

# VISVESVARAYA TECHNOLOGICAL UNIVERSITY

“JnanaSangama”, Belgaum -590014, Karnataka.



## LAB REPORT

on

# Object Oriented Modelling and Design

*Submitted by*

**NEHA CATHRIN A (1BM19CS099)**

*in partial fulfillment for the award of the degree of*

**BACHELOR OF ENGINEERING**

*in*

**COMPUTER SCIENCE AND ENGINEERING**



**B.M.S. COLLEGE OF ENGINEERING**

(Autonomous Institution under VTU)

**BENGALURU-560019**

**April-2022 to July-2022**

**B. M. S. College of Engineering,  
Bull Temple Road, Bangalore 560019**  
(Affiliated To Visvesvaraya Technological University, Belgaum)  
**Department of Computer Science and Engineering**



**CERTIFICATE**

This is to certify that the Lab work entitled "**Object Oriented Modelling and Design**" carried out by **NEHA CATHRIN A (1BM18CS099)**, 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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## Index Sheet

Sl. No.	Experiment Title
1.	<b>College Information System</b>
2.	<b>Hostel Management System</b>
3.	<b>Stock Management System</b>
4.	<b>Coffee Vending Machine</b>
5.	<b>Online Shopping System</b>
6.	<b>Railway Reservation System</b>
7.	<b>Graphics Editor</b>

## Course Outcome

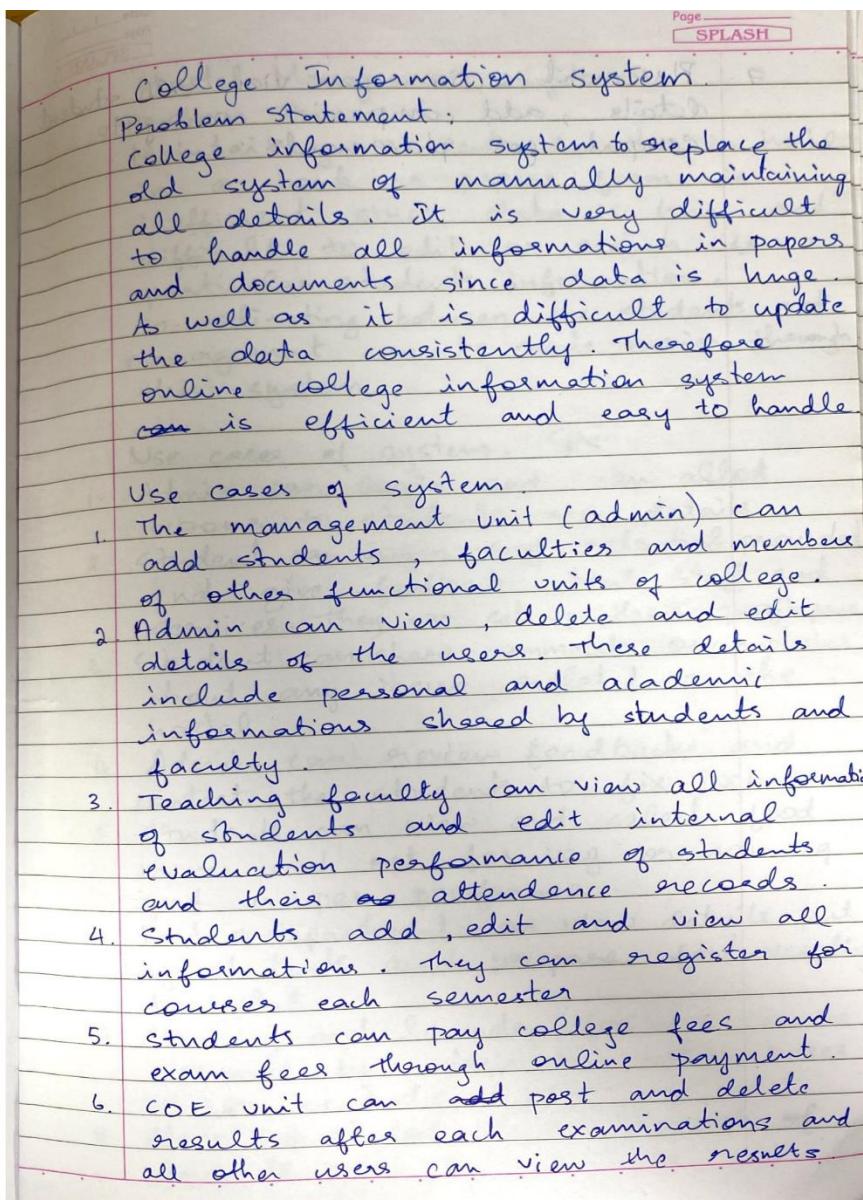
CO4	Ability to conduct practical experiment to solve a given problem using Unified Modeling language.
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# 1. COLLEGE INFORMATION SYSTEM

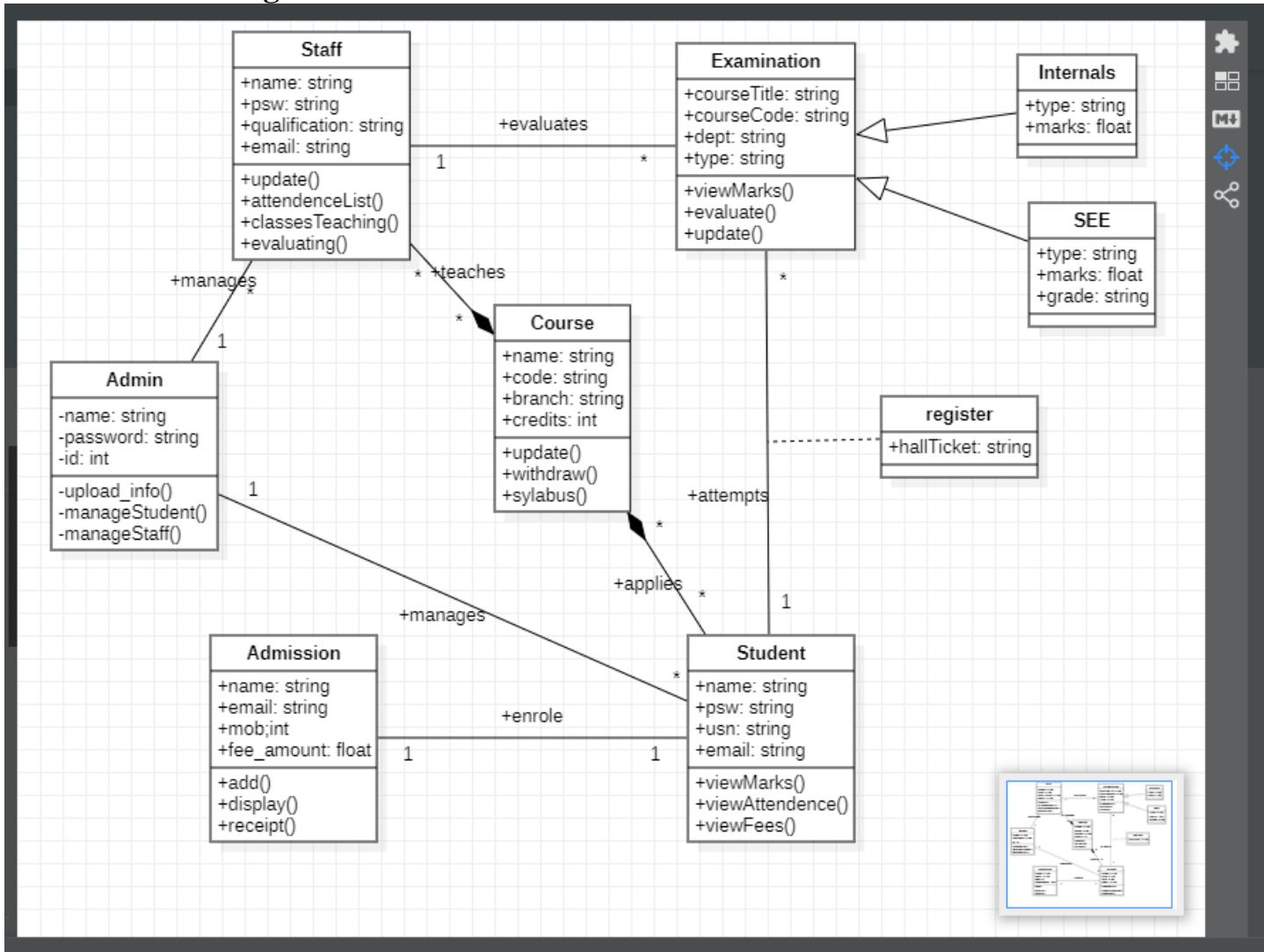
## 1.1 Problem statement

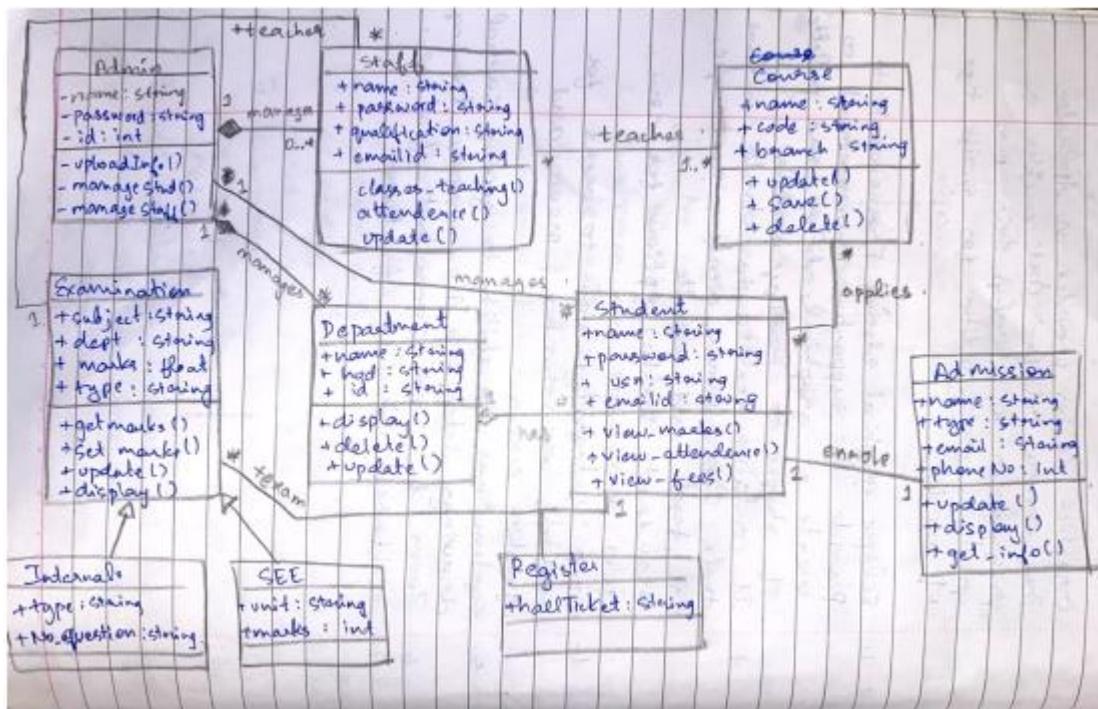
The College Information System is a system that maintains student, staff and department information. It maintains the courses taught by teachers and students enrolled in them. Admission records of student and Examination details and other important information related to college management is maintained.

## 1.2 Software Requirement Specification



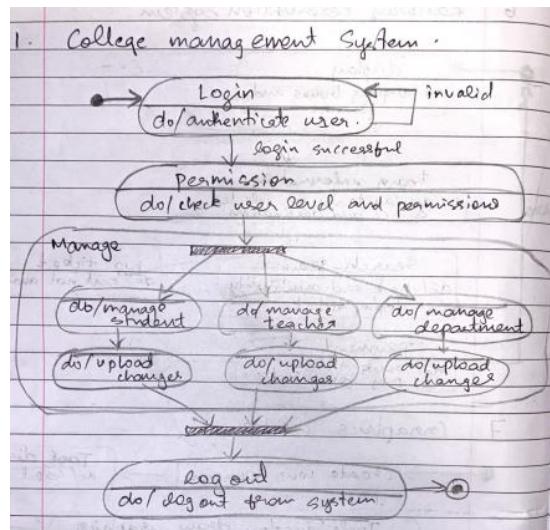
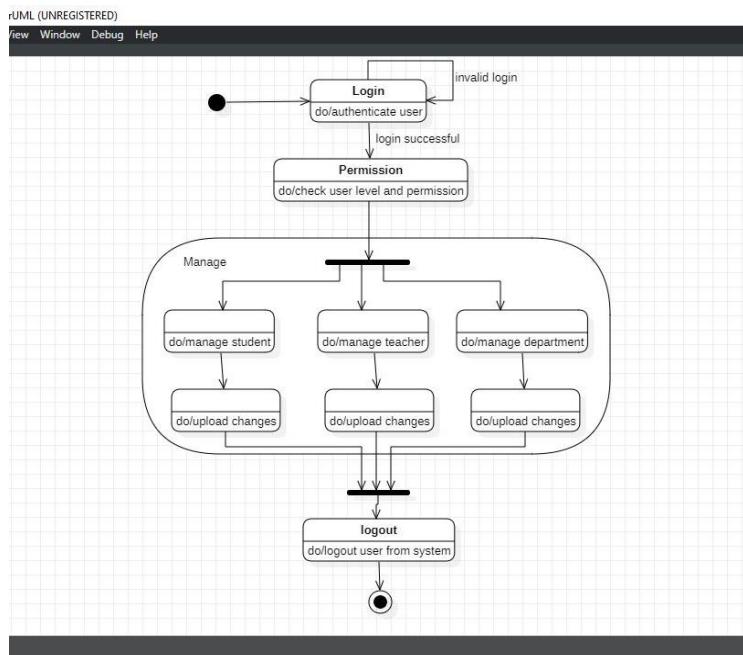
### 1.3 Class Diagram





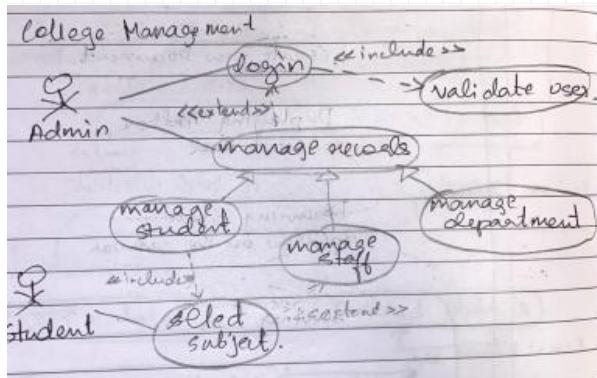
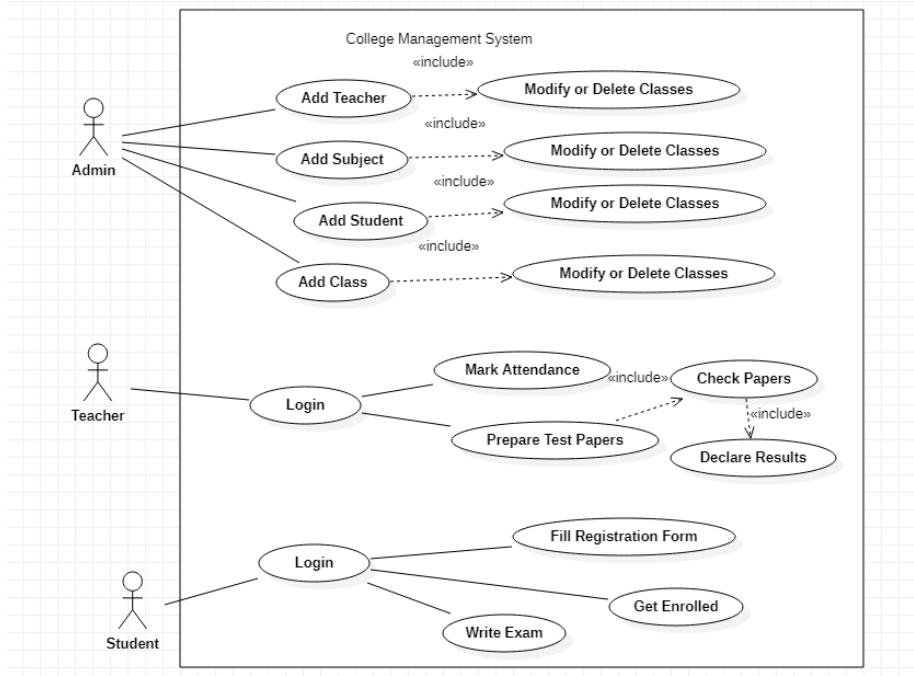
Admin can view and modify the student's records, teachers and department details. The students of the college register themselves in the department and examination and for the courses they are interested in and join the college by taking admission and following all the admission procedures. College conducts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

## 1.4 State Diagram



The above state diagram describes the states the admin goes through in uploading information of student, 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 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.

## 1.5 Use Case Diagram



### Actors:

Admin: the person who manages everything

Student: A person who uses the system

COE: A person who is responsible for examinations

Staff: A person who works in the college

### Use Cases:

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

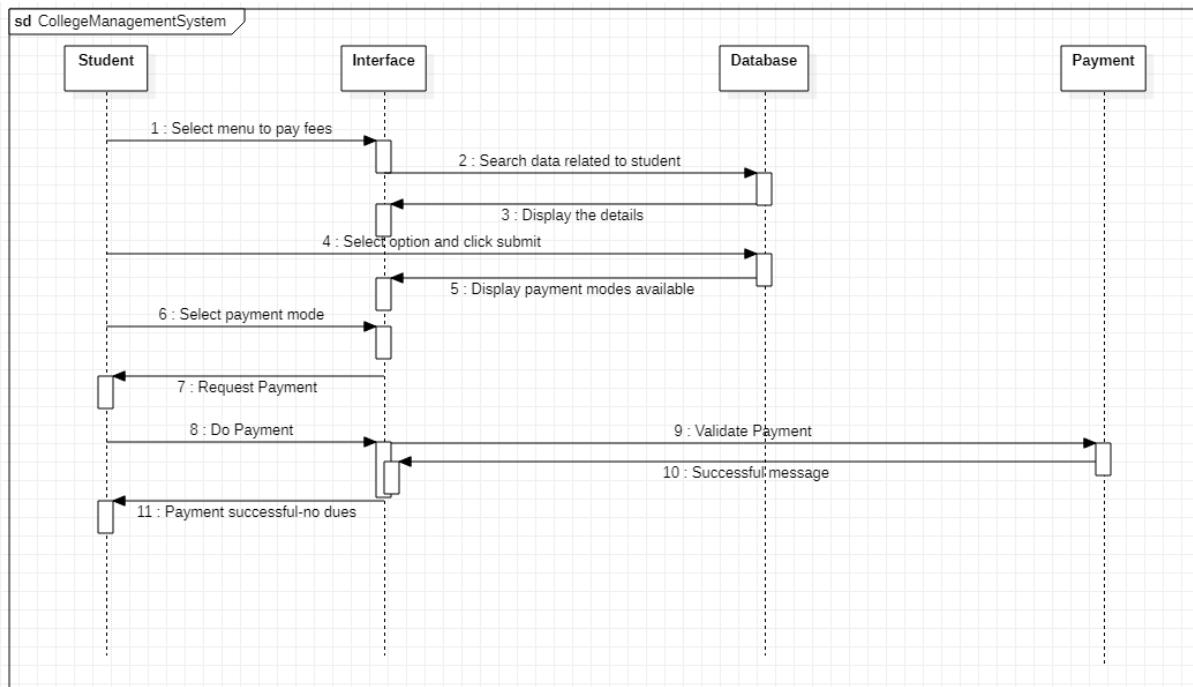
View results: displays the result of students.

Subject details: various details related to subject is displayed.

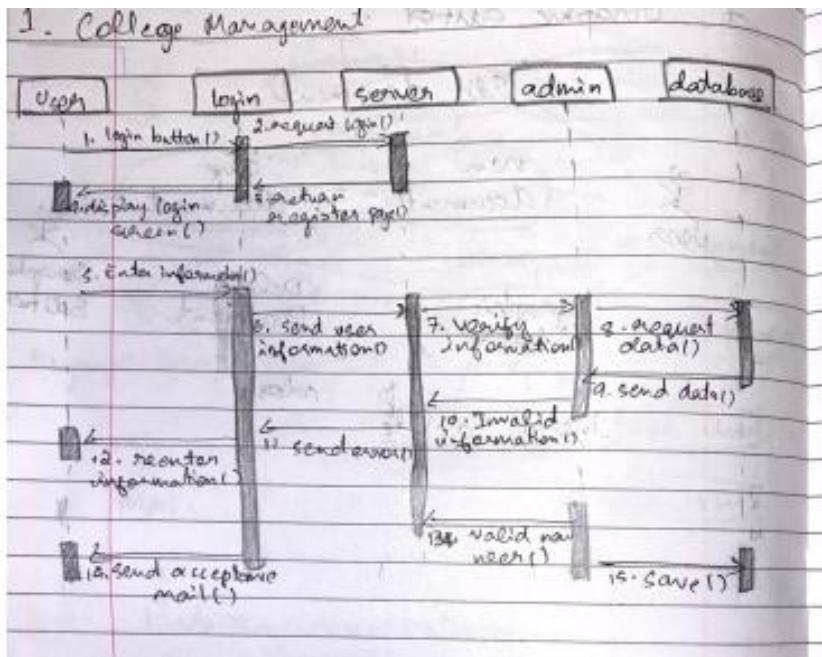
View student details: the details of student is displayed

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

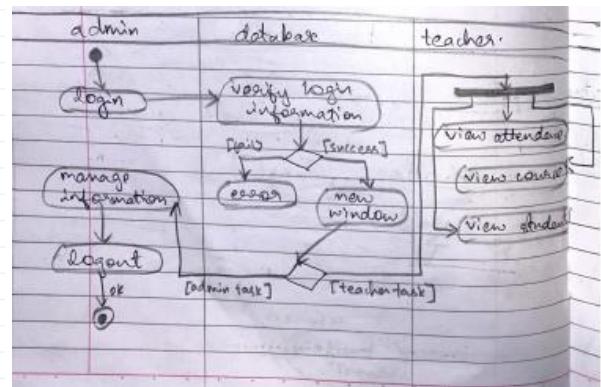
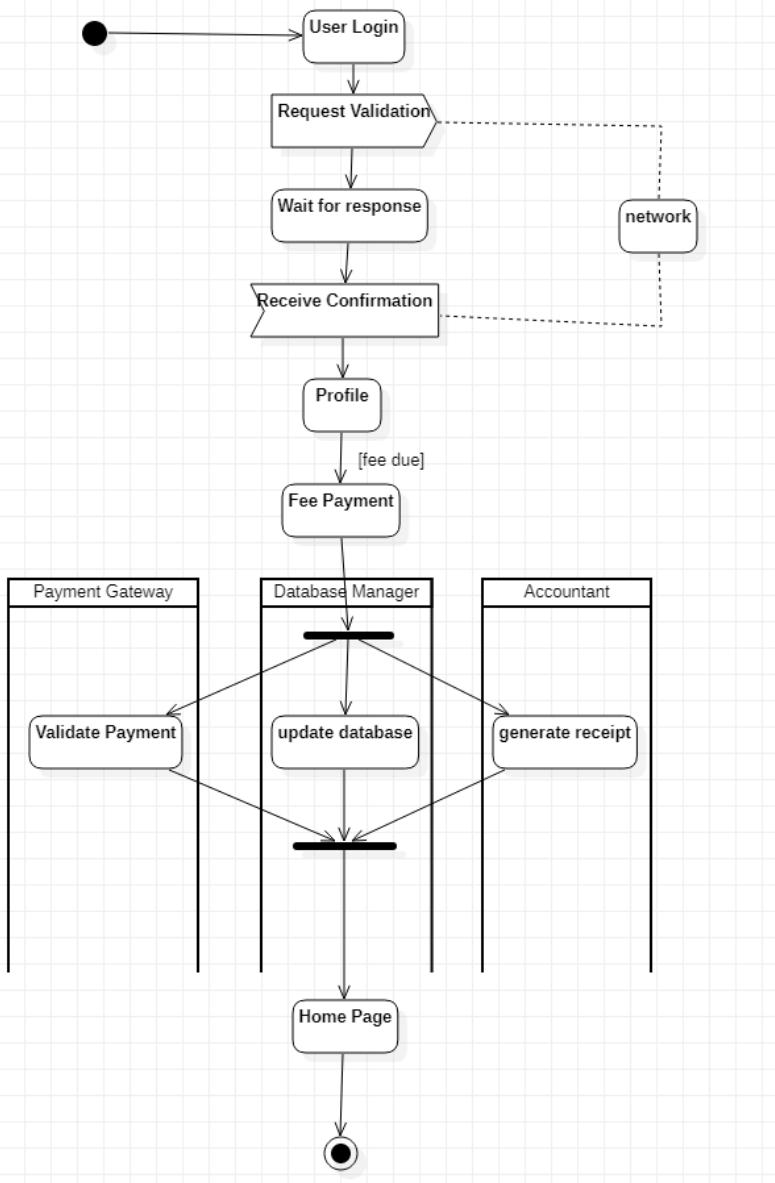
## 1.6 Sequence Diagram



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.



