

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

“JnanaSangama”, Belgaum -590014, Karnataka.



LAB REPORT on

Object Oriented Analysis 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 “**LAB COURSE Object Oriented Analysis and Design**” carried out by **KIRAN M K (1BM19CS073)**, 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 an **Object Oriented Analysis 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 -

a) SRS:

1 College Information System

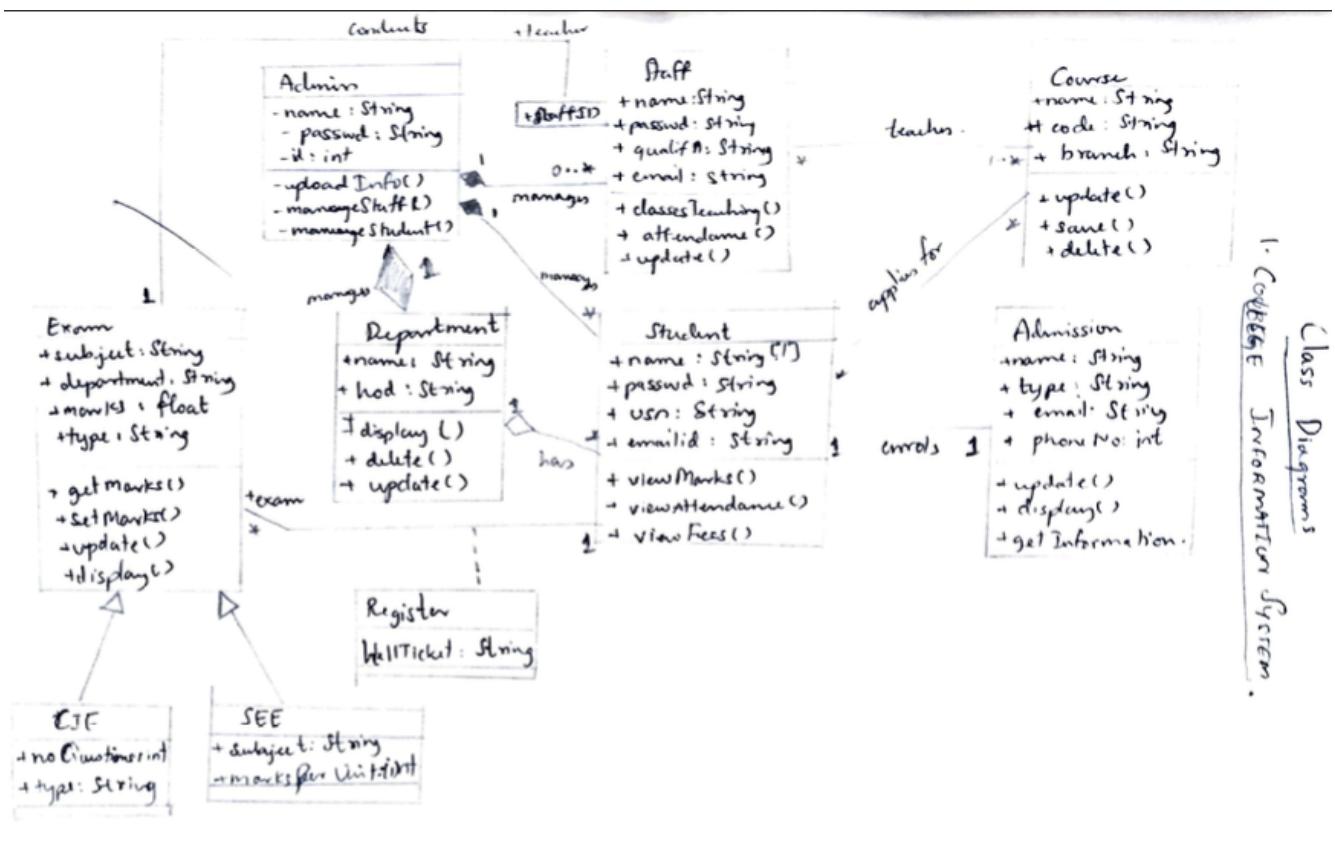
Problem Statement: The College Information System is a system that maintains student, staff and department information. It maintains the courses taught by teachers and students enrolled in them. Admission records of student and examination details and other important information related to college management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

