

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

“JnanaSangama”, Belgaum -590014, Karnataka.



LAB REPORT on

Object Oriented Modelling and Design

Submitted by

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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)

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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 Modelling and Design**" carried out by **JAYANTI R LAHOTI (1BM19CS067)**, who is a 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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Experiment 1: College Information System

1. 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. So the proposed approach is a centralized system for managing, storing, accessing and updating all the information and details of students and both teaching and non teaching faculty.

The Use Cases of the System are:

- The management section of the college must be able to add, edit, view and delete student details like name, age, gender, email, phone number and address.
- The management section must be able to add, edit, view and delete student academic details like USN, department, semester, registered courses and proctor.
- The management section must be able to add, edit and view details of teaching and non teaching faculty.
- The teaching faculty should be able to view all student personal details and add or edit internal evaluation marks and attendance details for each subject.
- The teaching faculty should be able to register for courses to teach during each semester.
- The students must be able to view their details and register for courses during each semester.
- The students must be able to make payment of college fees in a secure way.

LAB-I

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1. College Information System

Software Requirement Specification

Purpose

The purpose of this document is to present a detailed description of the College information system. It will explain the purpose and features of the system, the interfaces of the system, what system will do, the constraints and how system will react to external stimuli. This document is intended for both client and developers of the system and will be proposed to the head for its approval.

Scope

This will be a web-based application that will cater to needs of various activities that take place and information about college

Requirements

1) Functional Requirements

- Entry of new student in department
- Entry of new faculty in department
- Declaration of student results
- Entry of attendance info

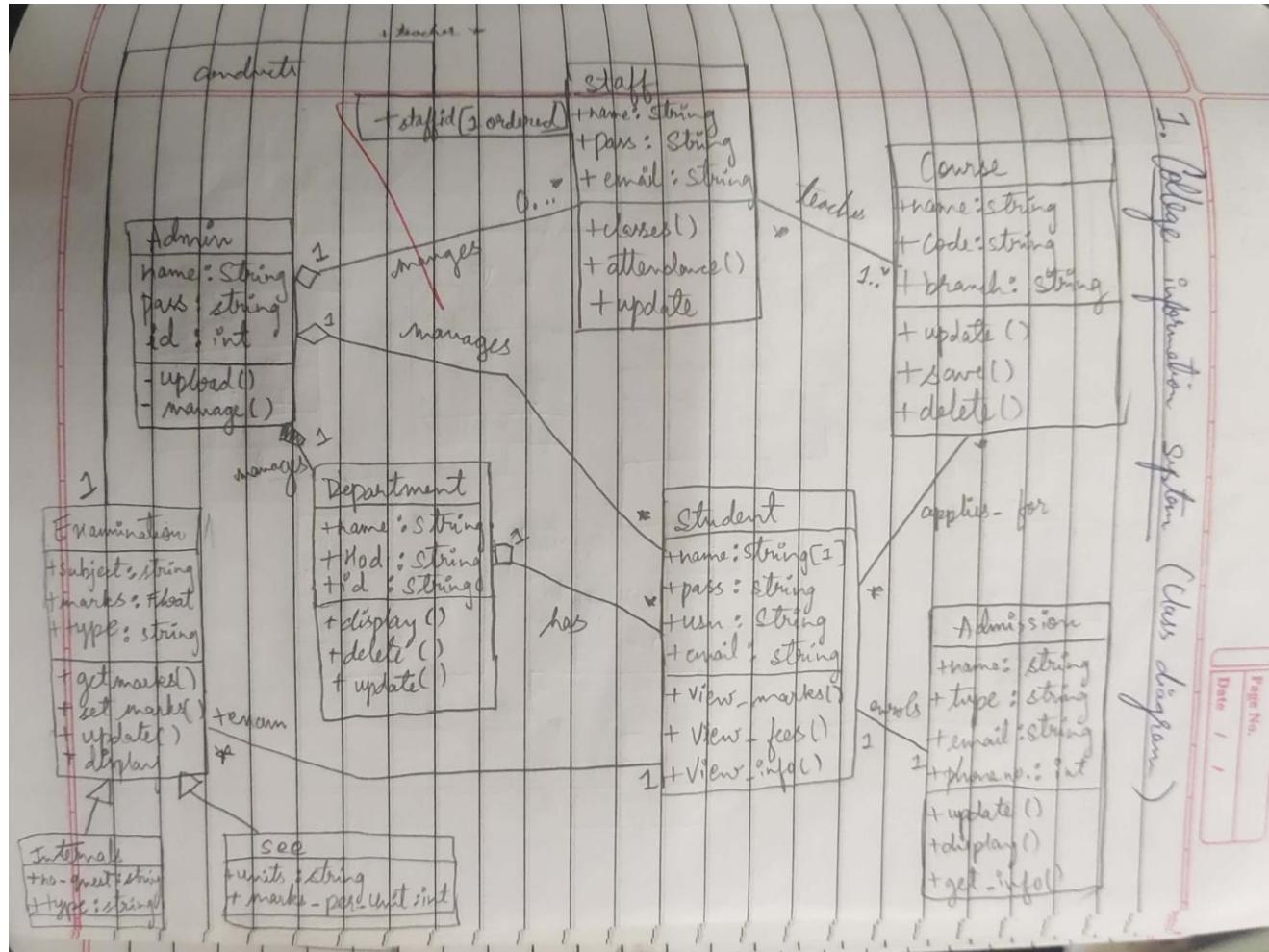
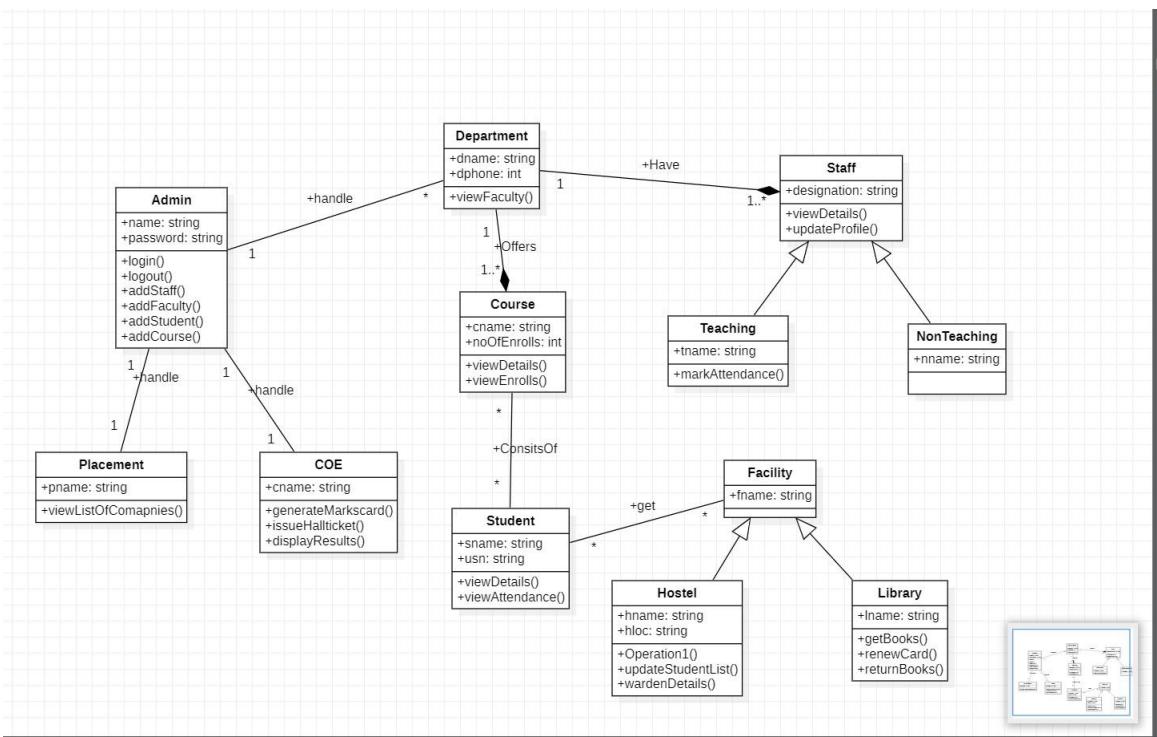
2) Non-functional requirements

- The database storing details must be secured
- The system should be easy to work with
- The response time should be small
- Specified budget

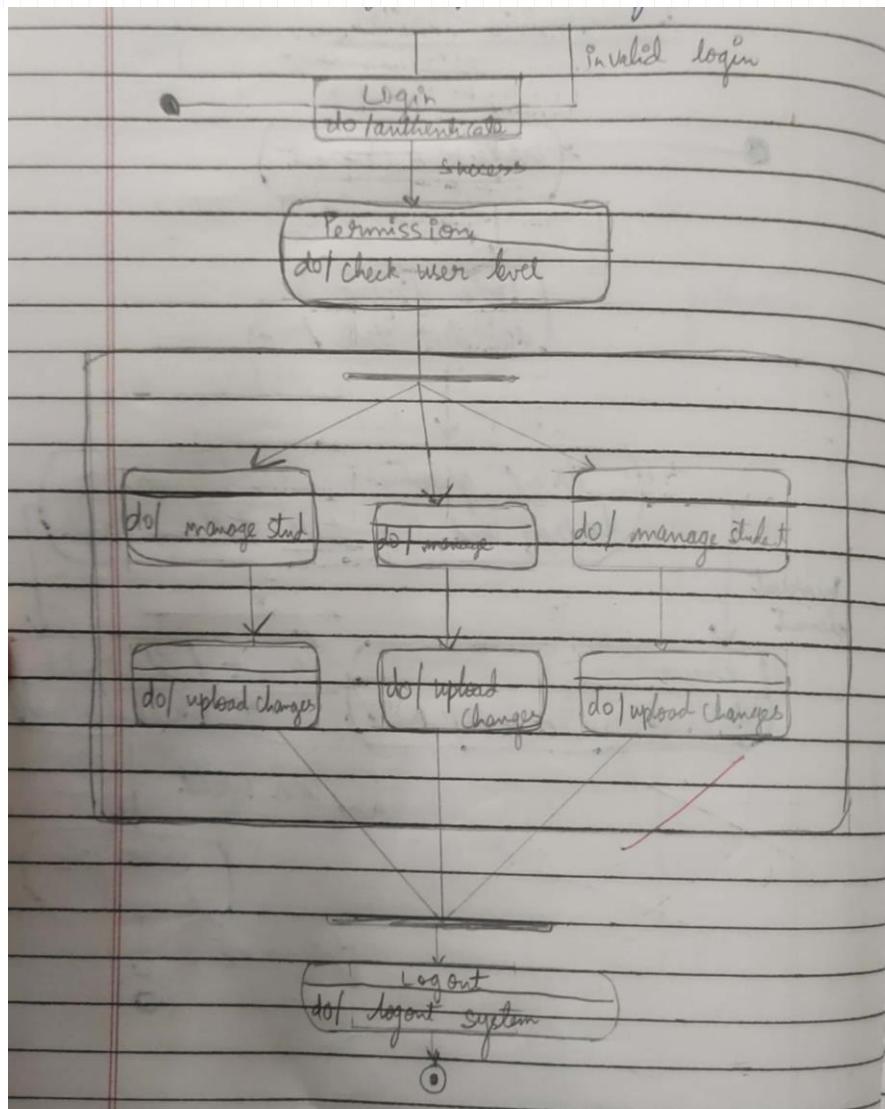
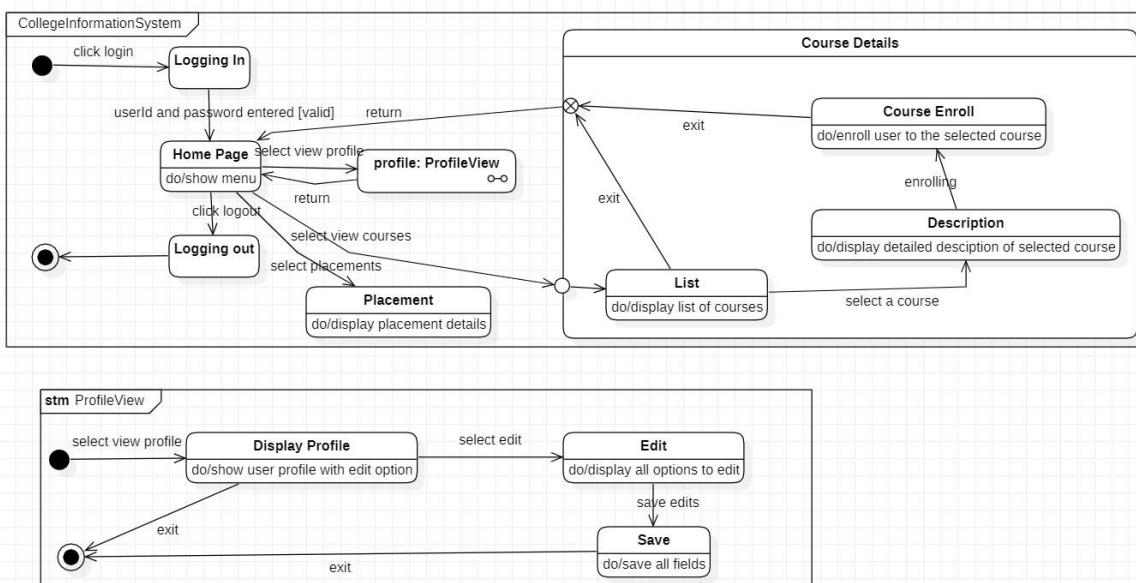
3) User requirements

- The student details should be displayed
- The course details should be displayed

2. Advanced Class Diagram:

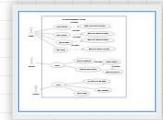
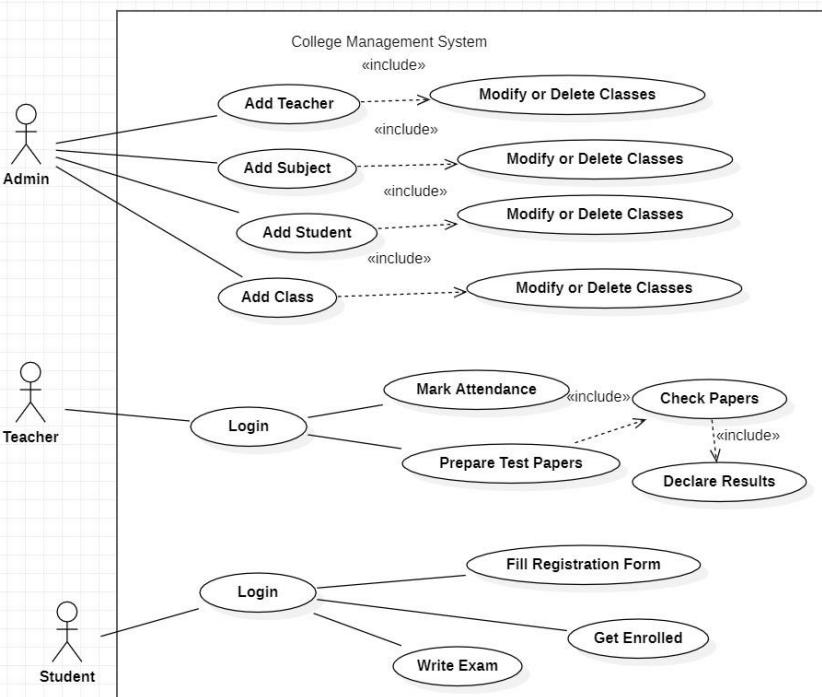


3. Advanced State Diagram:



The above state diagram describes the states the student goes through in uploading information of himself and courses. The student first needs to login which then leads to the validate state, where the login id and password are validated. If invalid it then goes back to the login state. Upon receiving the correct information it goes to the register composite state. The student can also make changes to his profile which is depicted as a sub state. After necessary changes the student can logout from the system.

4. Advanced Use Case diagram:

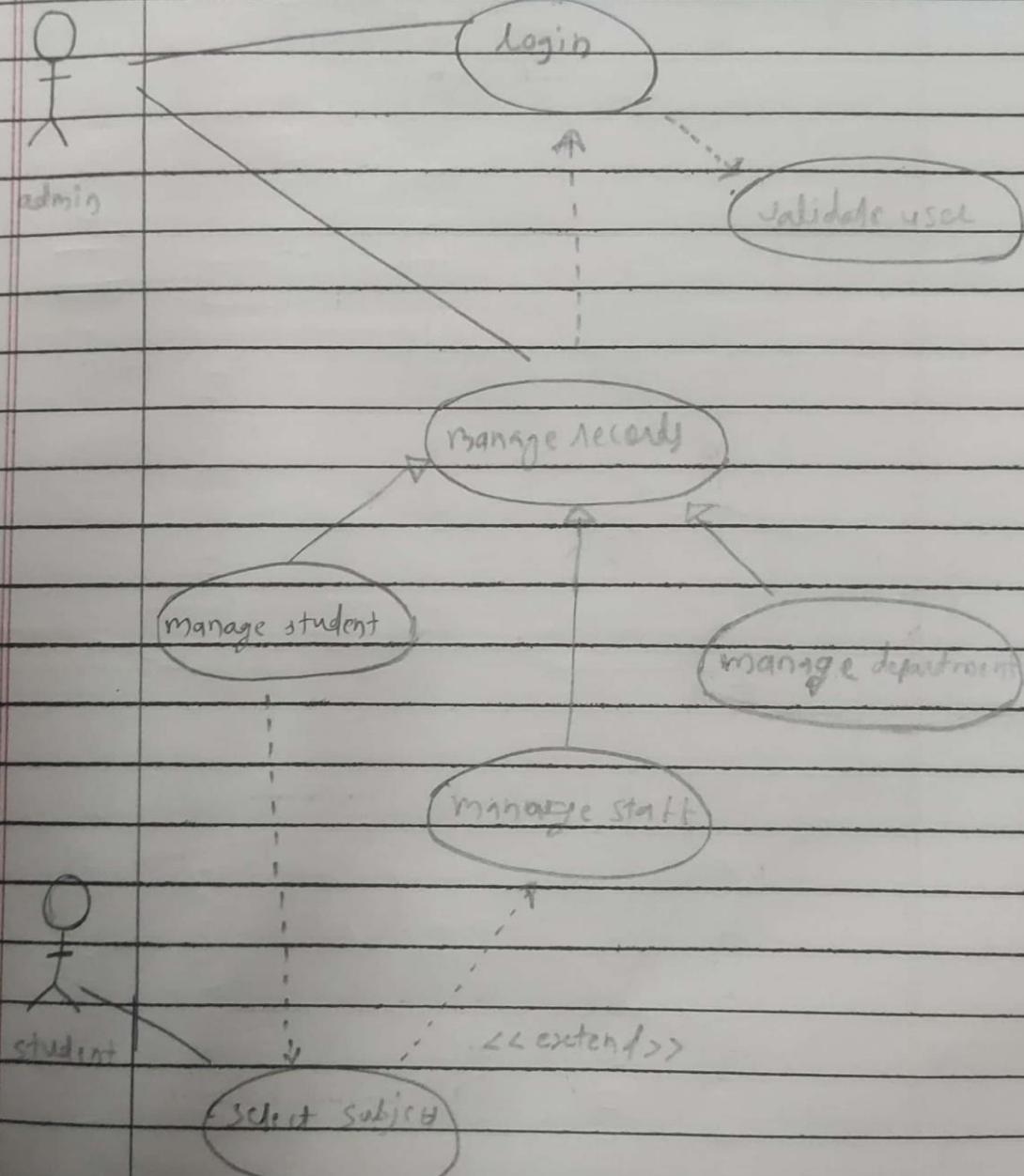


1. College Information System

Use Case

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Actors:

Admin: The person who manages everything

Student: A person who uses the system

Teacher: A person who works in the college and teaches students.

Use Cases:

Add Teacher: Admin can edit teacher details

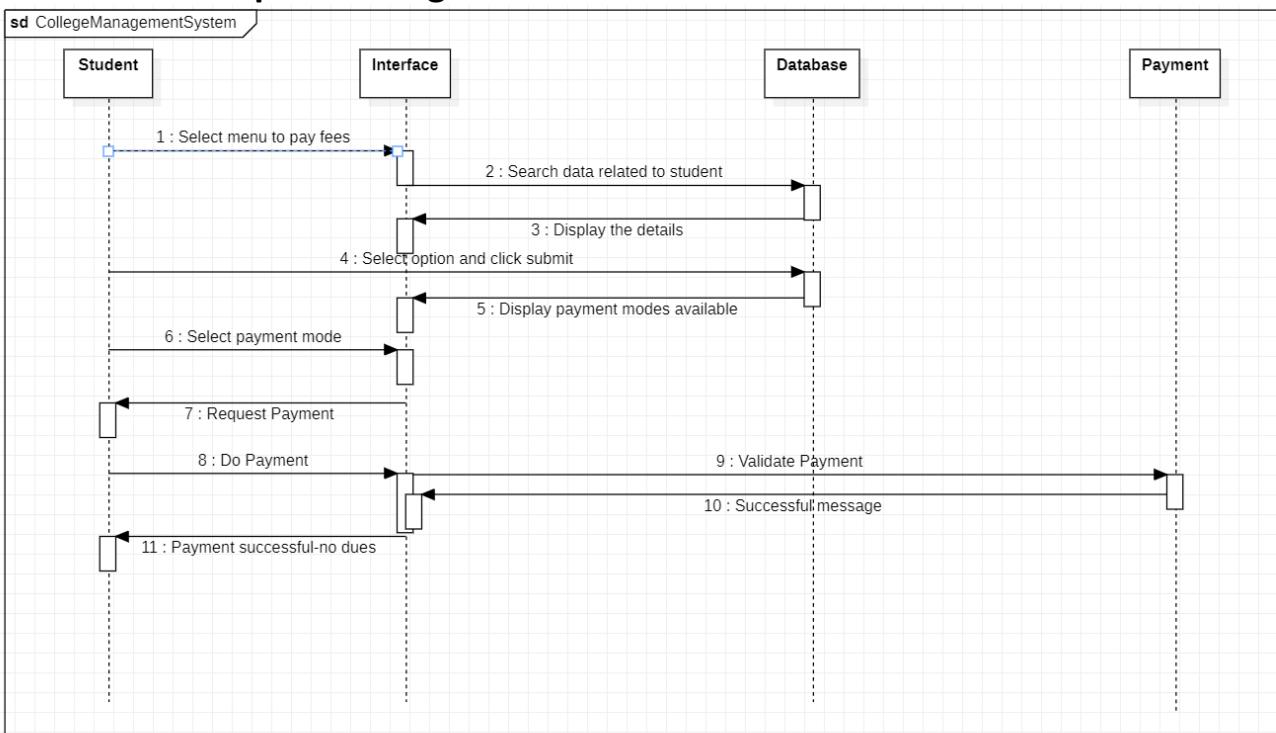
Add Subject: Admin can edit subject details

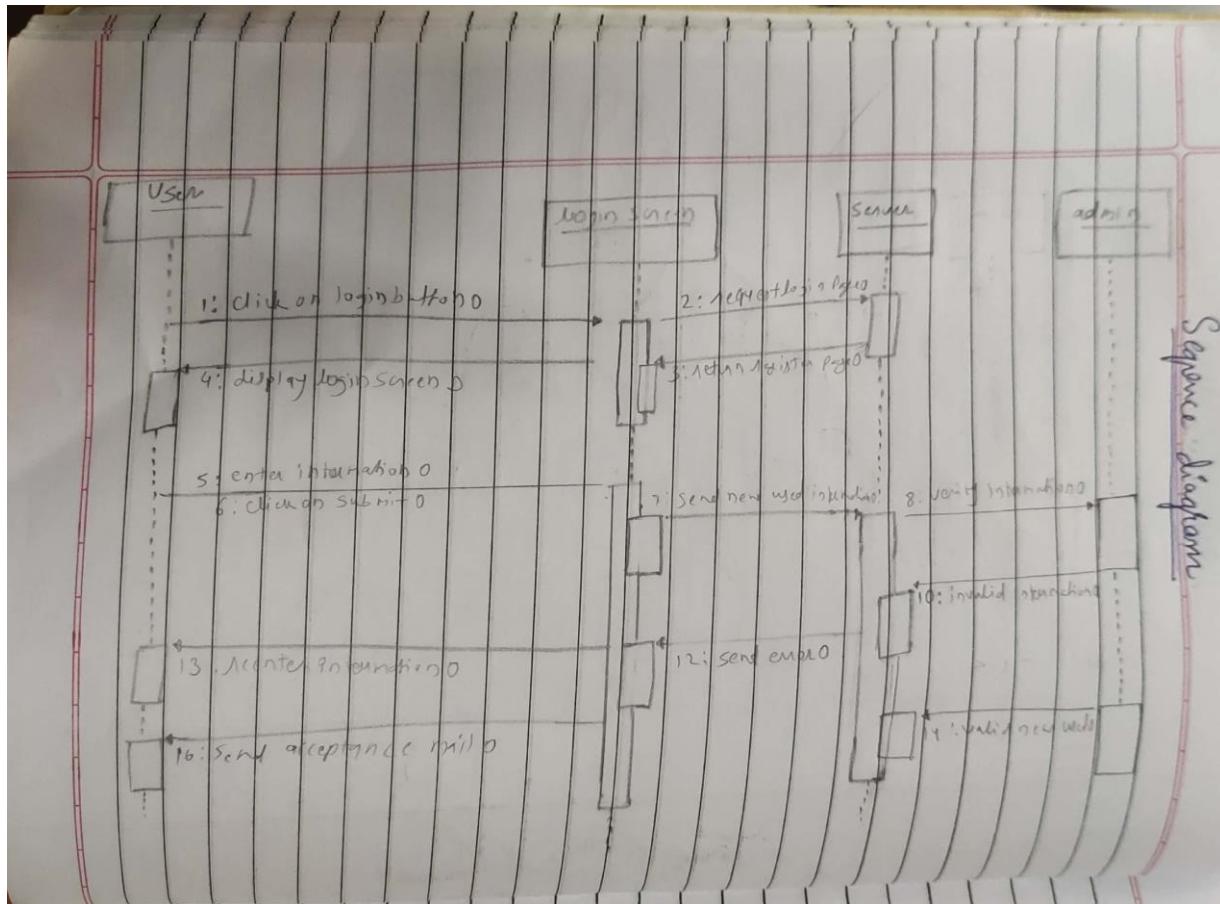
Add Student: Admin can edit student details

Add Class: Admin can edit class details

Login: The students and teachers can login to perform respective tasks

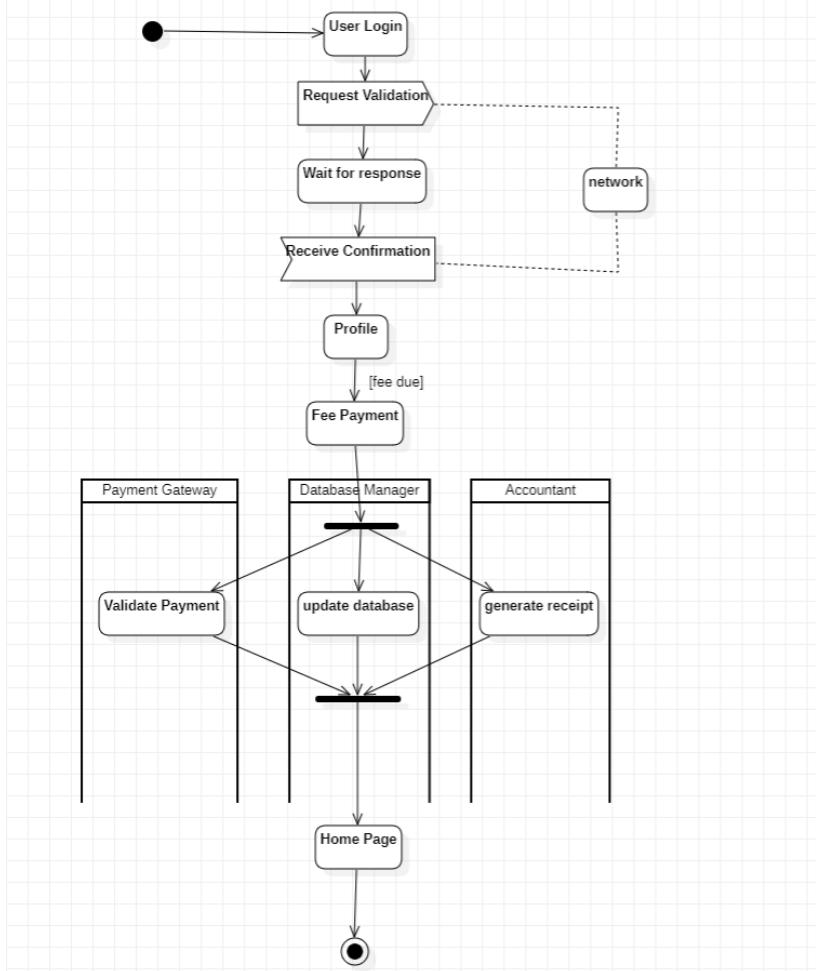
5. Advanced Sequence Diagram:

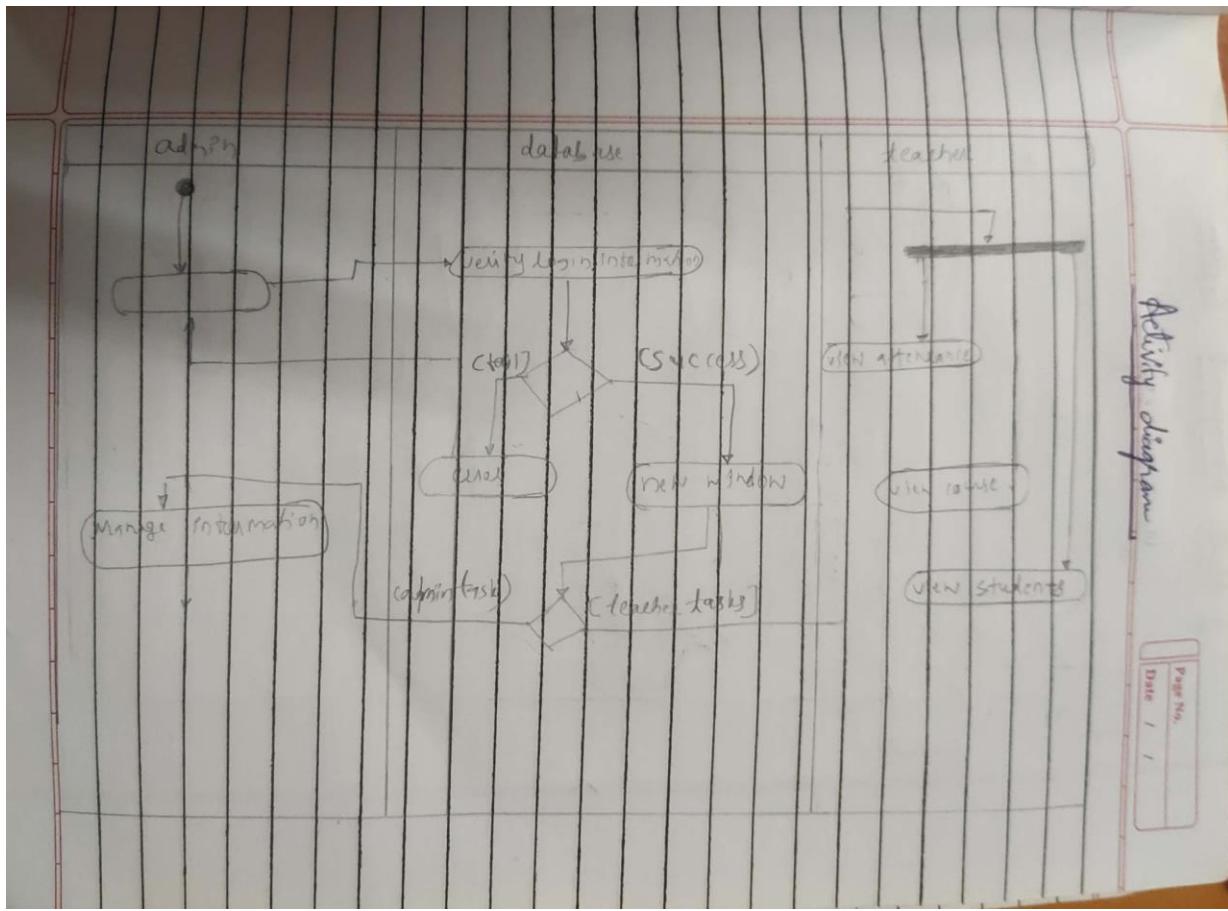




The above sequence diagram gives the interaction between objects while a user is logging into a system. The user enters login information in the website which sends to the server, where the information is validated and the appropriate reply message is displayed to the user.