## 1.7 Activity Diagram



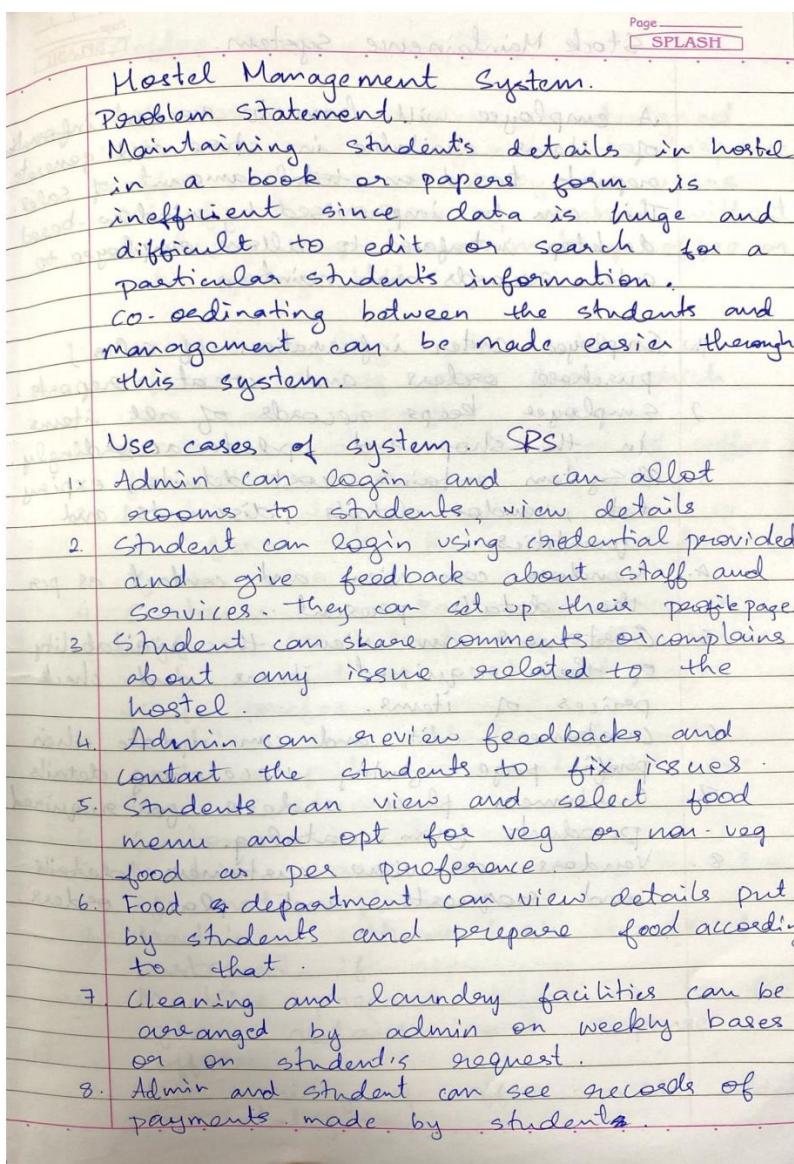
The above activity diagram has three swimlanes mainly admin, database and teacher. The admin can login and manage information. The database verifies the login information and on success has two options. He teacher can view attendance, view course details, and view student list.

## 2. HOSTEL MANAGEMENT SYSTEM

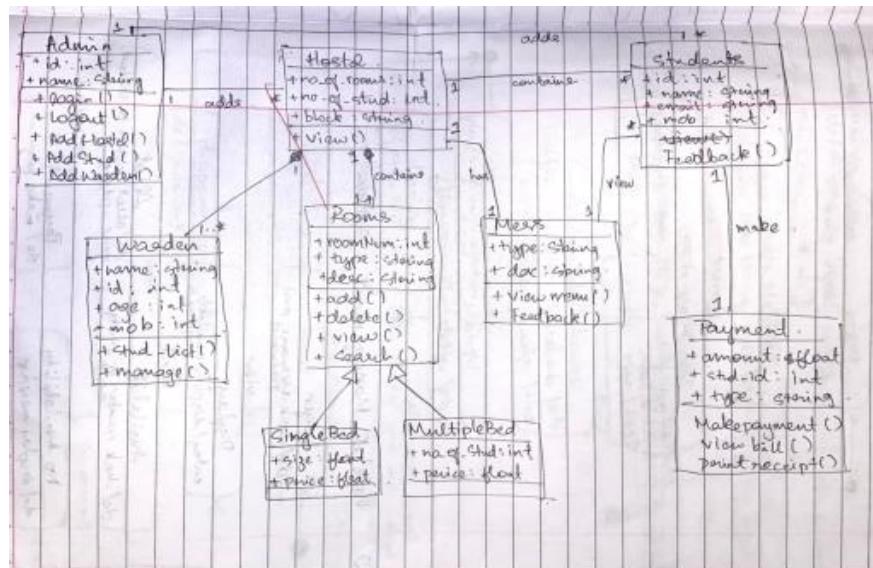
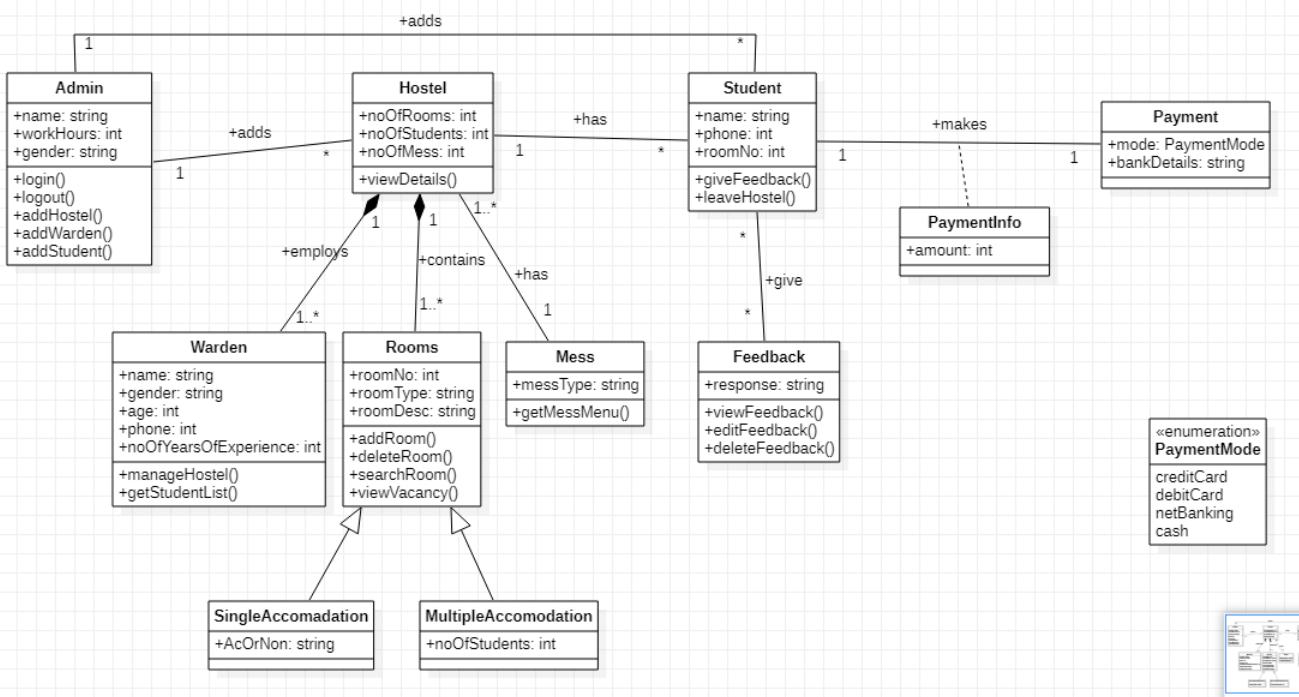
### 2.1 Problem statement

The hostel management system is to provide college students accommodation to the university hostel more efficiently. This project also keeps details of the hostellers and applied students. It is headed by Warden. He will be the administrator. This document is intended to minimize human works and make hostel allocation an easier job for students and hostel authorities by providing online application for hostel.

### 2.2 Software Requirement Specification

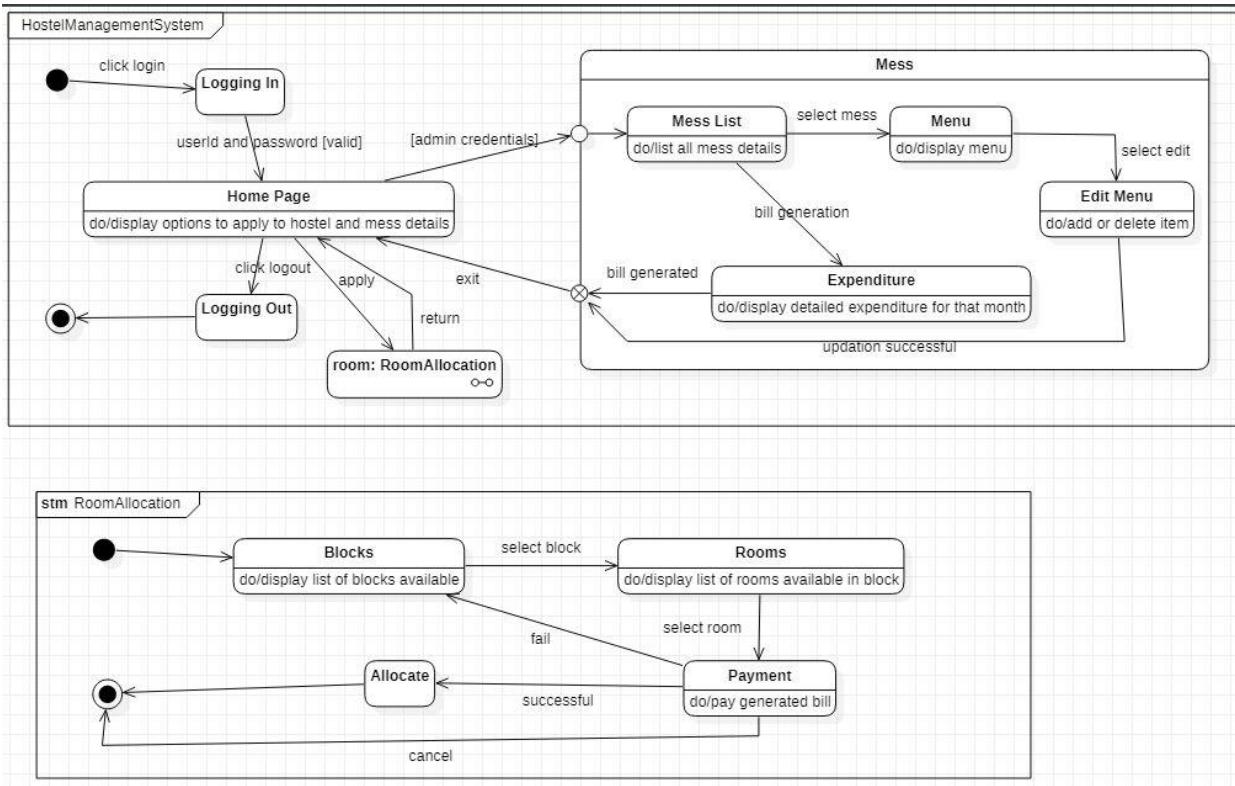


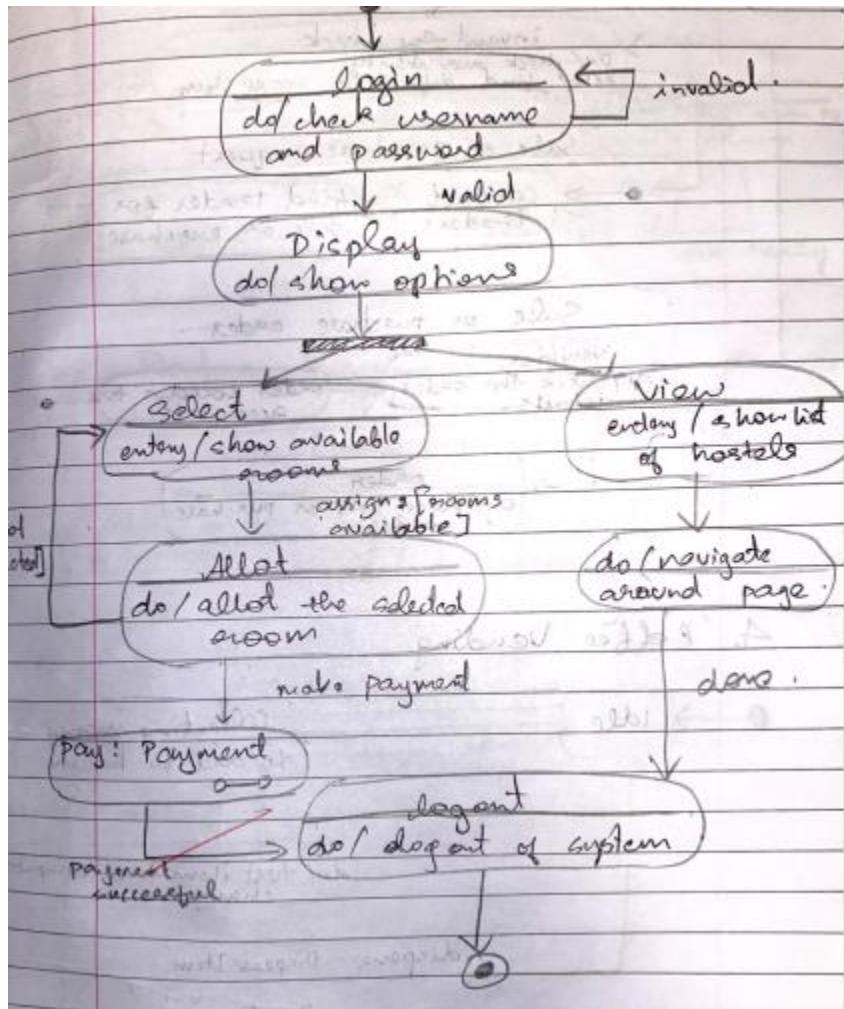
## 2.3 Class Diagram



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 having the mess status of the whole month.

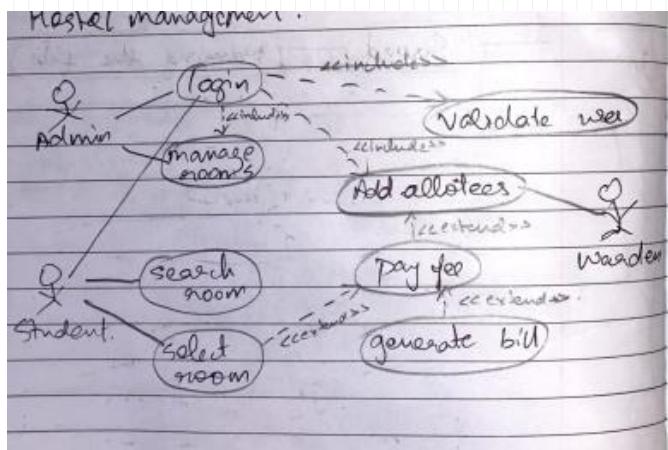
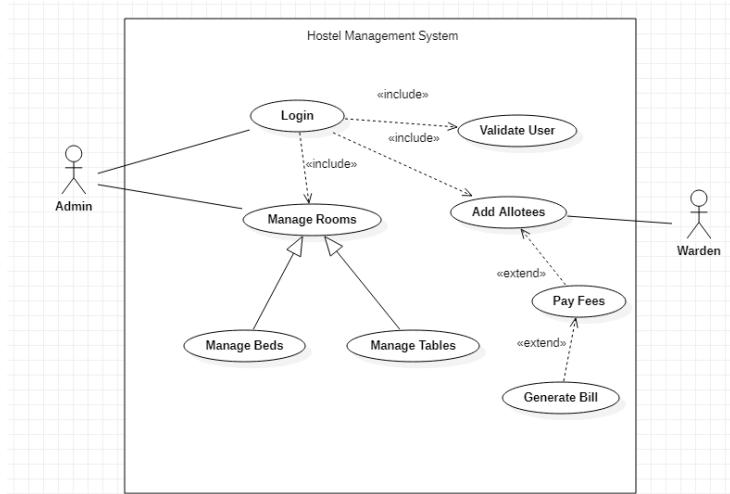
## 2.4 State Diagrams





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 logs in 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.

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

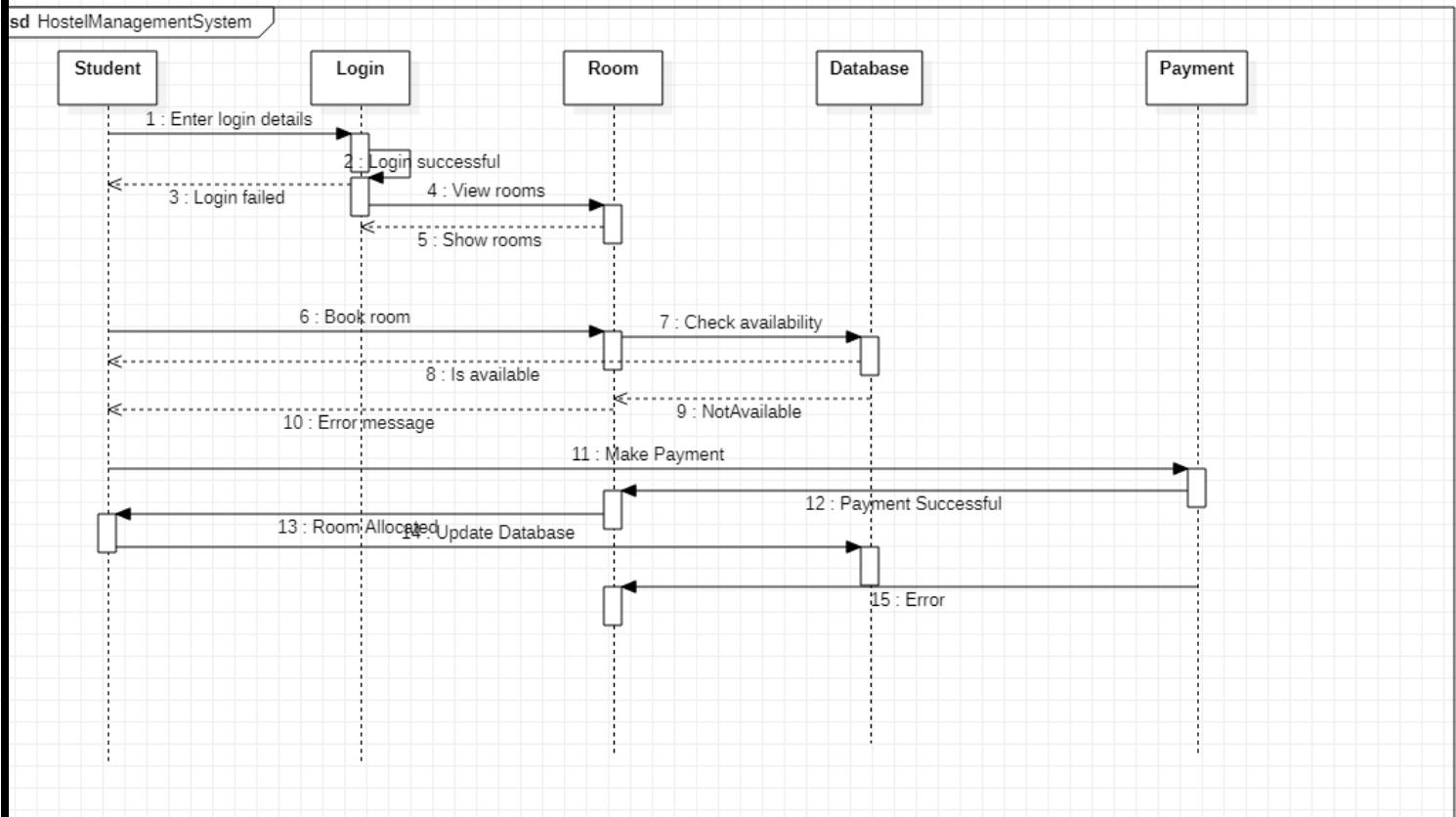
Login : allows actors to login into the system.

Add allottee: the students are allotted hostel rooms

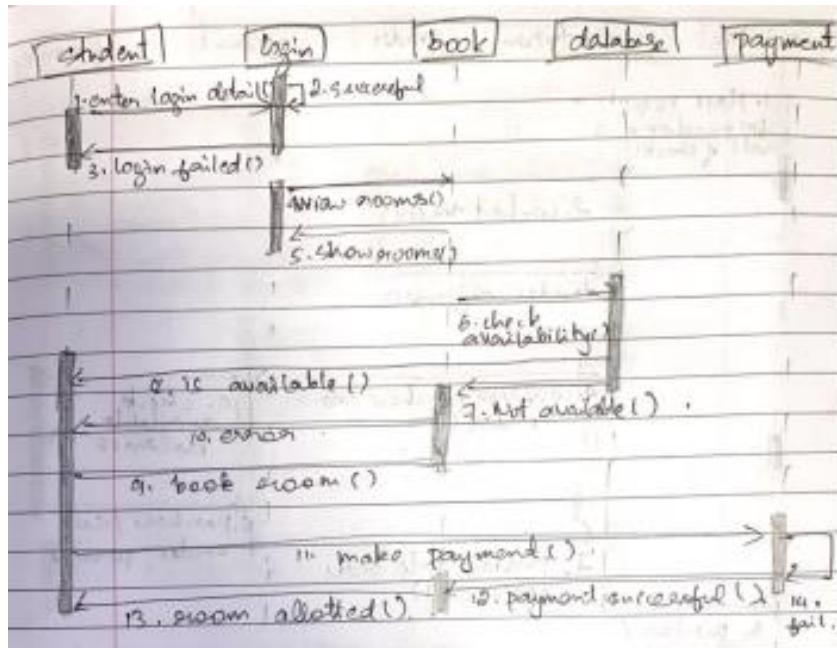
Book hostel: the student can select the hostel they wish to stay in.

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

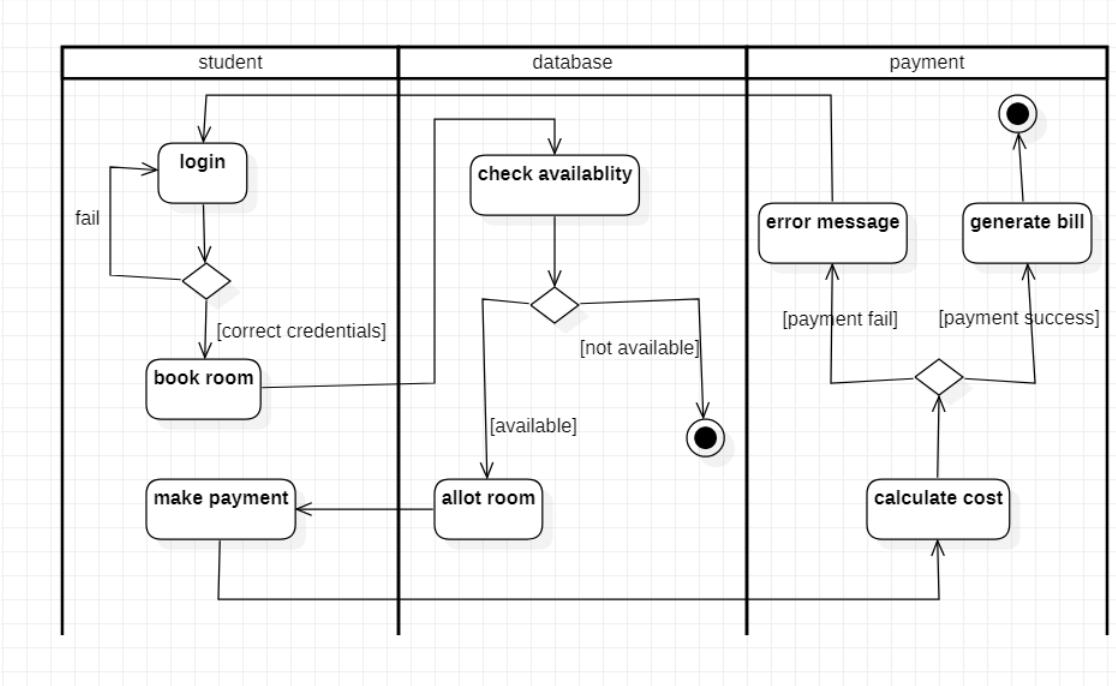
## 2.6 Sequence Diagram



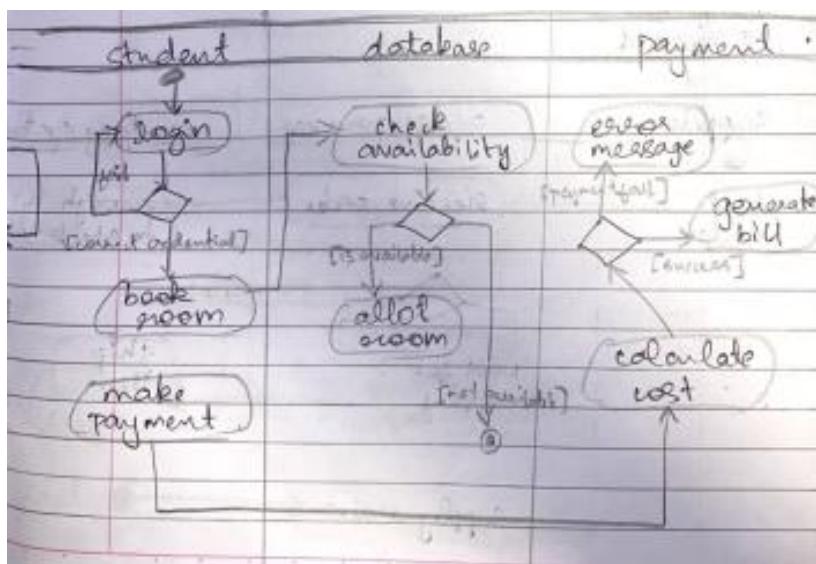
The above sequence diagram give the steps involved in a student logging in, booking a room, which is verified in the database and the payment for the same is made by the student.



