

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



**LAB REPORT**  
on

**Object Oriented Modeling and Design**

*Submitted by*

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(1BM19CS083)**

*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**



### **CERTIFICATE**

This is to certify that the Lab work entitled "**Object Oriented Modeling and Design**" carried out by **Manoj H A(1BM19CS083)**, 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 **Object Oriented Modeling 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

Lab 1 -

### College Information System

#### Problem Statement -

The system that maintains student, staff & dept. information. It maintains the courses taught by teachers & students enrolled in them. Admission records of student & examinations details & other important information related to college management is maintained.

#### Requirements -

##### i] Student -

- Add/Edit Student Details
- Course Registration
- Add/Edit/View results
- Timetable details

##### ii] Teacher -

- Department Details
- Marks Details
- Attendance Details
- Events Details

##### iii] College -

- college name
- college Address
- college Branches
- Events hosted
- Alumni Details

##### iv] Proctor -

- Proctor's Details
- Announcement / Notifications

### Library -

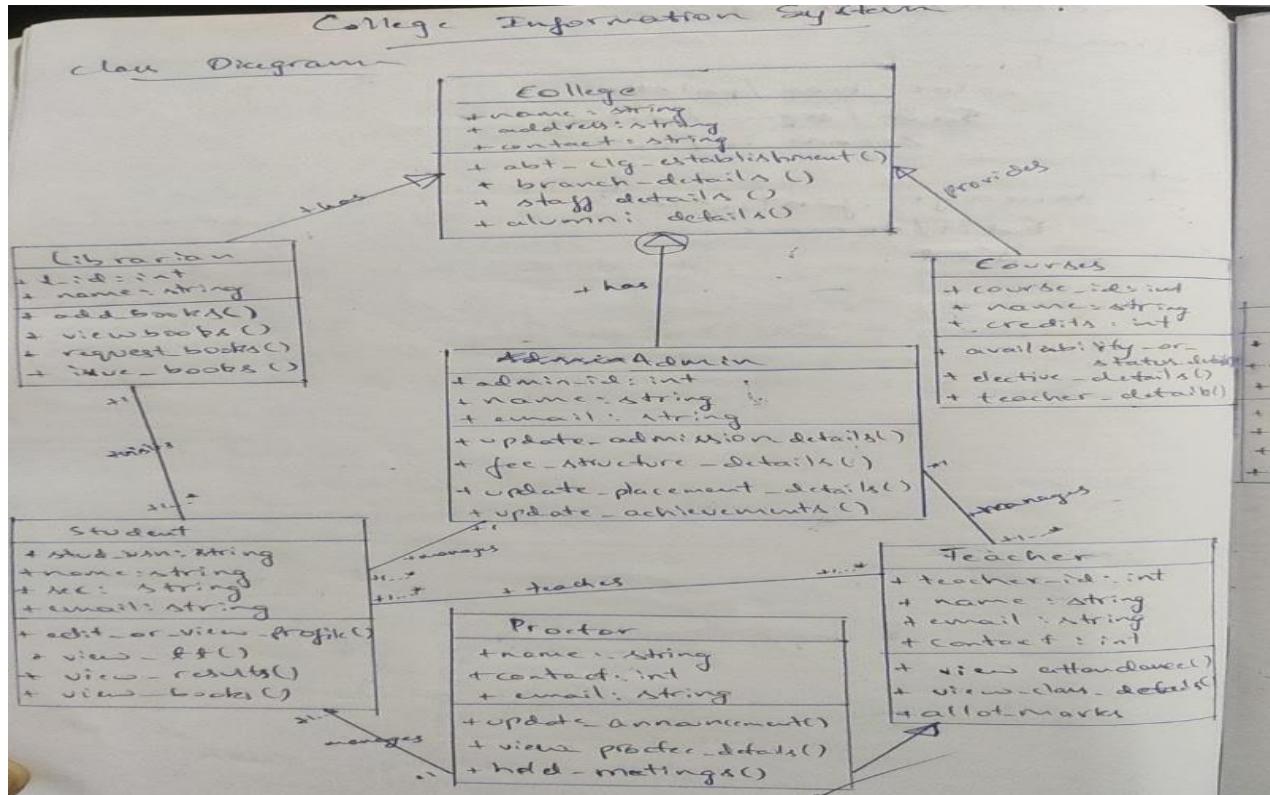
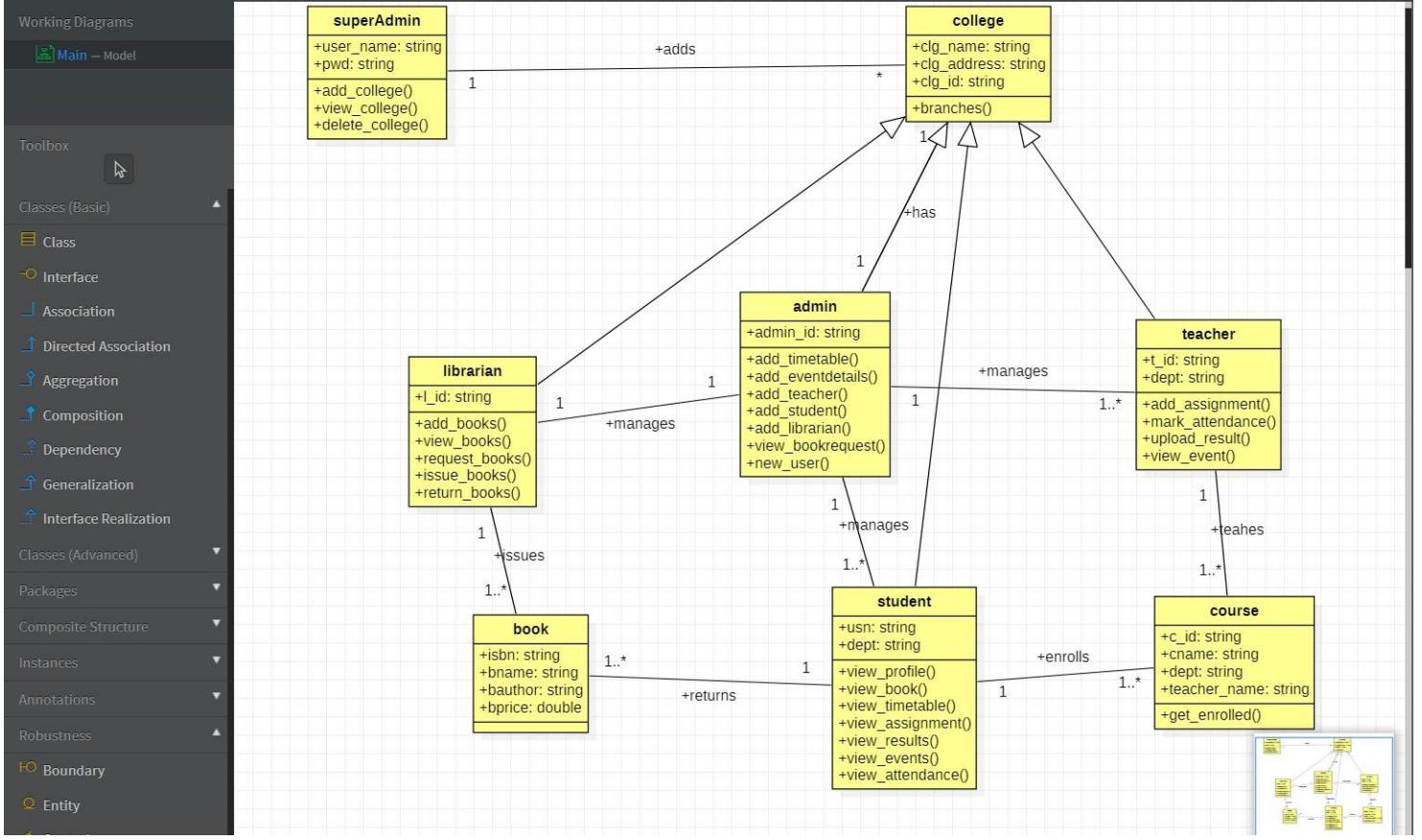
various categories of books listed  
view various books  
Issued books  
Return Books

### PLO -

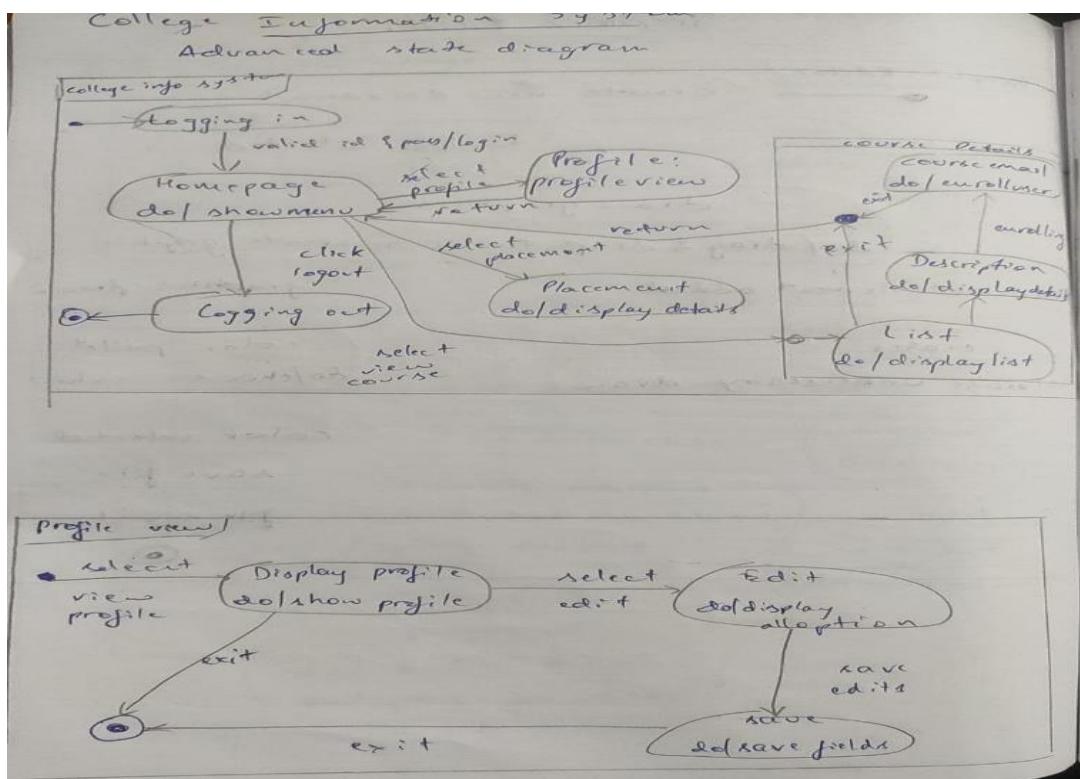
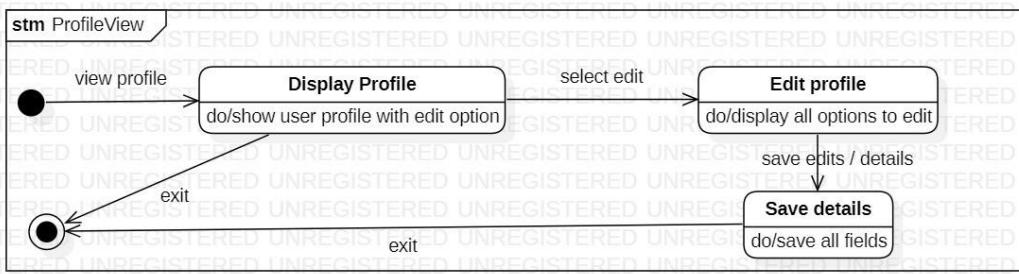
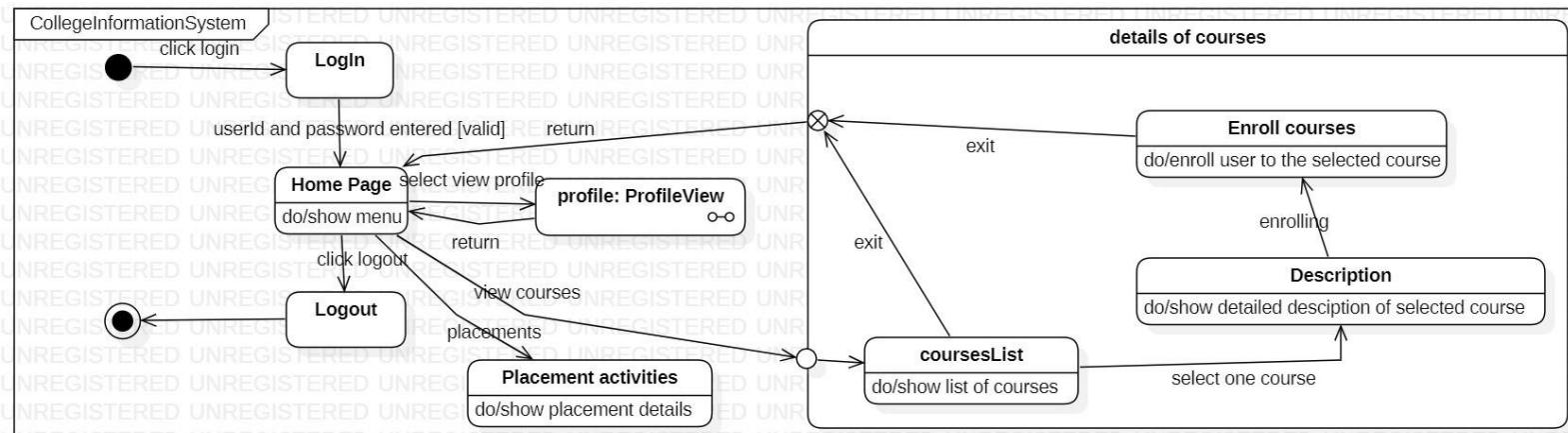
Company Details  
Placement Details  
Achievements.

## **Class Diagram**

Admin can view and modify the student's records, teachers and department details. The students of the college register themselves in the department and examination and for the courses they are interested in and join the college by taking admission and following all the admission procedures. College conducts Internals and semester end examination for students.

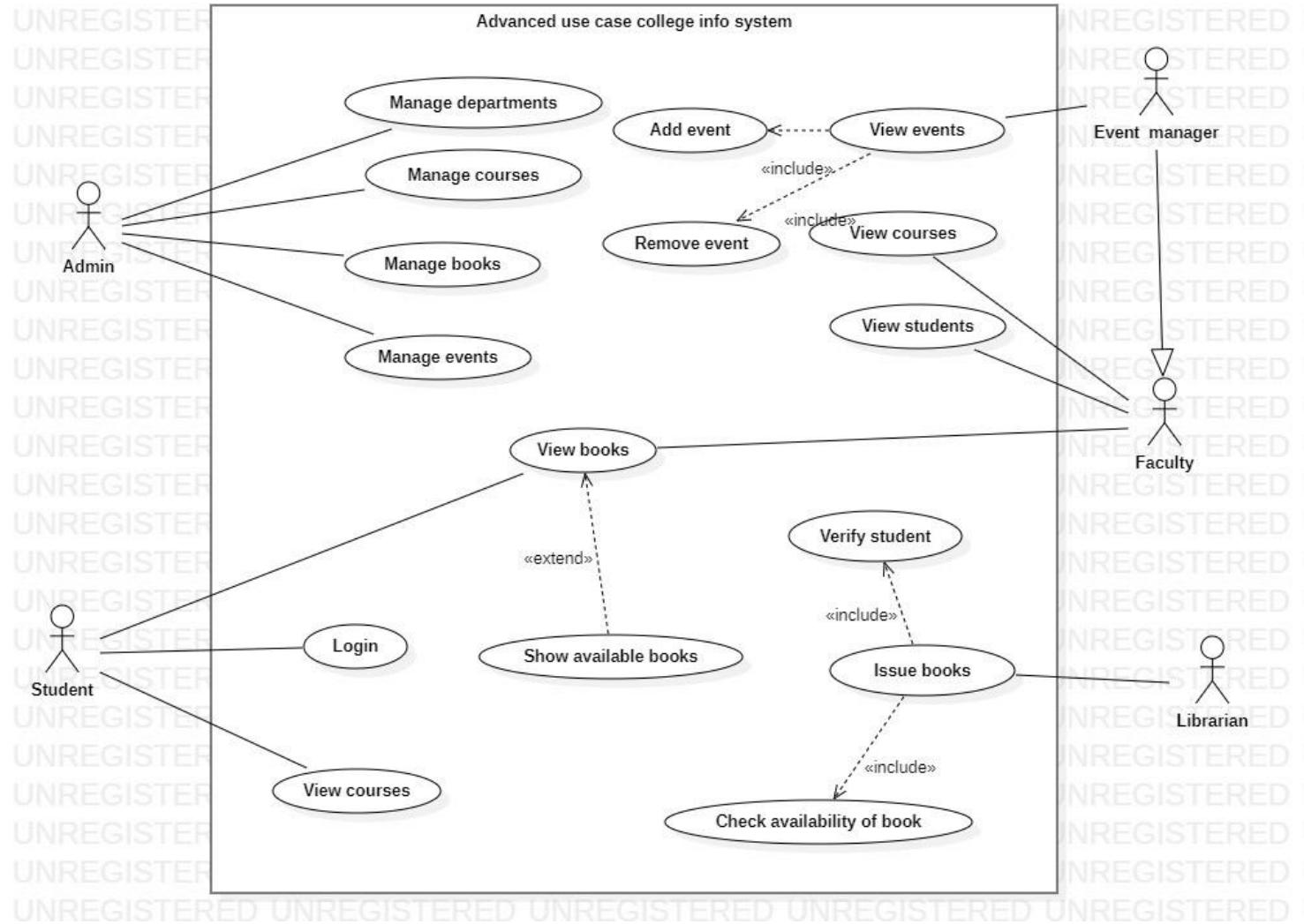


## State Diagram

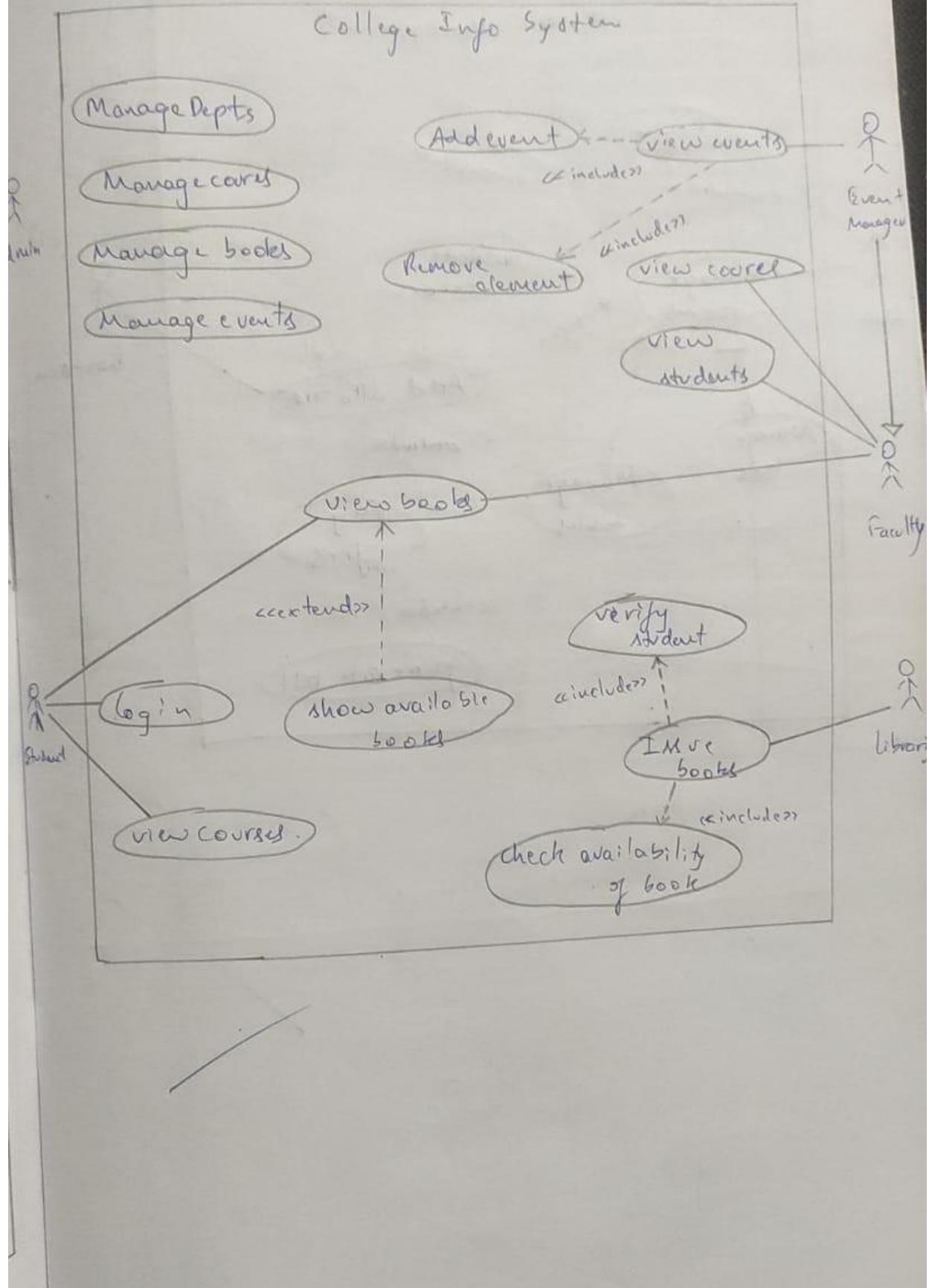


The above state diagram describes the states the admin goes through in uploading information of students, staff and department. The admin first needs to login which then leads to the validate state, where the login id and password are validated. If invalid it then goes back to the login state or goes to the get information state. Upon receiving the correct information it goes to the upload state and then to the commit state to save all changes. The admin first needs to login and be cleared of their permissions. The admin can then manage information related to the student, teacher, or department. After necessary changes the admin can update the information and logout from the system.

# Use Case Diagram



## Advanced use case college Info System



## **Actors:**

Admin:the person who manages everything

Student: A person who uses the system

Faculty:A person who manages the students

## **Use Cases:**

Manage details: the admin can update,insert or delete the data.

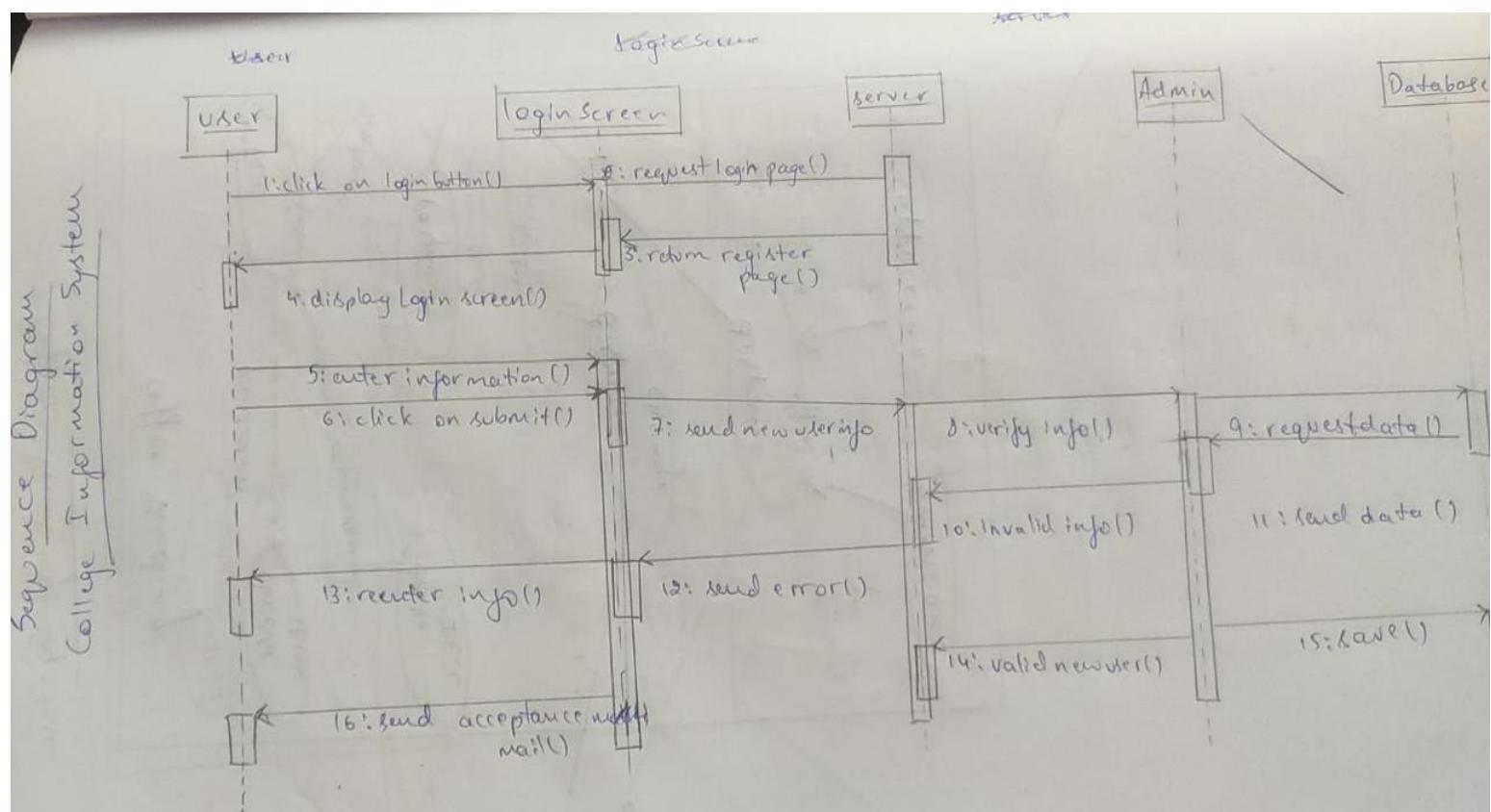
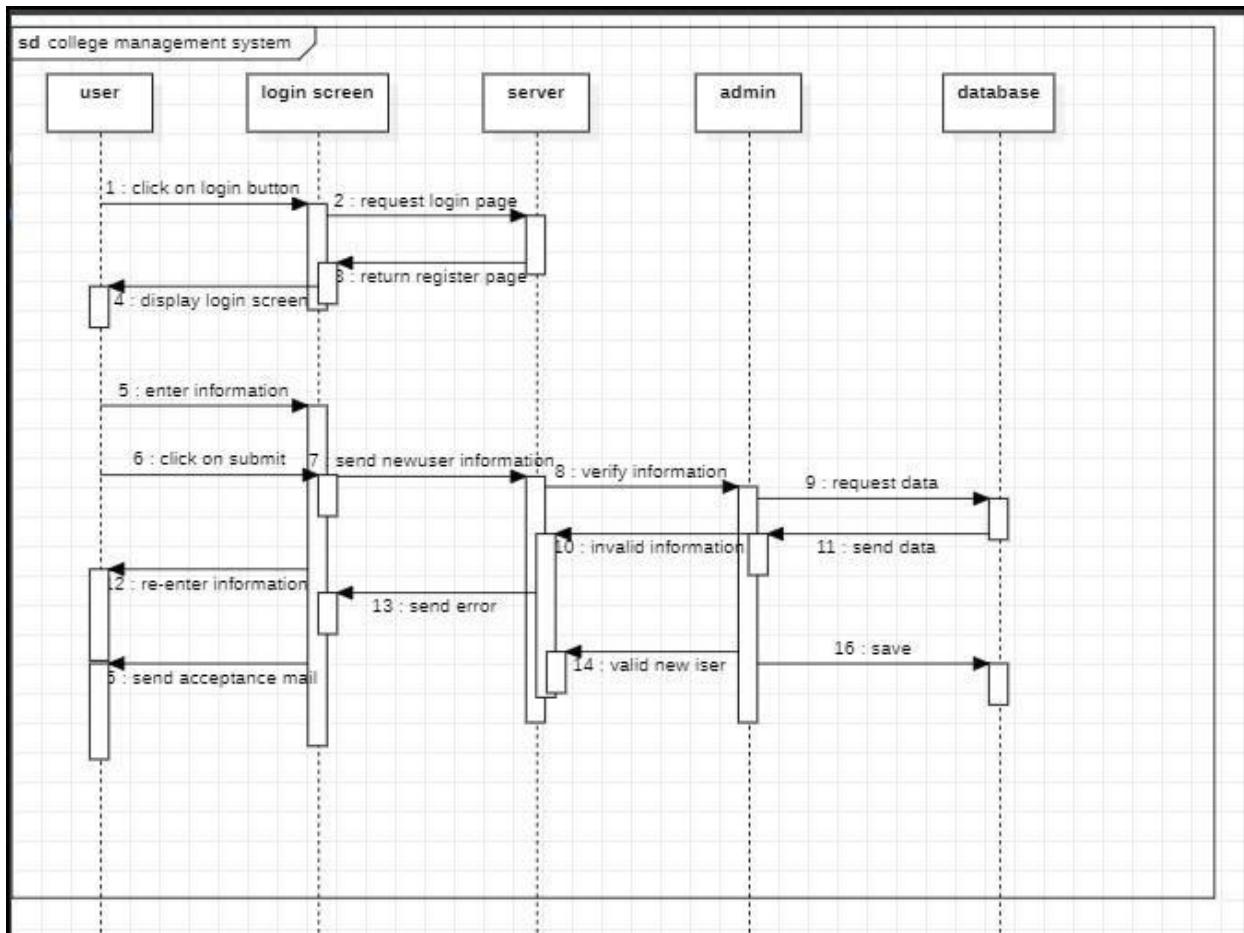
View results: displays the result of students.

Subject details:various details related to subject is displayed.

View student details: the details of student is displayed

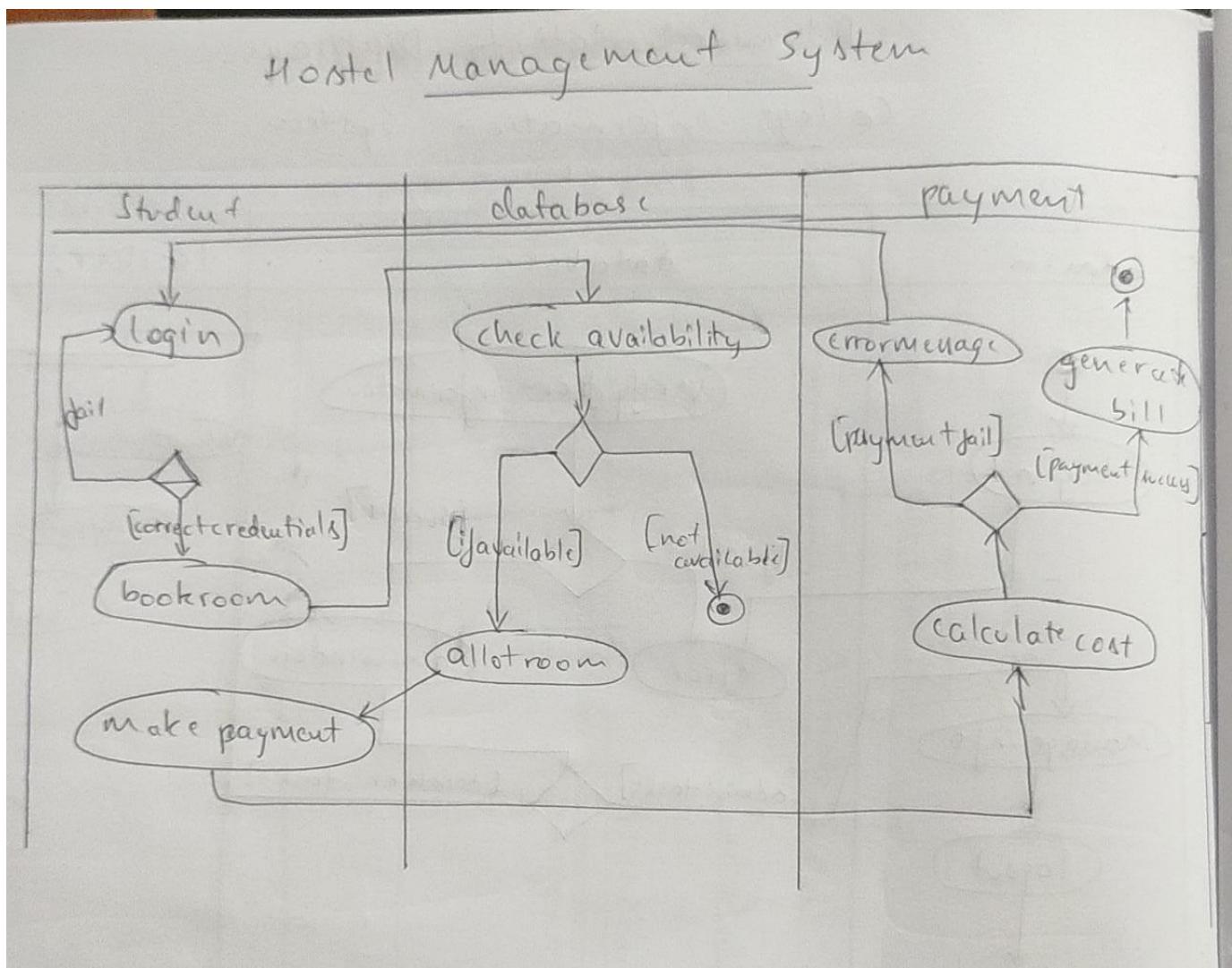
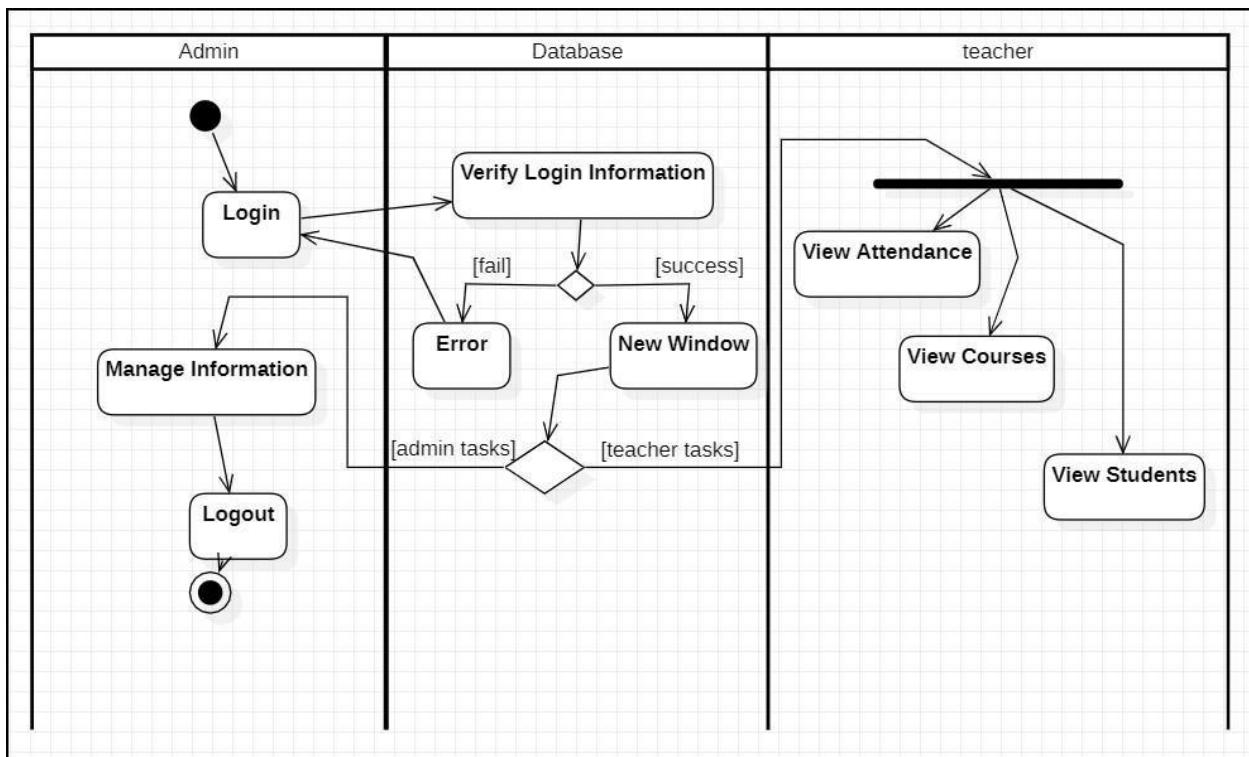
Declare results: the results of exams written by student is displayed.