6. Advanced Activity Diagram:





The above activity diagram has three swimlanes mainly payment gateway, database manager and accountant. The student can login and make payments. The payment gateway verifies the payment information, while the database makes an new entry. After payment user is redirected to home page.

Experiment 2: Hostel Management System

1. SRS:

Problem Statement:

Manual hostel management involves a lot of confusion and difficulty in organization and management of student records. So the proposed system involves a way to organize the rooms, mess and student records digitally.

The Use Cases of the System are:

- The warden must be able to register for specific shifts during a week.
- The management should be able to add, edit, views and delete student personal details like name, age, grade, email, phone number and address.
- The management should be able to allot rooms to the students.
- Students should be able to view their own details.
- Students should be able to give feedback.
- Mess manager can update the menu list.
- Manager can review the mess feedback.

2. Hostel Management System

Software Requirement Specification

Purpose / Problem statement

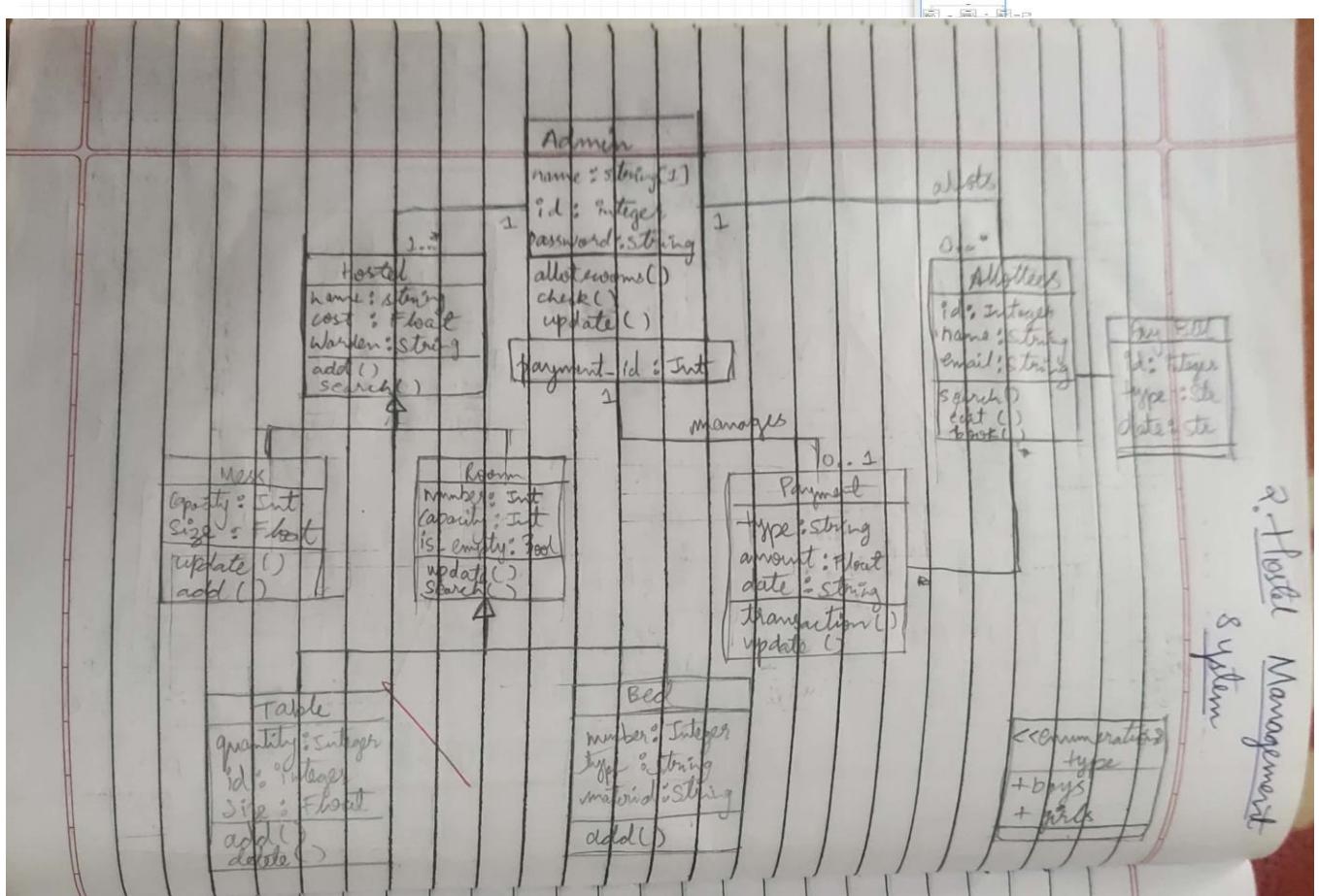
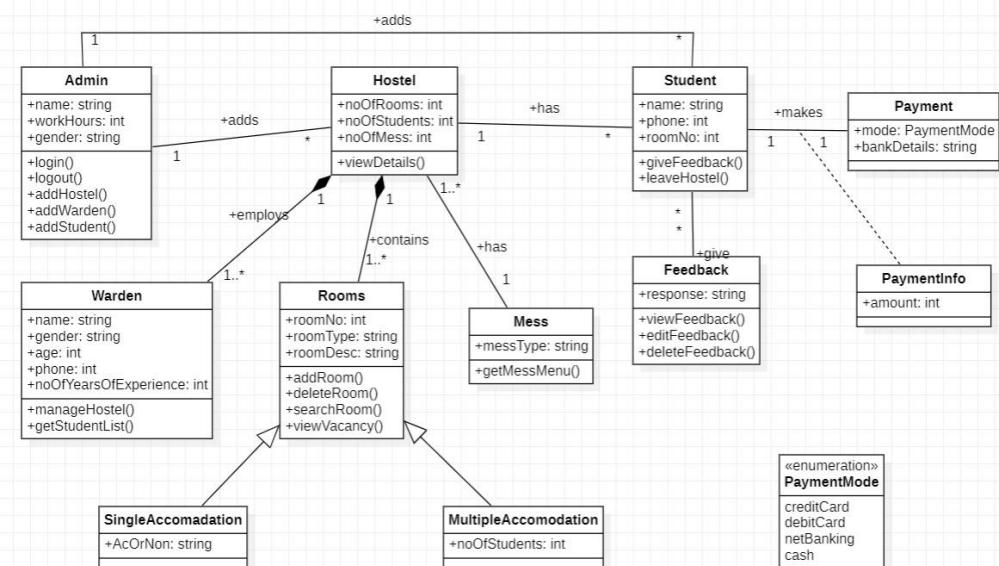
- The hostel management system is to provide college students accomodation to university hostel more efficiently. This project also keeps details of hostellers and applied students. Warden will be administrator. This document is intended to minimize human work and make hostel allocation an easier job.

SRS

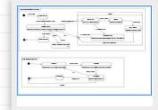
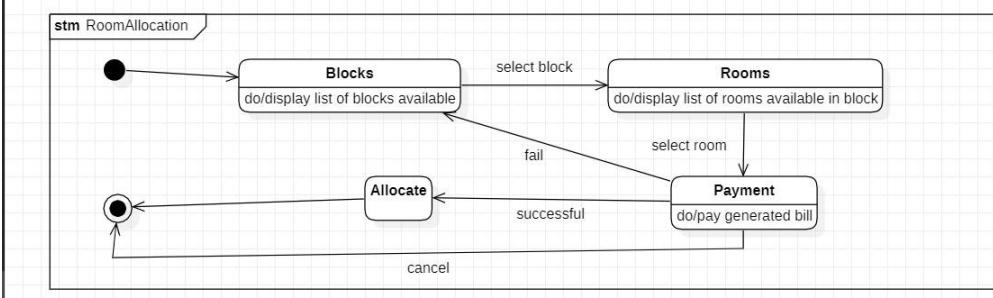
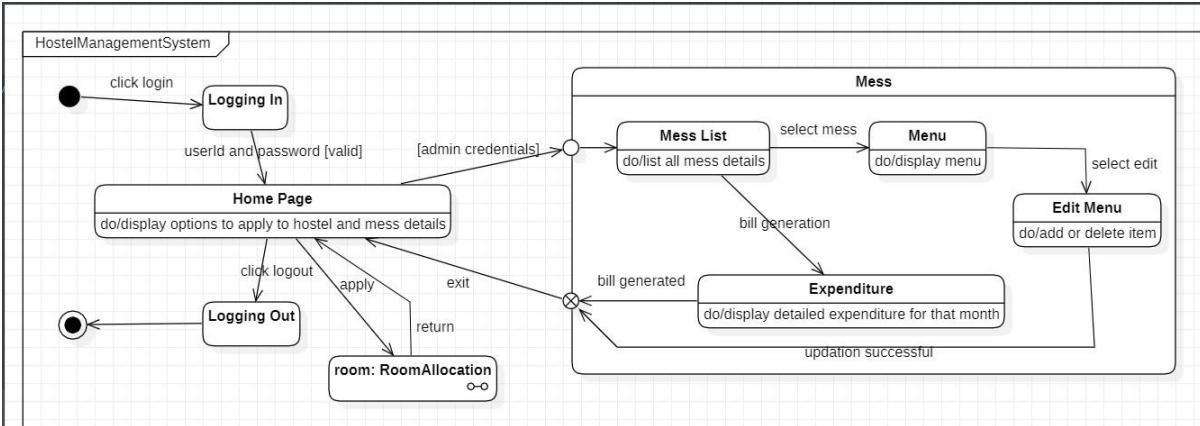
- It has admin who manages hostel, allotes and payment methods. The admin will allocate a room to student and will keep track of payment made by students
- As students course is over, they will vacate their rooms and it is required for admin to remove their records from database tables

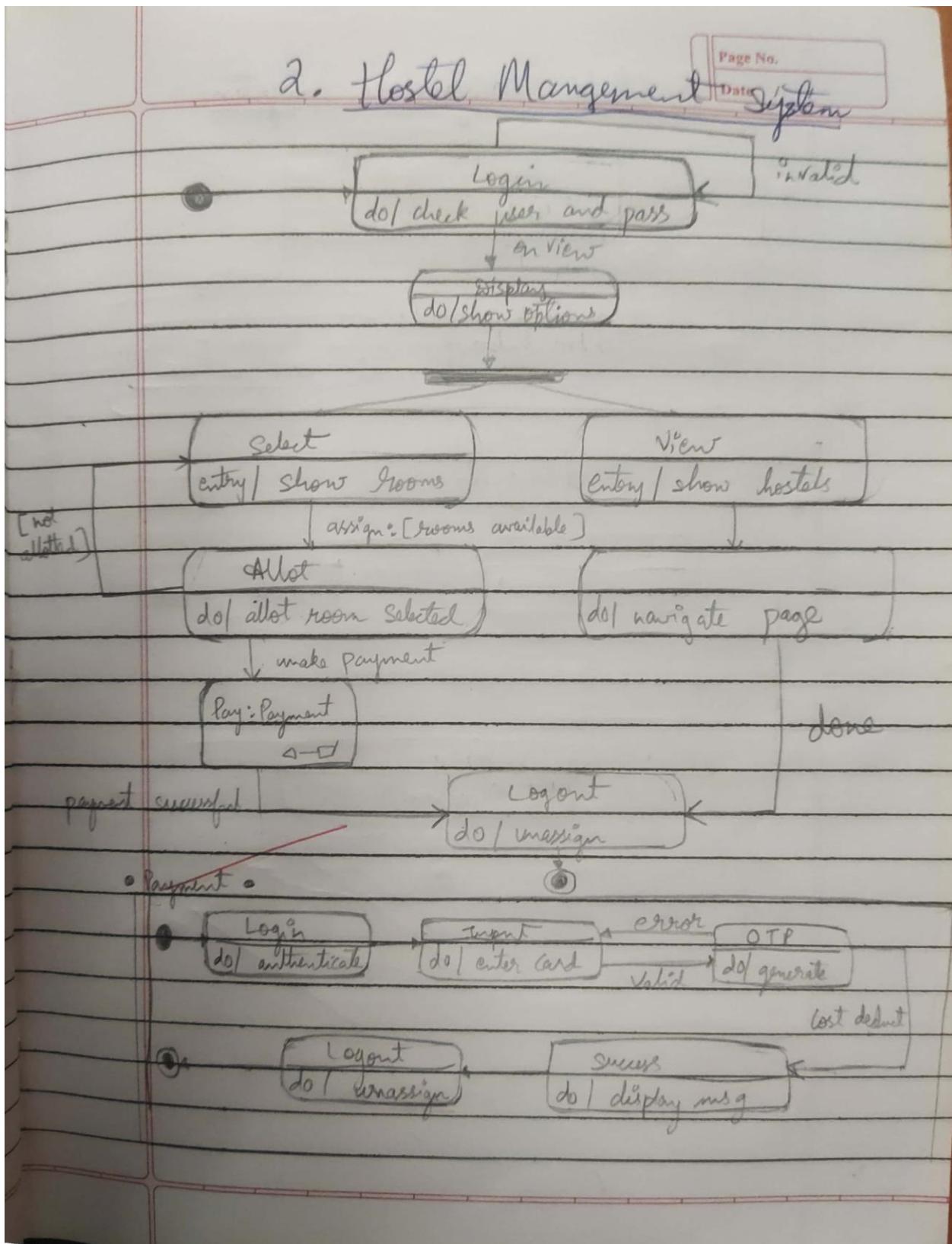
- The allot-ee makes payment accord to bill generated which have attributes bill number, type, date
- The details of Students Staying in the hostels like name, place, address, contact details is in database
- The hostel is categorized in 2 types i.e boys and girls hostel. Each hostel type has off costs, warden and name.
- A hostel is made up of mess and rooms. A mess account will also generate.
- It will allow renewing the student's registration every year, the rooms of hostel are composed of tables and beds whose count is maintained

2. Advanced Class Diagram:



3. Advanced State Diagram:

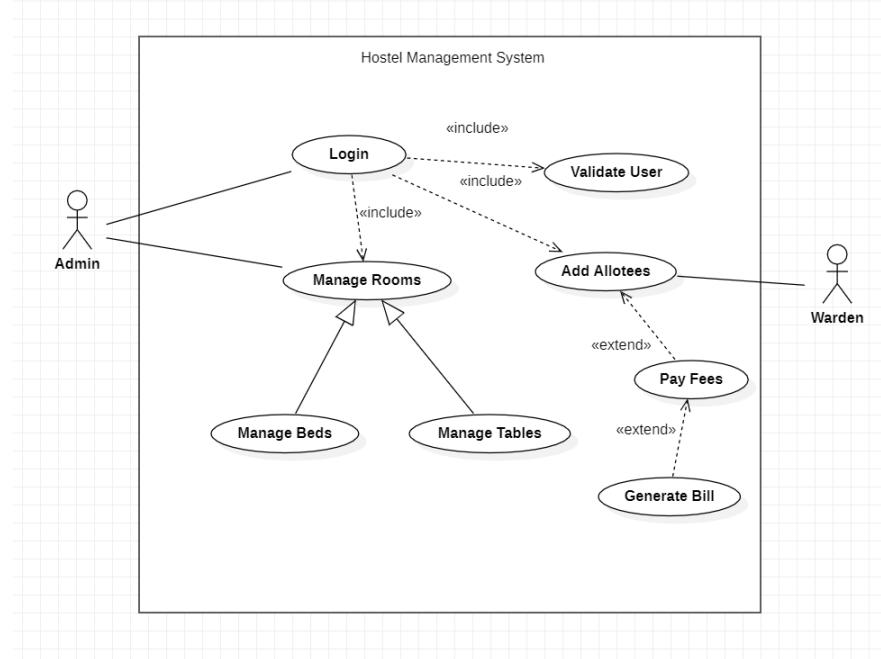




The above state diagram gives the movement of states in allotting a room to a student. The admin allots rooms for students. The student first logs in to the system ,which displays a set of option for mess list and room allocation. The admin chooses to allot rooms and finds the availability for rooms. If rooms are available then the admin allots

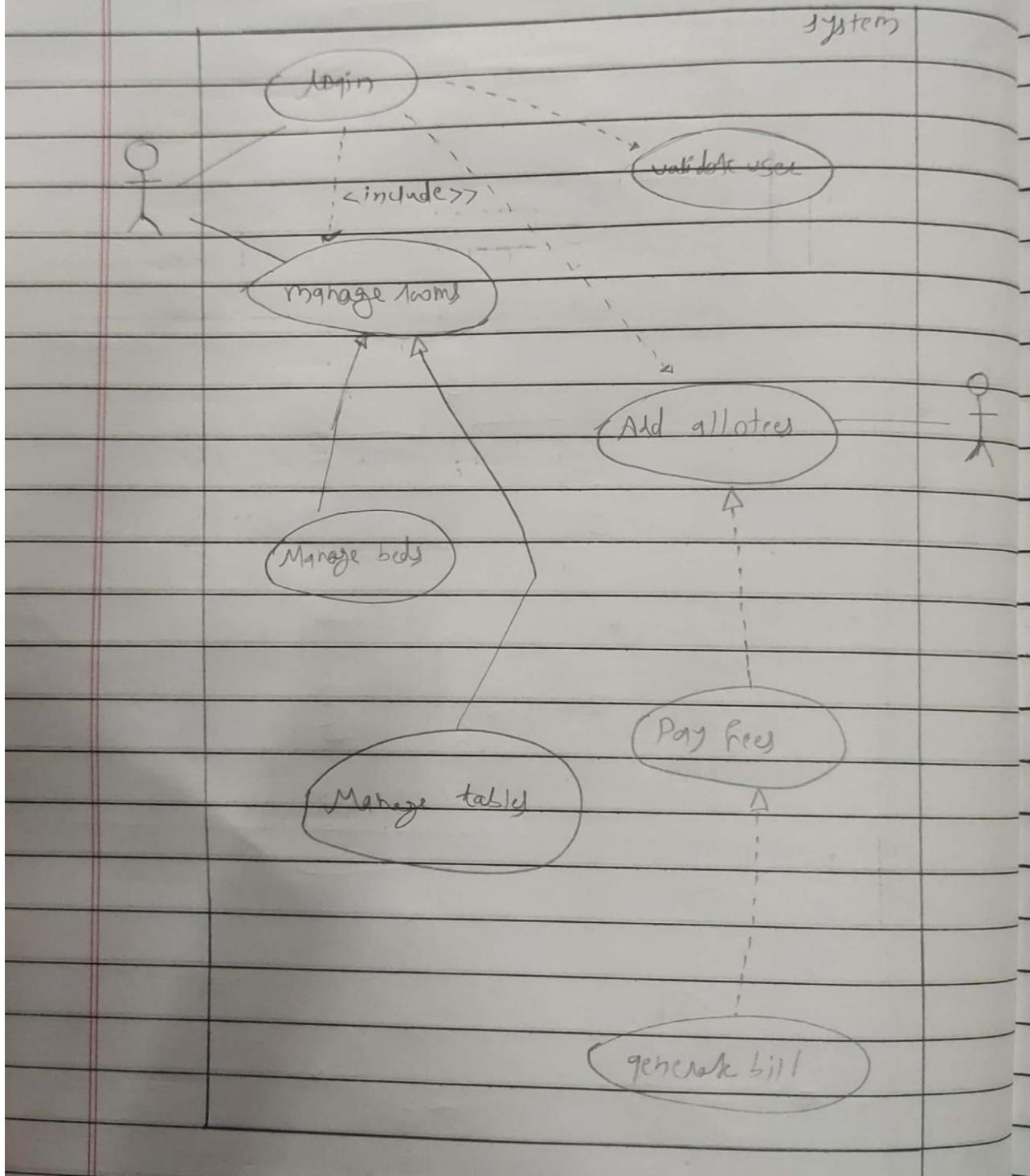
room to the student and when successful the student makes the payment. If no rooms are available,a message is displayed and control goes back to the display state.

4. Advanced Use Case Diagram:



2. Hostel Management System

Use Case diagram



Actors:

Admin: the person who manages the whole system

Warden : the person who manages the allottees

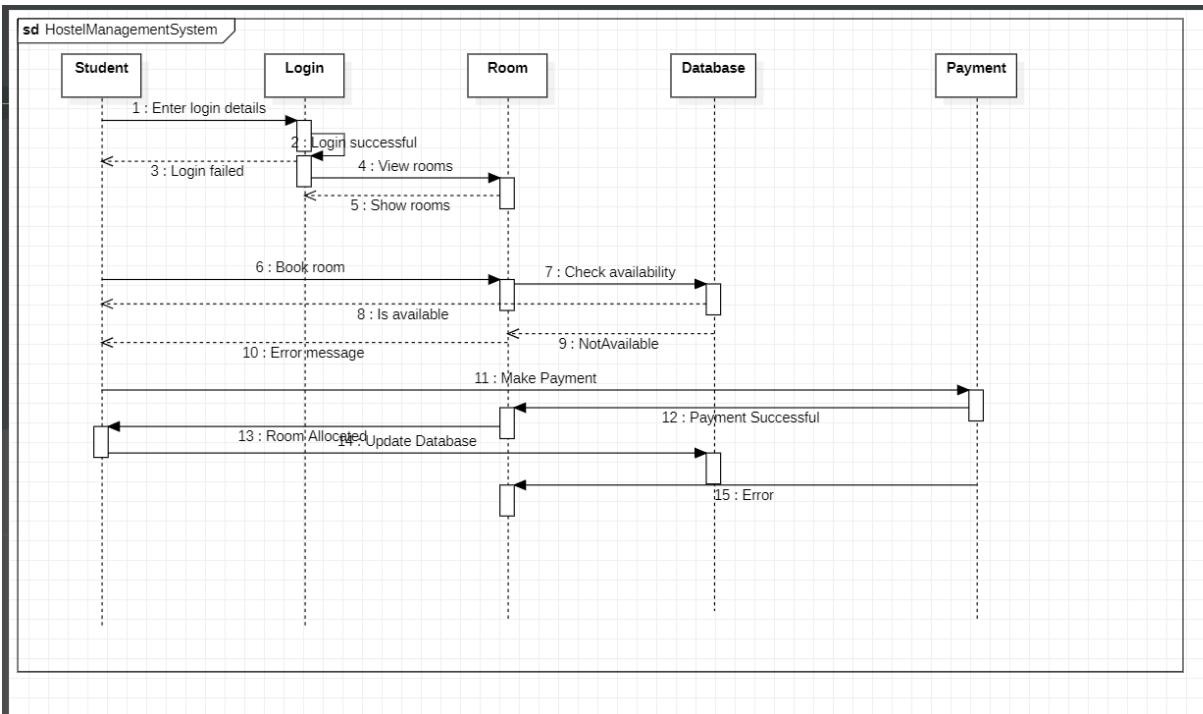
Student : the person who uses the hostel system

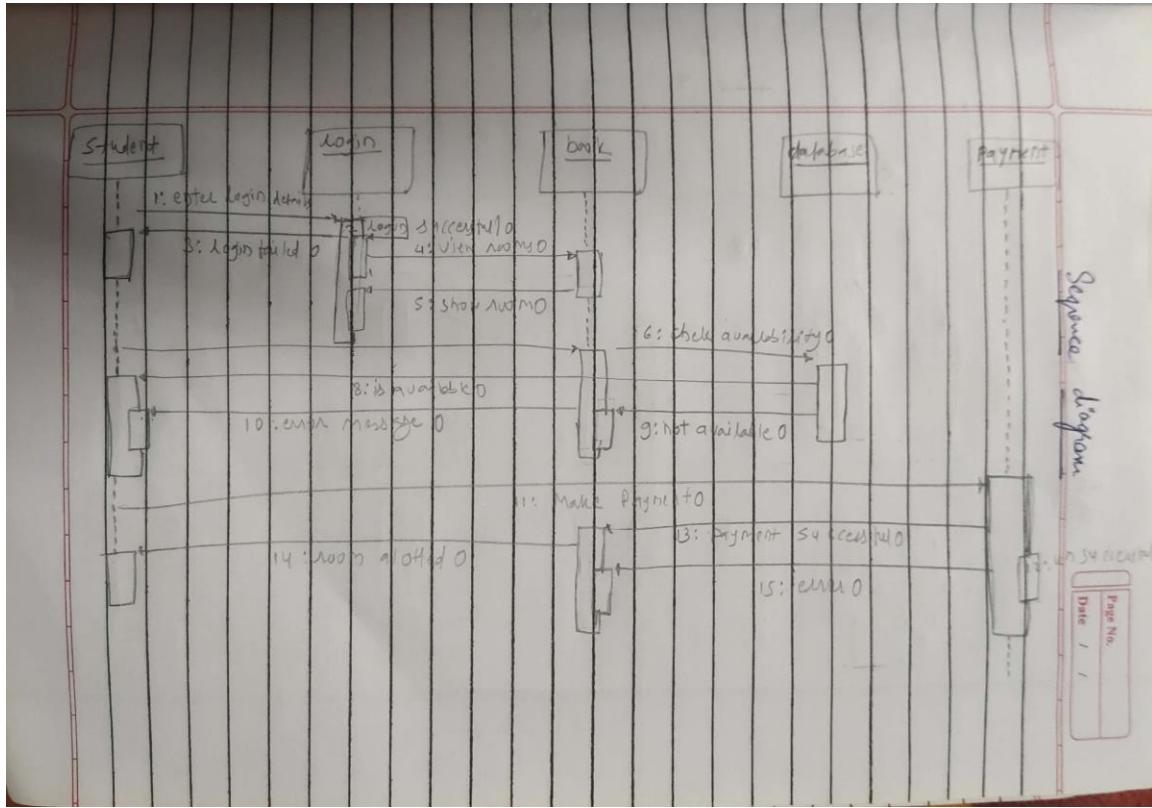
Use Cases:

Manage Rooms : allows actor to update delete or add information

Add allottee: the students are allotted hostel rooms

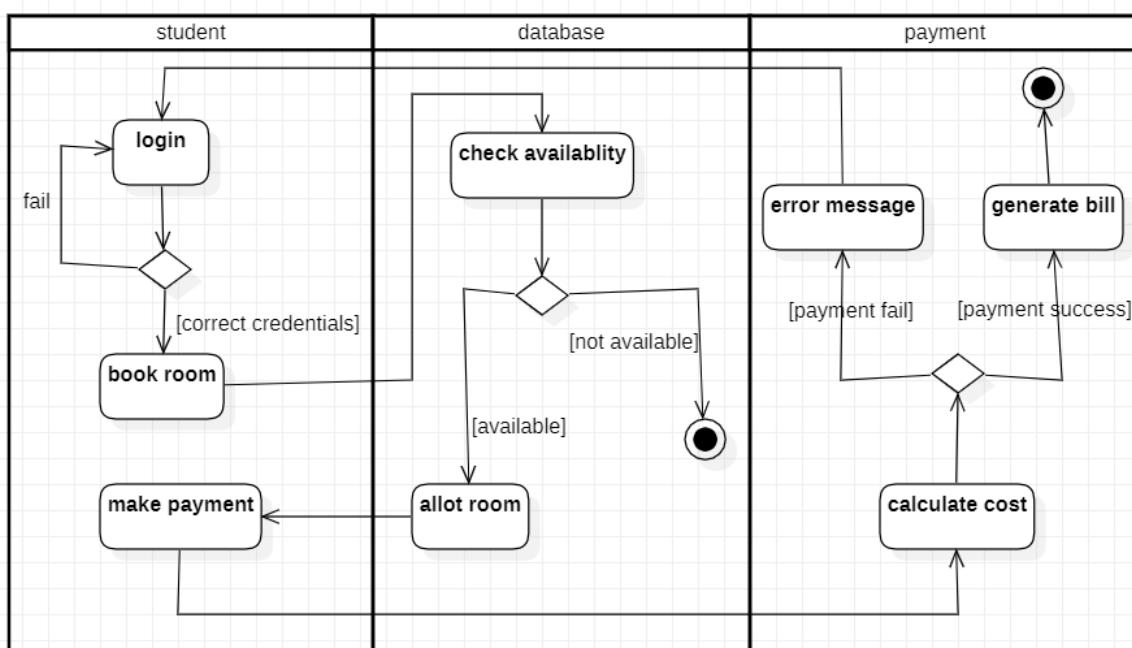
5. Advanced Sequence Diagram:



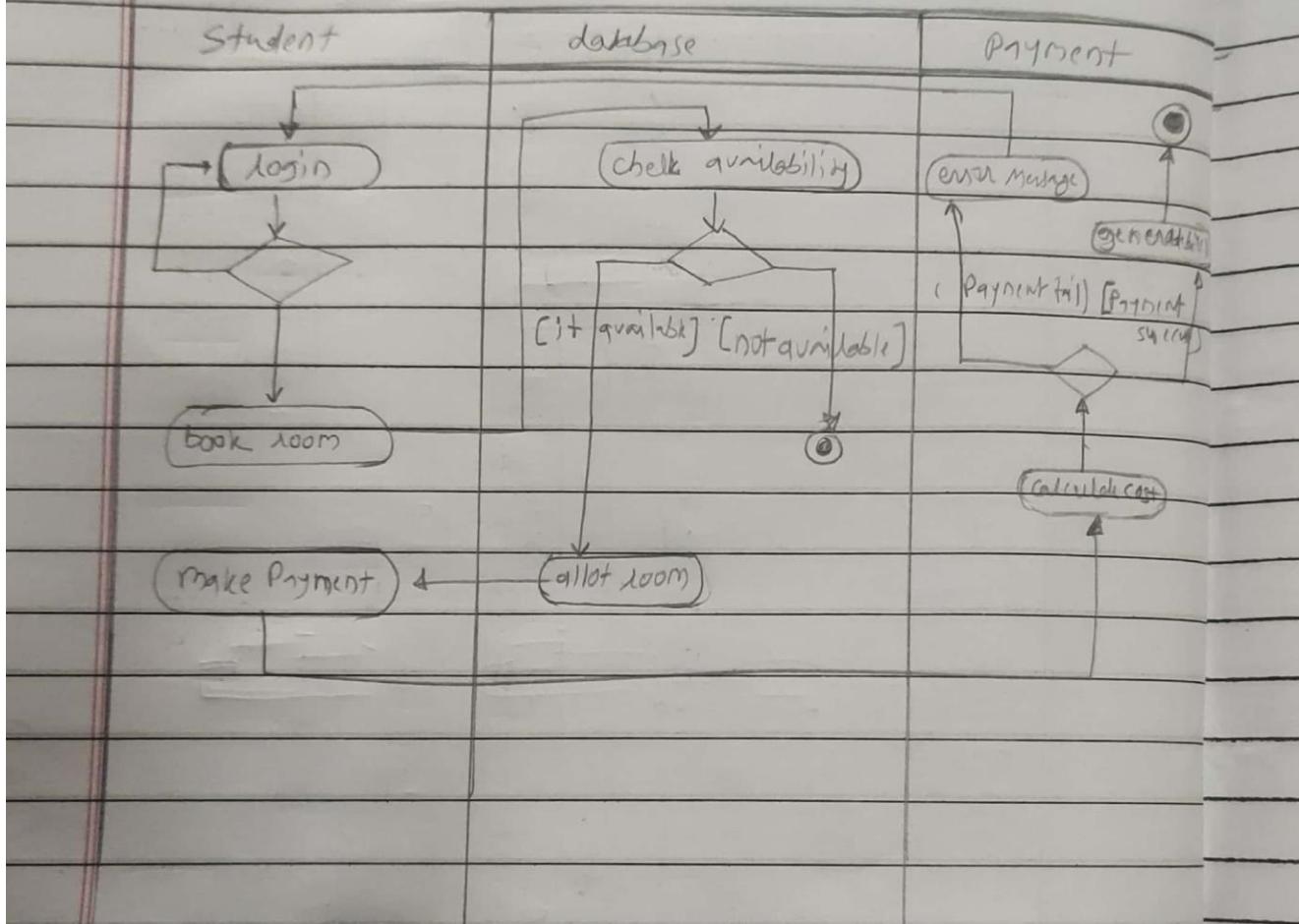


The above sequence diagram give the steps involved in a student logging in, booking a room, which is verified in the database and the payment for the same is made by the student.

6. Advanced Activity Diagram:



Activity diagram



The activity diagram tells about the activities involved in payment of fees. The above activity diagram give the steps involved in a student logging in, booking a room, which is verified in the database and the payment for the same is made by the student.

Experiment 3: Stock Management System

1. SRS:

Problem Statement:

The stock maintenance system is for the customers who access the information about the stock and retrieves the Information. The stock maintenance is to replace the existing maintenance system which is inefficient. The are system will allow the employee to record information of the products available in the store. The vendor deals with the information about the details of the suppliers giving product to the organization.

The Use Cases of the System are:

- The owner has a manager who manage the inventory. The owner can order, sell stock. He can make payments, report quality issue, return stock and track order.
- The manager maintains a ledge does quality check and reports to the owner.
- In the inventory, we can add, remove, edit and search the inventory. We can calculate the required and expired stock.
- The order details contains 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 a product can be viewed.

3. Stock Maintenance System

Problem statement

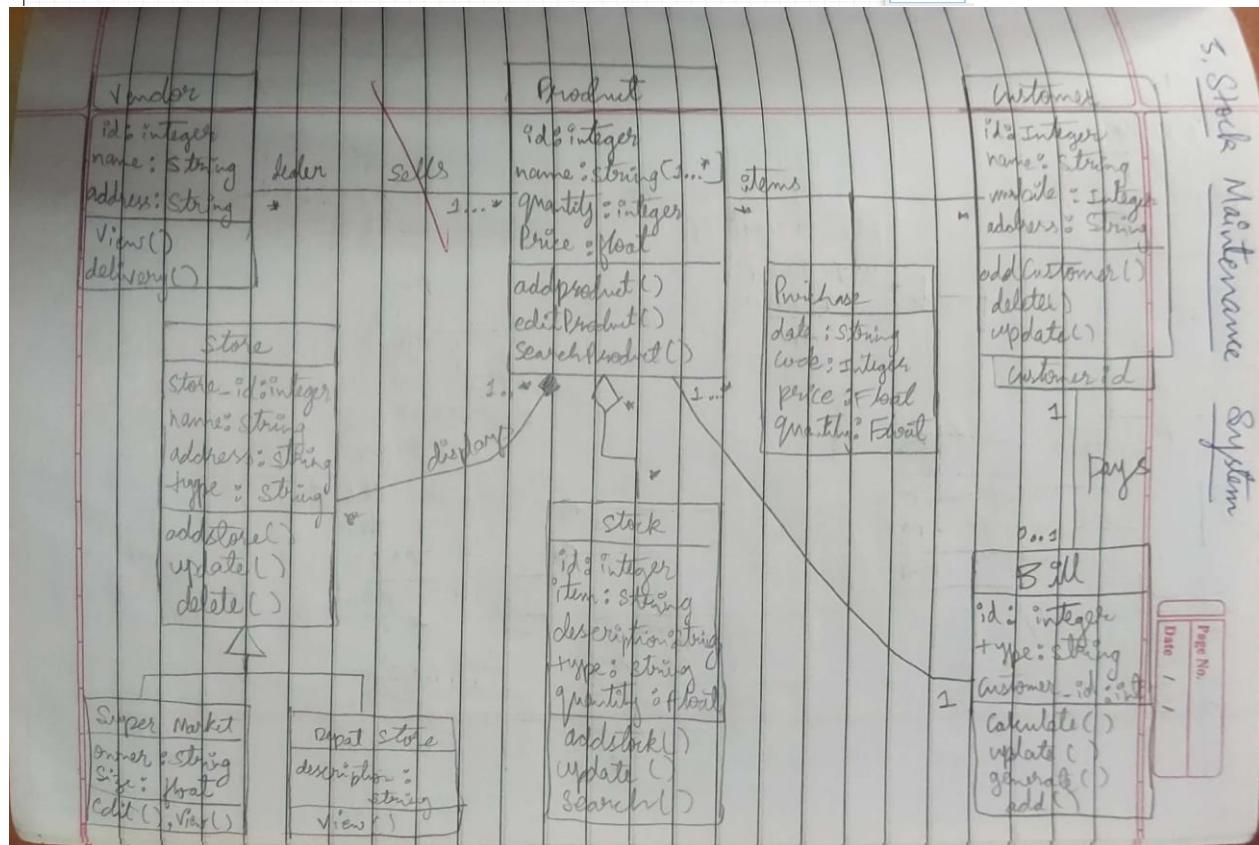
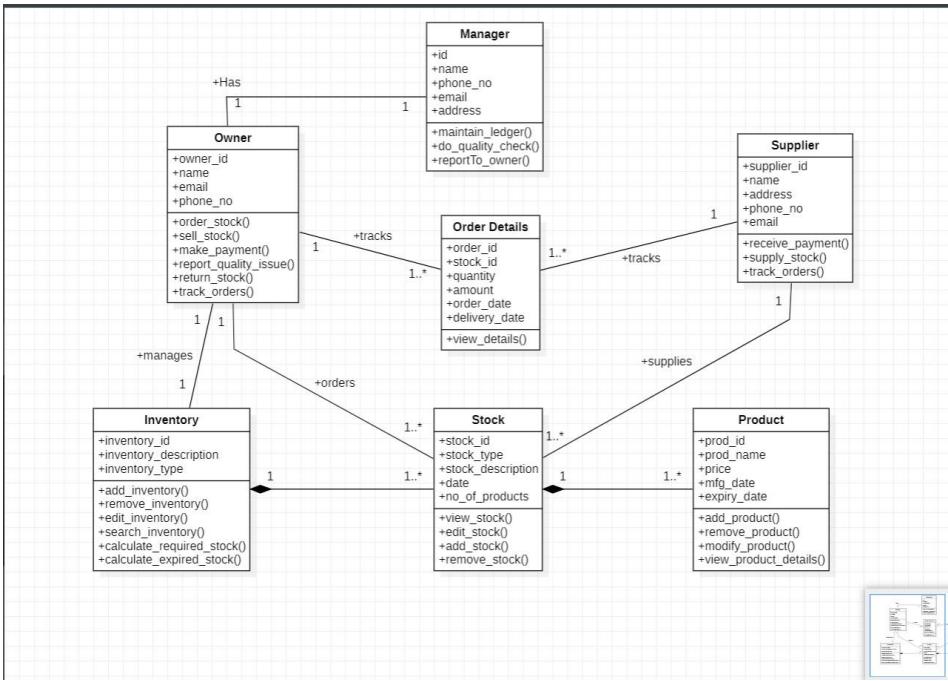
- The stock maintenance System is basically for customers who access the information about the stock and retrieves the info. It is to replace the existing maintenance system which is inefficient. The new System will allow the employee to record info of products available in store.

Software Requirement specification

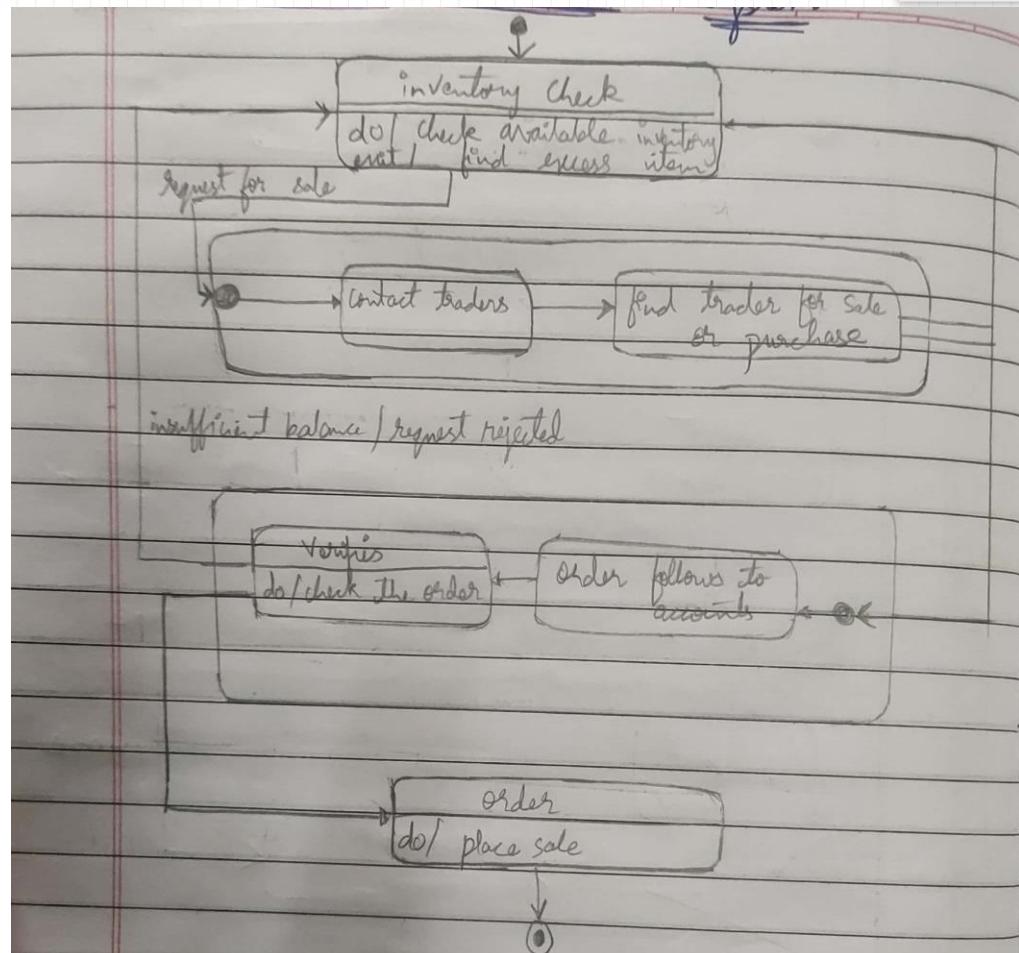
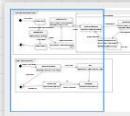
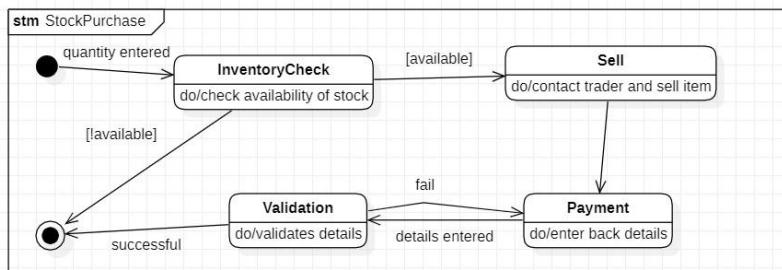
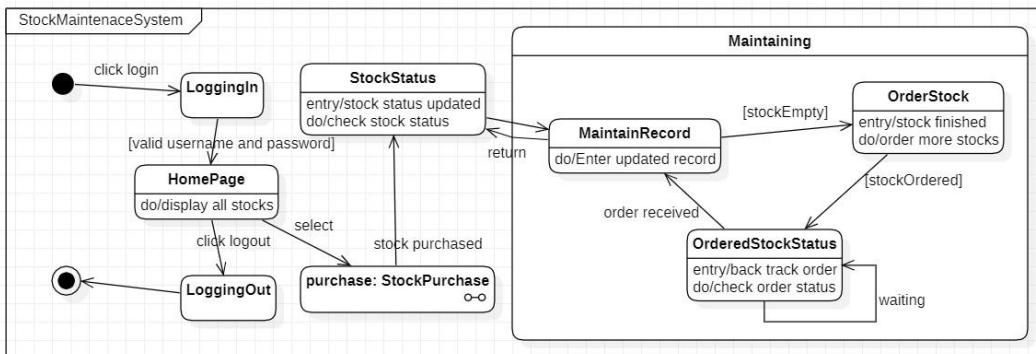
- The customer can purchase 1 or more stock on any day, which will have a quote price and quantity
- ~~The customer will need to pay bill for products he or she has purchased and the bill no, type, description and customer who is paying is maintained.~~
- The stock of products is maintained separately.

- Stock consists of details such as name of the product id generated, quantity, cost etc. This info is retrieved during the sales and purchase of a product.
- The Vendor deals with info about the details of Suppliers giving product to organisation
- Vendor consists of details such as Vendor name, address, email id, Sales tax number etc.
- The products are displayed in stores across the city or world. All info regarding the store such as store id, name, address and type are used to locate any product. The stores can be of many types. Some of them are departmental stores, super markets etc.

2. Advanced Class Diagram:

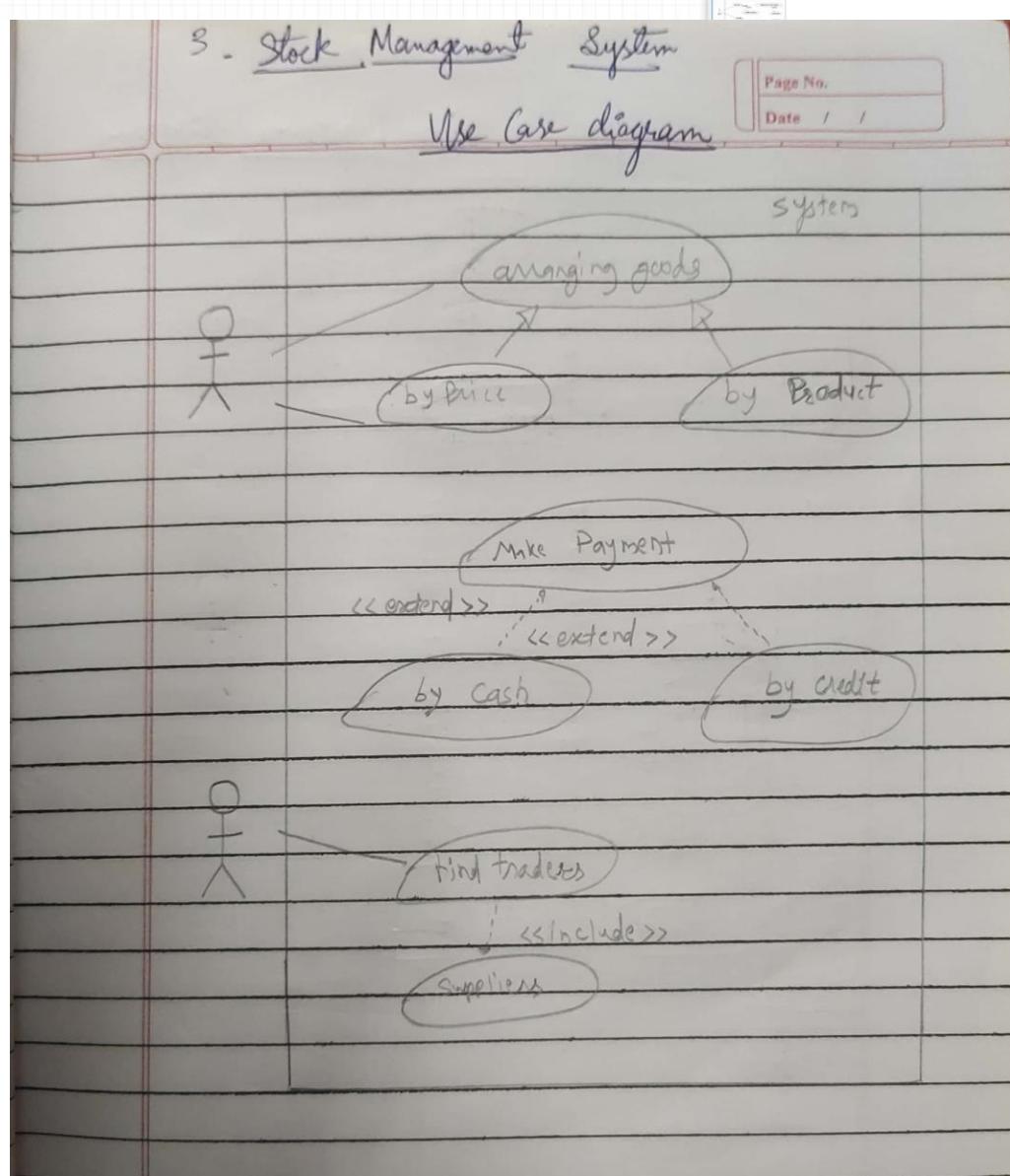
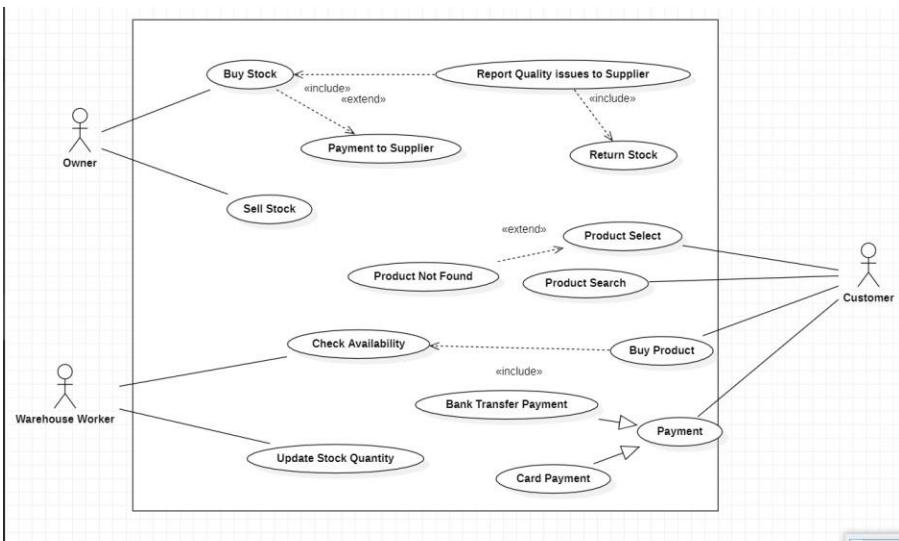


3. Advanced State Diagram:



The state diagram above gives us the states involved in purchasing a product and placing the order for the same. There is first an inventory check ,where is stock of products is noted and if the stock is less than minimum an order is placed by first searching for suitable trader. If a suitable trader is found , the order is placed and verified by the accountant. After the accountant has verified a payment is made for the products purchased.

4. Advanced Use Case Diagram:



Actors:

Customer: a person who purchases the products

Owner: a person who owns inventory

Warehouse worker: a person who supplies the products

Use Cases:

Buy stock: allows a user to purchase any product

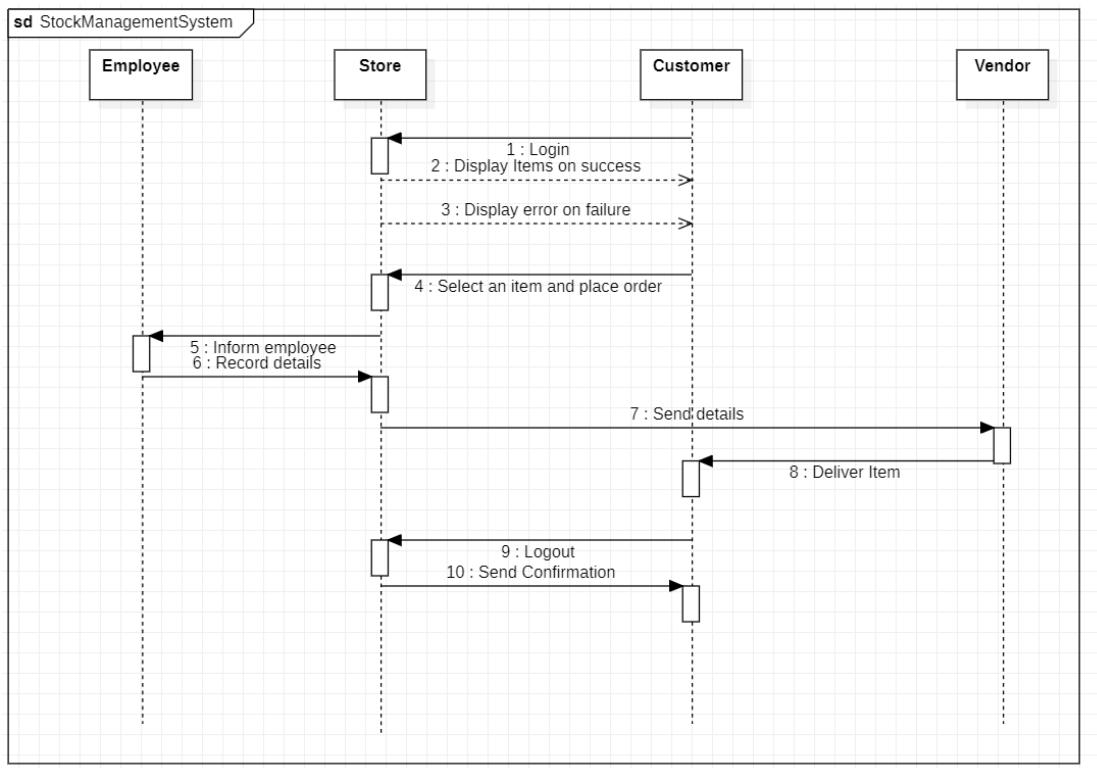
Make payment: accepts the payment

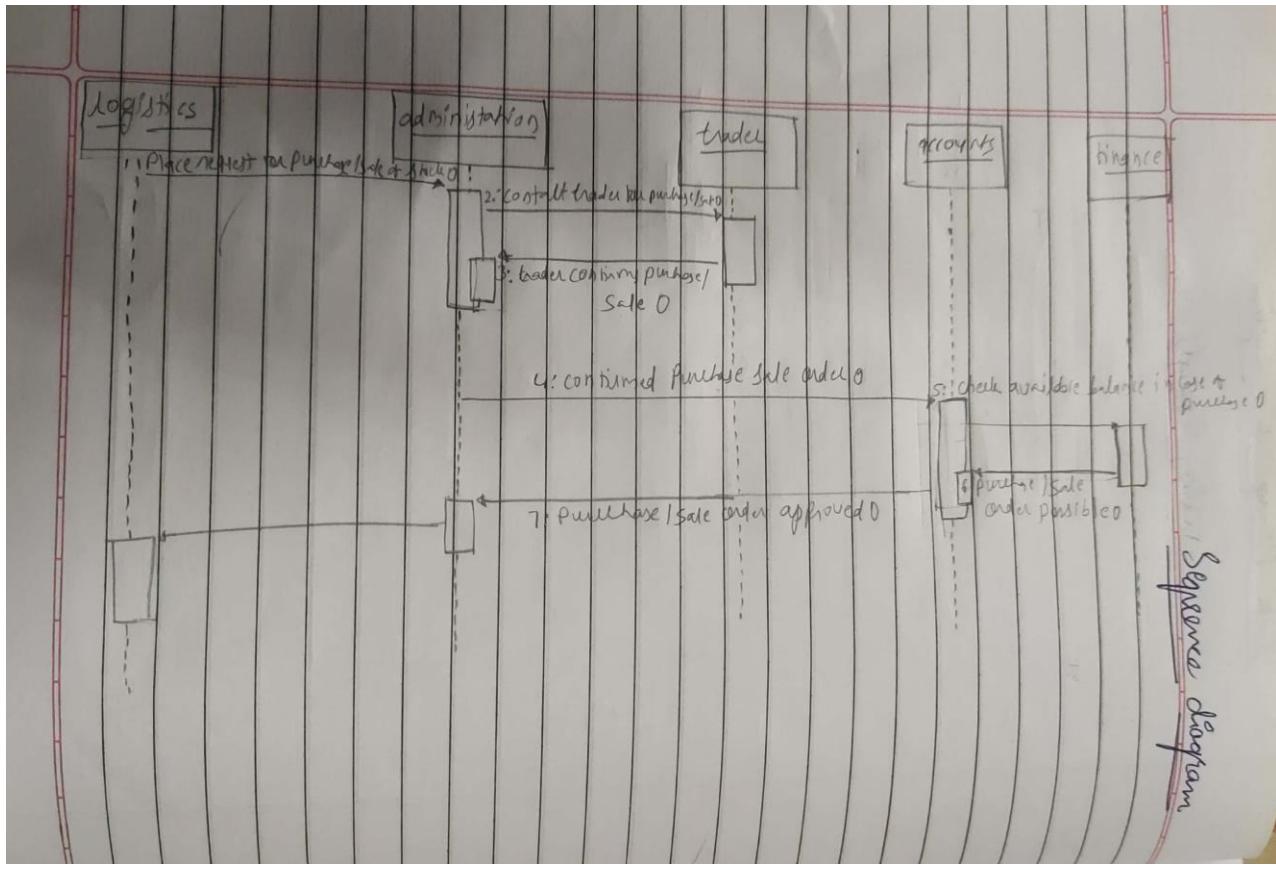
Supply stock: keeps track of the stock supplied