Software Requirement Specification:

- * College information system has admin who manages the staff, student and department
- * Admin can view and modify the student's records like student's profile, attendance, fee, results, and details of teachers and other employees in college, their personal information and their attendance for their salaries.
- * In this system, user authentication will be done by login by user name and password and classified by user type
- * Staff in college teach more than one course to many students and the staff who are teachers conduct examinations for students of the college
- * The students of the college register themselves in the department and for the courses they are interested in and join the college by taking admission and following all the admission procedures.

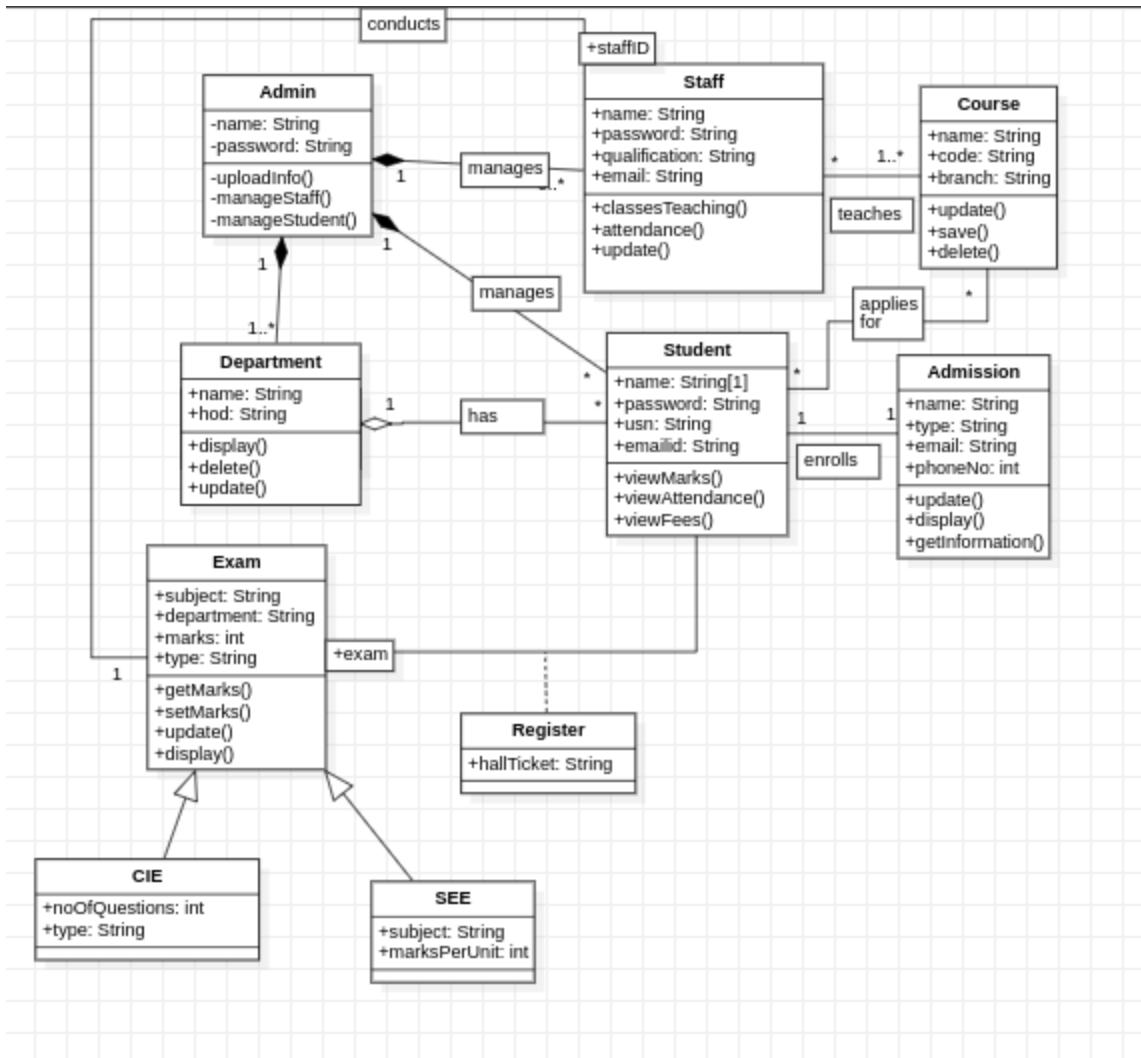
- * There are different types of examinations conducted by the college for the students. Internals and semester end examination are 2 of them.
- * Every course has a name and its unique name. Every course has different subjects and every subject has its own unique name.
- * Department will provide the details about departments within a college with their name and every department have its Department name.