## 2.7 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.



### 3. STOCK MAINTENANCE SYSTEM

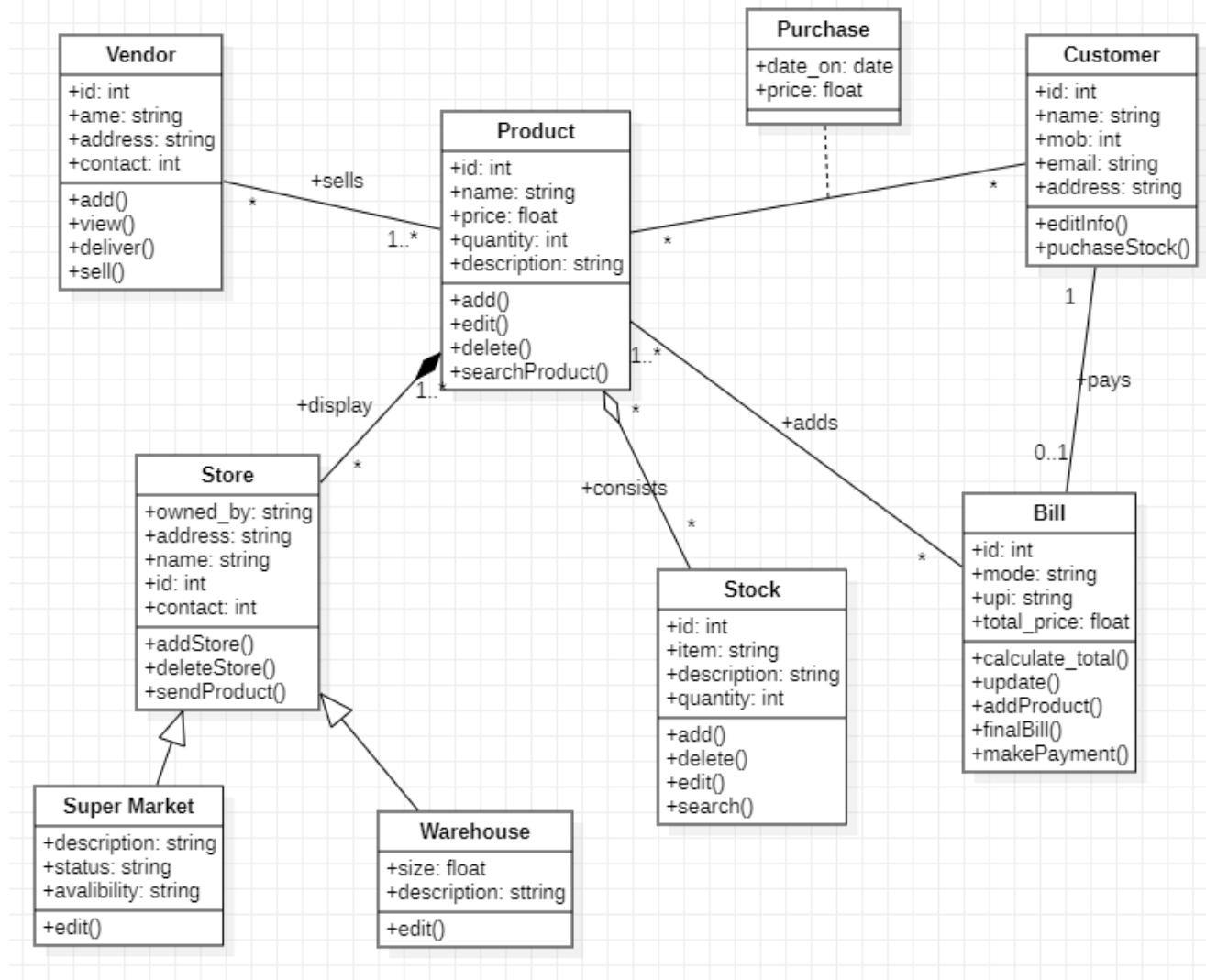
#### 3.1 Problem statement

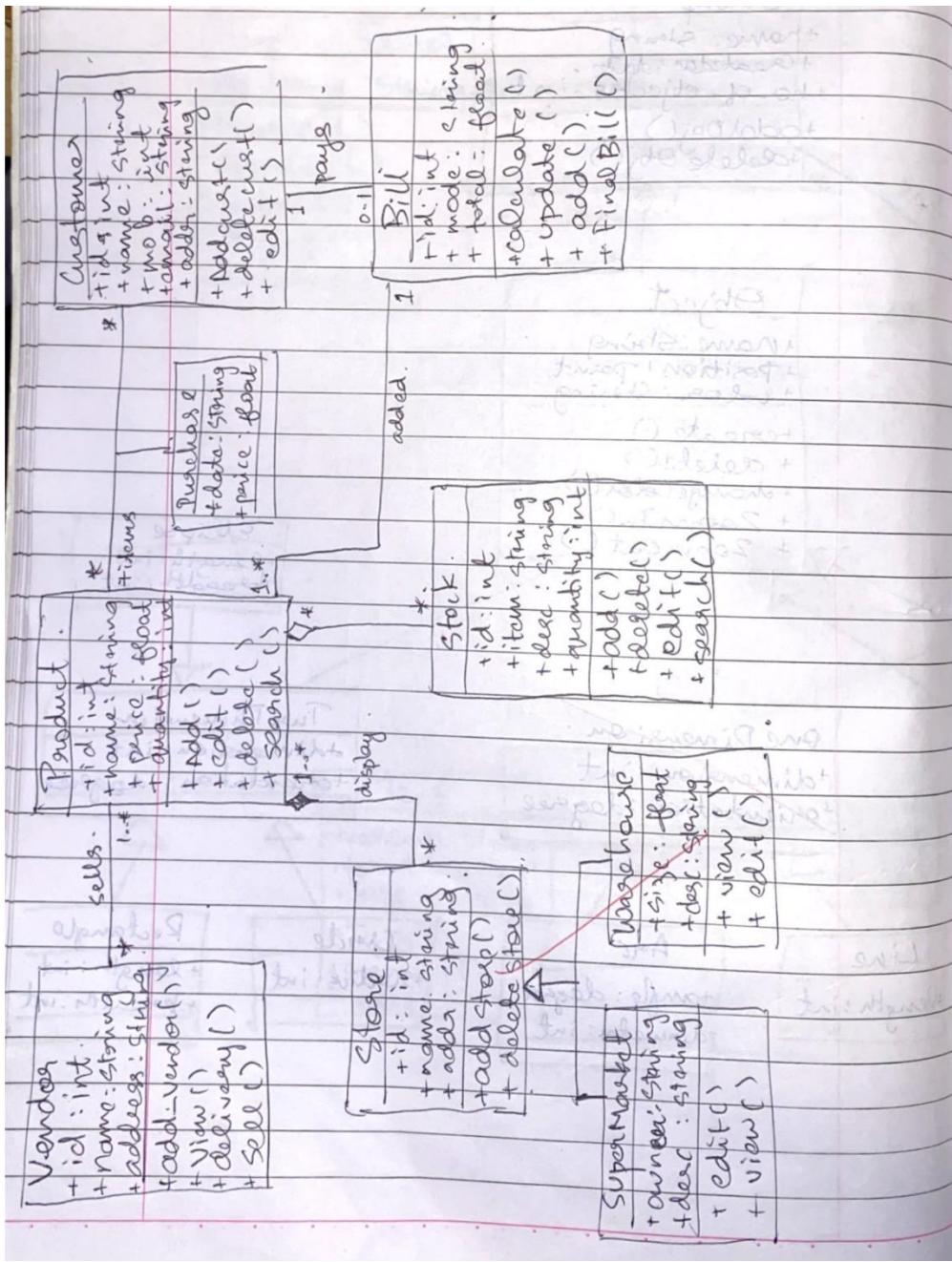
The stock maintenance system is basically for the customers who access the information about the stock and retrieves the information. The stock maintenance system is to replace the existing maintenance system which is inefficient. The new stock maintenance system will allow the employee to record information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

#### 3.2 Software Requirement Specification

Stock Maintenance System		Date _____ Page _____ SPLASH
<p>A employee will have to record information of items available in store and generate reports based on total amount of sales. This can be improvised by window-based desktop interface to allow employee to enter records and maintain.</p>		
<ol style="list-style-type: none"><li>1. Employee enter information of sales , purchase orders and create reports .</li></ol>		
<ol style="list-style-type: none"><li>2. Employee keeps records of all items in the shop and update accordingly.</li></ol>		
<ol style="list-style-type: none"><li>3. System retains cost details , expiry date , vendor details , discounts and quantities.</li></ol>		
<ol style="list-style-type: none"><li>4. Vendor can view and contact as per the details present .</li></ol>		
<ol style="list-style-type: none"><li>5. Customers can view the availability of their required items and check prices of items .</li></ol>		
<ol style="list-style-type: none"><li>6. Customers edit and can update their profile page giving necessary details .</li></ol>		
<ol style="list-style-type: none"><li>7. Customers place orders for required products from catalog .</li></ol>		
<ol style="list-style-type: none"><li>8. Vendors can view customer details and requests and place orders .</li></ol>		

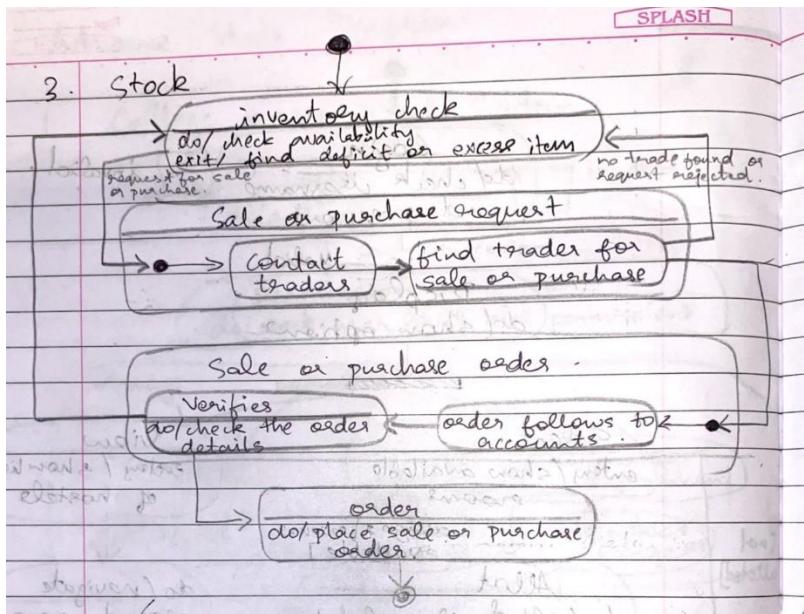
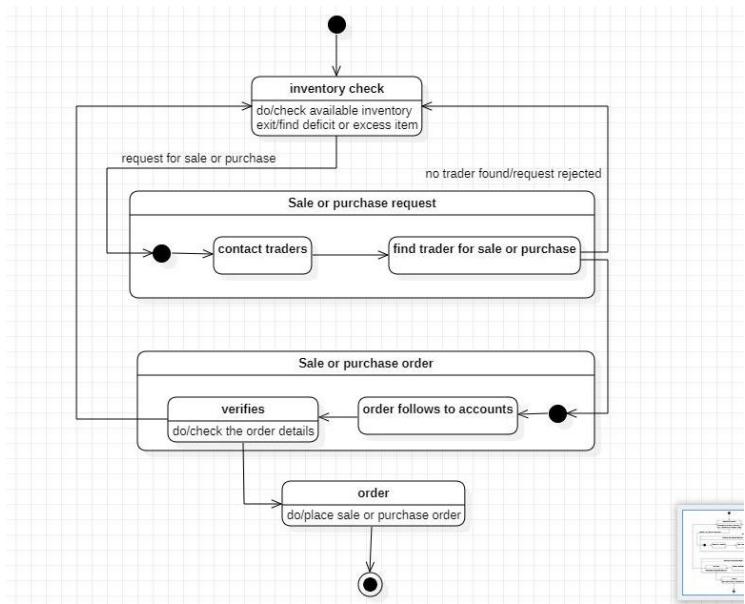
### 3.3 Class Diagram





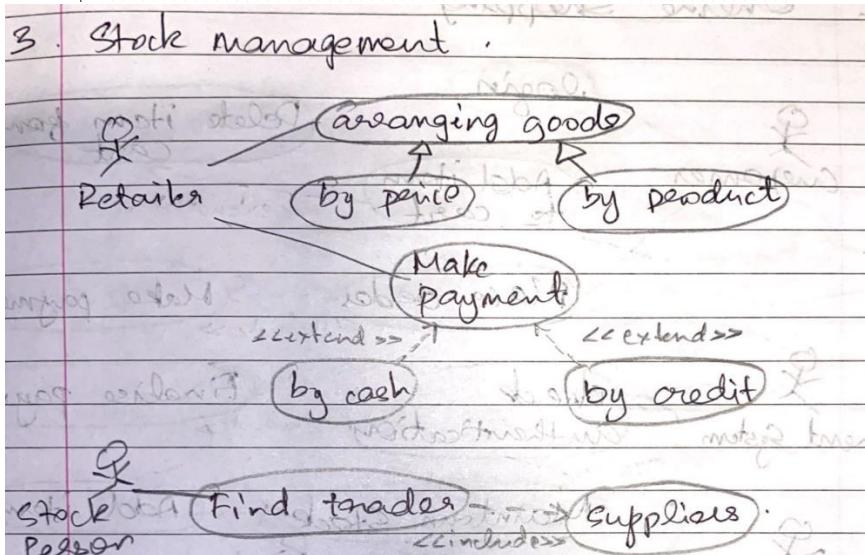
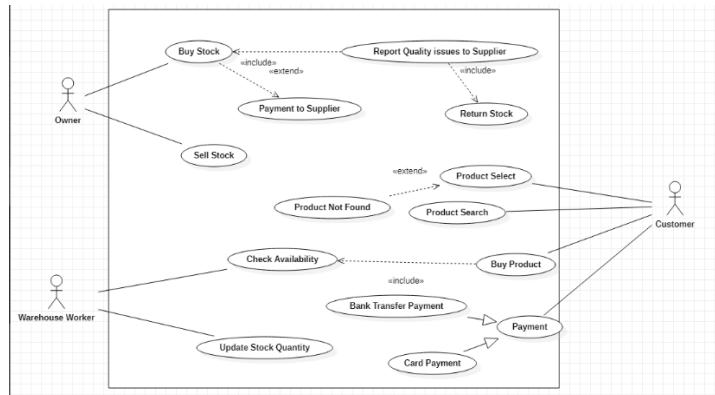
The products are displayed in stores across the city or world. All the information regarding the store are used to locate any product. The stores can be of many types. Some of them are departmental stores, super markets and ware houses where the products are kept for display. The vendor deals with the 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



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 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.

### 3.4 Use Case Diagram



#### Actors:

Customer: a person who purchases the products

Retailer: a person who sells the products

Stock person : a person who keeps check of the stock

Supplier: a person who supplies 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

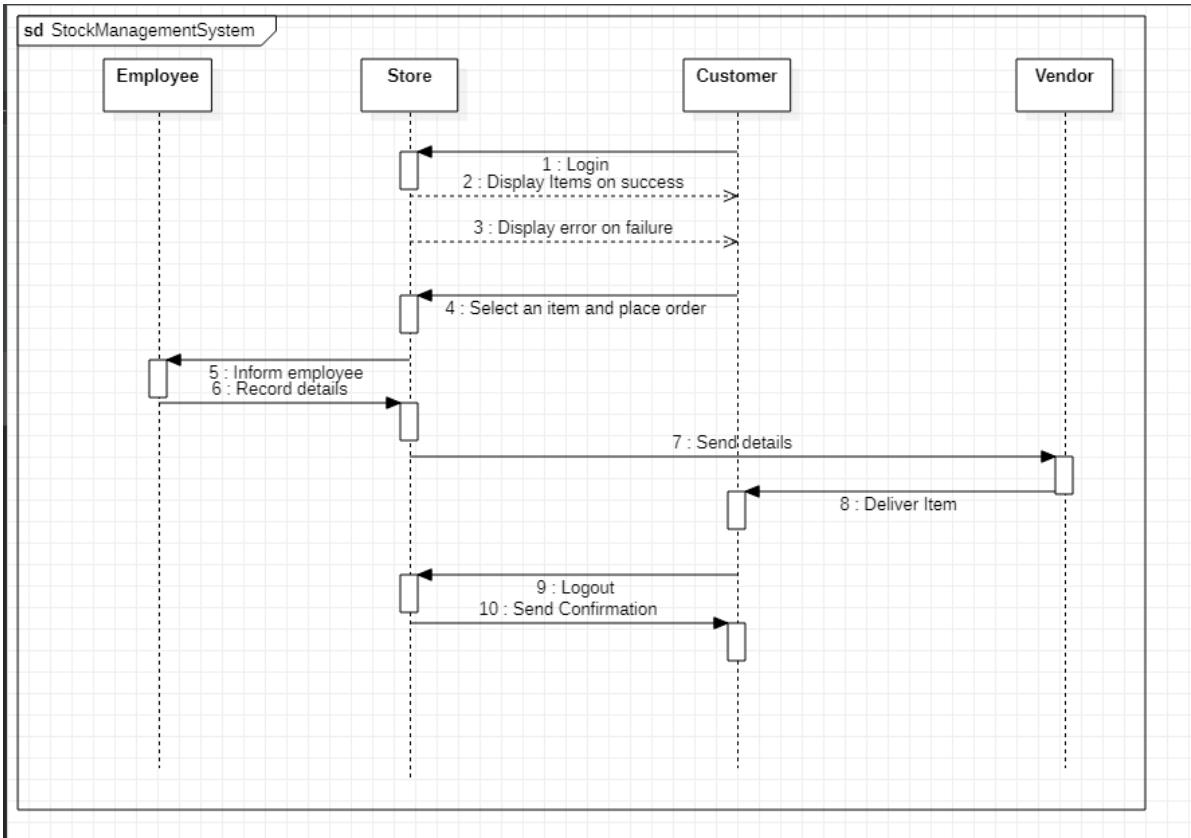
Find traders: provides a list of traders

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

### 3.5 Sequence Diagram



Place request for purchase/sale of stock

Contact seller for purchase/sale

Seller confirms purchase/sale

Confirmed purchase/sale order

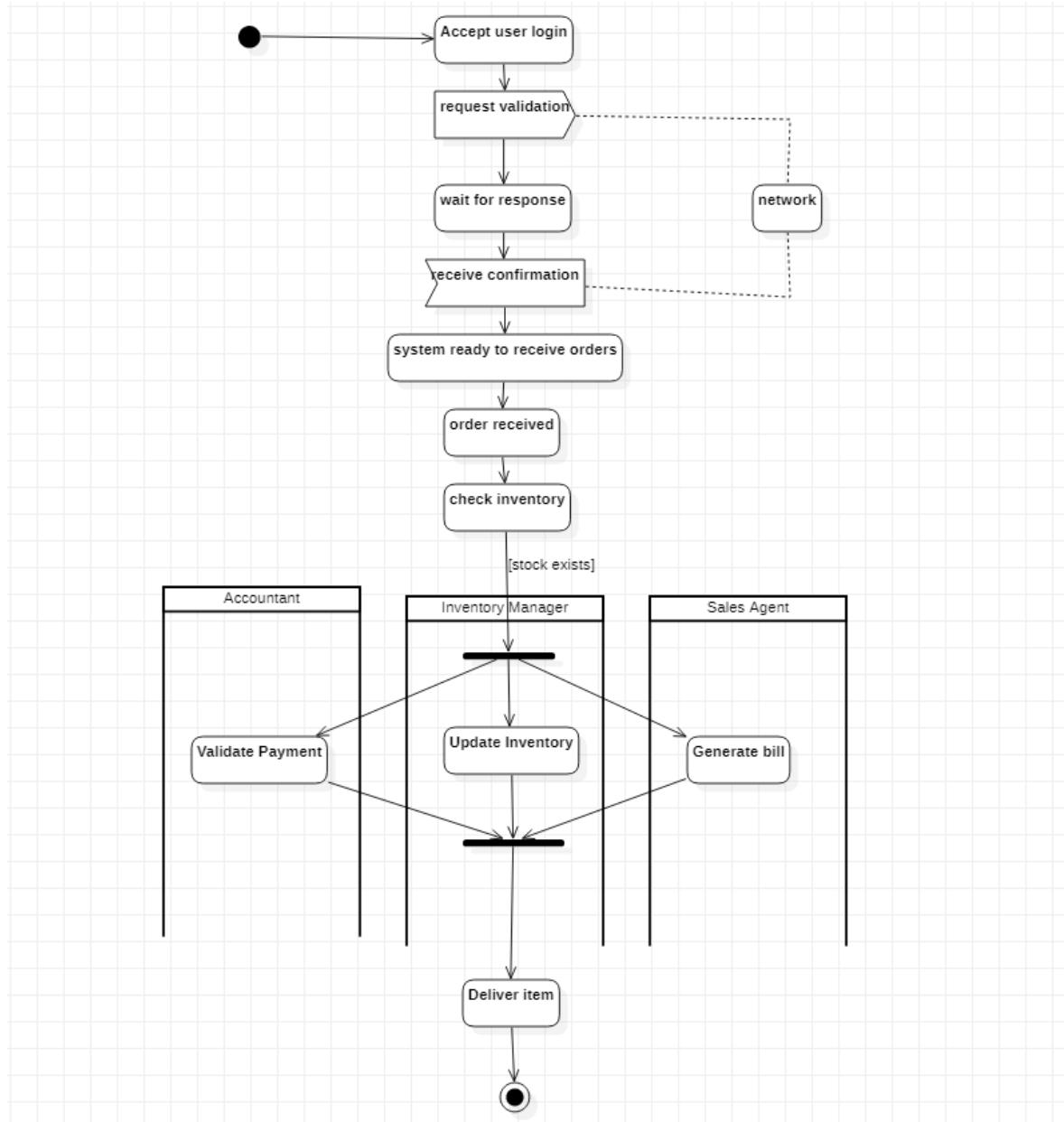
Check available balance in case of purchase order

Purchase/sale order possible

Purchase/sale order approved

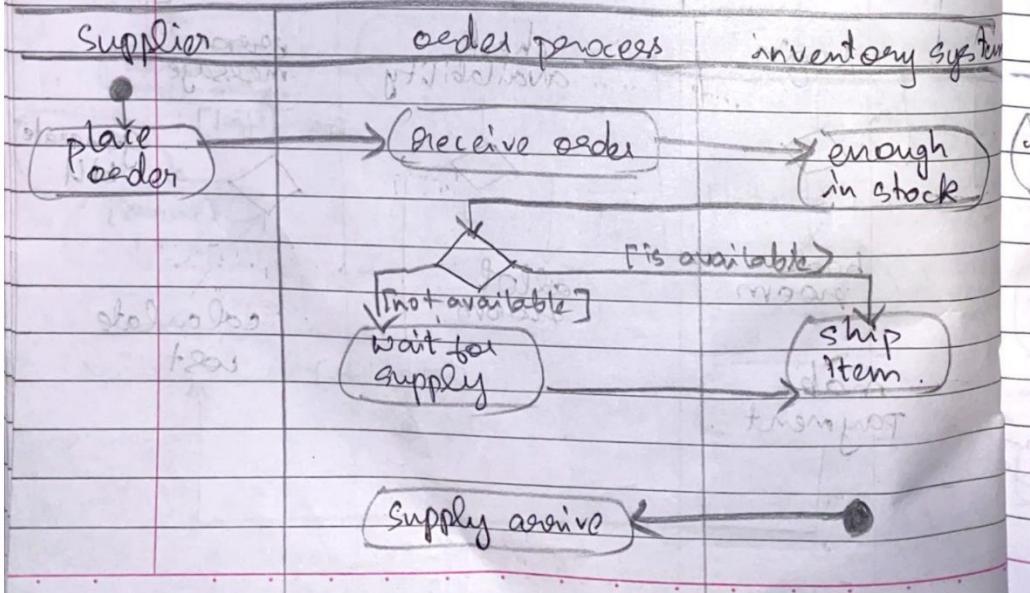
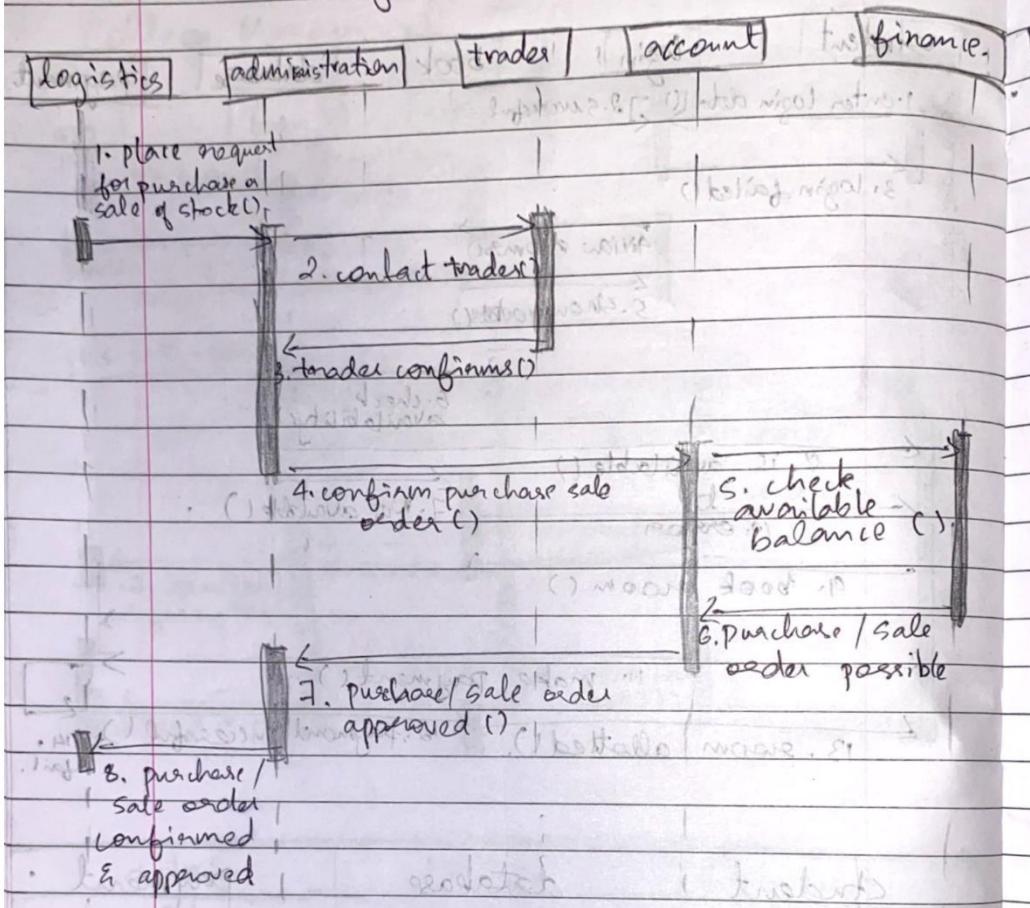
Purchase/sale of stock confirmed and approved.