Find traders: provides a list of traders

Update stock: the stock list is updated by the stock person

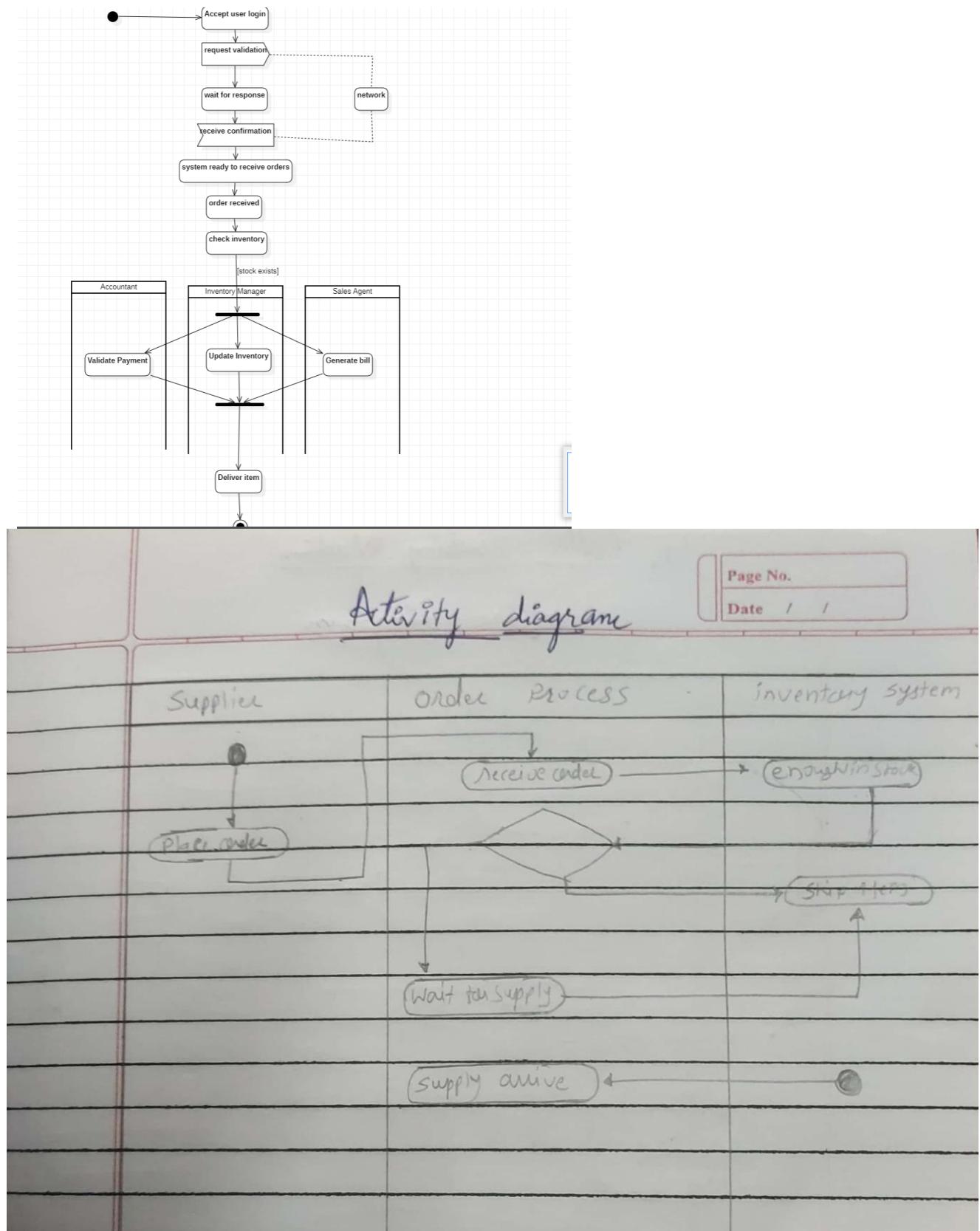
5. Advanced Sequence Diagram:





The above sequence diagram conveys the sequences involved from the point of login, till confirmation of stock purchase. The customer interacts with the store and the purchase information is recorded by the employees, who send the details to the vendor. The vendor delivers the stock.

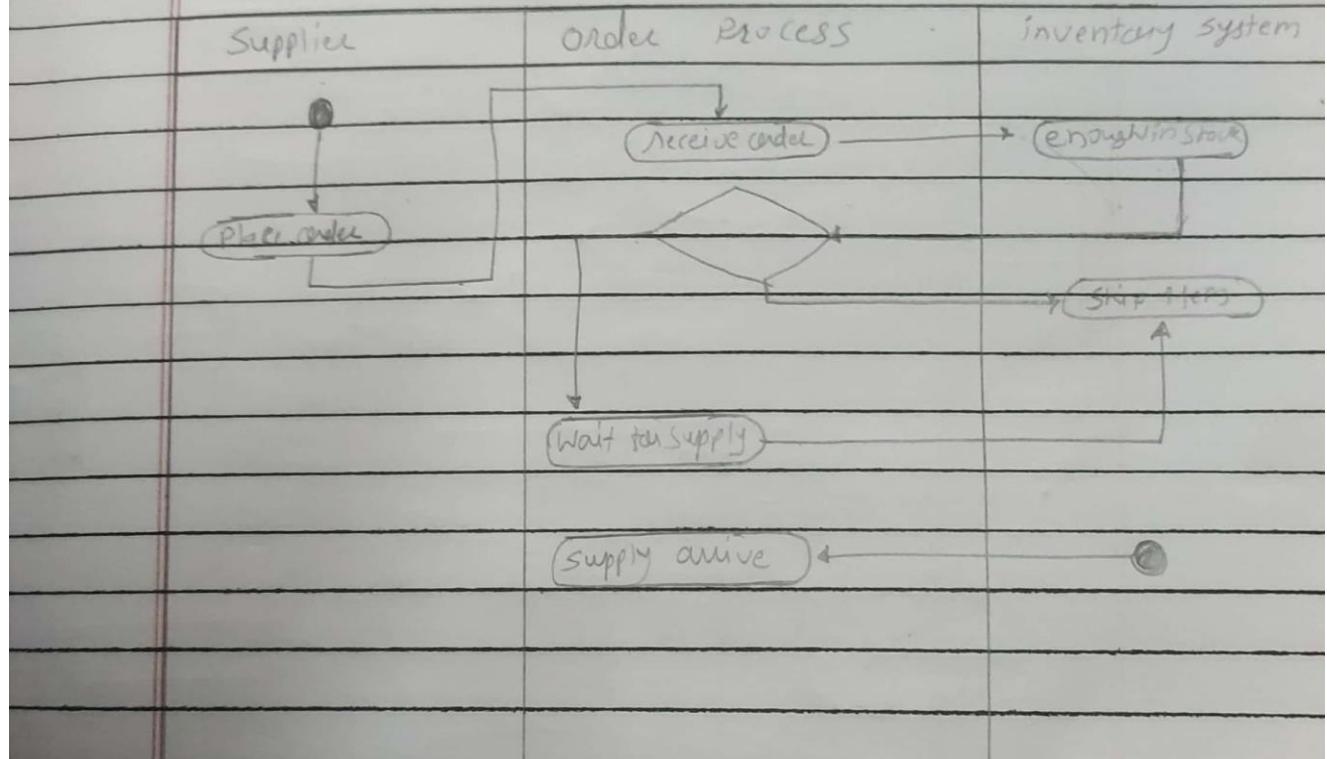
6. Advanced Activity Diagram:



Activity diagram

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The activity diagram shows that first user logs in. Depending on authentication the user can then purchase stock and place order. The events on the existence of stock is

represented by swimlanes which has accountant, Inventory management and sales agent who validate the payment, update the inventory and generate the bill respectively.

Experiment 4: Coffee Vending Machine

1. SRS:

Problem Statement:

The coffee vending machine is basically for the customers to buy coffee by themselves without third person being involved. A coffee vending machine sells different types of coffee such as cappuccino, black coffee, cold coffee and latte. Each type of coffee has a price and a name. A customer can buy their choice of coffee by selecting the button of their coffee and paying for the same through the coin box.

The Use Cases of the System are:

- The controller should disperse the product, check availability of product, update product quality after each dispense.
- The selection panel sends the status 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 the product should be maintained.
- Coin dispenser should dispense the remaining amount to the customer.

4. Coffee Vending machine

Problem statement

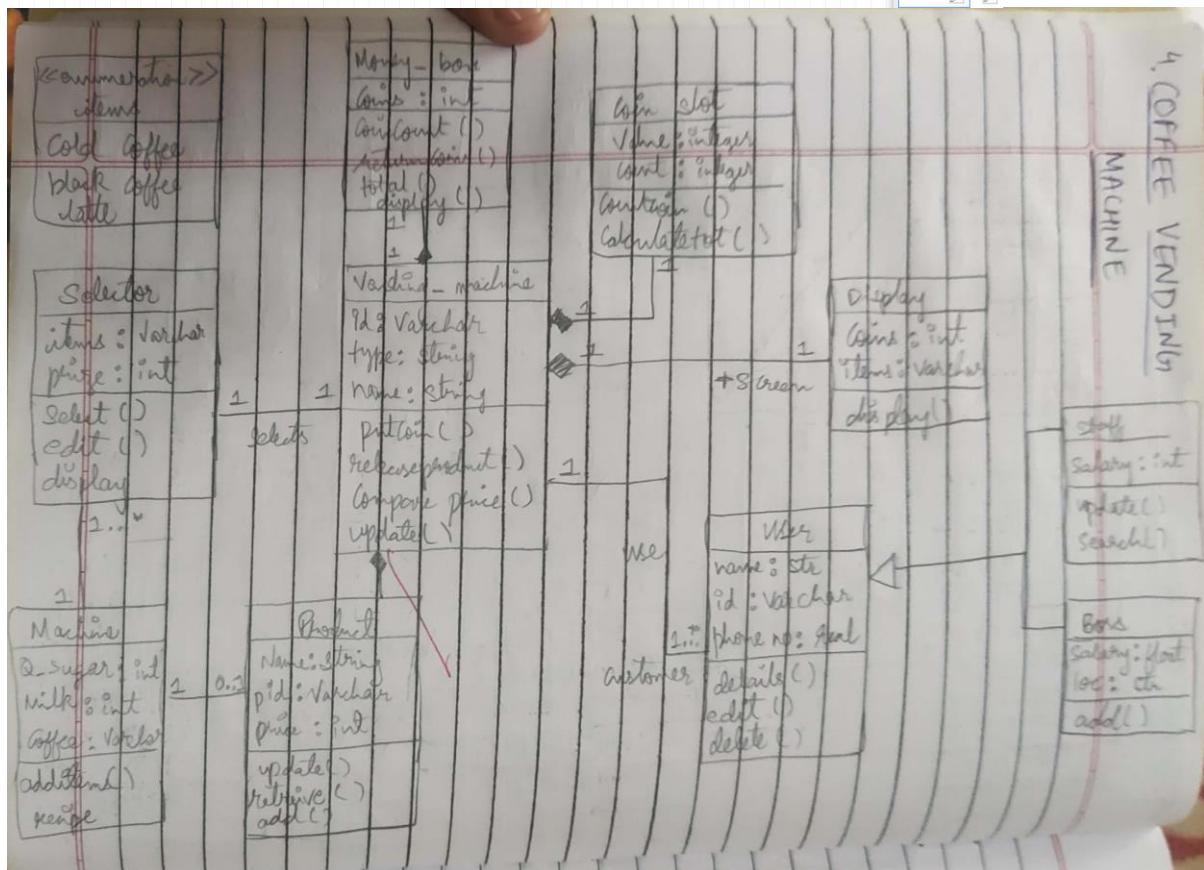
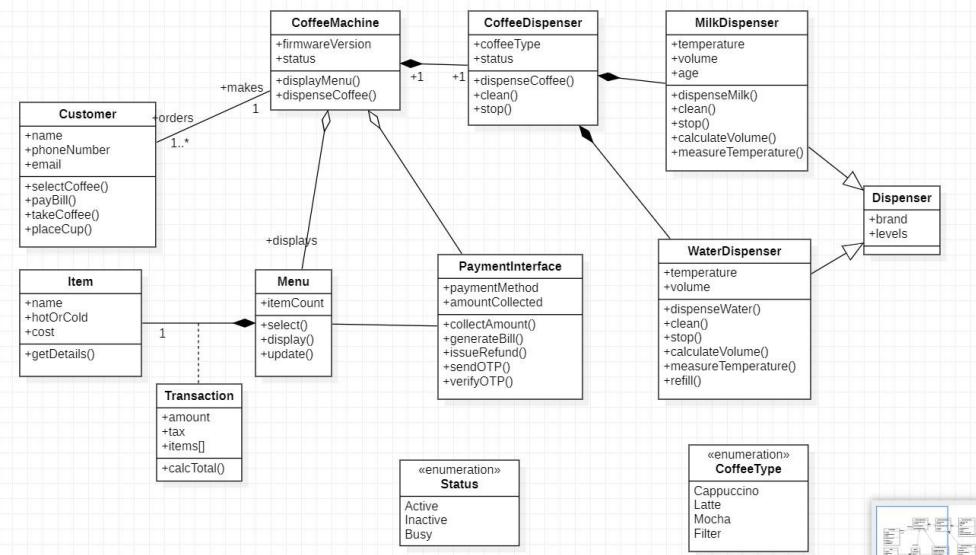
- The coffee vending machine is basically for customers to buy coffee by themselves without any third person being involved. It sells different types of coffee. Each type of coffee has a price and a name. A customer can buy their choice of coffee by selecting button of their coffee and paying for same through coin box.

Software requirement Specification

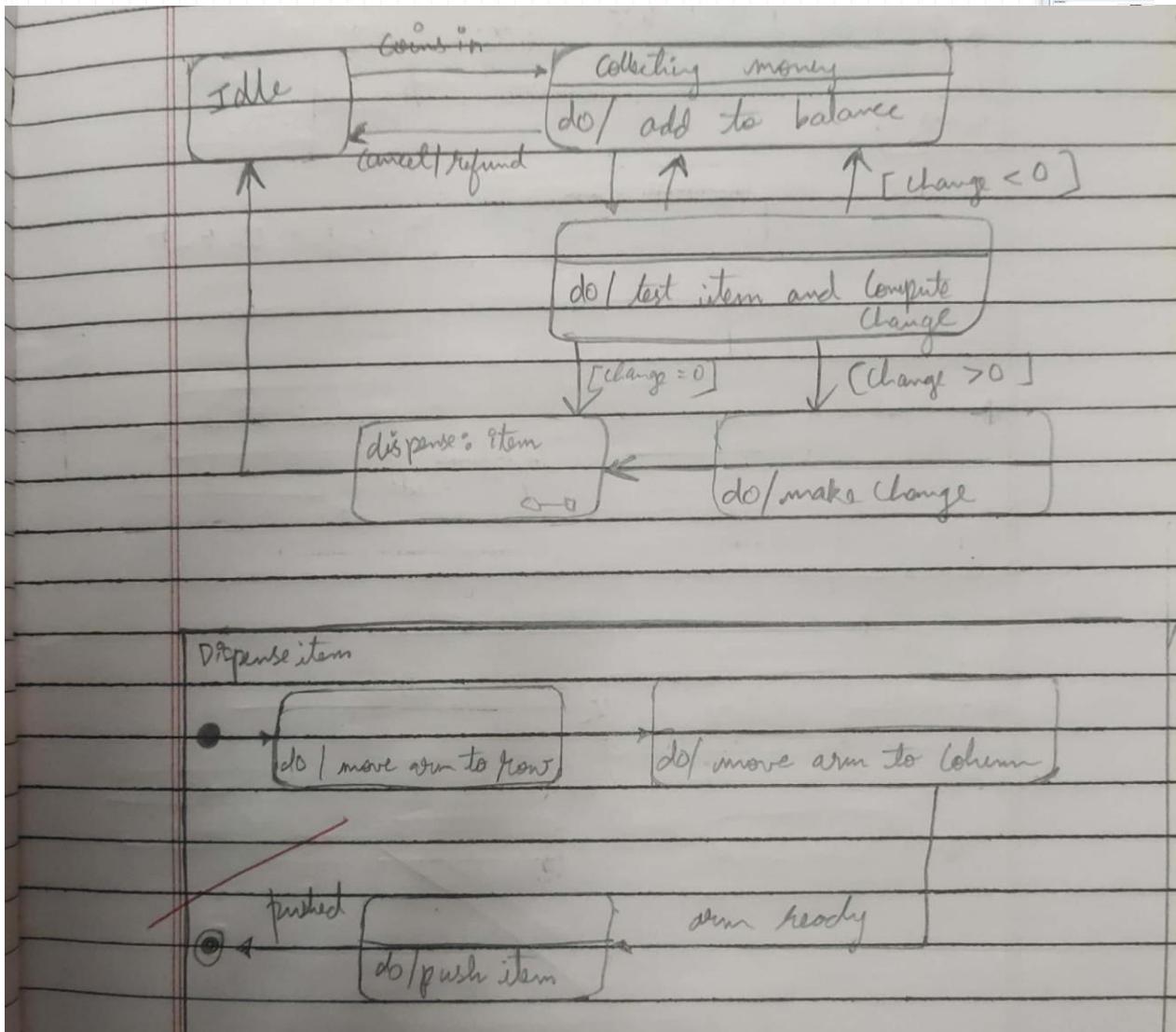
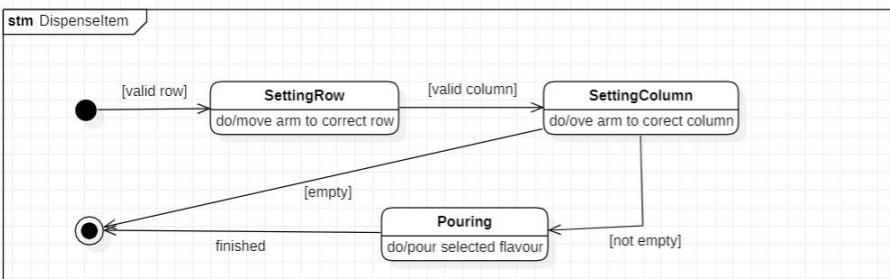
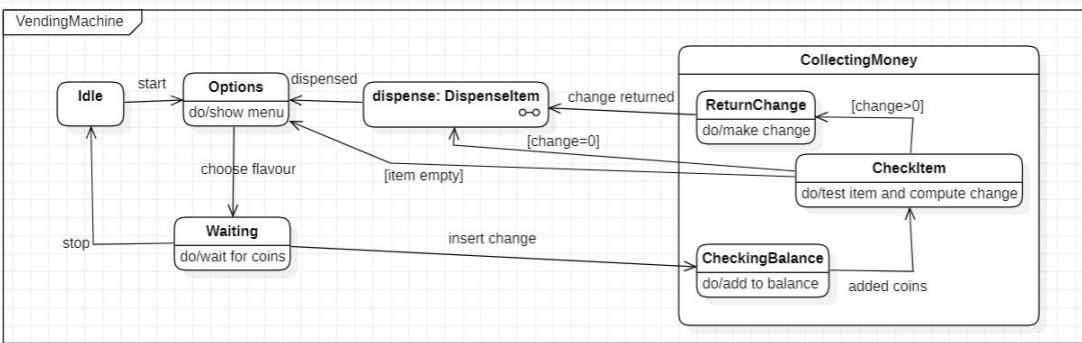
- The vending machine must have money box, coin slot, display screen and products i.e coffee for the machine is used
- The user on selecting a coffee, the coffee machine must be able to dispense the selected coffee to user.

- The user shall get empty cup placed right below filter.
- There must be buttons (start, pause, stop etc) for user to interact with system.
- The System shall check for properly inserted coins
- The System must accept coins of different amount and the System must compare the item cost with entered coin.
- The System shall be able to detect the low amount of ingredients and low no. of cups and indicate with a indicator (small LED)

2. Advanced Class Diagram:



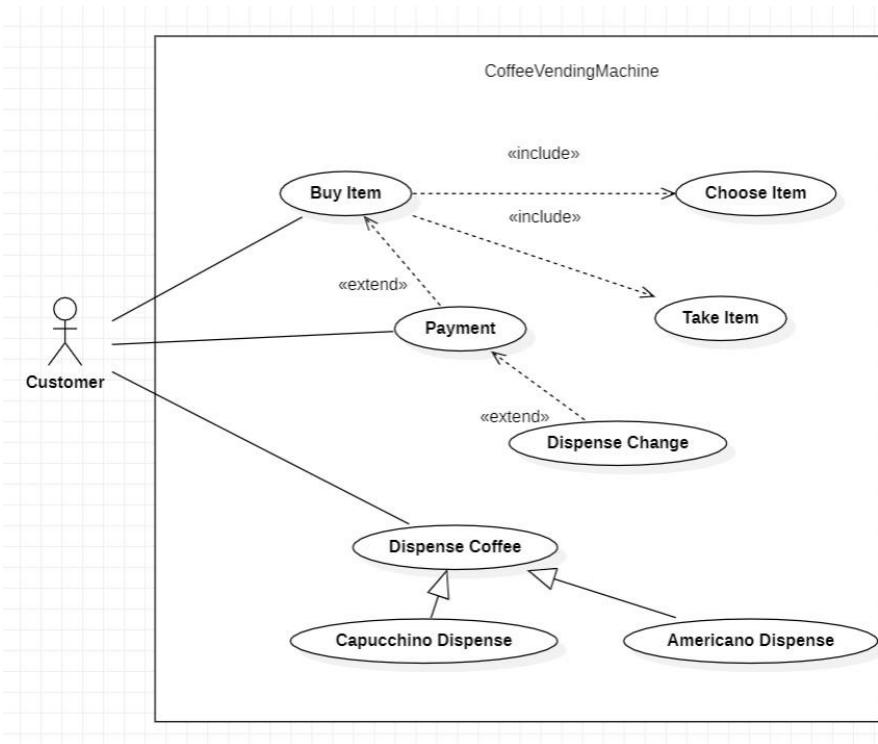
3. Advanced State Diagram:



Initially the vending machine is in the idle state. The machine displays the selected item selected by the user. When the person inserts a coin the machine adds the amount to the cumulative balance. After adding some coins, a person can select any item. If item is empty or balance is insufficient, the machine

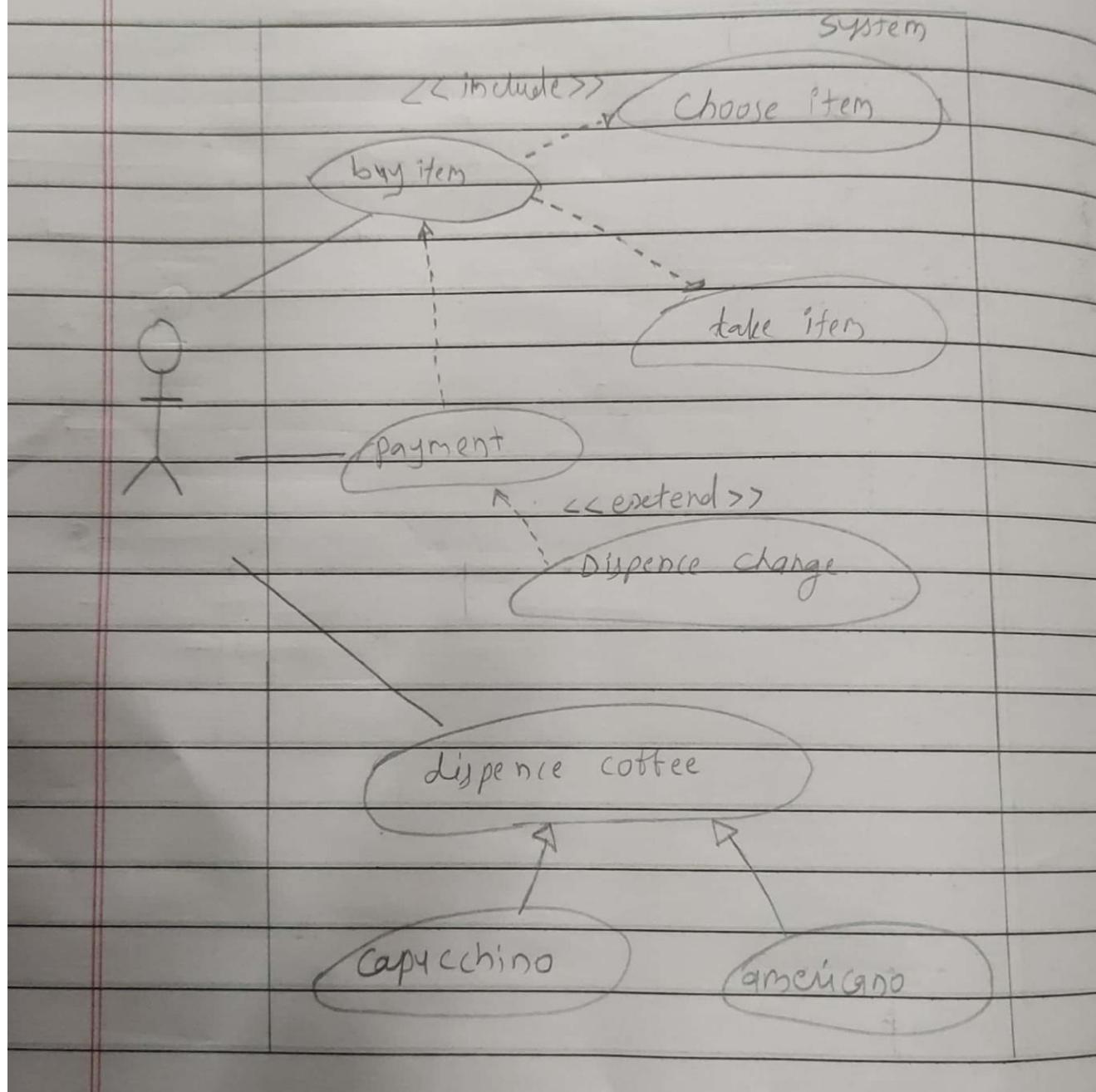
waits for another selection. Otherwise the machine dispenses the item and returns the appropriate change. The state diagram for coffee vending machine has a sub-machine called dispense Item, which has the states for dispensing an item from the vending machine. The arm of the machine first moves to an appropriate row, when ready, moves to an appropriate column and when the arm is ready it finally dispenses the item from the machine.

