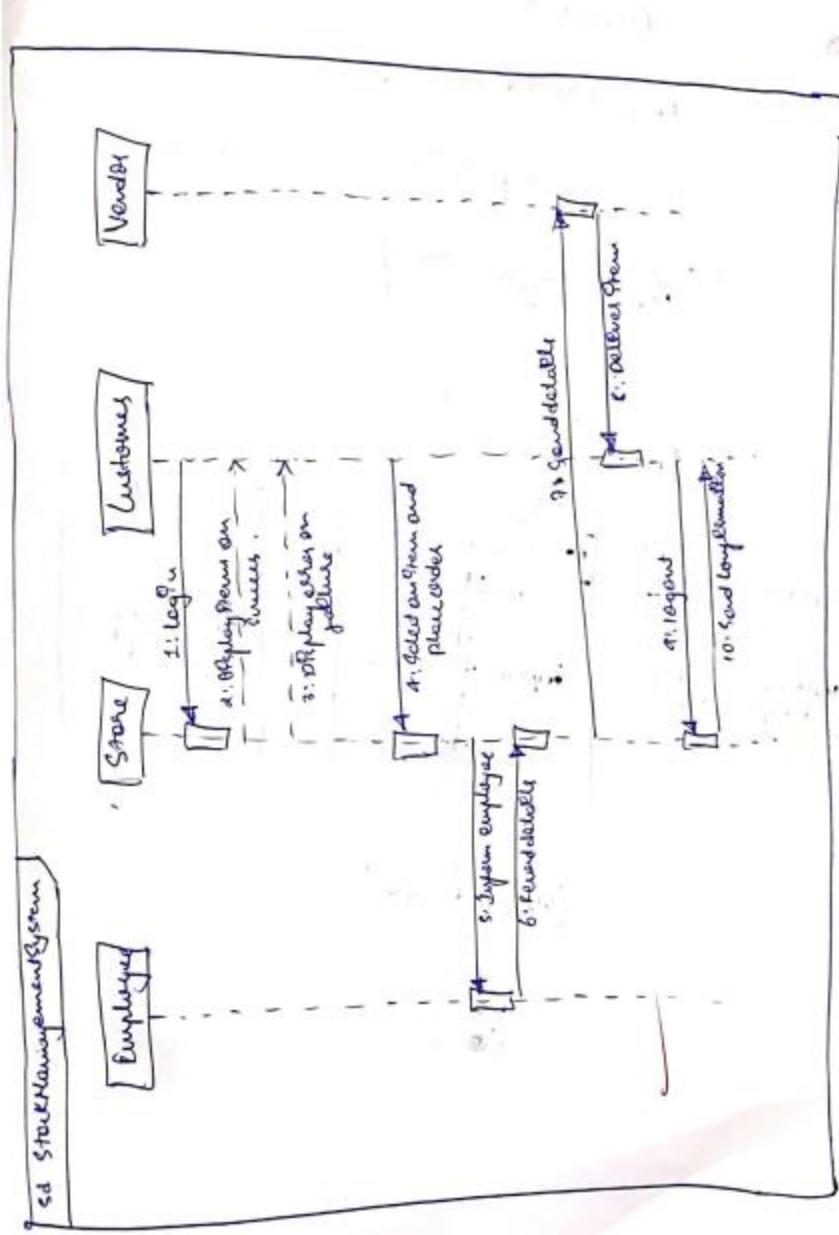
The advanced use case diagram has extra functionalities which includes extends, includes and generalization. The stock level use case extends place order use case, detective shipment use case extends check quality criteria use case , shipment error use case extends receive shipment with bill use case,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

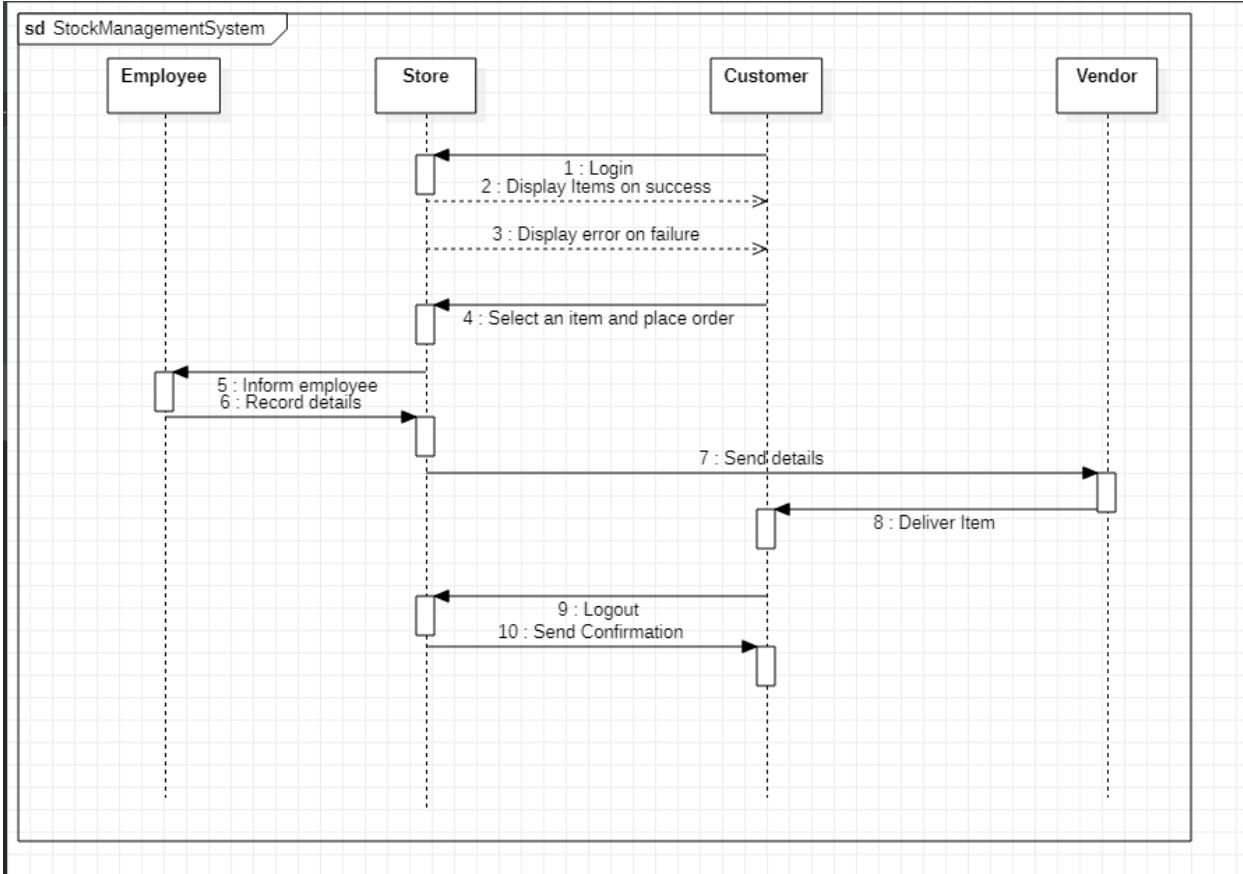




### e) Sequence Diagram:

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.

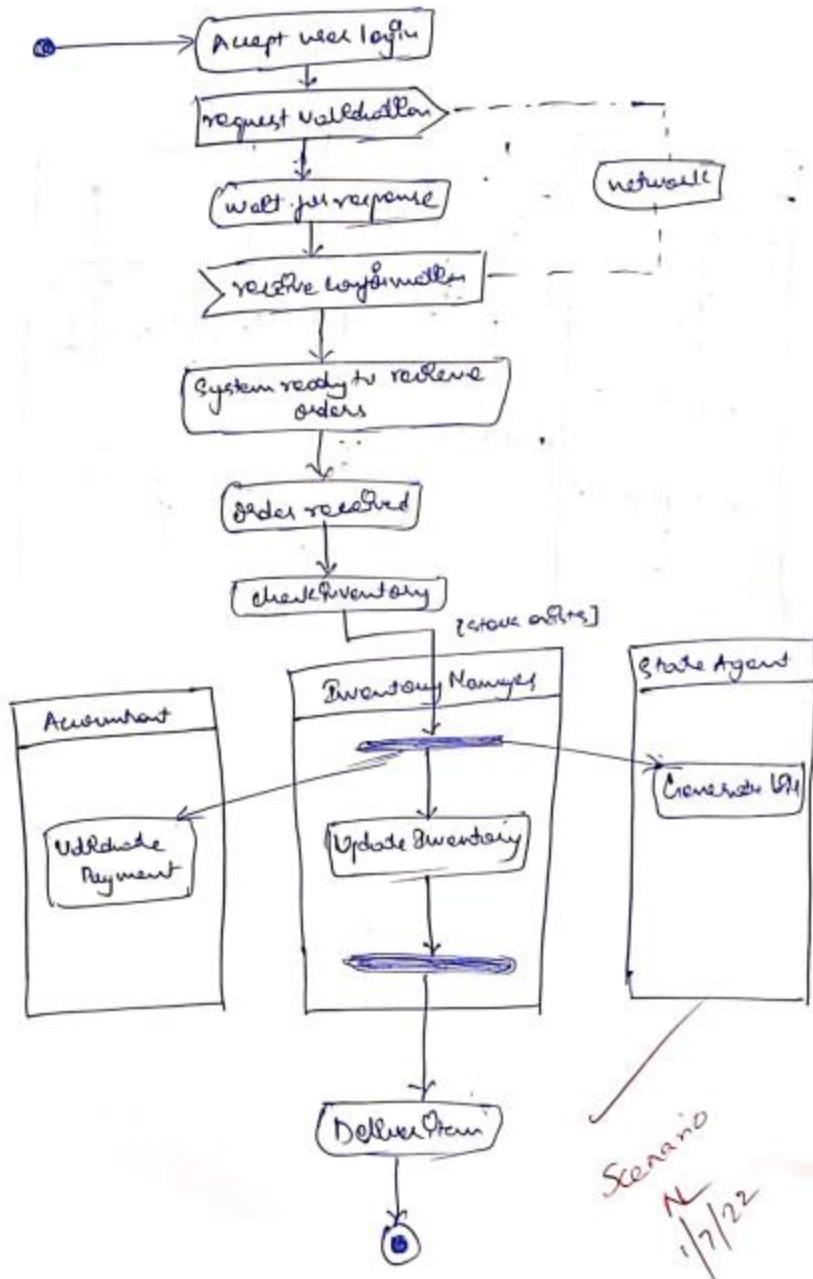


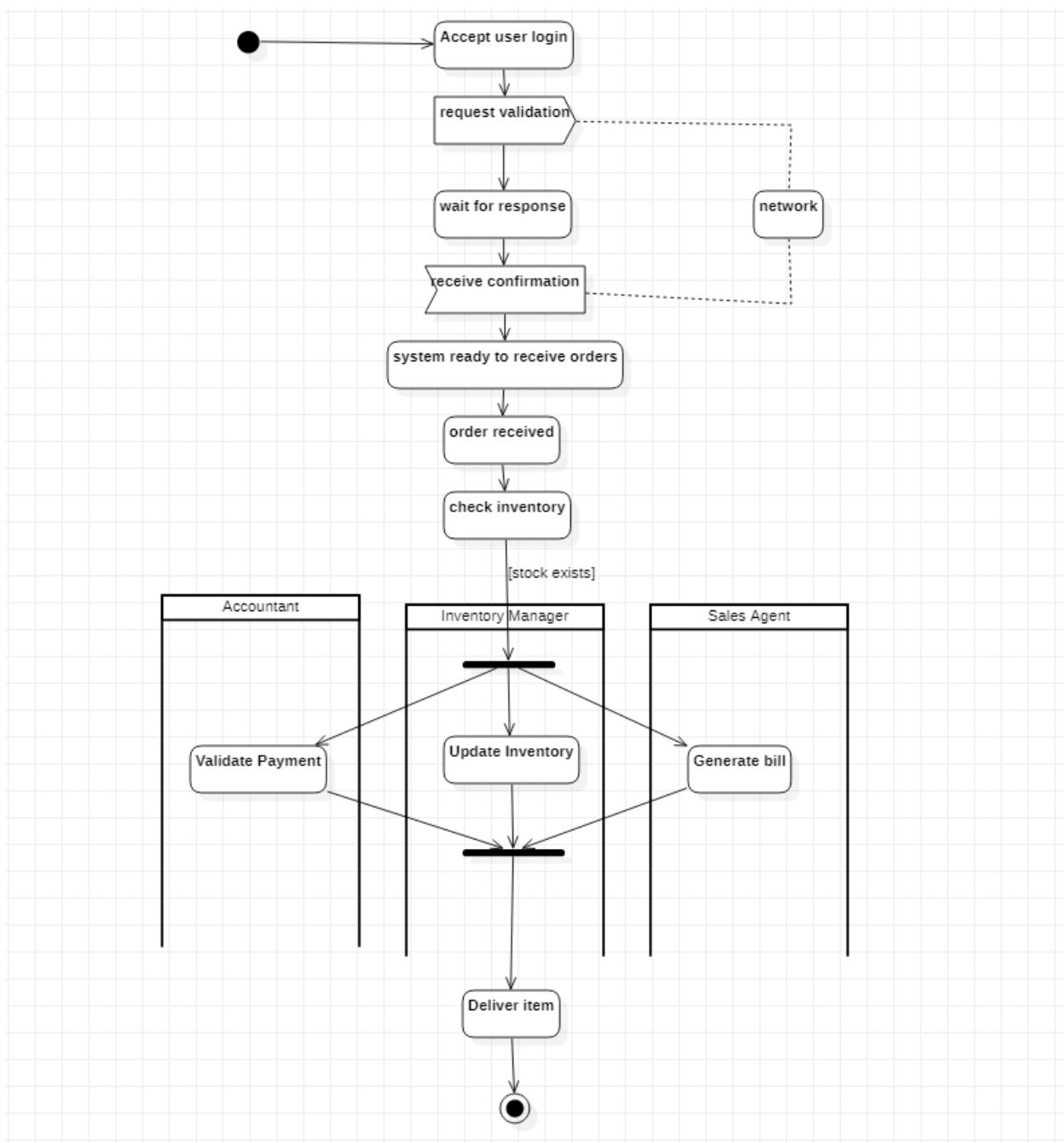


#### f) Activity Diagram:

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.

## ② Stock Management System.





#### **4. Coffee Vending Machine-**

a) SRS:

## ① Coffee Vending Machine

Problem Statement :

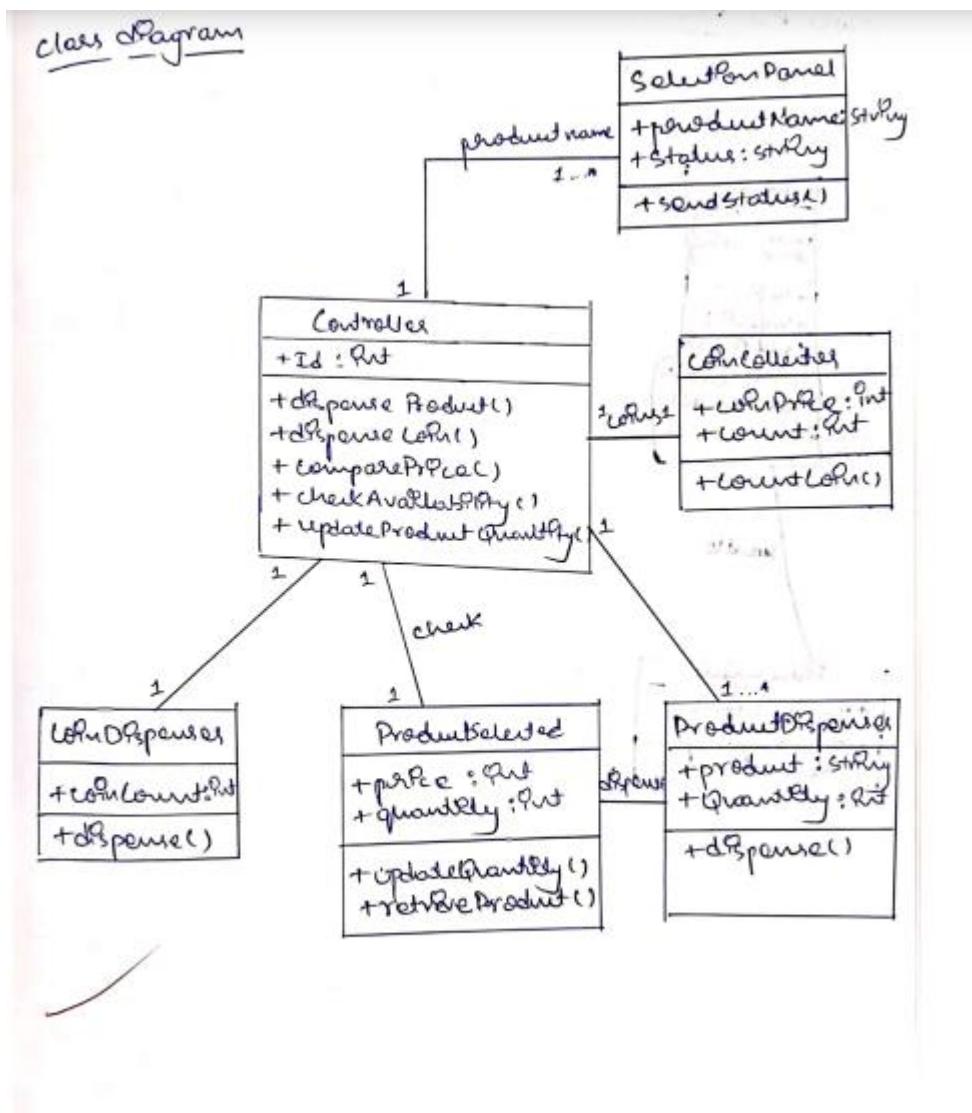
The coffee used to get in hand by the third person. It's not good in these pandemic situation. Lack of hygiene.