### 3.6 Activity Diagram



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

### 3. Stock Management.

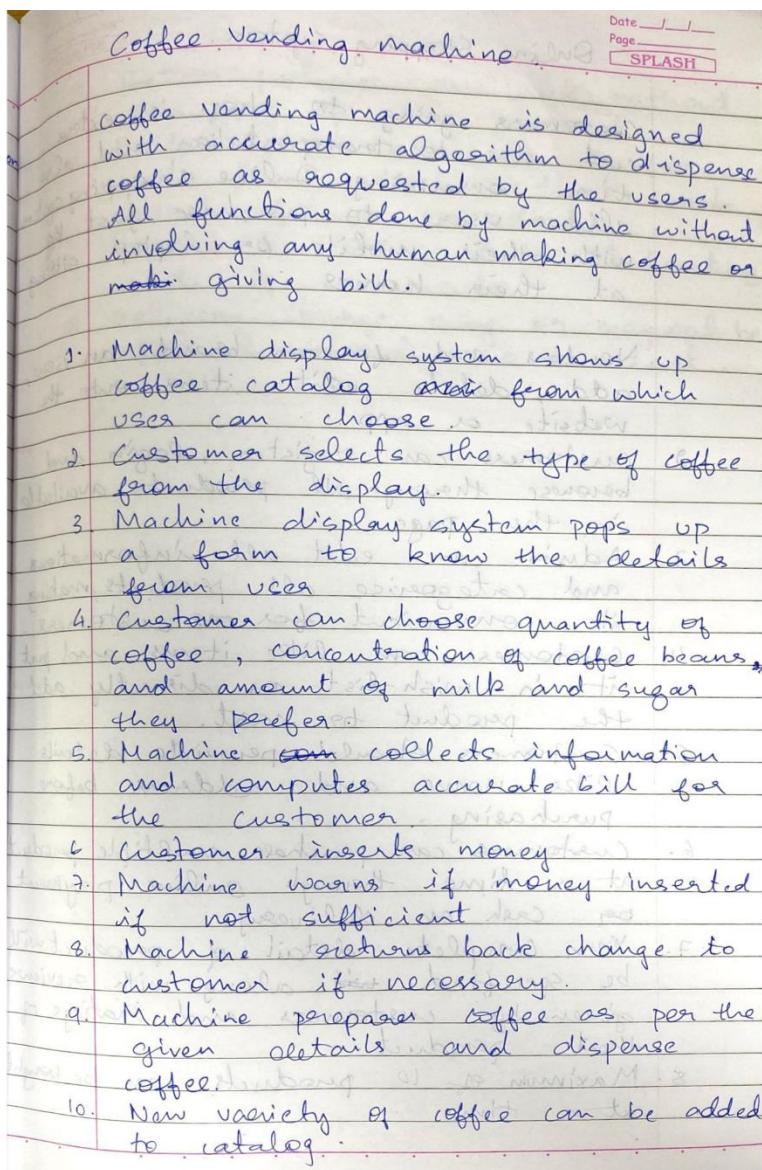


## 4. COFFEE VENDING MACHINE

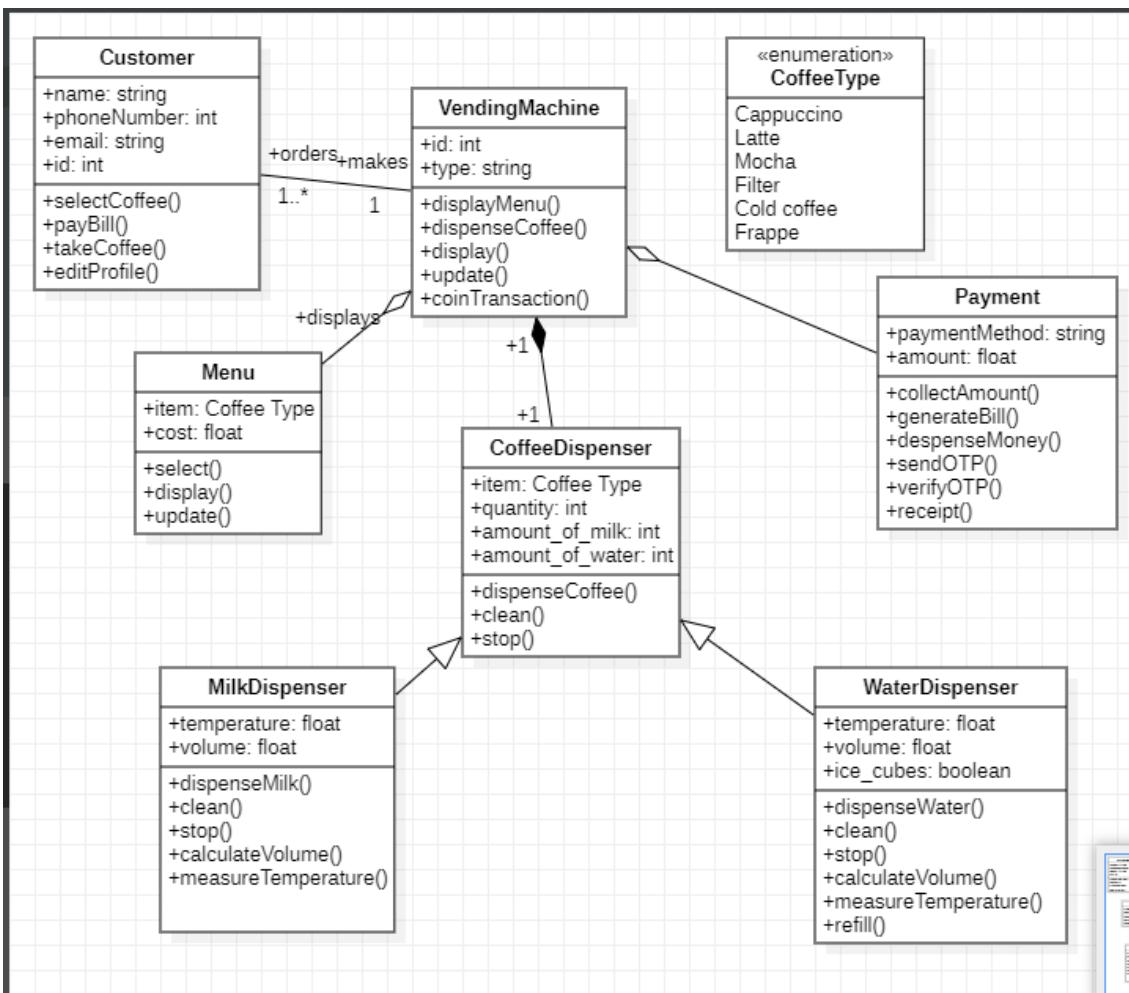
### 4.1 Problem statement

The coffee vending machine is basically for the customers to buy coffee by themselves without any 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.

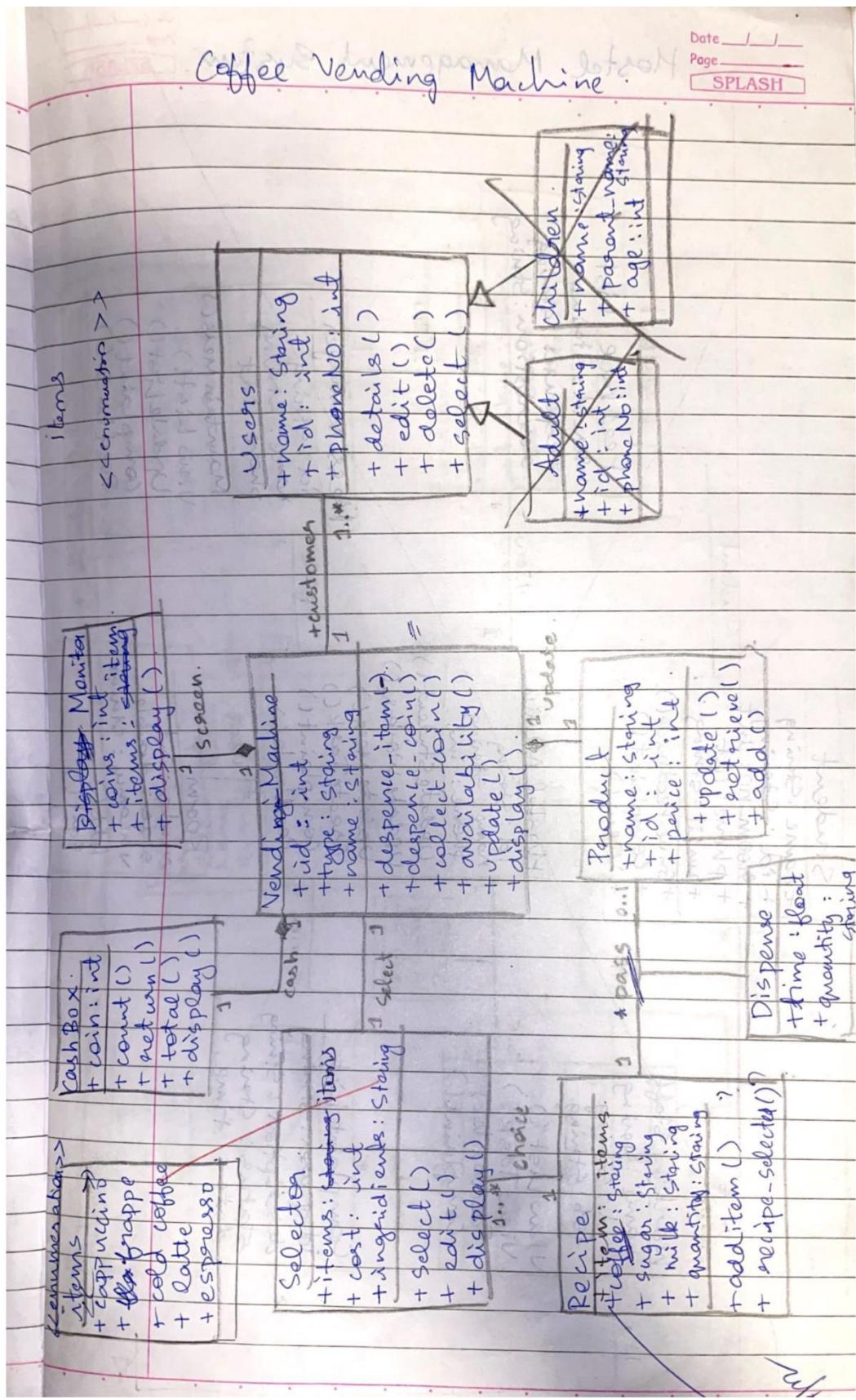
### 4.2 Software Requirement Specification



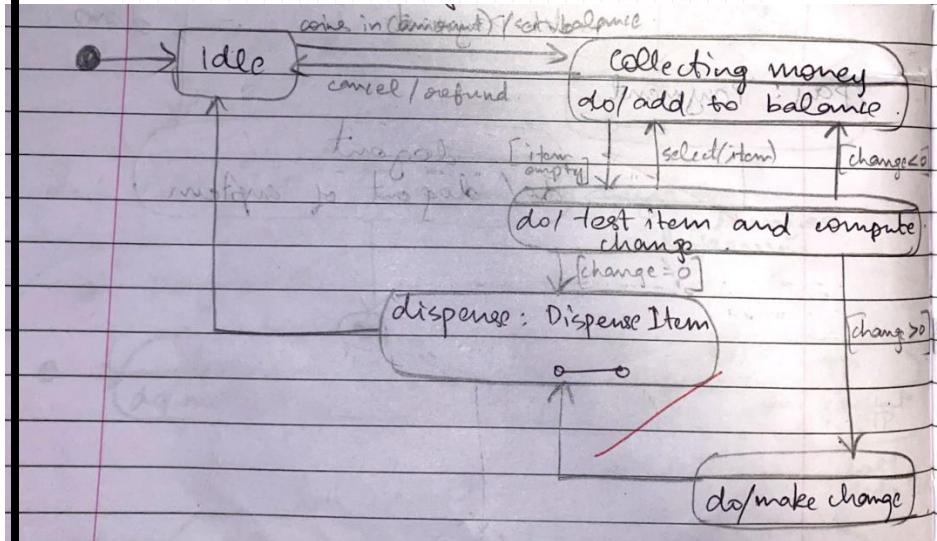
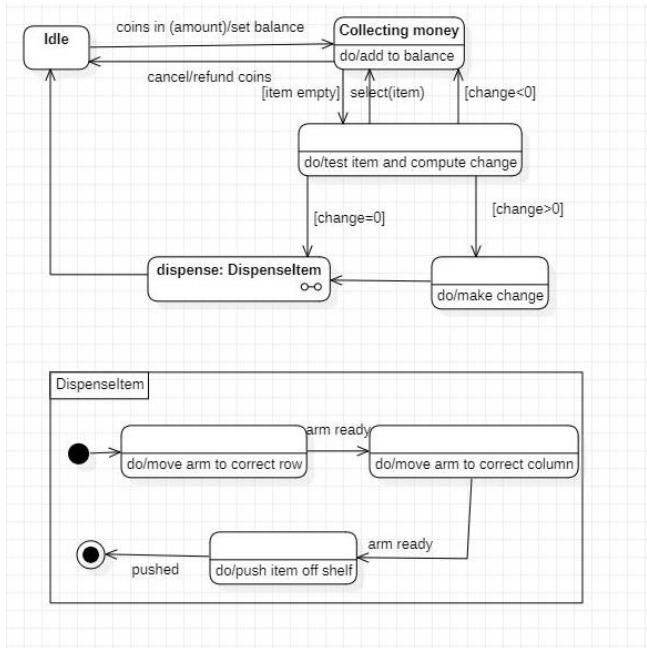
### 4.3 Class Diagram



The vending machine must have 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 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.



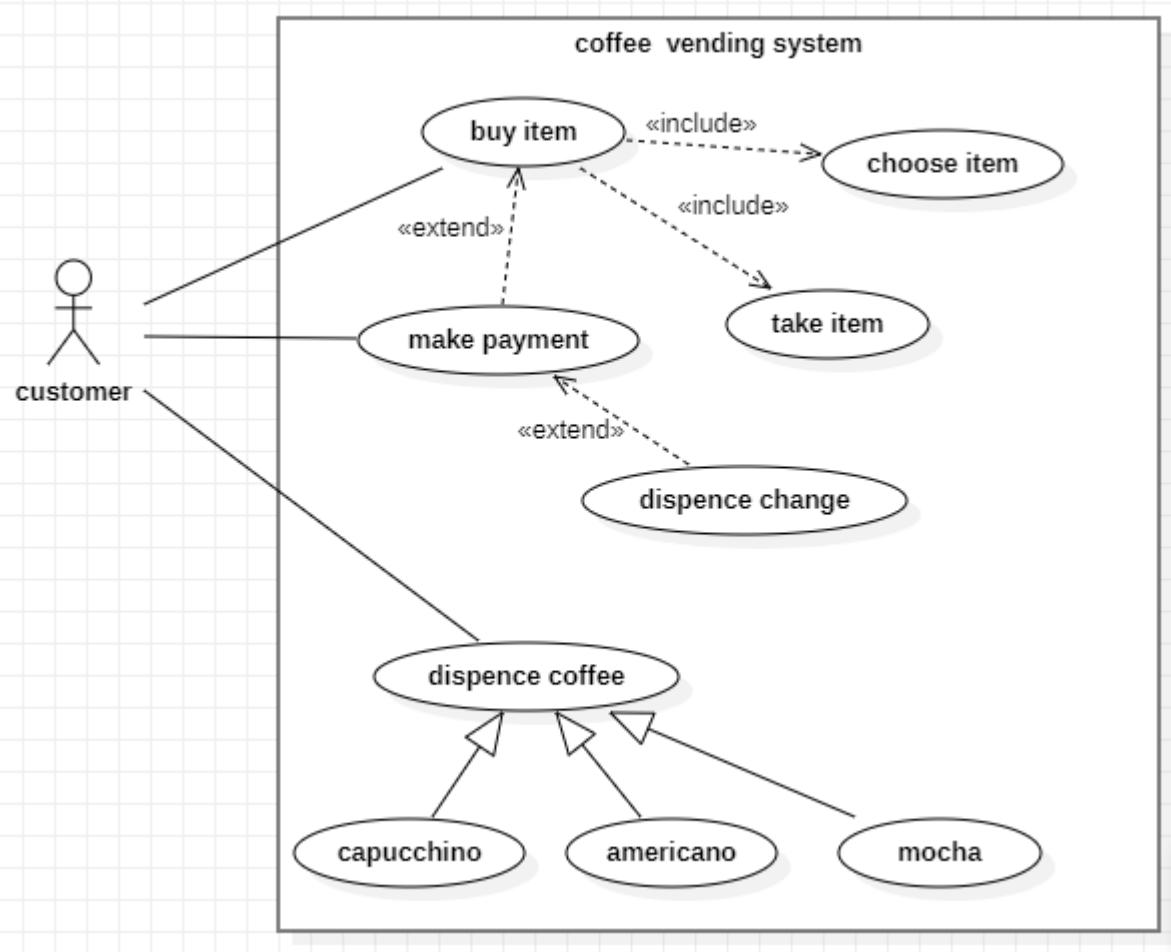
## 4.4 State Diagrams

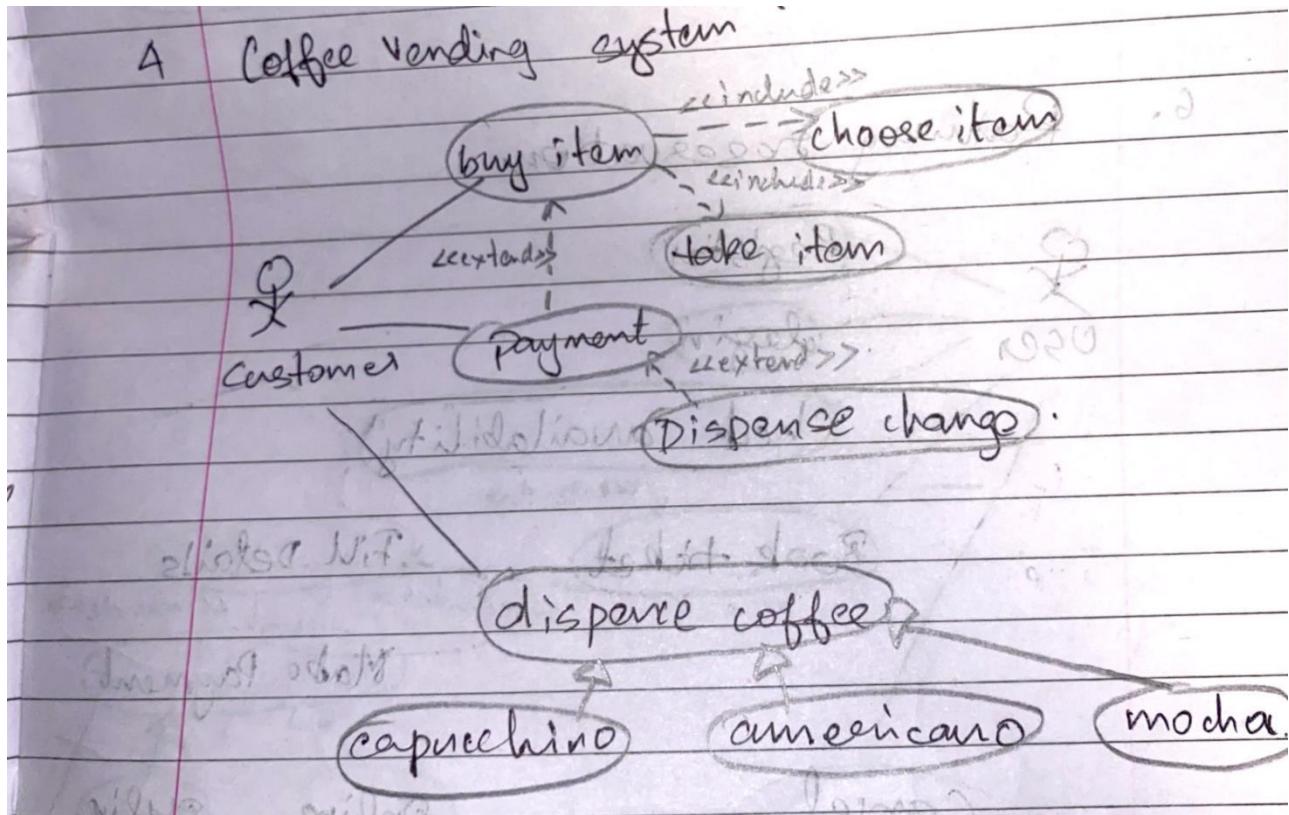


Initially the vending machine is in the waiting state. The machine displays the selected item selected by the user. When the person inserts a coin the machine adds the amount to he cumulative balance. After adding some coins, a person can select nay item. If item is empty or balance is insufficient,the machine waits for another selection. Otherwise the machine dispense 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 dispences the item from the machine.

## 4.5 Use Case Diagram





### Actors:

Customer : a person who uses the coffee vending machine

Stock clerk : a person who maintains the stock

Coffee vending : a person who maintains the machine

### Use Case:

Display payment details : displays the payment details

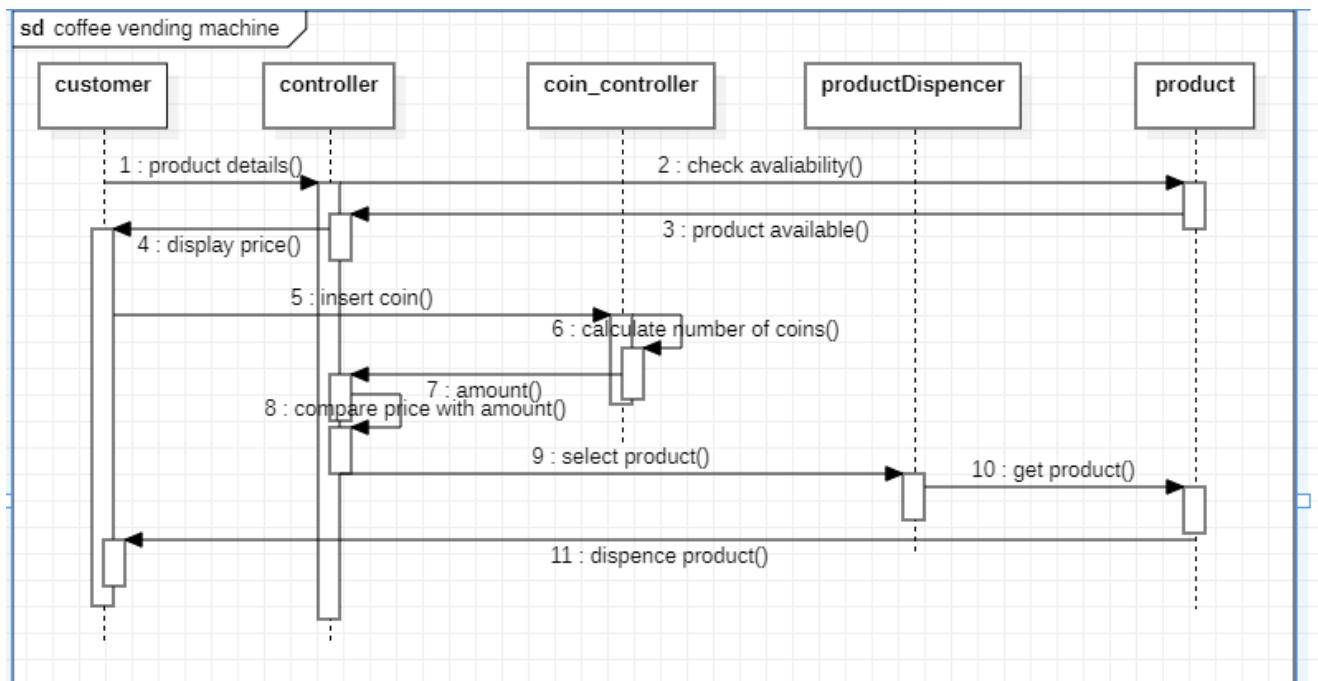
Request coffee : allows user to order their coffee

Make payment : accepts money for the coffee

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

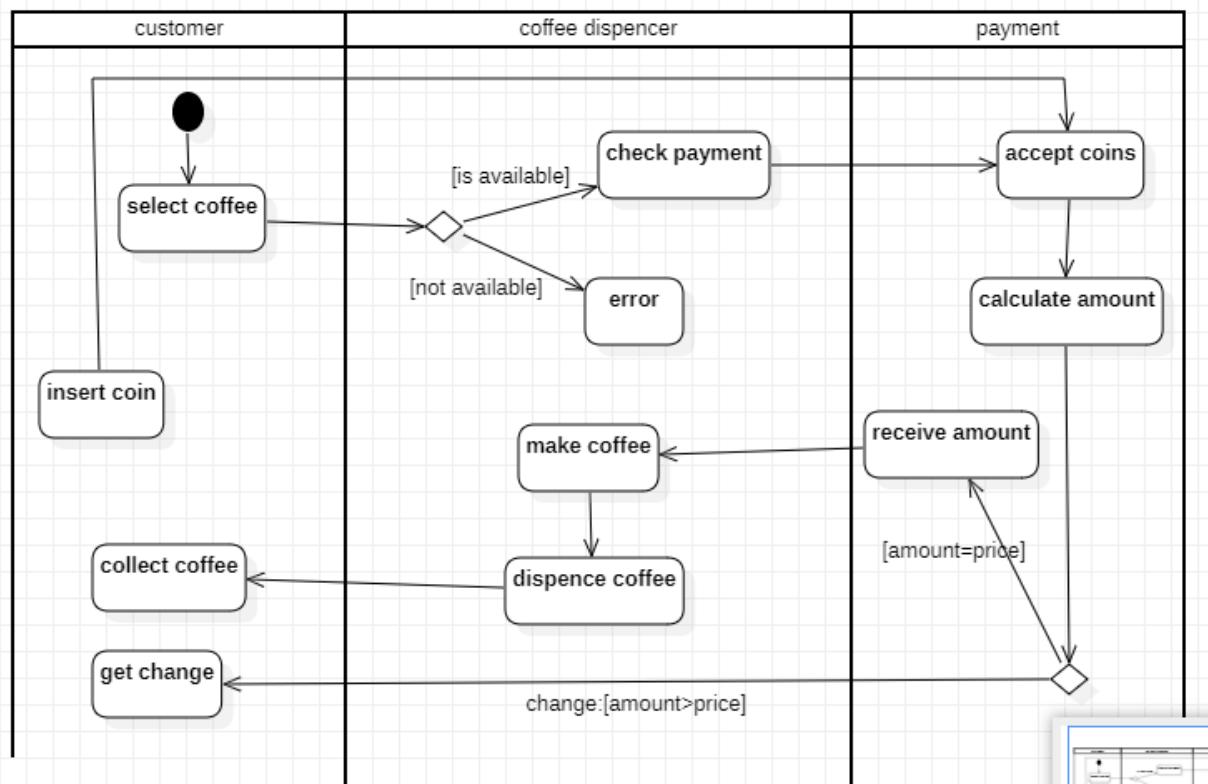
Dispense coffee : the coffee ordered is prepared and given