b) Advance Class Diagram:

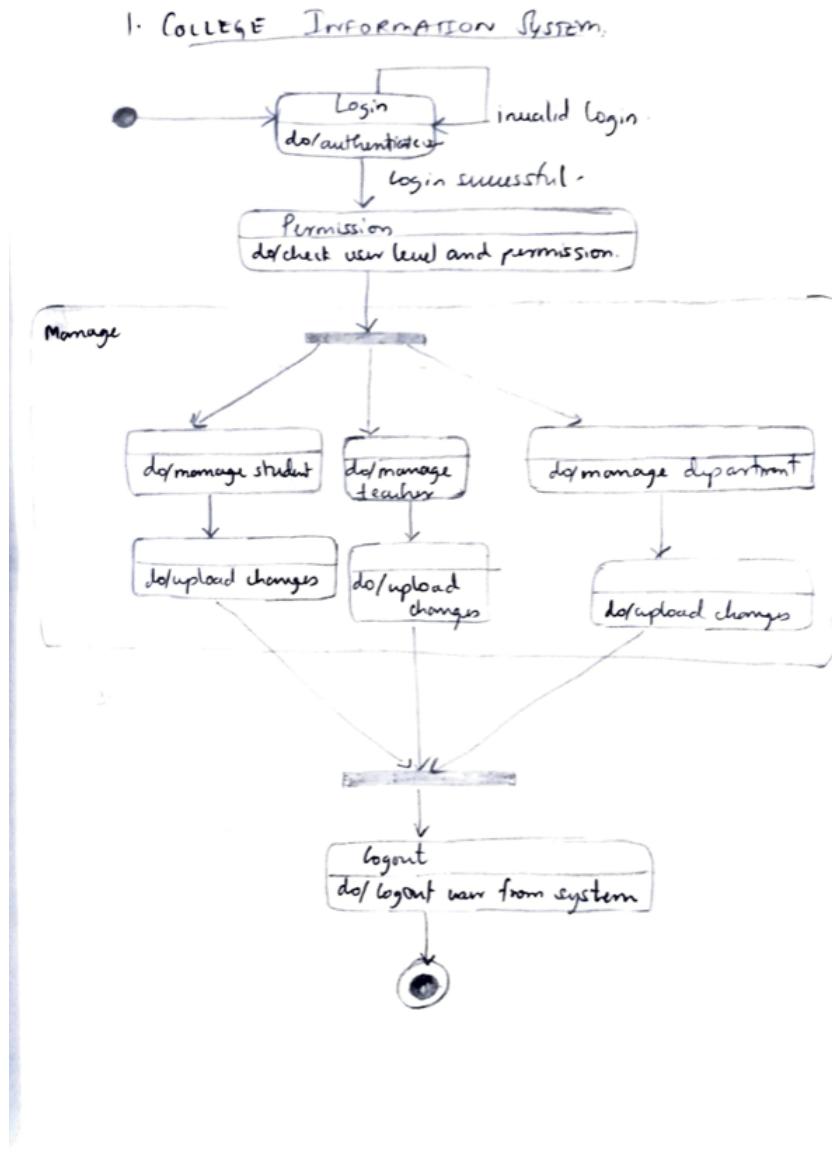


Justification:

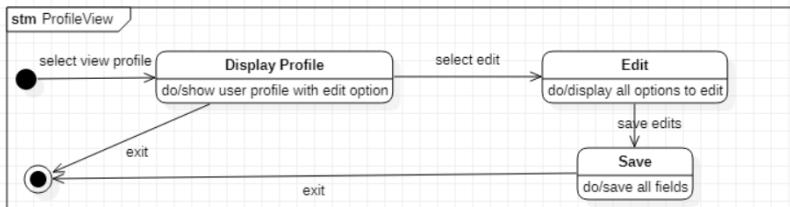
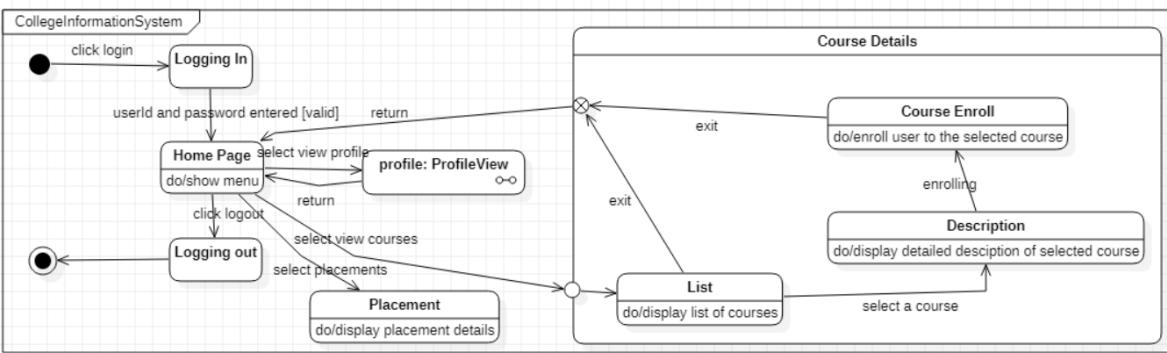
Under Admin, department, student and staff are the components which cannot exist without admin class, hence it is a composition. The courses are associated with the staff as they teach the course. The staff also conduct exams, which have 2 sub classes related by inheritance. Students are associated with class, exam and staff.