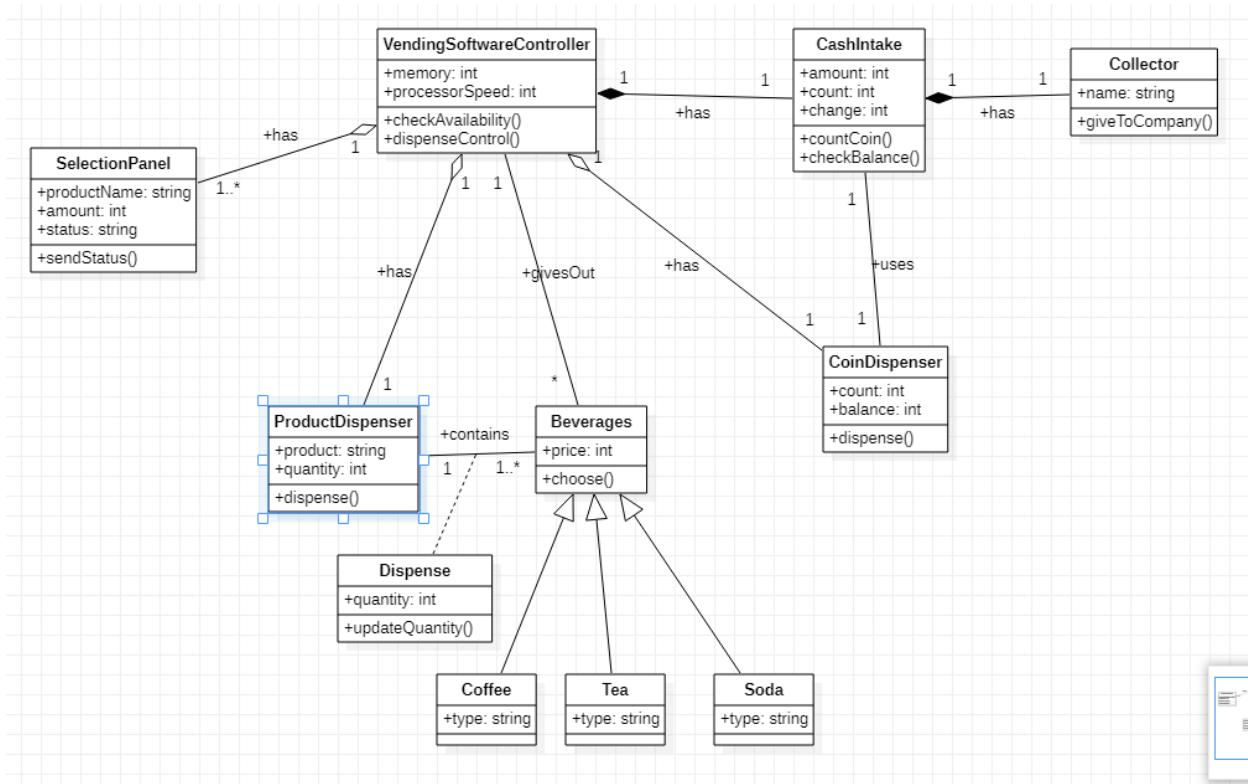
SRS :

Coffee vending machine is designed to dispense coffee in required quantity by collecting information such as type of coffee from customer and estimating price and quantity necessary for preparation of particular type of coffee.

- \* Controller should dispense the product, check availability of product, update product quality of the each dispense.
- \* The selection panel sends codes of selected product.
- \* The coin collector should count the coins given by customer and keep track of it.
- \* Product dispenser should dispense the selected product.
- \* The price and quality of product should be maintained.
- \* Coin dispenser should dispense remaining amount to the customer.

b) Advance Class Diagram:

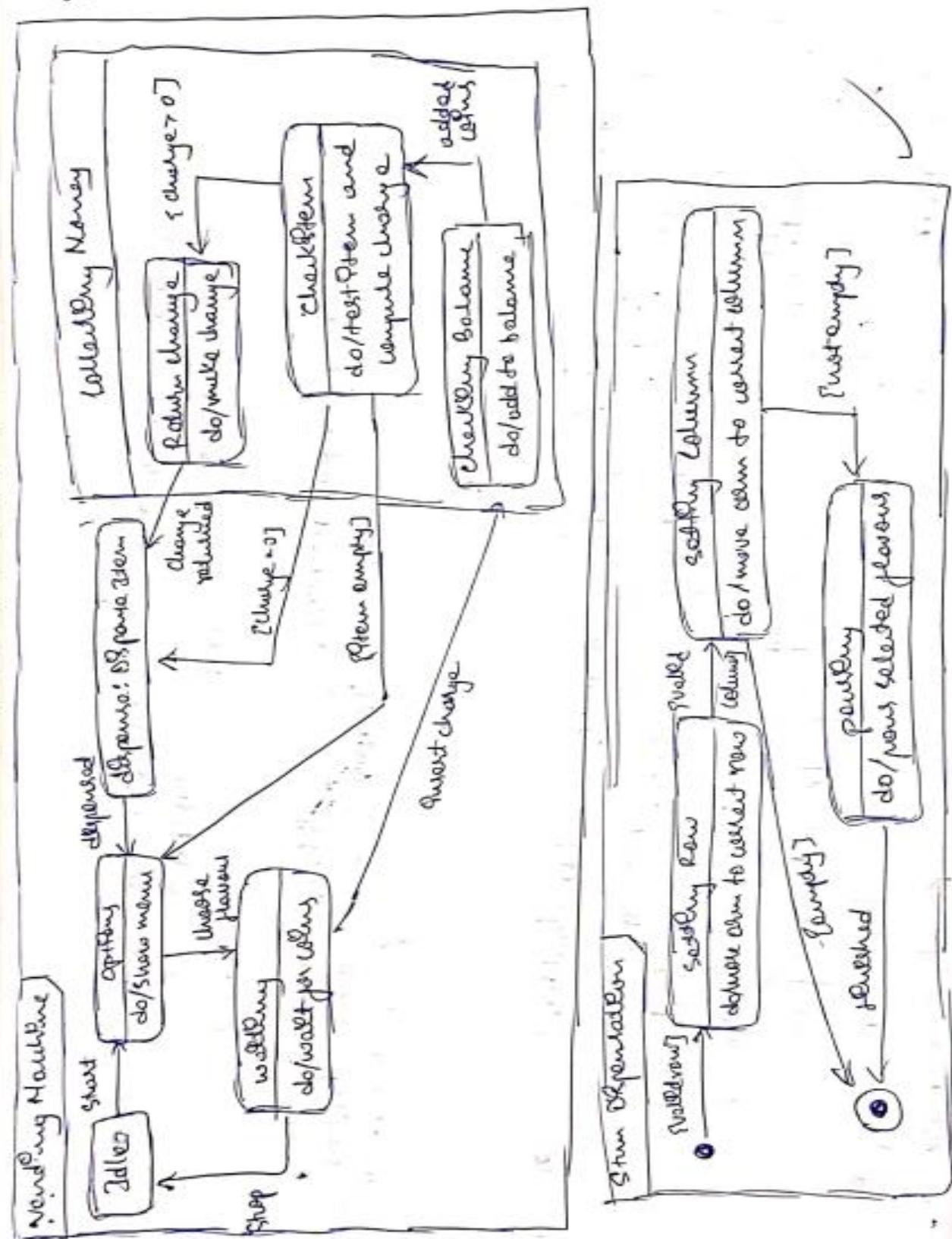


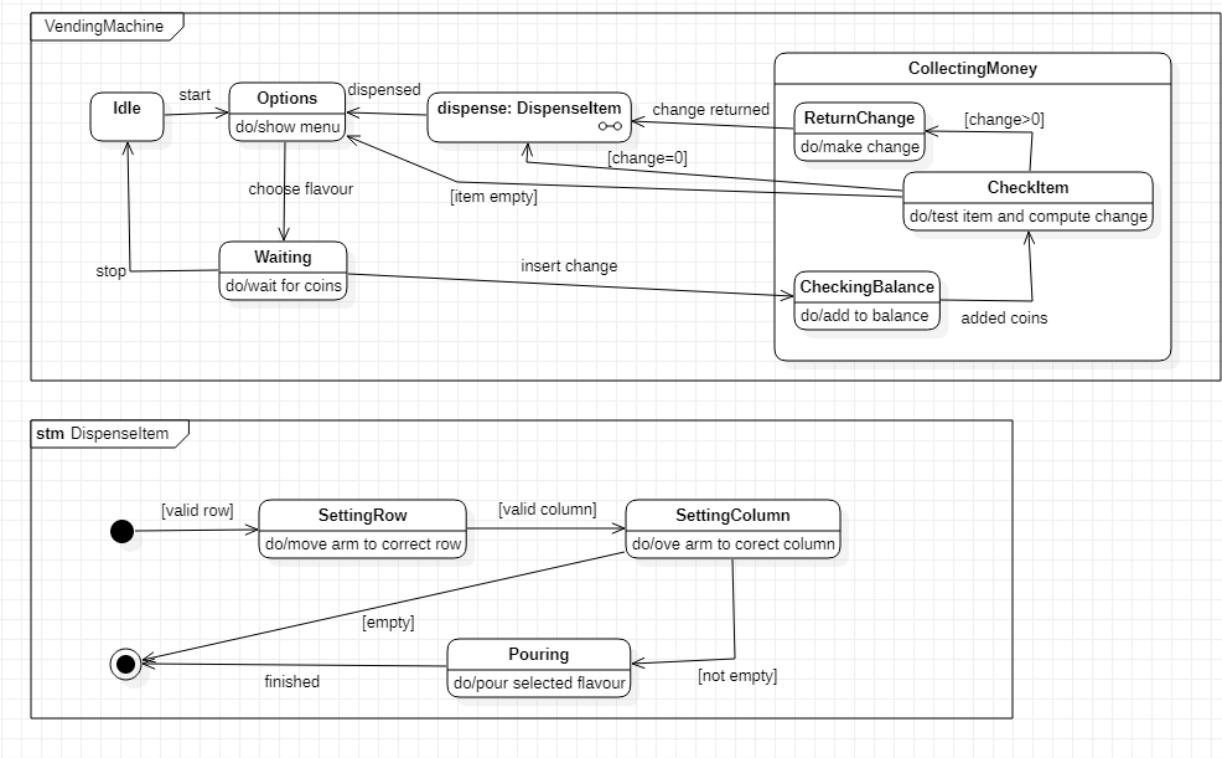


### c) Advance State Diagram:

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.

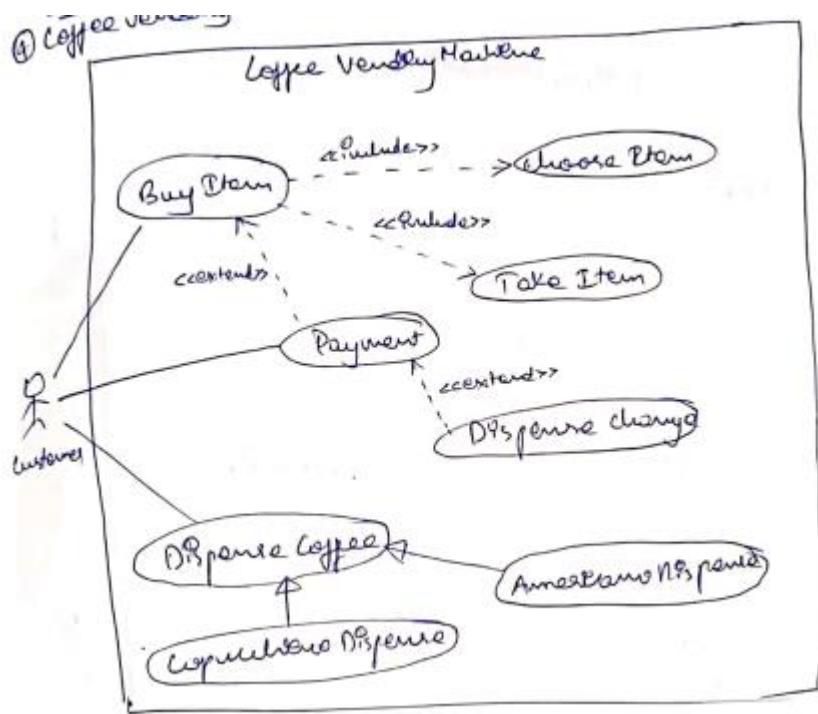
## Coffee vending system :-

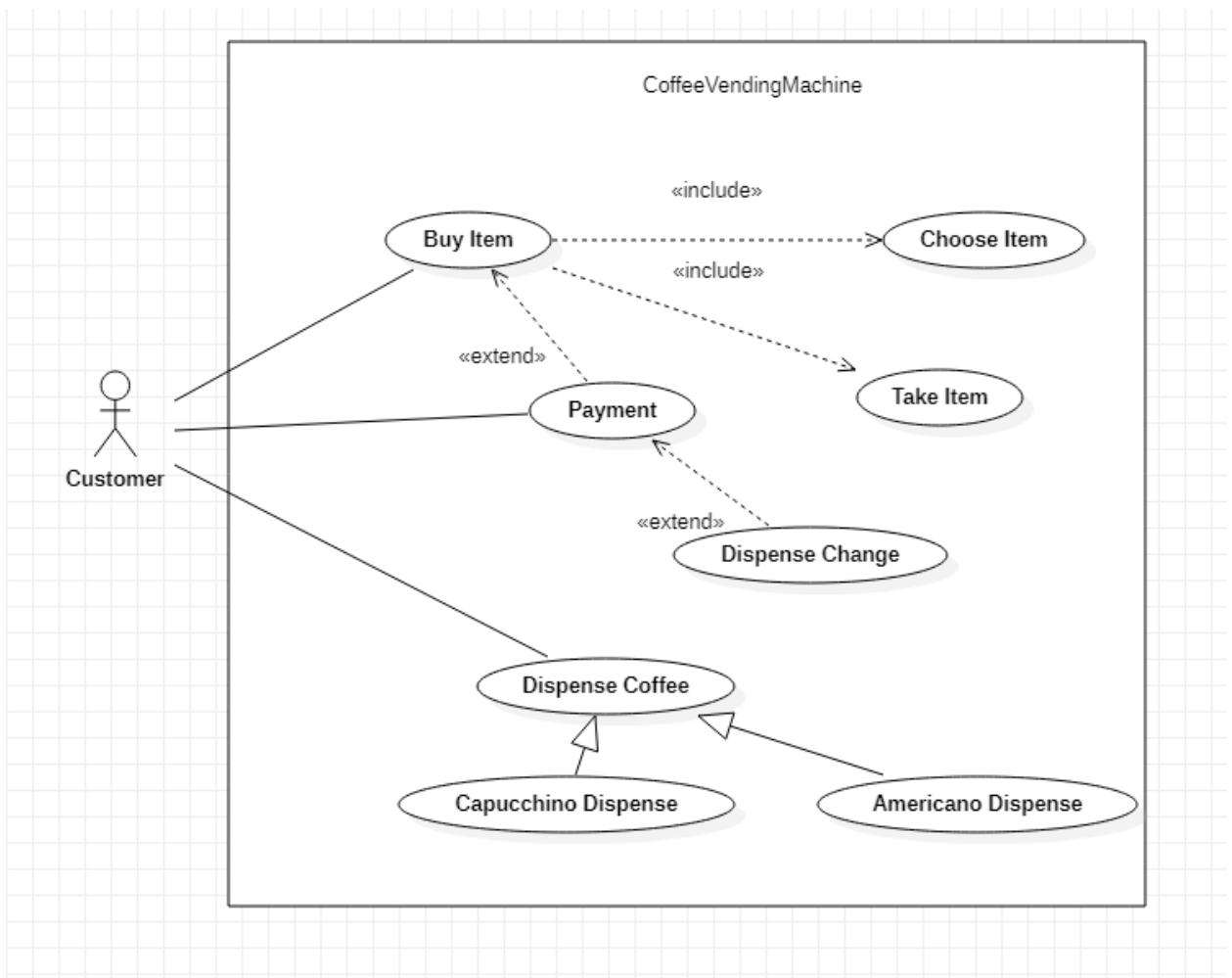




#### d) Advance Use Case Diagram:

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. Capuchino dispense and American dispense