## 4.6 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 .

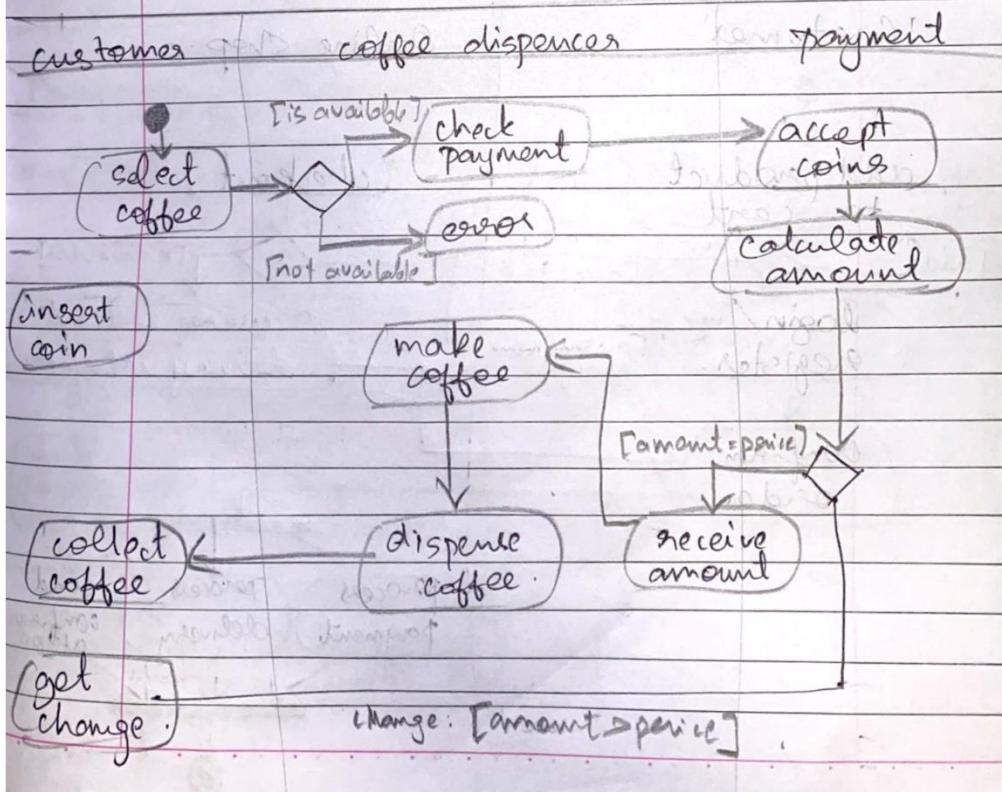
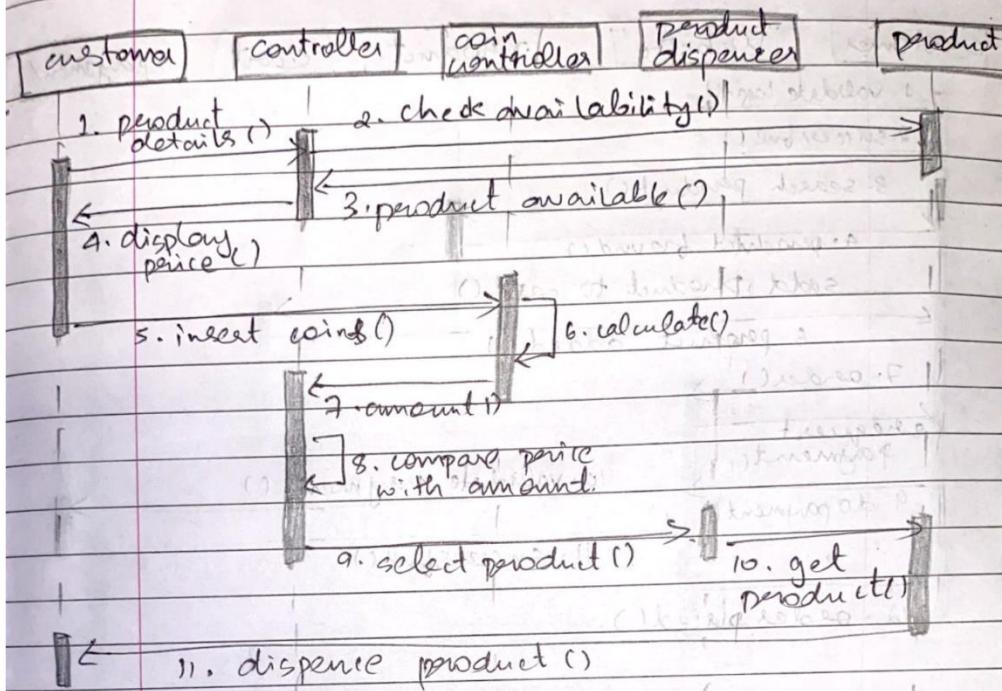
## 4.7 Activity Diagram



The activity diagram above receives the order and forks into two activities i.e make coffee and display order . on choosing an option if the user wants a receipt it gets printed otherwise no and order ends.

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.

### A. Coffee vending Machine

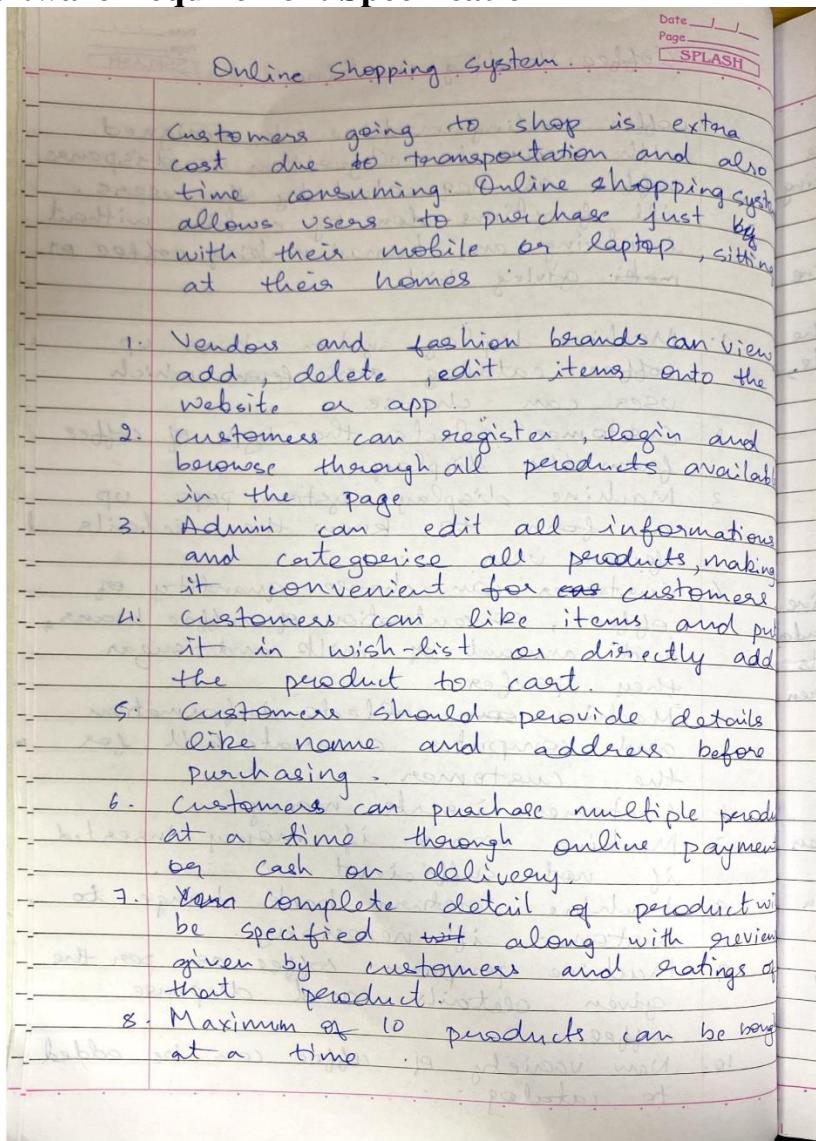


## 5. ONLINE SHOPPING SYSTEM

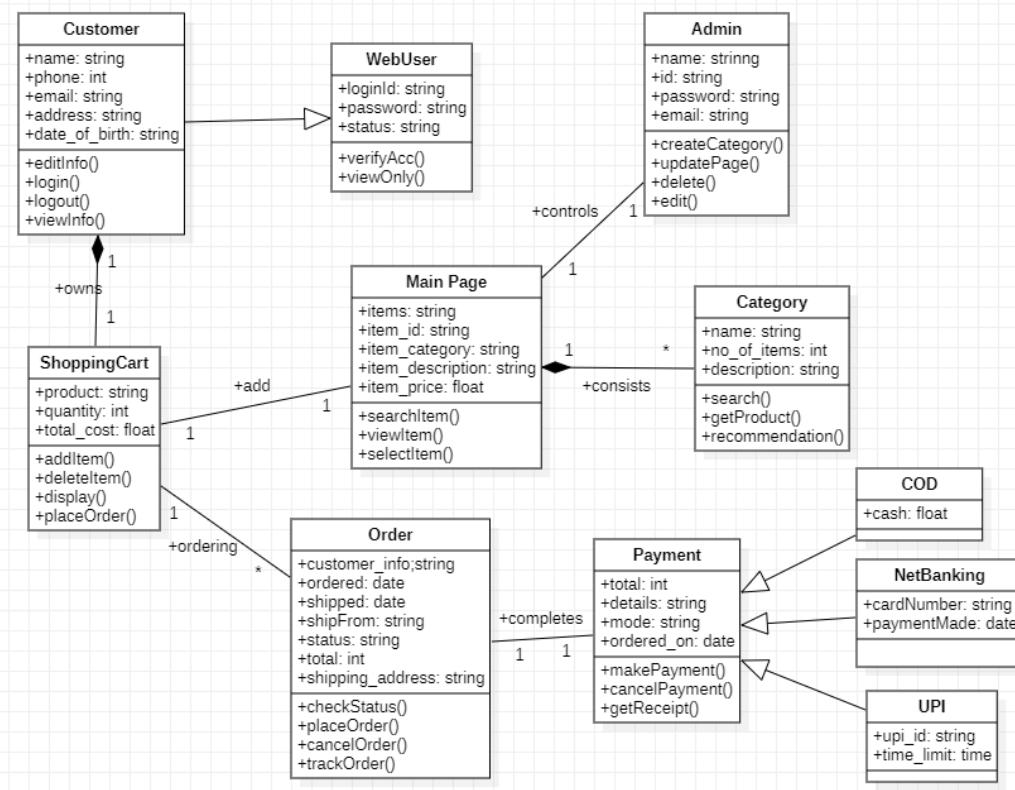
### 5.1 Problem statement

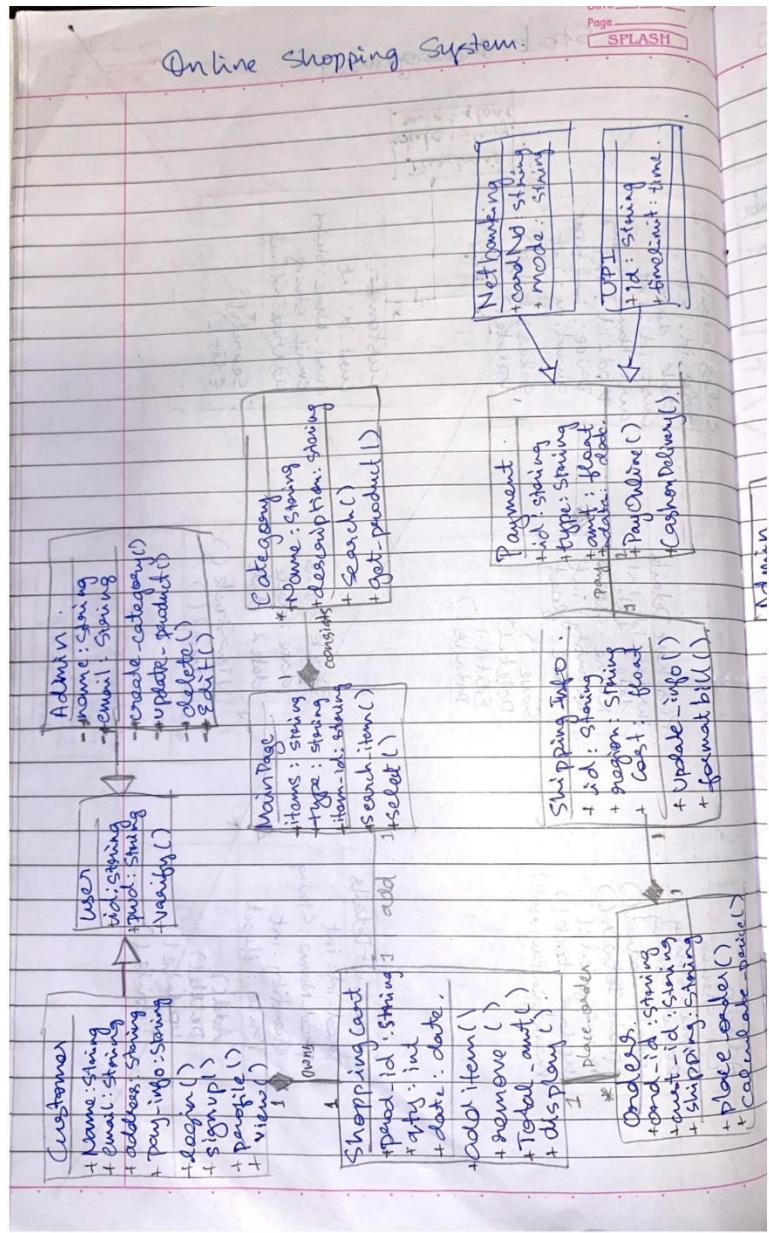
The Online Shopping System for all kind of products web application is intended to provide complete solutions for vendors as well as customers through a single get way using the internet. It will enable vendors to setup online shops, customer to browse through the shop and purchase them online without having to visit the shop physically. The administration module will enable a system 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 add or remove the product over the internet.

### 5.2 Software Requirement Specification



### 5.3 Class Diagram

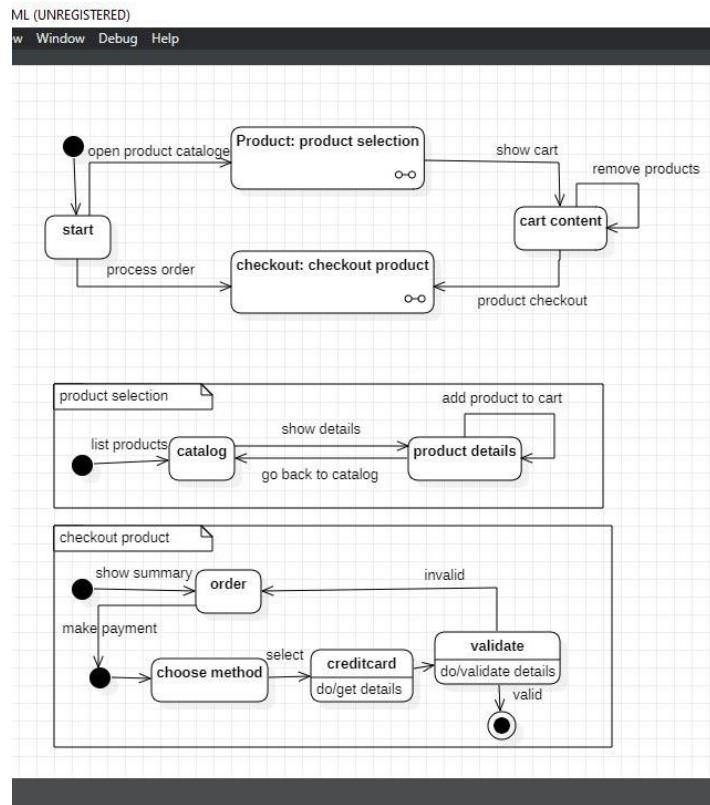


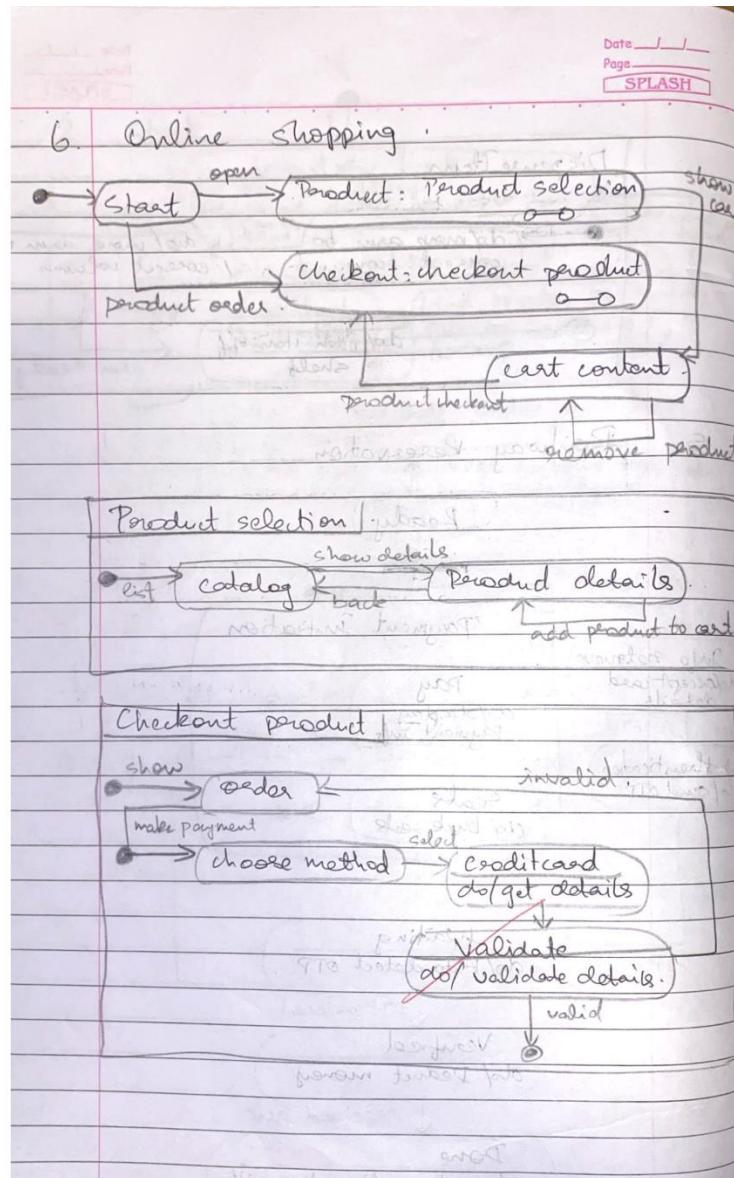


Scanned with CamScanner

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.

## 5.4 State Diagrams



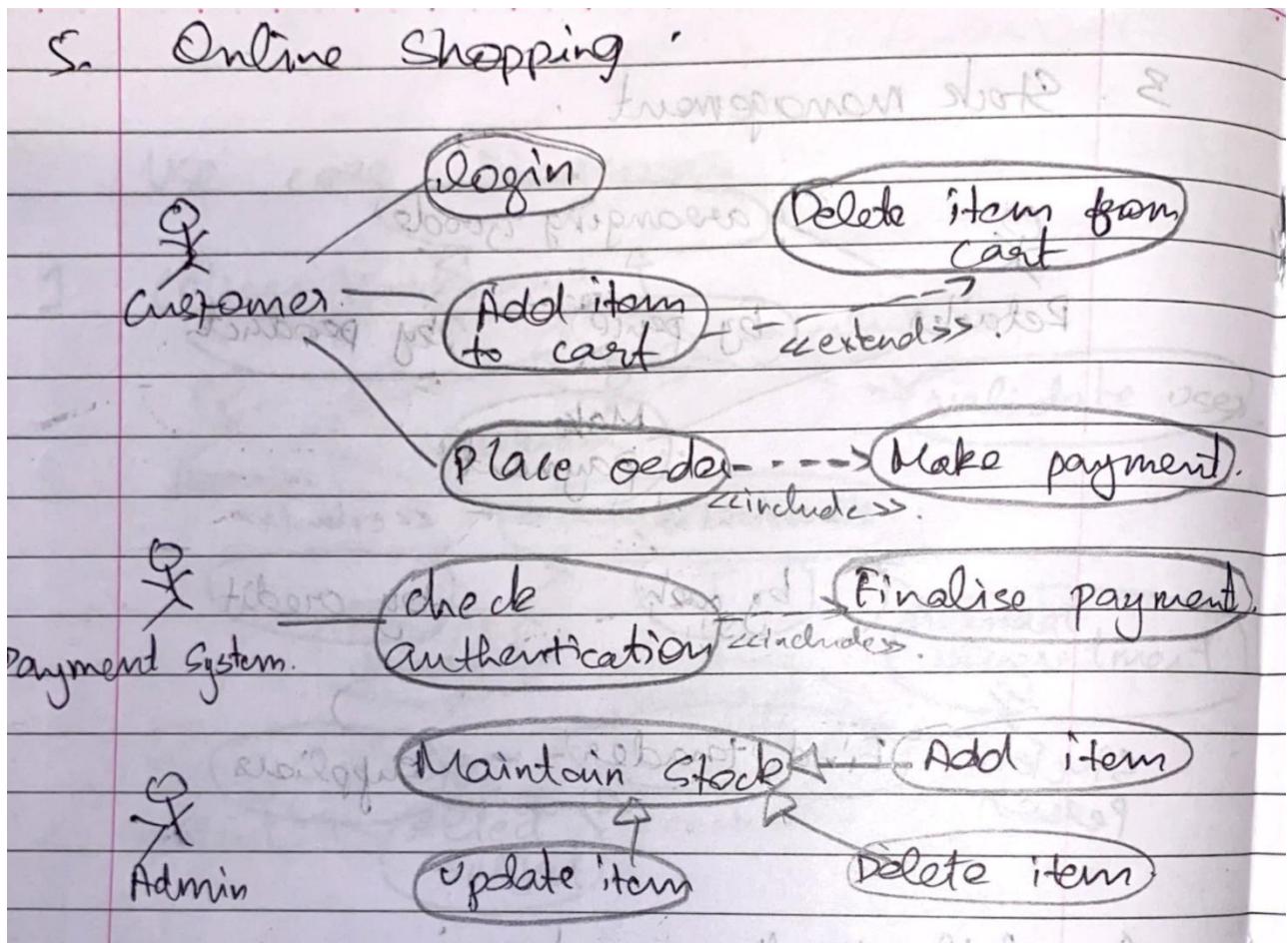


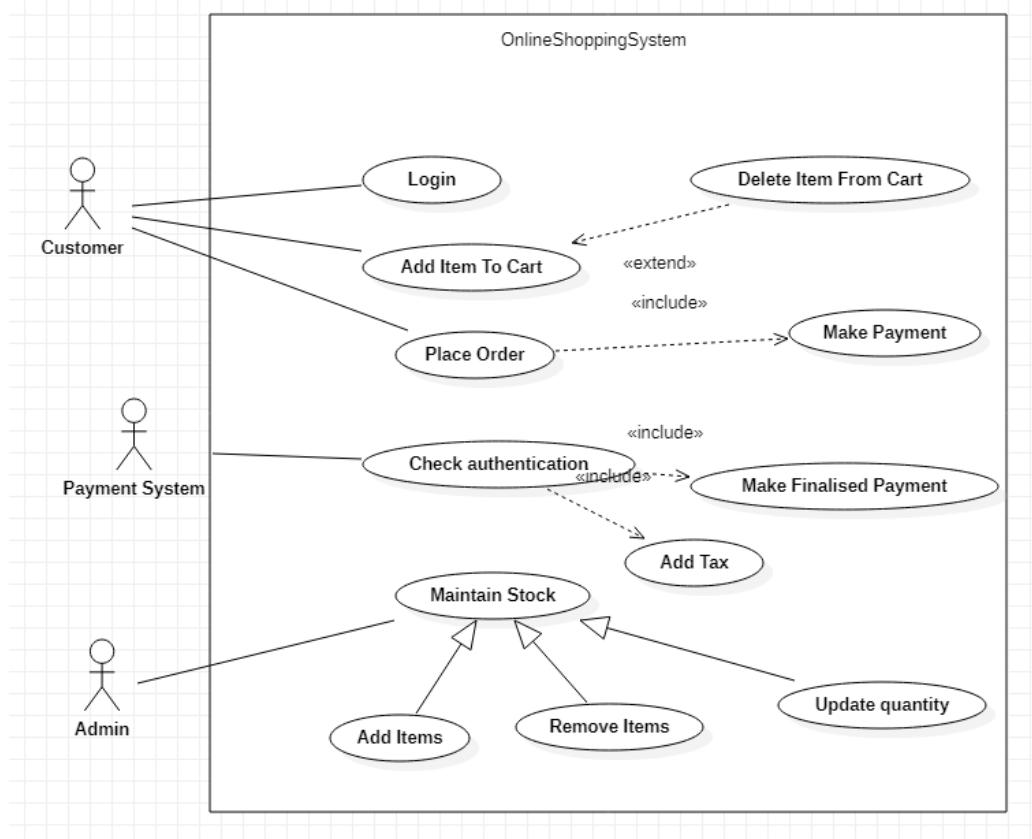
Scanned with CamScanner

The simple state chart diagram gives us states in purchasing a order and paying for the order. The customer is first mad to register and then login into their account. Then the items are displayed,where they can select their choice and add them to cart or reserve or order them. The transaction details are displayed.