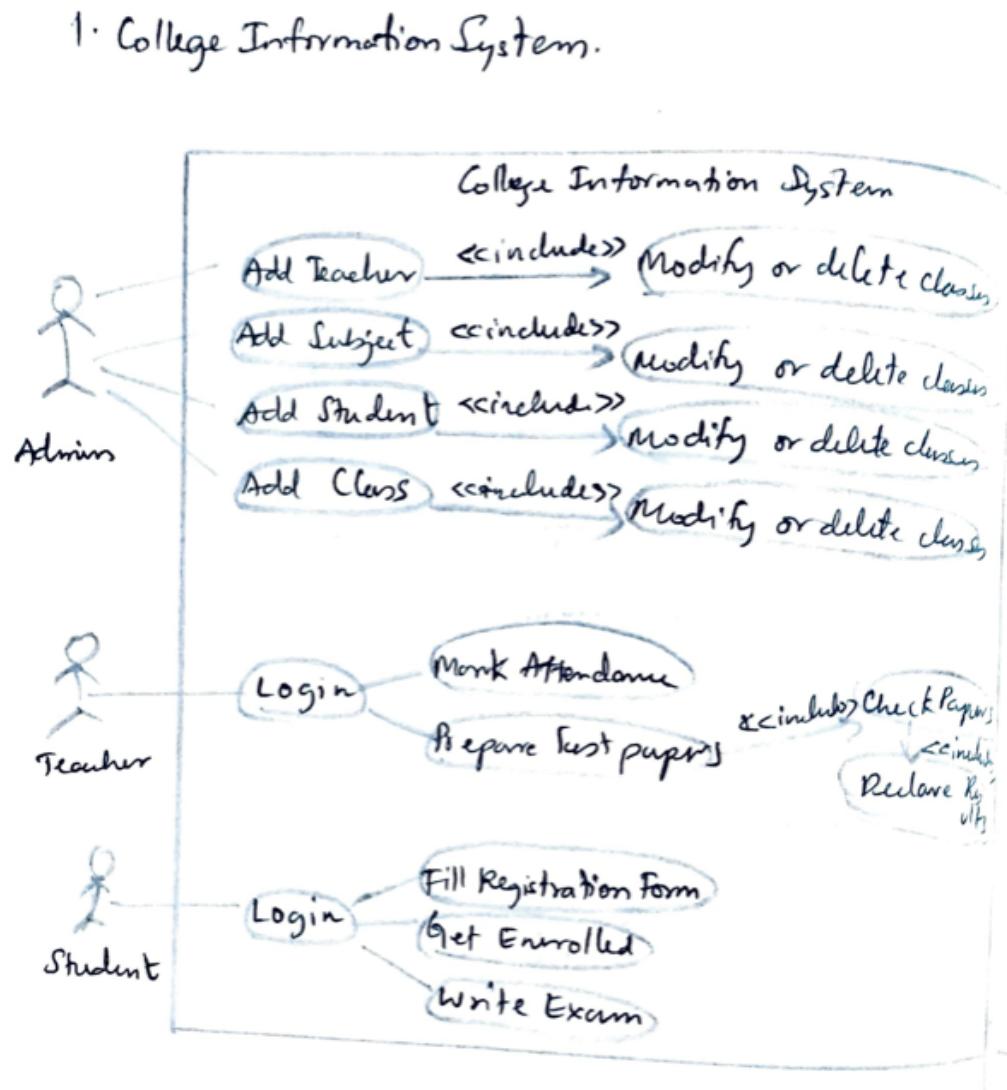
c) Advance State Diagram:



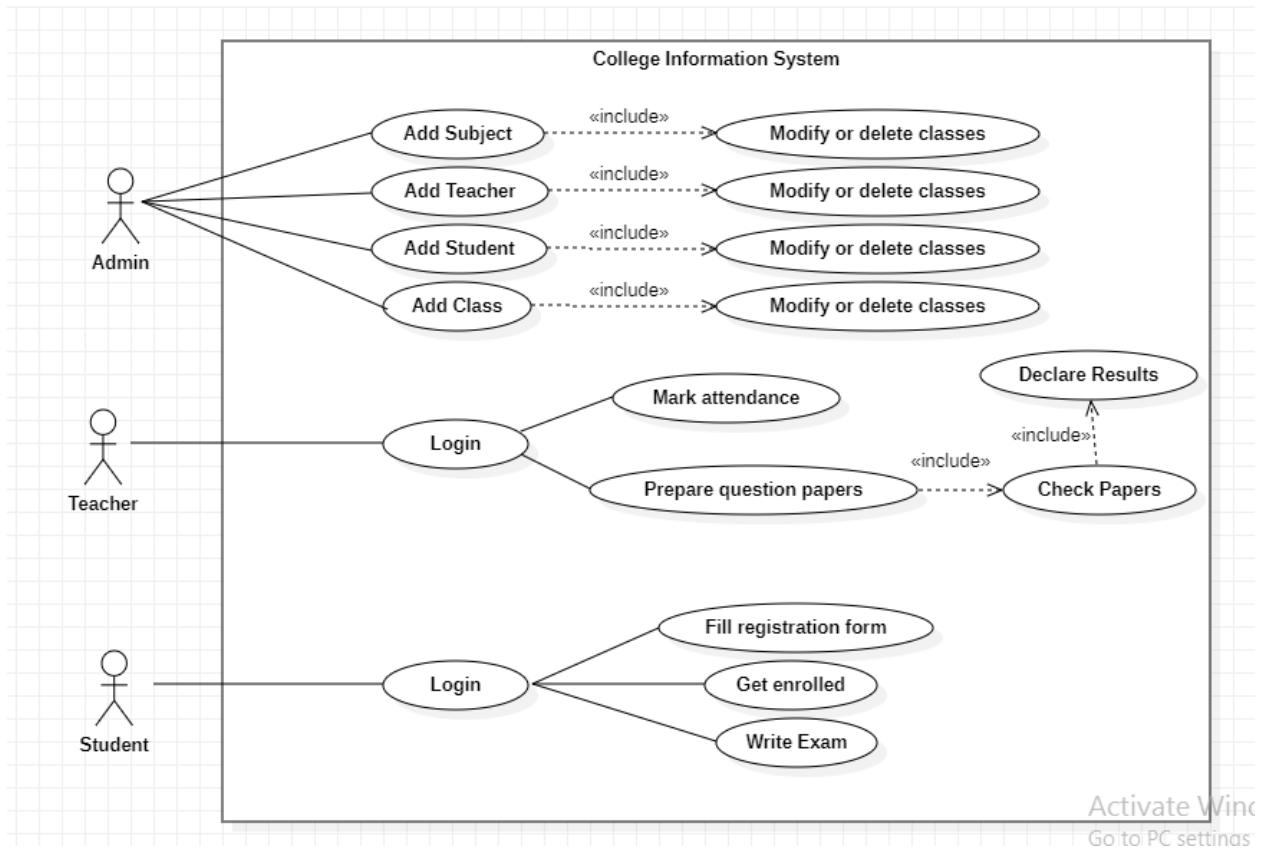
Justification: The given state diagram explains the various states present in the case and gives a detailed description of course details and view profile in the form of a sub state machine and composite machine. All the respective details of transitions are mentioned