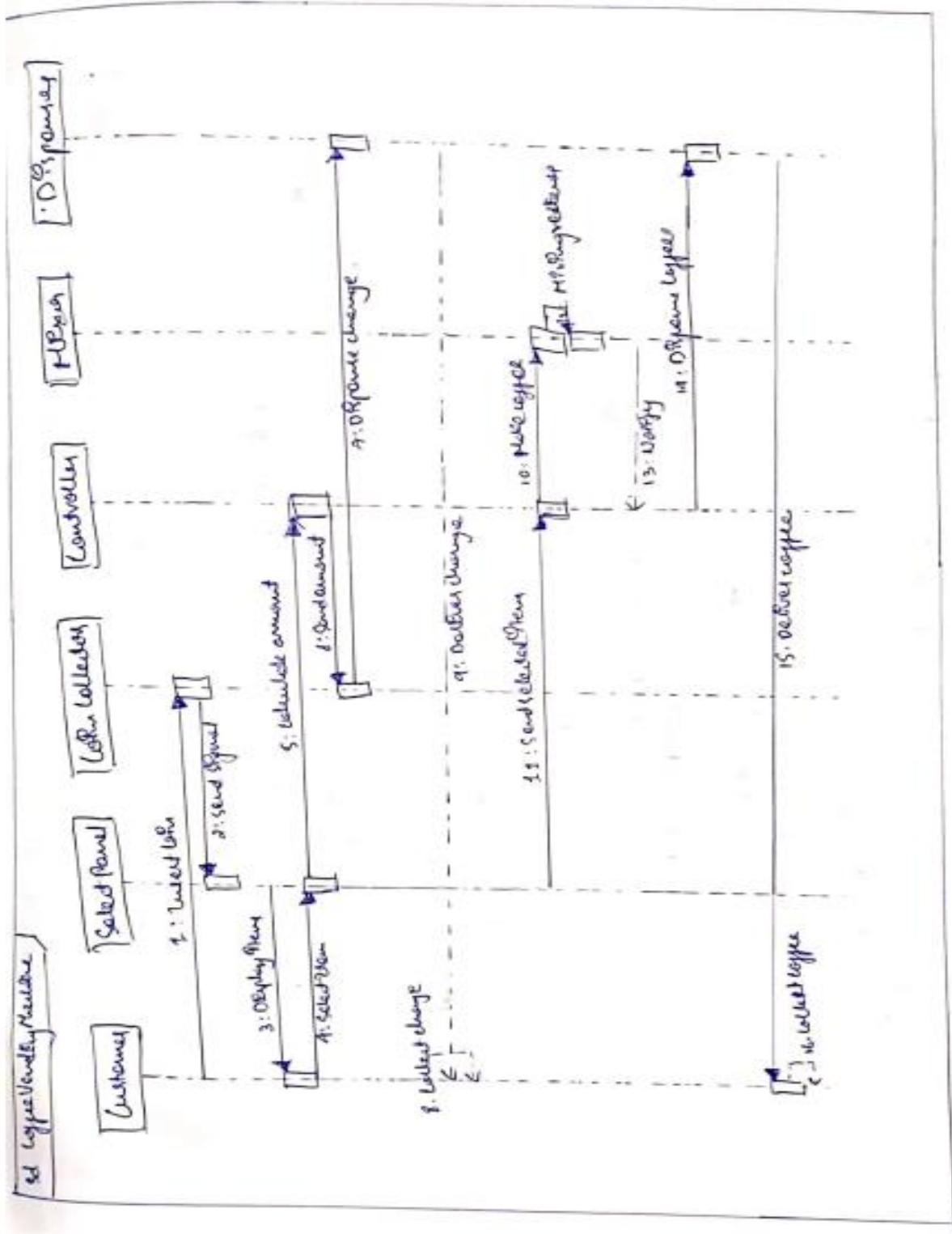


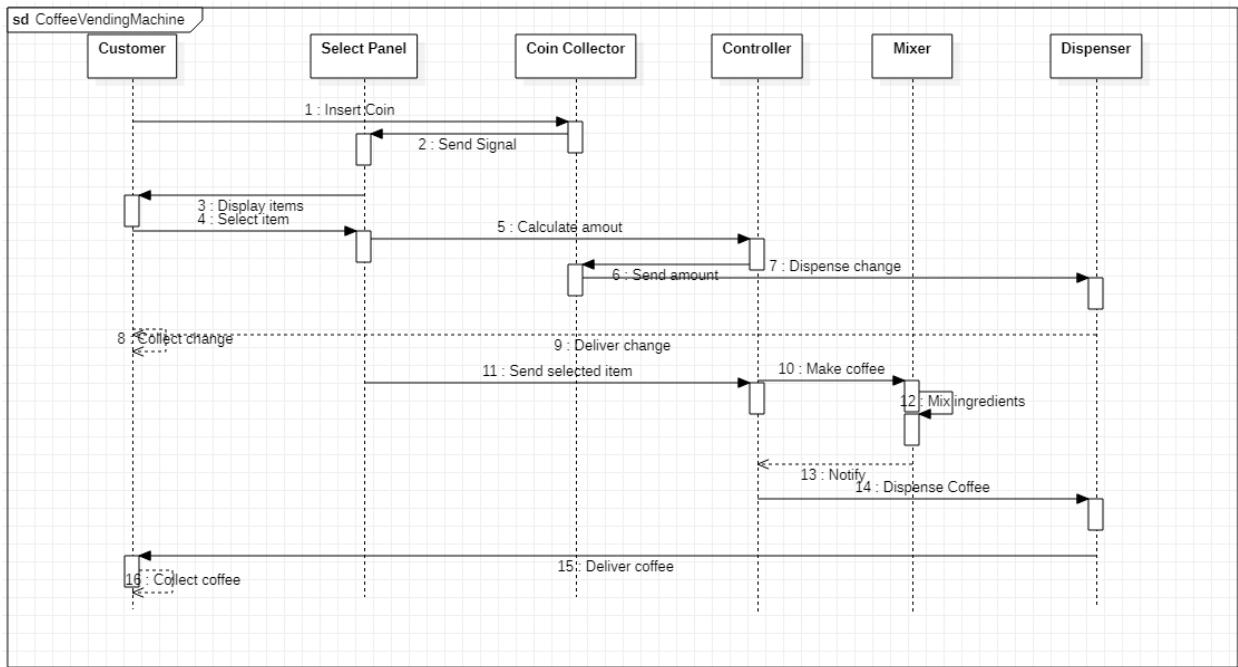
e) Sequence Diagram:

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 verify coins.

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.

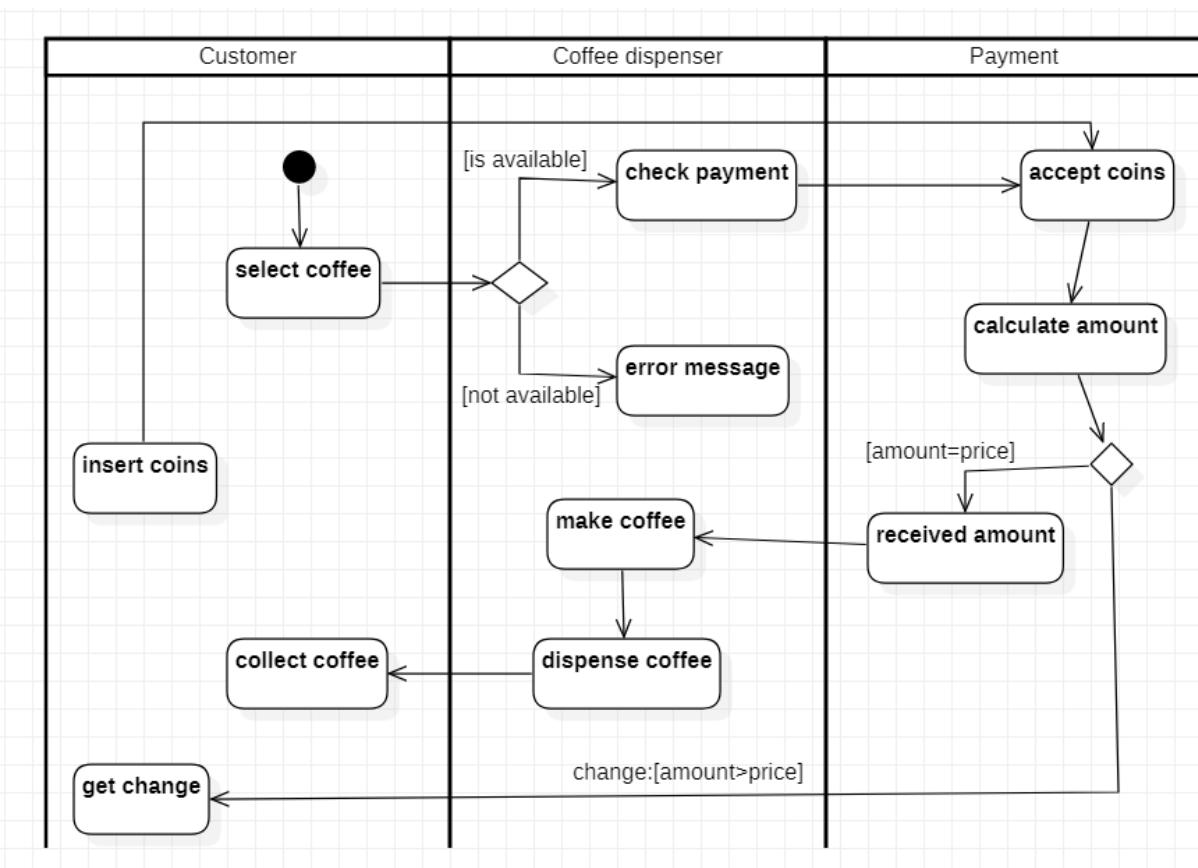
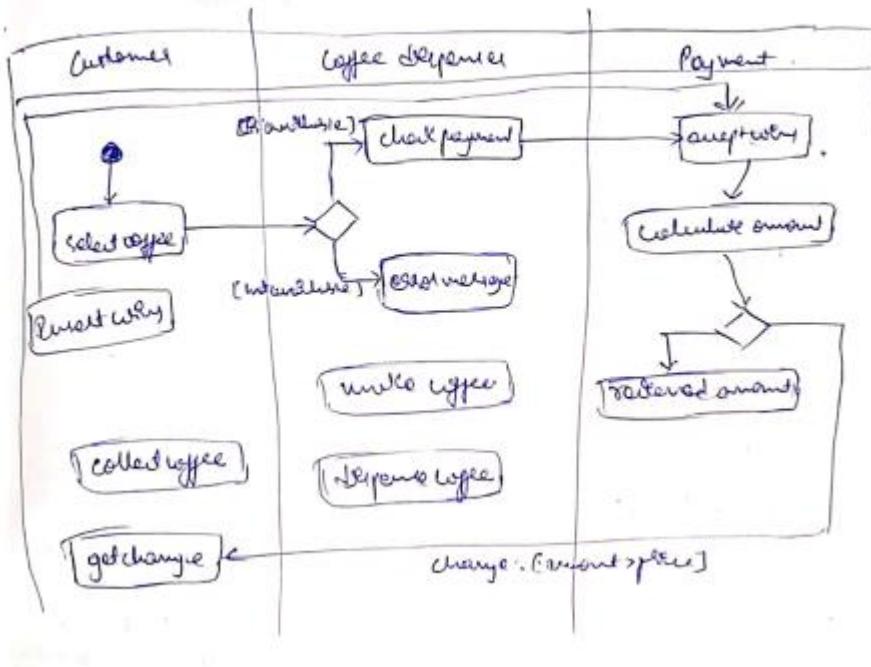
① coffee vending machine





f) Activity Diagram:

① Coffee Vending Machine



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-**

a) SRS:

### ③ Online Shopping System

Problem Statement:

The local shopping system does not have much collection points. It also has the quality issue and price issue.

SRS:

The online shopping system allows the users and vendors to exchange products remotely & reduces the amount of cost and time substantially.

The system provides following facilities to customers.

- \* facilitates easy shopping online anywhere with free shipping
- \* provides information about products in category.
- \* can avail the facility of purchasing second hand products
- \* customers are provided with up to date information in the products available.
- \* provides email facility
- \* provides backup facility.
- \* can add nearly ten products to their shopping cart at a time

The system will not provide the following facilities to customers:

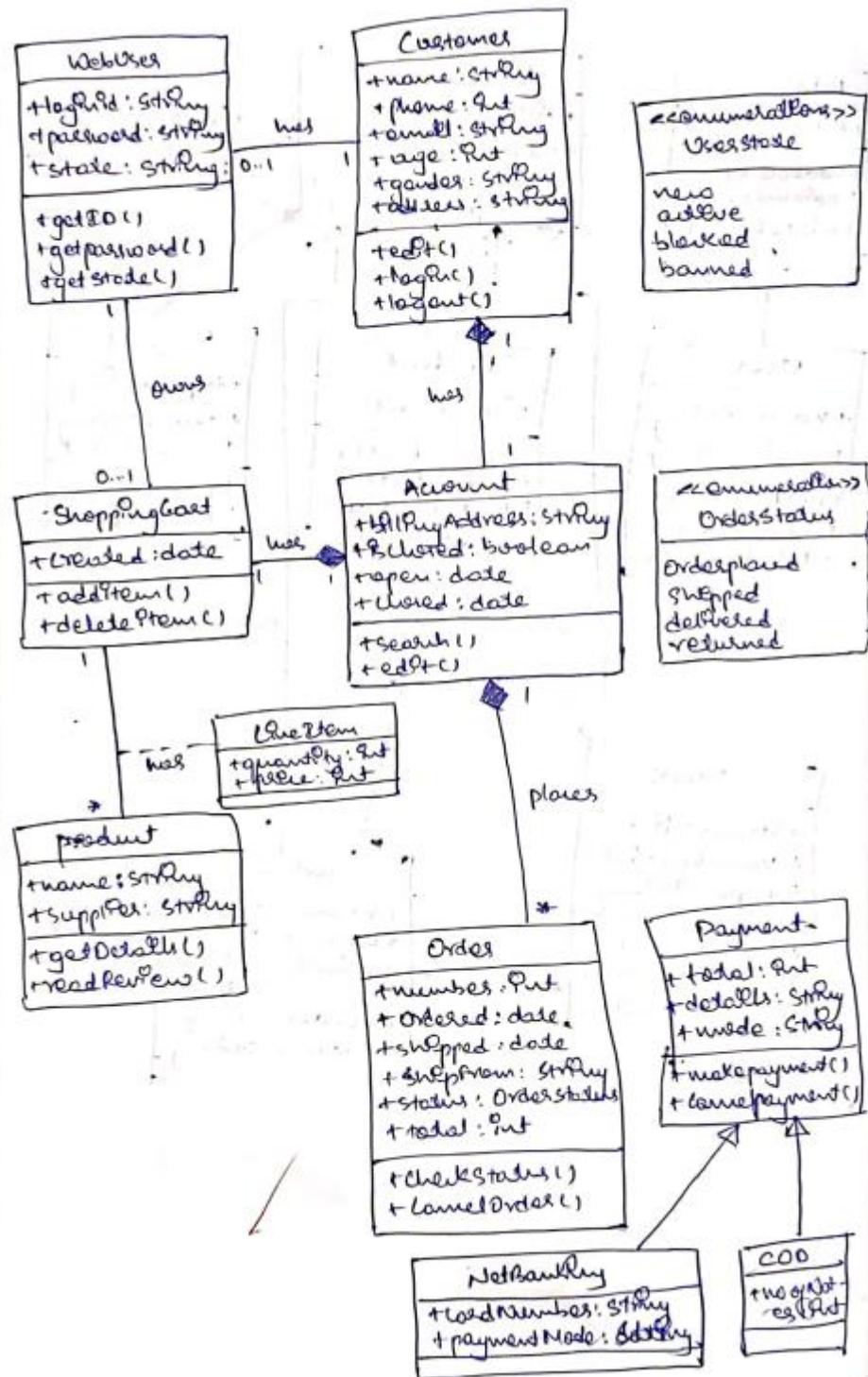
- \* cannot reverse the product for more than two days.
- \* cannot receive more than two products
- \* Responsibility of damages

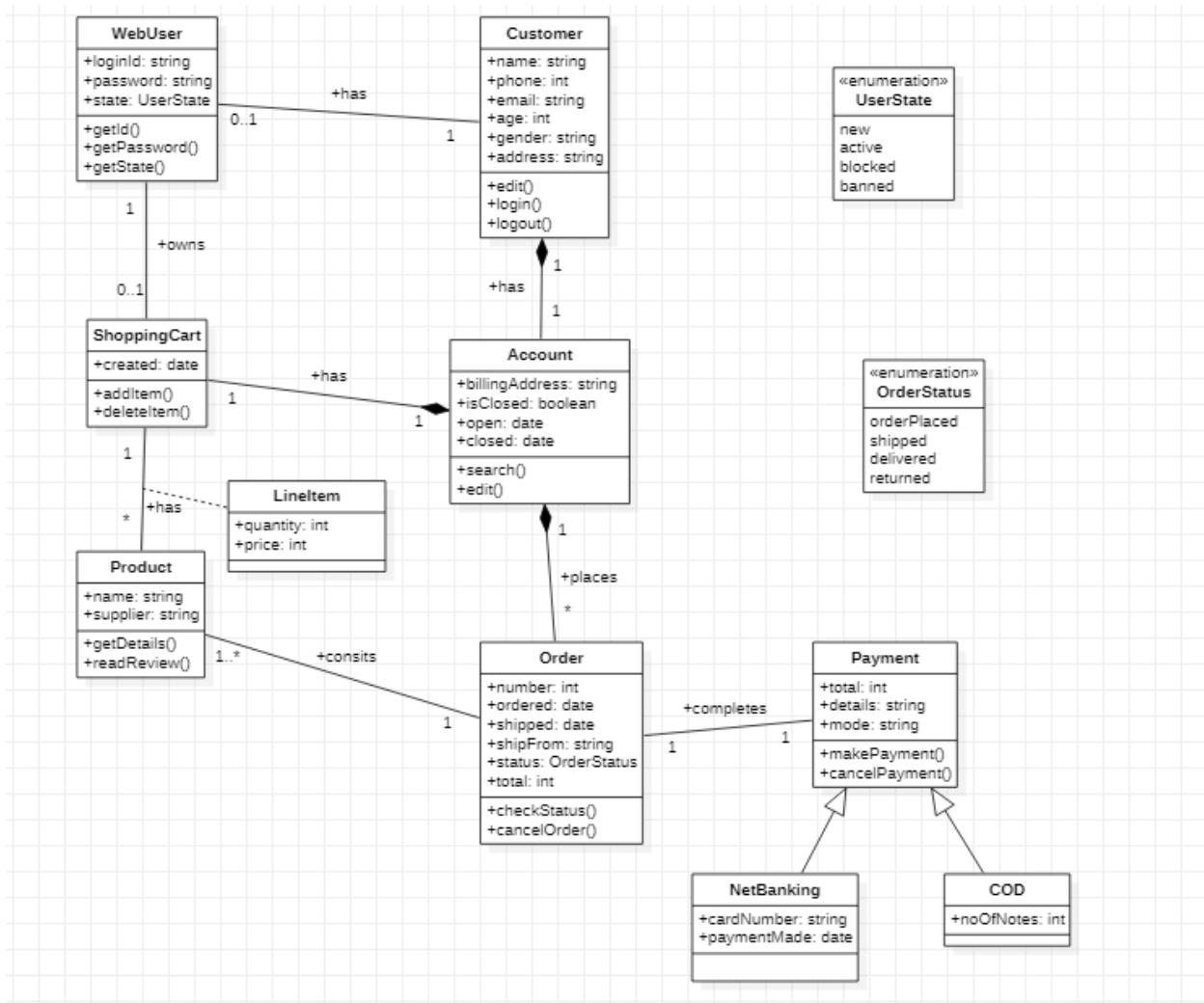
The system provides following facilities to merchants.