# 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 is sent to the server, where the information is validated and the appropriate reply message is displayed to the user.

## Activity Diagram



The above activity diagram has three swimlanes mainly admin, database and teacher. The admin can login and manage information. The database verifies the login information and on success has two options. He teacher can view attendance, view course details, and view student list

## 2. Hostel Management System

### Problem Statement and Software Requirement Specification

Hostel Management System -

Problem Statement -

The system is to provide college students accommodation to university hostel more efficiently this project also keeps details of hostels & applied students. It is headed by Warden. He will be admin. This doc is intended to minimize human works. & make hostel allocation an easier job for student & hostel authorities by providing online app. for host

Hostel Requirements -

Hostel Staff -

- Personnel Details
- Job Details / warden
- view Student Details
- Room allotment Details

Hostel -

- Student Details
- Staff Details
- Allocated / unallocated room
- complaints
- Fee details

Feedback -

- give feedback
- Complaint Registration
- Complaint Details.

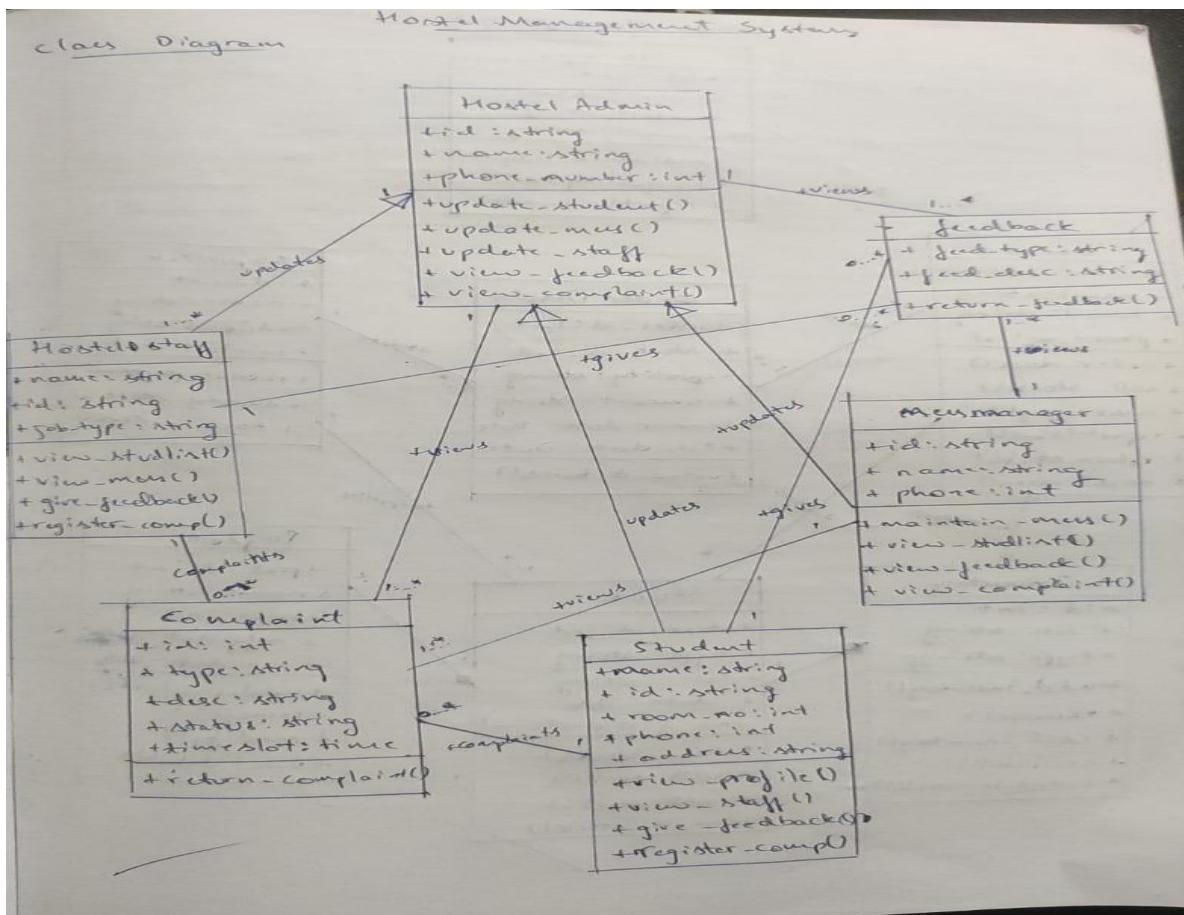
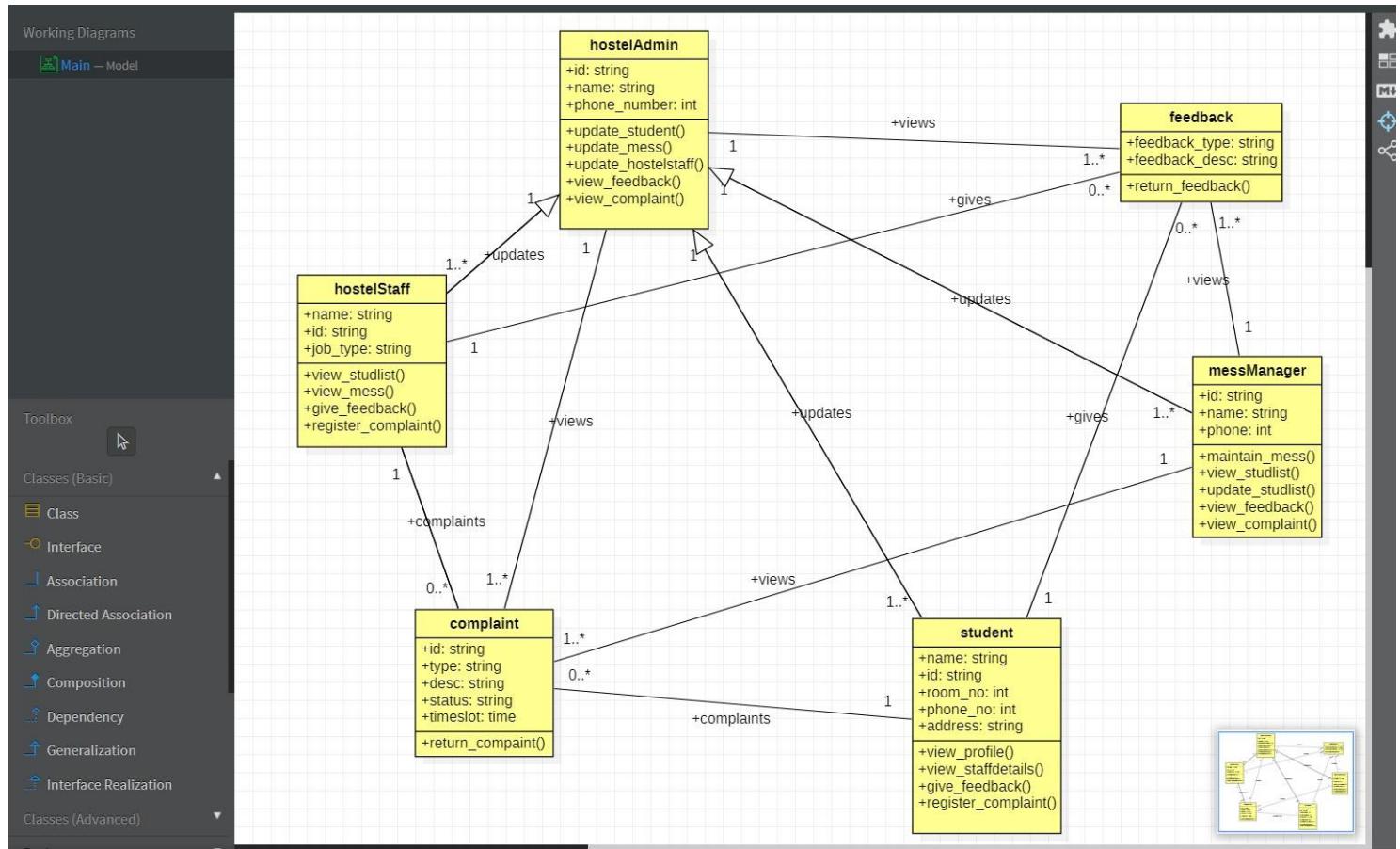
Menu -

- Menu
- Menu staff Details
- veg / Non veg Student list
- complaints / feedback

Hostel Admin - Personnel Details

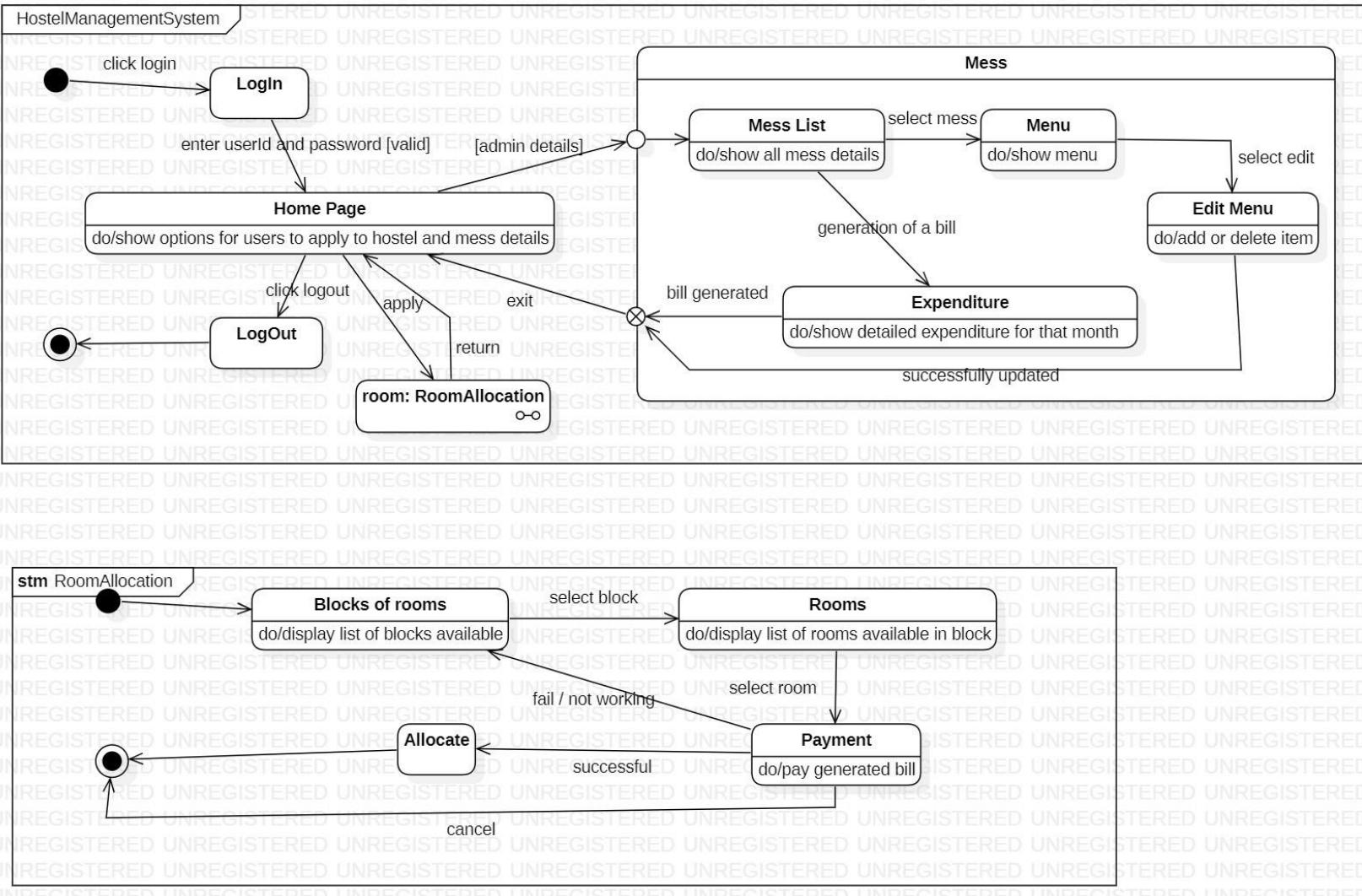
- view feedback / complaints
- Staff Details
- Room allotment Details.

# Class Diagram

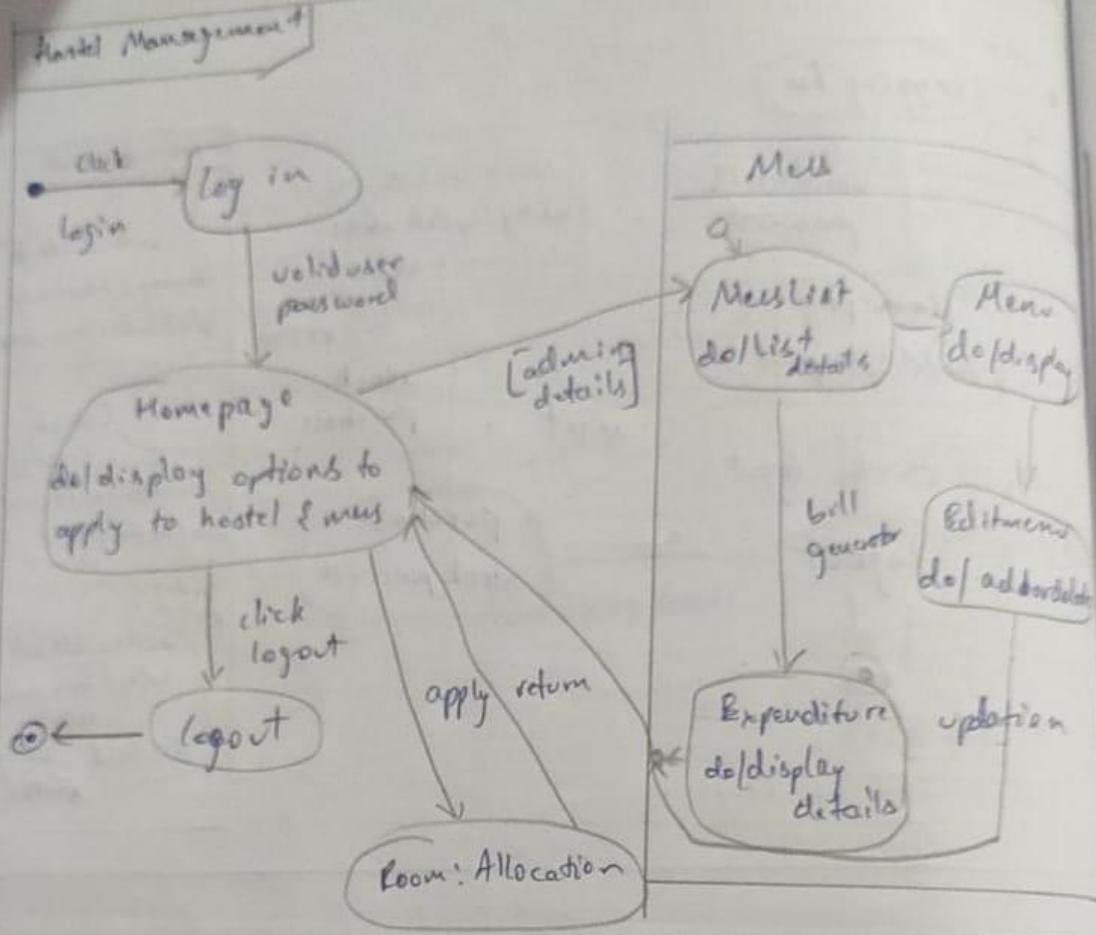


Hostel management system has admin who manages the hostel, allot-es and payment methods. The allot-es makes payment according to the bill generated which have the attributes bill number, type and date. The hostel is categorized into two types I.e boys and girls hostel. A hostel is made up of mess and rooms. A mess account will also generate. This account has the mess status of the whole month.

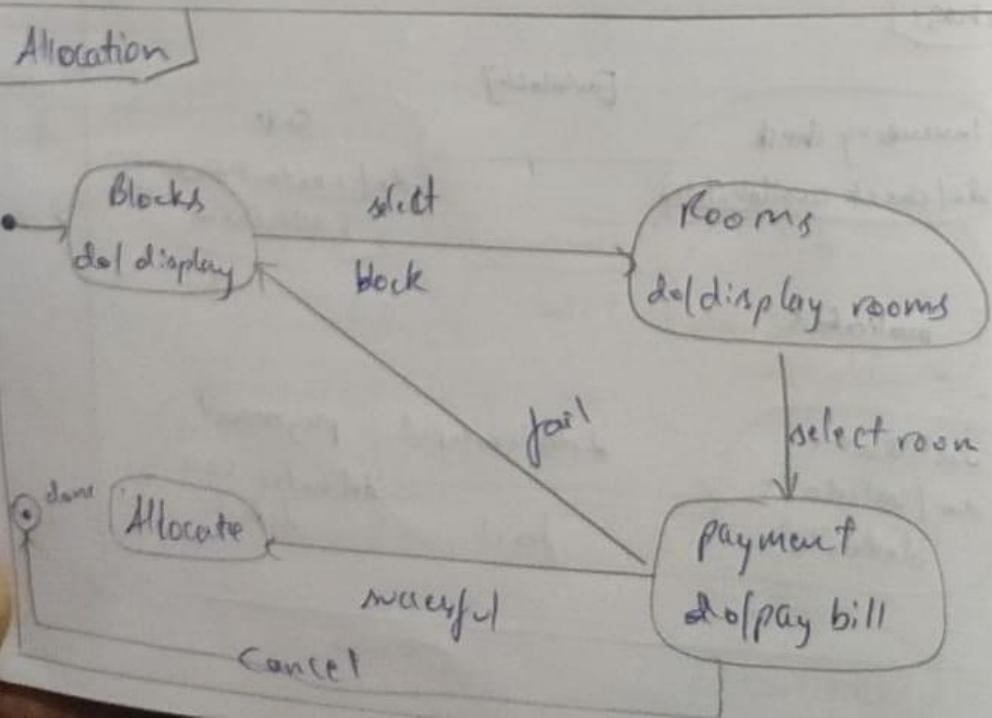
# State Diagrams



# Hostel Management

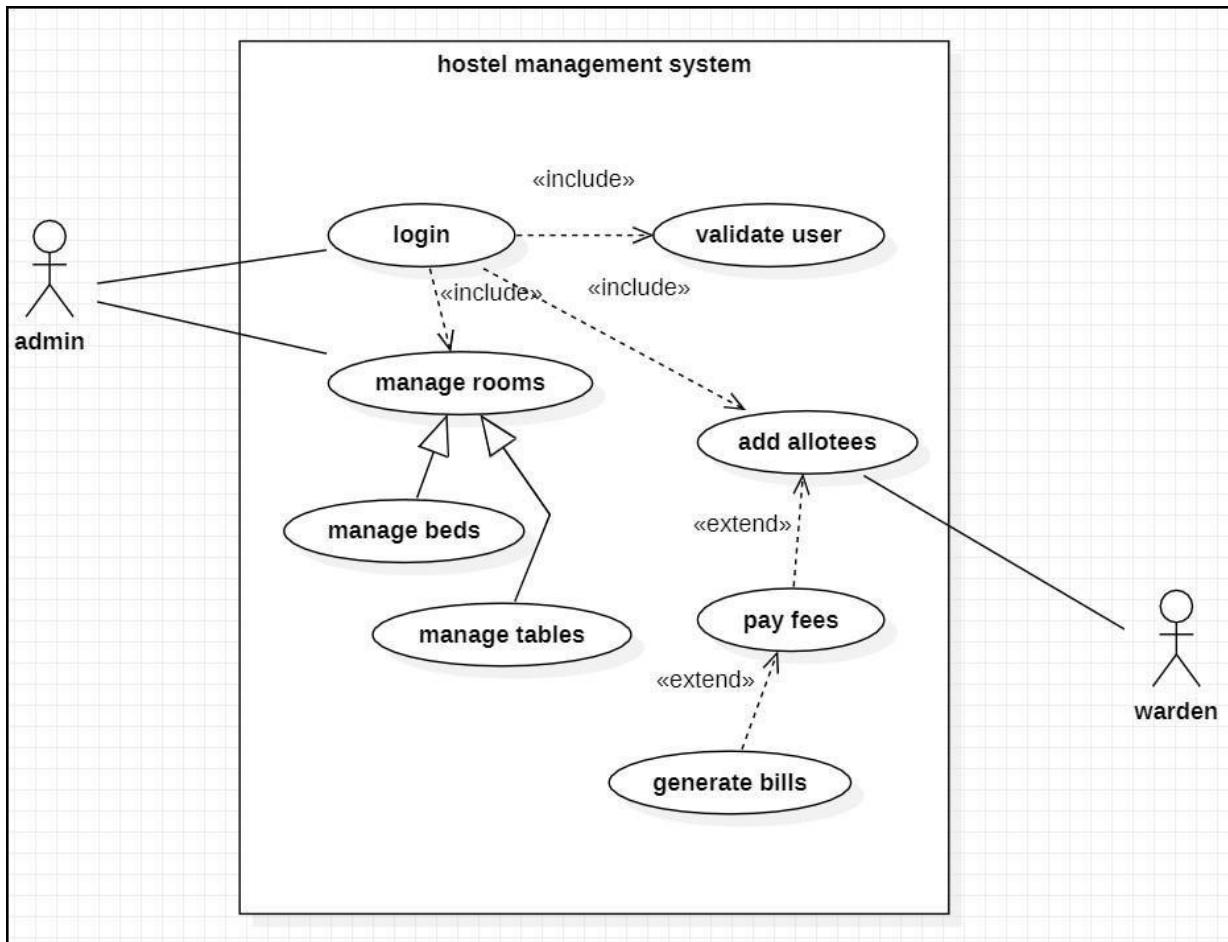


## Allocation

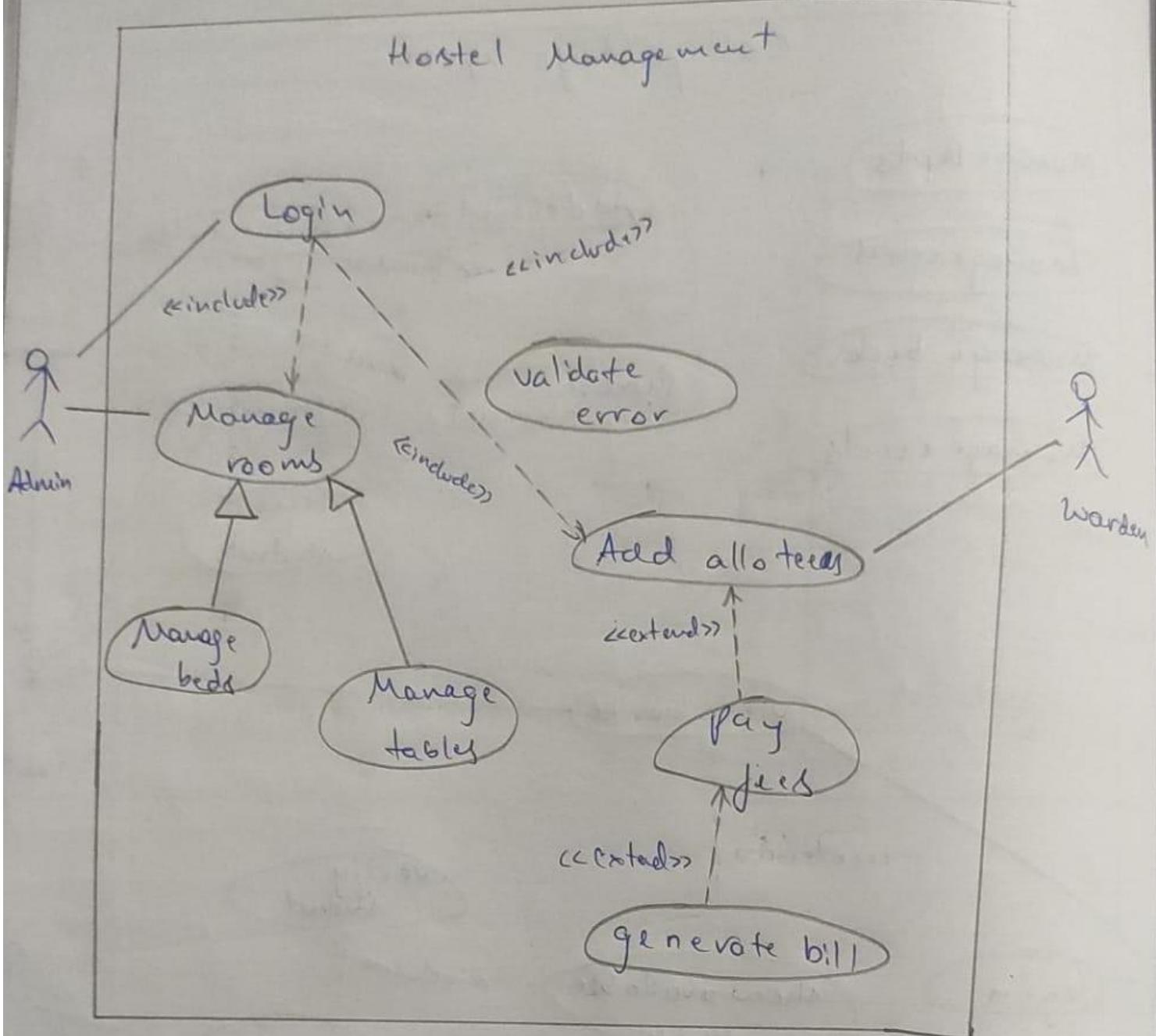


The above state diagram gives the movement of states in allotting a room to a student. The admin allots rooms for students. The admin first login s to the database ,which displays a set of options.the admin then chooses to allot rooms and finds the availability for rooms. If rooms are available then 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.

## Use Case Diagram



# Hostel Management System



## **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 hostel : allows actor to update delete or add information

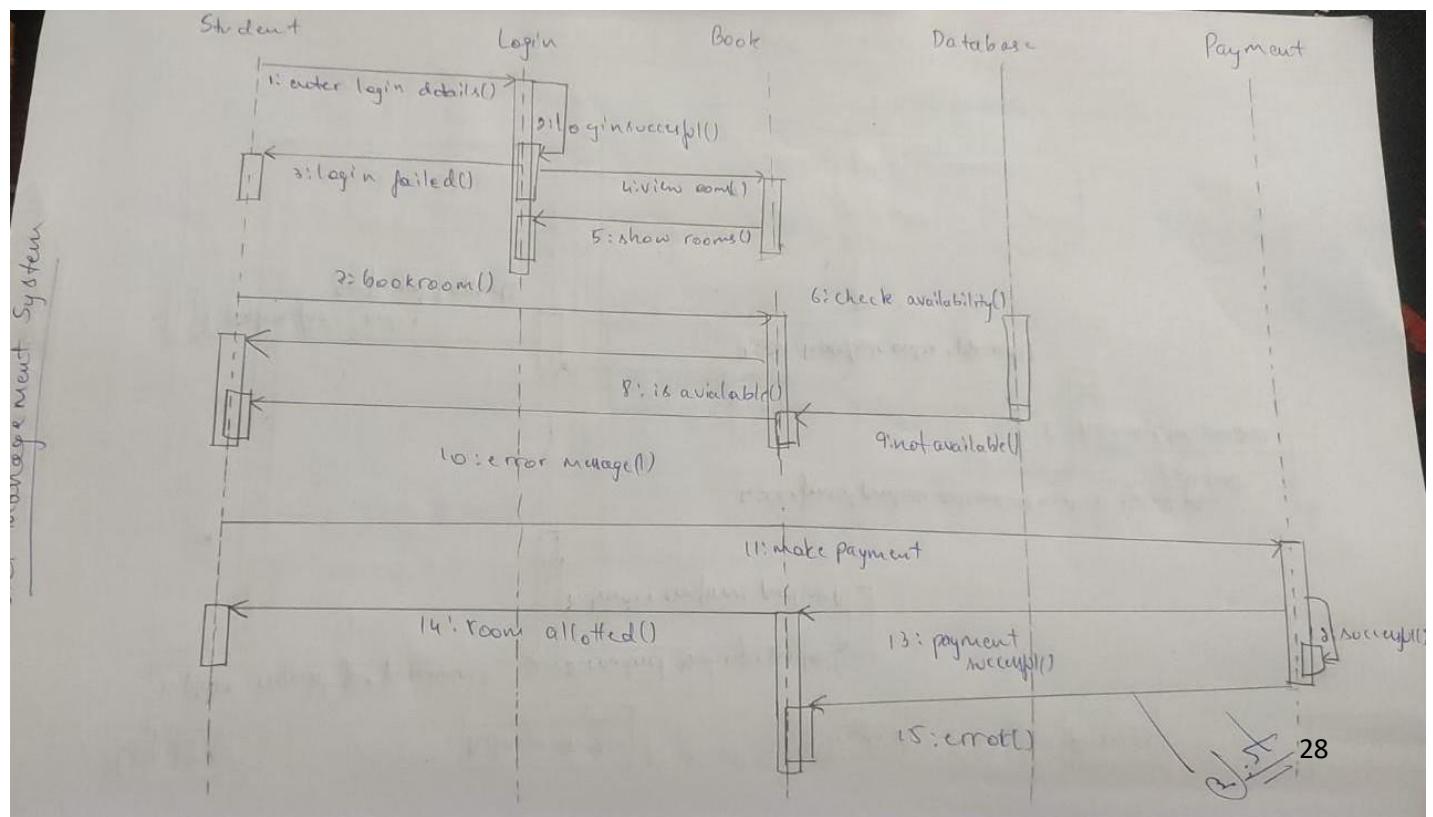
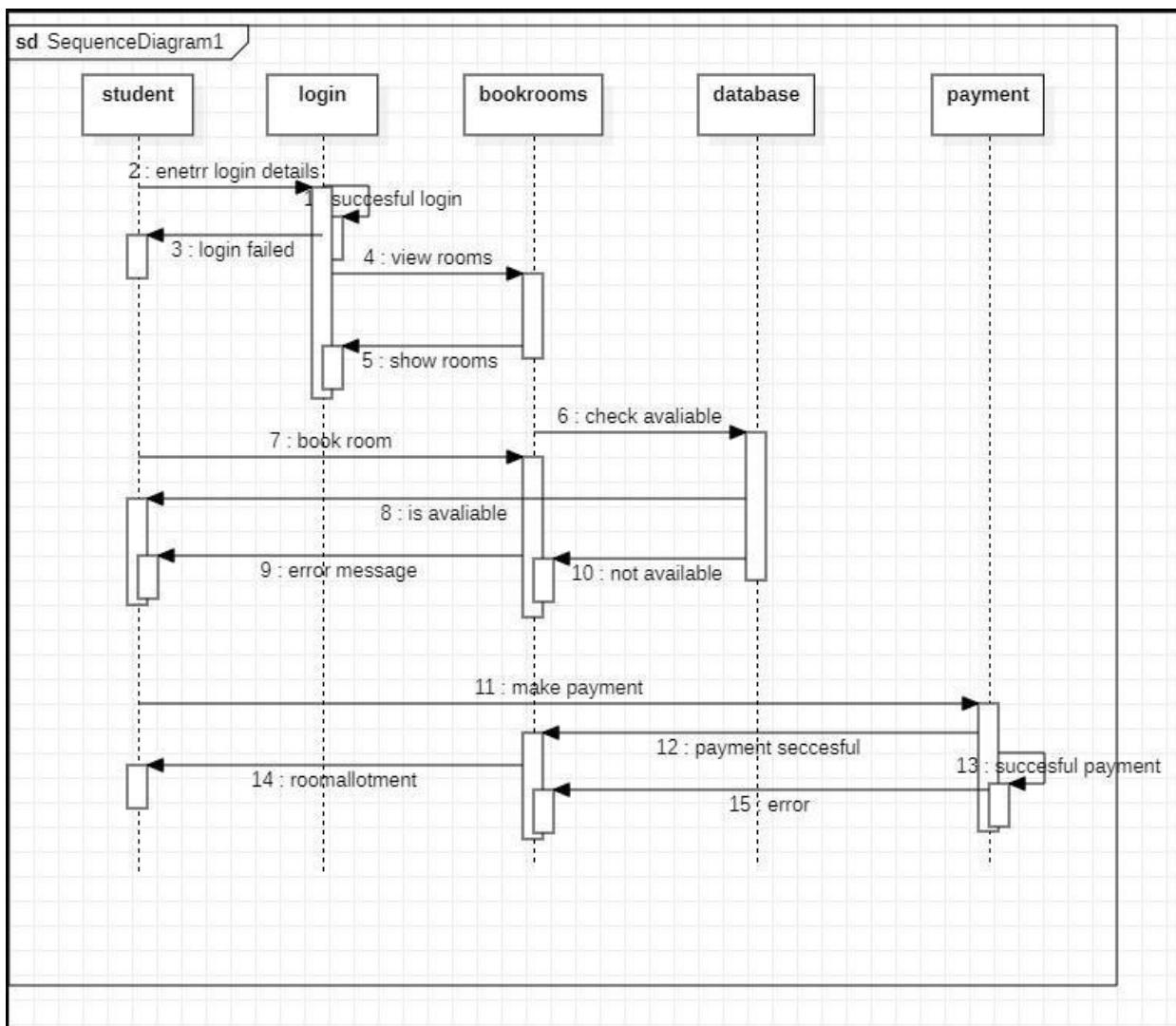
Login : allows actors to login into the system.