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 paymentmethods and validating the methods.

## 5.5 Use Case Diagram





### Actors:

Customer: a person who uses the online shopping system

Supplier : person who supplies products

Payment System: person who handles the payment

Delivery executive : a person who manages the delivery

### Use Case:

view product details : displays all product details

Place order : order the items present in the cart

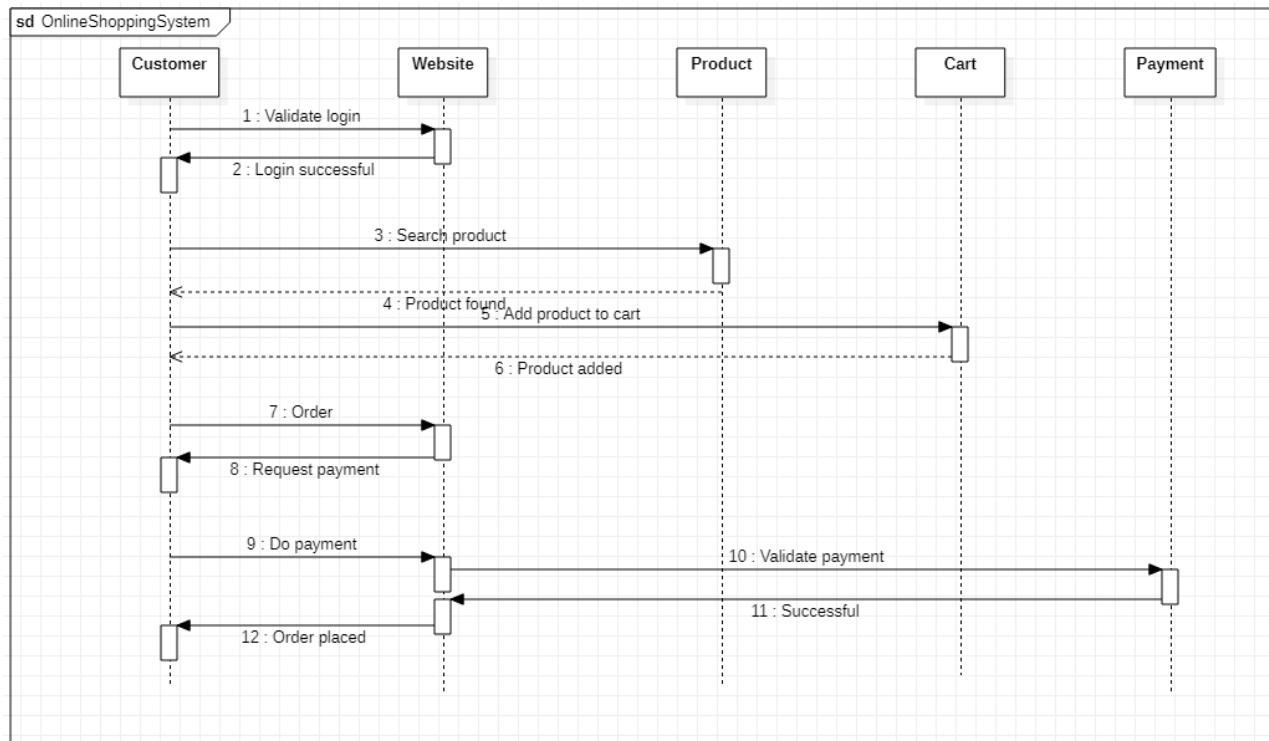
Make payment : accepts payment for the products purchased

Deliver product : delivery of the product is handled

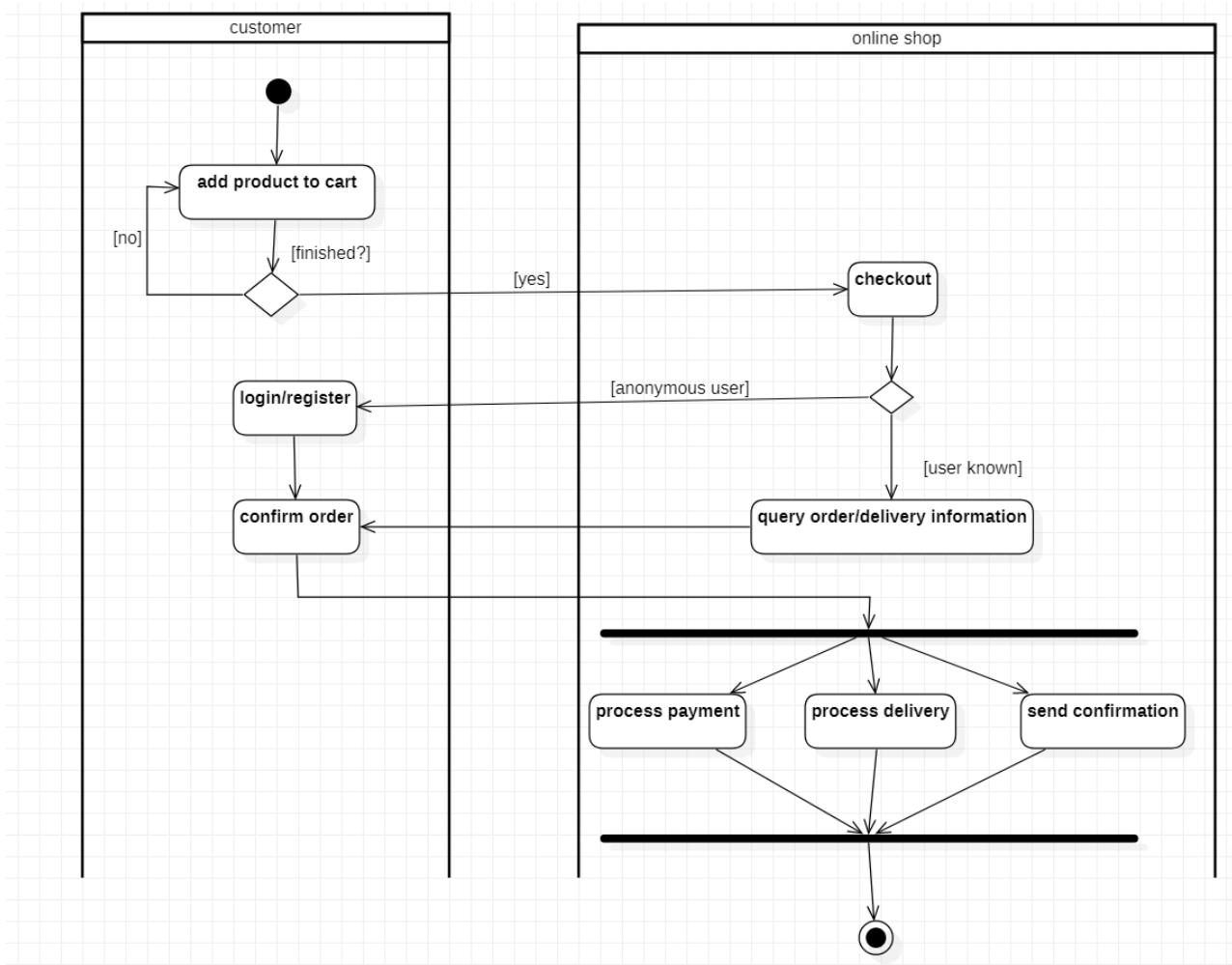
Supply Product : product supply is maintained

Maintain Stock : stock availability is checked

## 5.6 Sequence Diagram

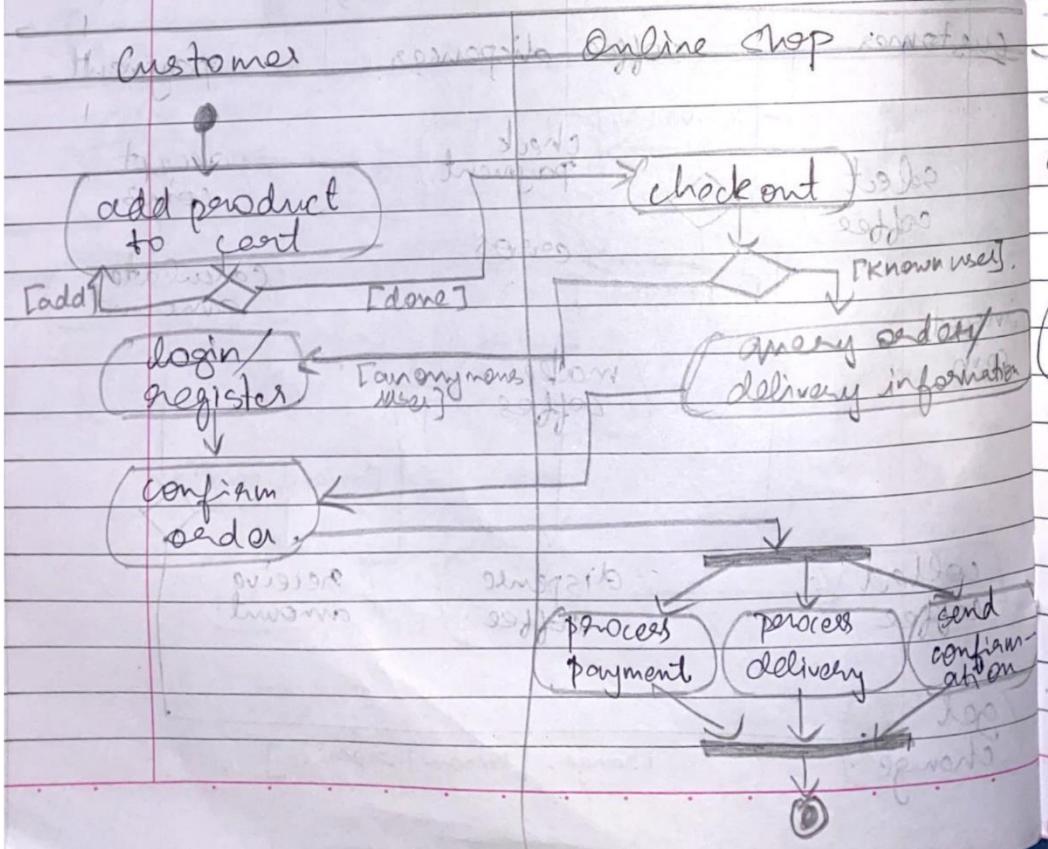
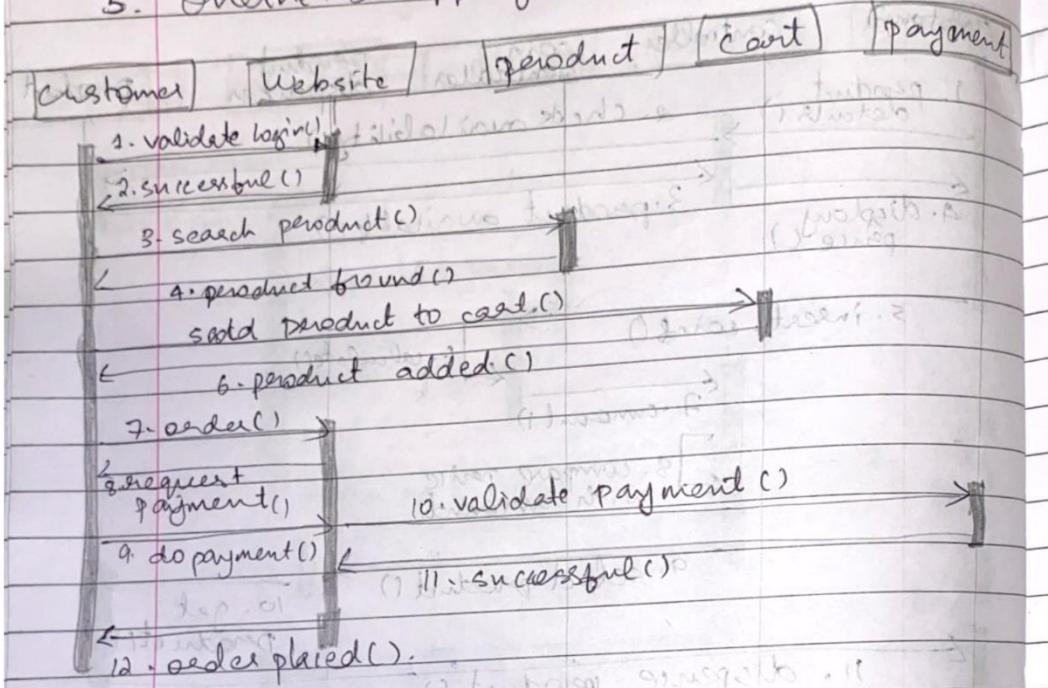


## 5.7 Activity Diagram



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.

## 5. Online Shopping

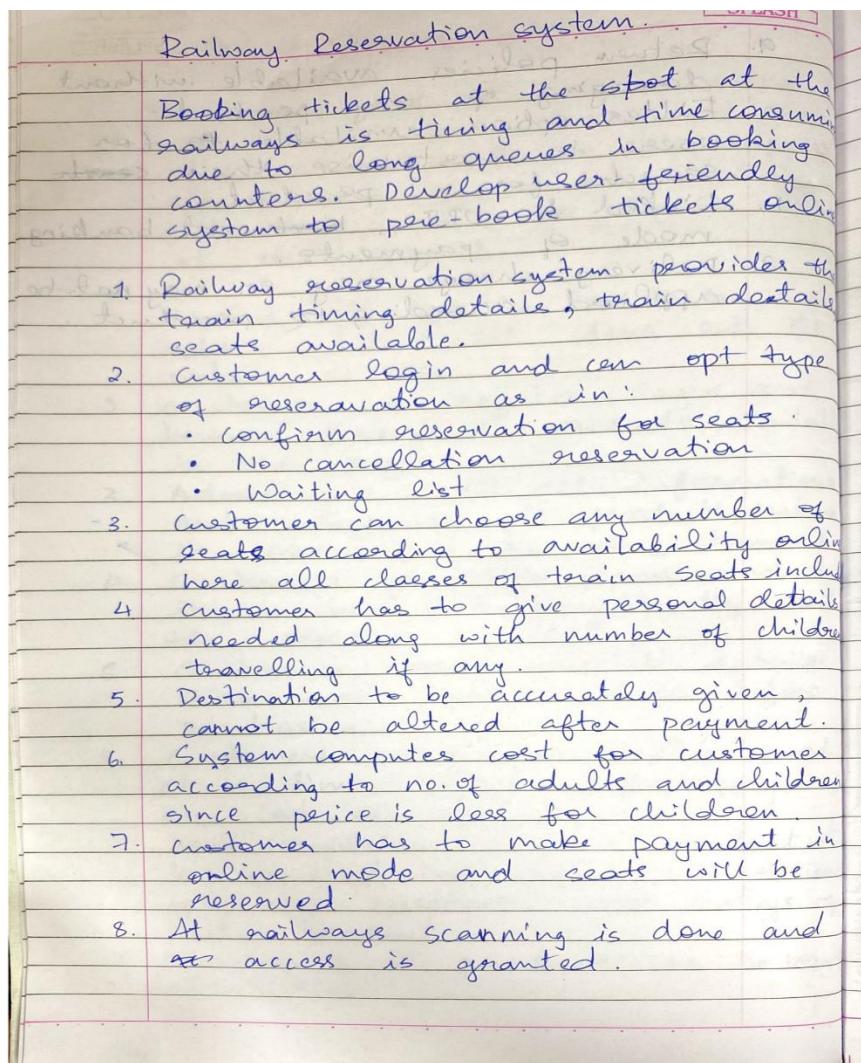


## 6. RAILWAY RESERVATION SYSTEM

### 6.1 Problem statement

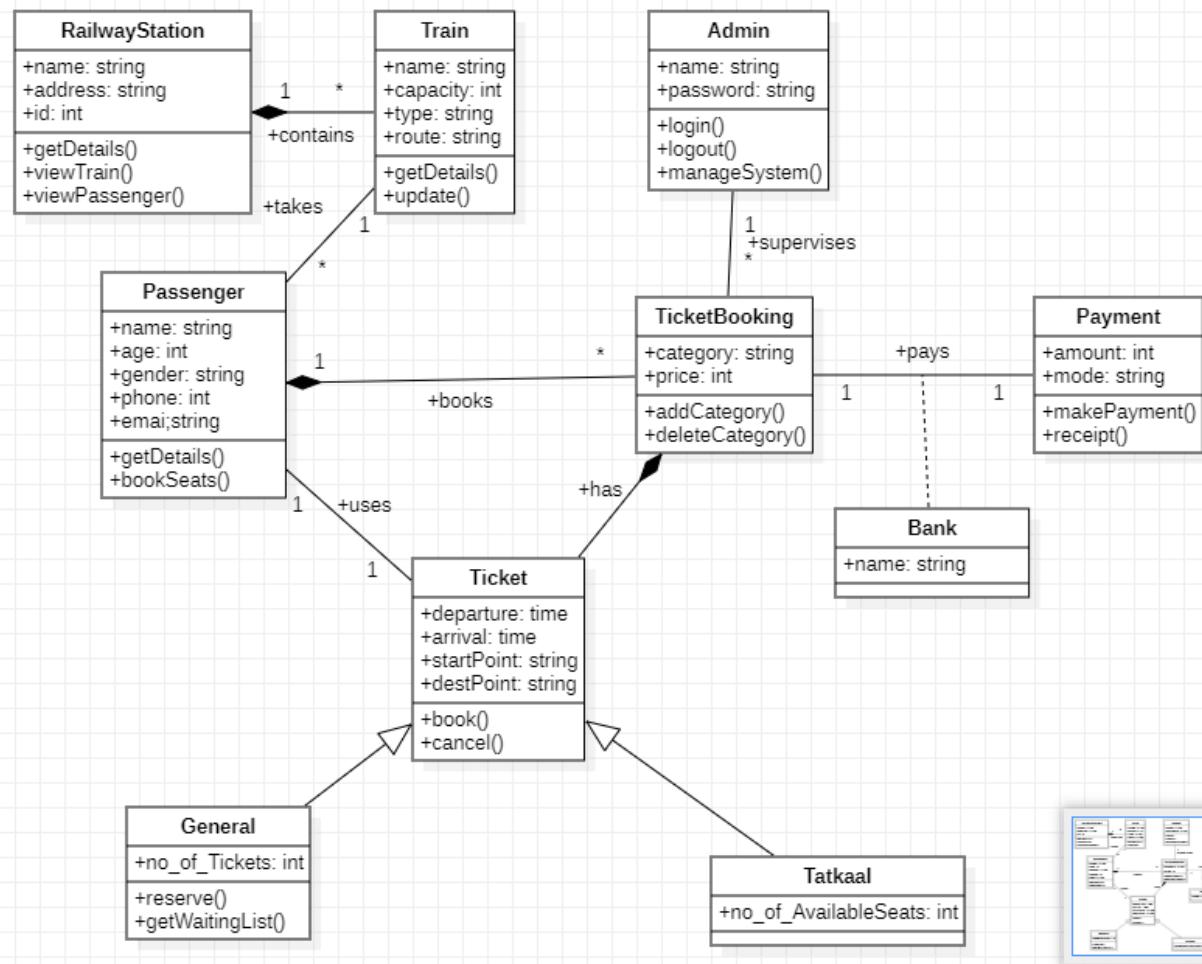
Railway Reservation System is a system used for booking tickets over internet. Any Customer Can book tickets for different trains. Software has to be developed for automating the manual reservation system of railway. The system should be standalone in nature. It should be designed to provide functionalists like booking of tickets in which a user should be able to applied for tickets of any train and of any class. The software takes the current system date and time as the date of issue and calculates the amount to be paid by the user. It also provide the functionality of cancellation of tickets.

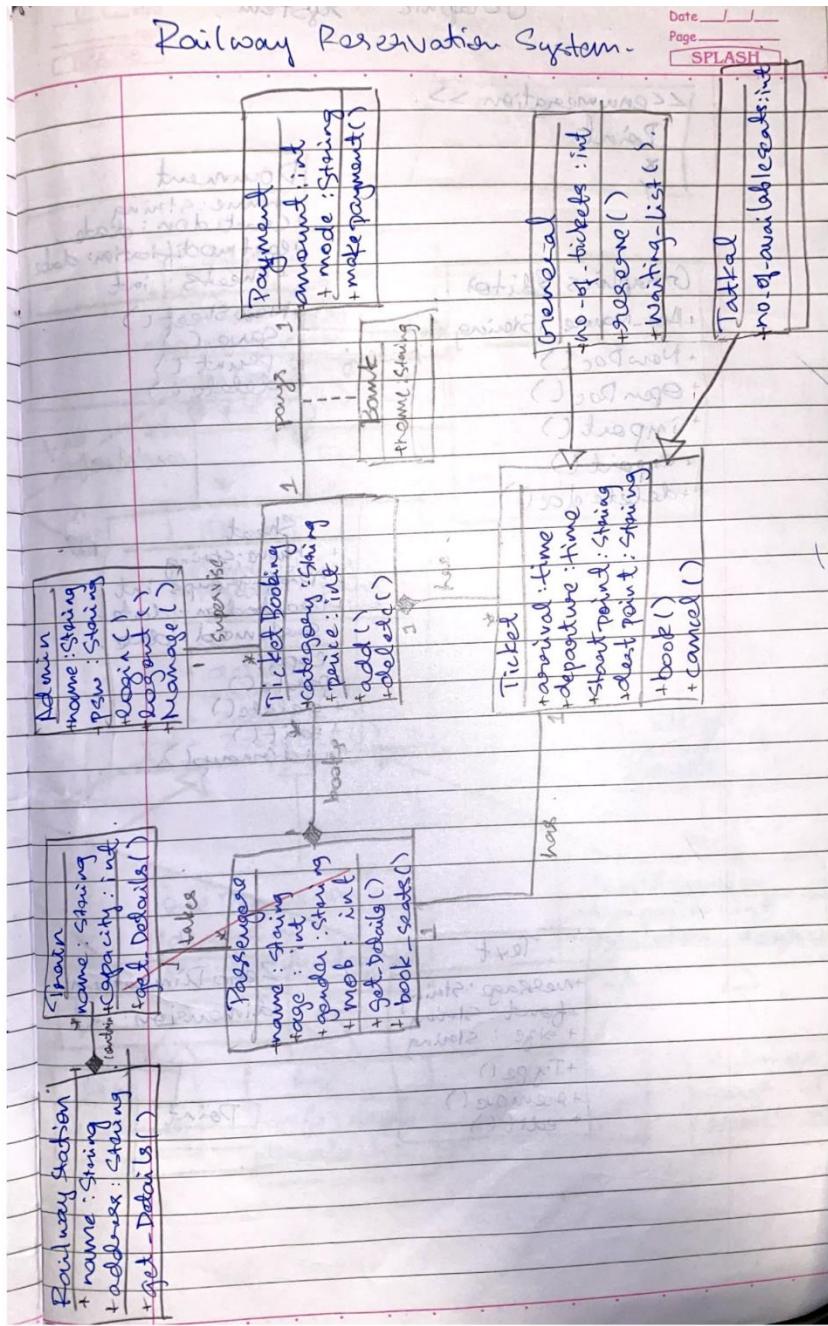
### 6.2 Software Requirement Specification