- \* facilitates every bidding facility.
- \* provide complete information about the customers.
- \* provide complete information about the products
- \* can avoid the facility of small user experience.
- \* can avail the brand catalog facility.

b) Advance Class Diagram:

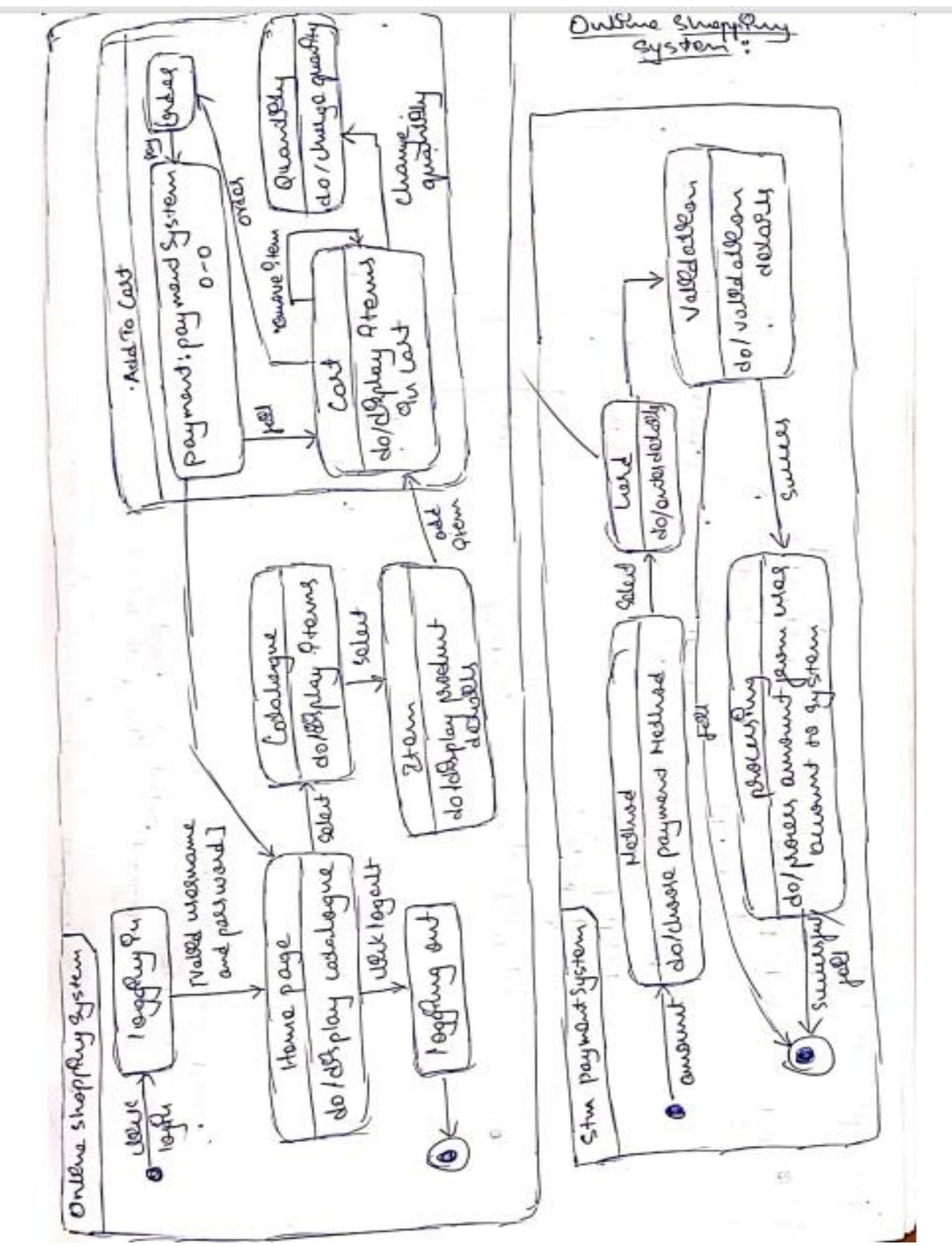
## Online Shopping System

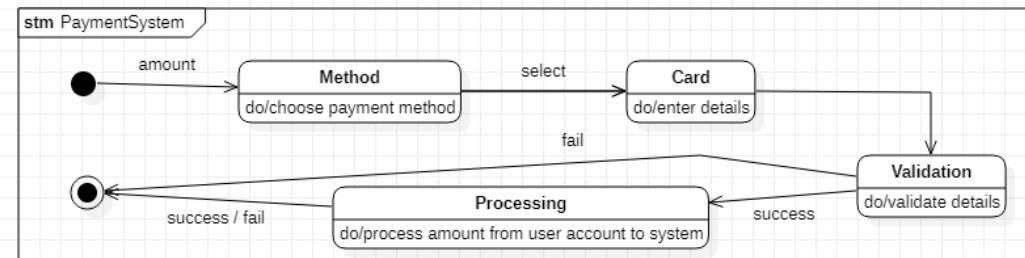
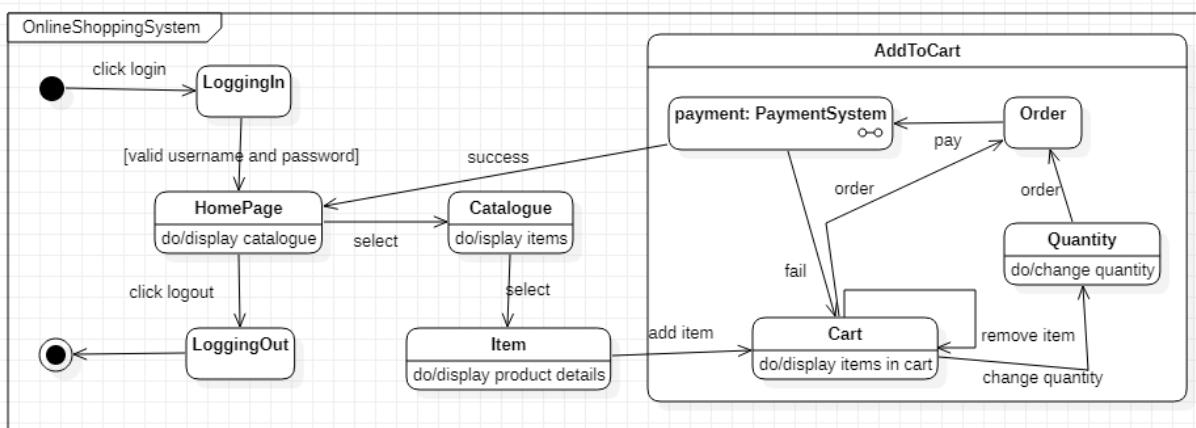




### c) Advance State Diagram:

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.

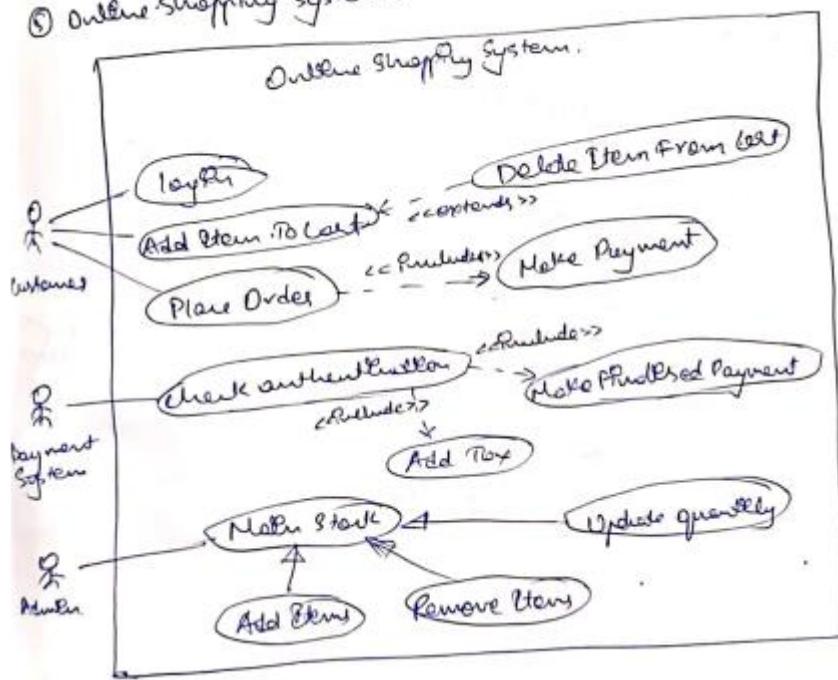


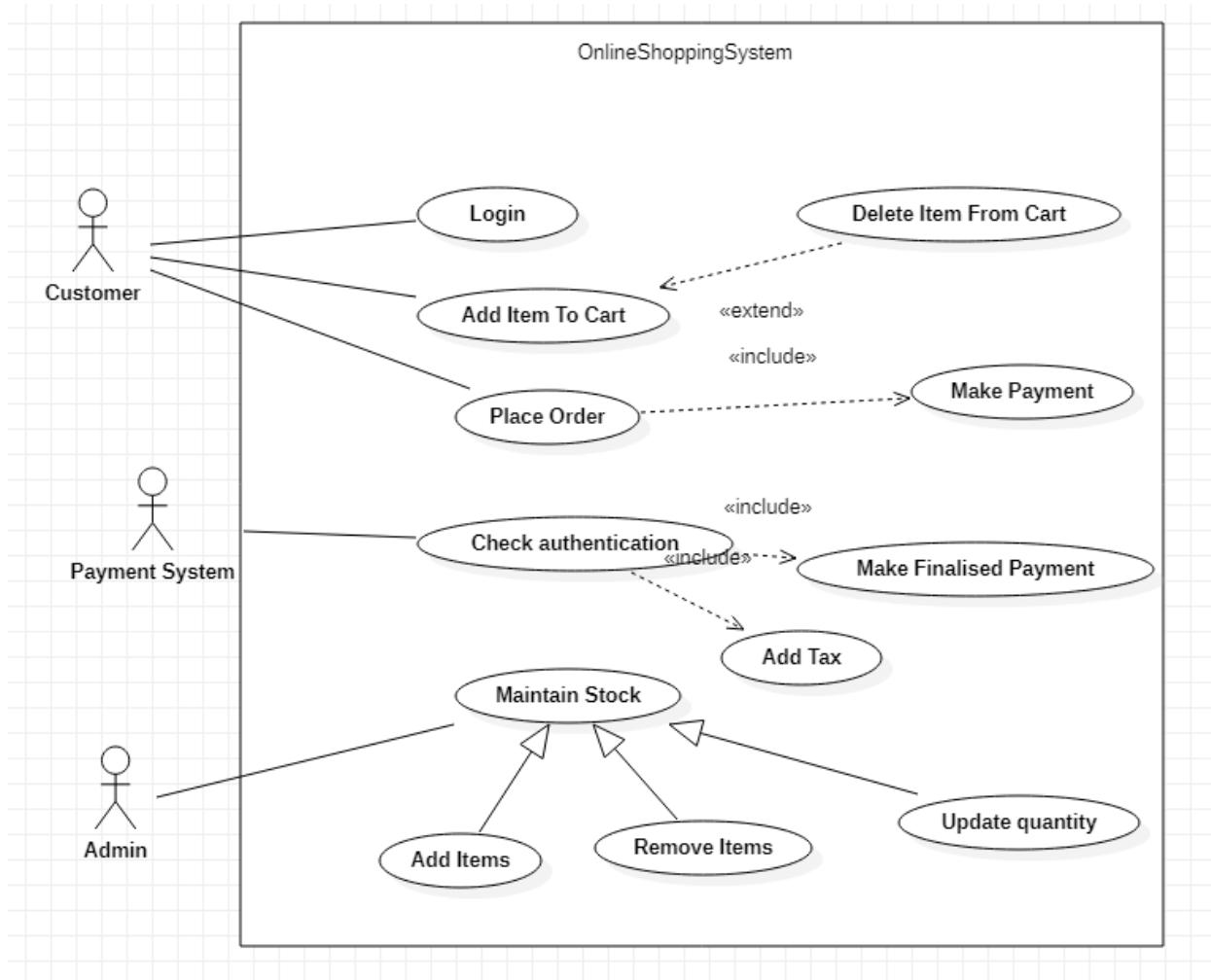


#### d) Advance Use Case Diagram:

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.

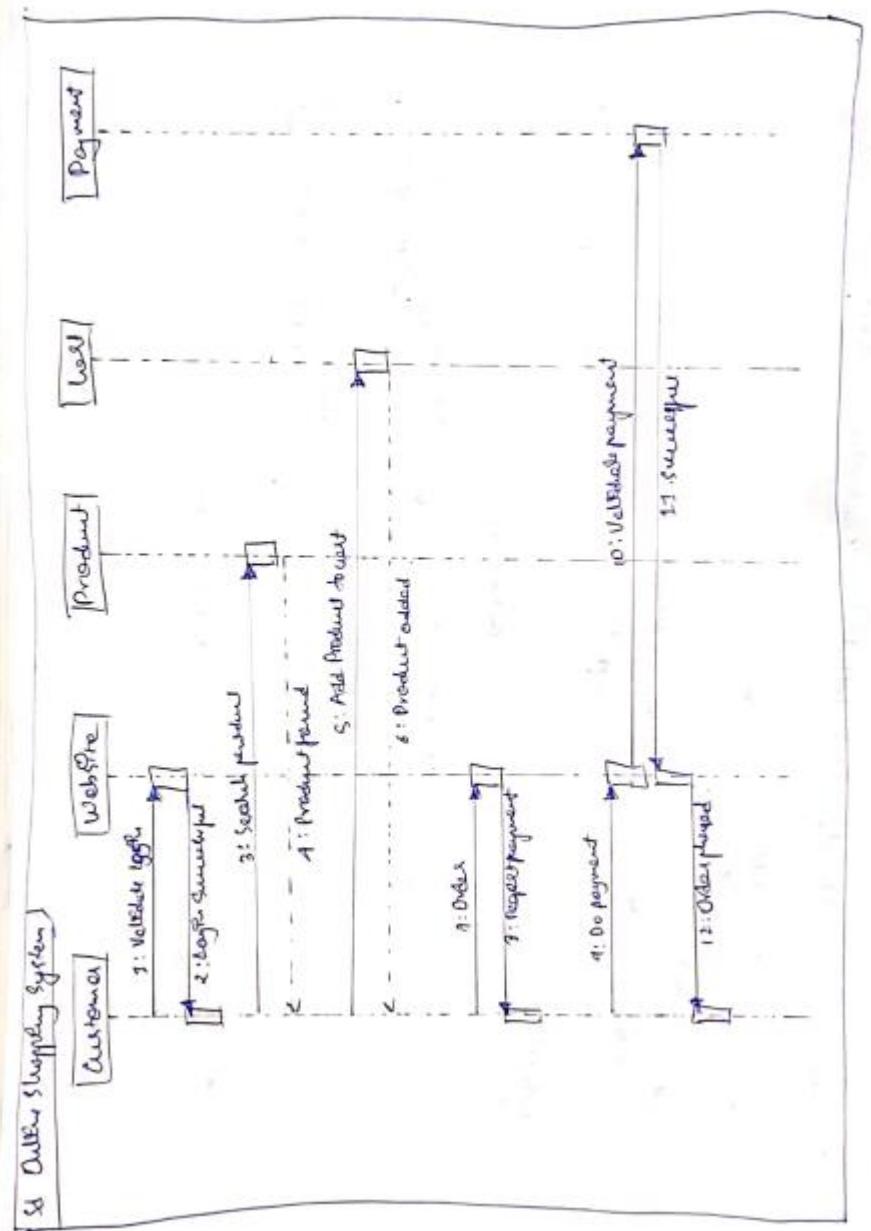
## ⑤ Online Shopping System.