Add allottee: the students are allotted hostel rooms

Book hostel: the student can select the hostel they wish to stay in.

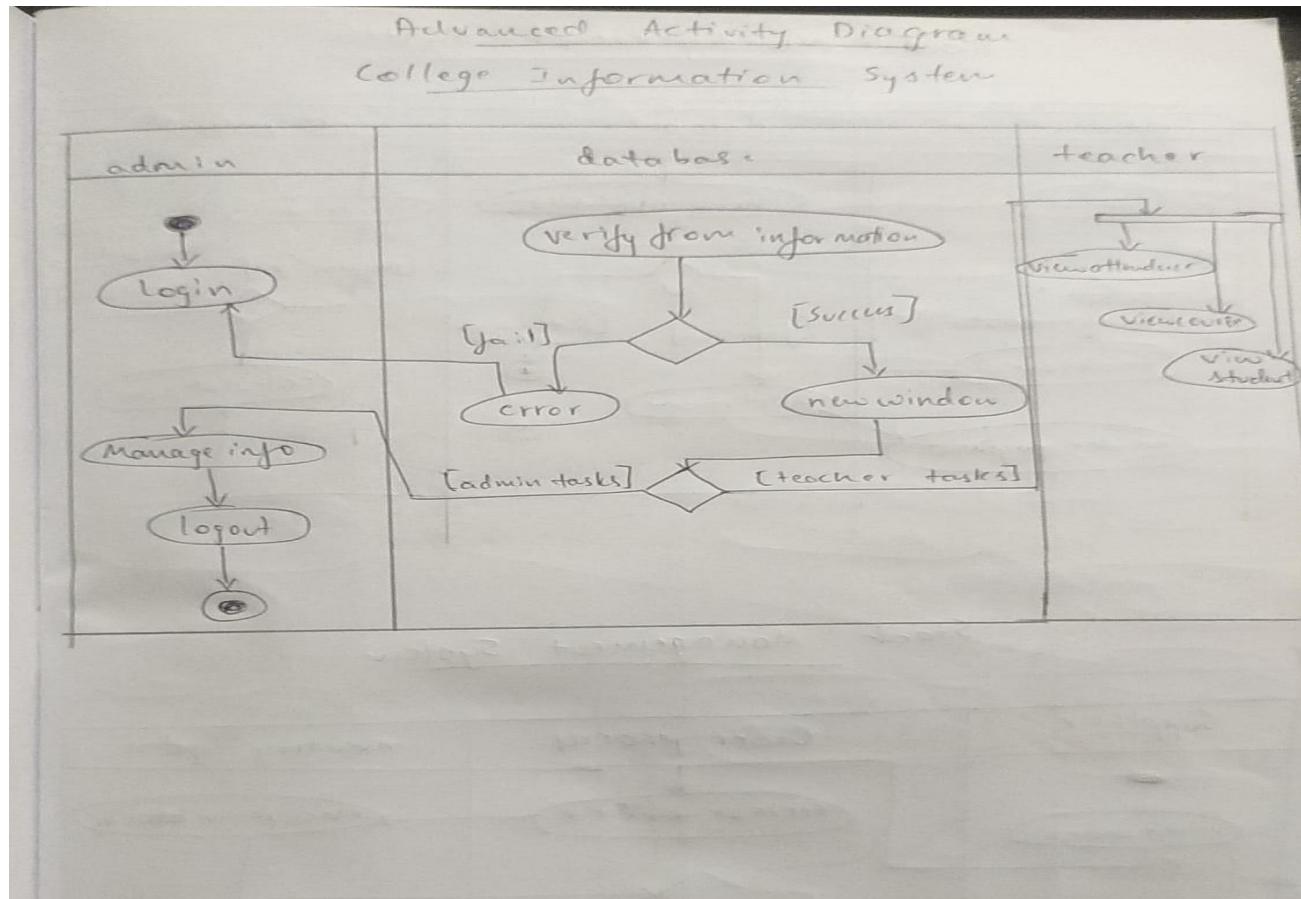
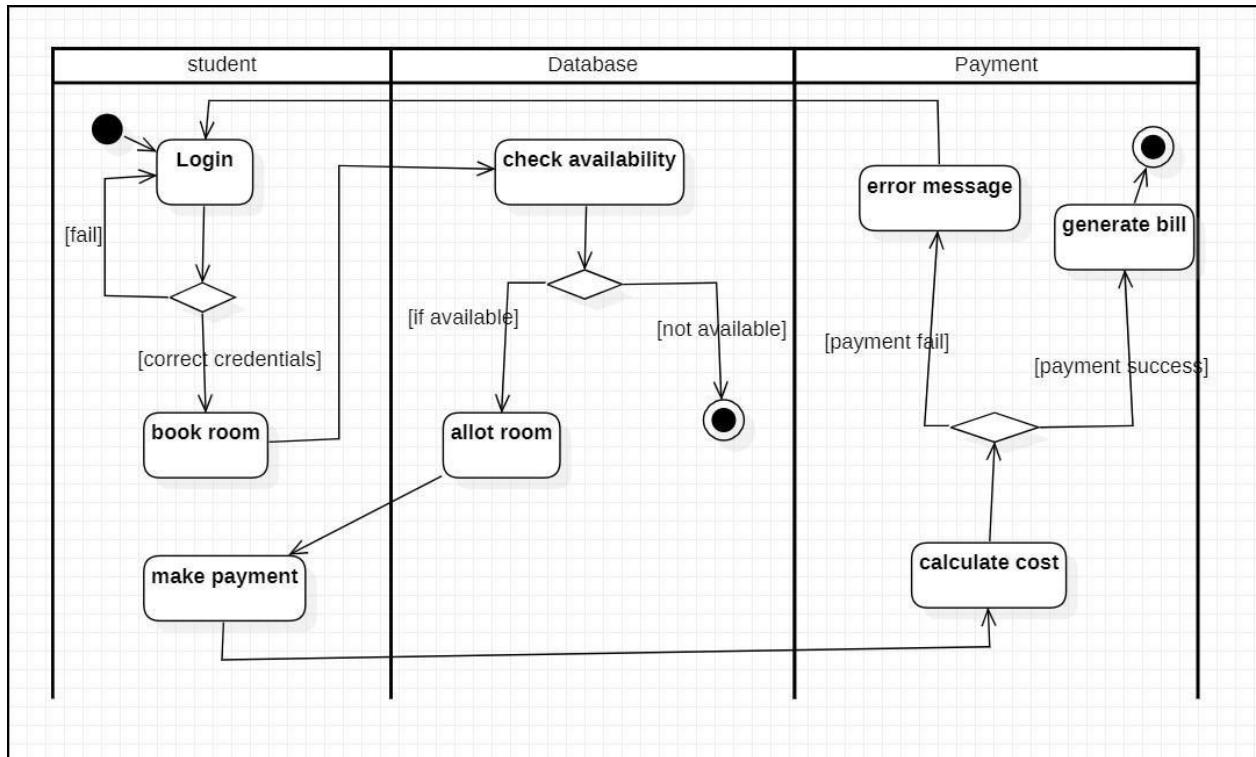
Pay fees: the fees payment is done by this use case.

# 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.

# Activity Diagram



The activity diagram tells about the activities involved in payment of fees. The above activity diagram gives 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.

### 3. Stock Maintenance System

#### Problem Statement and Software Requirement Specification

##### Stock Management System

The system is basically for the customer who access the info about the stock & retrieves 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. The vendor deals with the info about the details of suppliers giving products to organization.

##### Requirements -

###### Manager -

- Id, name
- phone no.
- Email address
- Address

###### Owner -

- owner-id
- name
- Email address

###### Order Details -

- order-id
- Stock-id
- Quality
- Amount
- order/Delivery date

###### Supplier -

- supplier-id
- Name
- Address
- Phone no.
- Email

###### Product -

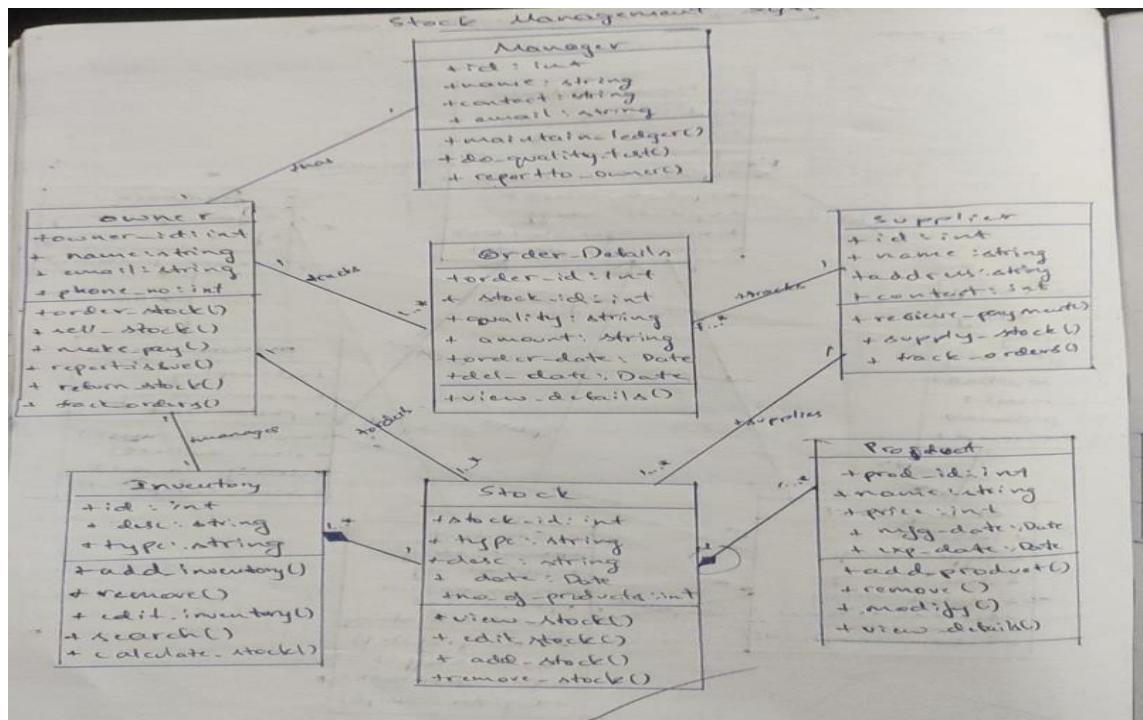
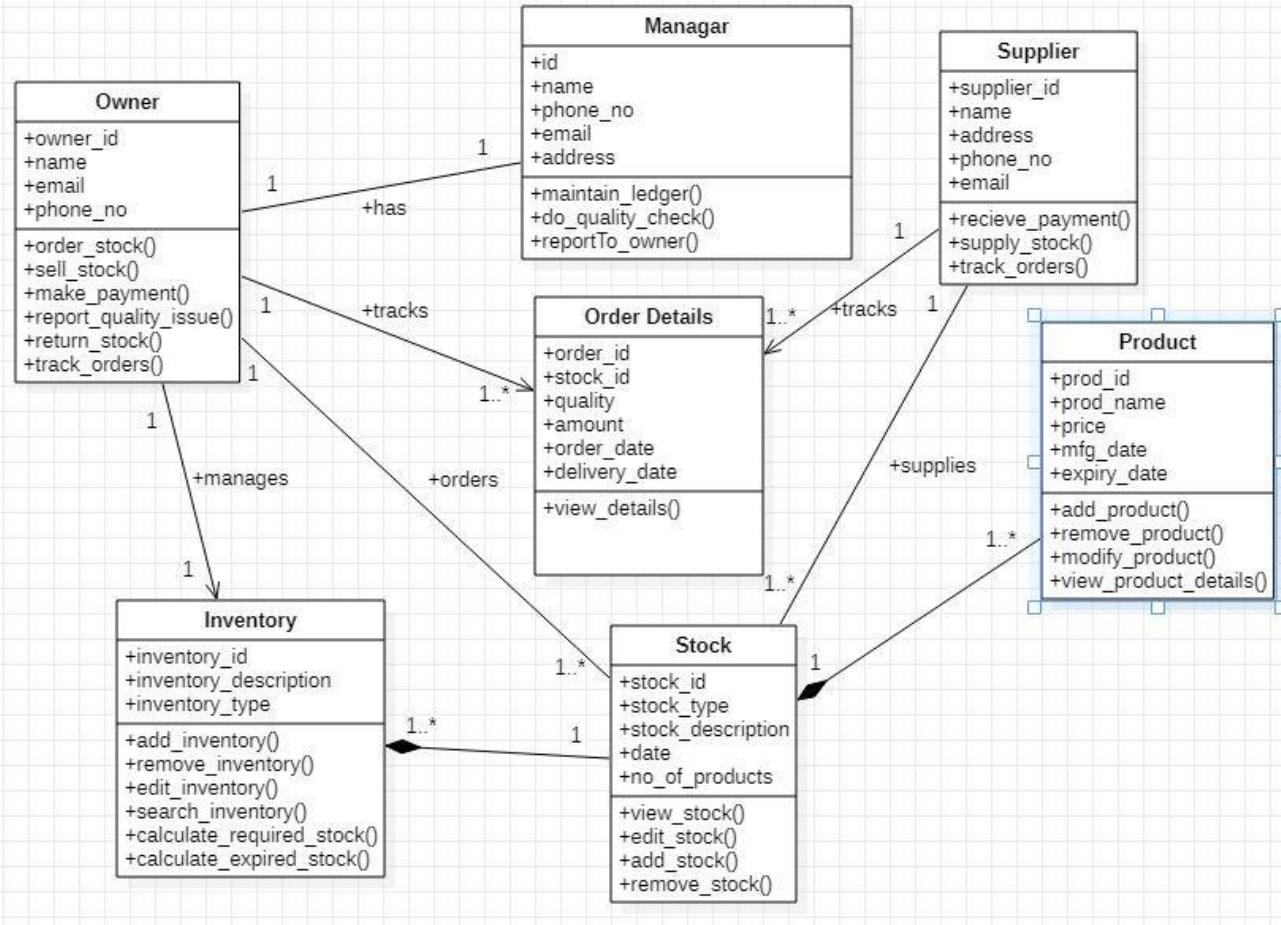
- product-id
- product-name
- price
- Manufacture date
- Expiry date

### Stock -

- Stock type
- Description
- No. of products

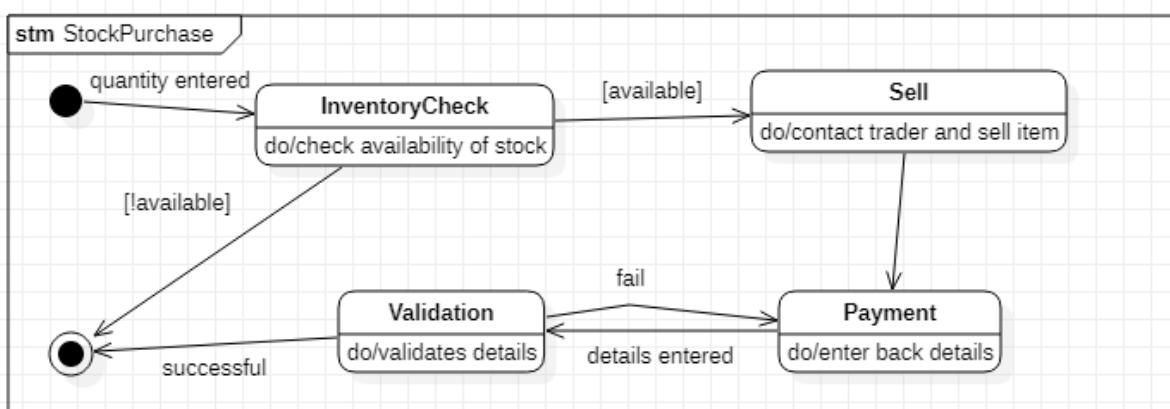
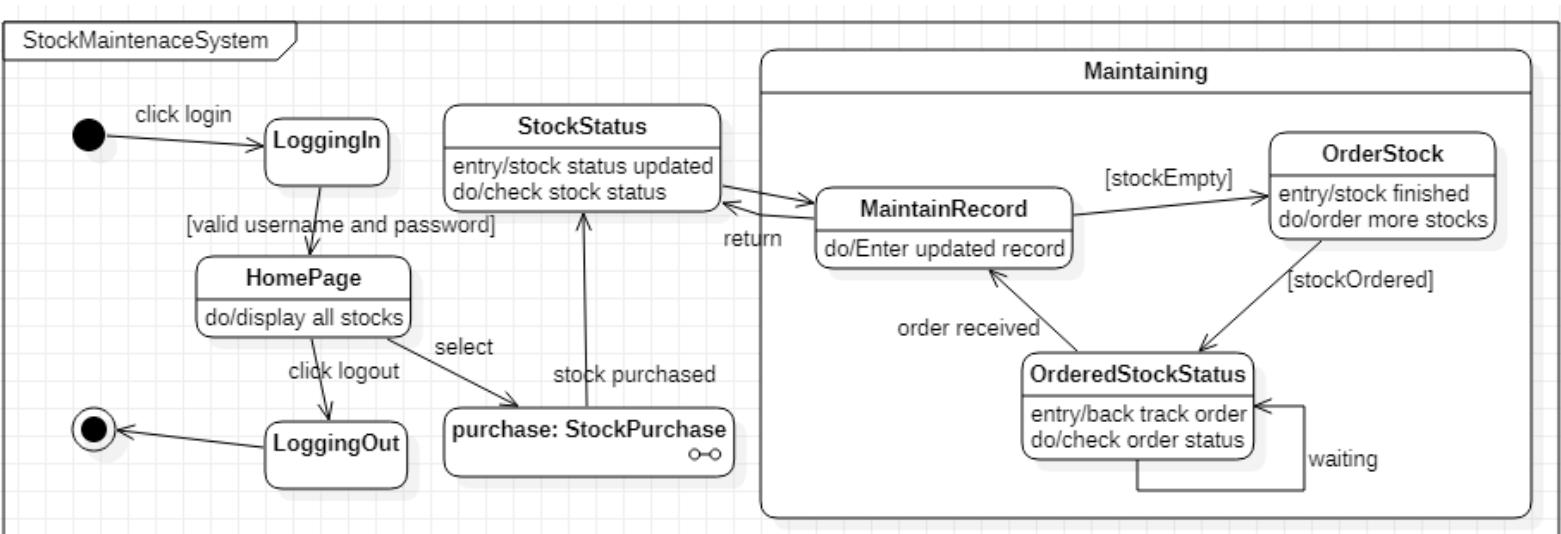
### Warehouse/ Inventory -

- Address Details
- Area Details
- Type of stocks stored.



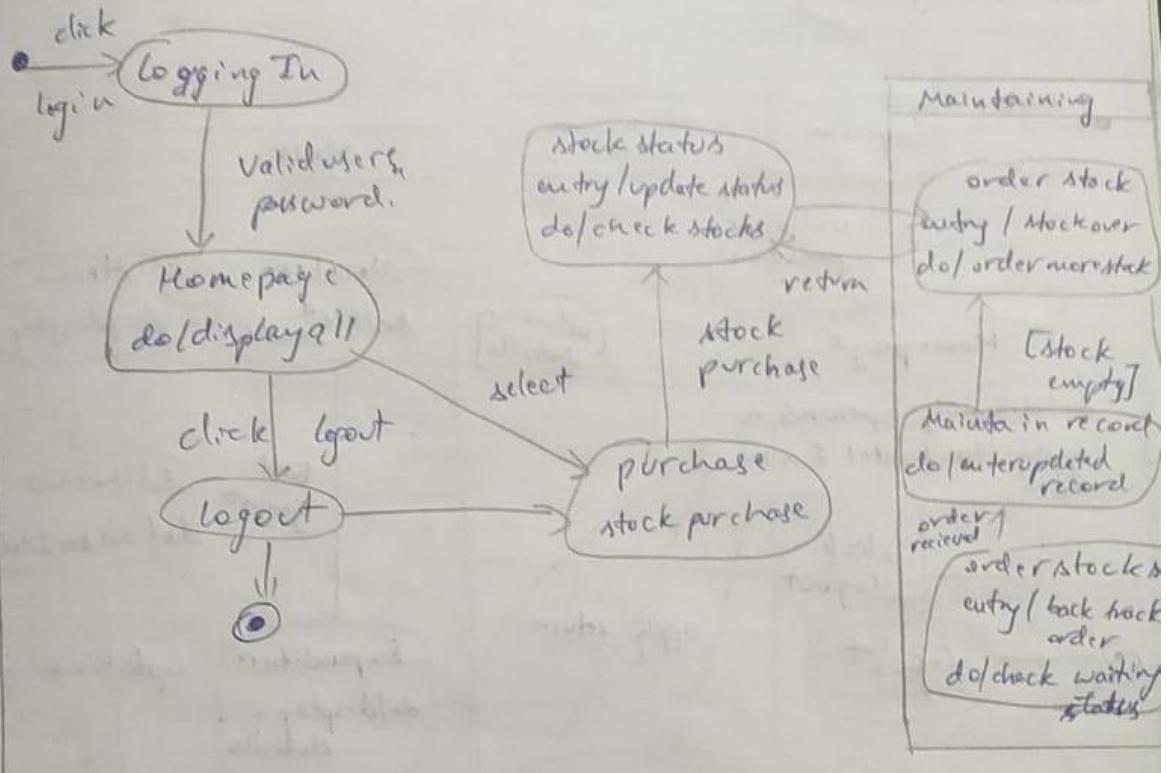
The products are displayed in stores across the city or world. All the information regarding the store are used to locate any product. The stores can be of many types. Some of them are departmental stores, super markets and warehouses where the products are kept for display. The vendor deals with the information about the details of the suppliers giving product to the organization. The stock of the products is maintained separately. The stock deals with information about the details of the product that the concern handling.

## State Diagrams

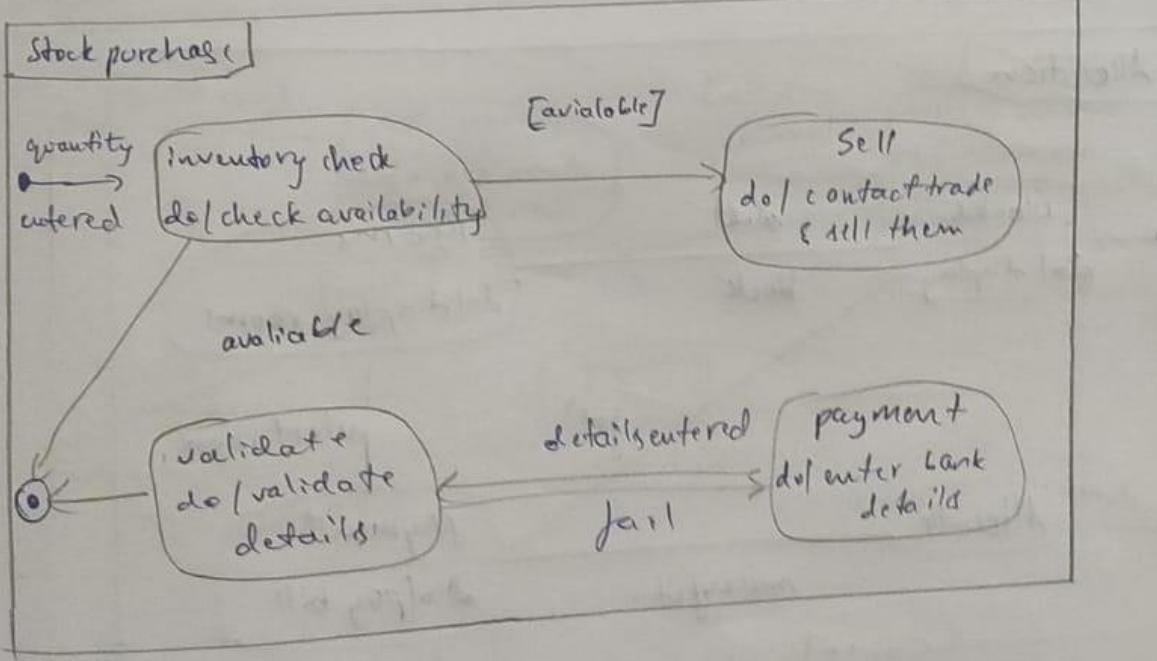


# Stock Management System

## Stock Management

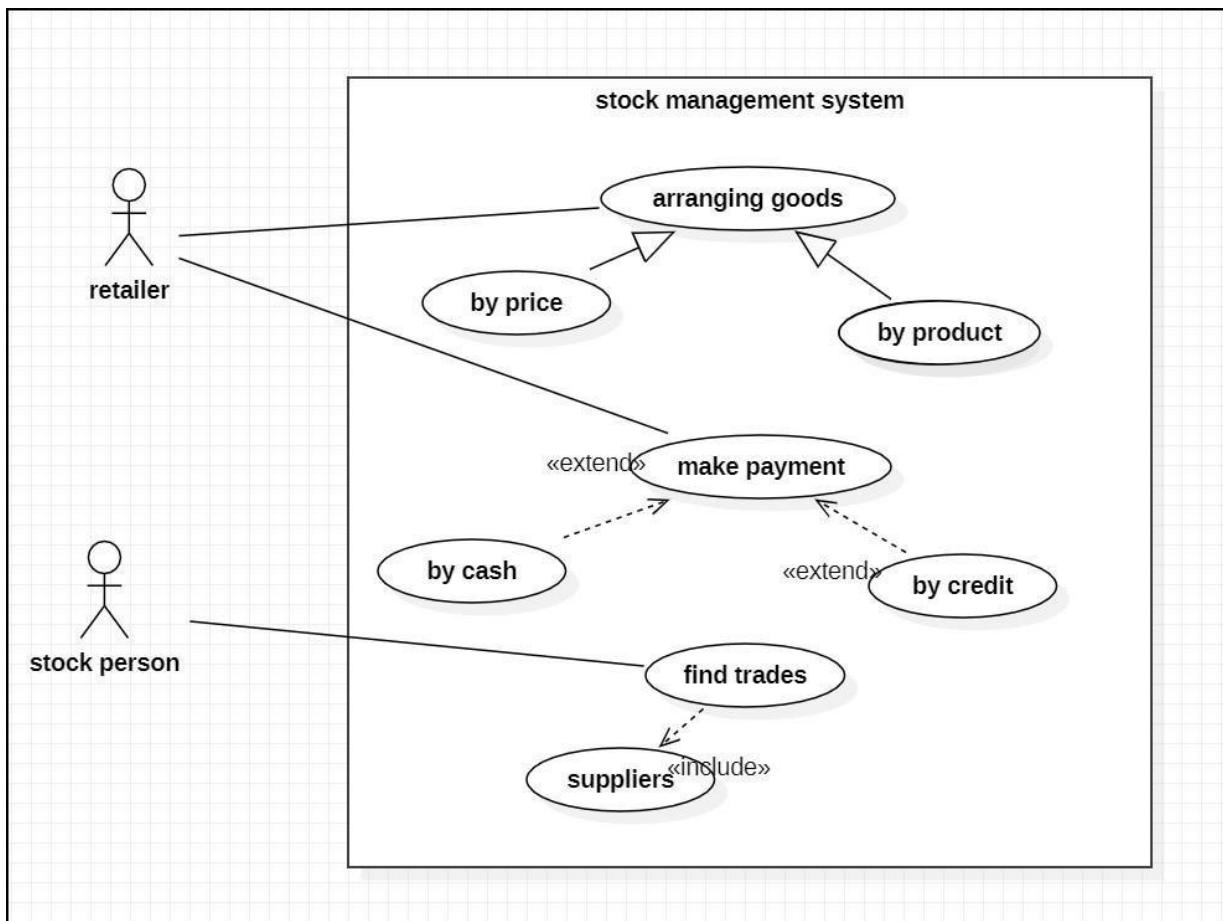


## Stock purchase

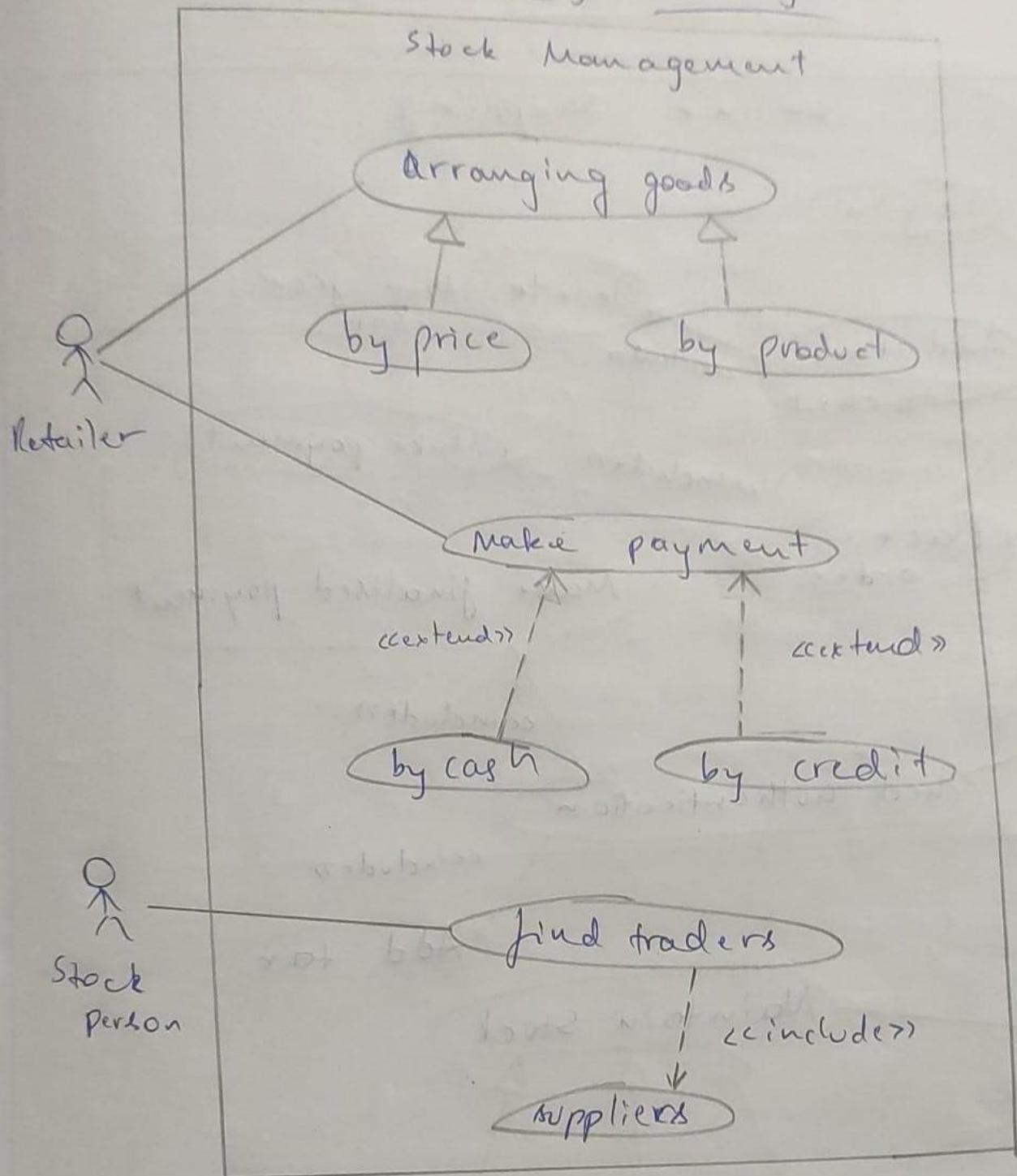


The state diagram above gives us the states involved in purchasing a product and placing the order for the same. There is first an inventory check ,where the stock of products is noted and if the stock is less than minimum an order is placed by first searching for a suitable trader . If a suitable trader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