4. Advanced Use Case Diagram:



4. Coffee Vending Machine

Use Case diagram



Actors:

Customer :a person who uses the coffee vending machine

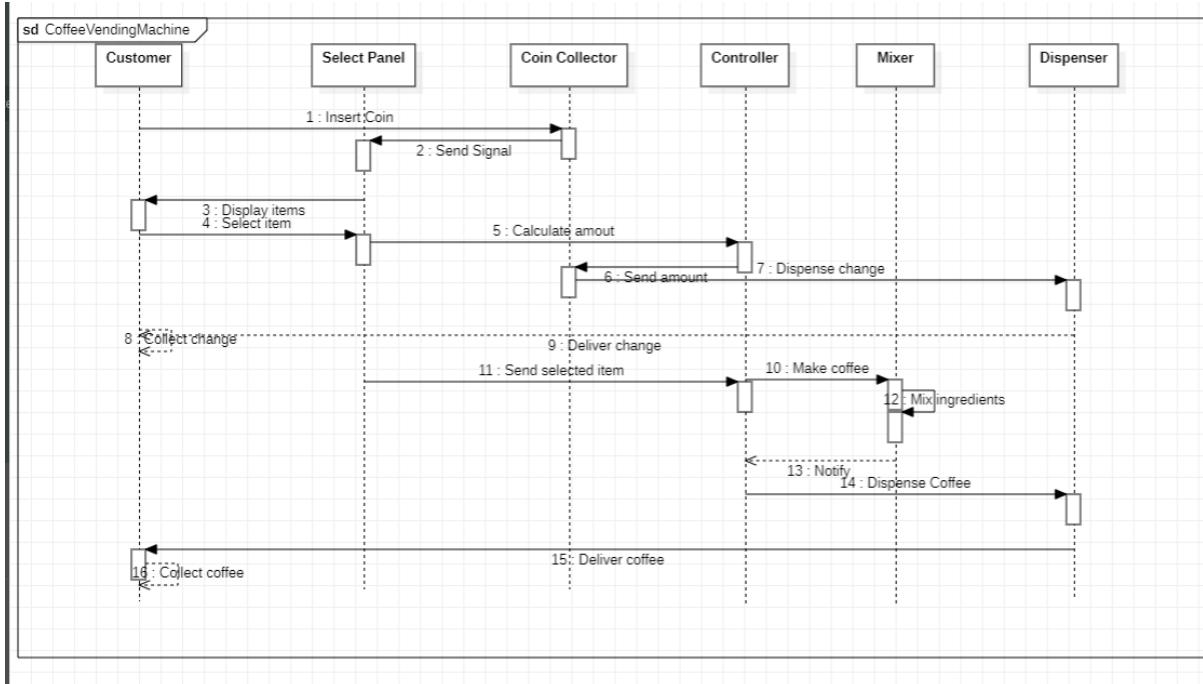
Use Case:

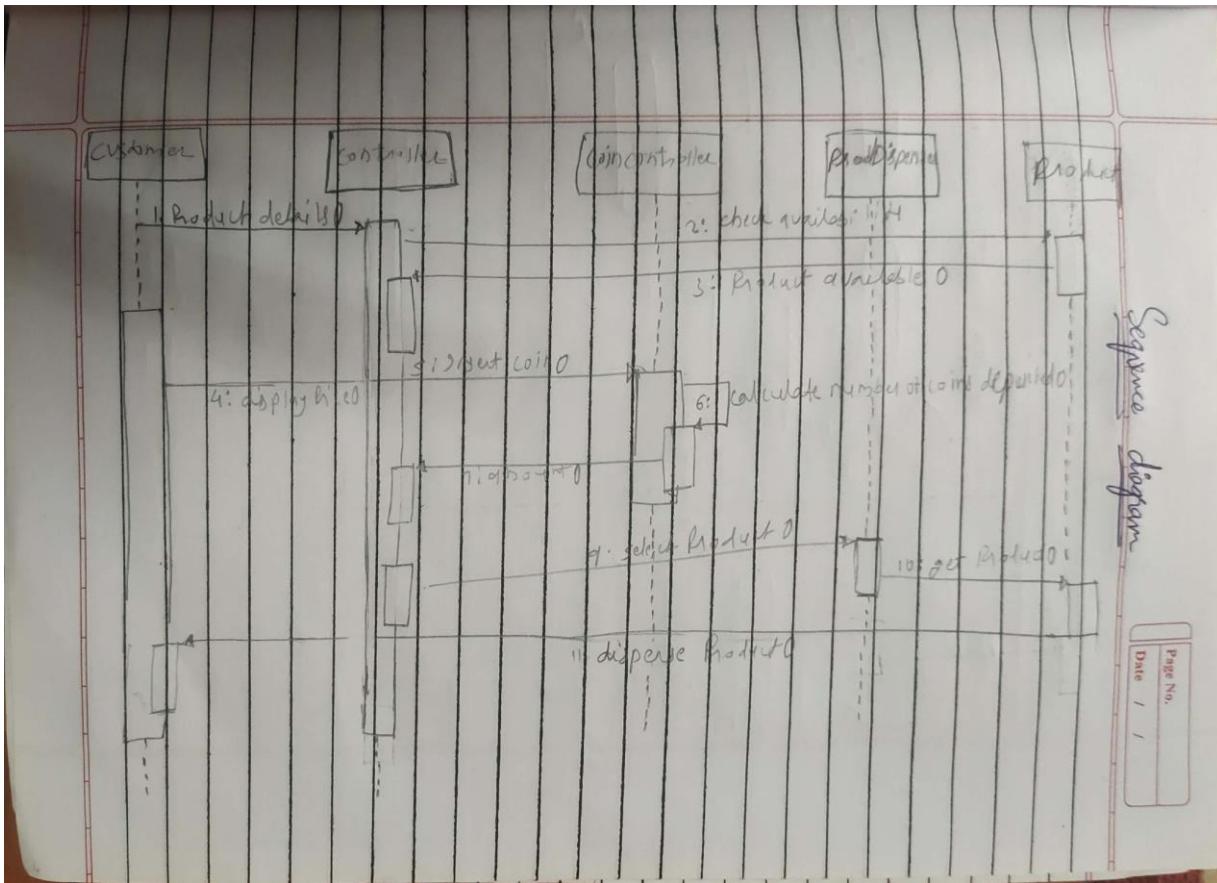
Buy item : allows user to order their coffee

Payment : accepts money for the coffee

Dispense coffee : the coffee ordered is prepared and given

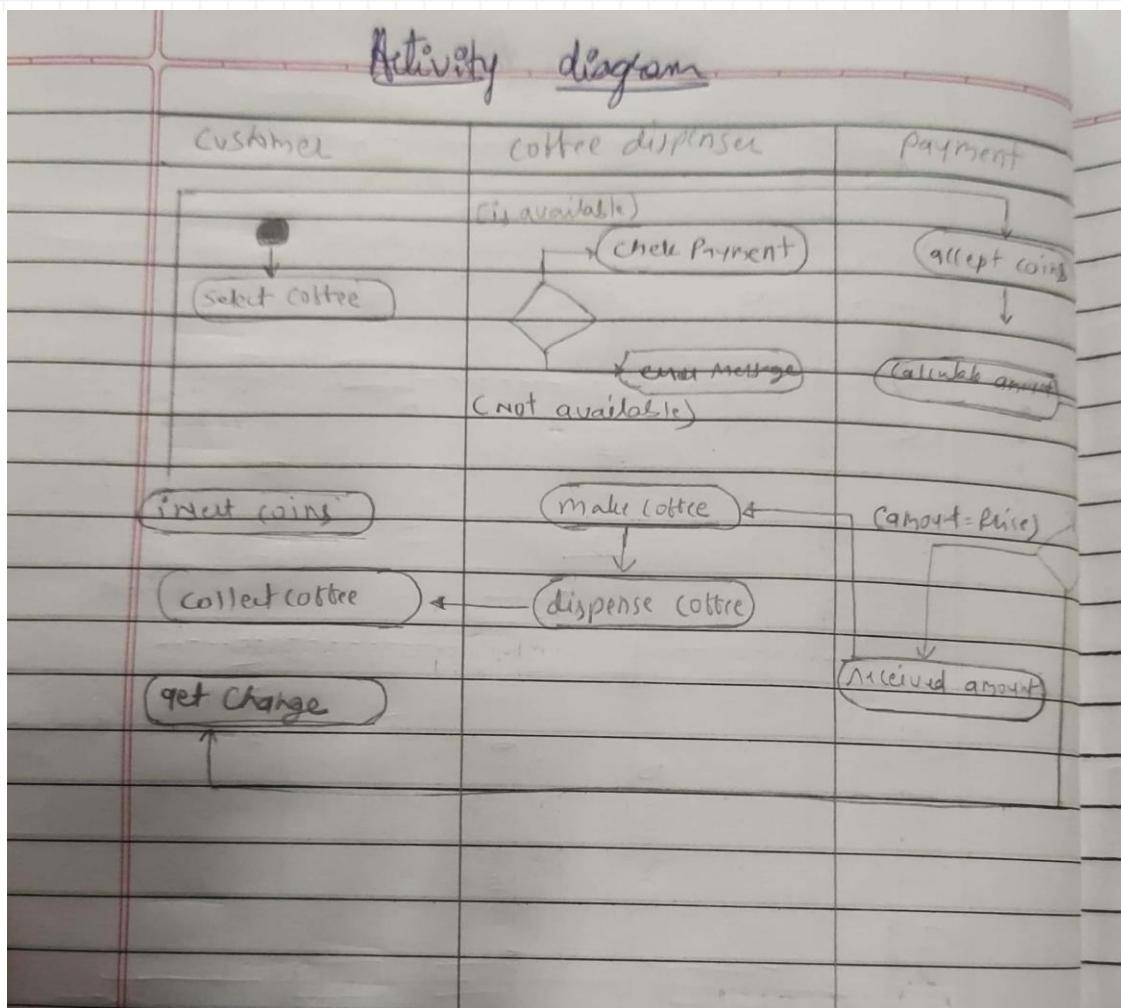
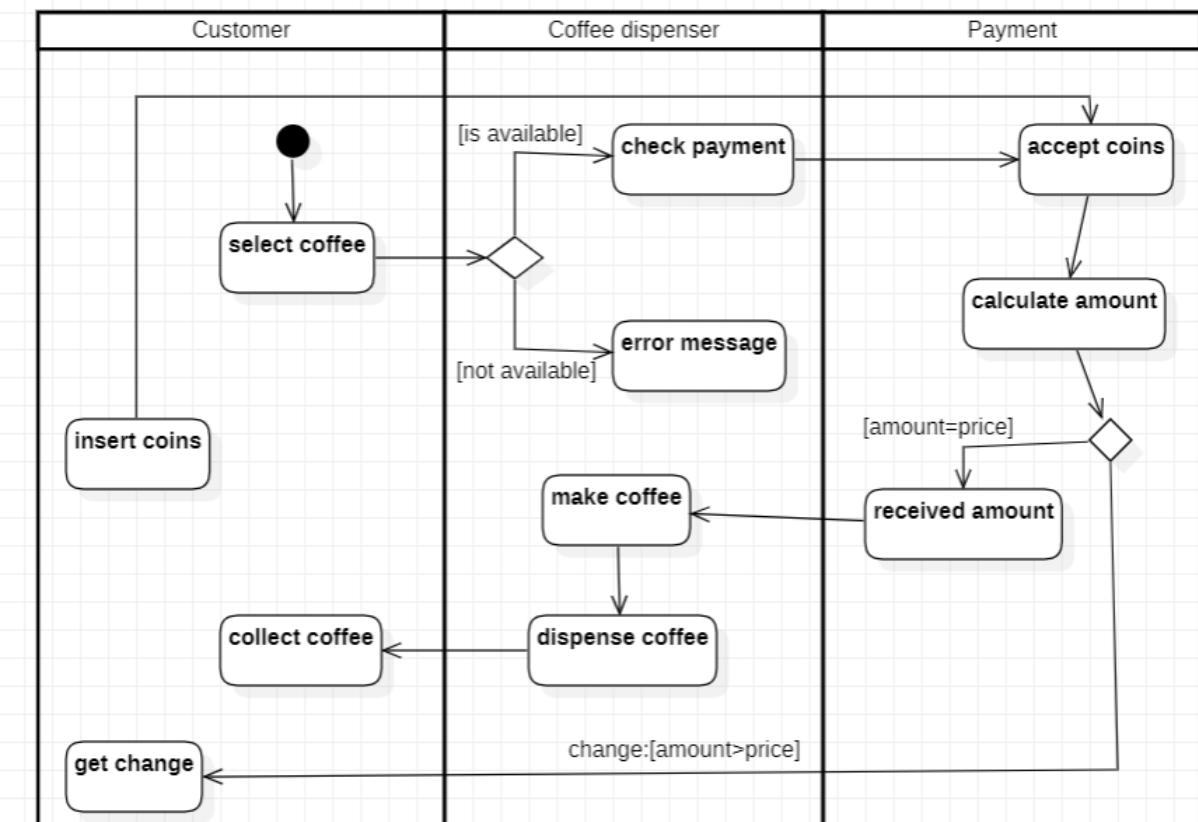
5. Advanced Sequence Diagram:





The above sequence diagram gives us the steps involved in dispensing a product from the coffee machine. First coins are inserted after which which is calculated by the machine. Depending on the coins inserted available items are displayed which the user then selects. Change is dispensed and the coffee is prepared. Finally the coffee is delivered.

6. Advanced Activity Diagram:



The advanced activity diagram has three swim lanes i.e customer,coffee dispenser and payment. The customer can select coffee ,insert coins,get change and collect coffee. The coffee dispenser checks for payment and makes ,dispenses the coffee. The payment lane accepts coins, calculates amount and gives back the change.

Experiment 5: Online Shopping System

1. SRS:

Problem Statement:

The online shopping system for all kinds of products is a web application intended to provide complete solutions for vendors as well as customers through a single gateway using the internet. It will enable the vendors to setup online shops, customers to browse through the shops and purchase them online without having to visit the shop physically. The administration module will enable a systems administrator to approve and reject requests for new shops and maintain various lists of shop category. This system allows the customer's to maintain their cart for adding or removing products over the internet.

The Use Cases of the System are:

- The system is used by users who can be admin, a session manager or customer.
- The admin handles actions like create and delete department products. He can view Catalog details and update new product details or existing ones.
- The customers can register and login to the system, and can buy products by searching.
- The session manager manages the session for a customer like listing products, getting customer details and order details.
- A shopping cart feature exists which list all products a customer wishes to buy.
- Various orders can be placed in the system by giving relevant order details.
- There exists different departments which contain various categories of products and their information.
- Once an order is placed, the shipping information of the product must be available for product delivery to customer.

5. Online Shopping System

Problem statement

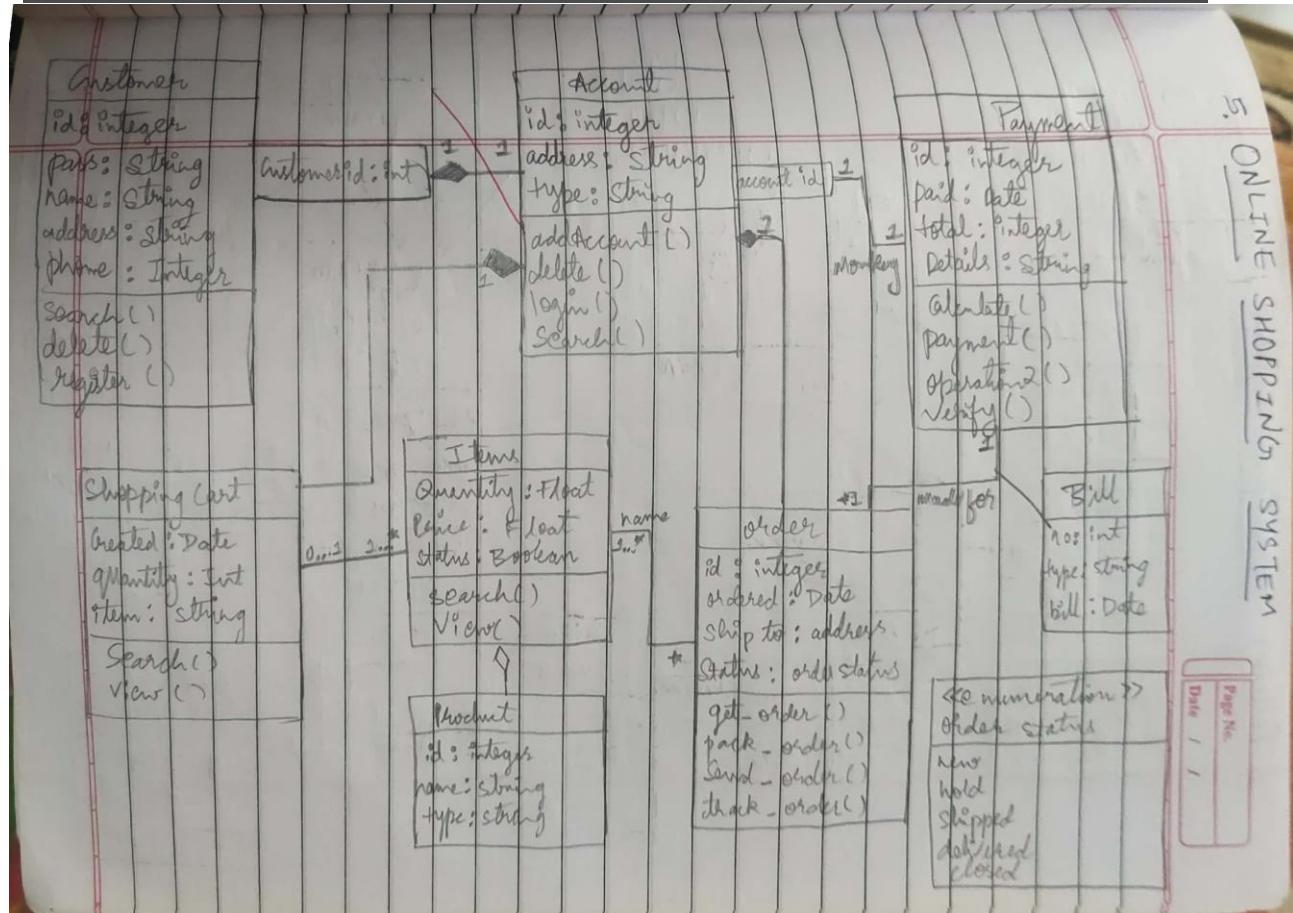
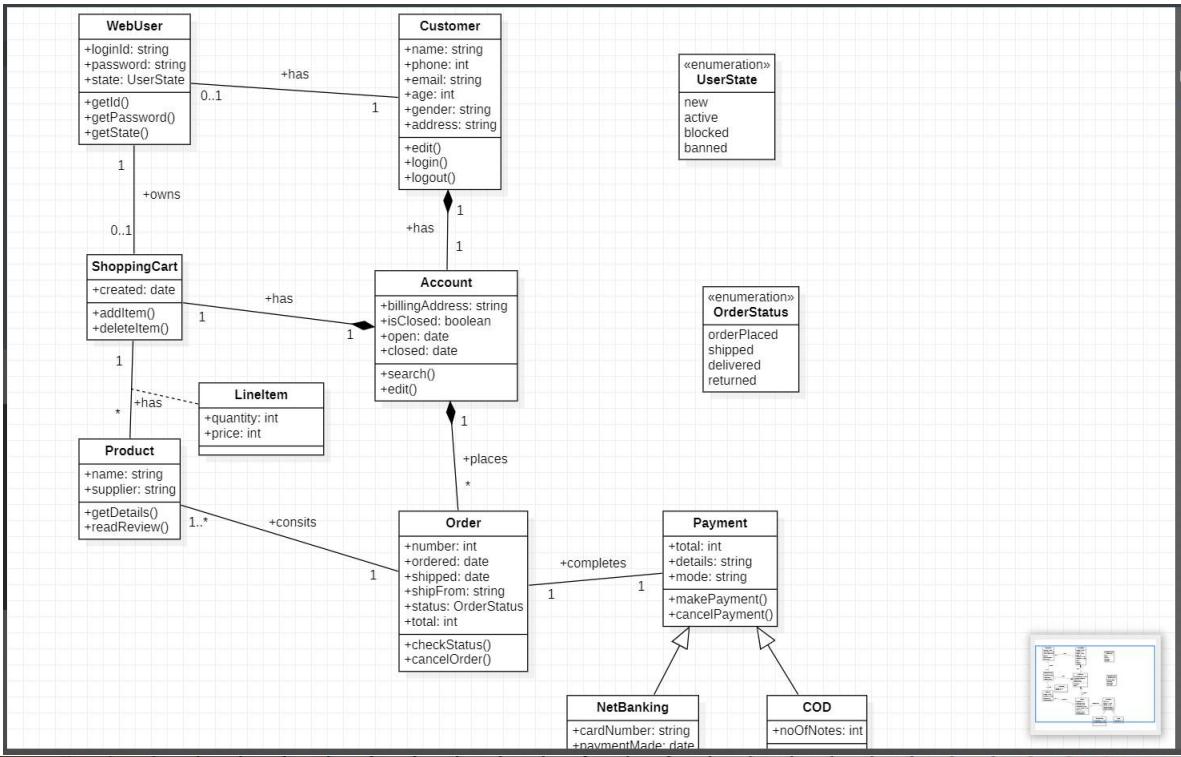
The online shopping system for all kind of products web application is intended to provide complete solutions for Vendors as well as customers through a single gateway using Internet. It will enable vendors to setup online shops, customer to browse through shop and purchase them online without having to visit shop physically. This system allows the customers to maintain their cart for add or remove the product over internet.

Software requirement specification

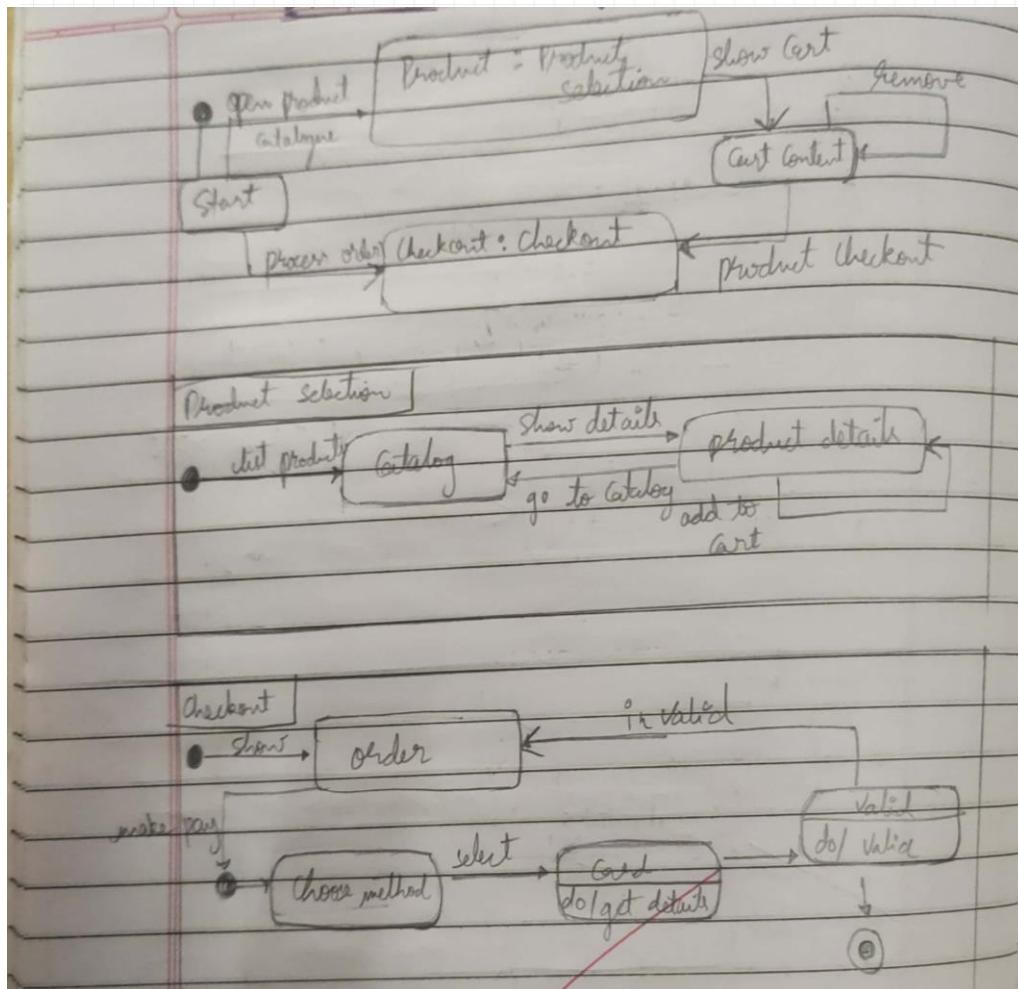
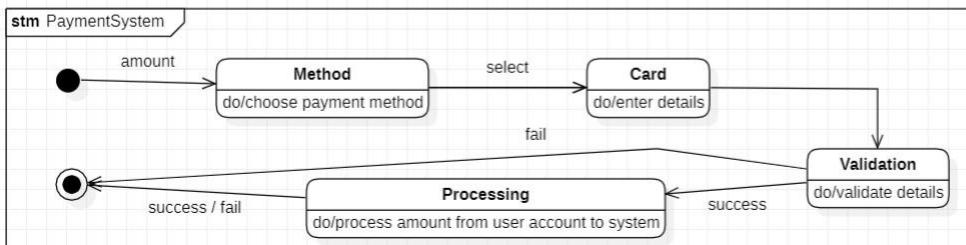
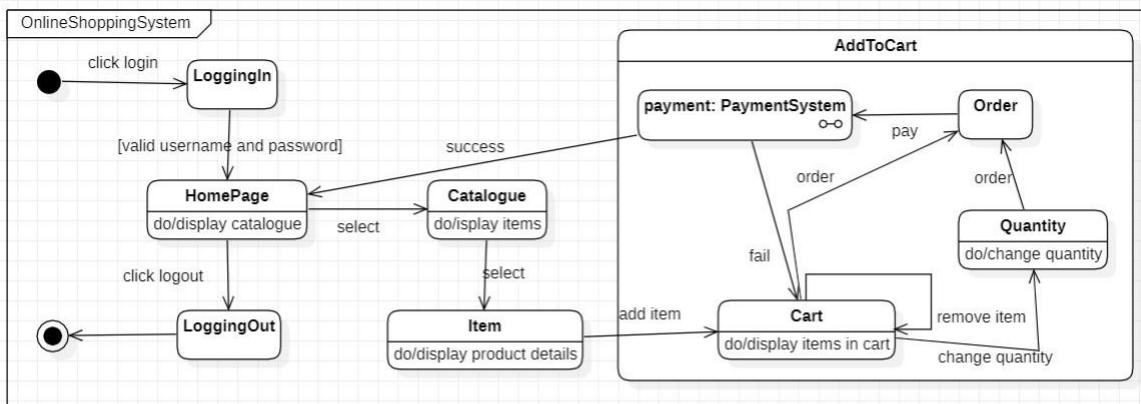
- The customer must have an account in online website where they can purchase products.
- Customer login to System by entering valid id & password for shopping.

- Changes to cart means the customer after login or register can make order or cancel from the cart
- The products sold for customers are sold for various categories like men, women, kids and home products
- Customer can view all available products compare them and make a choice for purchasing products
- For Customer there are many type of secure billing will be prepaid as debit or credit card, COD check or bank draft. The security will provide by the third party like Pay-Pal etc
- After the payment or surf products, the customer can log out

2. Advanced Class Diagram:

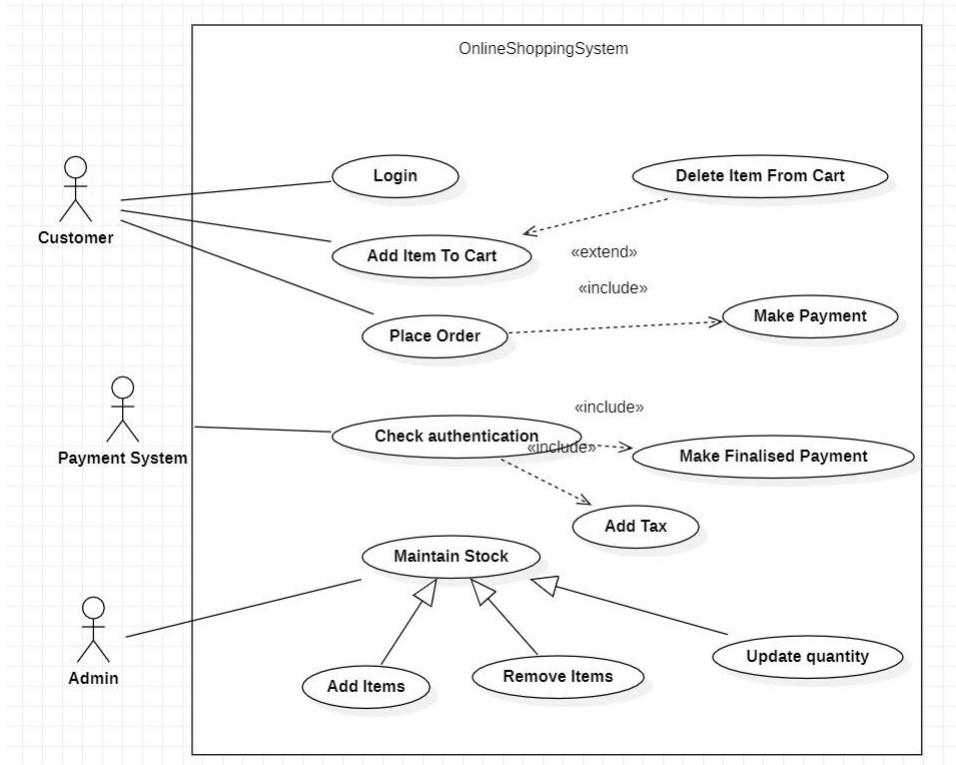


3. Advanced State Diagram:



The advanced state chart diagram has states explaining the product purchase and payment. It has one sub machines for payment process and validation and one composite state representing the steps involved in adding to cart.