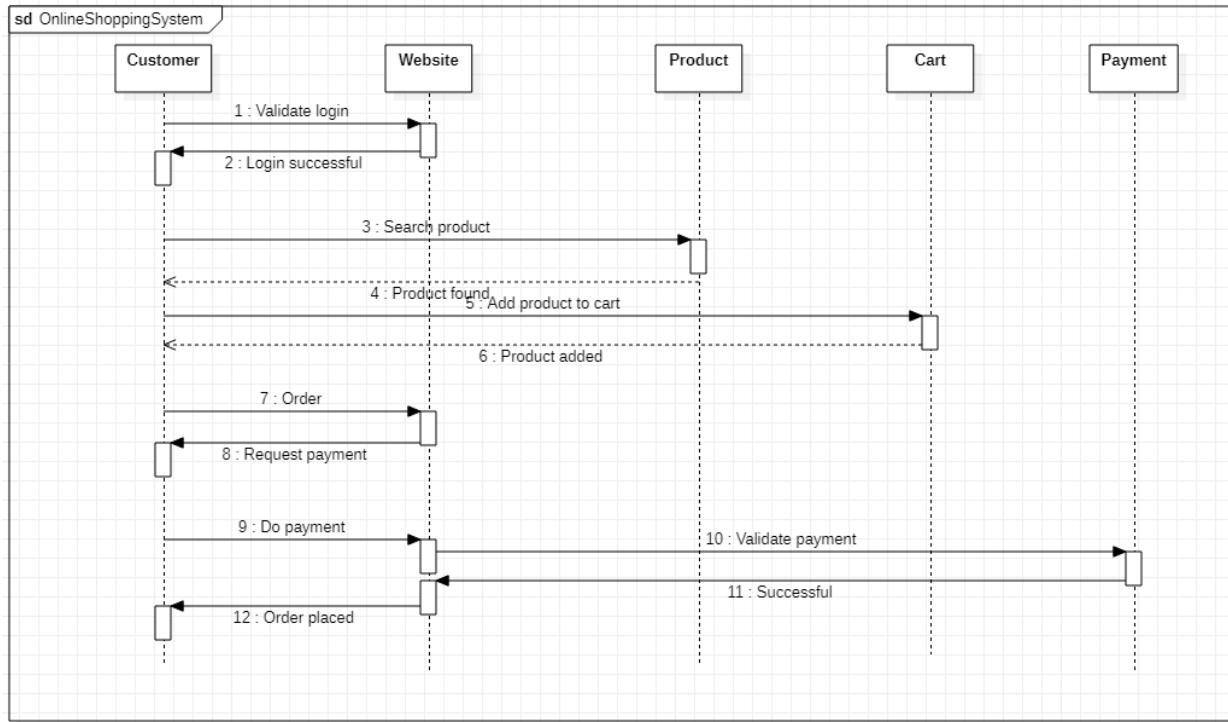




#### e) Sequence Diagram:

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.

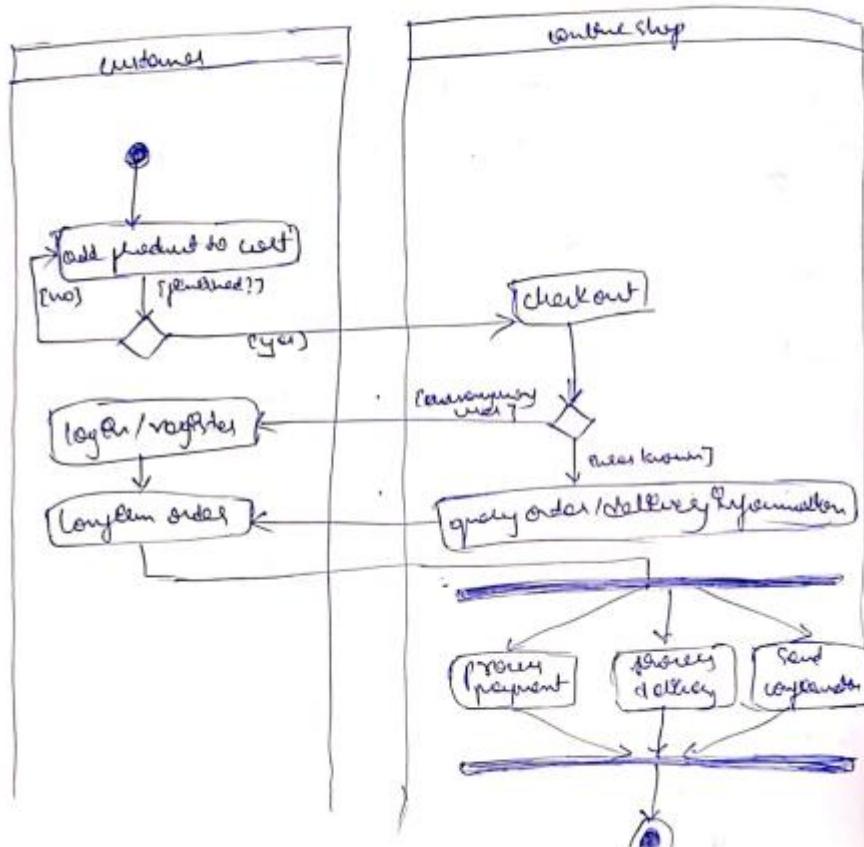


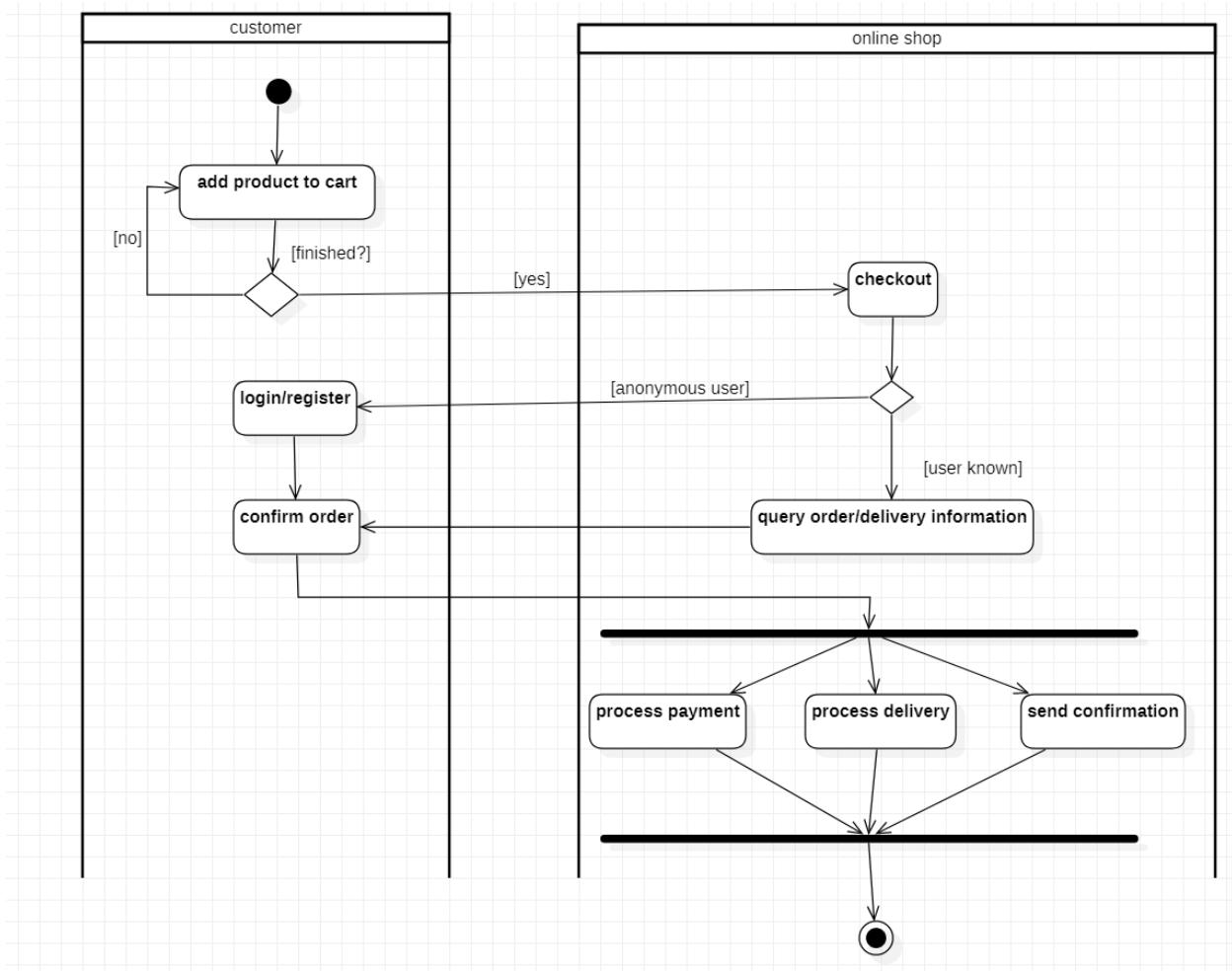


#### f) Activity Diagram:

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.

## ⑤ Online shopping system:





## **6. Railway reservation system-**

a) SRS:

## ⑥ Railway Reservation System

Problem statement:

The ticket booking in station is a lengthy process and takes time. It is a waste of time.

SRS:

To develop a user-friendly Railway reservation system to enable passengers to book tickets online and make payment online as well.

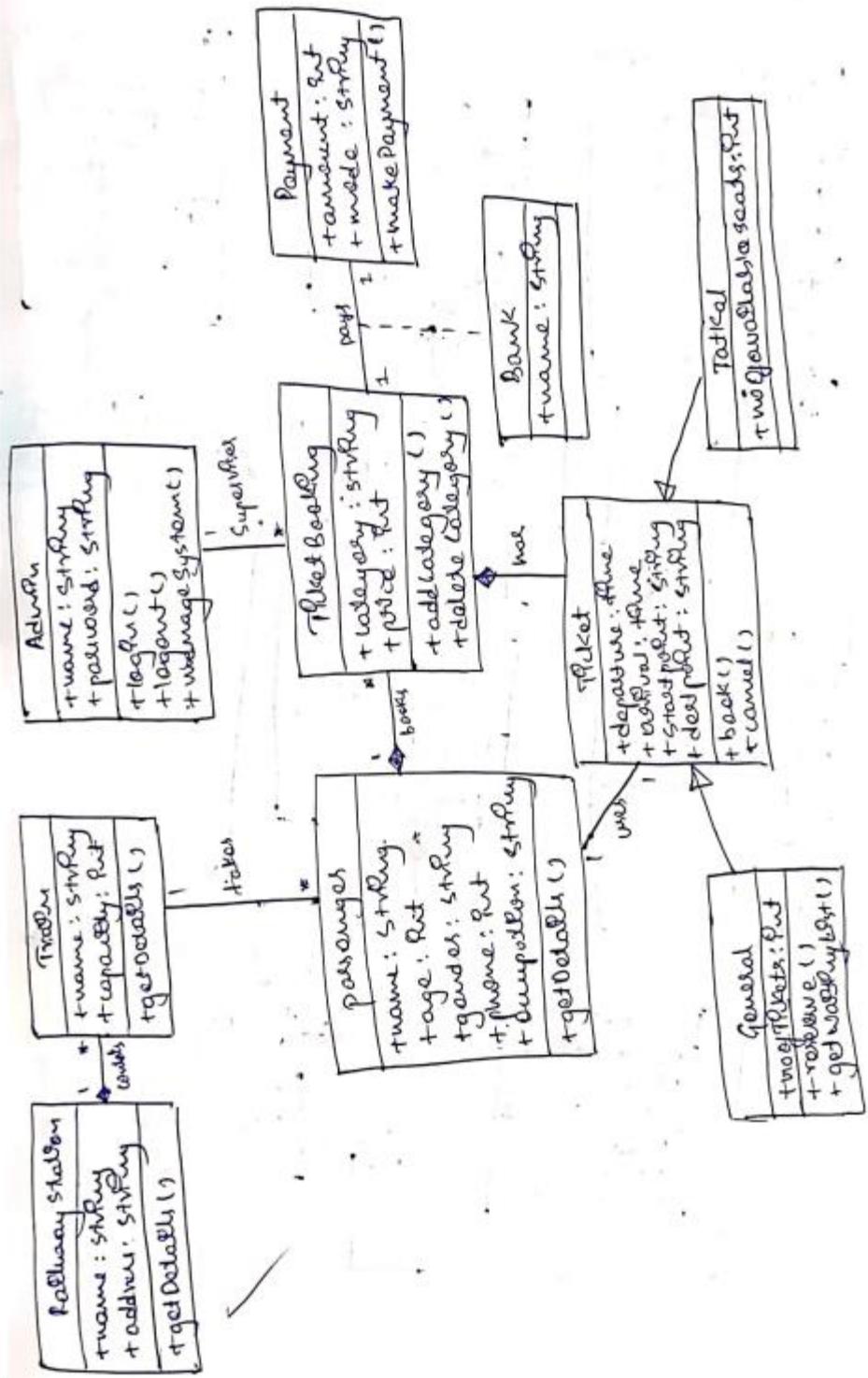
Railway reservation system which provides the train timing details, reservation, billing and cancellation on various type of reservation namely

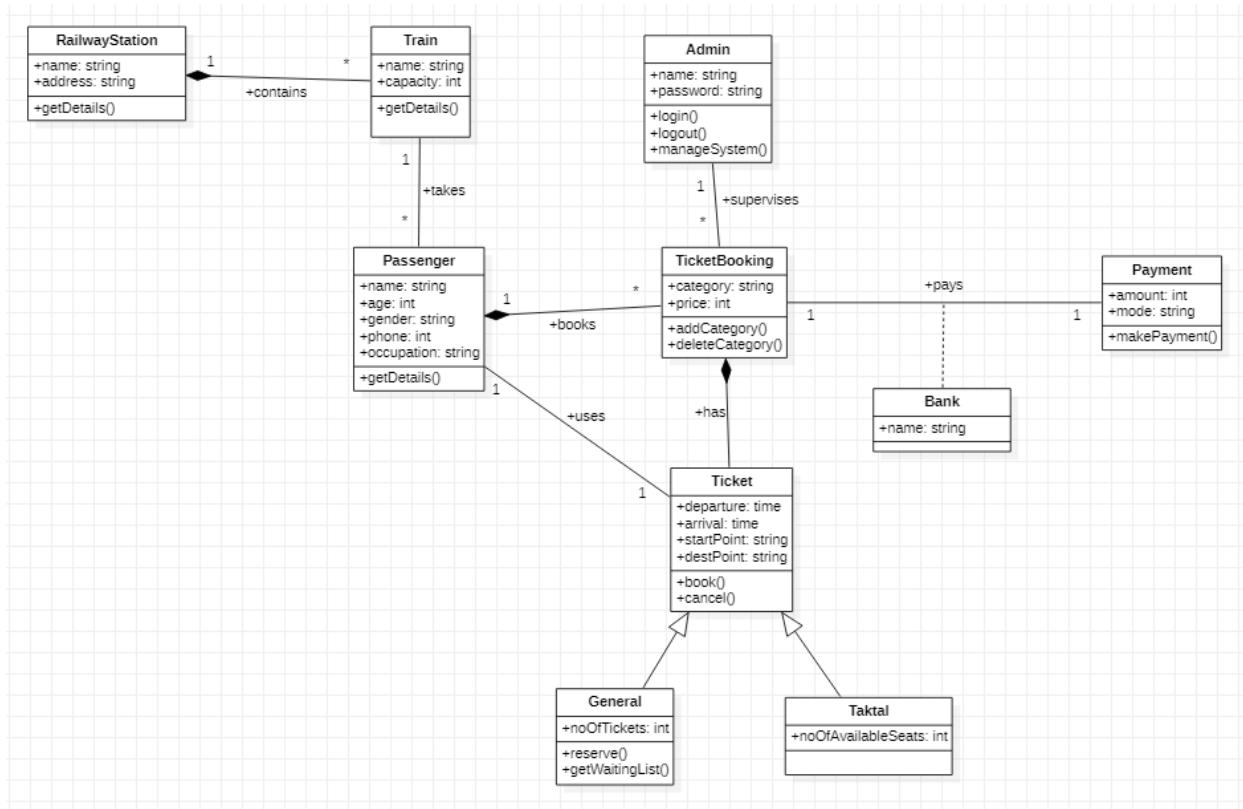
- \* System reservation for seat
  - \* Reservation against cancellation
  - \* Waiting list reservation
  - \* Online reservation
  - \* Tatkal reservation.
- 
- \* Admin can add new train and supervise the ticket booking.
  - \* Train has name and no. of passengers it can carry is specified.
  - \* Railway station has name and details of trains pass through it.
  - \* Passenger can login/signup and can book ticket in particular train.
  - \* Ticket has departure time, arrival time, start point and destination point on it.