## Use Case Diagram



# Stock Management System



## **Actors:**

Customer: a person who purchases the products

Retailer: a person who sells the products

## **Use Cases:**

Purchase item: allows a user to purchase any product

Make payment: accepts the payment

Supply stock: keeps track of the stock supplied

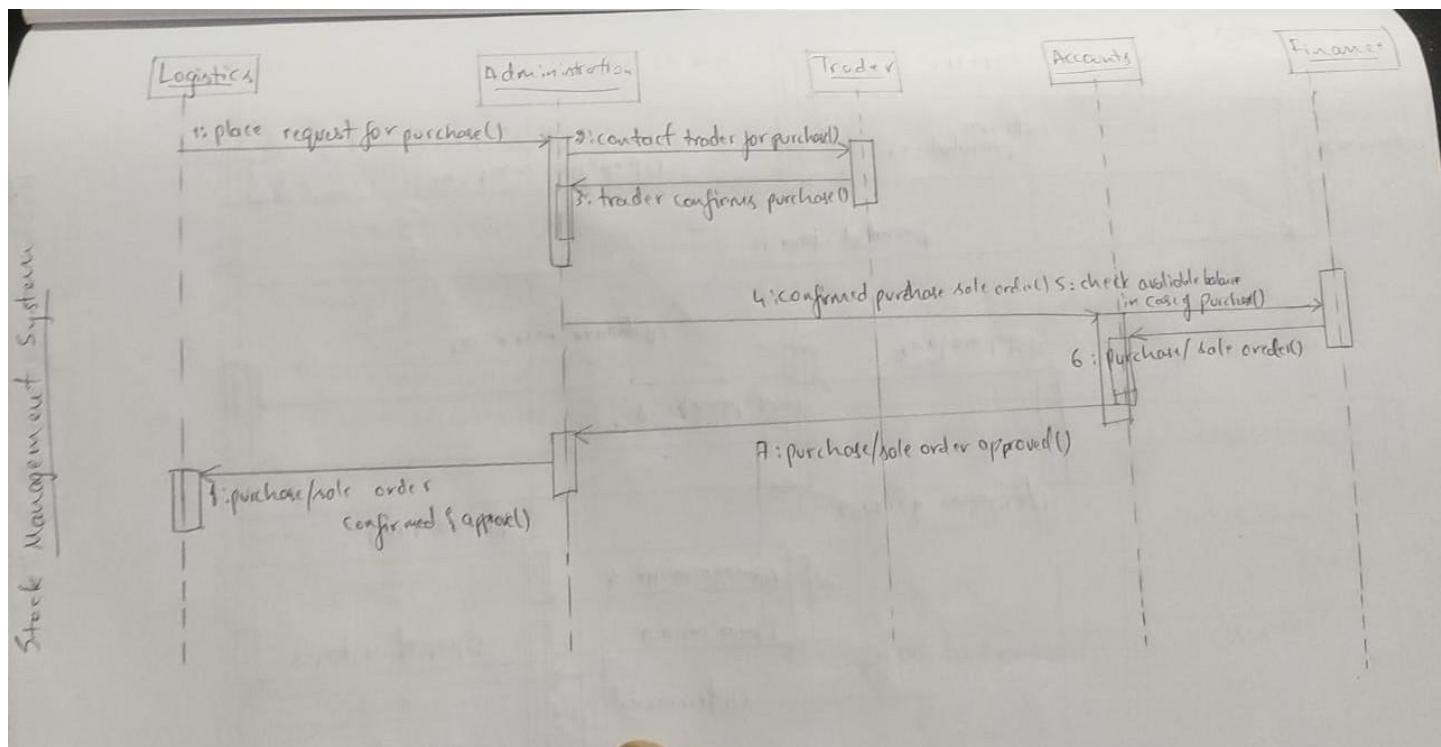
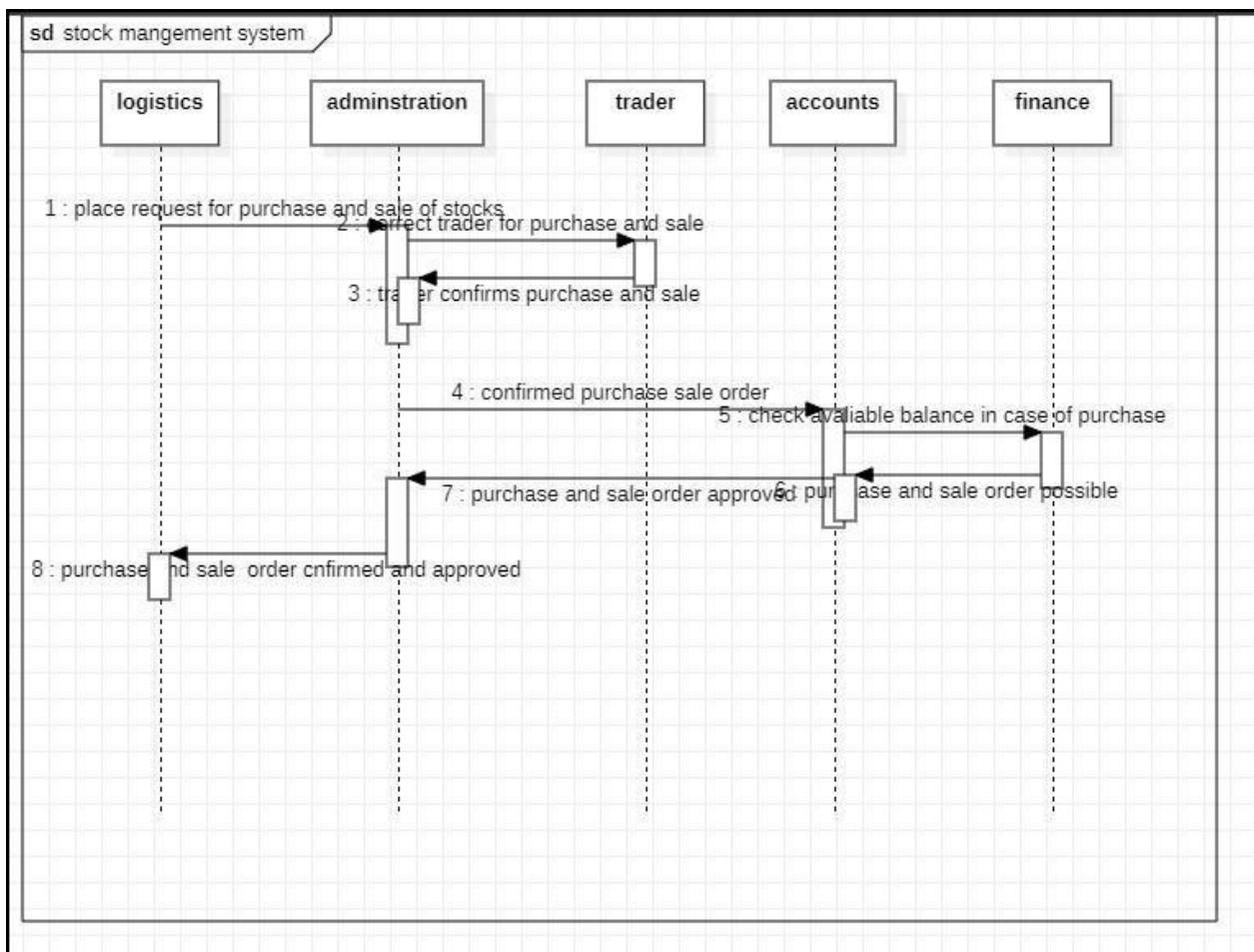
Find traders: provides a list of traders

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

Order goods: the products coming to an end are ordered

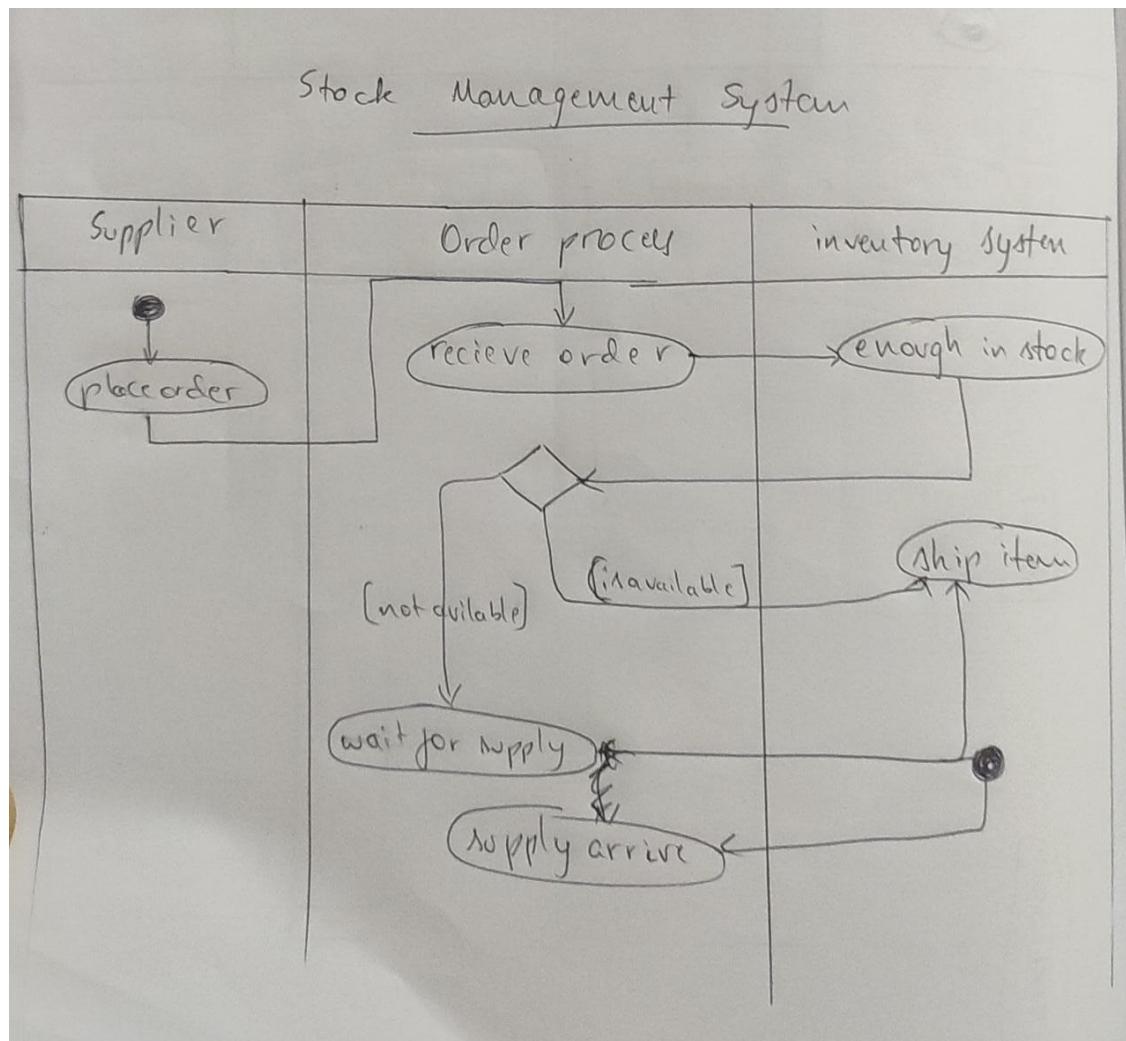
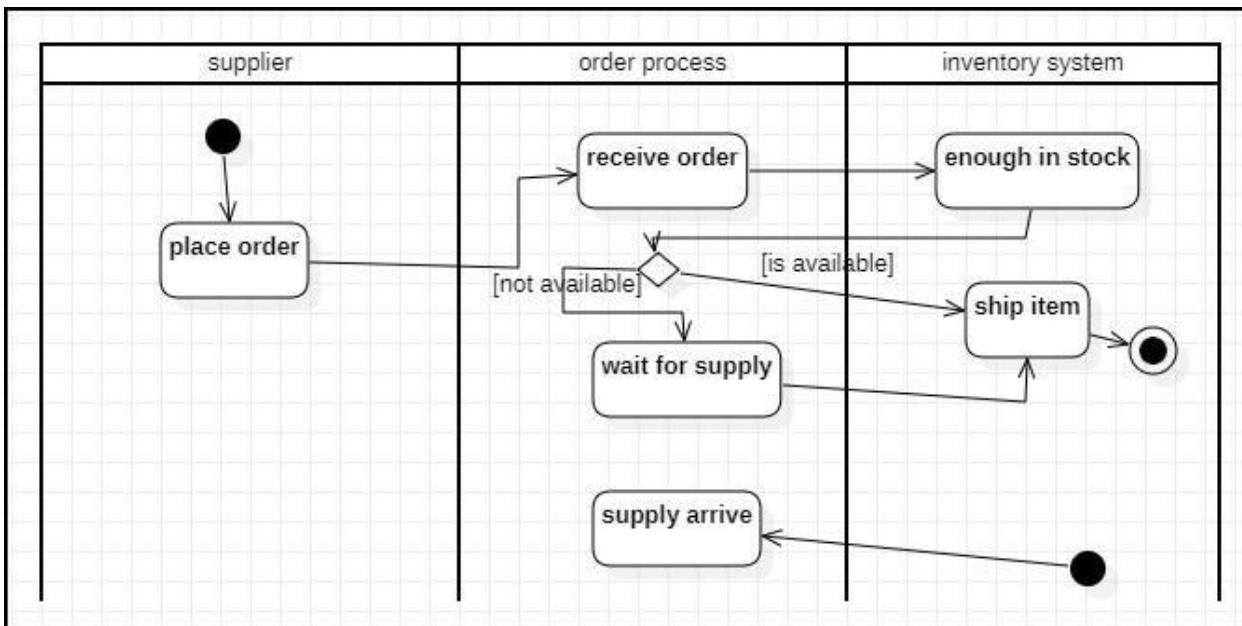
Prepare bill:a bill for products purchased is made

# Sequence Diagram



Place request for purchase/sale of stock  
Contact seller for purchase/sale  
Seller confirms purchase/sale  
Confirmed purchase/sale order  
Check available balance in case of purchase order  
Purchase/sale order possible  
Purchase/sale order approved  
Purchase/sale of stock confirmed and approved.

# Activity Diagram



The above advanced activity diagram gives us the activities involved with each swim lane. There are three swimlanes I.e supplier,order process and inventory system which have the activities of placing order, receiving order and check for stock, and ship the item respectively.

## 4. Coffee Vending Machine

### Problem Statement and Software Requirement Specification

#### Coffee Vending Machine

##### Problem Statement -

The machine is basically for customers to buy coffee by themselves without any 3rd person being involved. A machine sells different types of coffee such as cappuccino, black coffee, latte. Each type of coffee has a price & name. A customer can buy their choice of coffee by selecting the button of their coffee & paying for the same through the coin box.

##### Requirements -

##### Controller -

###### Attributes -- id

###### Functions of classes -

- Dispense the product
- Dispense the coin to customer
- Compare price of coin to that of product price
- check availability of product
- update the product quality

##### Selection Panel -

###### Attributes - product-name, status

###### Functions of classes -

- Sends the status of selection product

##### Cash Box -

###### Attributes - Coin classification, count

###### Functions of class -

- Know out of money to put in
- Give change, know price of coffee

product Dispenser -

Attributes - product , quality

Function of class -

Dispense the selected product

Product -

Attributes - price , quality

Functions of class -

- choose product

- update the quantity of product

- after each dispense.

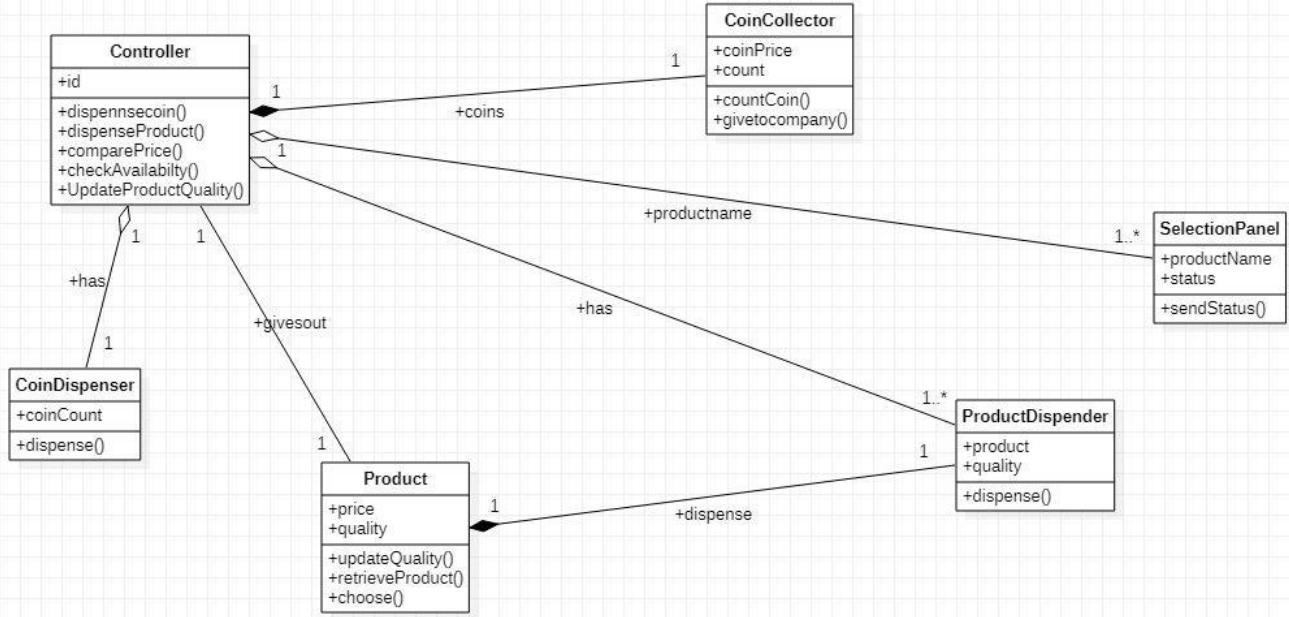
- Retrieve the selected product

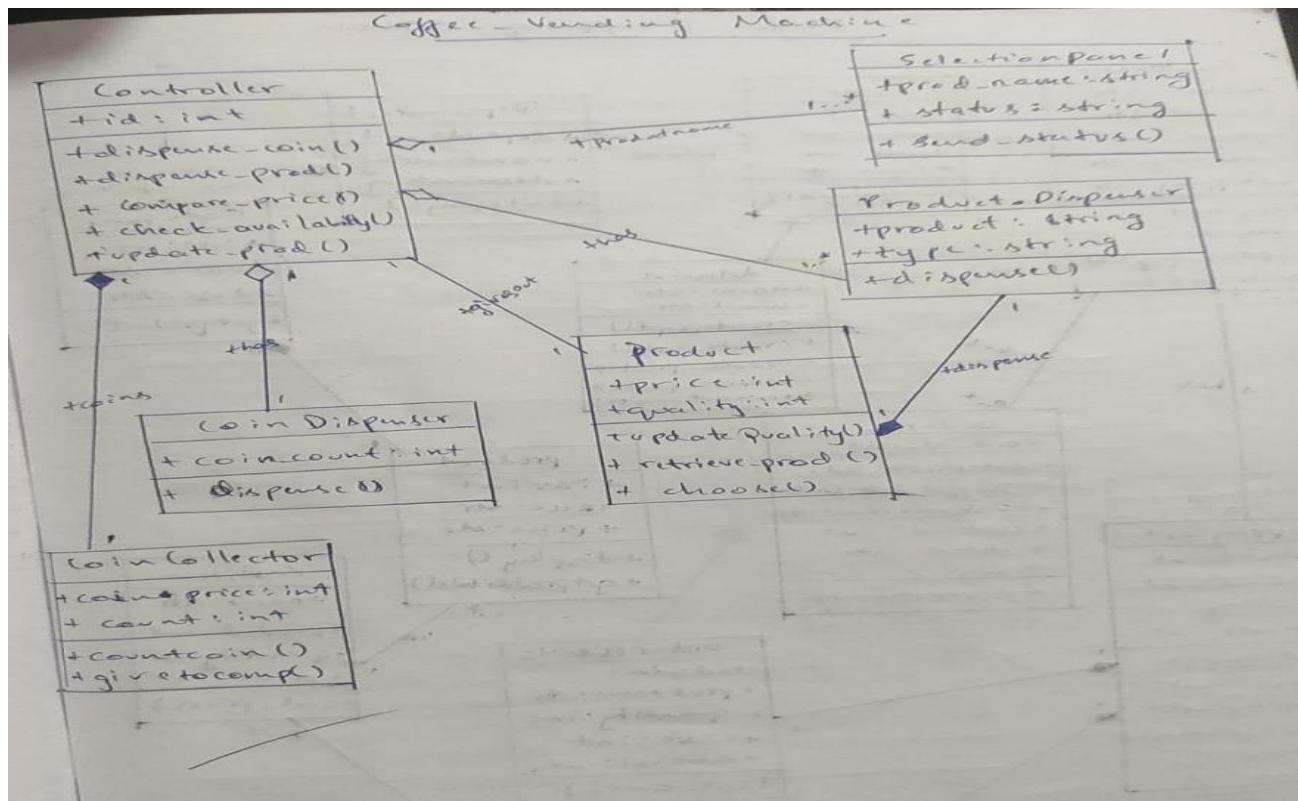
Cash Dispenser -

Attributes - coin count

Functions of class -

Dispense the remaining amount to customer.

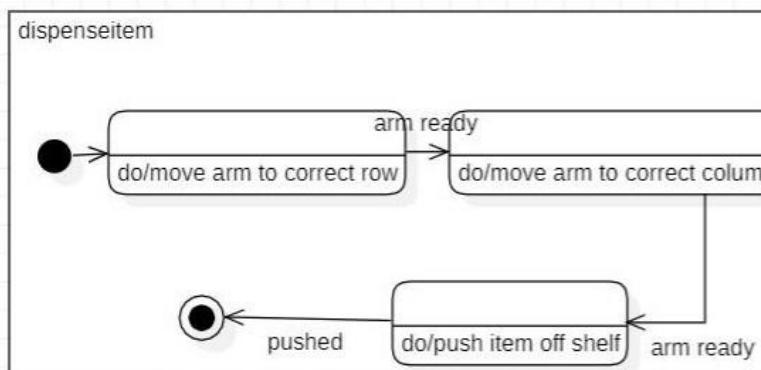
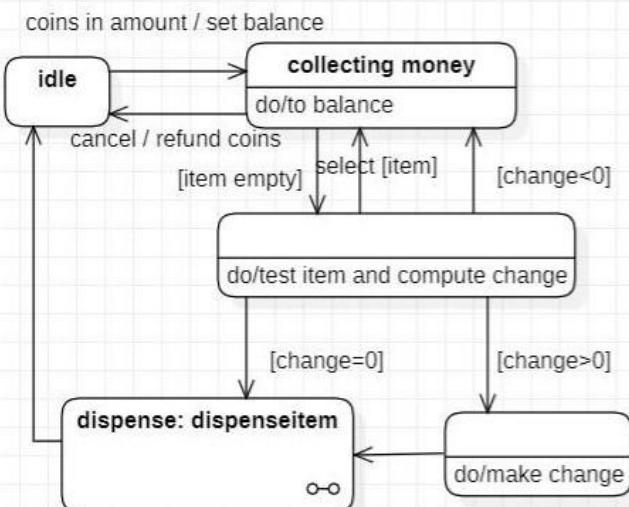




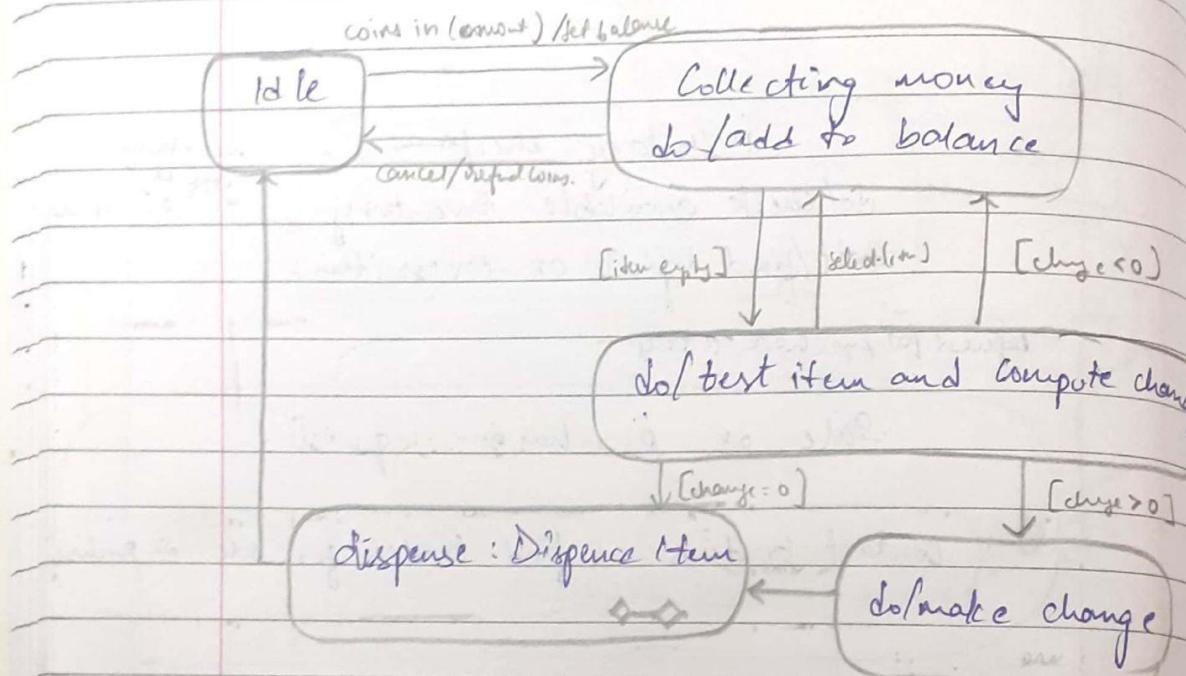
The vending machine must have a money box, coin slot, display screen and products i.e coffee for the machine to be used. The user on selecting a coffee ,the coffee machine must be able to dispense the selected coffee to the user. The user shall get an empty cup placed right below the

filter. The user shall be able to choose his preferred beverage from the list of options. There are 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.

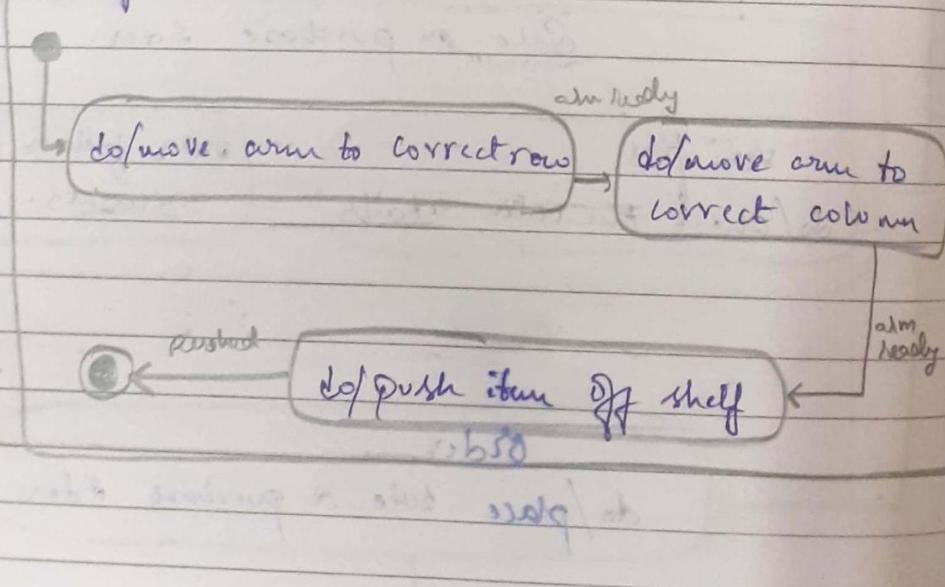
## State Diagram



## IV Advanced State Diagram

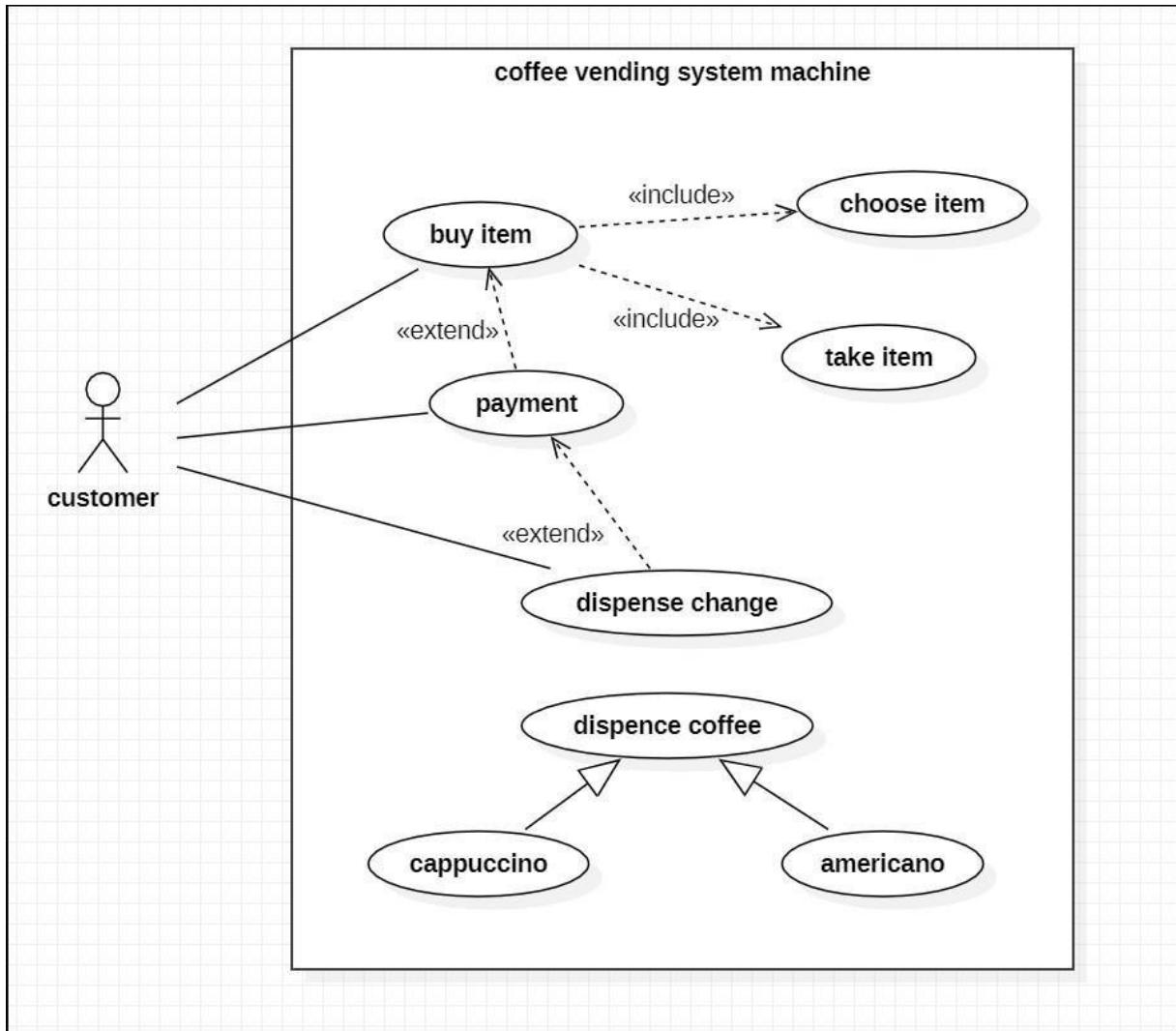


### Dispense Item

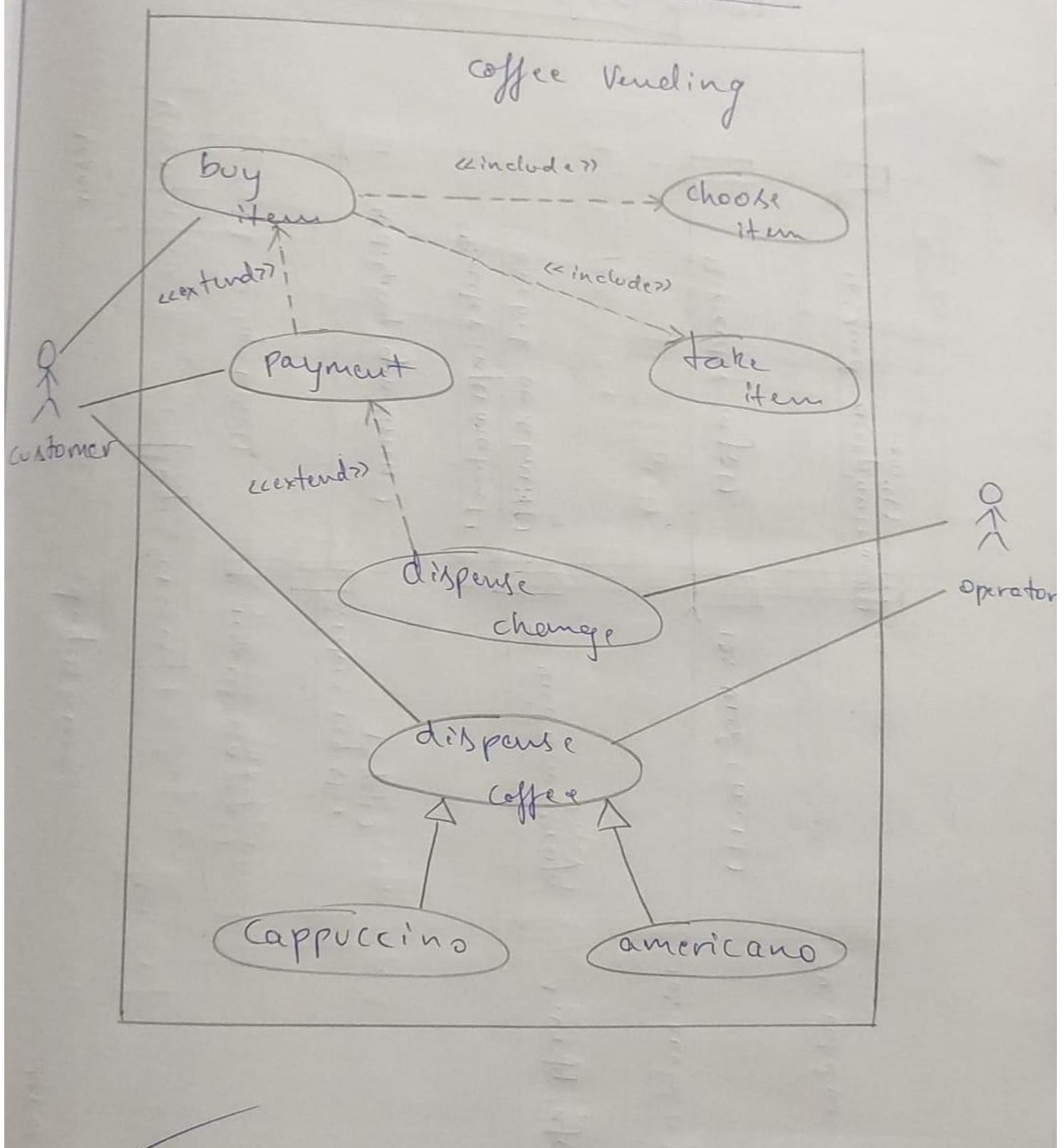


Initially the vending machine is in the waiting state. The machine displays the selected item selected by the user. When the person inserts a coin the machine adds the amount to the cumulative balance. After adding some coins, a person can select any item. If an item is empty or the balance is insufficient,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