Scanned with CamScanner

### 6.3 Class Diagram

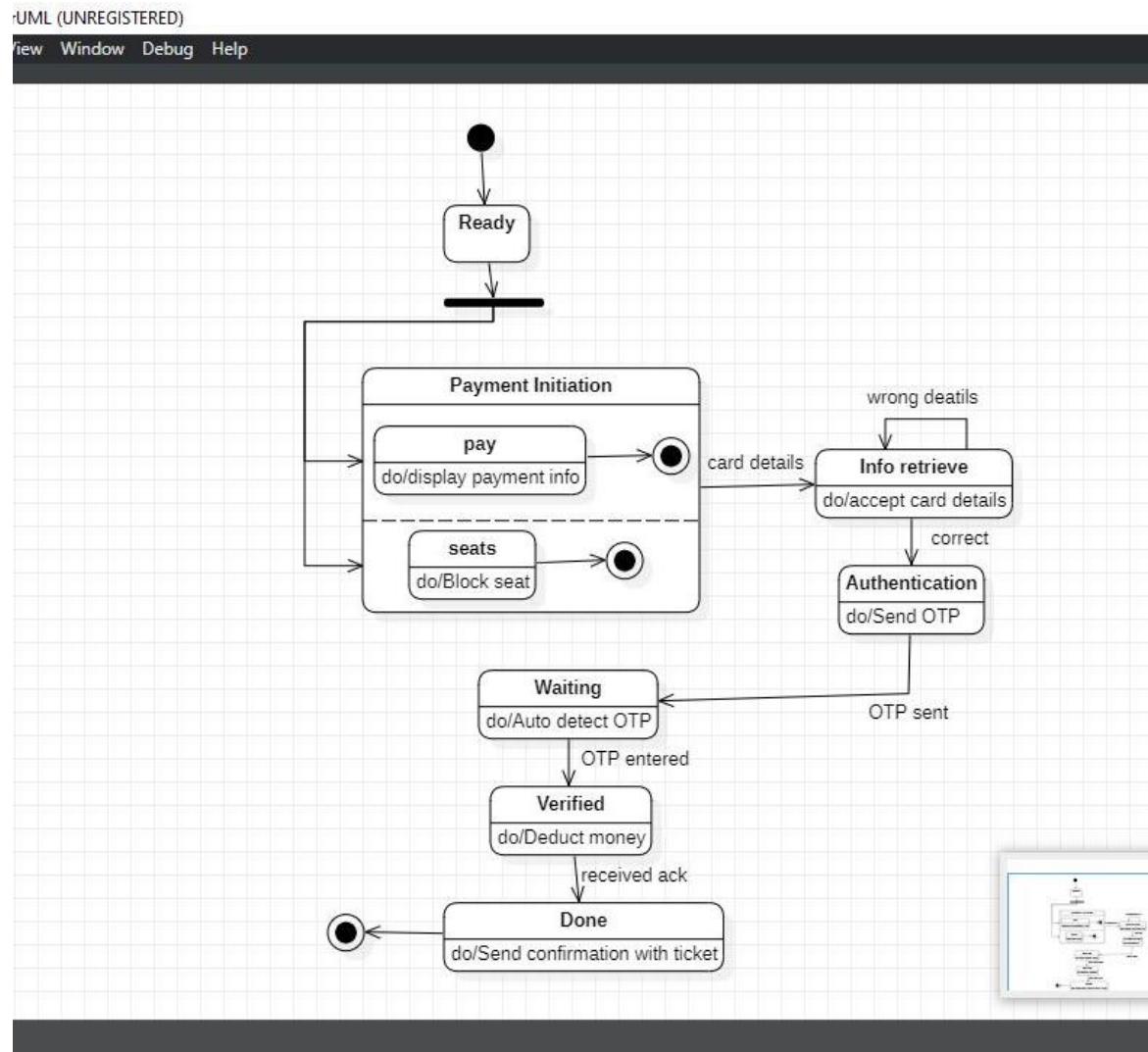




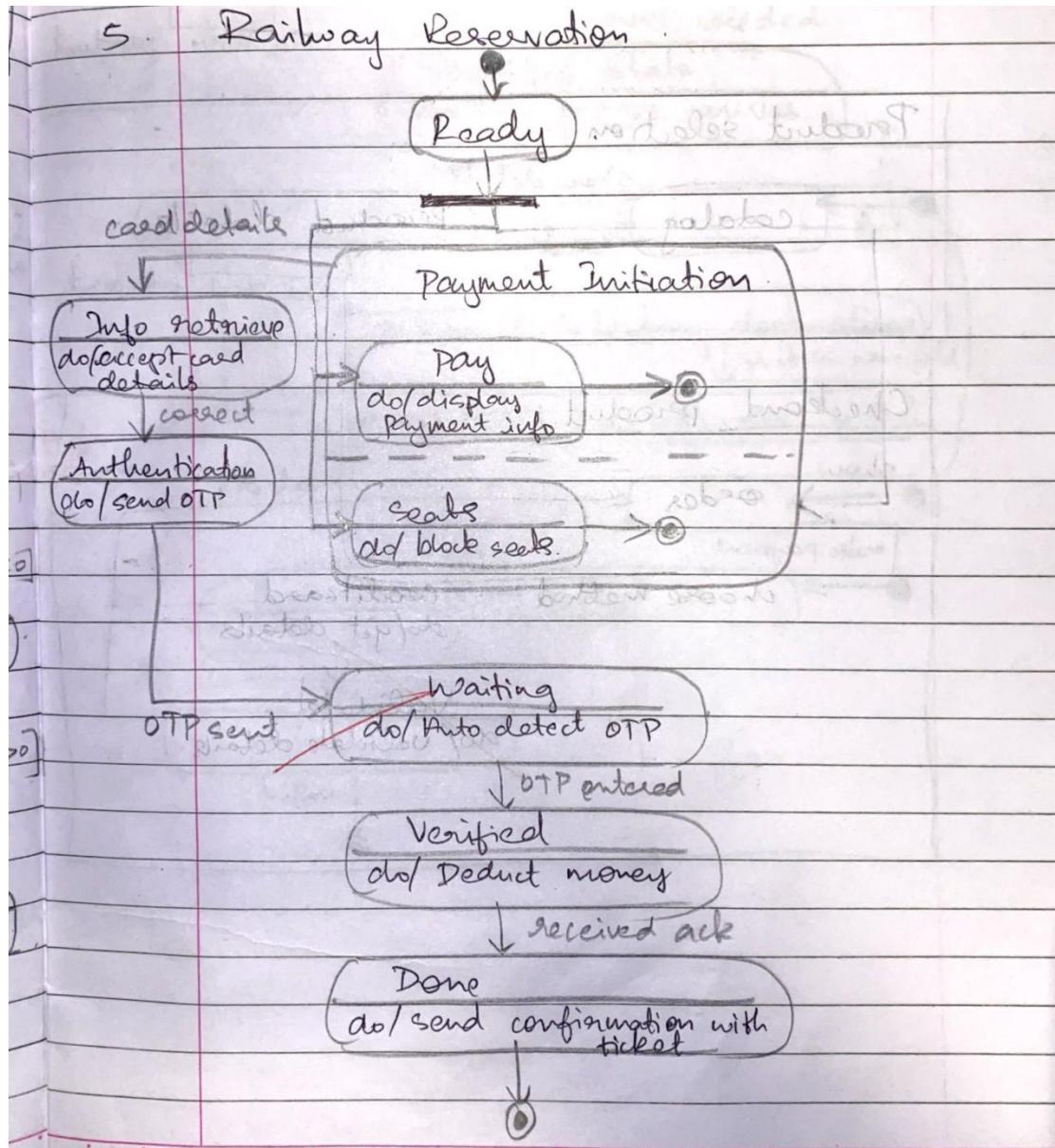
Scanned with CamScanner

The admin manages the trains and reservation related to 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 or by e-ticket booking.

## 6.4 State Diagrams



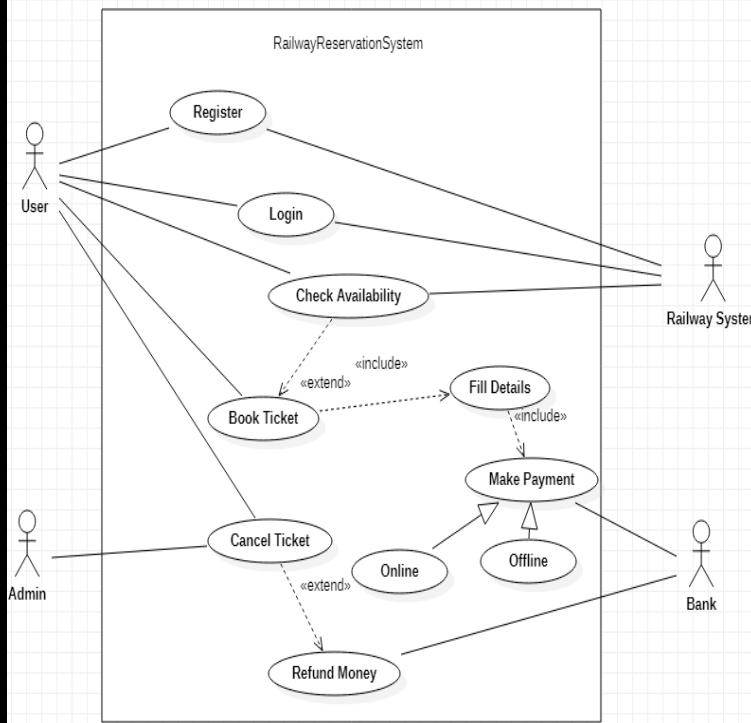
## 5. Railway Reservation



The simple state diagram gives the states involved in booking a train ticket and paying for the same. The user can see the train details and book a train for a particular source and destination . on timeout an error message is displayed and redirected to the main page. The user can then select a train and make payment for it

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.

## 6.5 Use Case Diagram



### Actors:

User: uses the railway reservation system.

Admin: manages all information

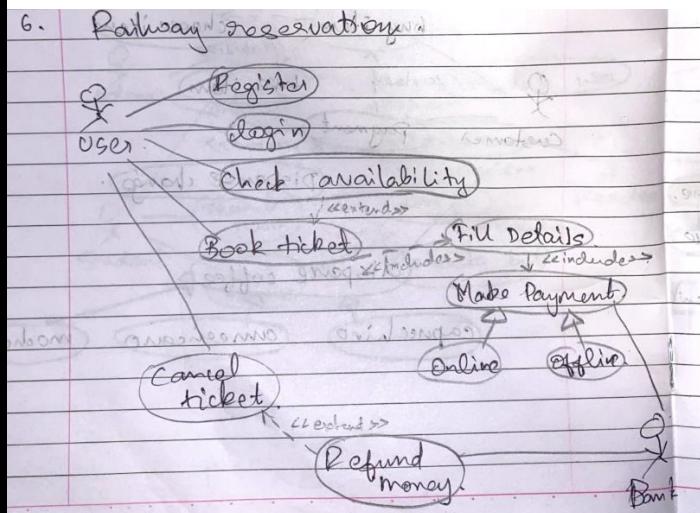
Railway System: System that is used for train ticket reservation.

### Use Case:

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

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

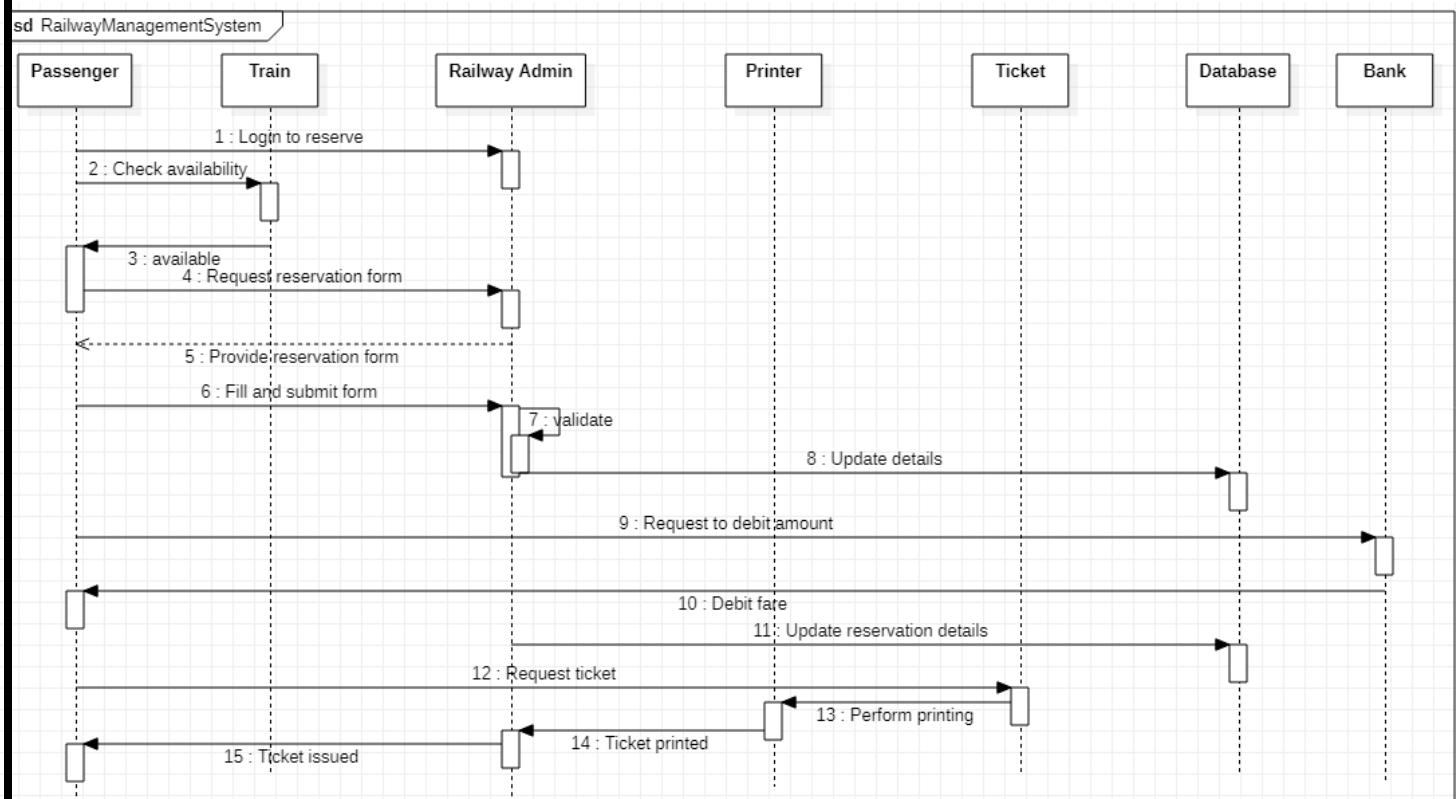
**Make payment:** System displays the payment details. User can make his payment.

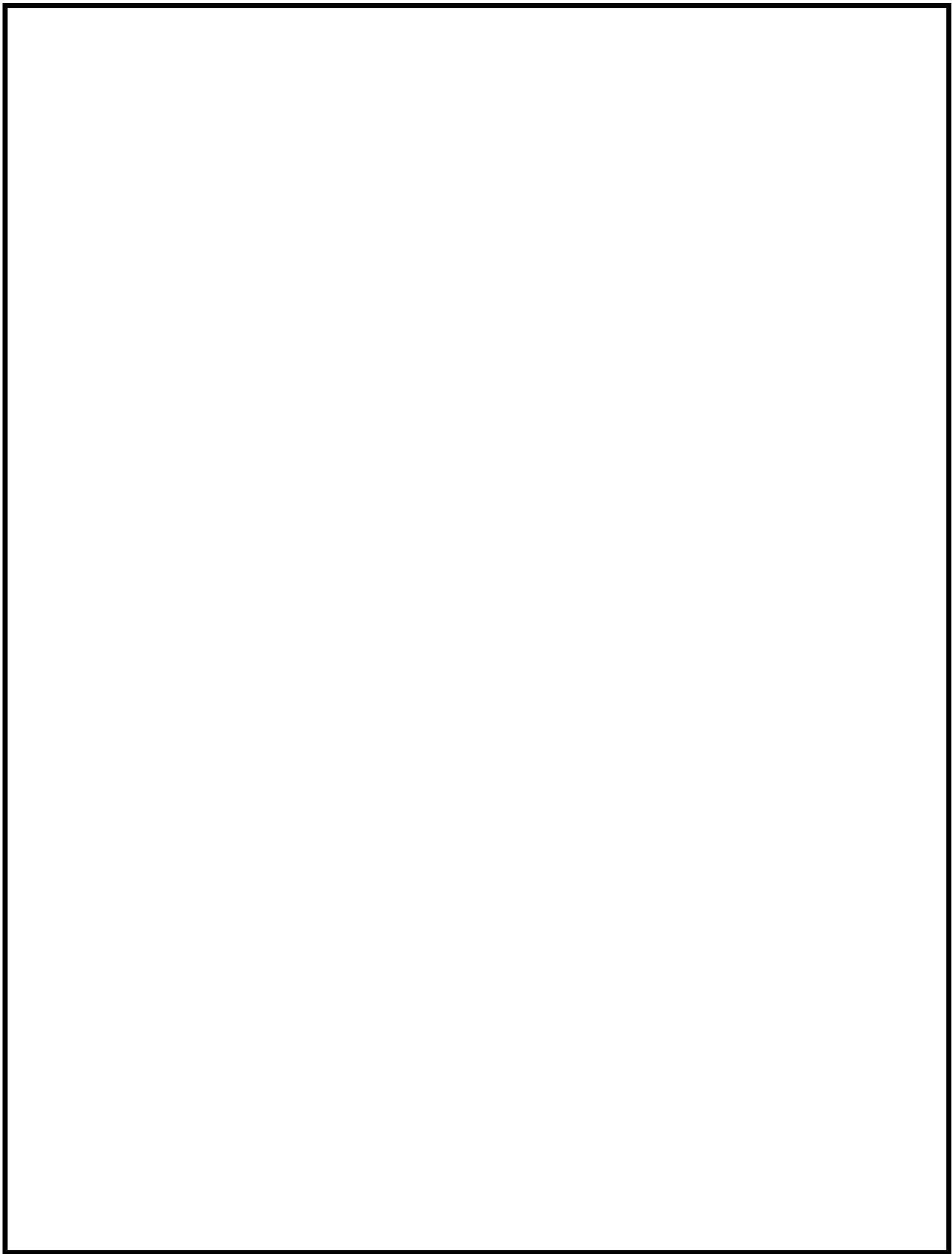


**Cancel Ticket:** User can cancel the ticket .

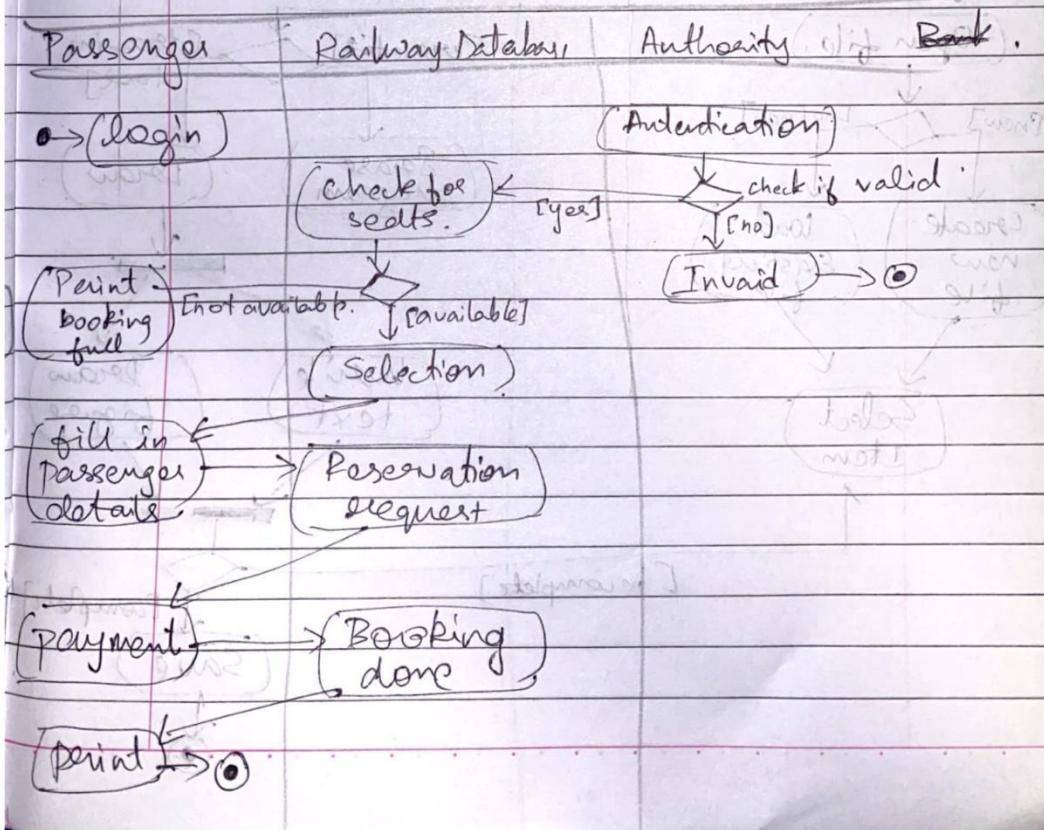
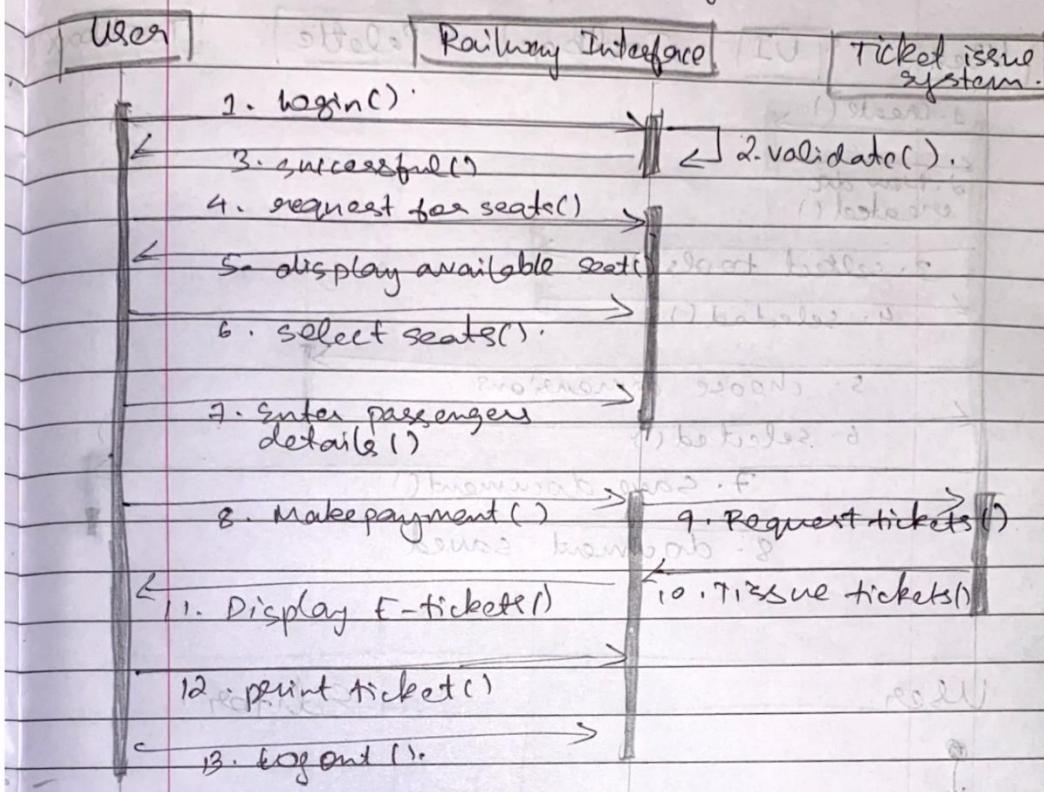
**Verify login credentials:** The admin verifies the user details, if it matches with the details in database then he allows access to the system.