\* ticket can be booked on general or talkal quotes.

\* passenger can pay the ticket price online.

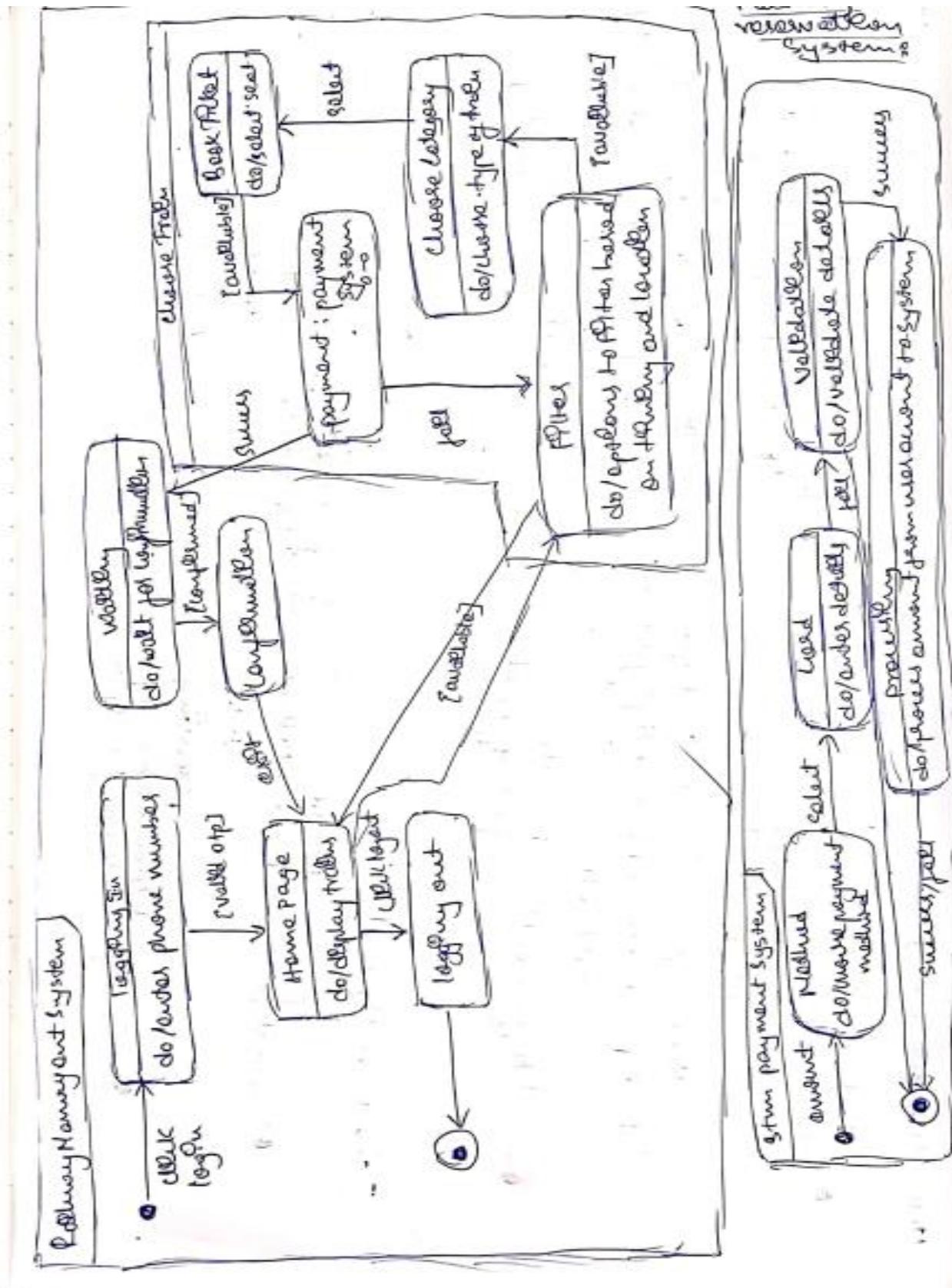
b) Advance Class Diagram:

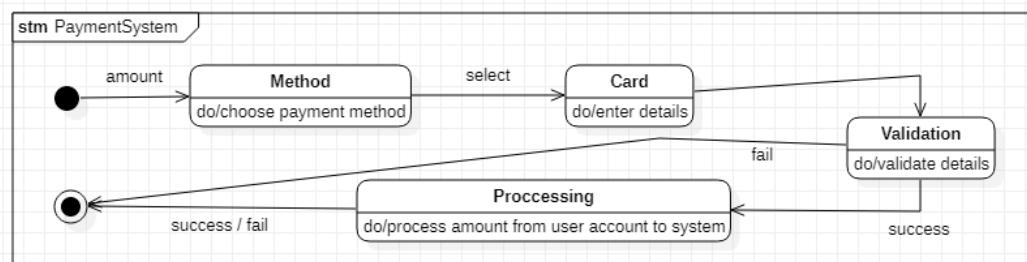
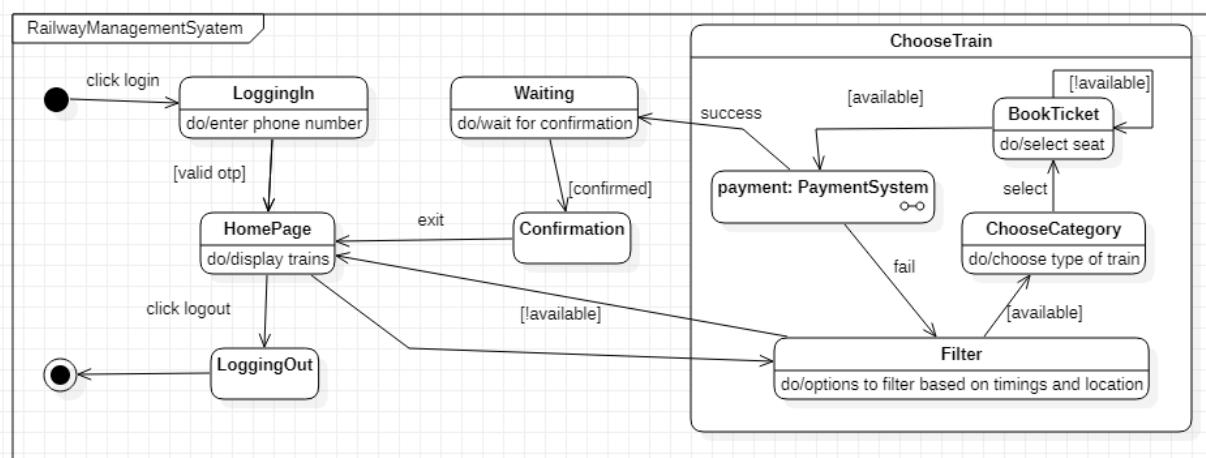




### c) Advance State Diagram:

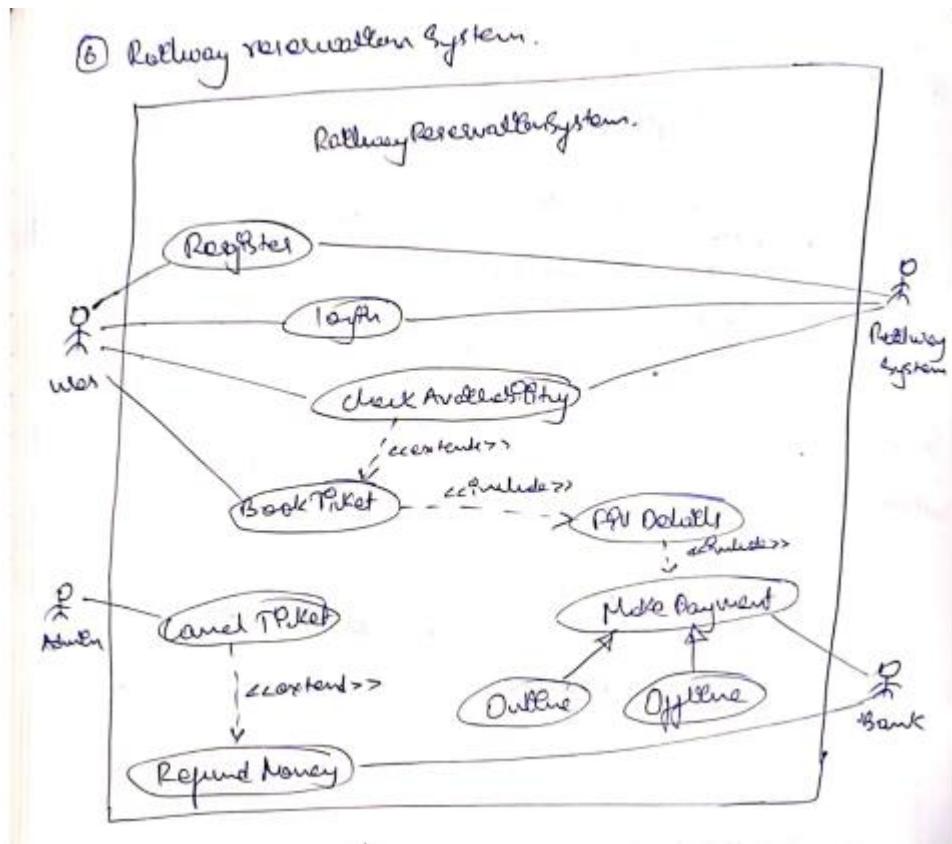
The advanced state diagram depicted below contains one nested state and one submachine, which on successful login shows the Choose Train details and Payment System procedure. It contains initial state and termination state with Choose Train as a nested state including the required simple states. It also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

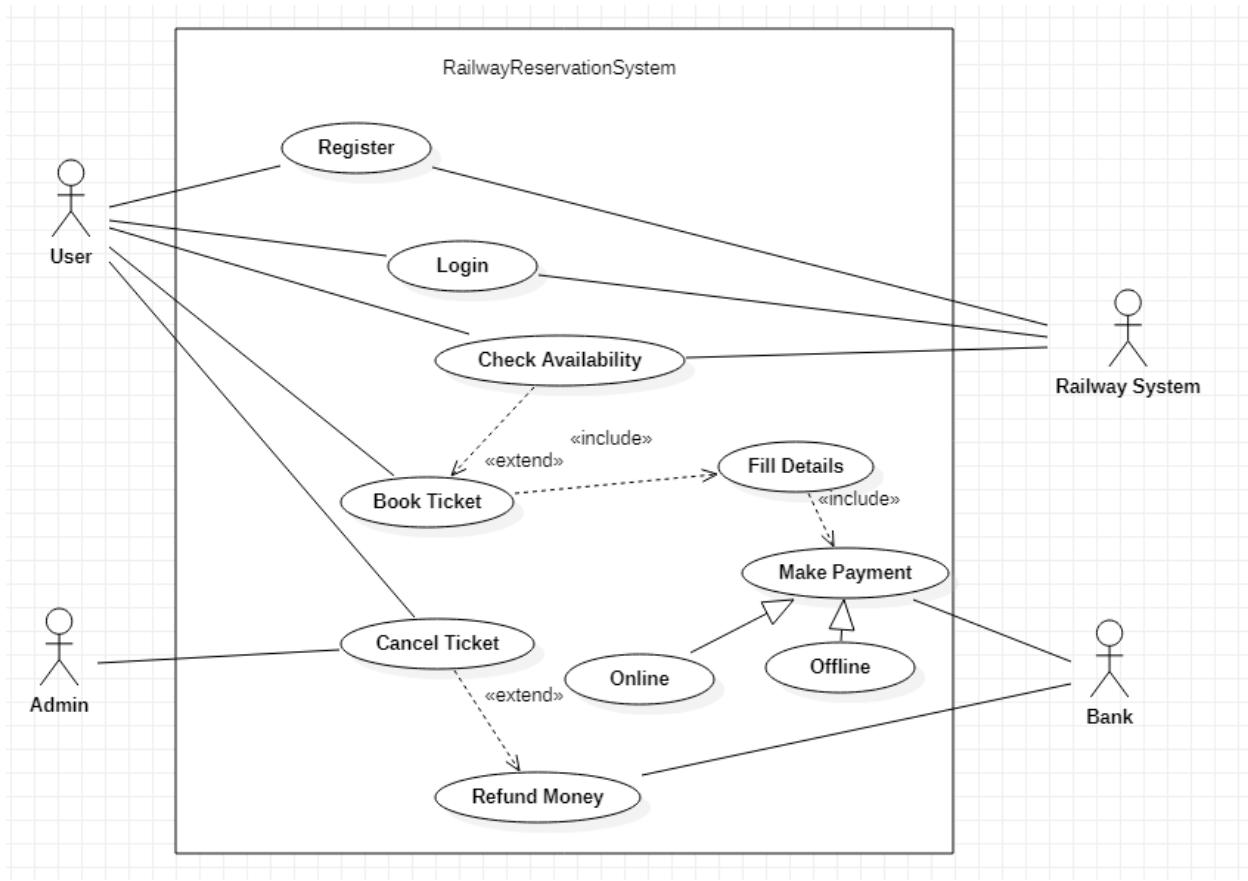




#### d) Advance Use Case Diagram:

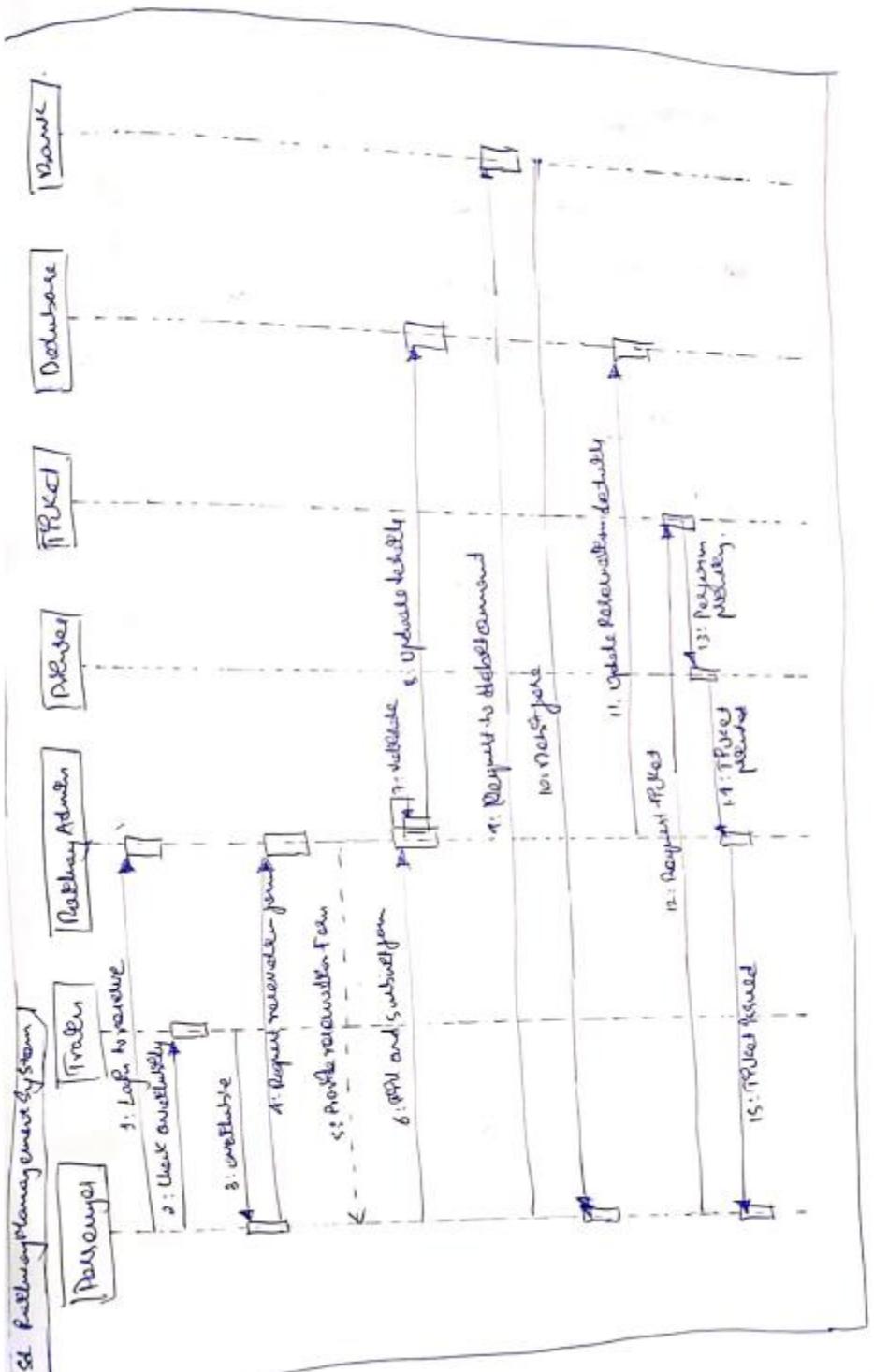
The advanced use case diagram has extra functionalities which includes extends, includes and generalization. The cancel ticket use case extends refund money use case, check availability use case extends book ticket use case, book ticket use case includes fill details use case, fill details use case includes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