## **Use Case Diagram**



# Coffee Vending System



## Actors:

Customer :a person who uses the coffee vending machine

## Use Case:

Display payment details : displays the payment details

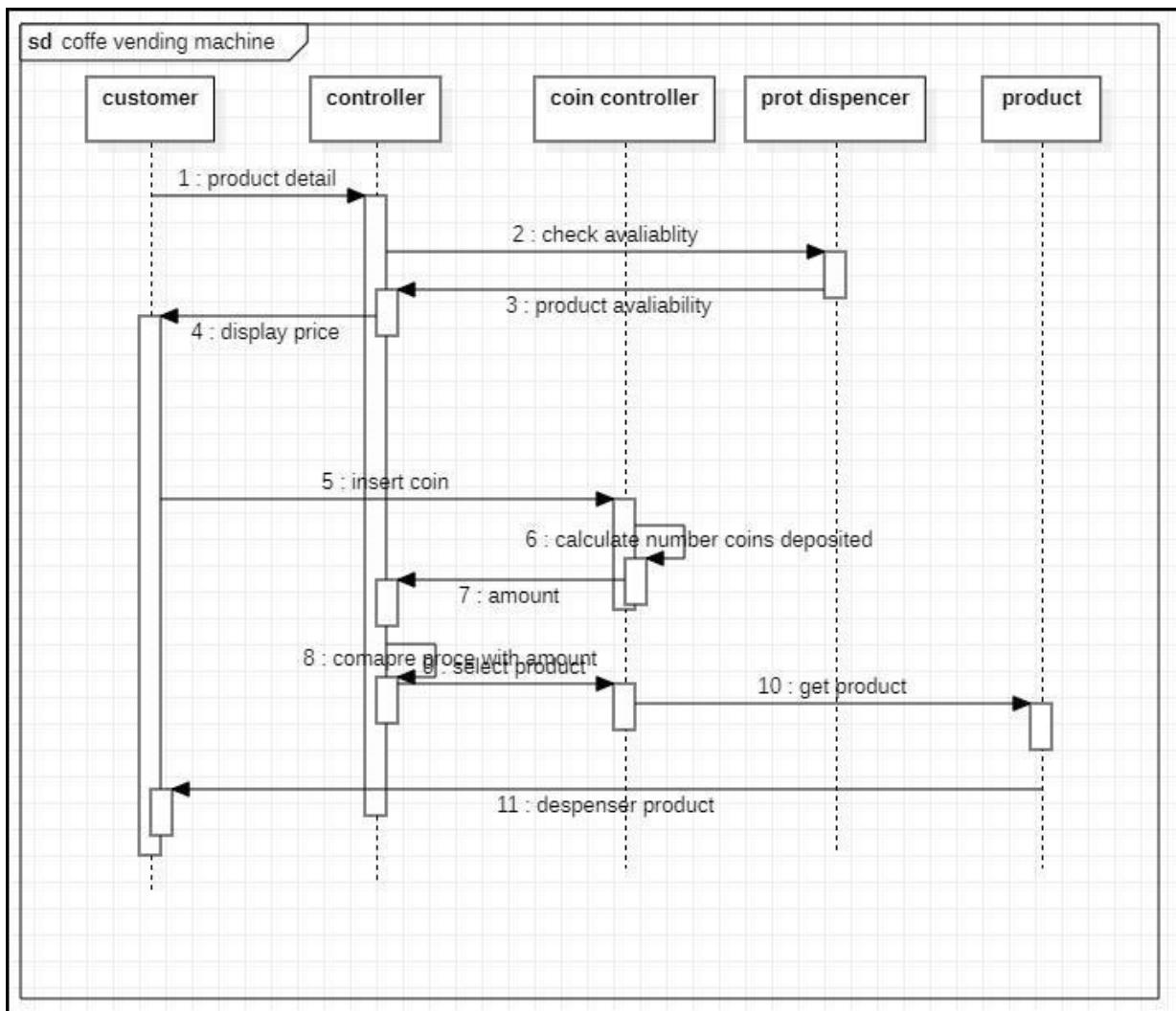
Request coffee : allows user to order their coffee

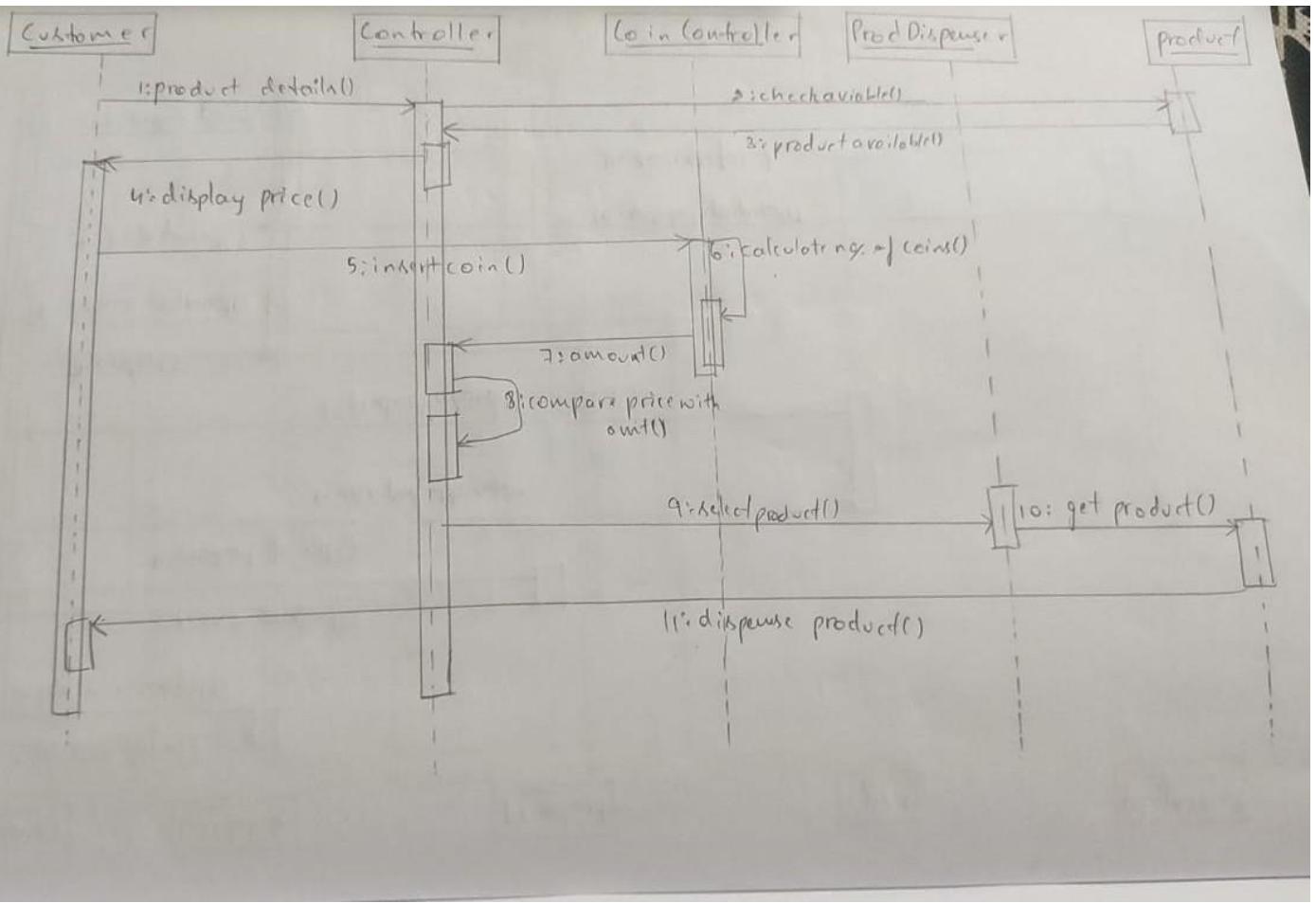
Make payment : accepts money for the coffee

Load ingredients : is the use case where the operator fills the machine with ingredients

Dispense coffee : the coffee ordered is prepared and given

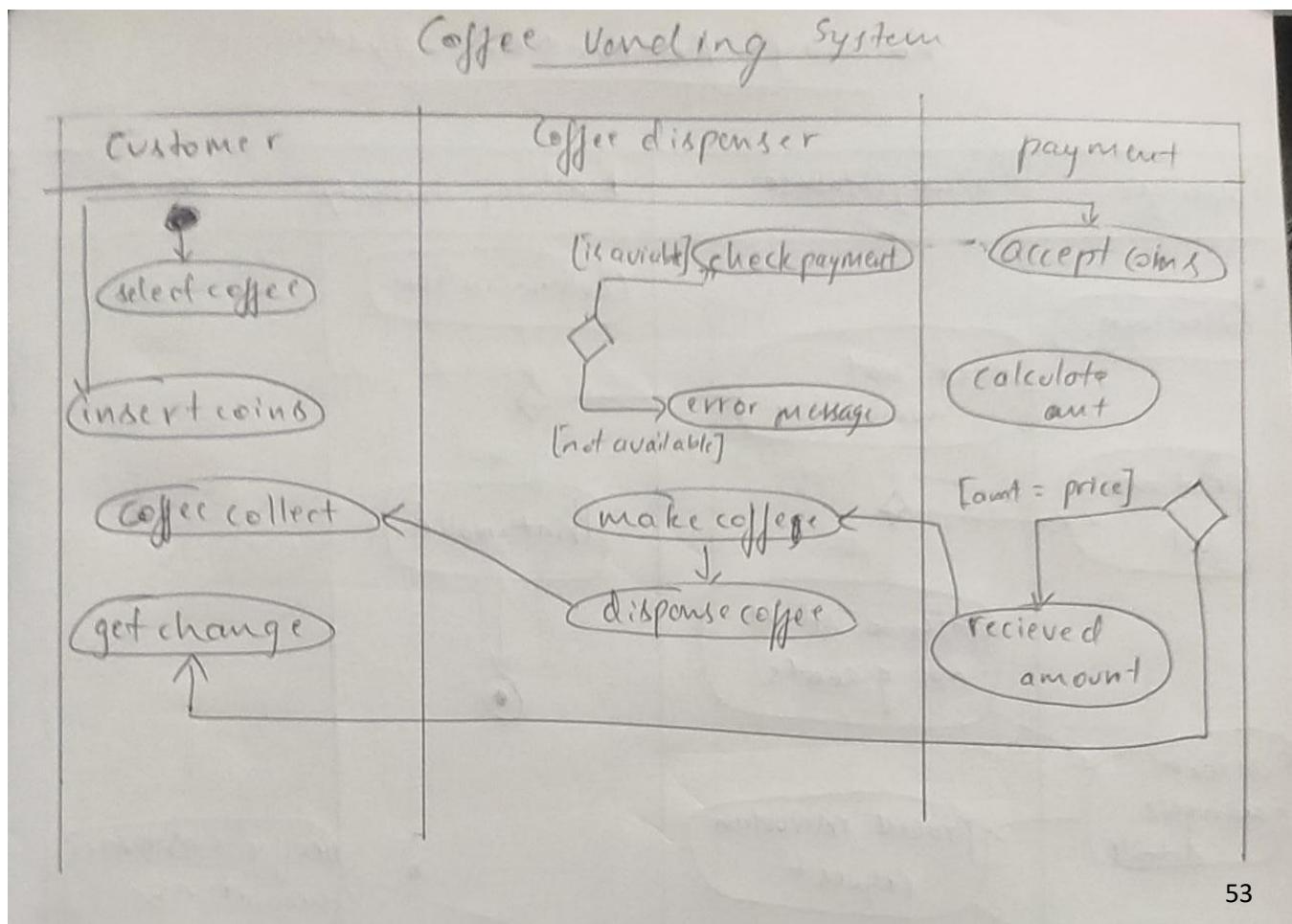
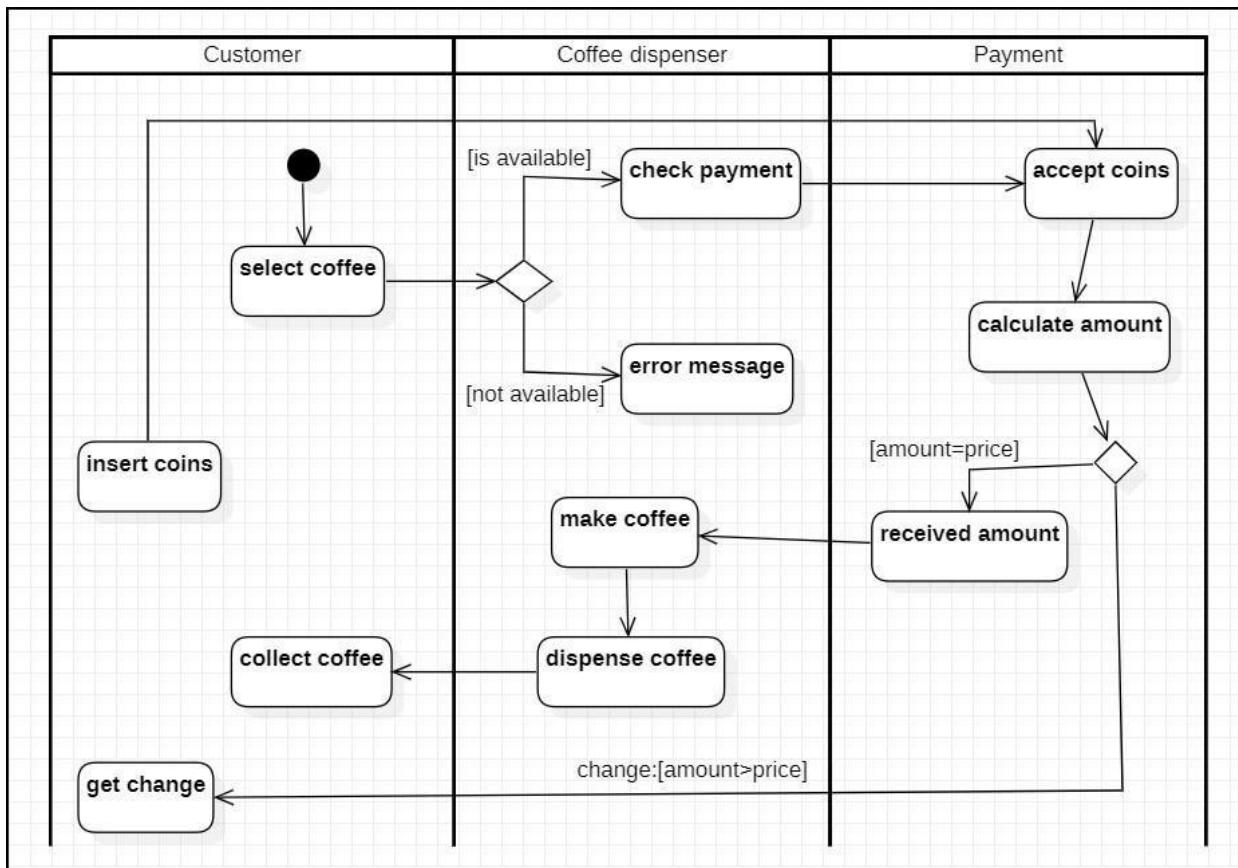
## Sequence Diagram





The above sequence diagram gives us the steps involved in dispensing a product from the coffee machine. First an enquiry for the product is made and if available the coins are inserted and calculated ,if correct the product is dispensed .

# Activity Diagram



The advanced activity diagram has three swimlanes 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 the amount and gives back the change.

## 5. Online Shopping System

### Problem Statement and Software Requirement Specification

Online Shopping System -

problem Statement -

The 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 the internet. It will enable vendors to setup online shop. customer to browse through the shop & purchase them online without having to visit the shop physically. the administration module will enable a system administrator to approve or reject requests for new shop & maintain various list of shop category. This system allows the customers to maintain their cart for add or remove product over internet.

Requirements

Customer -

- Name, address
- email/phone
- card-info
- login/register

Shopping cart -

- cart-id
- product-id
- quantity/update quantity
- Add item / remove item
- checkout/ calculate amt

User -

- user-id
- password
- login status
- verify login

### orders -

- Date created
- Date Shipped
- Customer-name
- Shipping-id
- place order

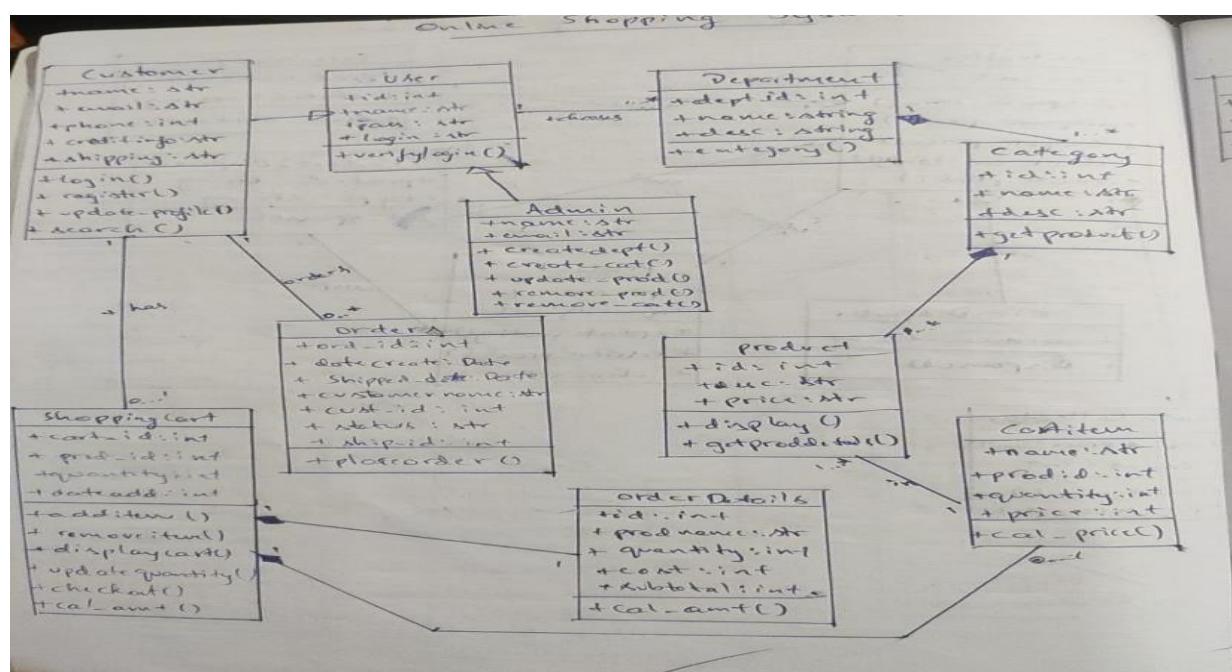
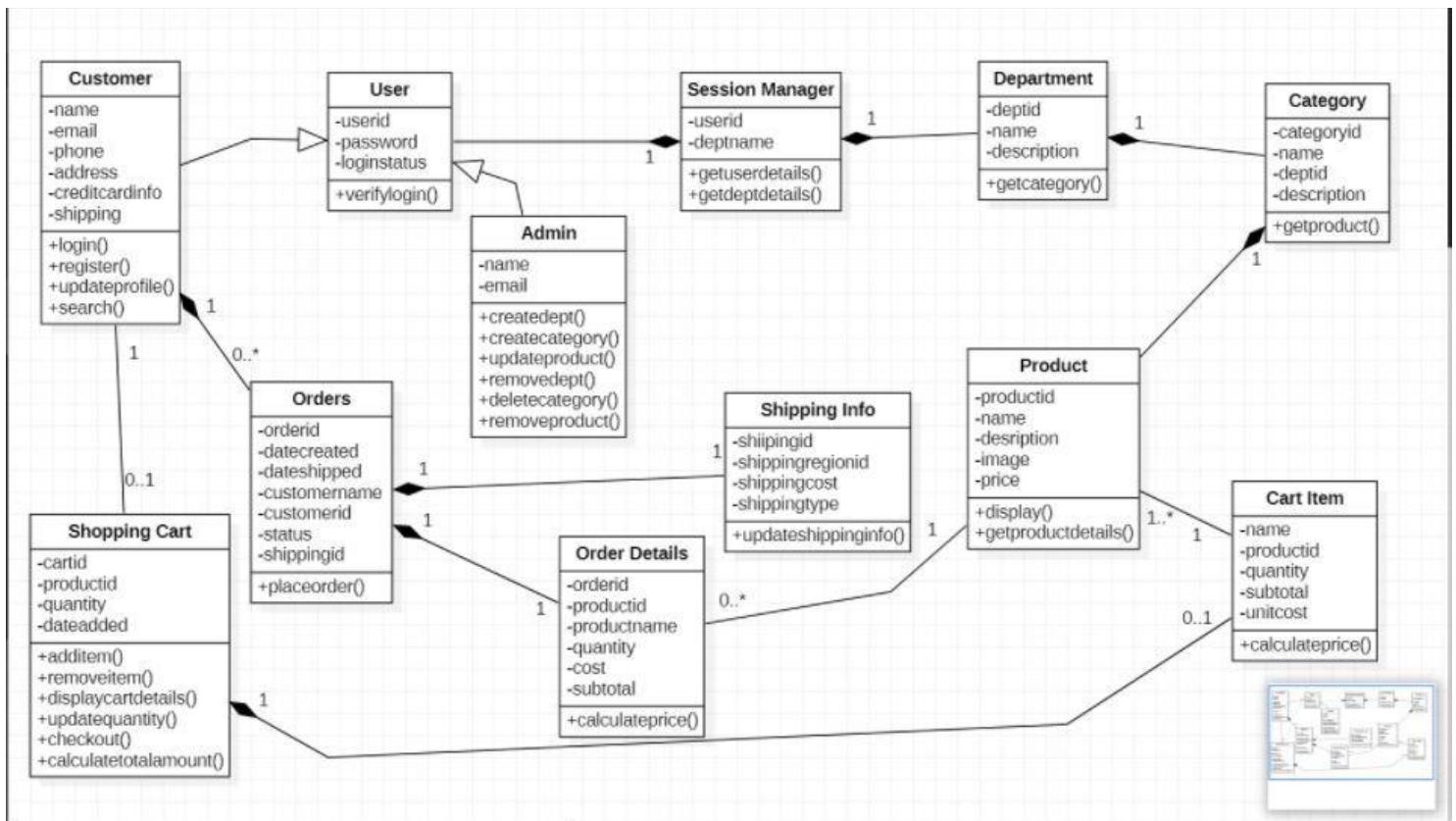
### Admin -

- Name, Email
- Create dept.
- Create category
- update / remove product
- update / remove category

### category -

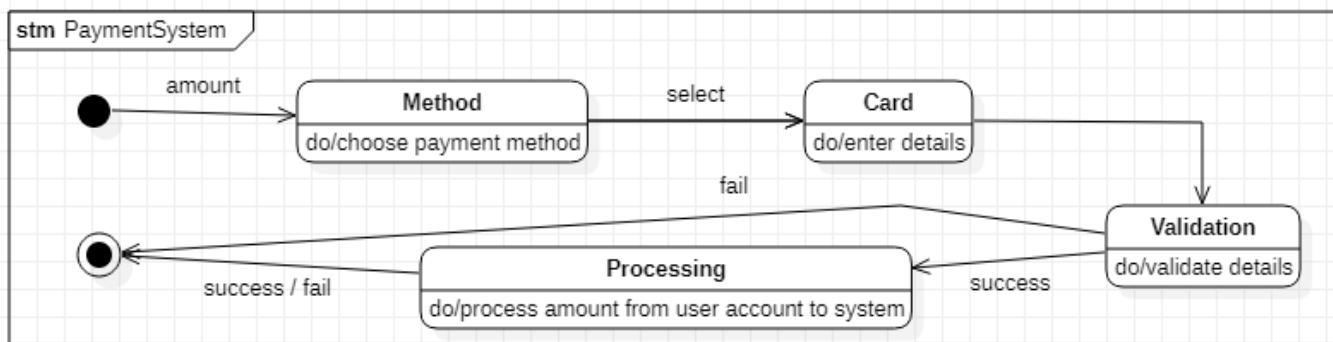
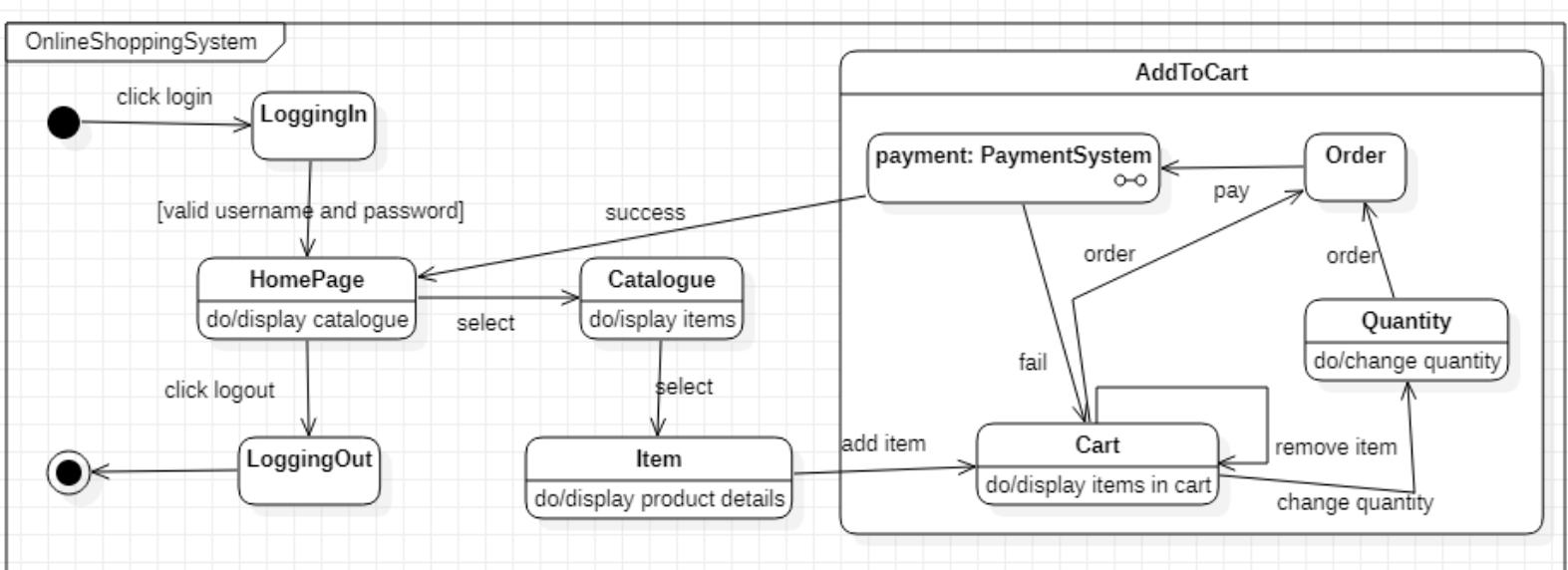
- category-id
- category-name
- Dept-id
- Description

## Class Diagram

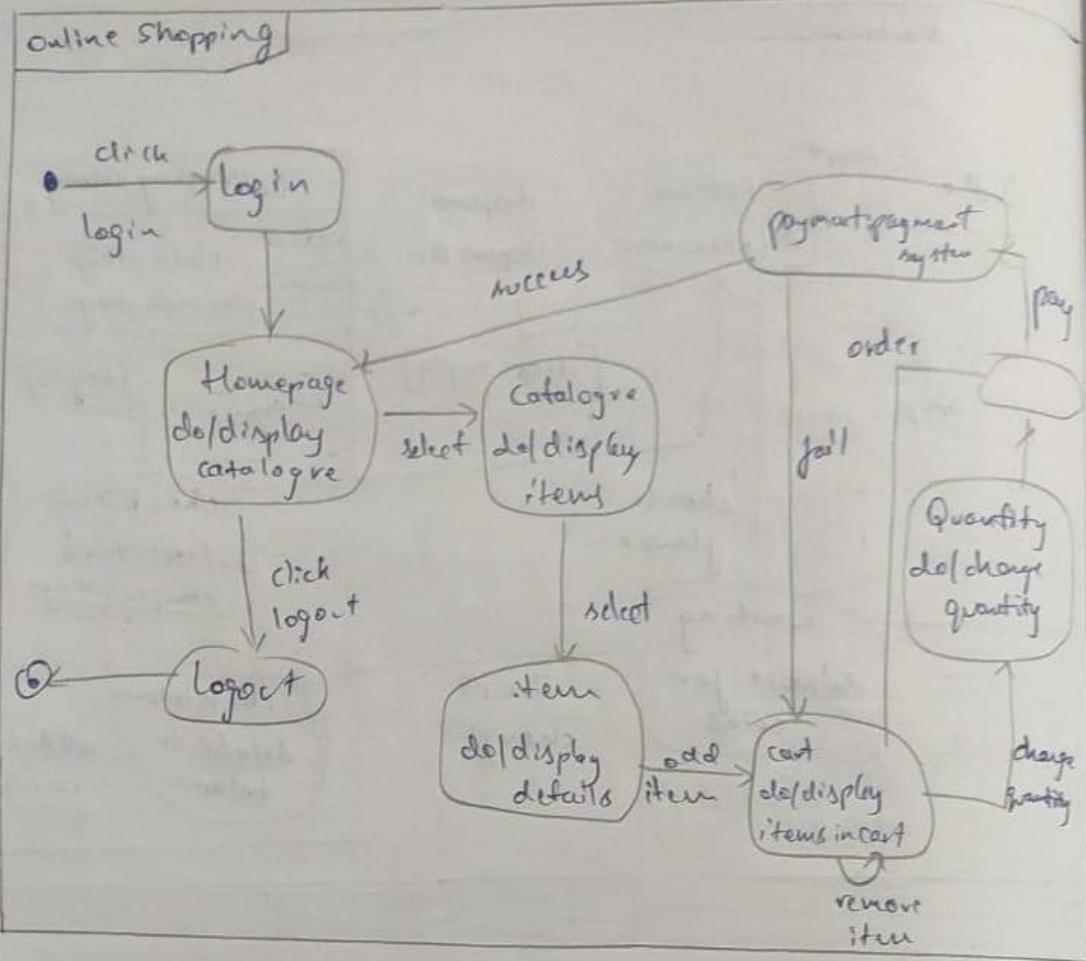


The online shopping system has customers who must have an account in the online website where he/she can purchase products. If customer wants to buy the product then he/she must be registered, unregistered user can't go to the shopping cart. Customer login to the system by entering valid user id and password for the shopping. The products sold for customers are sold for various categories like men, women, kids and home products. After the payment or surf the product the customer will logged out.