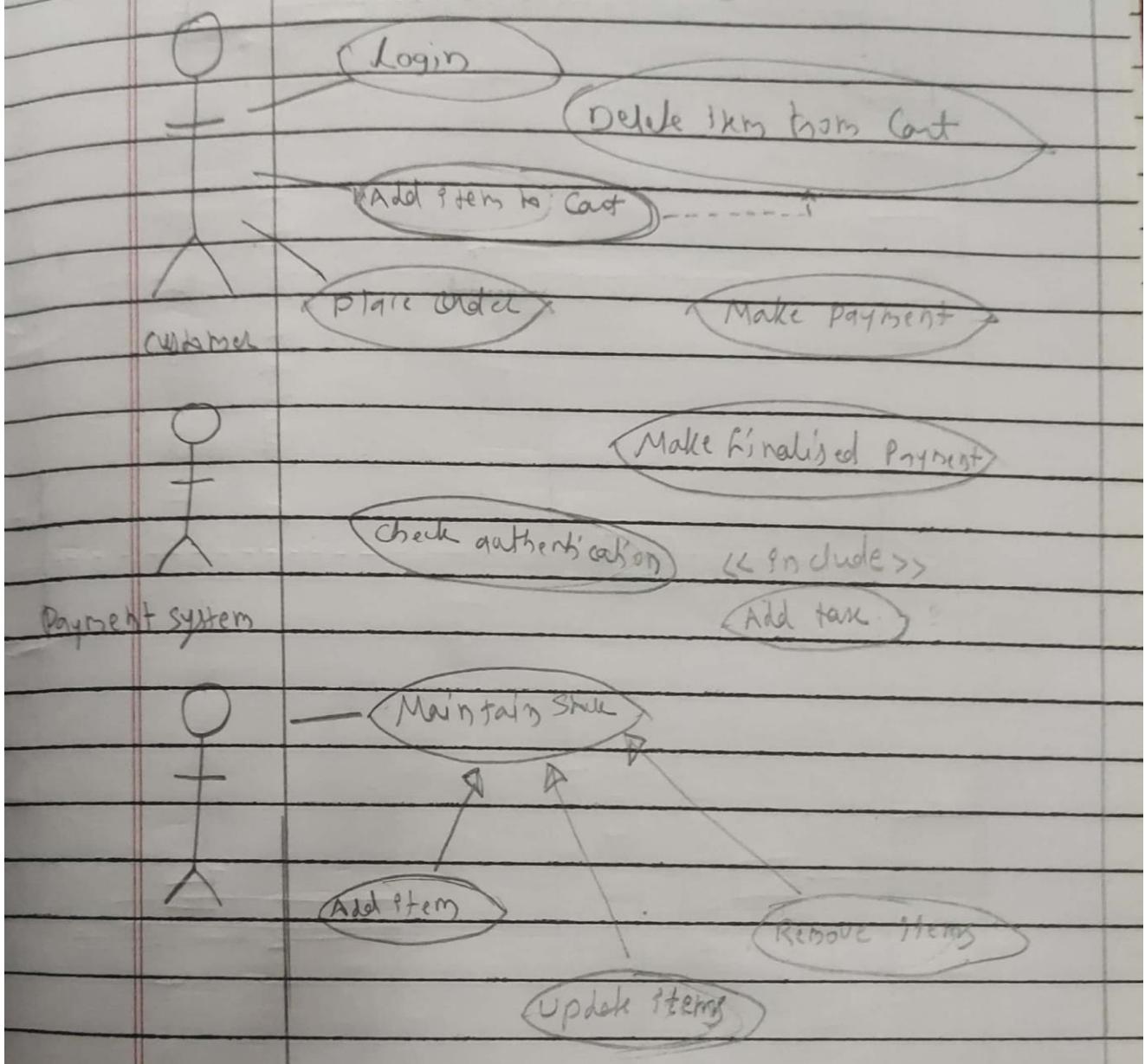
4. Advanced Use Case Diagram:



5. Online Shopping System

Use Case

Page No. _____
Date / /



Actors:

Customer: a person who uses the online shopping system

Admin : person who supplies products

Payment System: person who handles the payment

Use Case:

Add item to cart : selected items are displayed in cart

Place order : order the items present in the cart

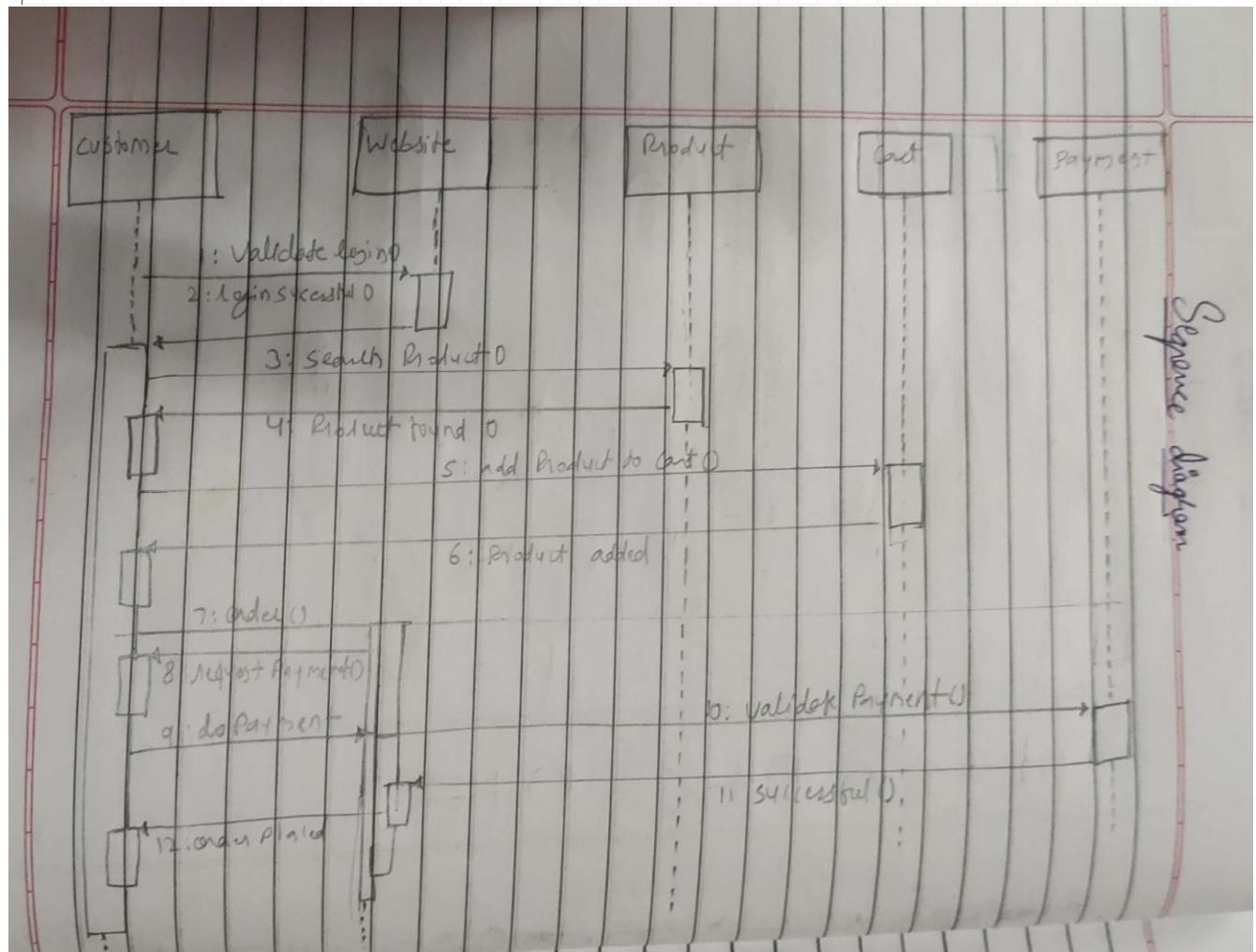
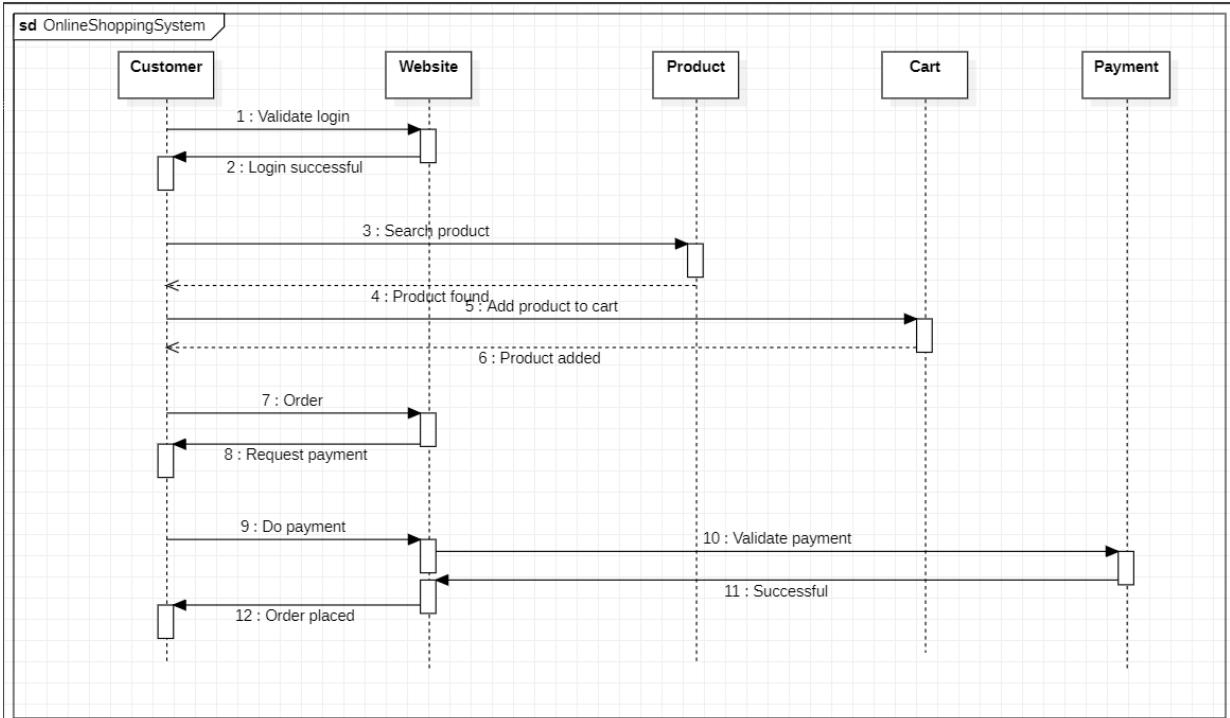
Make payment : accepts payment for the products purchased

Deliver product : delivery of the product is handled

Check authentication : The validity of payment is checked

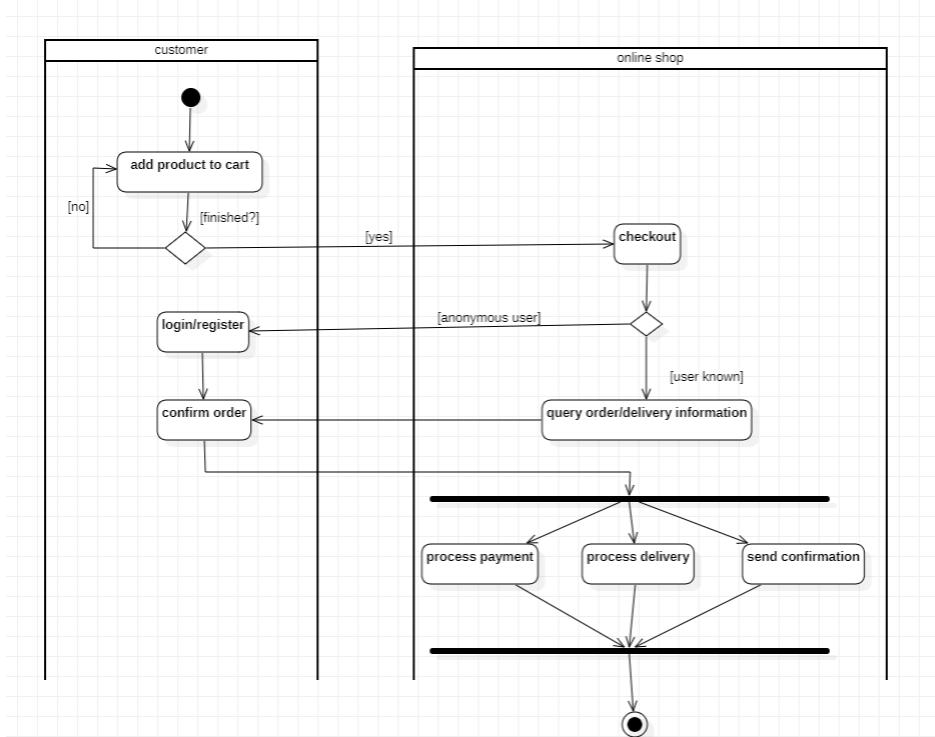
Maintain Stock : stock availability is checked

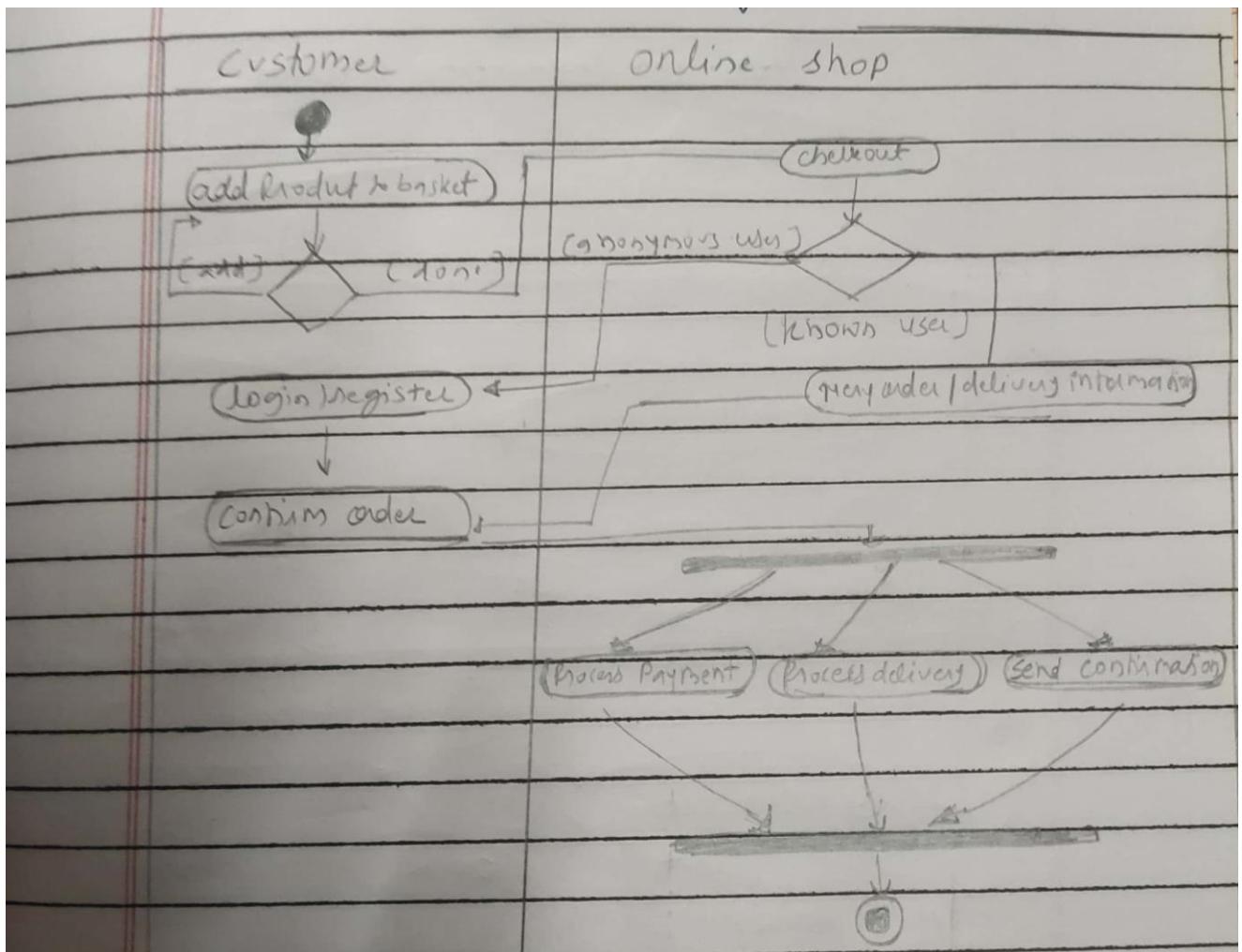
5. Advanced Sequence Diagram:



The sequence diagram shows the sequence of events starting from when the customer logs in, until the successful payment for his order. After authenticated log in, the customer can search for products and then add to cart. The customer can then request for payment and if it is successful, the order is placed.

6. Advanced Activity Diagram:





The advanced activity diagram has two swim lanes i.e customer and online shop. The customer can add product to basket and login/register and confirm order. The online shop can checkout the products, deliver, process payment and send confirmation to customer which is represented as concurrent events.

Experiment 6: Railway Reservation System

1. SRS:

Problem Statement:

The Railway Reservation System is a system used for booking tickets over the internet. Any customer can book tickets for different trains. The system should be standalone in nature. It should be designed to provide functionalities like looking tickets in which user should be able to apply tickets for any train, of any class. The software take the current system date and time as date of issue and calculates the amount to be paid by the user. It also provides the functionality of cancellation of tickets.

The Use Cases of the System are:

- Admin can add new new trains and supervise the bookings of tickets.
- The capacity of the train, that is the number of passengers that can be carried by each train should be specified.
- Railway station should have the name and details of the train passing through it.
- Passengers can login or sign up and can book tickets for a a particular train.
- Ticket has departure time, arrival time, start up and destination on it.
- Ticket can be booked in general or tatkal quota.
- Passengers can pay the ticket price online.

6. Railway Reservation System

Problem Statement

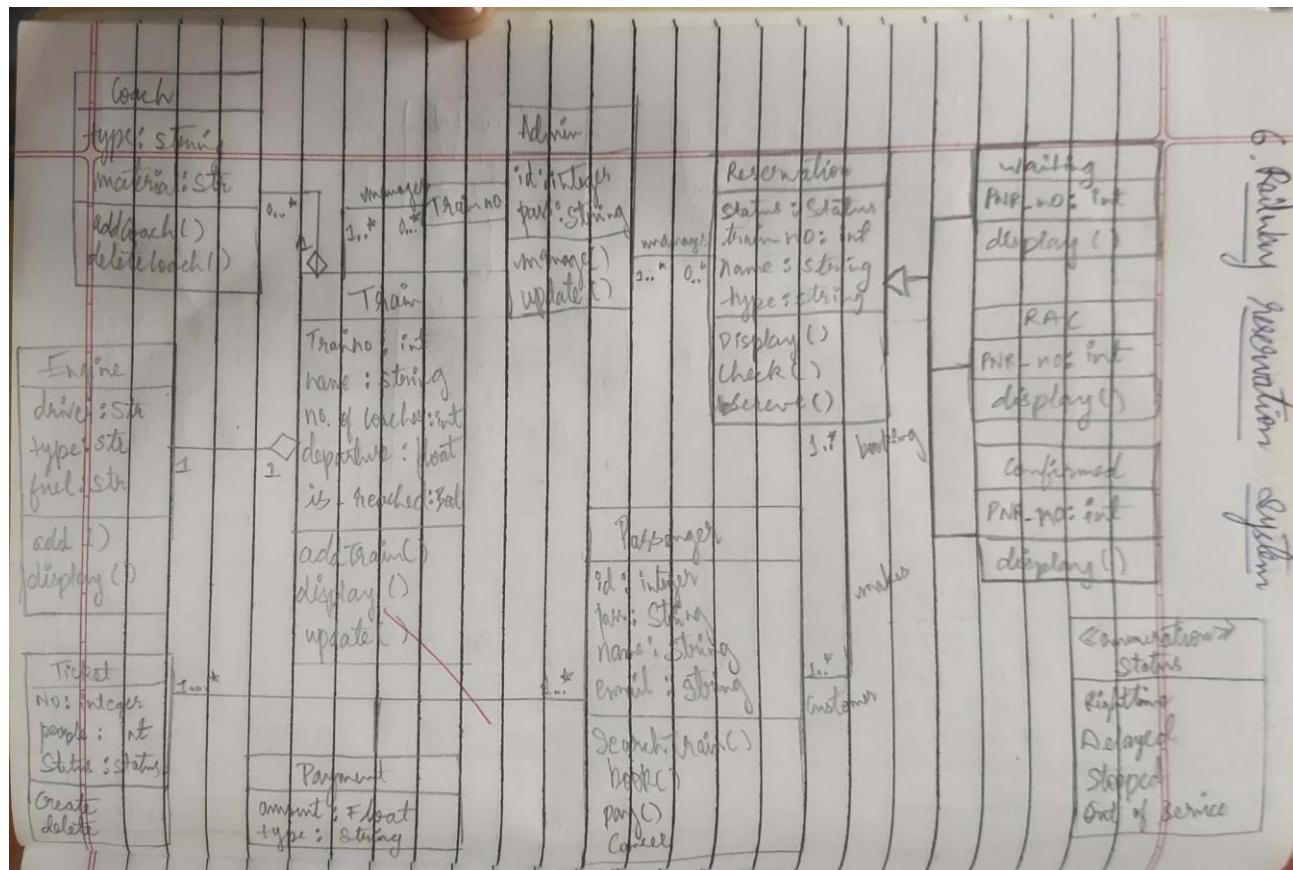
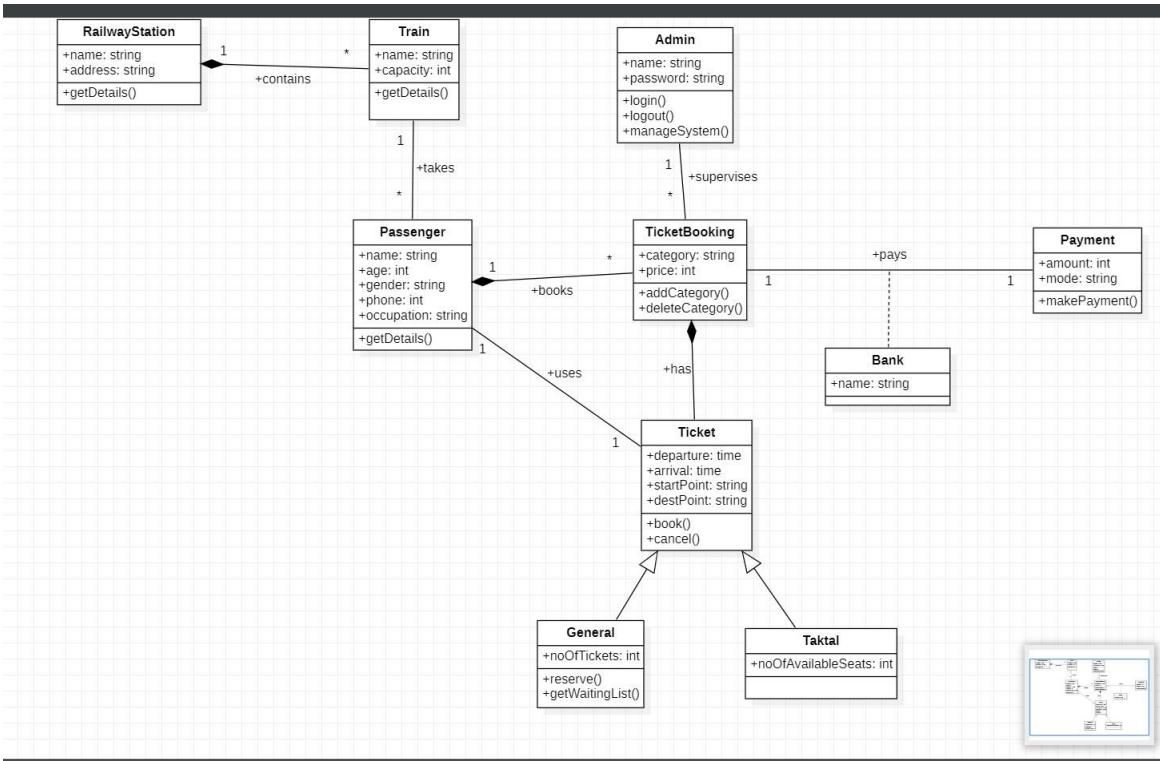
- Railway reservation System is a system used for booking tickets over internet. Any customer can book tickets for different trains. Software has to be developed for automating the manual reservation system of railway. The system should be stand alone in nature. It should be designed to provide functionalities like booking of tickets in which a user should be able to apply for tickets of any train & any class.

Software requirement specification

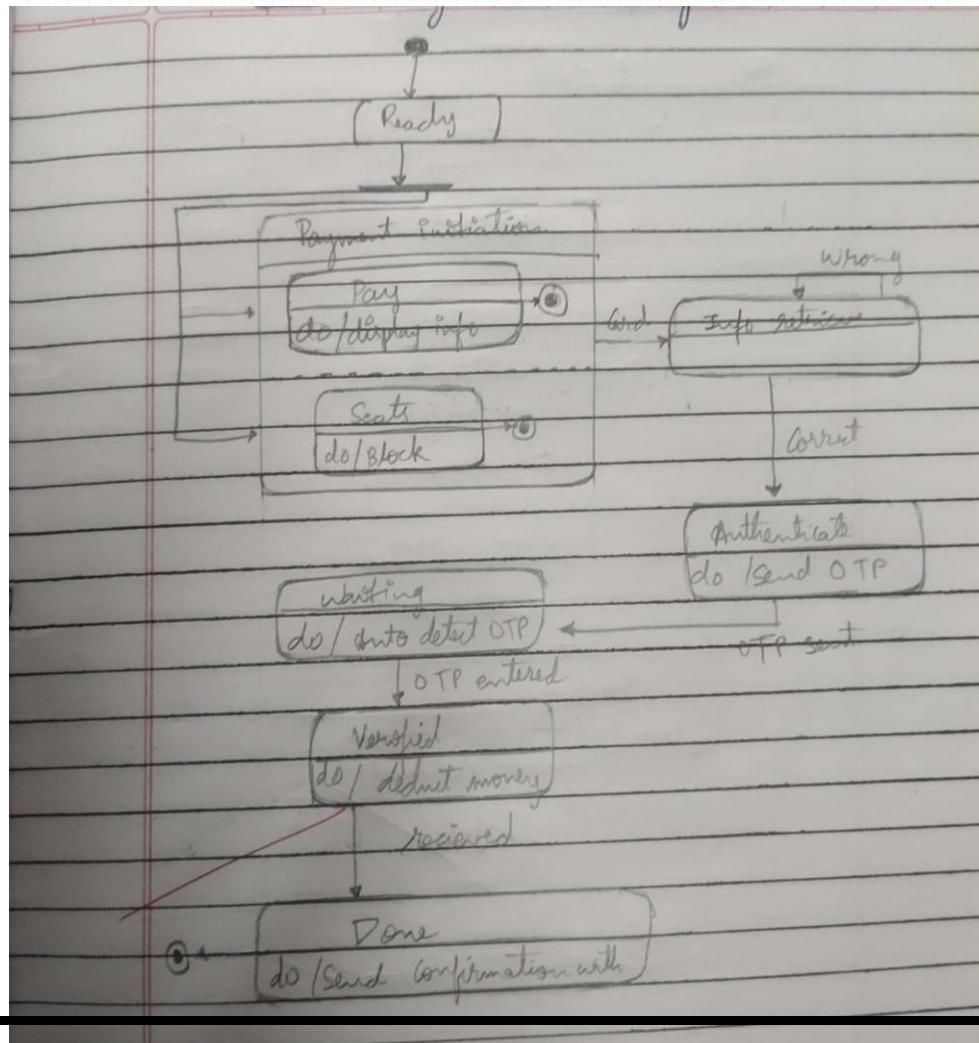
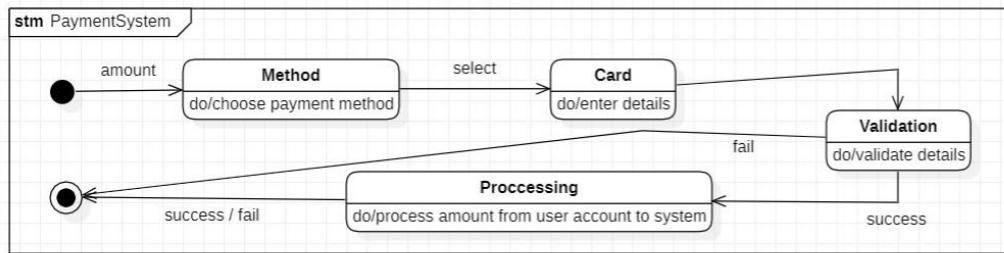
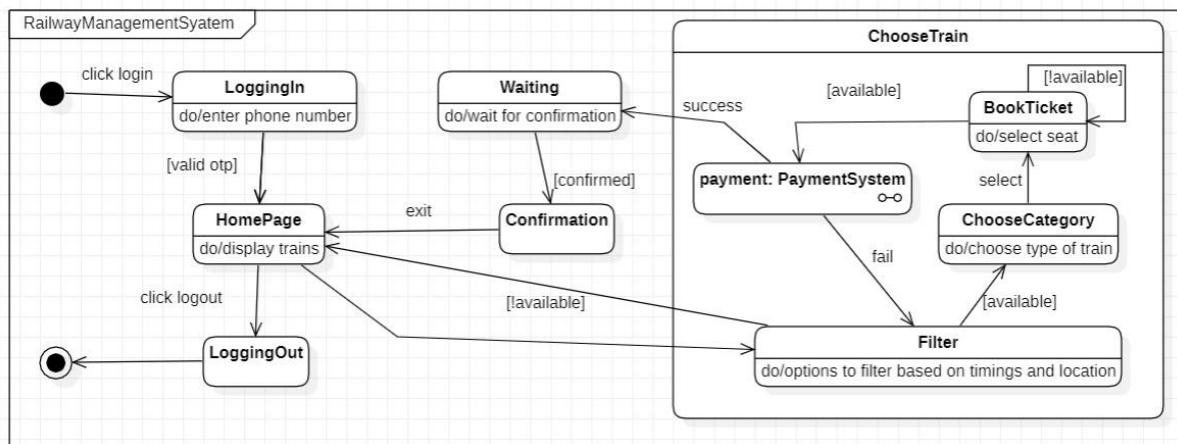
- Each user should have a user id and a password. Record of the users of the system should be kept in the log file. Provision should be made for full backup of the system.