## Sequence Diagram

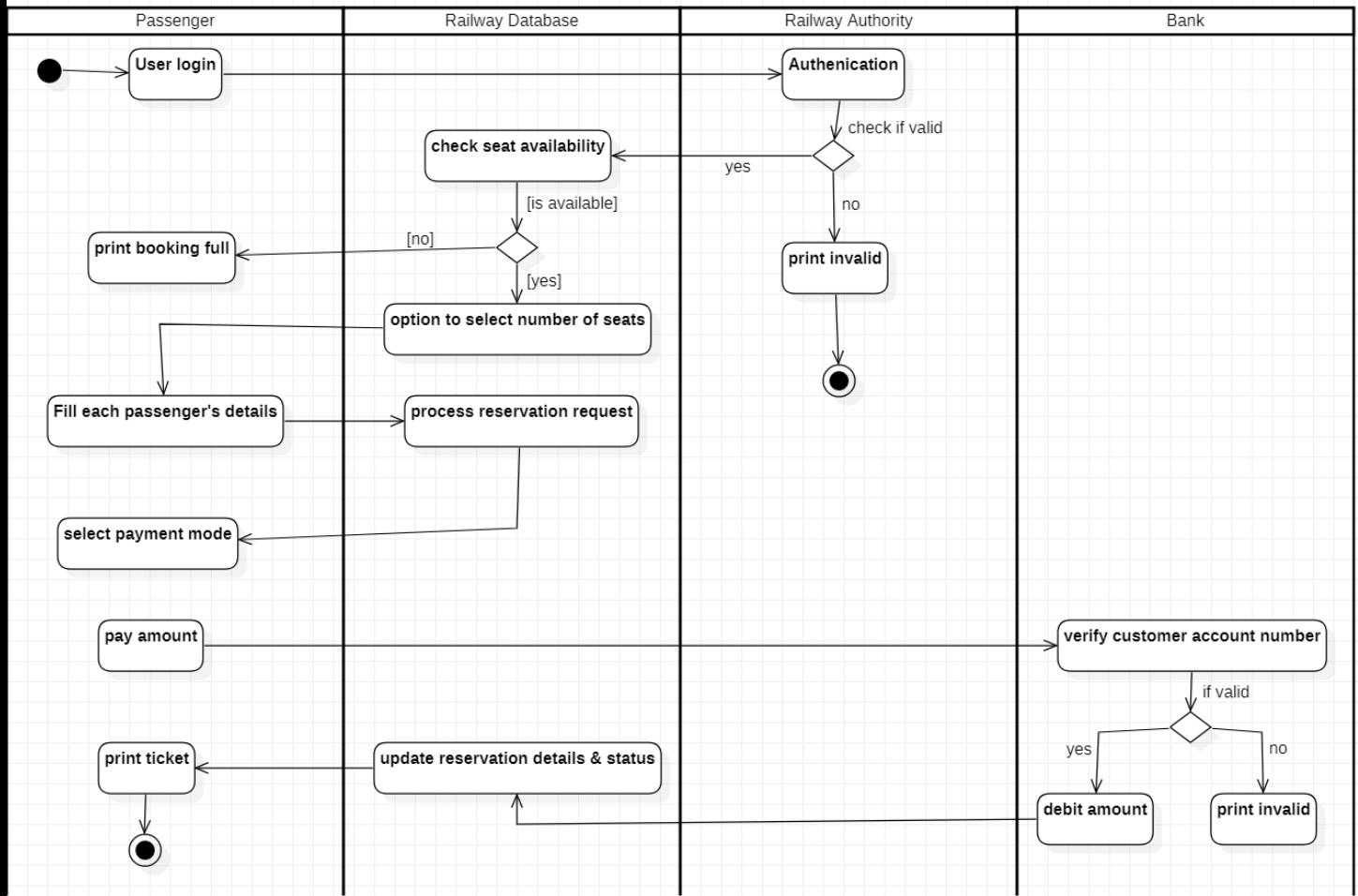




## 6. Railway Reservation System



## 6.6 Activity Diagram

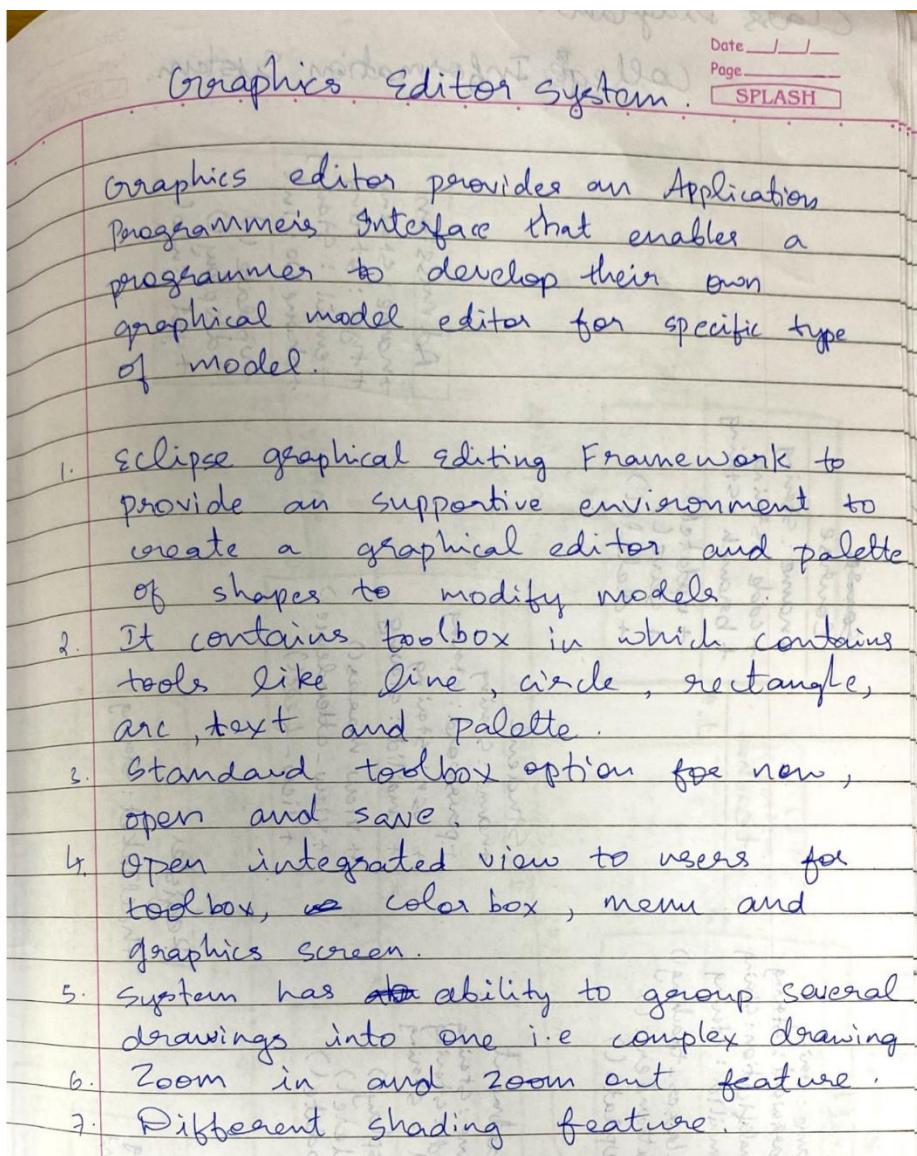


## 7. GRAPHICS EDITOR

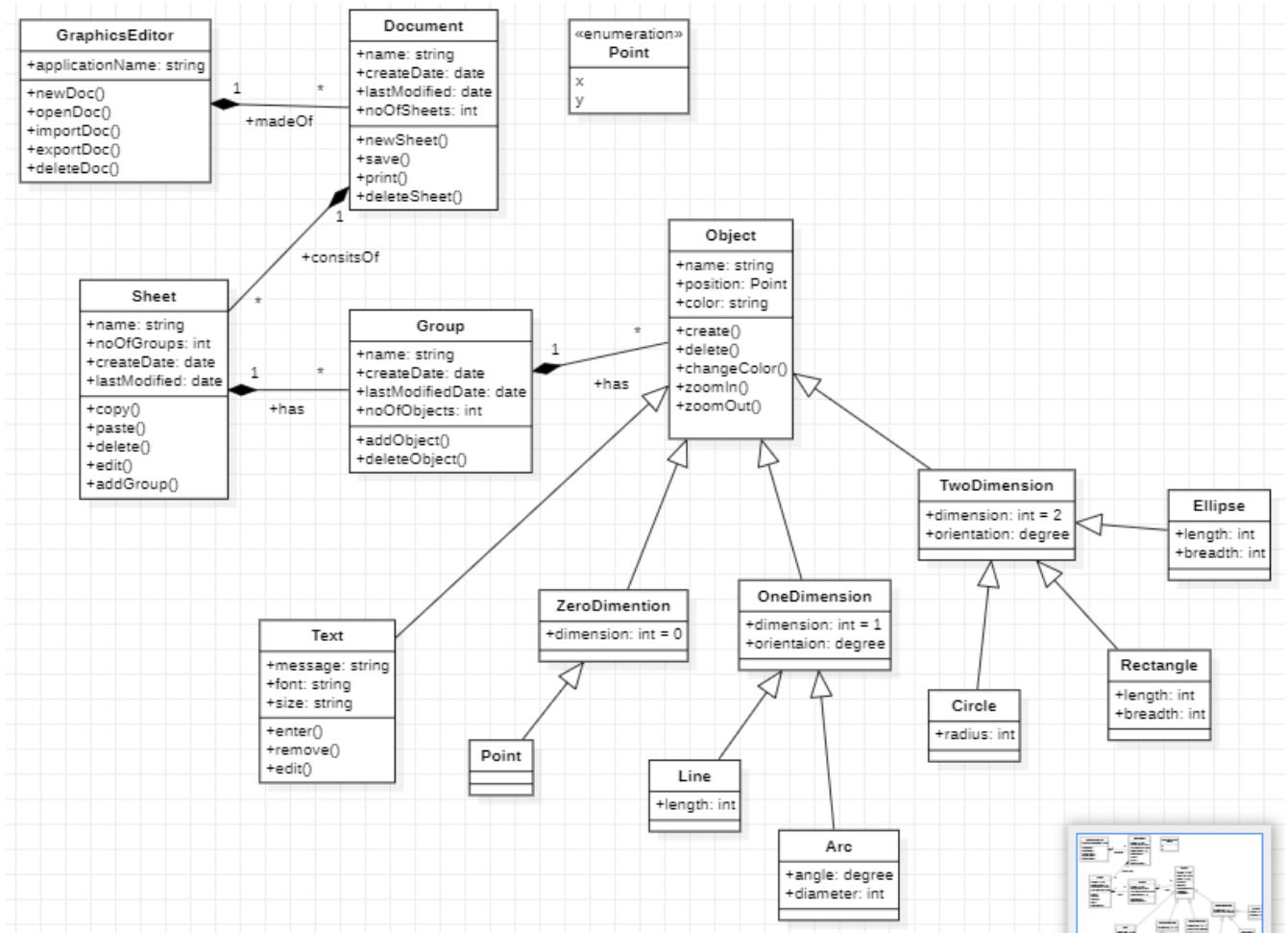
### 7.1 Problem statement

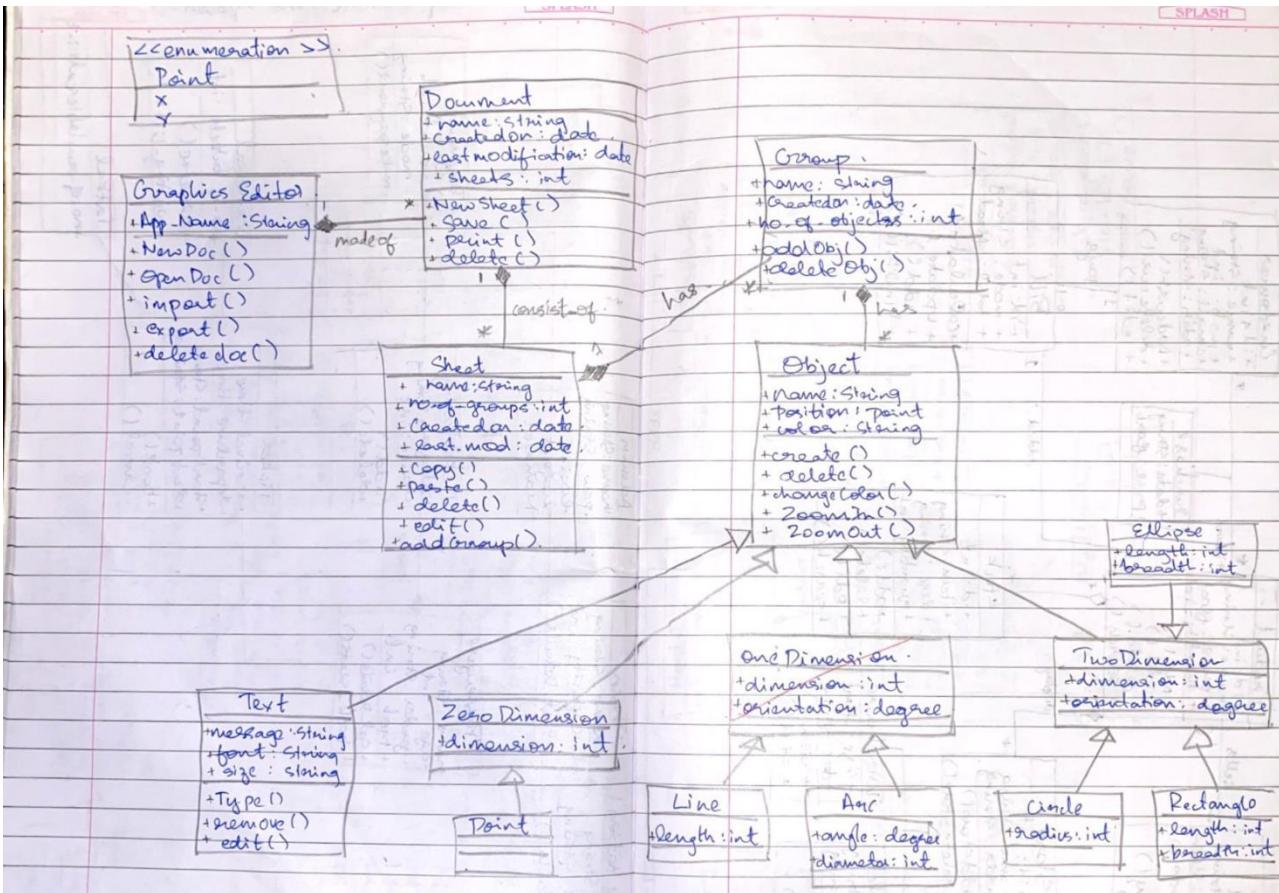
The graphics editor provides an Application Programmer's Interface that enables a programmer to develop their own graphical model editor for a specific type of model. This API in turn, relies on extending the Eclipse Graphical Editing Framework to provide an environment in which the editor functions,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

### 7.2 Software Requirement Specification



### 7.3 Class Diagram



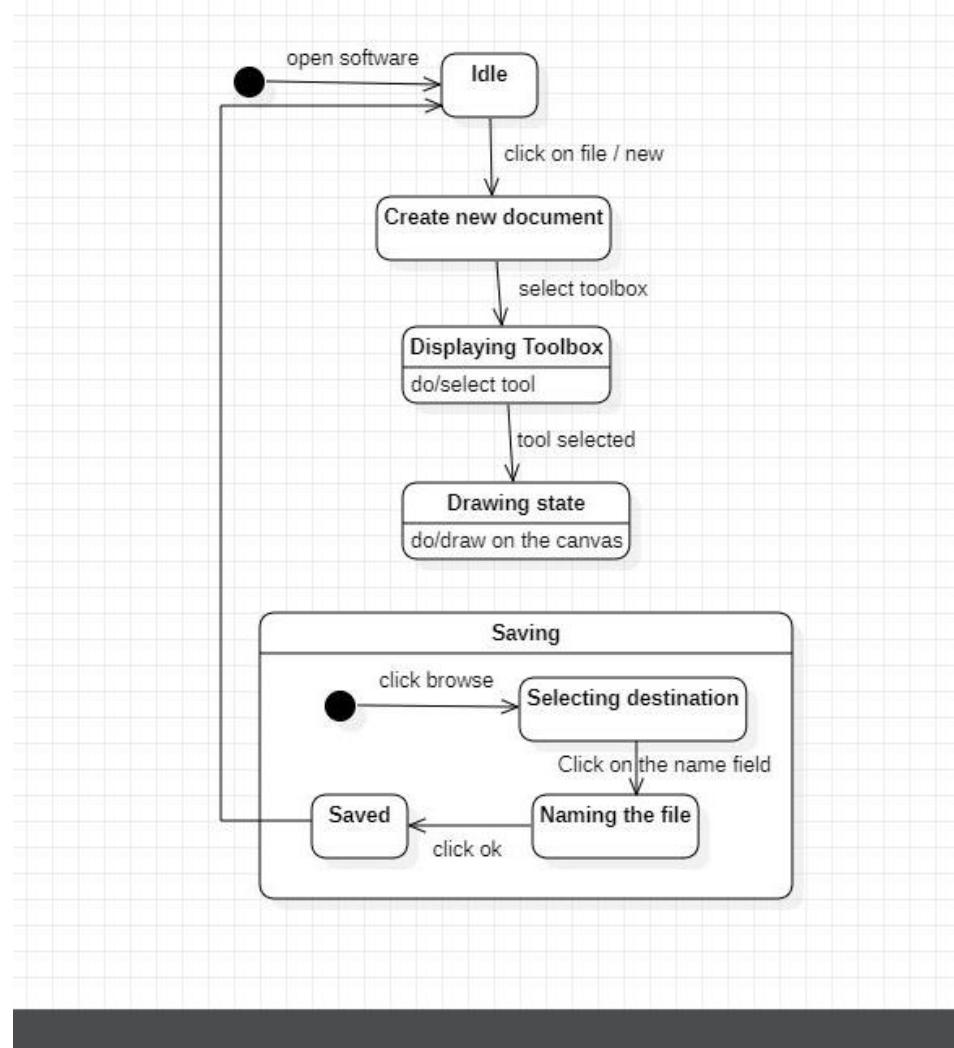


The graphical editor has documents consisting of several sheets. Each sheet contains drawing objects, including text, geometrical objects and groups. A group is simply a set of drawing objects. A geometrical object includes circle, ellipse, rectangles, lines and squares.

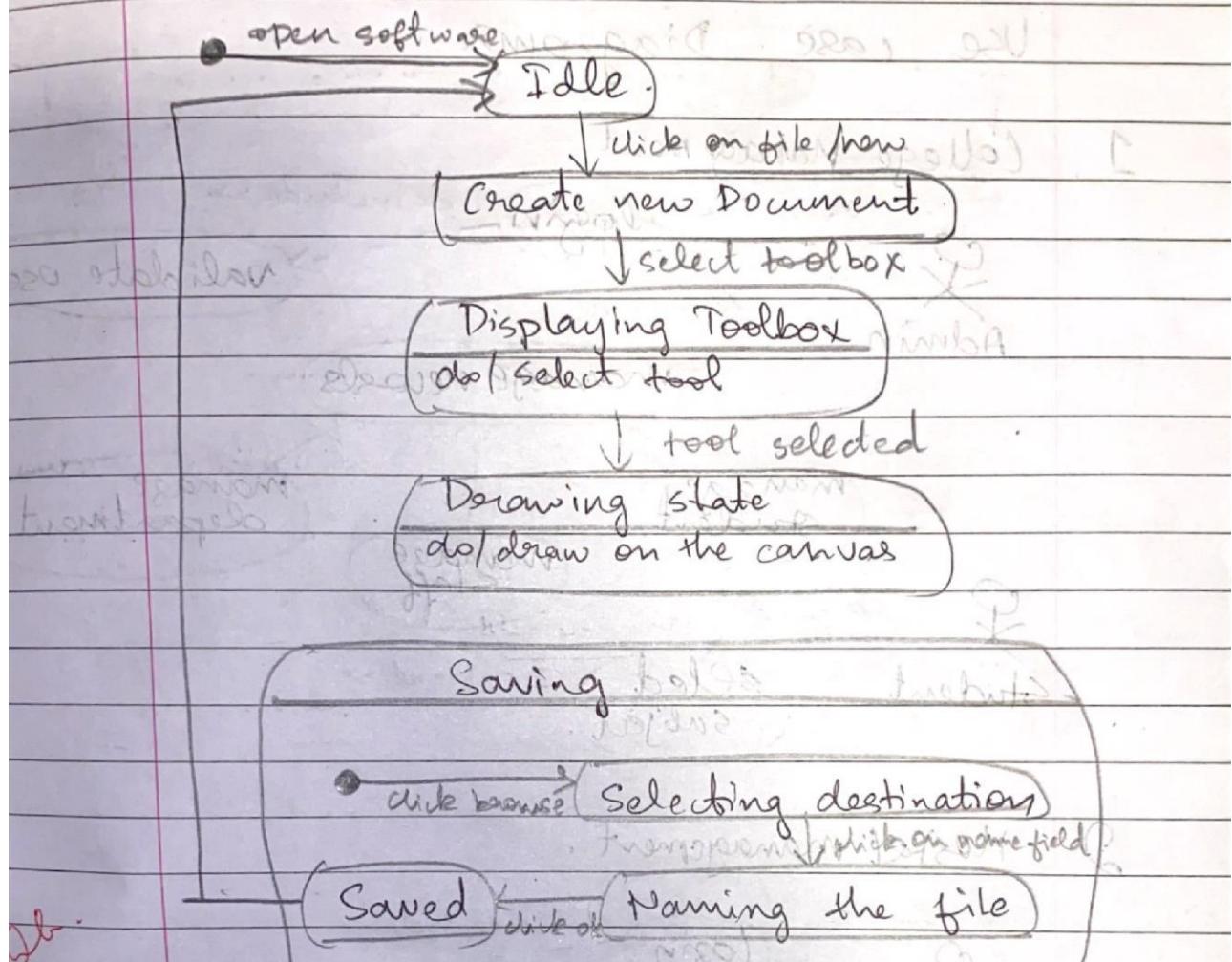
## 7.4 State Diagrams

(STERED)

Debug Help



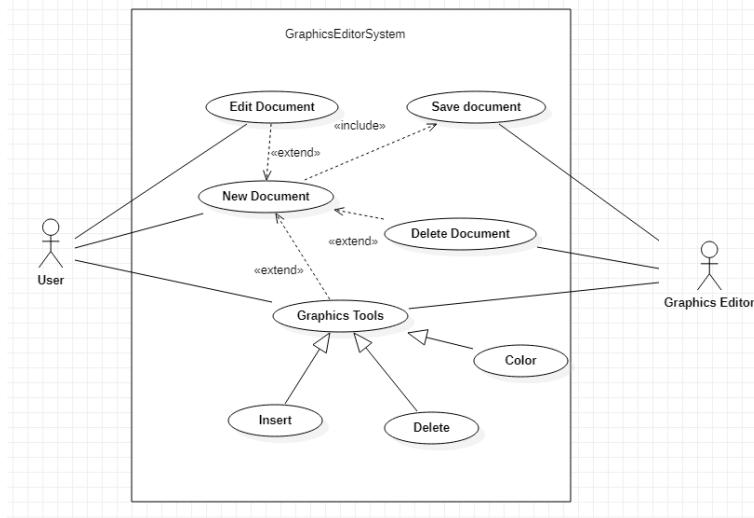
## 7. Graphics editors



The simple state diagram and 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.

## 7.5 Use Case Diagram



### 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

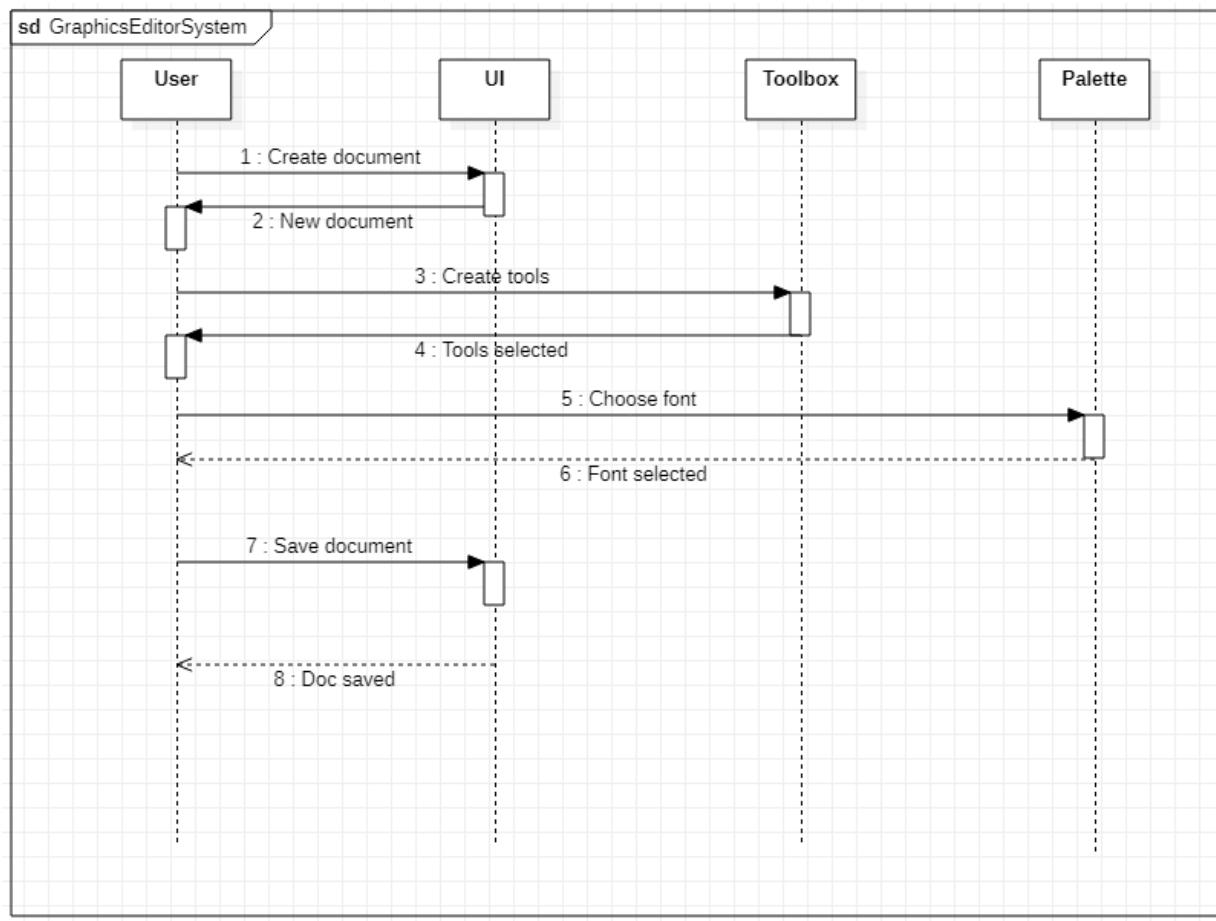
Display toolbox: displays the available tools

Add graphic object : insert a new graphic object

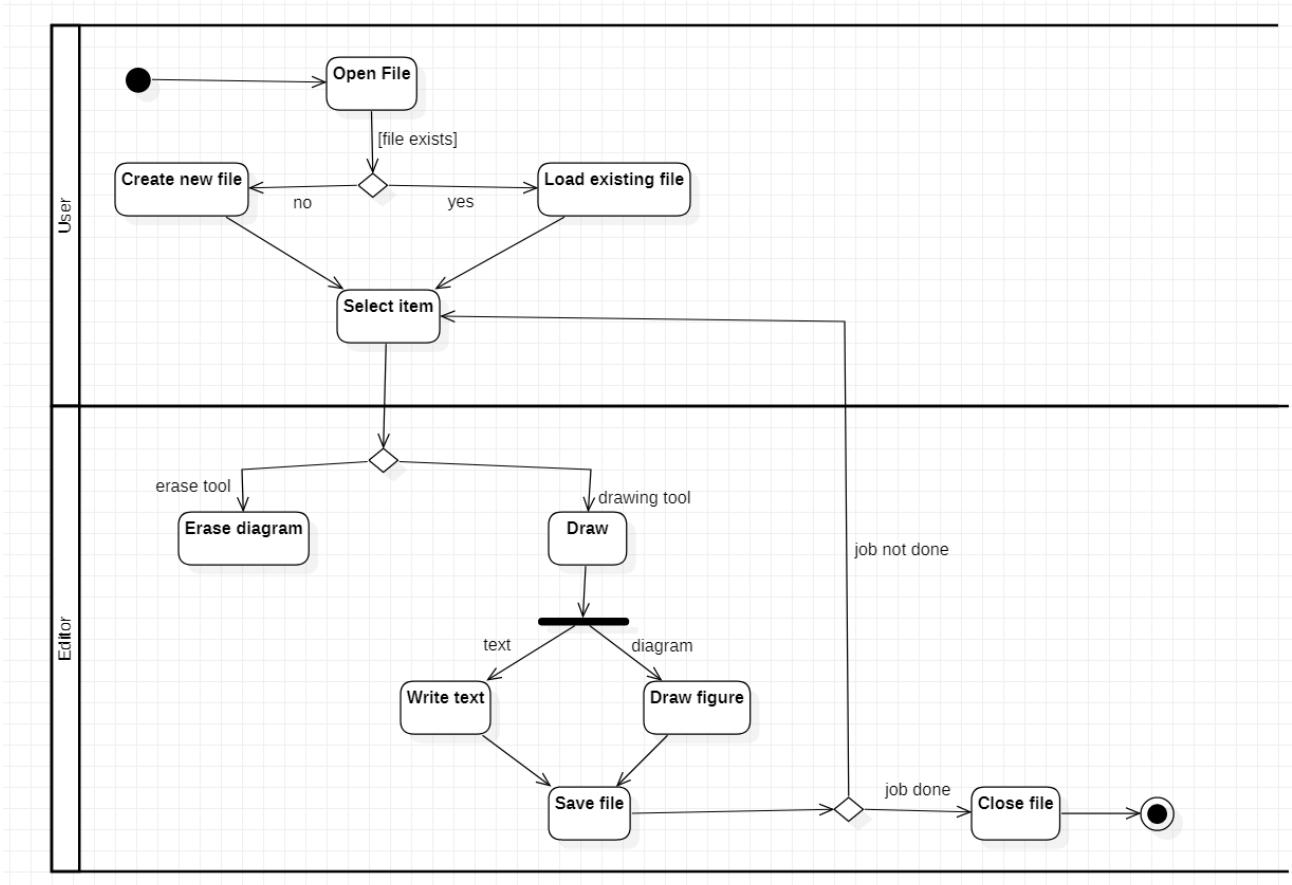
Choose tools from toolbox : allows user to choose tools

Delete document : Permanently deletes the document

## 7.6 Sequence Diagram



## 7.7 Activity Diagram



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.