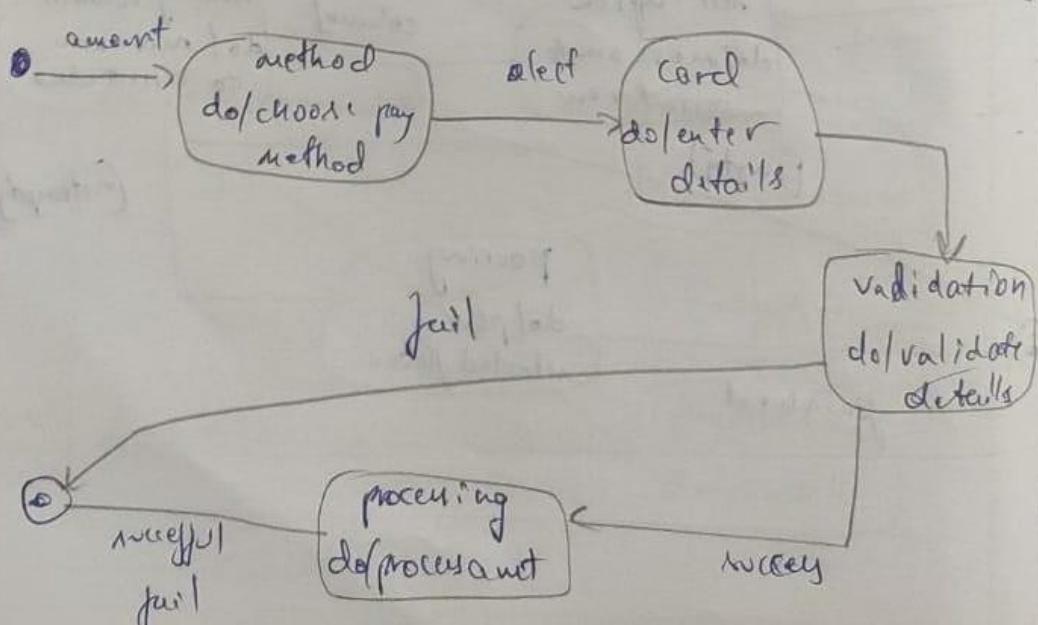
## State Diagrams



## Online Shopping System

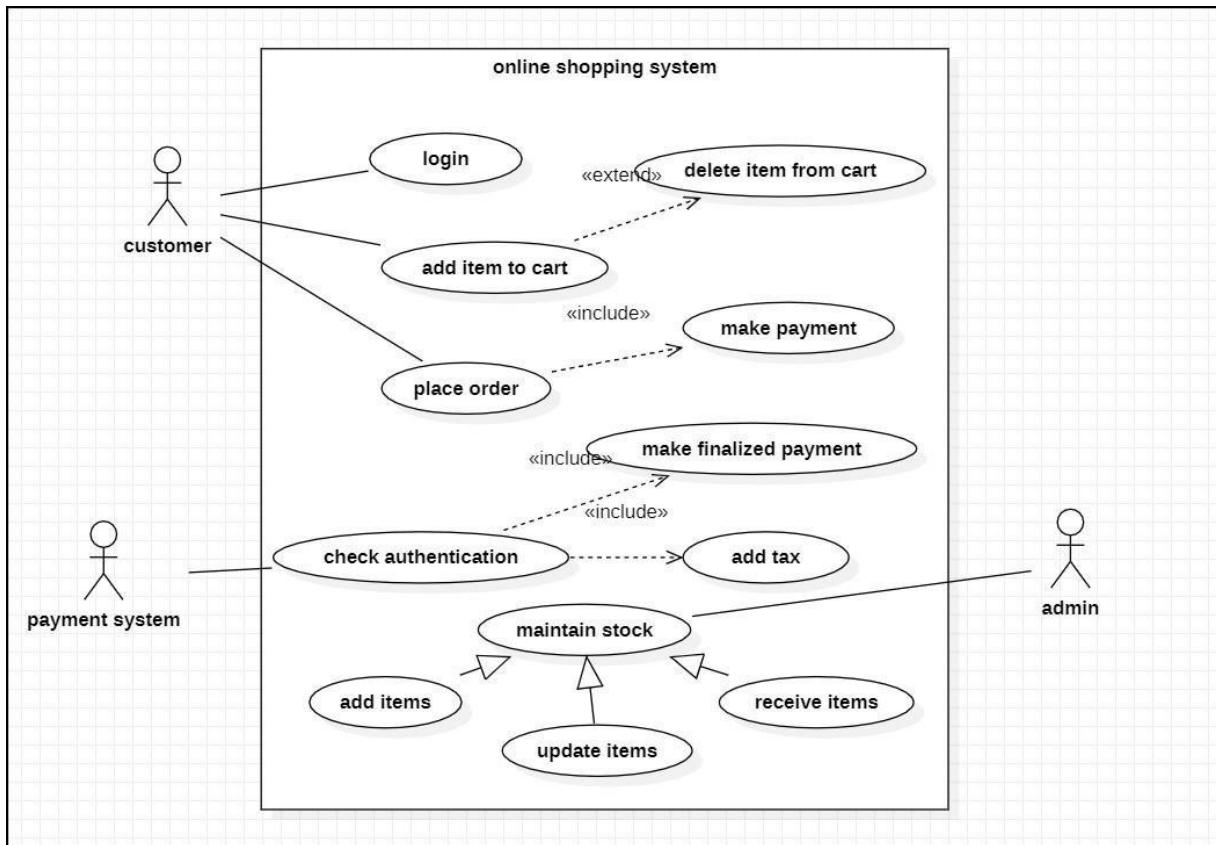


## Payment System

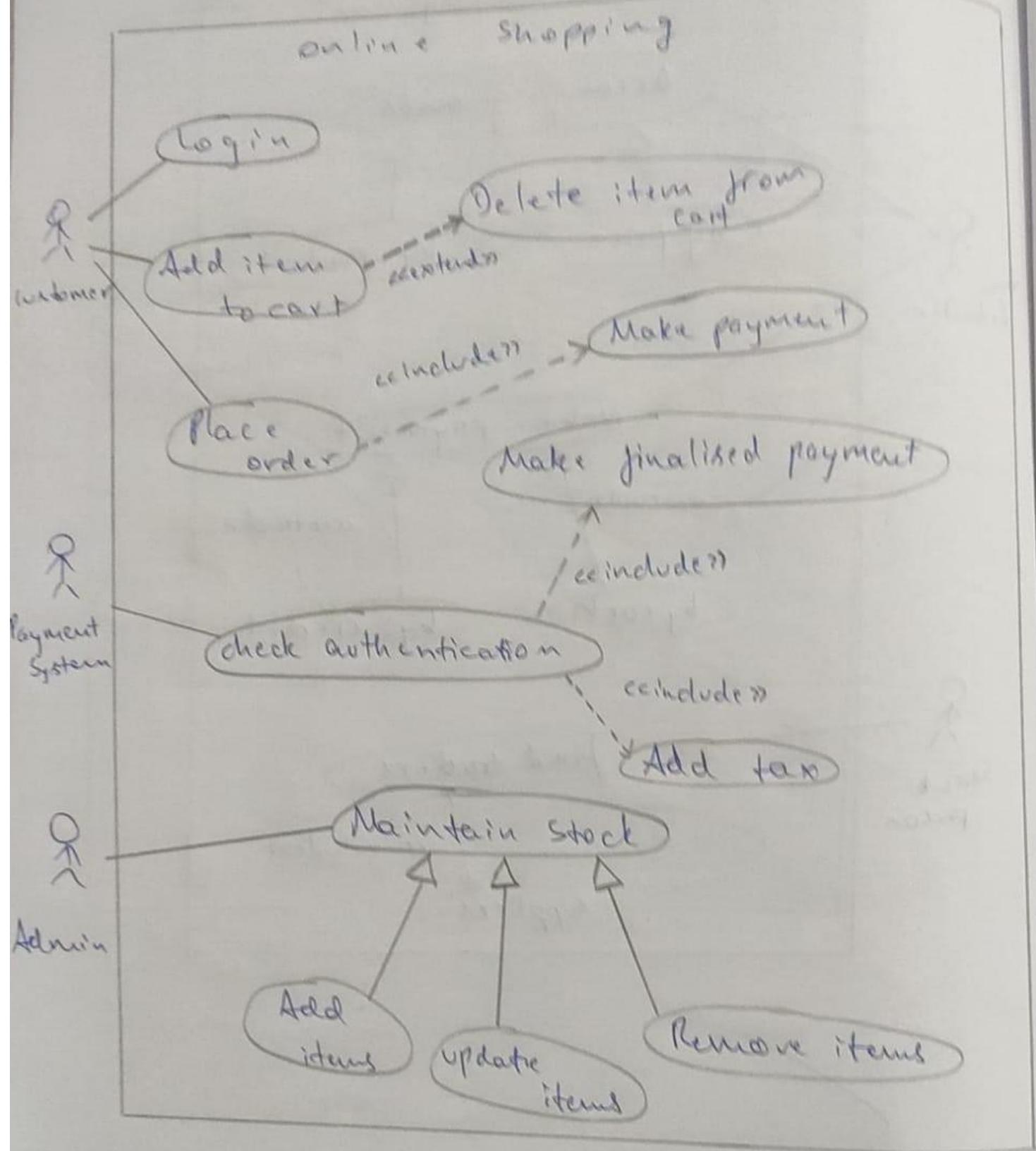


The advanced state chart diagram has states explaining the product purchase and payment. It has two sub machines i.e product selection and checkout product. Product selection allows us to select products and add them to cart. Checkout product has states explaining the payment methods and validating the methods.

## Use Case Diagram



# online Shopping System



## Actors:

Customer: a person who uses the online shopping system

Supplier : person who supplies products

## Use Case:

view product details : displays all product details

Place order : order the items present in the cart

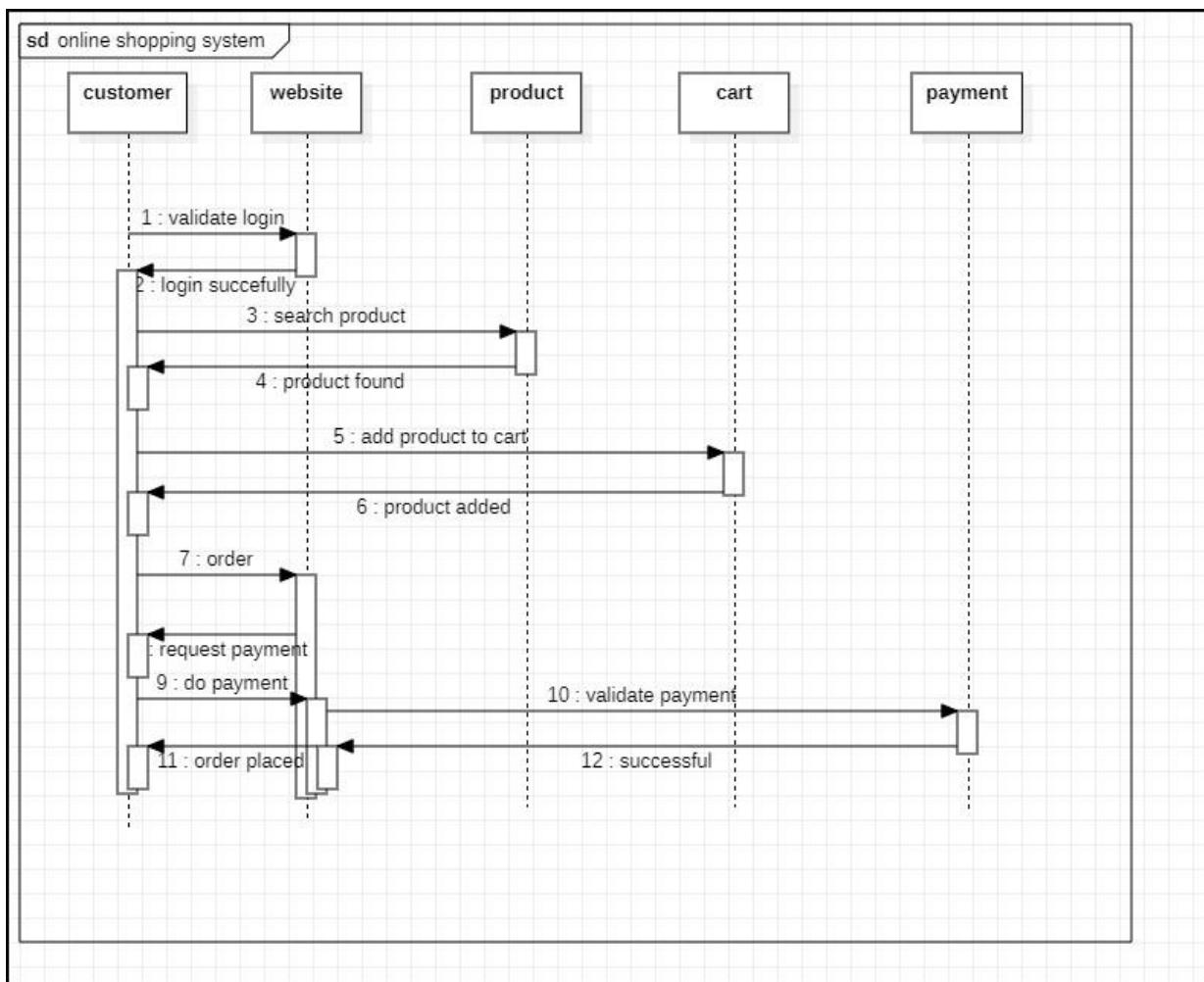
Make payment : accepts payment for the products purchased

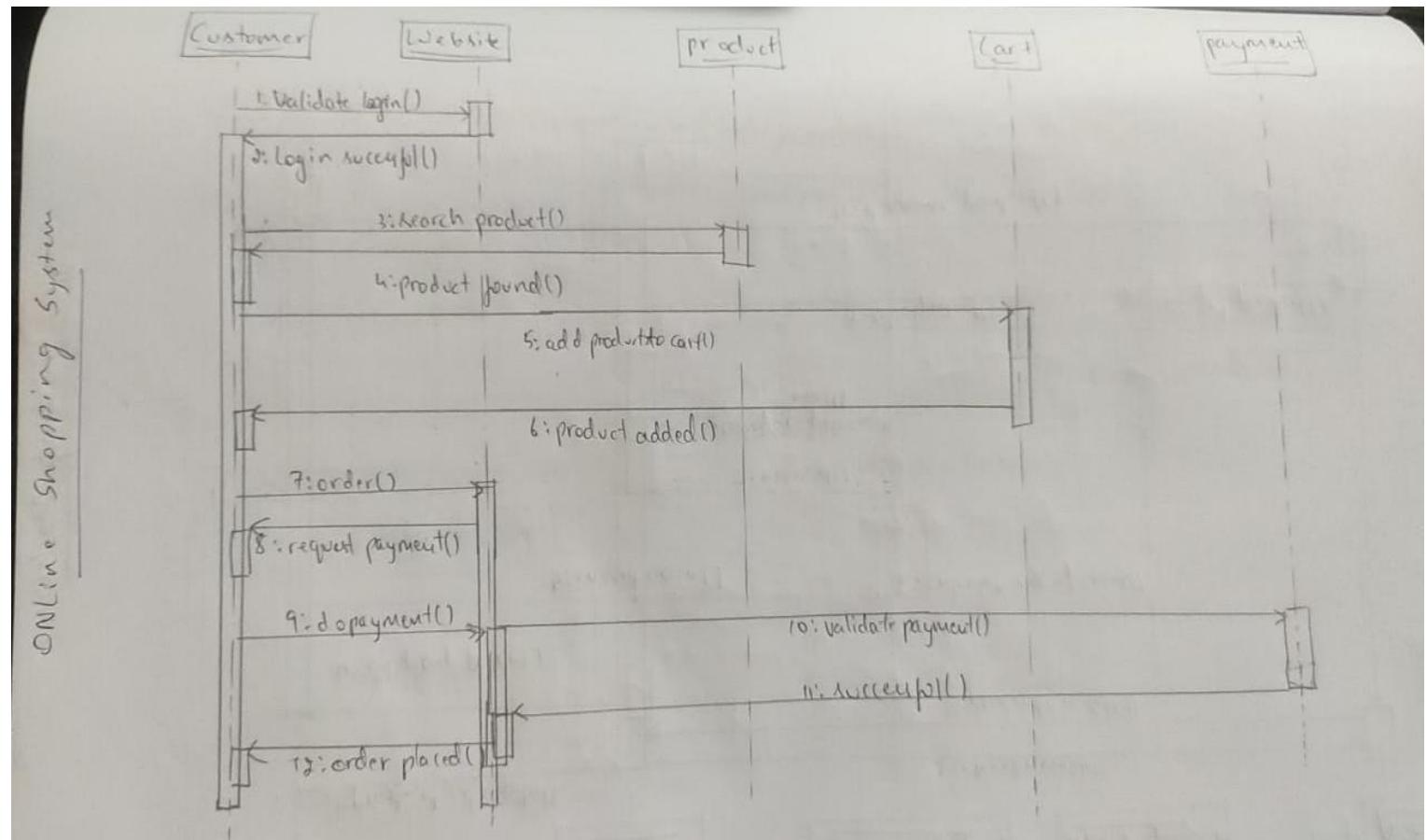
Deliver product : delivery of the product is handled

Supply Product : product supply is maintained

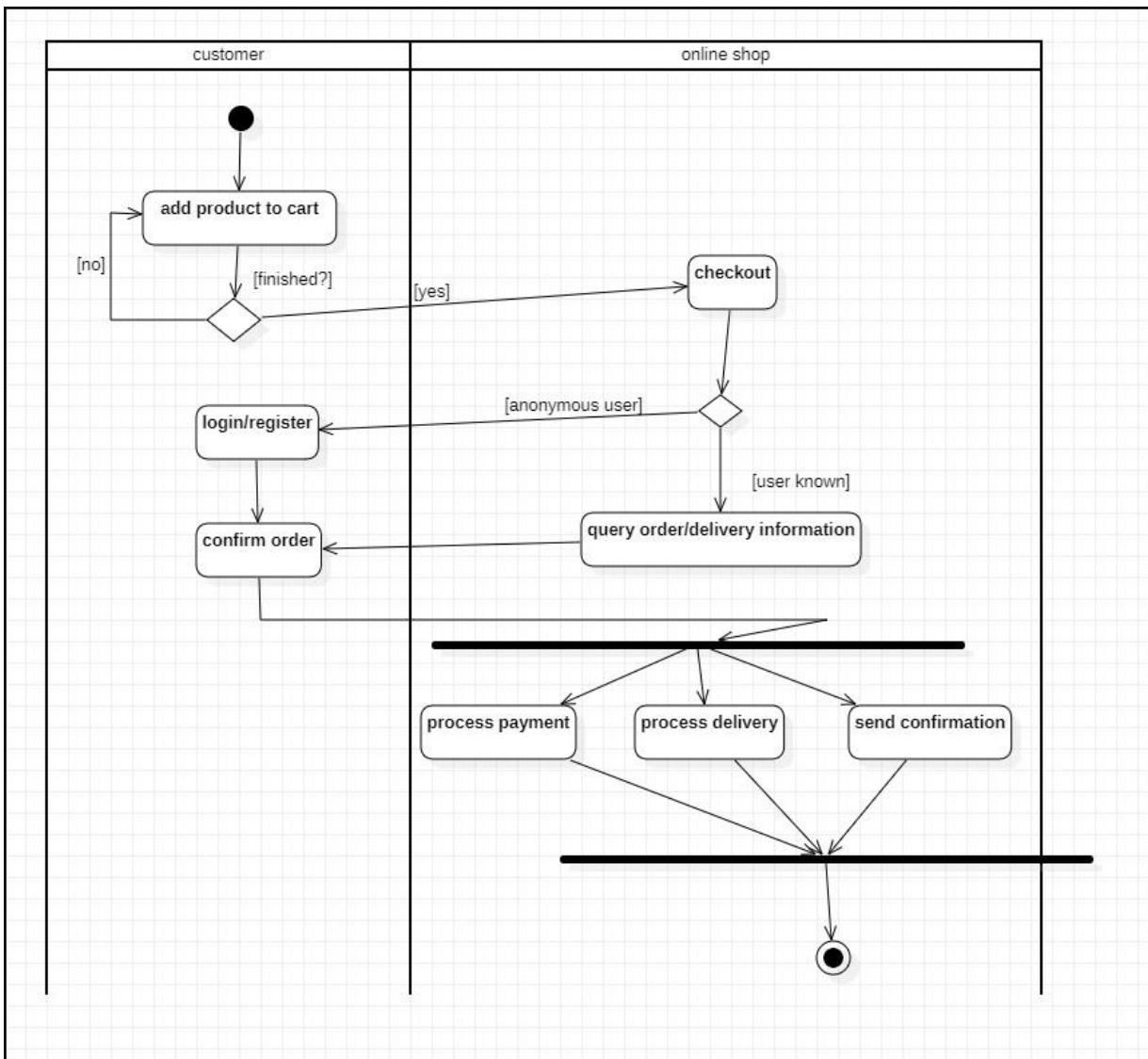
Maintain Stock : stock availability is checked

## Sequence Diagram

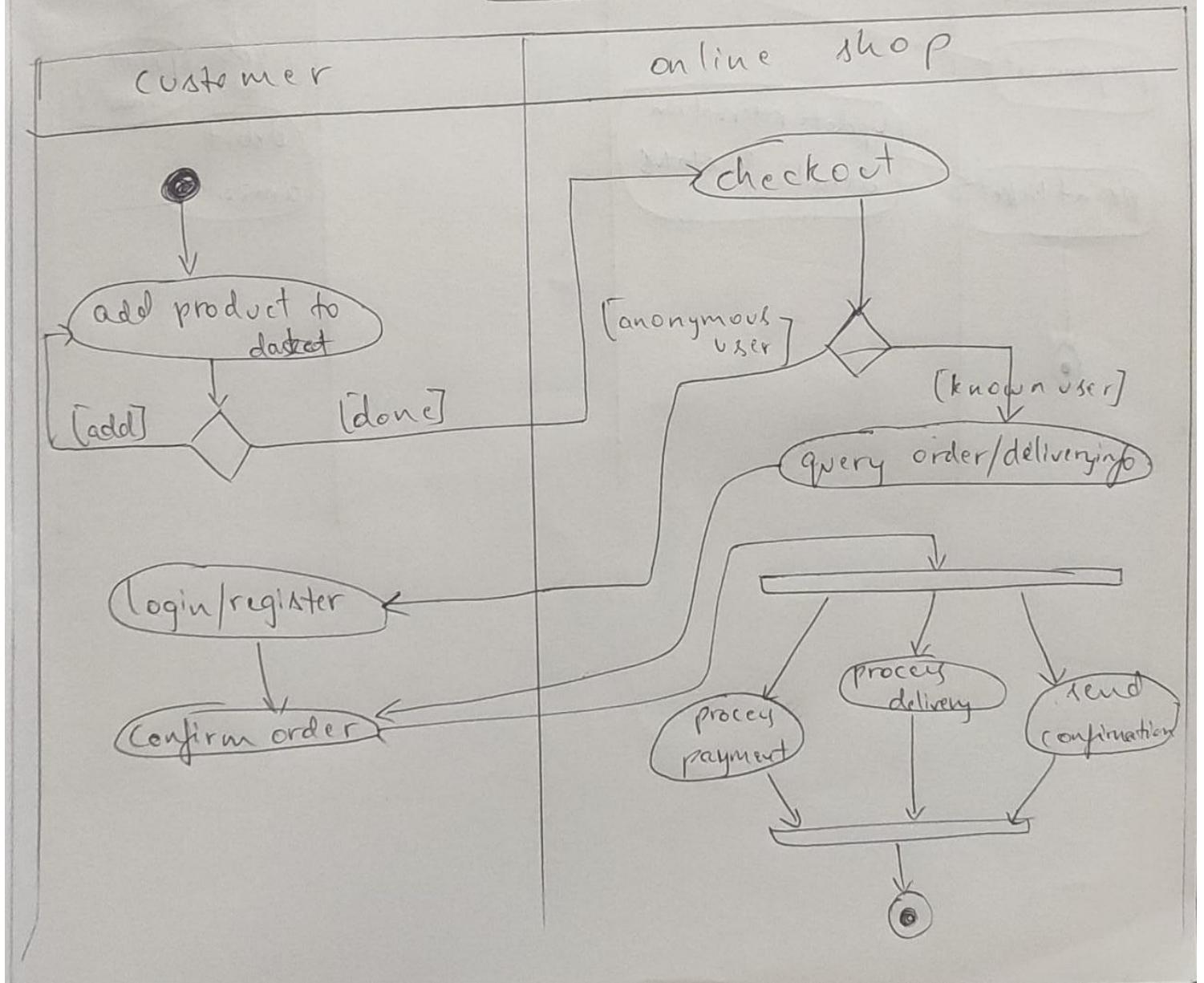




# Activity Diagram



## Online Shopping System



the advanced activity diagram has two swimlanes i.e customer and online shop. The customer can add the product to the basket and login/register and confirm the order. The online shop can checkout the products,deliver,process payment and send confirmation to customer

## 6. Railway Reservation System

### Problem Statement and Software Requirement Specification

#### Railway Registration System

The system is 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 standalone 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 and of any day. The system takes the current system date & time as date of issue & calculates the amt to be paid by user. It also provides the functionality of cancellation of ticket.

#### Requirements -

##### Customer -

- Tickets Booked
- Customer id, name
- Previous travels

##### Train -

- Train - number, name
- No. of coaches
- Arrival / Departure time
- Destination

##### Coach -

- Type of Coach
- No. of seats
- No. of compartments

##### Ticket -

- Ticket no., PNR no.
- Status of ticket

- Amount of ticket
- Ticket Details - date

### Payment -

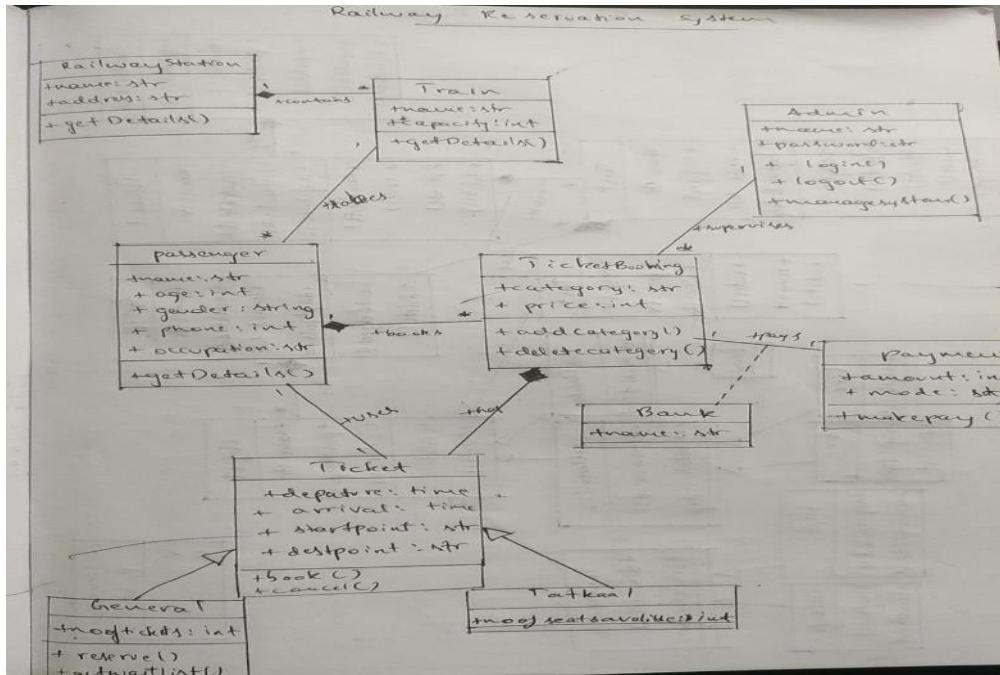
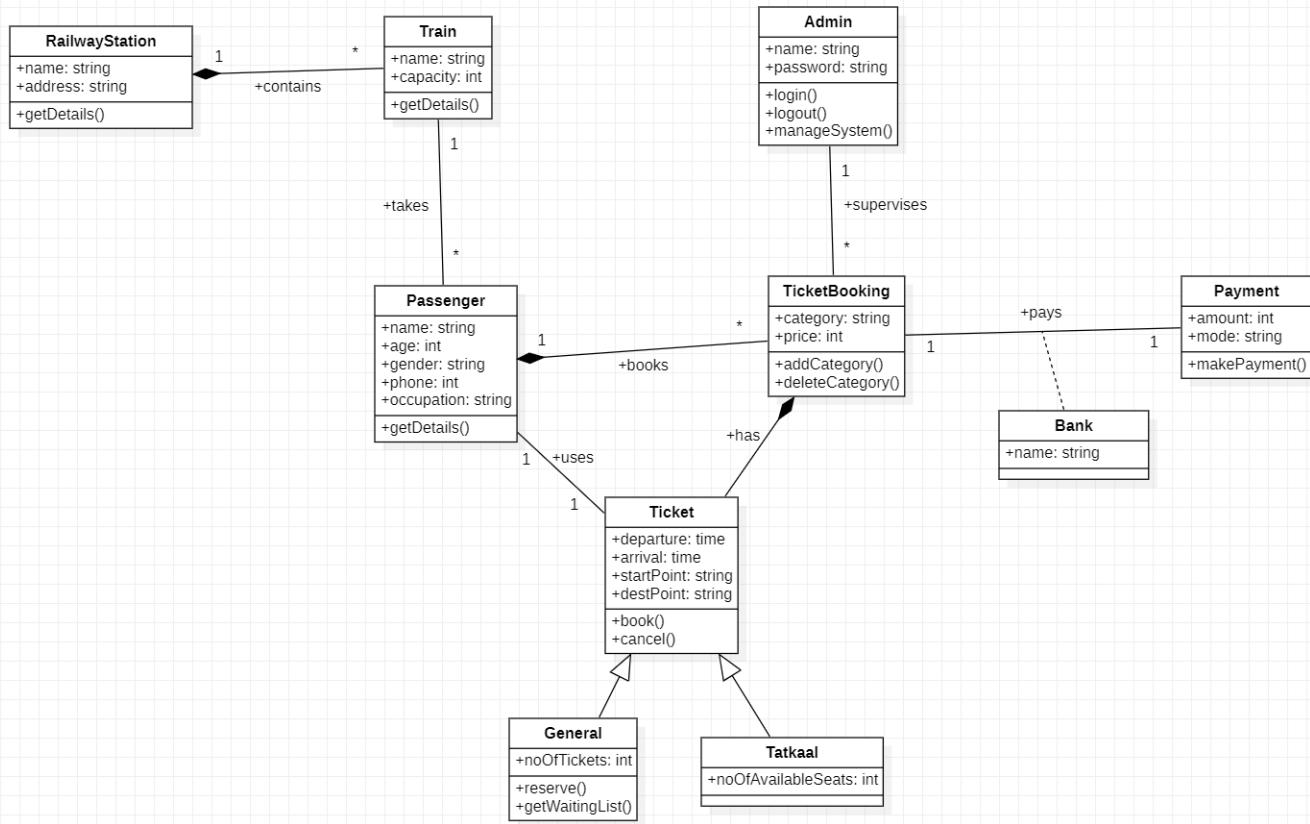
- Type of products
- Payment portal
- Payment details
- Receipt details

### Admin -

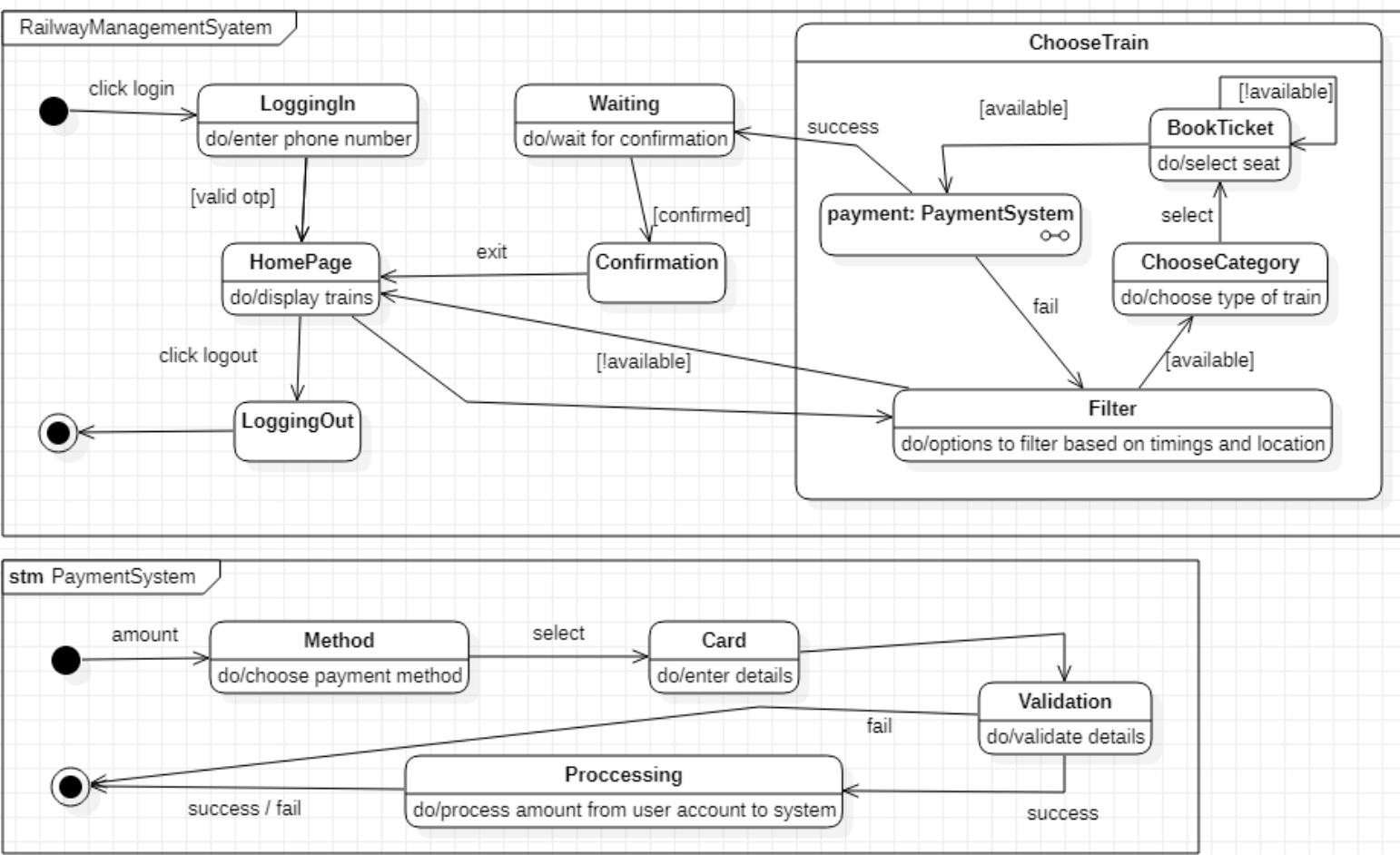
- id, name
- manage train routes
- manages reservation of seats
- Manages final booking list.