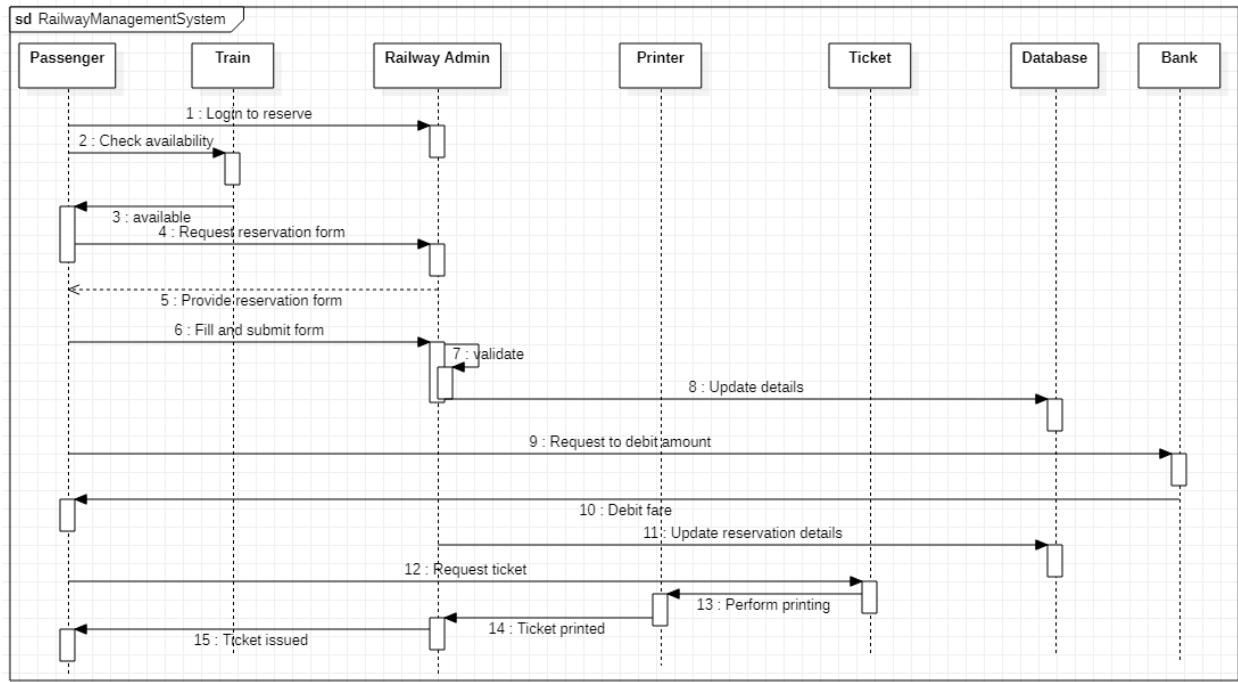




### e) Sequence Diagram:

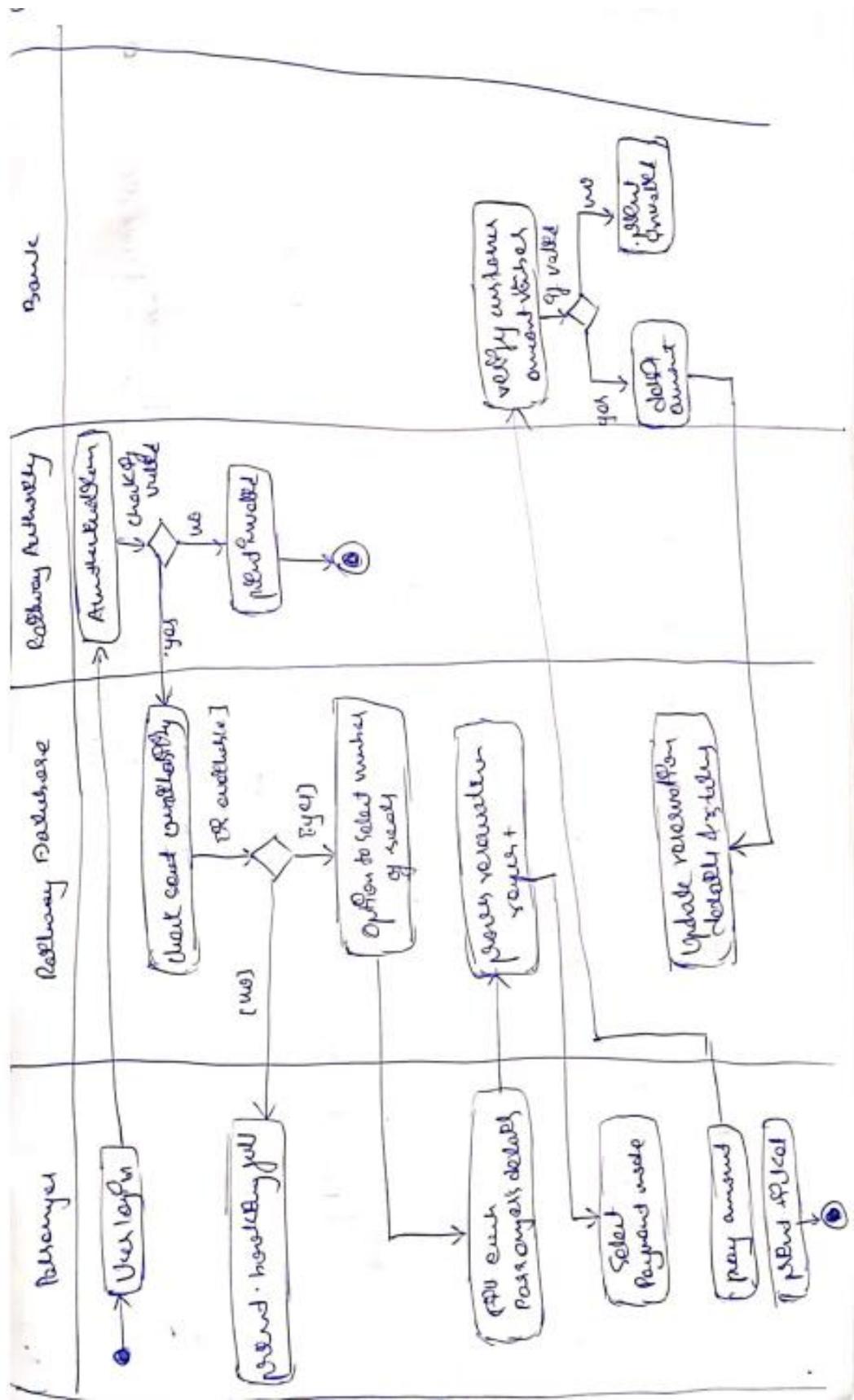
The lifeline is the dotted line and the rectangles represent the period of time the object is executing and is hence called activation. The recursive function of validation is shown by double activation rectangle of validation with self-transition and verify user. Reply message is used to return back to lifelines with the required message.

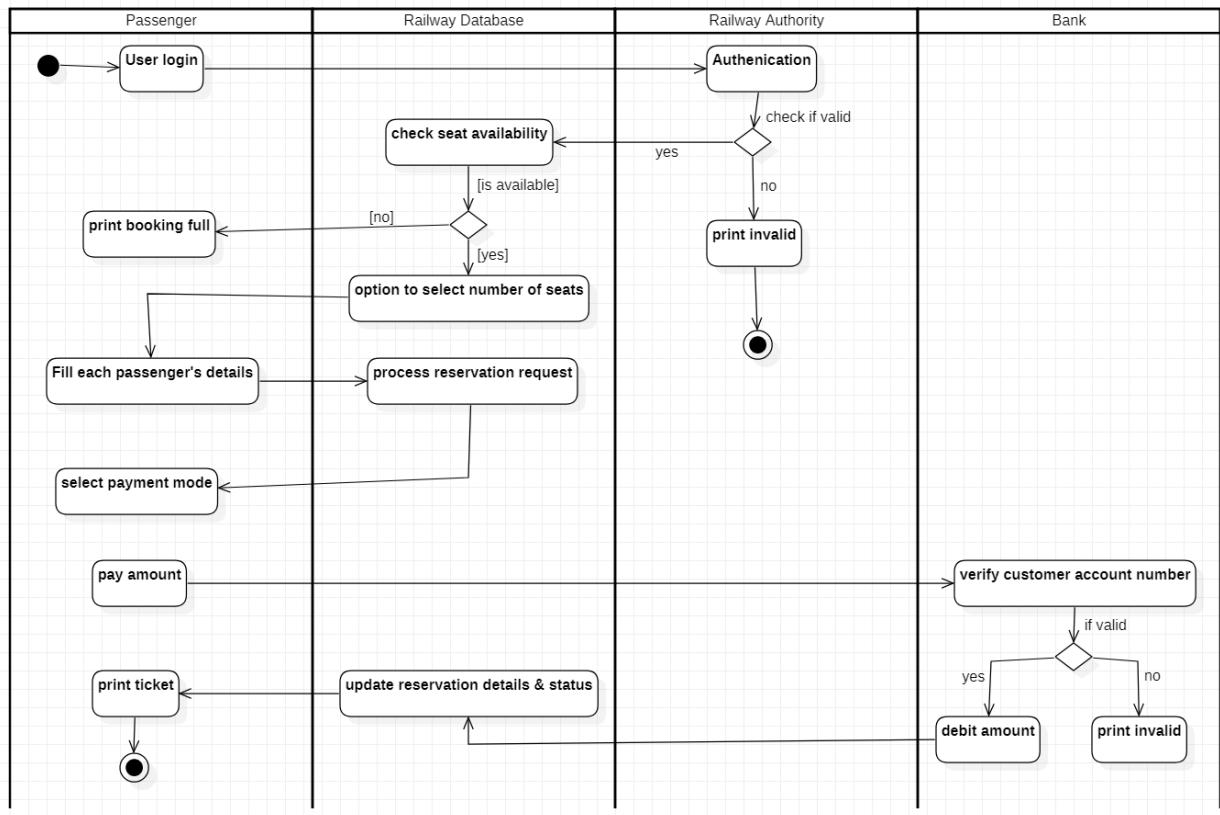




#### f) Activity Diagram:

passenger login activity where a signal is sent to the network for request validation and upon confirmation the control 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-**

a) SRS:

## ⑦ Graphics Editor System:

Problem Statement:

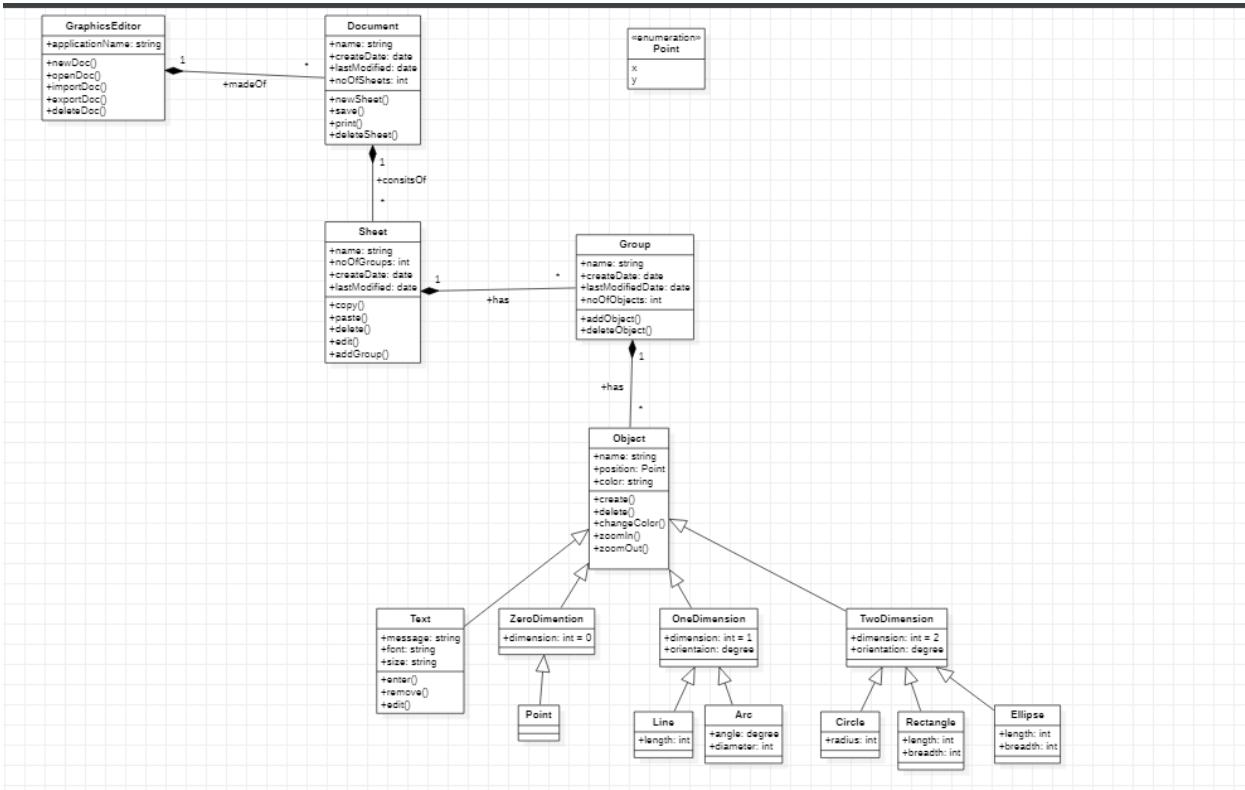
The existing graphics system has some loose parts.  
The API is not good and does not contain new methods.

### SPS:

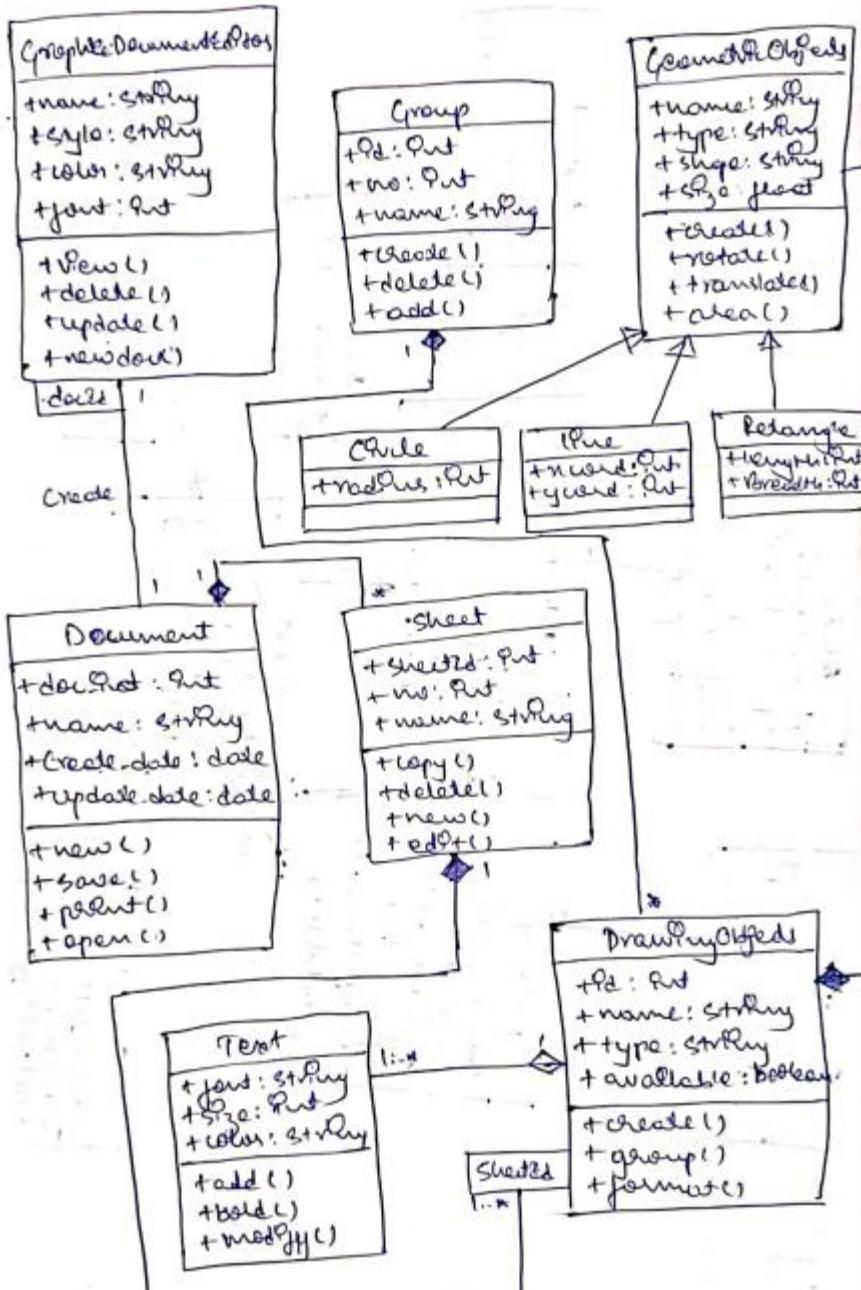
The graphics editor provides an application programmer's interface that enables a programmer to develop their own graphical model editor for a specific type of model. This API in turn, relies on extending the Eclipse graphical editing framework to provide an environment in which editor functions.

- \* It contains the toolbox which contains tools like line, circle, rectangle, arc etc.
- \* color bar or palette.
- \* standard toolbox with options for new, open, save toolbox and text toolbox.
- \* One integrated view to users the toolbar, colorbox 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 shading of the tool are provided.