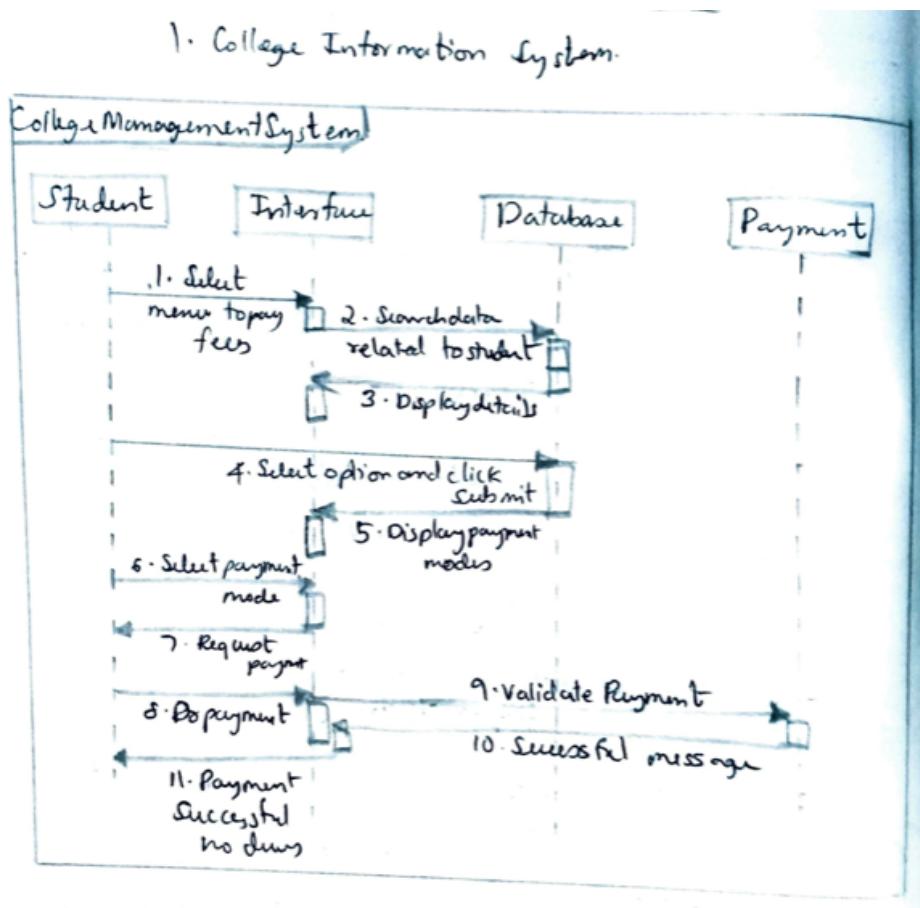
d) Advance Use Case Diagram:



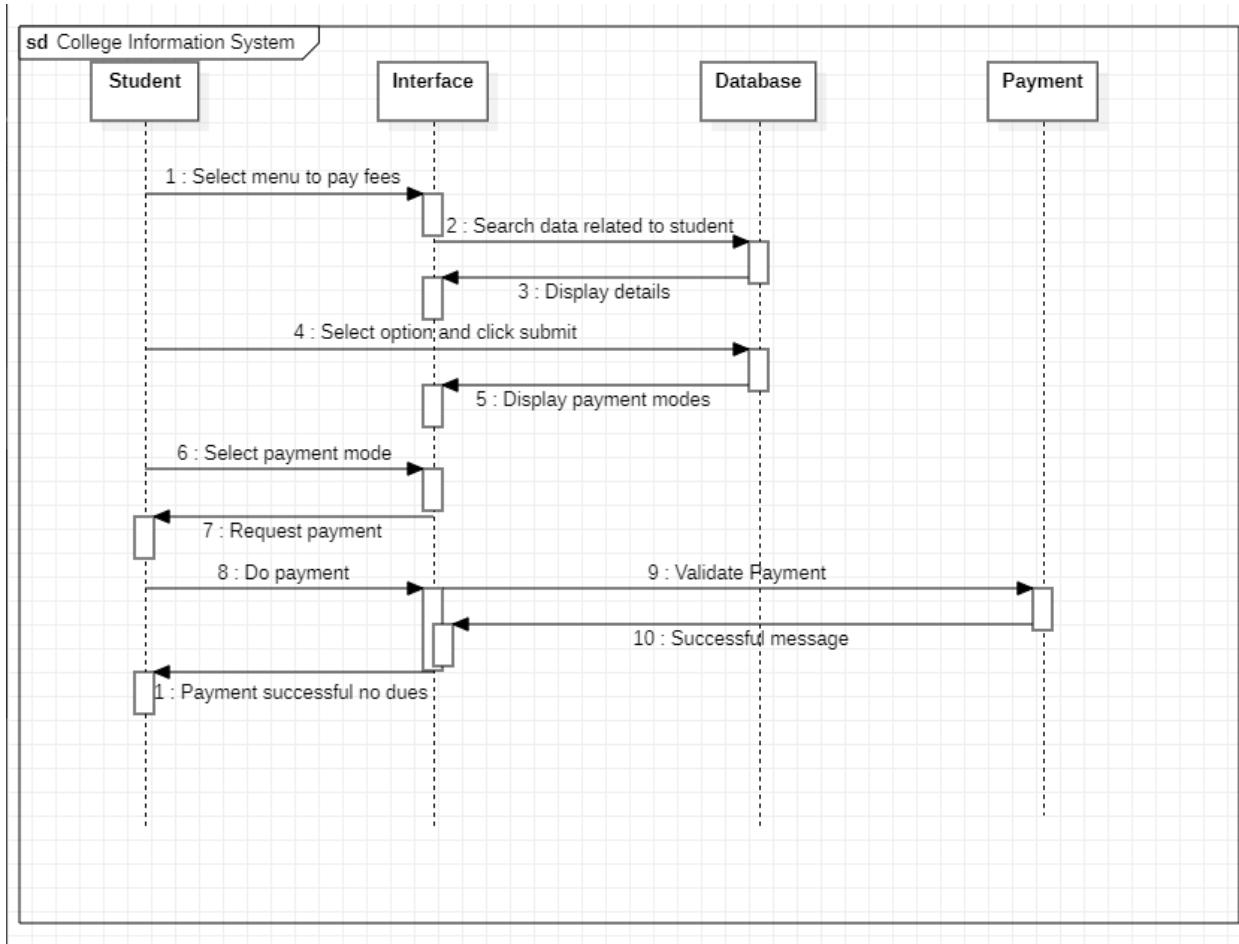
Justification: All the functionalities are mentioned in the given figure and all actors are involved in the system like student, faculty, admin, librarian and event manager. Their relations are clearly indicated in the given diagram.