## Class Diagram

The admin manages the trains and reservations related to the railway reservation system. There are three types of reservation, I.e RAC, waiting and confirmed. The passengers with a reservation goes to one or the other reservation. A train consists of coaches and engine. A passenger pays for the ticket booked . Tickets can be booked in two ways by i-ticket by e-ticket booking.

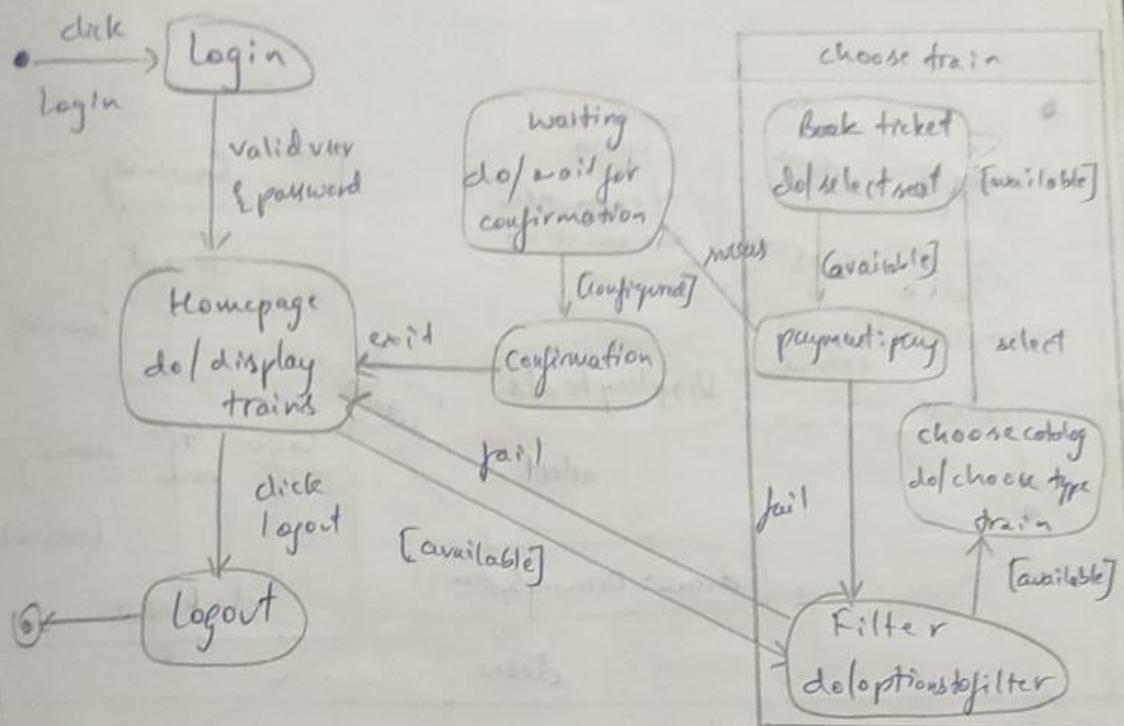


# State Diagram

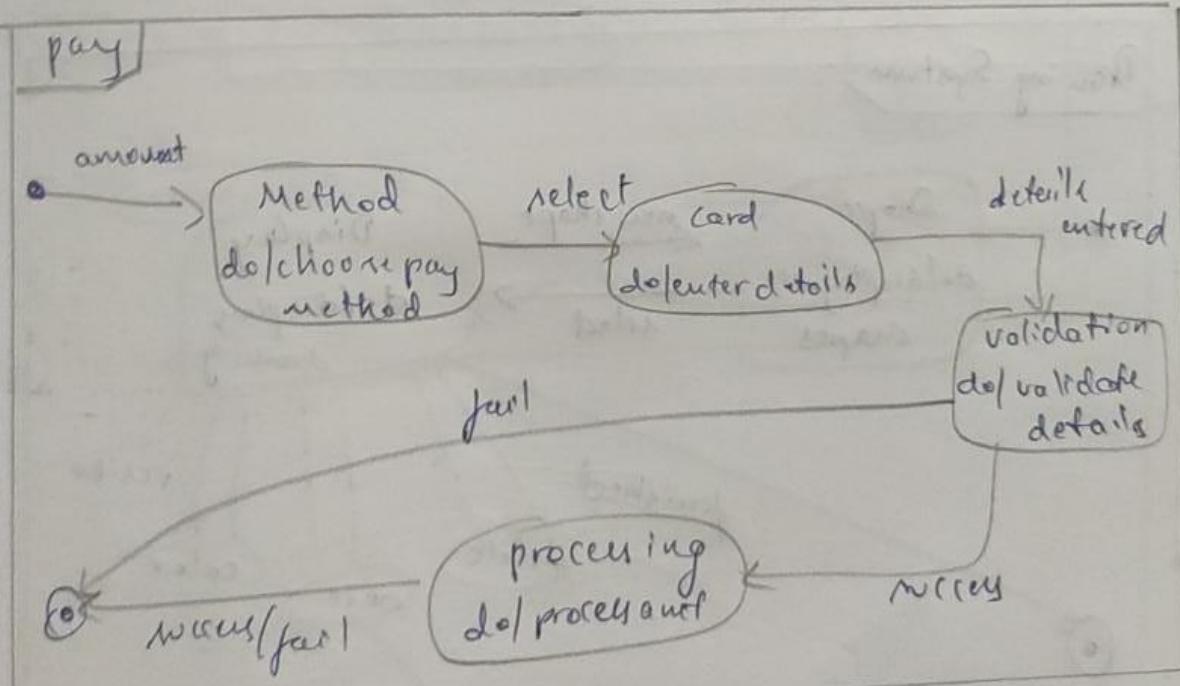


# Railway Reservation System

## Railway Reservation

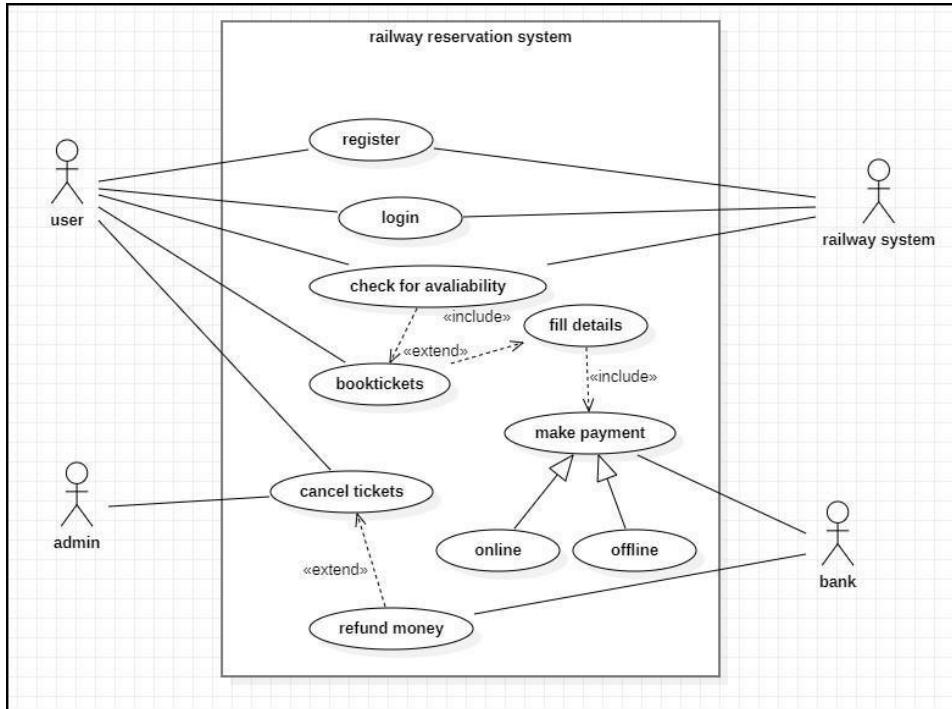


## pay

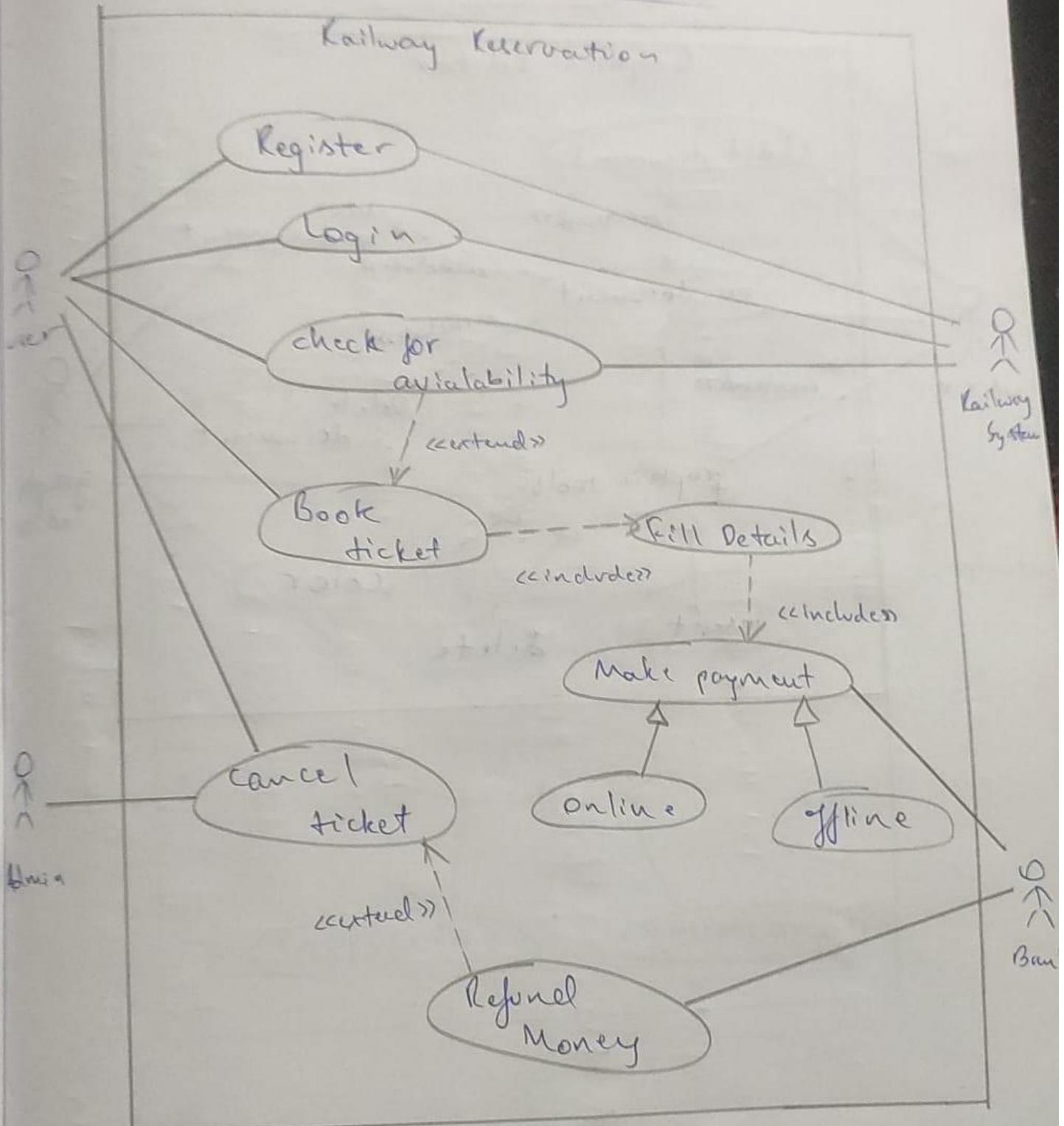


The advanced state diagram has states for paying the ticket. from the ready state the user goes to payment initiation after which the card details are accepted and an OTP is sent to the registered mobile number. On verification the money is deducted and ticket is sent to the customer

## Use Case Diagram



# Railway Reservation System



## **Actors:**

User: uses the railway reservation system.

Admin: manages all information

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

## **Use Case:**

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

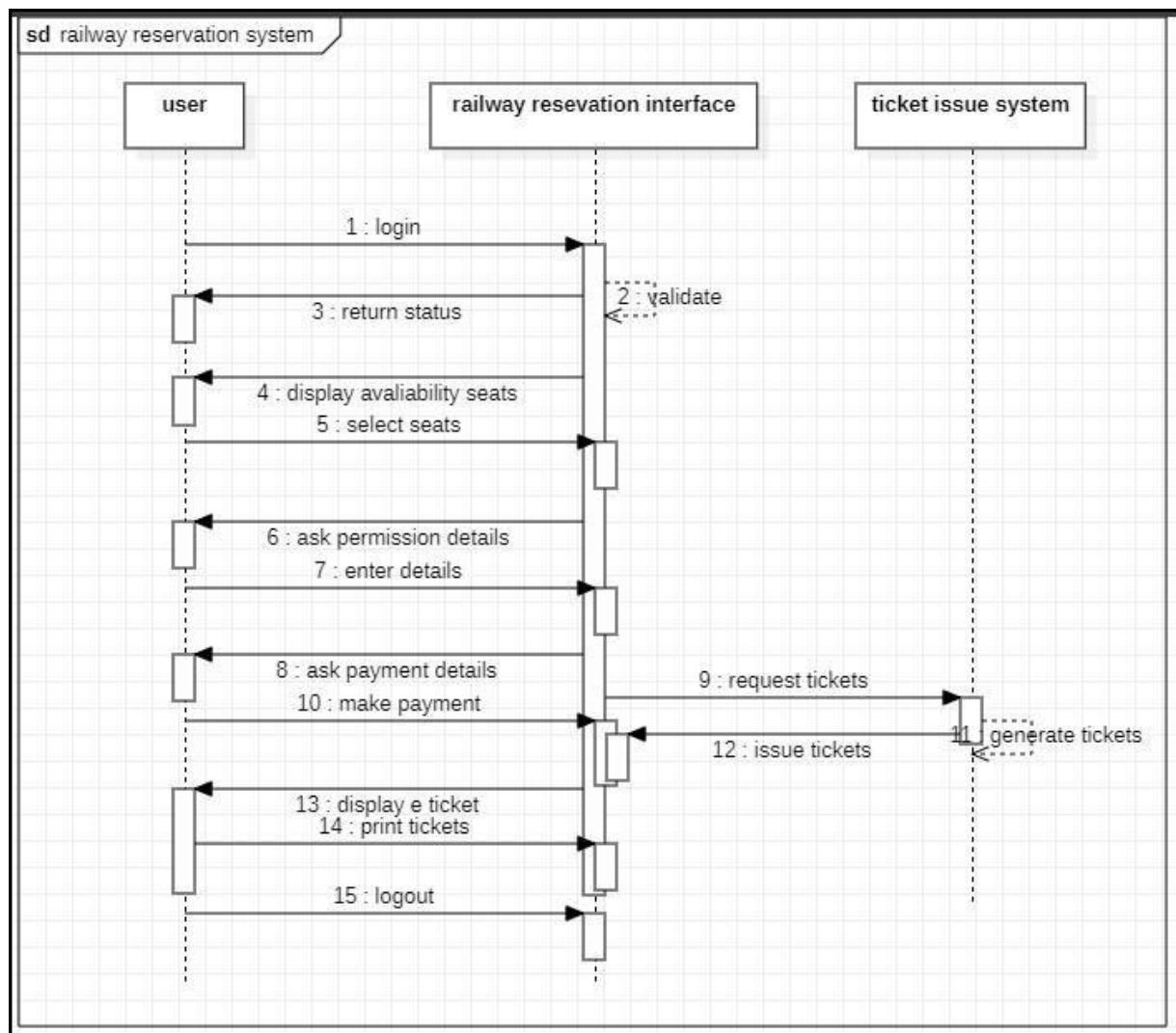
Book Ticket: Users can select the type of coach and no of seats and book the ticket.

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

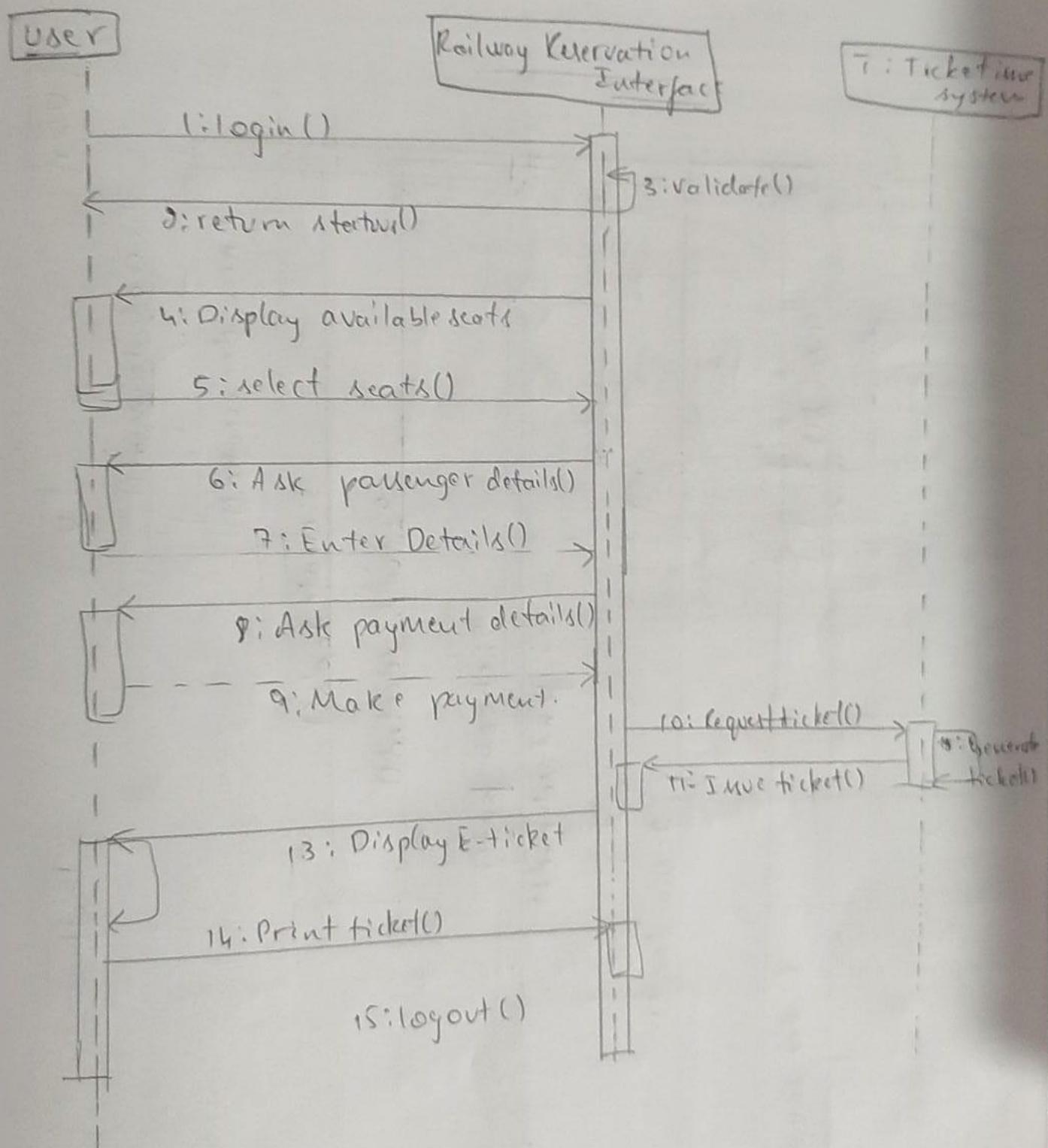
Cancel Ticket: Users can cancel the ticket . The amount will be refunded.

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

# Sequence Diagram

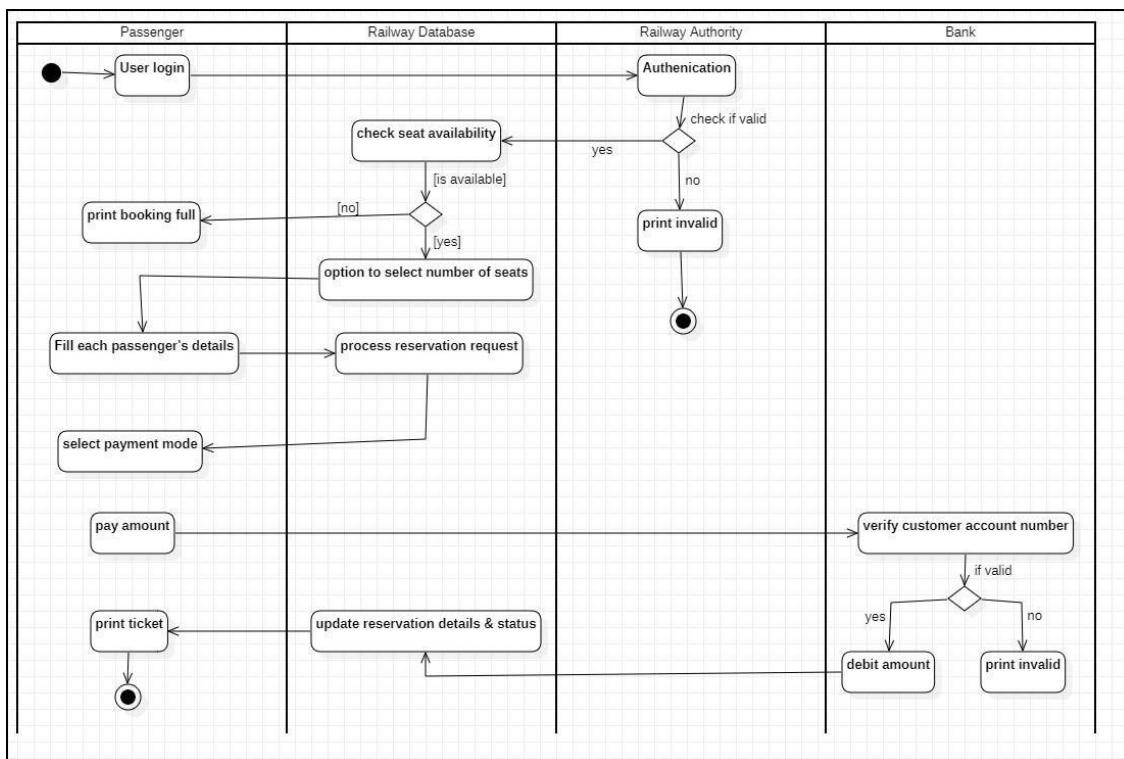


# Railway Reservation System

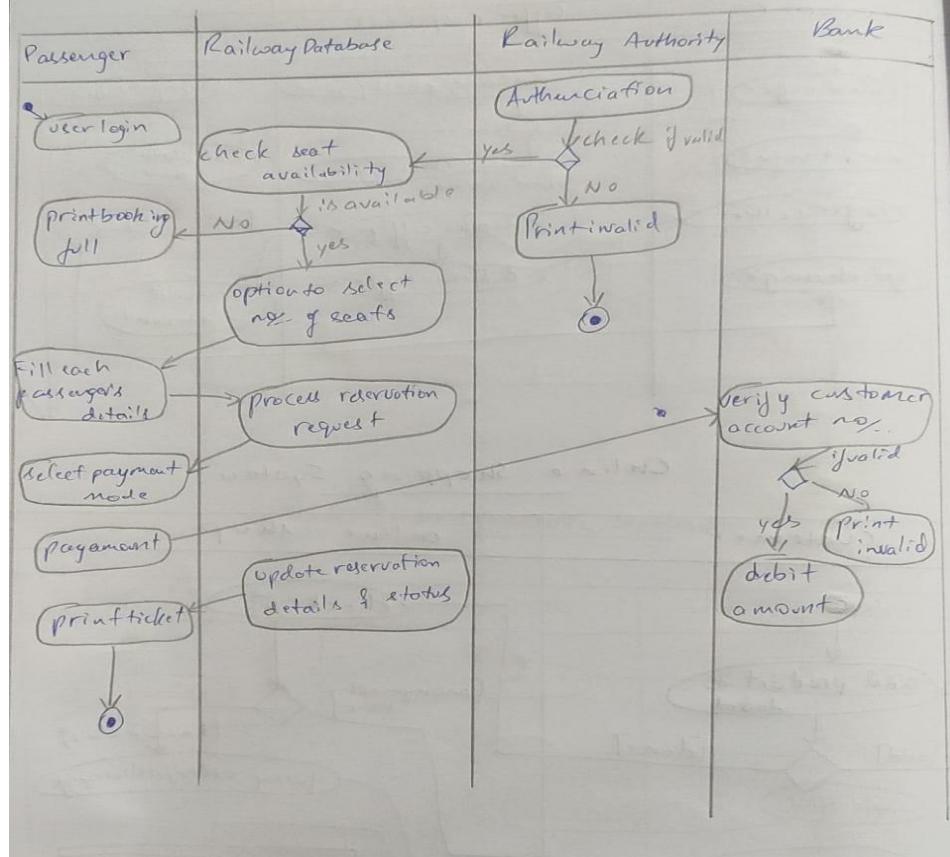


Users log into the railway reservation system. Admin verifies the login details. System establishes secure communication. User checks for availability of trains . Admin updates the train details. System displays the train details. Users book tickets. System displays payment details. User makes the payment. System issues the e-ticket. User logs out.

## Activity Diagram



# Railway Reservation System



The scenario considered for the reservation of a seat in a train. Here the user can login with correct credentials and check for the seats available. Once the user selects a seat, he can select a payment option if the seat is available. After payment, he can print the tickets.

## 7 Graphics Editor

### Problem Statement

#### Problem Statement -

It provides an application programmer's interface that enables a programmer to develop their own graphical model editor for a specific type of model. The API in turn, relies on extending the Eclipse graphical framework to provide an environment in which the editor functions & the programmer can create a graphical editor providing an interface with which the programmer implements said editor for a given underlying model. Such instance of graphical editor allows a user to drag objects from a specified model into a working graphical diagram.

#### Requirements -

#### Graphics Editor -

- Add new Doc / open Doc
- Import / Export Doc
- Delete Doc

#### Document -

- Name, id
- Last modified date
- No. of sheets
- New sheet()
- Save() / print()
- Delete sheet()

#### Objects -

- Name, position, color,
- Dimension of objects
- Position of objects.

- create/Delete objects.

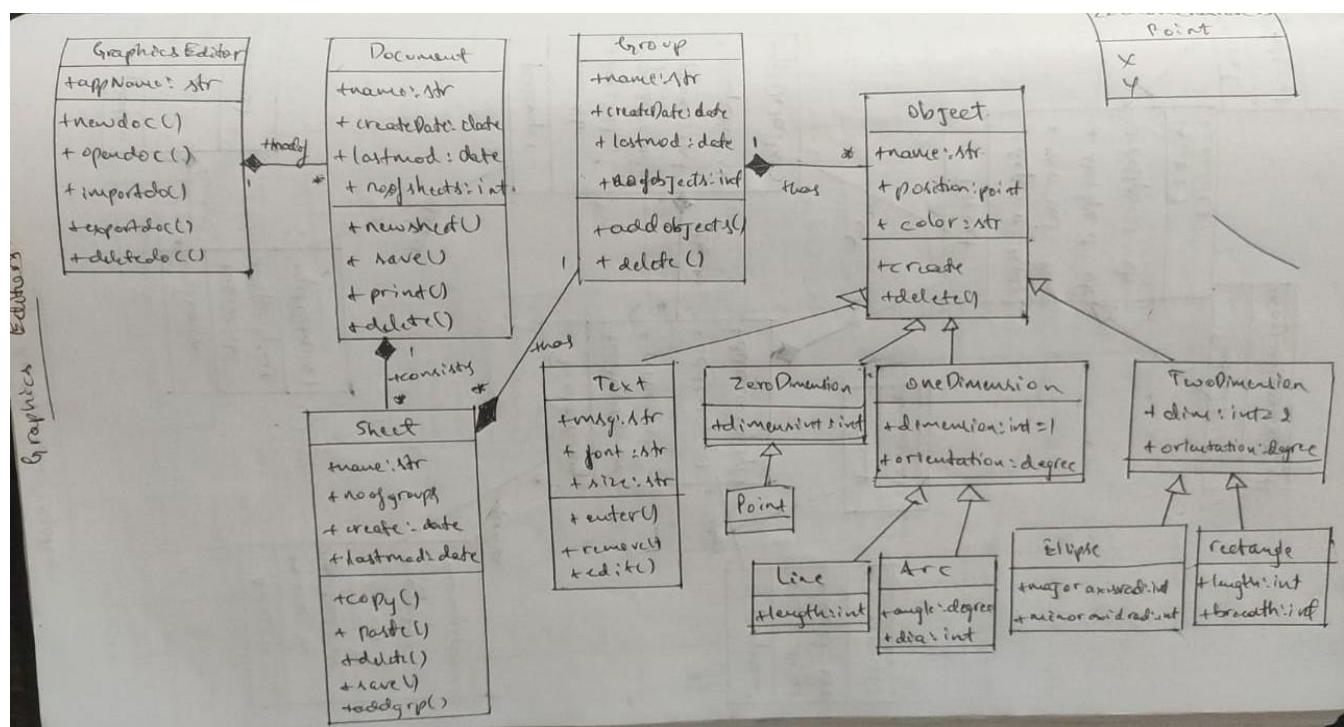
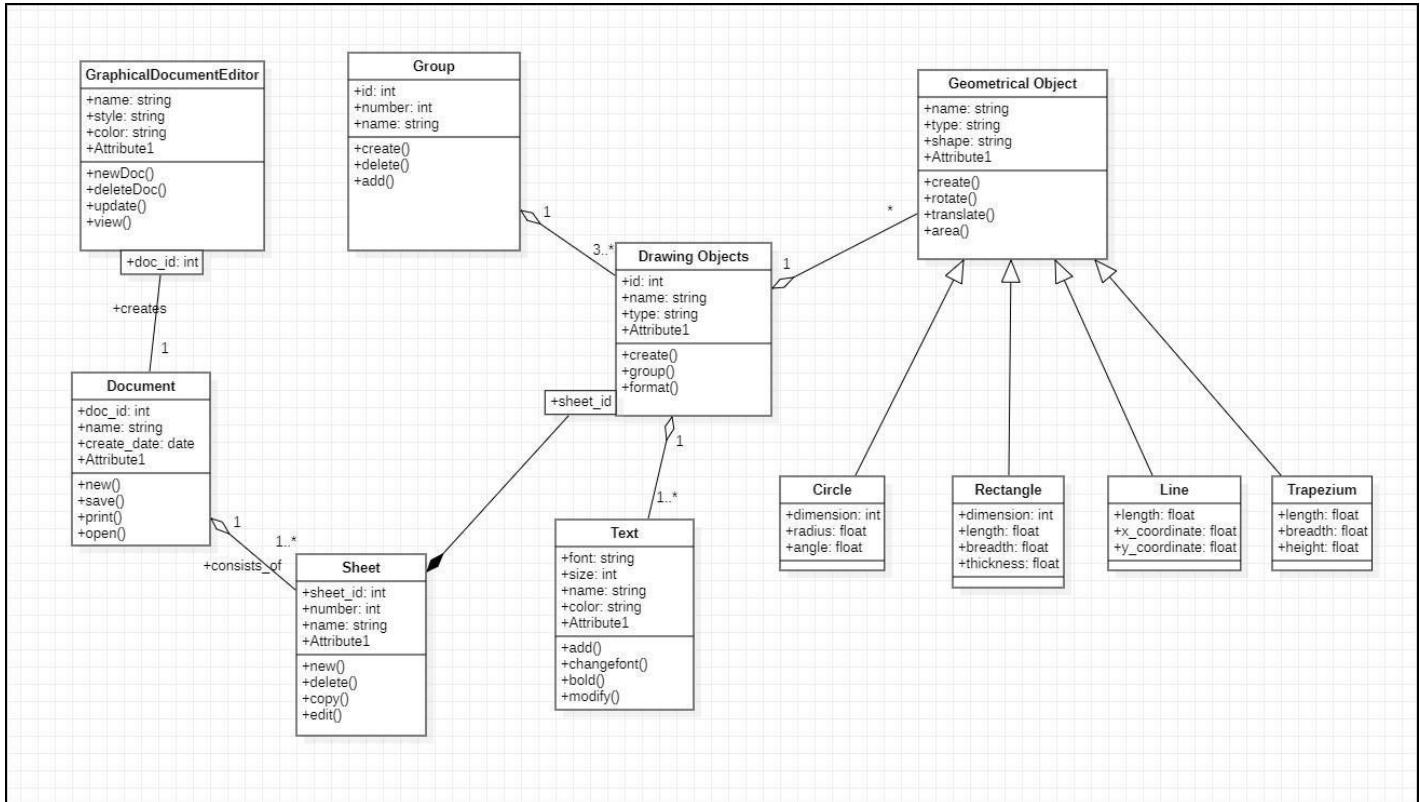
### Tool box -

- Eraser
- color box / palette
- Save / open / delete
- Zoom in/out

### Text -

- Manage font, size
- Edit/remove
- Add.