## b) Advance Class Diagram:

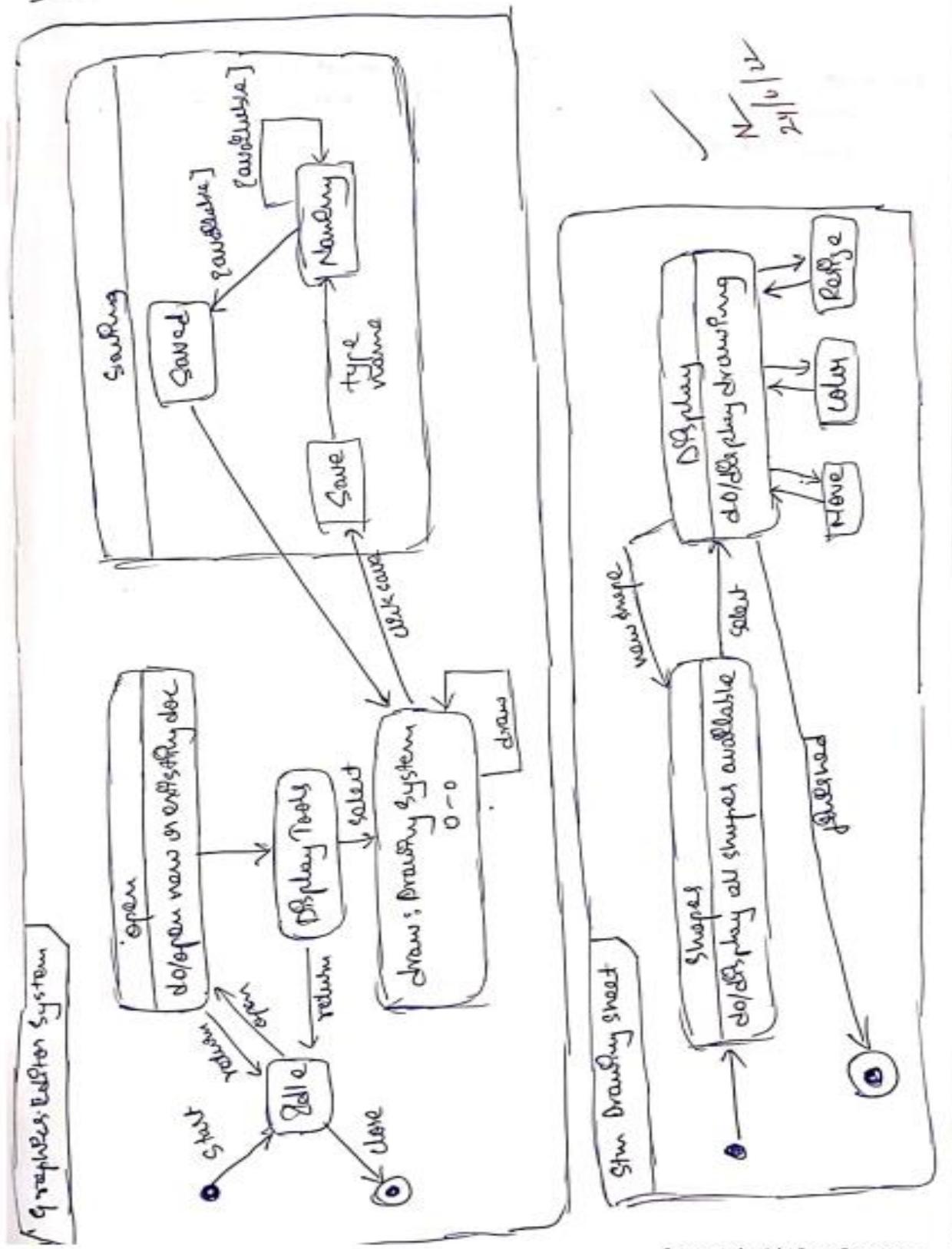


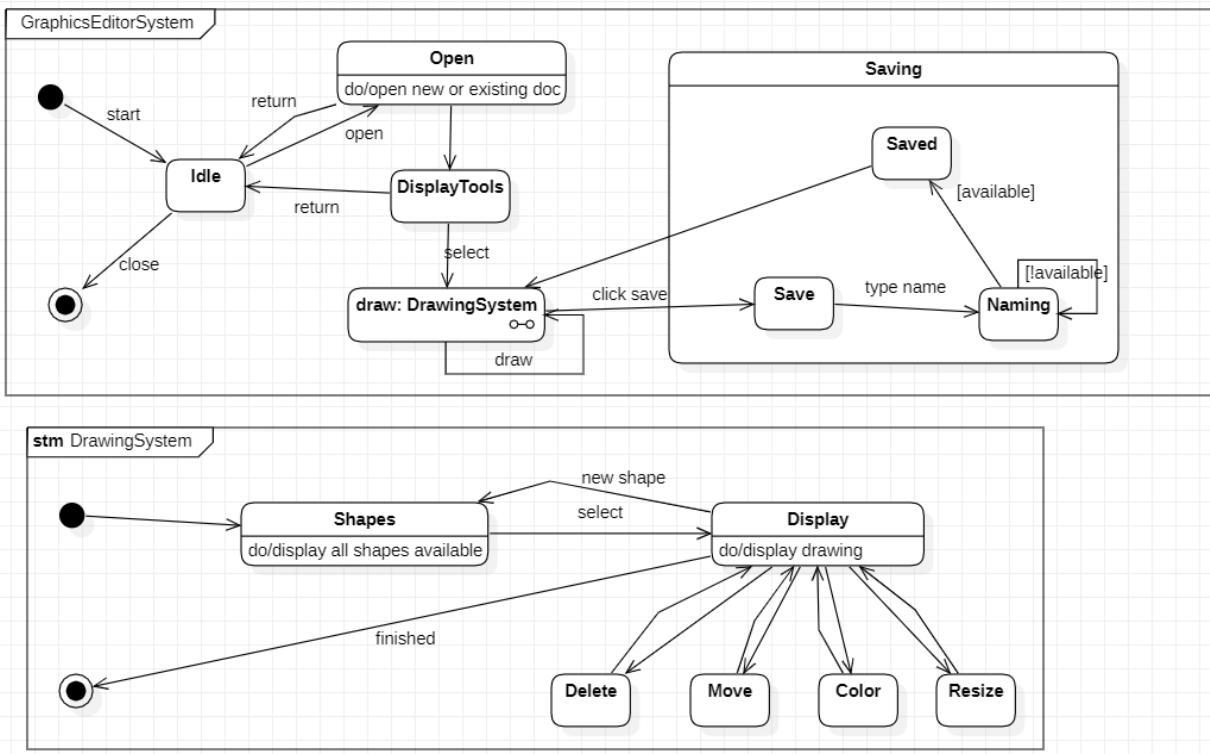
### Graphic Editor



c) Advance State Diagram:

## Graphics Editor System:



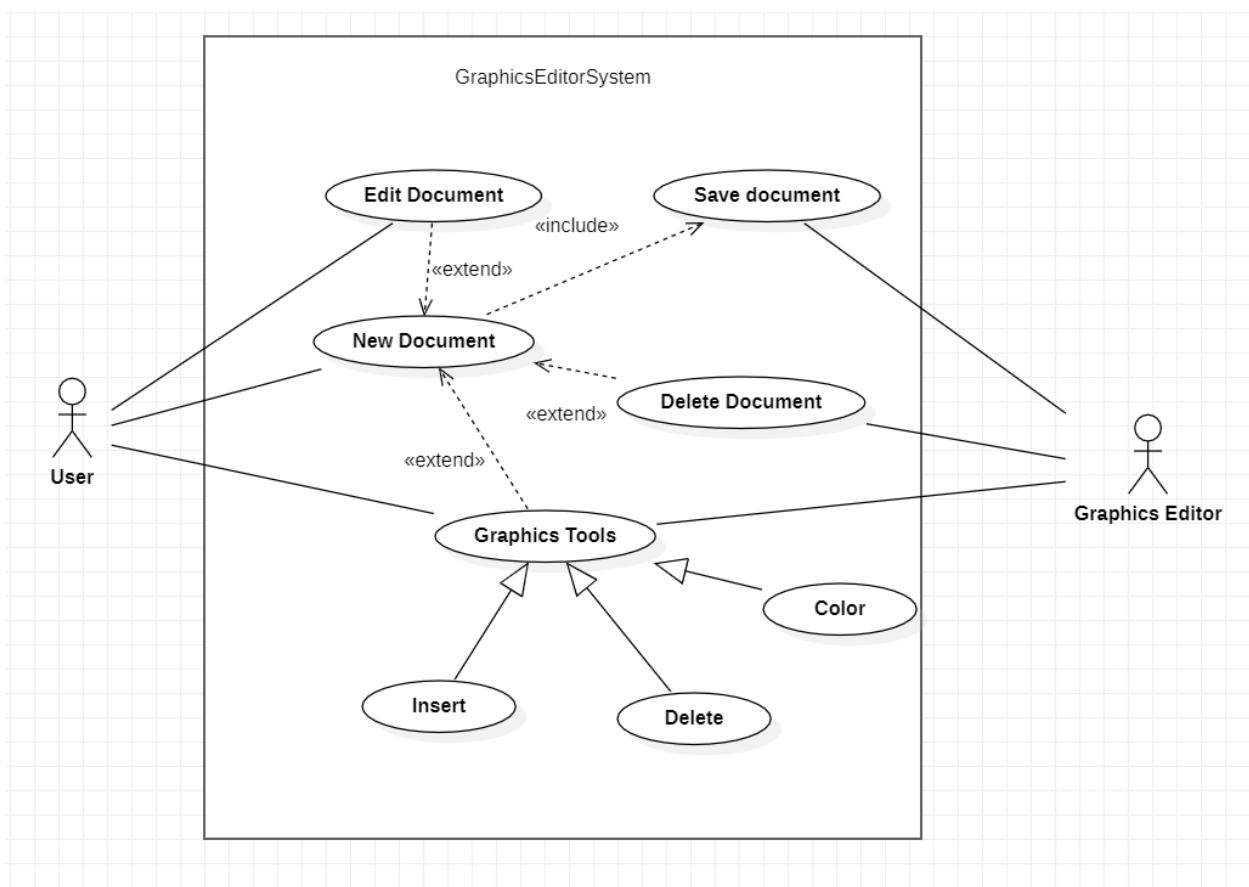
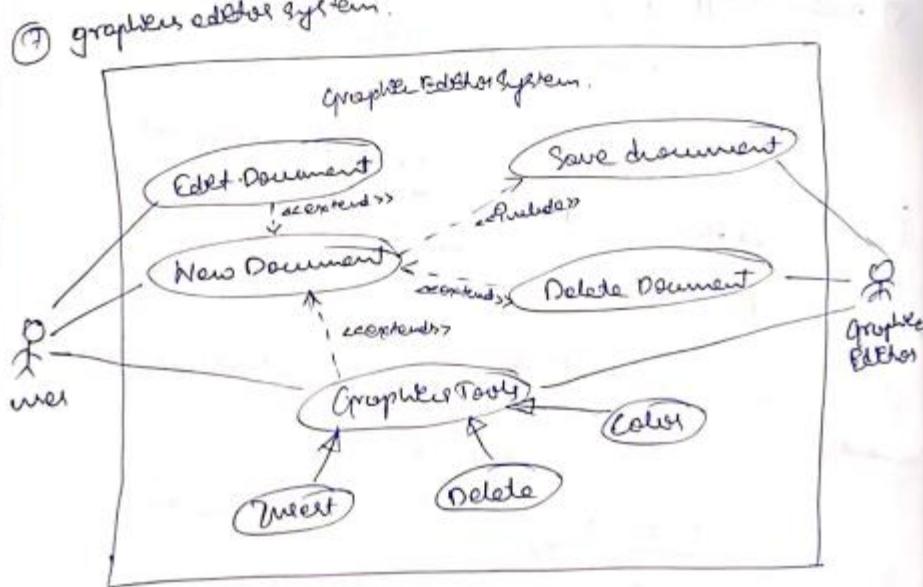


The advanced state diagram depicted below contains one nested state and one submachine, which on successful login shows the Saving procedure and Drawing System procedure. It contains initial state and termination state with Saving as a nested state including the required simple states. It also has a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

#### d) Advance Use Case Diagram:

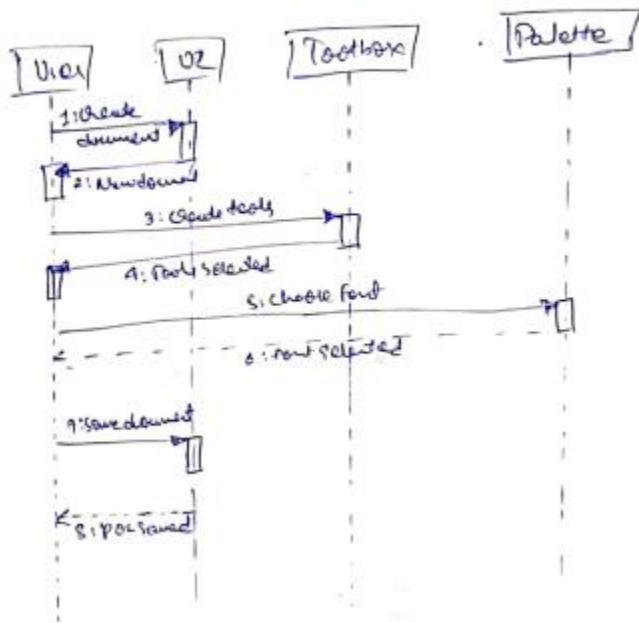
The advanced use case diagram has extra functionalities which includes extends, includes and generalization. The edit document use case extends new document use case, delete document use case extends new document use case, graphic tools use case extends new document use case, new document use case includes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

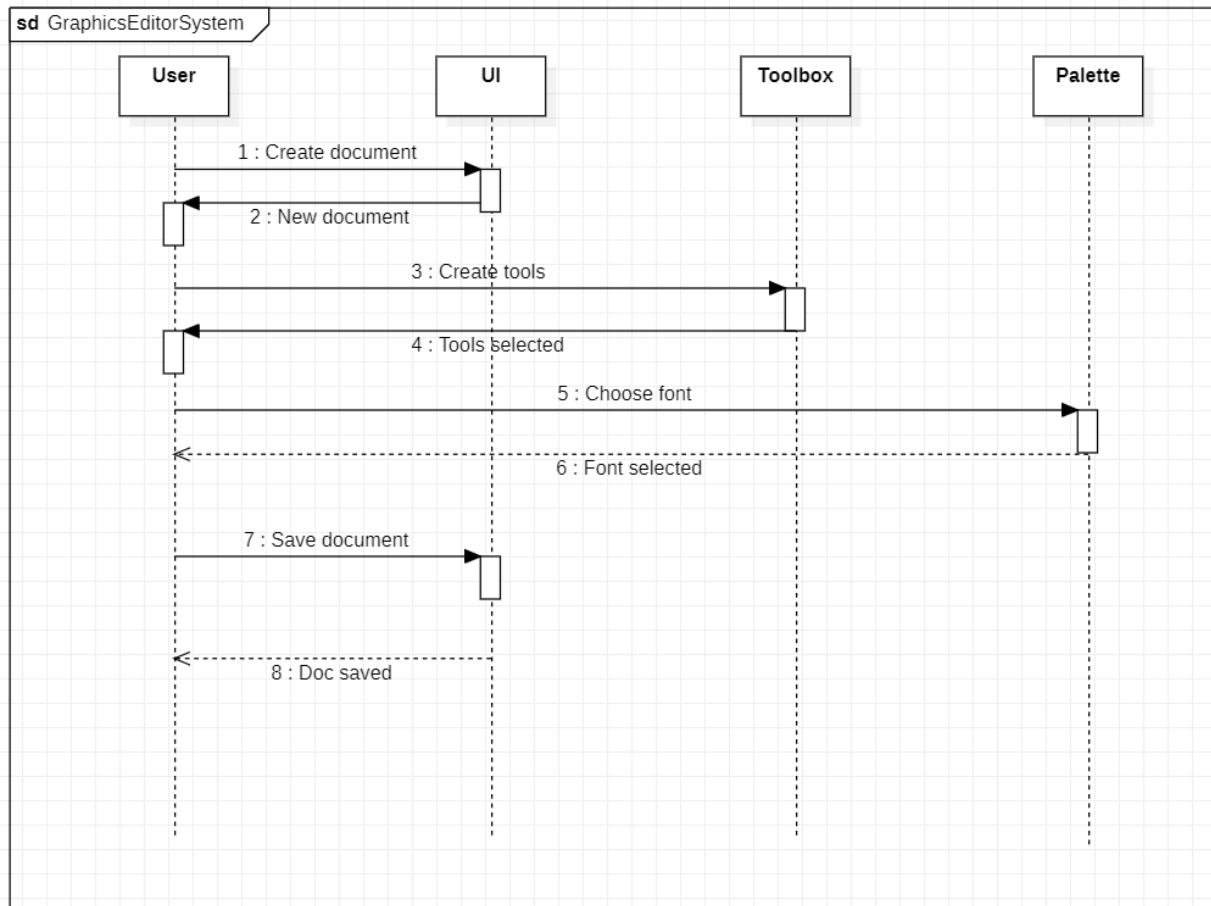
⑦ graphics editor system.



e) Sequence Diagram:

③ Graphics editor system.





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.

f) 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.