- The customers can view the trains available at any day, the cost and number of tickets available for any train.
- Customer can book a ticket if the tickets are available.
- Tickets can be booked in 2 ways by i-ticket or e-ticket.
- In case of i-ticket booking customer can book tickets online and tickets are confirmed. But in case of e-tickets booking and cancelling tickets, customer himself has to take print of ticket but in both cases, amount for tickets are deducted from customers account.
- For cancellation of ticket, the customer has to go at reservation office than fill form and ask clerk to cancel ticket and then refund should be transferred to their account.

2. Advanced Class Diagram:

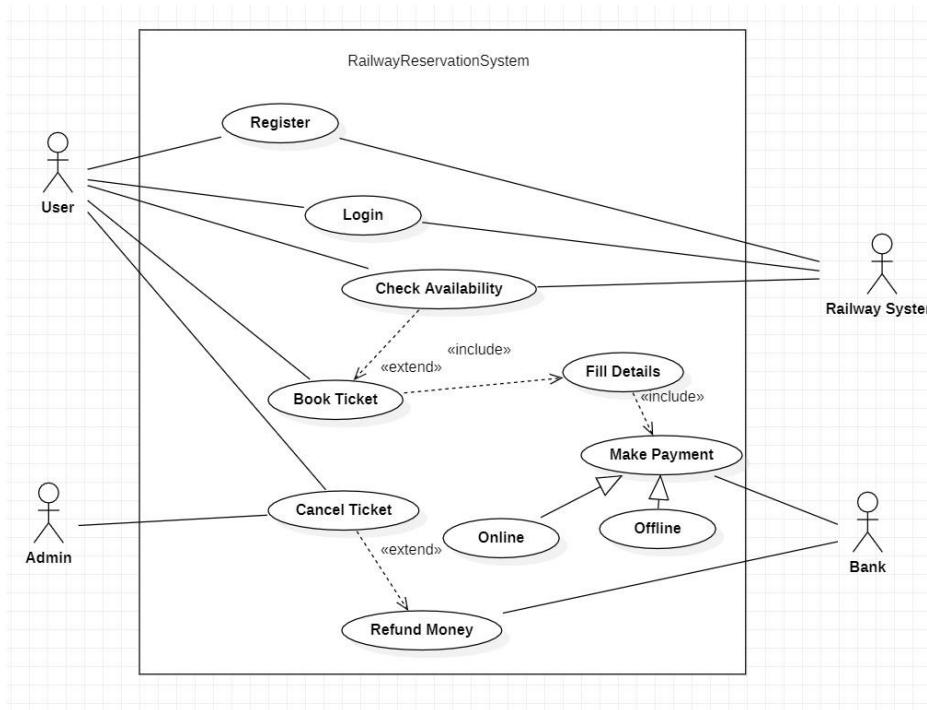


3. Advanced State Diagram:



The advanced state diagram has states for paying the tickets and choosing trains. From the waiting state, the user goes to the selection state where the user can choose trains and select seats after which he is directed to payment state. In payment initiation which is represented by a sub state, card details are accepted and an OTP is sent to the registered mobile number. On verification the money is deducted and ticket is sent to the customer.

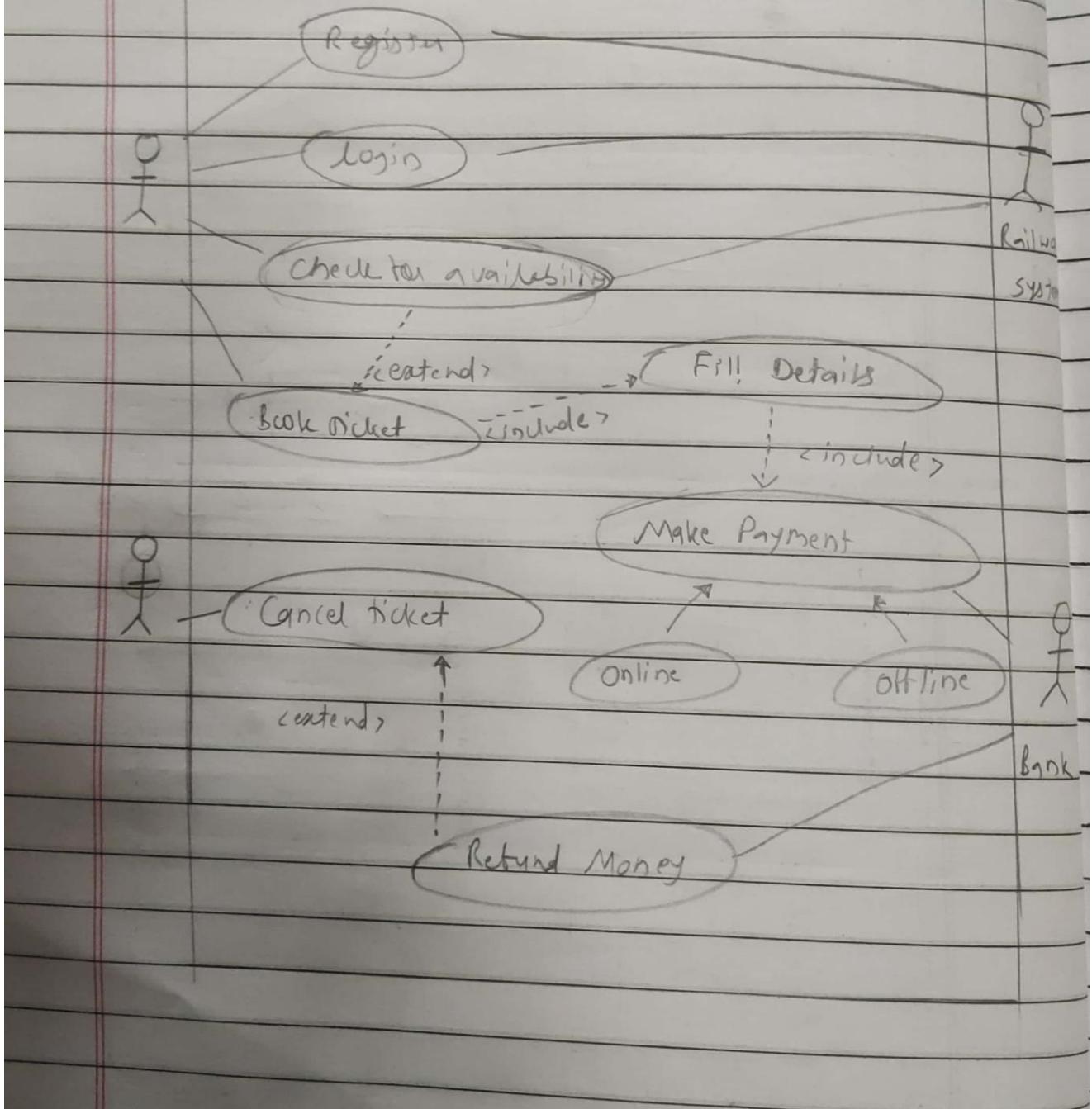
4. Advanced Use Case Diagram:



6. Railway Reservation System

Use Case

Railway Reservation System



Actors:

User: uses the railway reservation system.

Admin: manages all information

Railway System: System that is used for train ticket reservation.

Bank: manages transactions

Use Case:

Register: The first time user has to create a account in railway system.

Check availability: checks the availability of trains and seats.

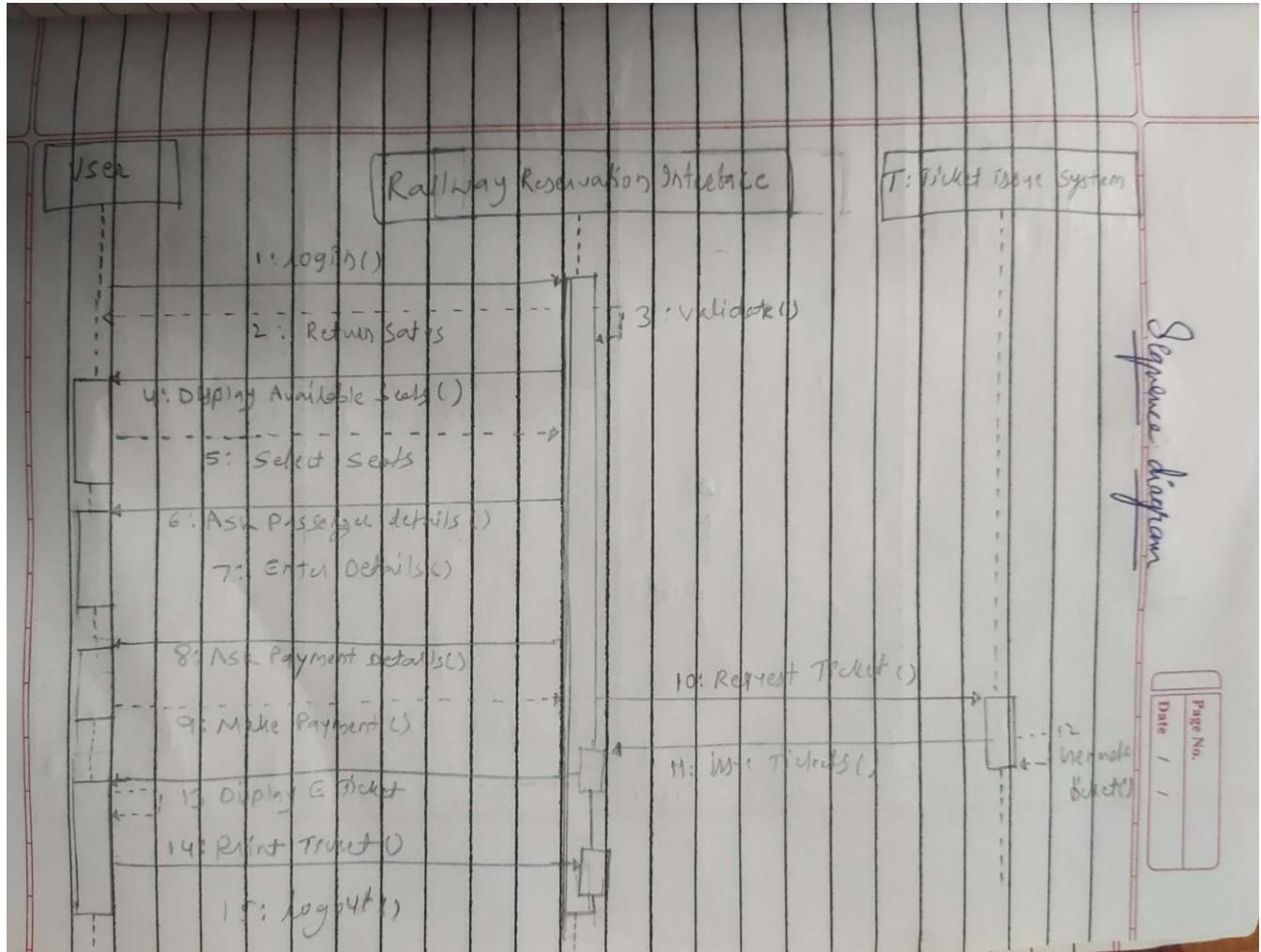
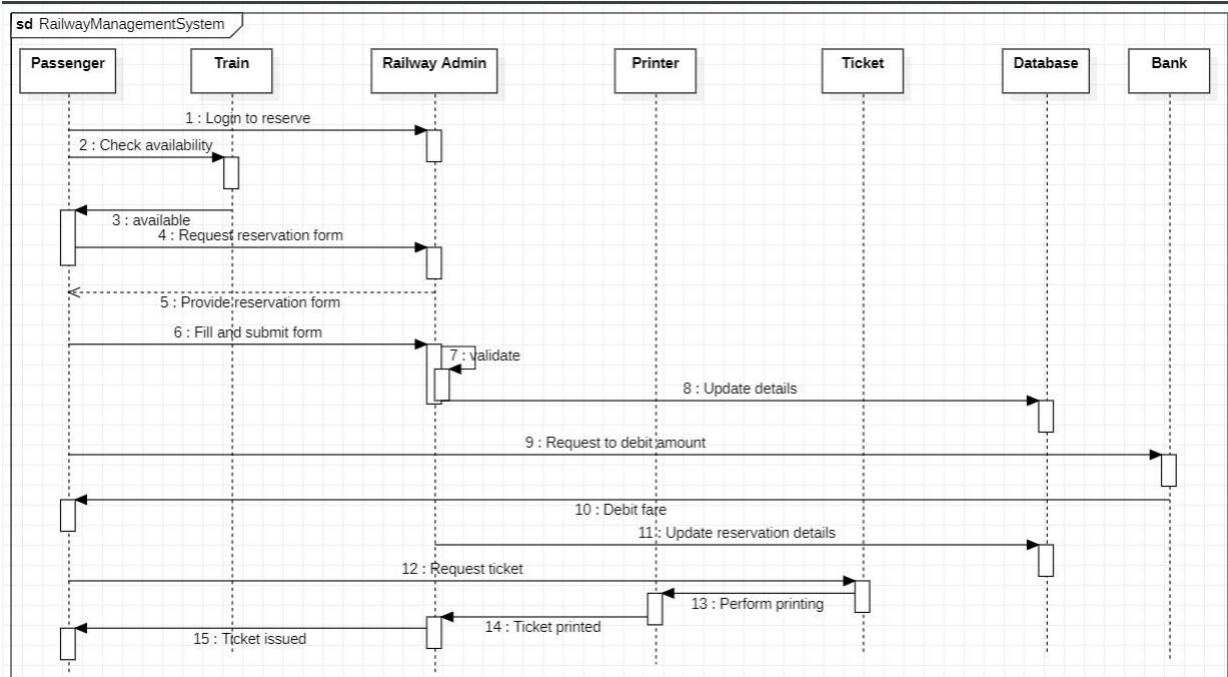
Book Ticket: User can select the type of coach and no of seats and book the ticket.

Make payment: System displays the payment details. User can make his

Cancel Ticket: User can cancel the ticket . The amount will be refunded.

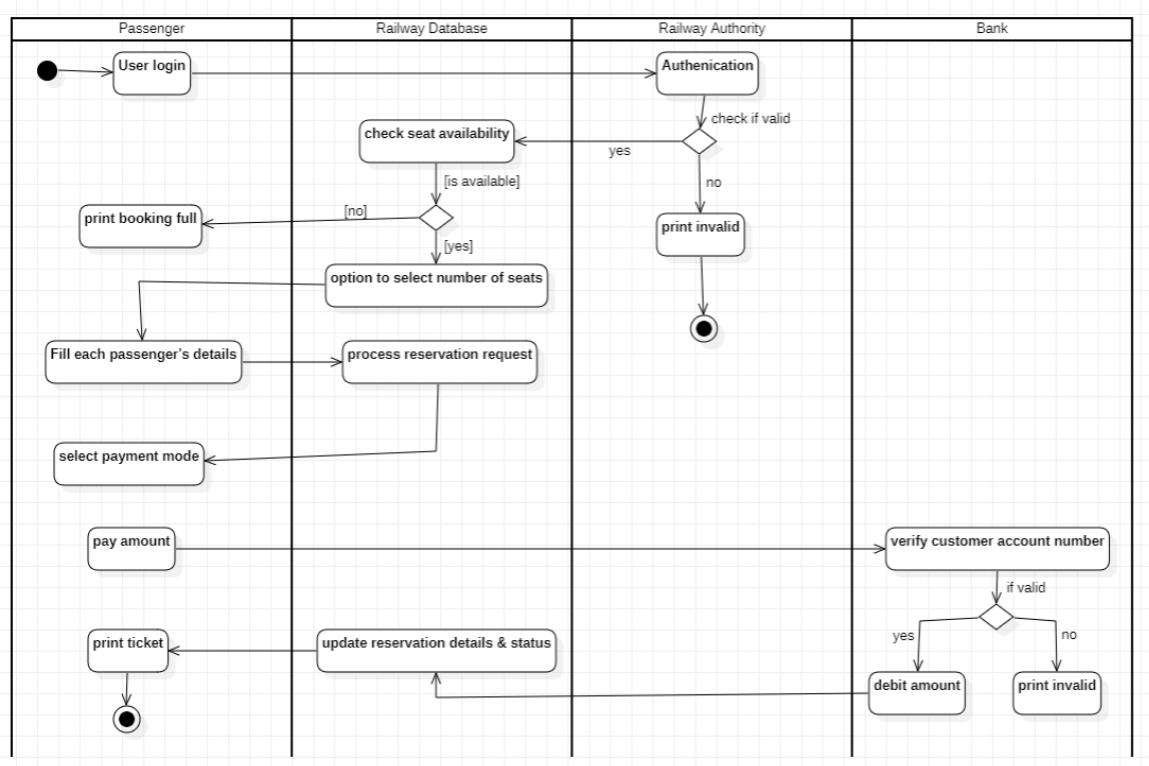
Verify login credentials: The admin verifies the user details, if it matches with the details in database then he allows access to the system.

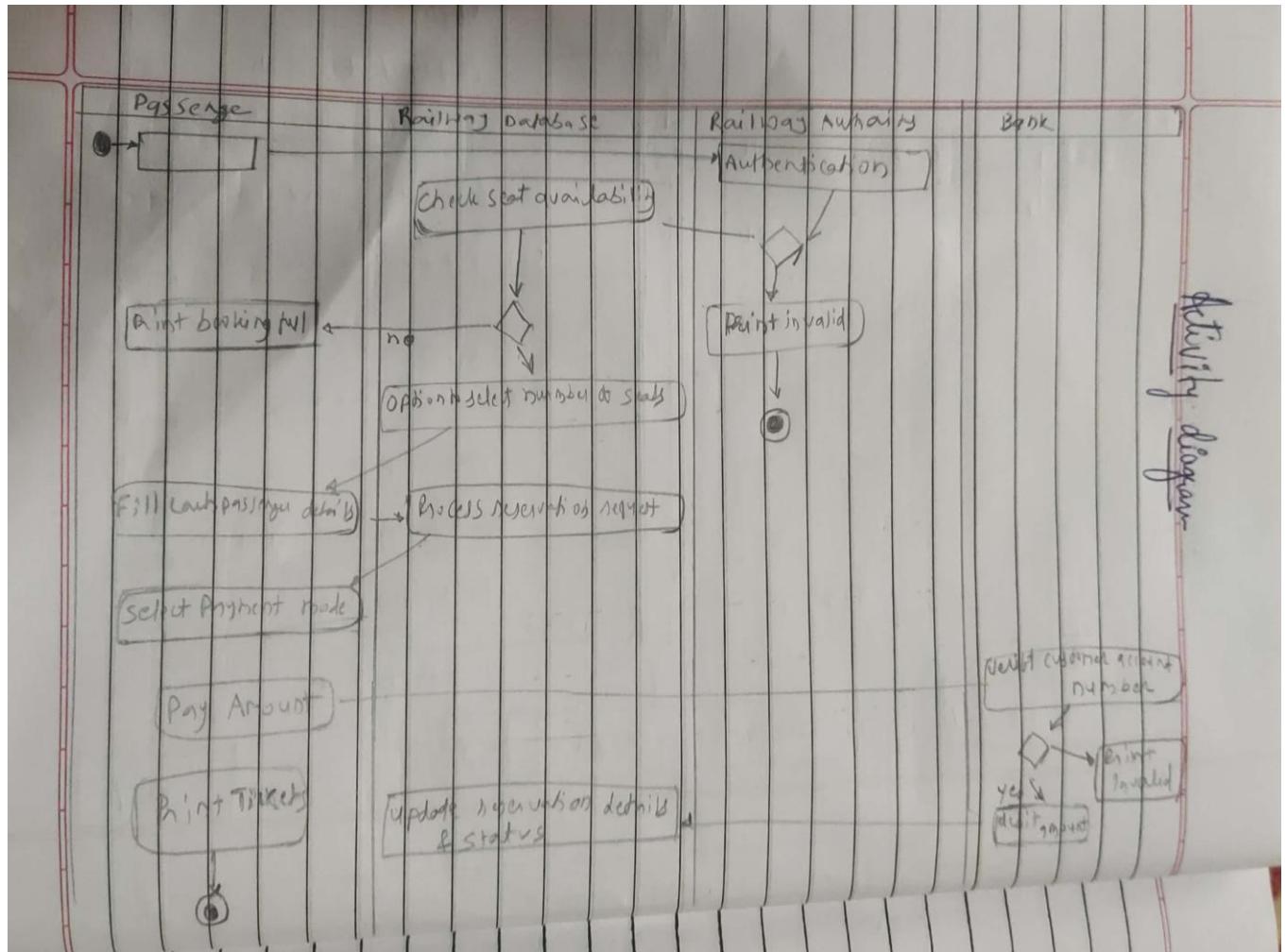
5. Advanced Sequence Diagram:



The user first logs in to the system and checks availability. Then the user requests a reservation form which he fills and submits. The admin validates the form and updates the details in the database. The user then makes payment and requests the amount. After validation, the ticket is confirmed and issued.

6. Advanced Activity Diagram:





The activity diagram has four swimlanes for Passenger, Railway database, railway authority and bank. The passenger is involved in logging in, and providing booking details. The railway database records the transactions and checks availability. Railway authority is responsible for validation which is confirmed by the bank.

Experiment 7: Graphics Editor System

1. SRS:

Problem Statement:

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 helps to overcome the difficulty of having to draw models on pen and paper.

The Use Cases of the System are:

- It contains a toolbox which contains tools like line, circle, rectangle, arc etc.
- It has a color bot or palette.
- Standard toolbox with options for new, open and save.
- One integrated view for users for toolbox, colour box, menu and graphics screen.
- Ability to group several drawings into one, i.e, complex drawing.
- Provision of zoom in and zoom out.
- Different shadings for the tools are provided.

7. Graphics Editor

Problem Statement

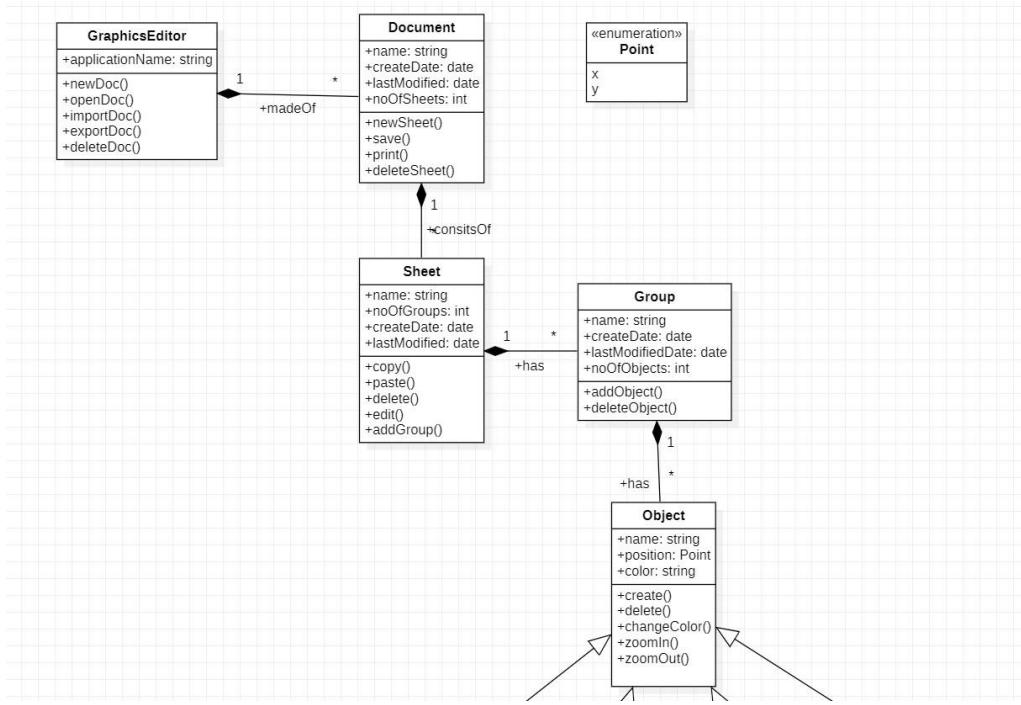
- The graphics editor provides an application program's interface that enables a programmer to develop their own graphical model editor for a specific type of model. This API in turn, relies on extending the framework to provide an editor functions and the programmer can create a graphical editor and palette of shapes in order to modify an model. Such instance of graphical editor allows a user to drag objects from a specified model into working graphical editor.