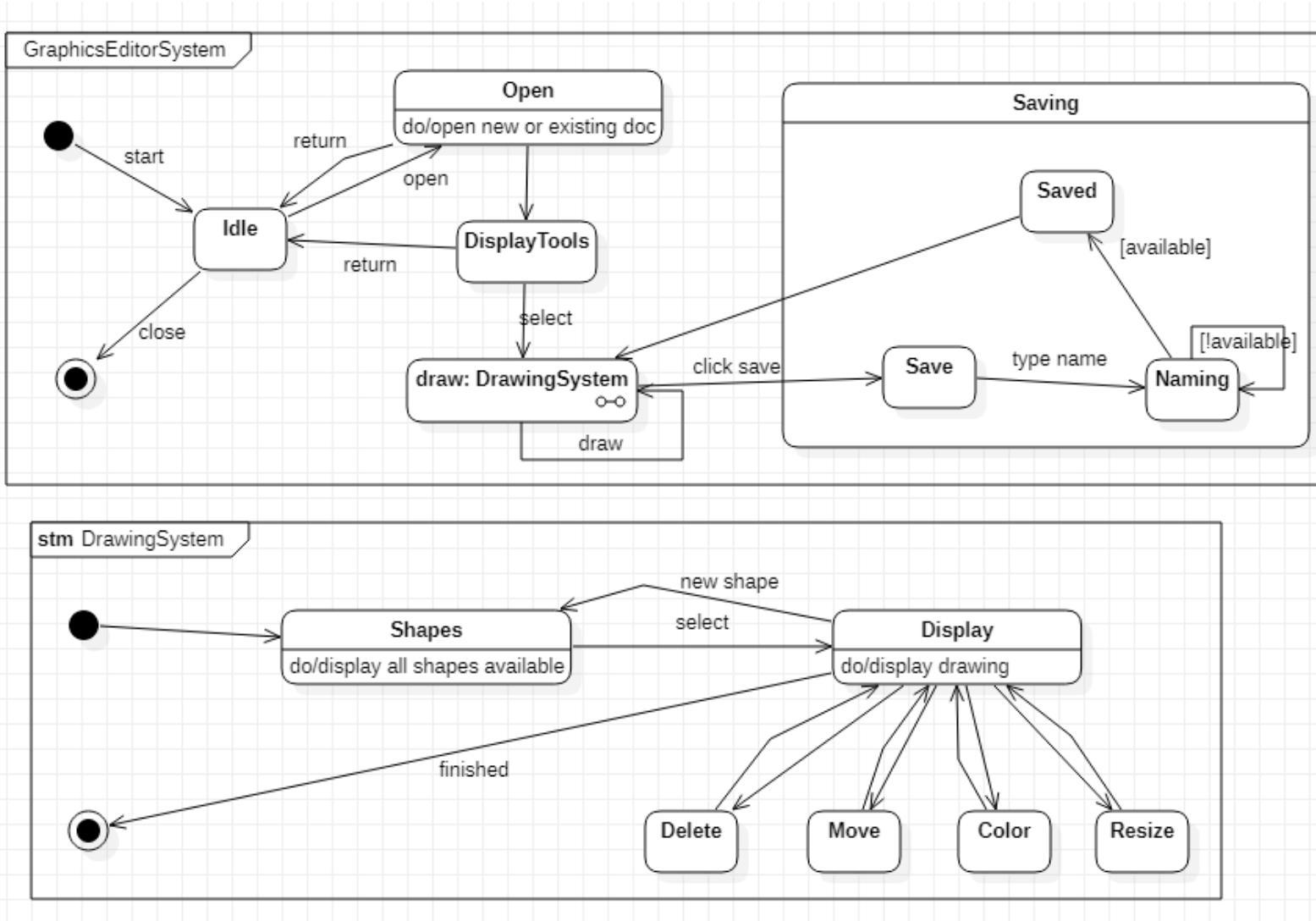
# Class Diagram



The graphical editor has documents consisting of several sheets. Each sheet contains drawing objects, including text, geometrical objects and

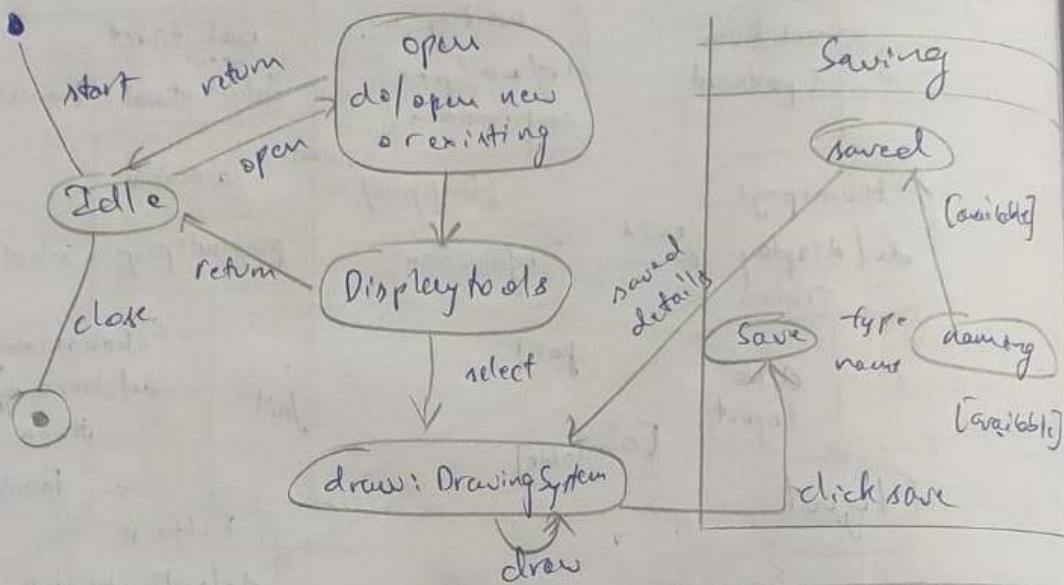
groups. A group is simply a set of drawing objects. A geometrical object includes circle, ellipse, rectangles, lines and squares.

## State Diagram

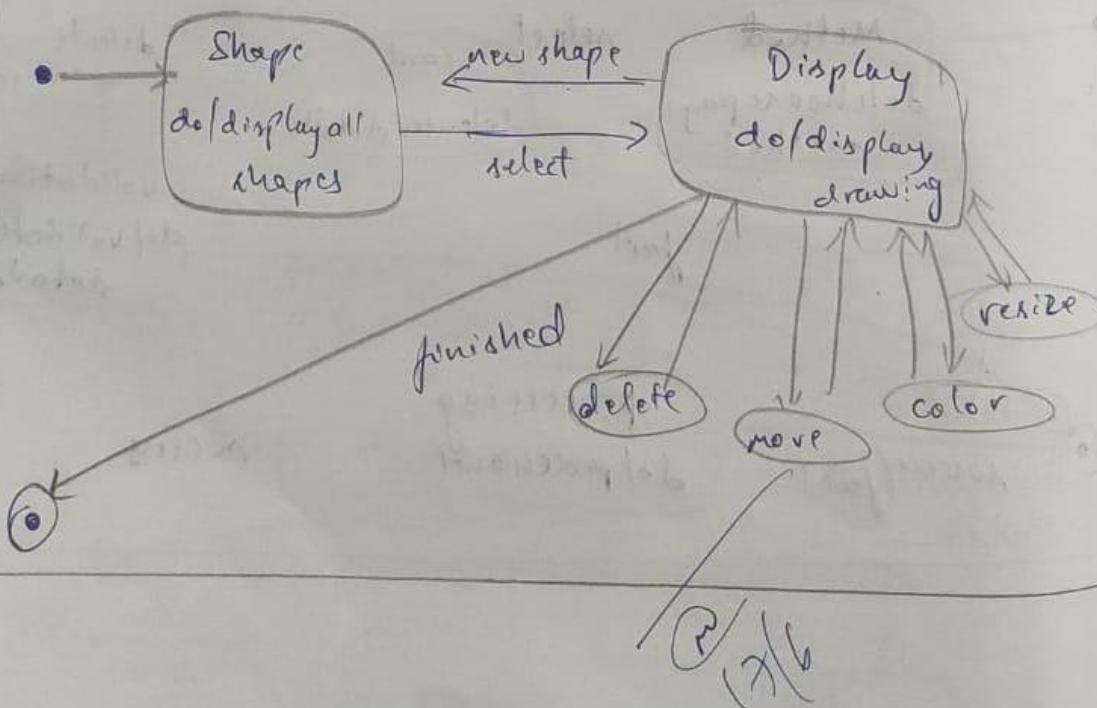


# Graphics Editor System

## Graphic Editor

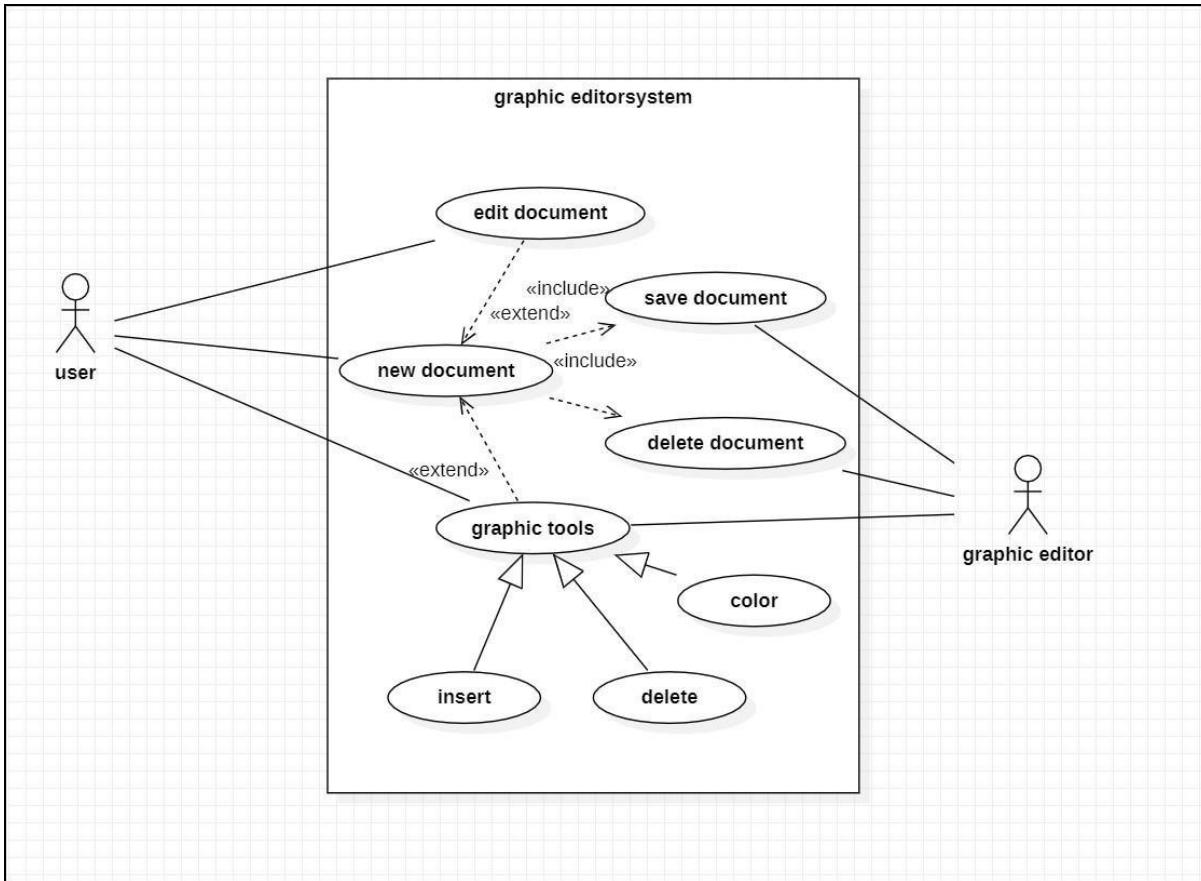


## Drawing System

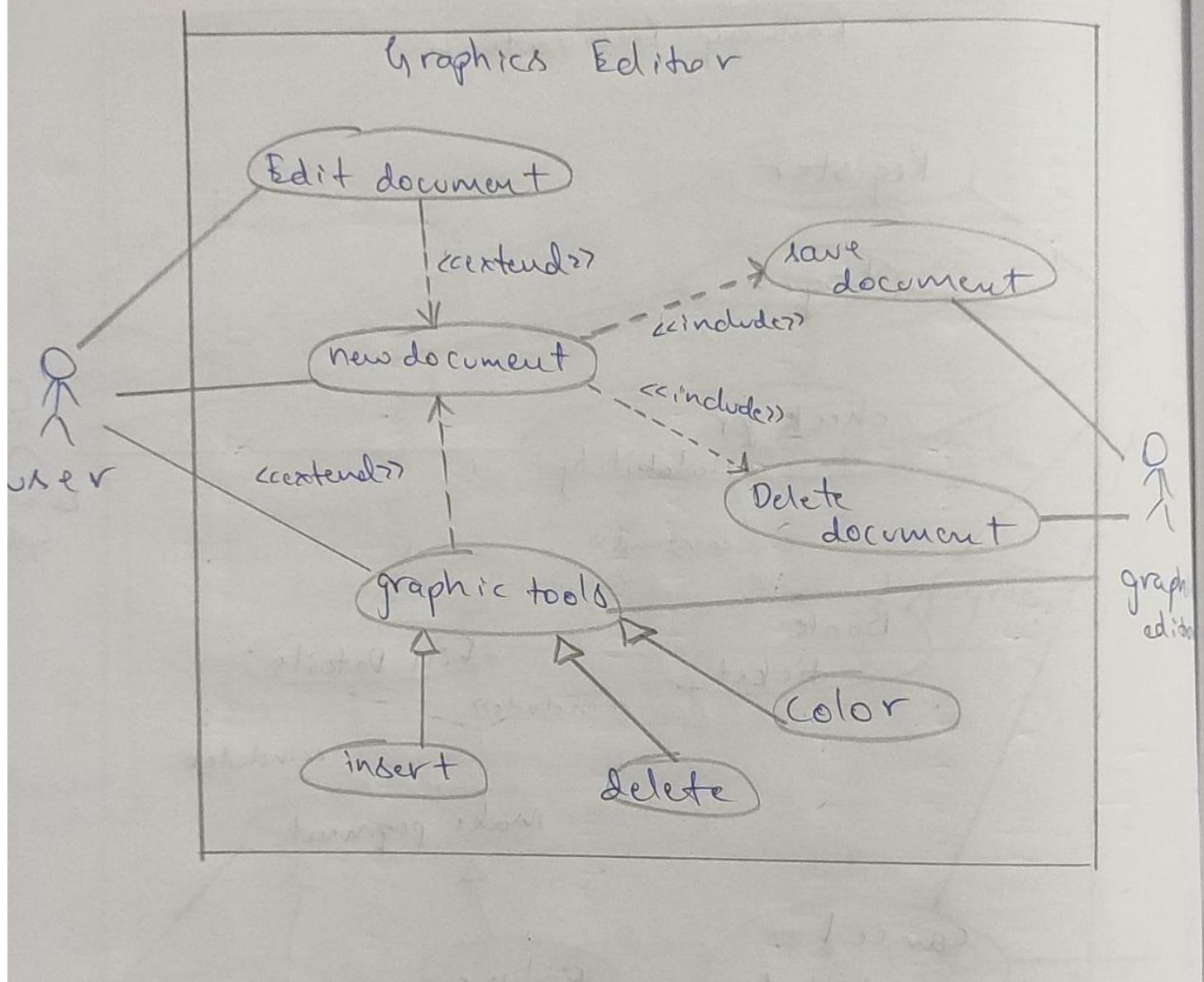


The advanced state diagram gives the states involved in making and saving a graphic file. first the user selects a new document and draws graphics. If there is a mistake he can erase and select a color from the color palet. He can then save the file created. The advanced state diagram had a composite state called saving where the user can save the file in their desired location.

## Use Case Diagram



# Graphics Editor System



## Actors :

User: the person who uses the graphic system

Graphics system: manages the system

## Use case:

Create document : performs creation of new document

Edit document: performs editing of document

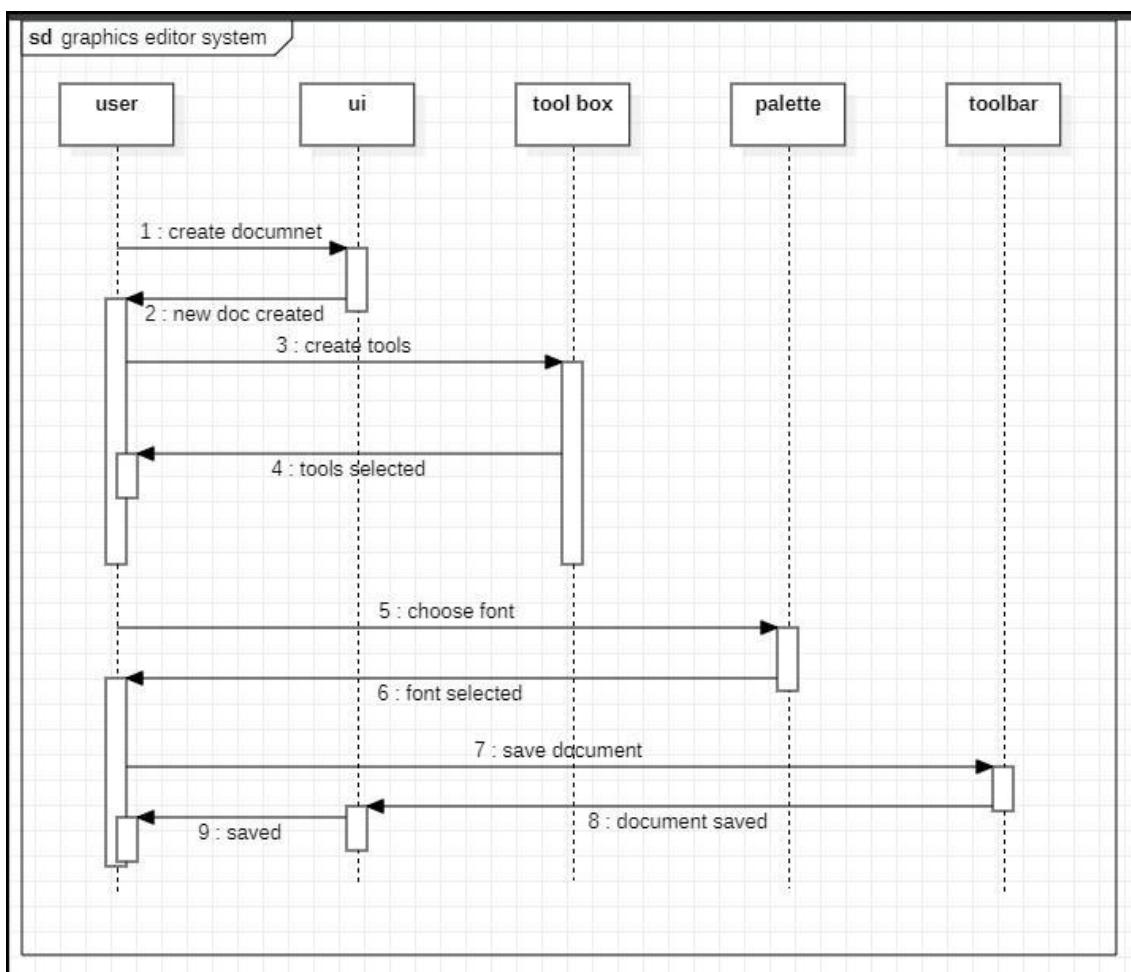
Display toolbox: displays the available tools

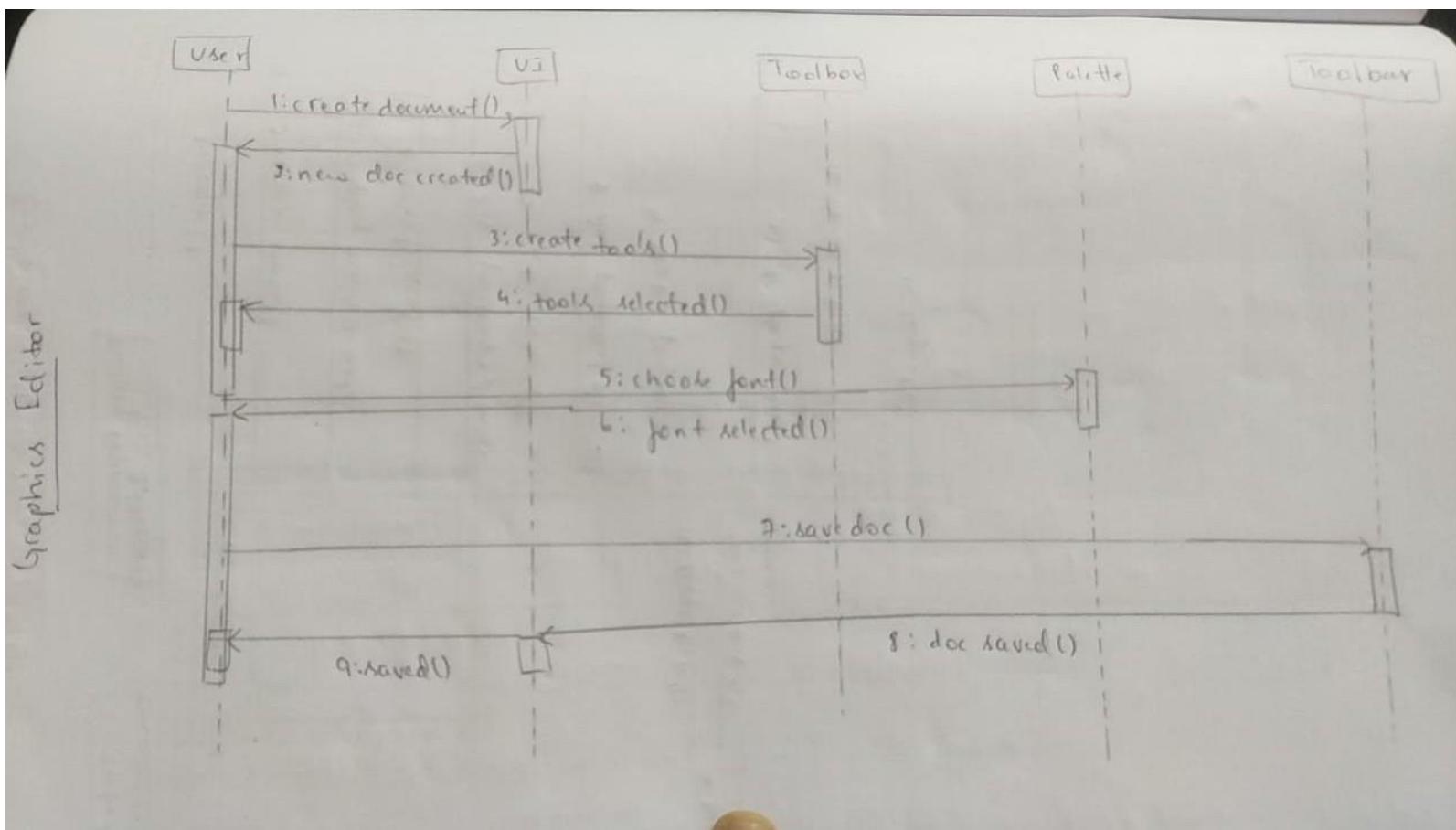
Add graphic object : insert a new graphic object

Choose tools from toolbox : allows user to choose tools

Delete document : Permanently deletes the document

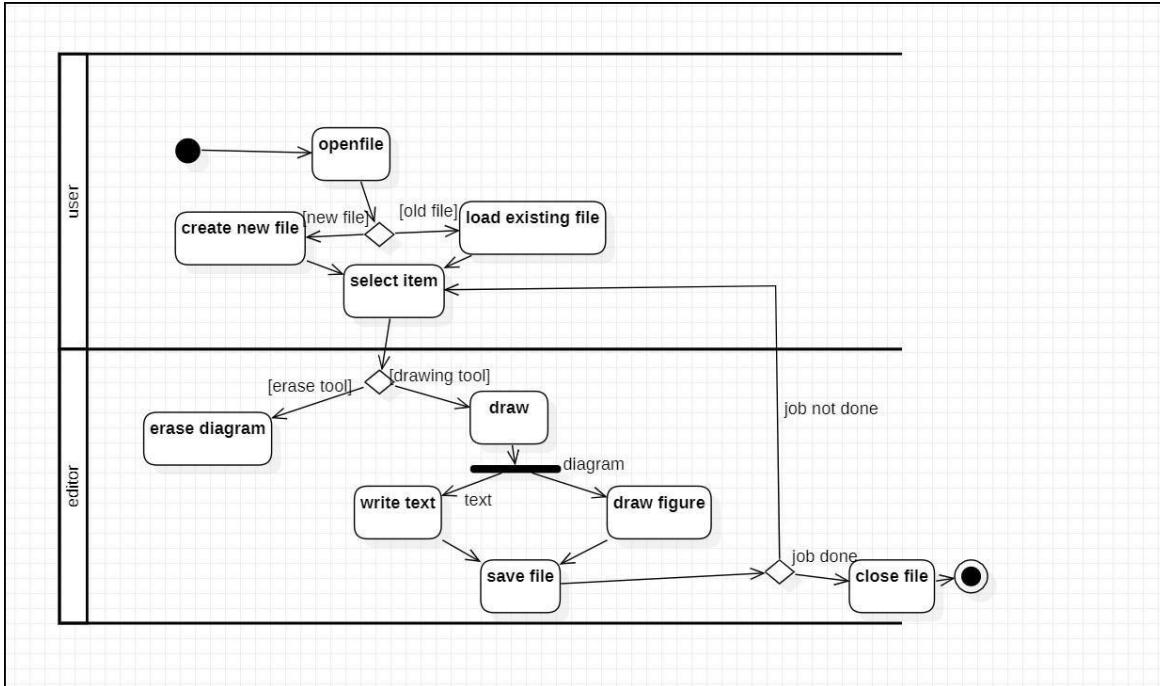
## Sequence Diagram



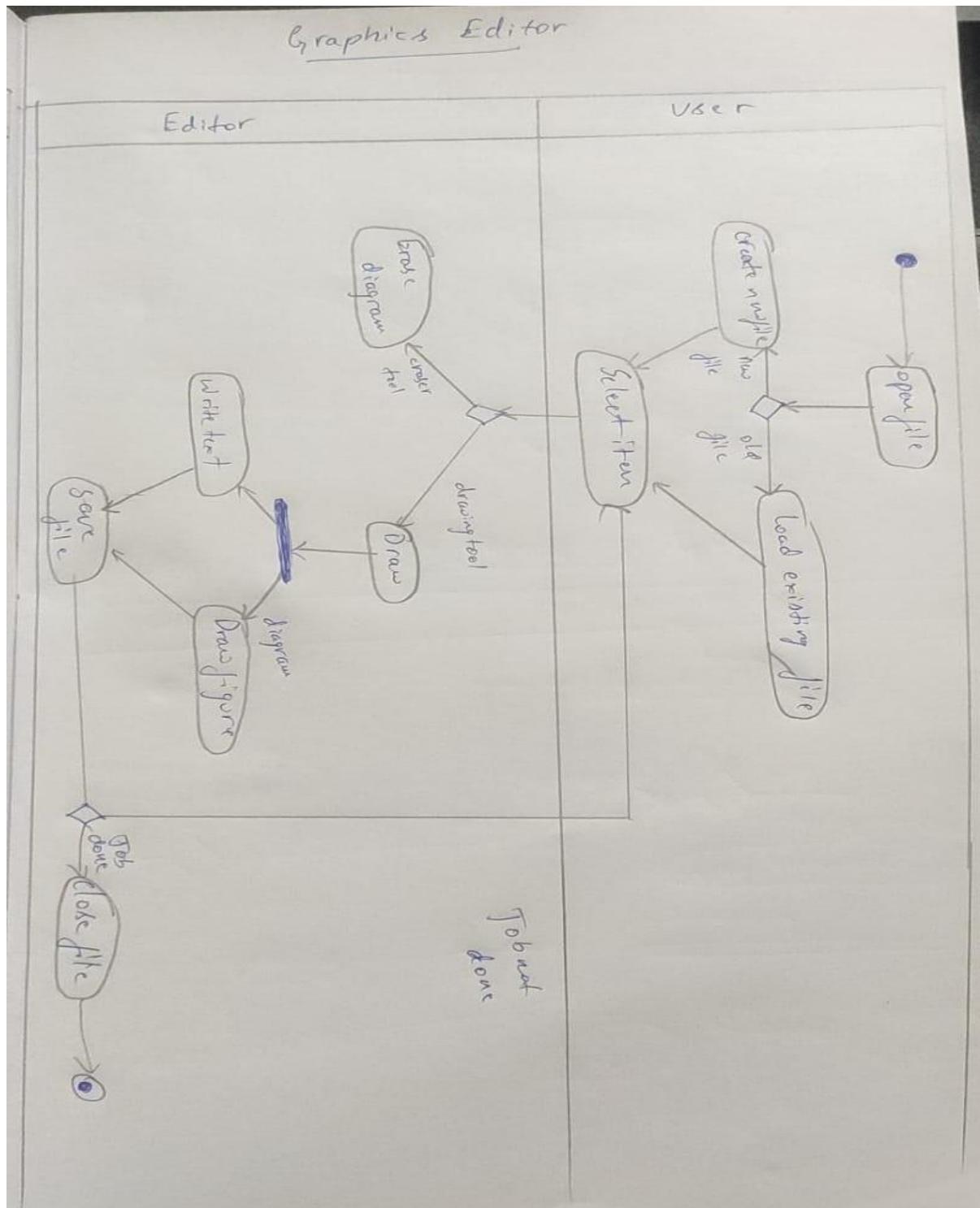


The above scenario depicts how a user creates a new document and also creates a new tool along with selecting it. The user has the facility to change the font and select it . Later after use he can save the document, and the saved message is sent.

# Activity Diagram



## Graphics Editor



The advanced activity diagram gives the states involved in making and saving a graphic file. The user selects a new document and draws graphics, saves the file and closes it.