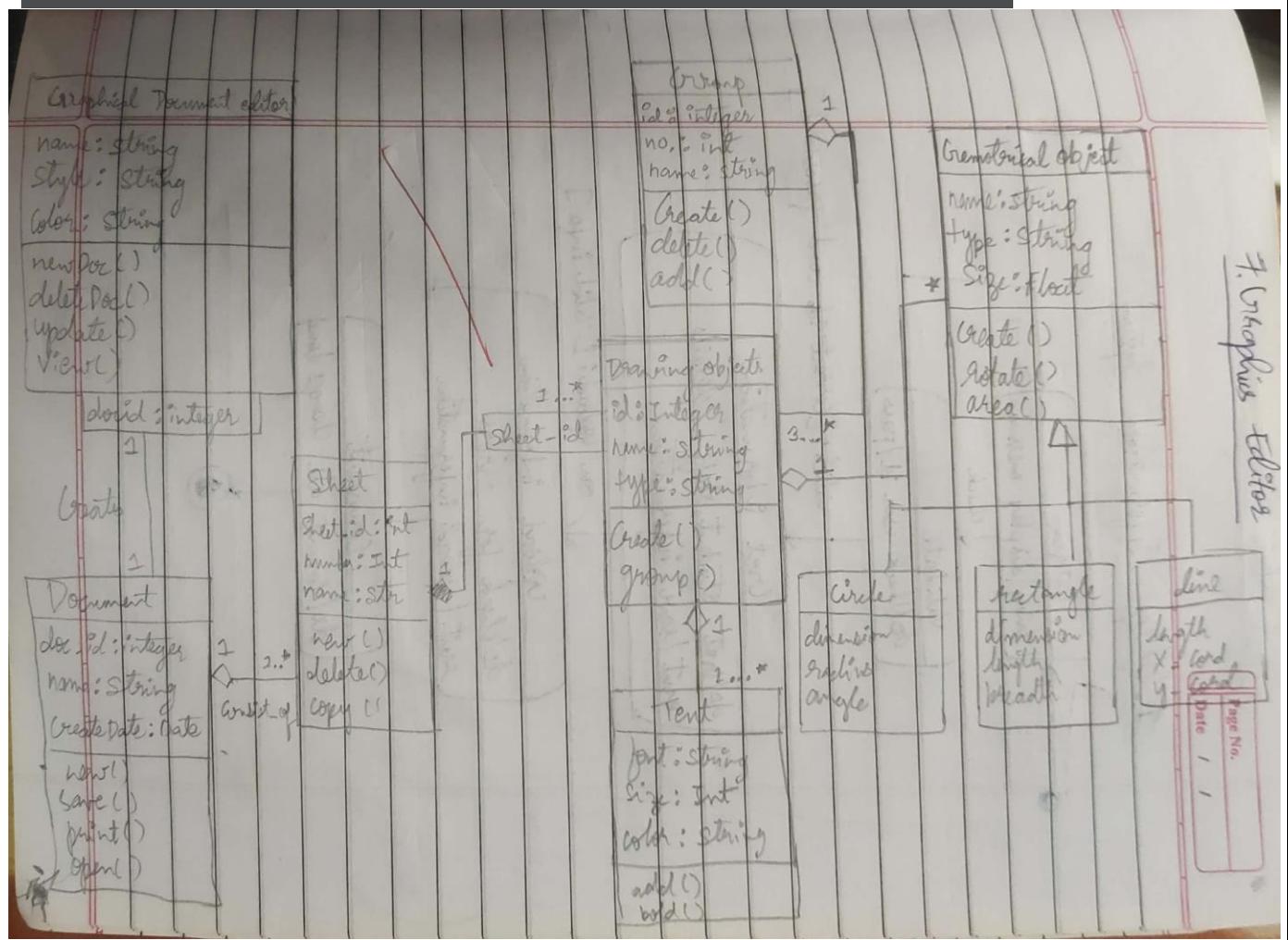
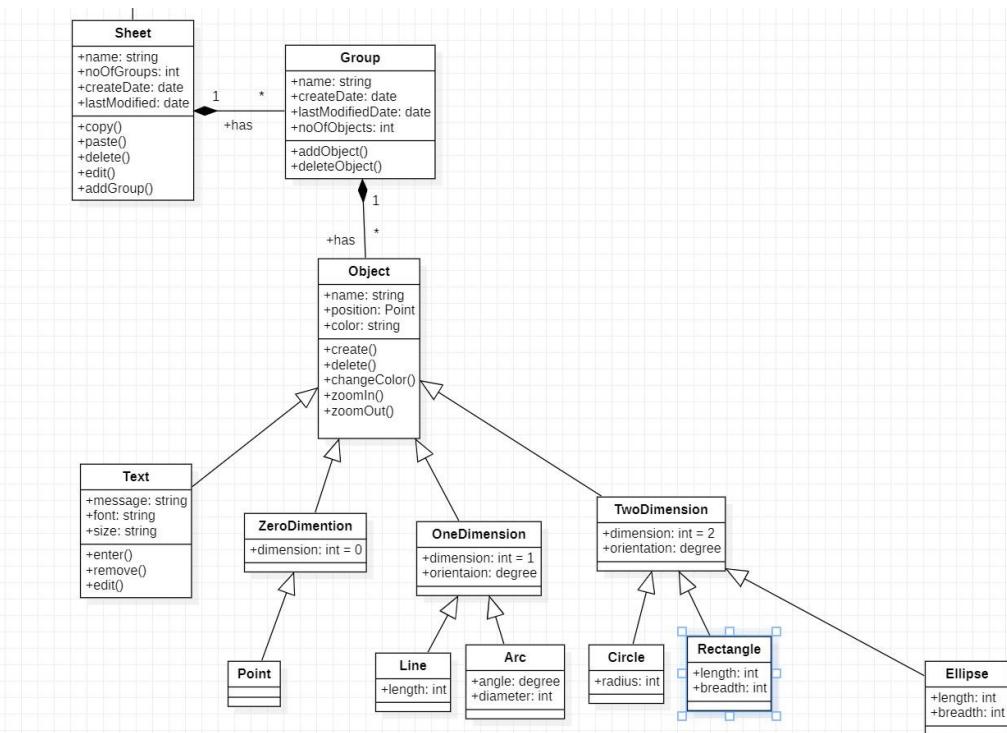
Software requirement specification

- The graphical editor consists of a graphical document editor which can be used to create new document, delete document, update or view the document.

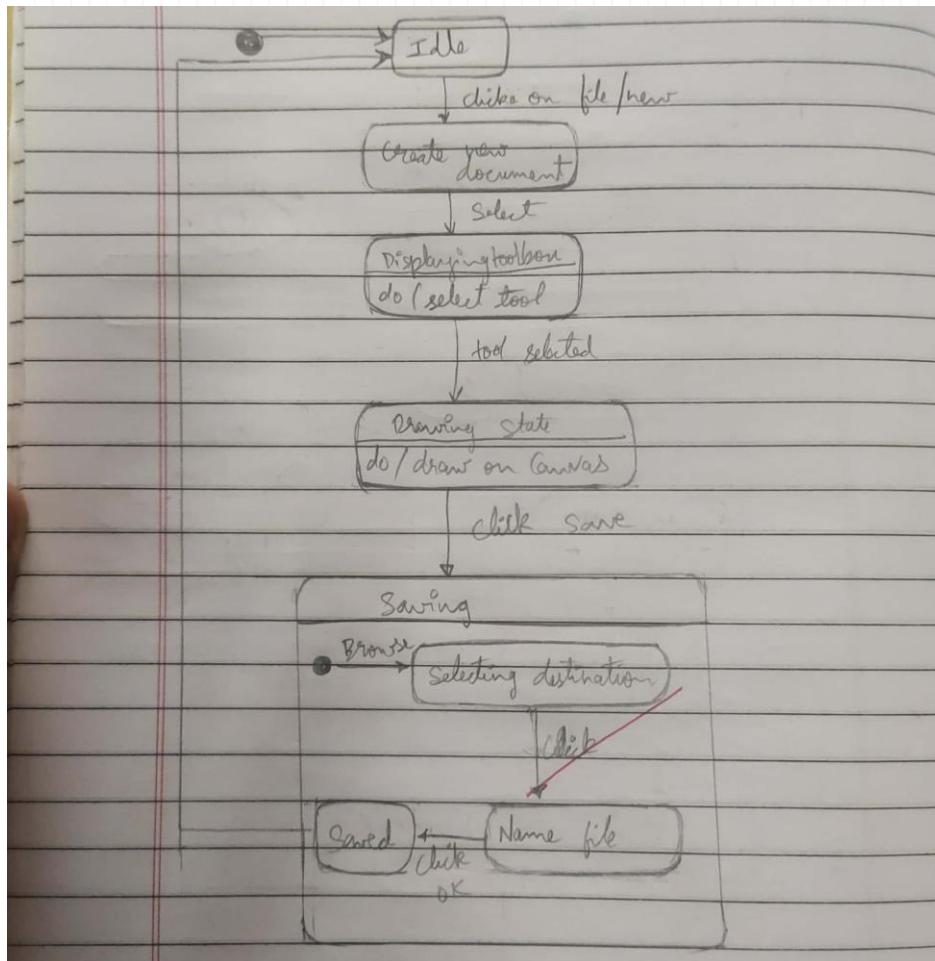
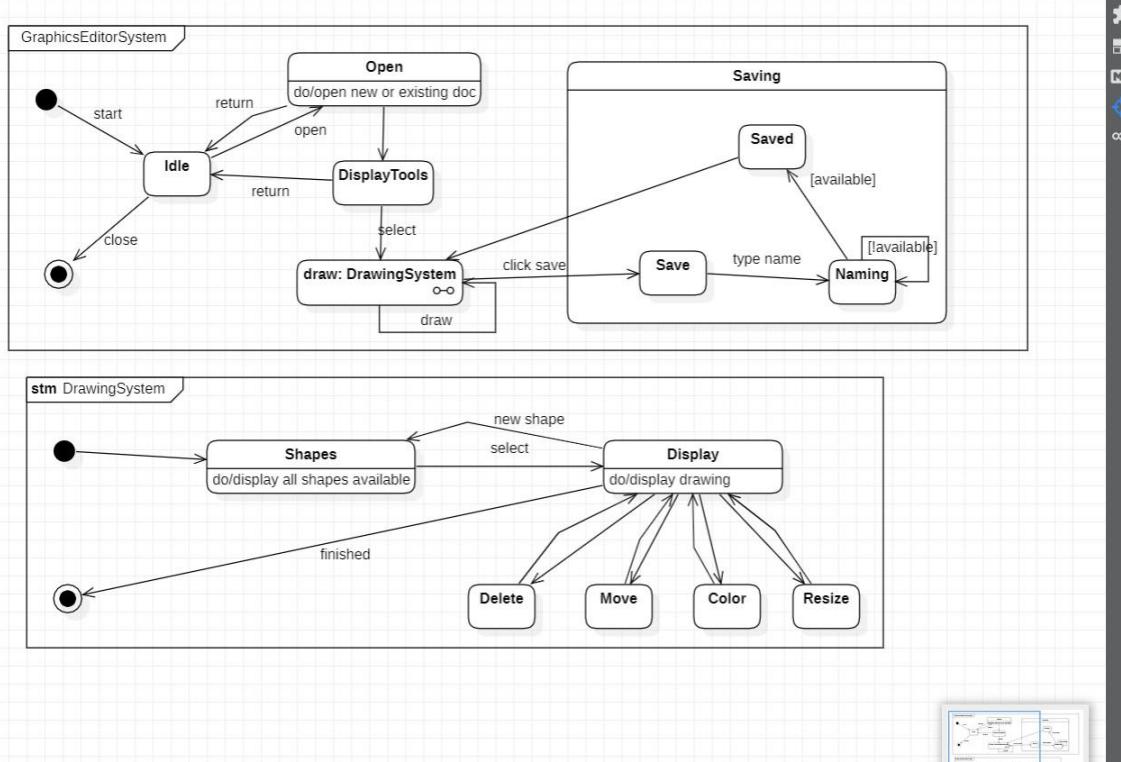
- It consists of many documents, where each document can be saved, opened, printed or create a new one.
- A document is made up of many sheets which can have graphics included in them.
- Sheets have multiple no. of drawing objects, which can be created, grouped or formatted.
- The user can also add and remove connections b/w these objects as needed using the palette supplied thus modifying the underlying model.
- Each sheet contains drawing objects, including text, objects and groups.
- A geometrical object includes circle, ellipse, rectangles, lines etc which are identified by their respective domains.

2. Advanced Class Diagram:



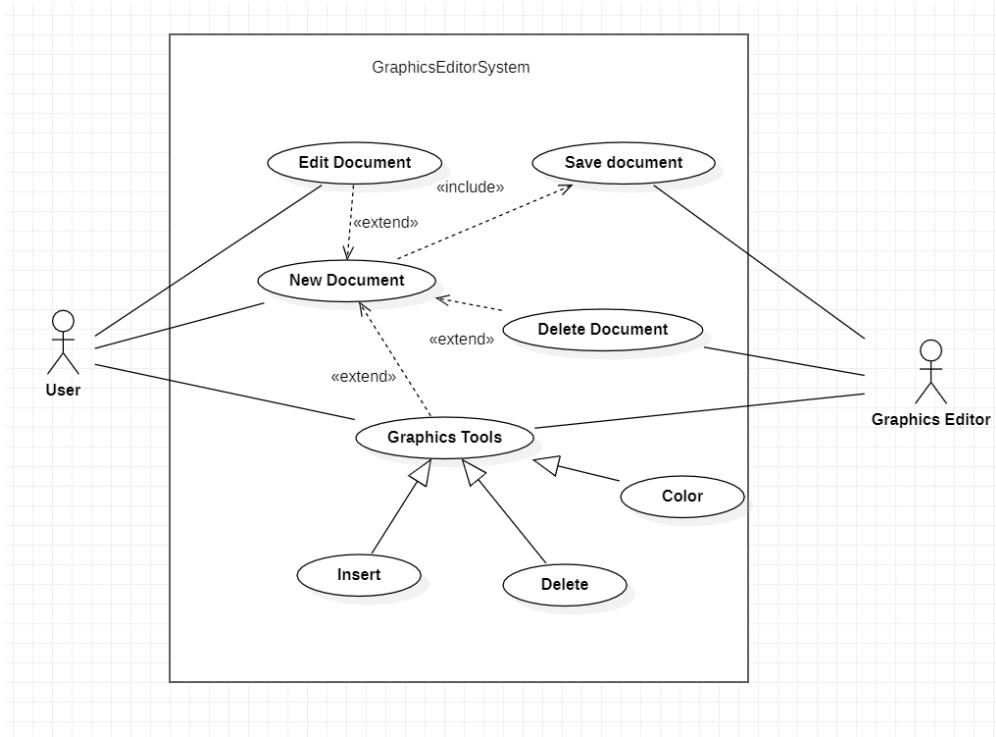


3. Advanced State Diagram:



The advanced state diagram had a composite state called saving where the user can save the file in their desired location. It has a sub state called Drawing system where the user can select different shapes and perform move, resize, delete operations on the drawing sheet with respective to these shapes.

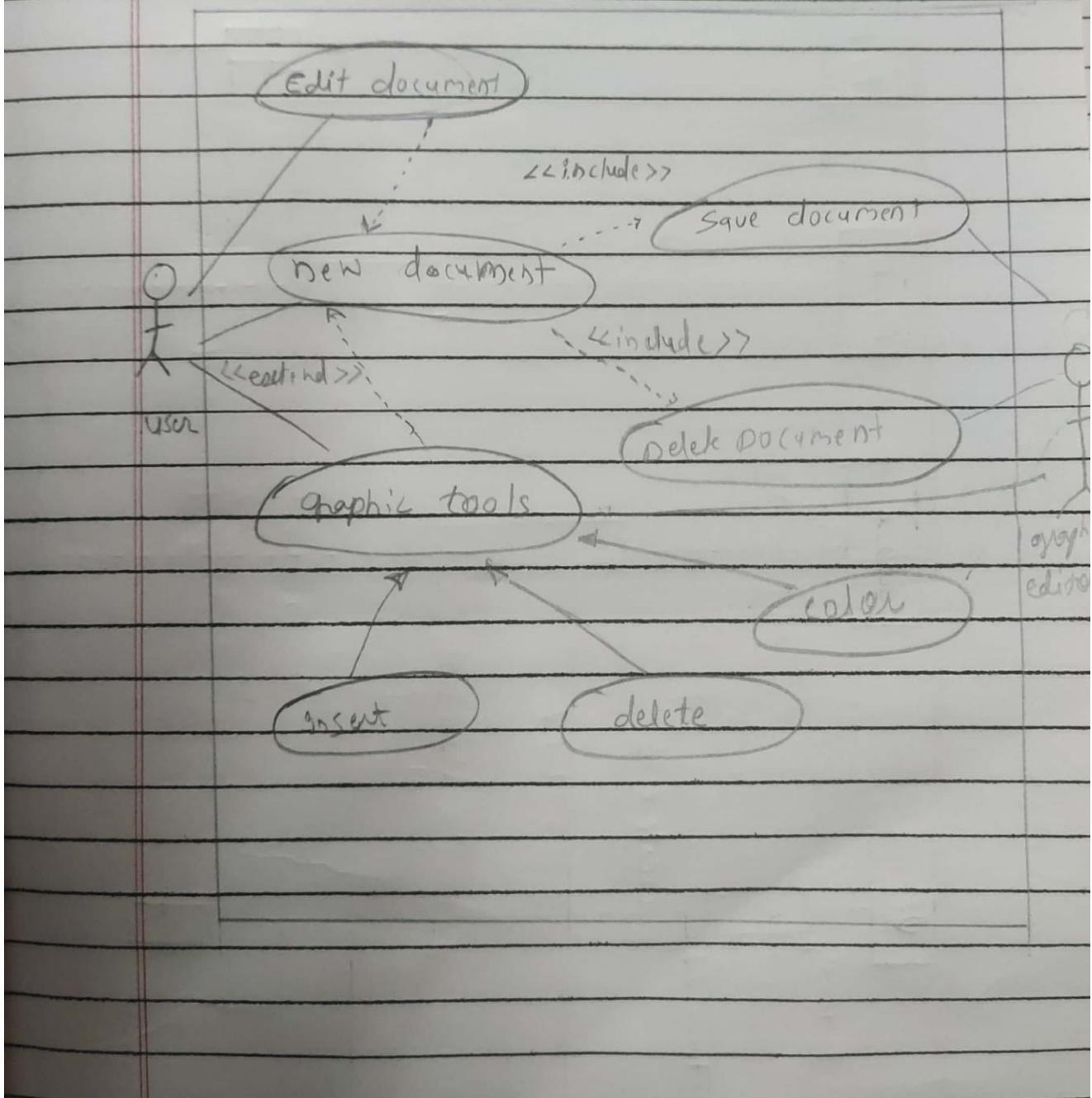
4. Advanced Use Case Diagram:



7. Graphics Editor

Use-Case

Page No. / /
Date / /



Actors :

User: the person who uses the graphic system

Graphics editor: manages the system

Use case:

New document : performs creation of new document

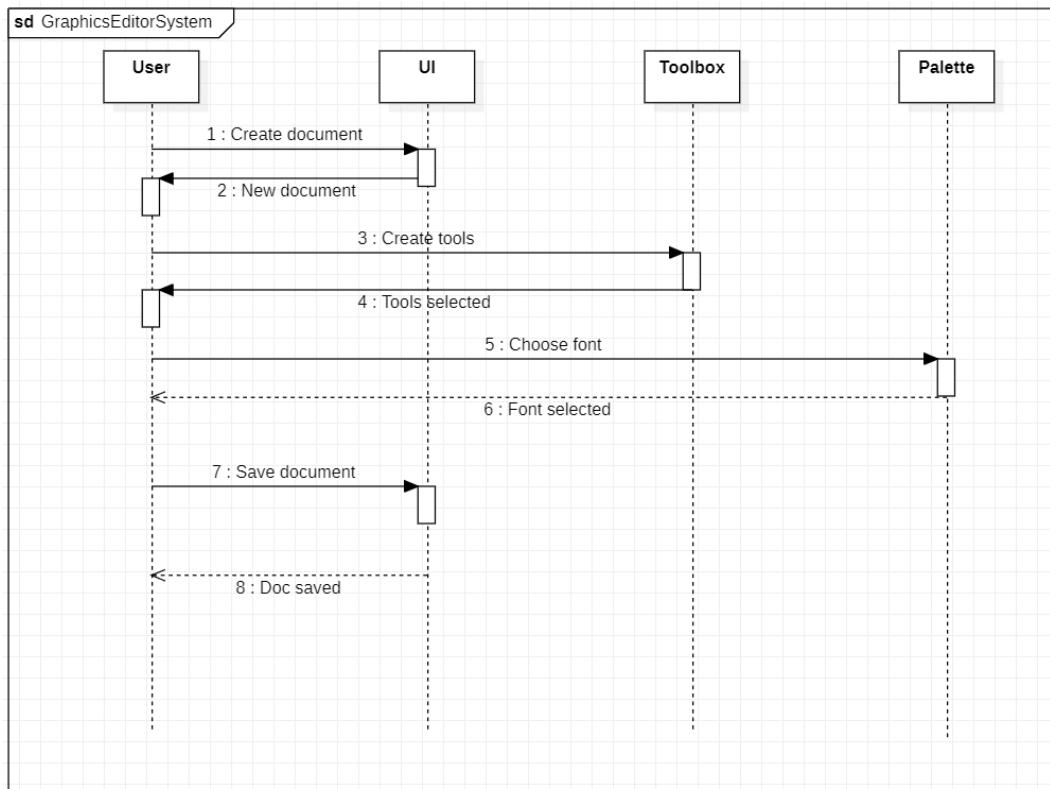
Edit document: performs editing of document

Graphics tools: displays the available tools

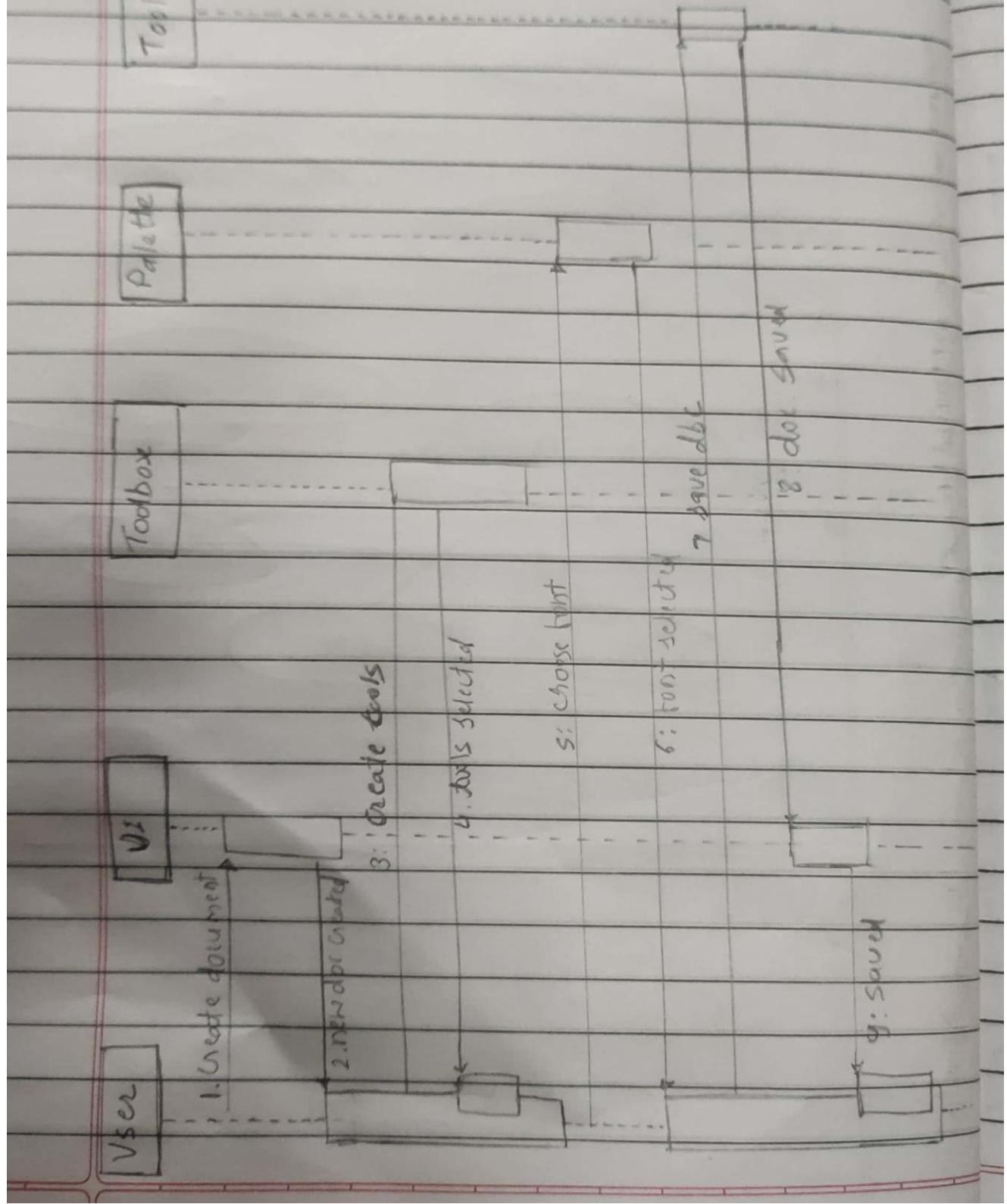
Save document : saves the document

Delete document : Permanently deletes the document

5. Advanced Sequence Diagram:

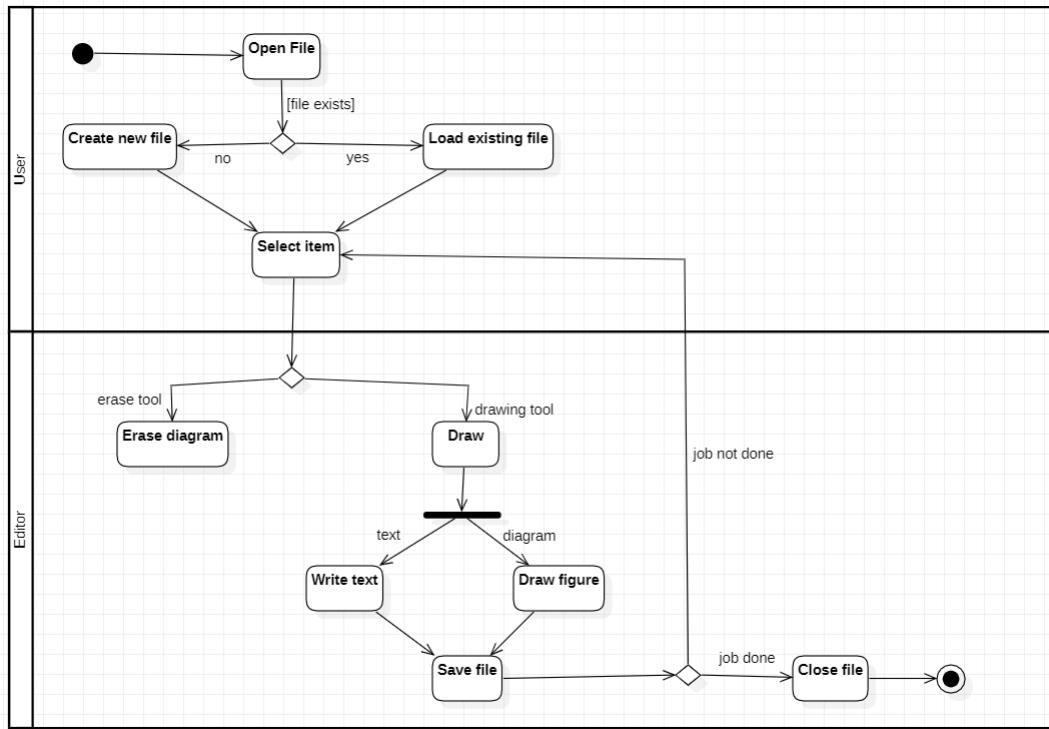


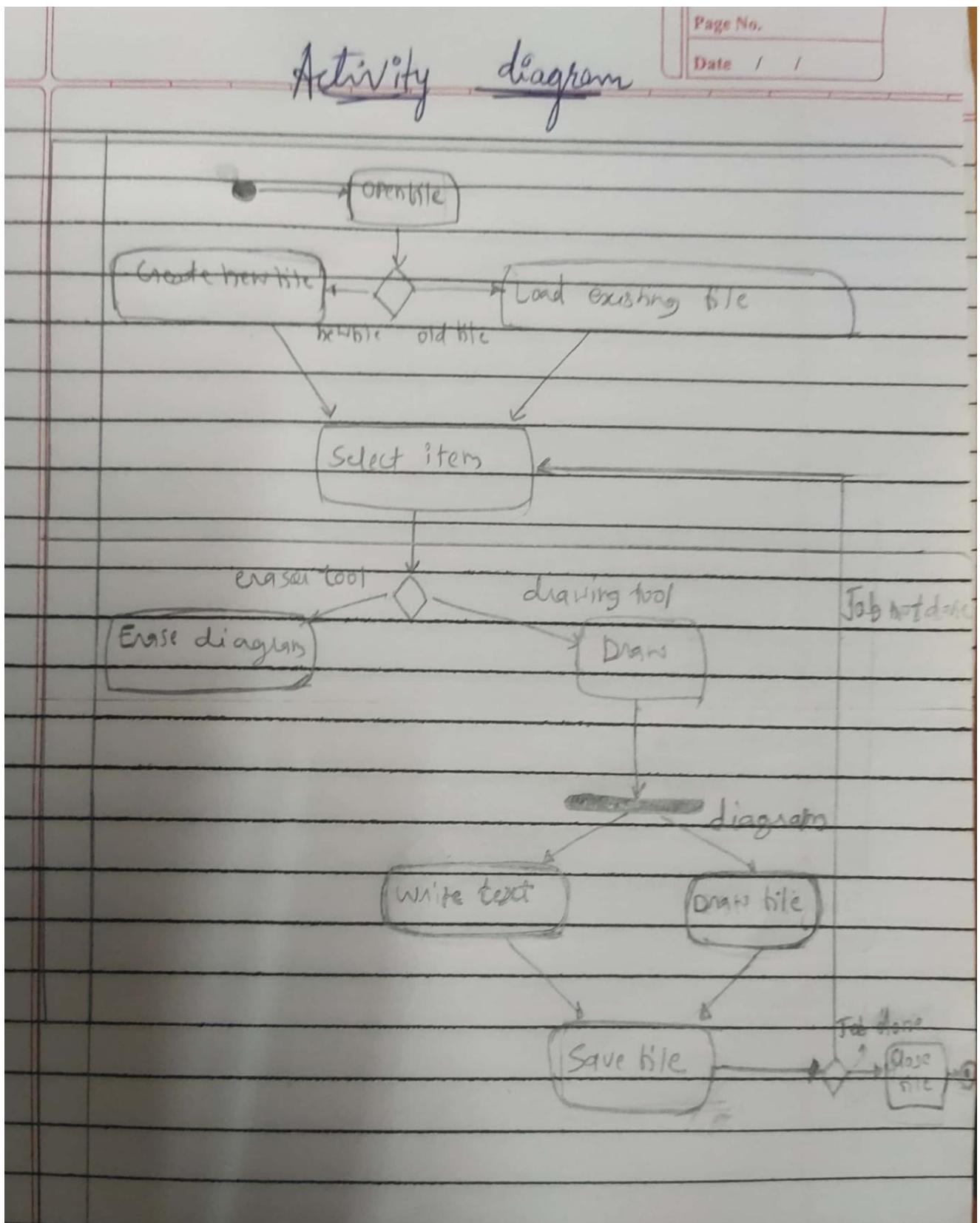
Sequence diagram



The sequence of interactions involve first the creation of the document, after which user can select tools and start drawing. The user can then save the document after he finishes working.

6. Advanced Activity Diagram:





The activity diagram has two swimlanes, Editor and User. The User first opens the file and if the file does not exist a new one is created. If it exists, the file is loaded. The user can then select items and work in the editor where he can concurrently write text and draw figures. The user can save the file and close.