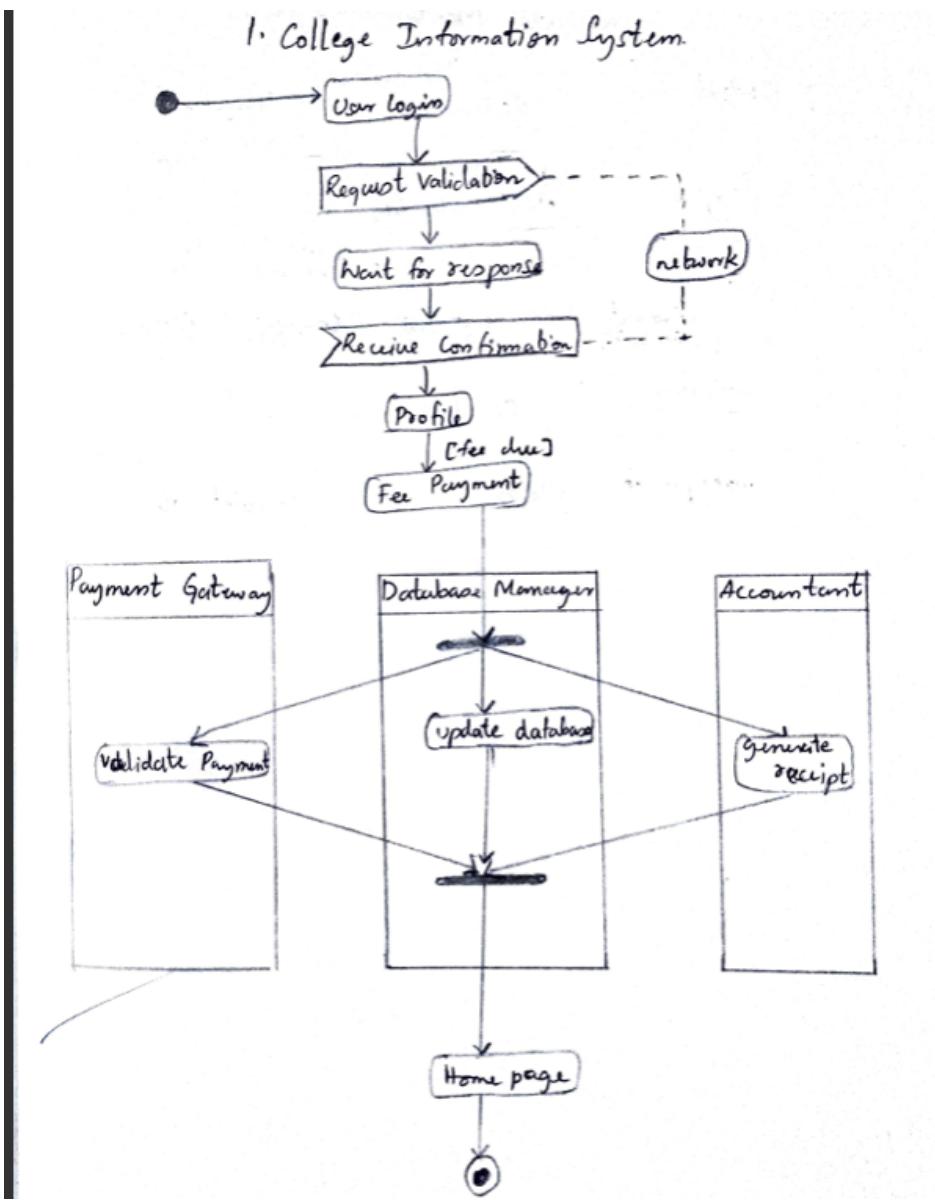
e) Sequence Diagram:



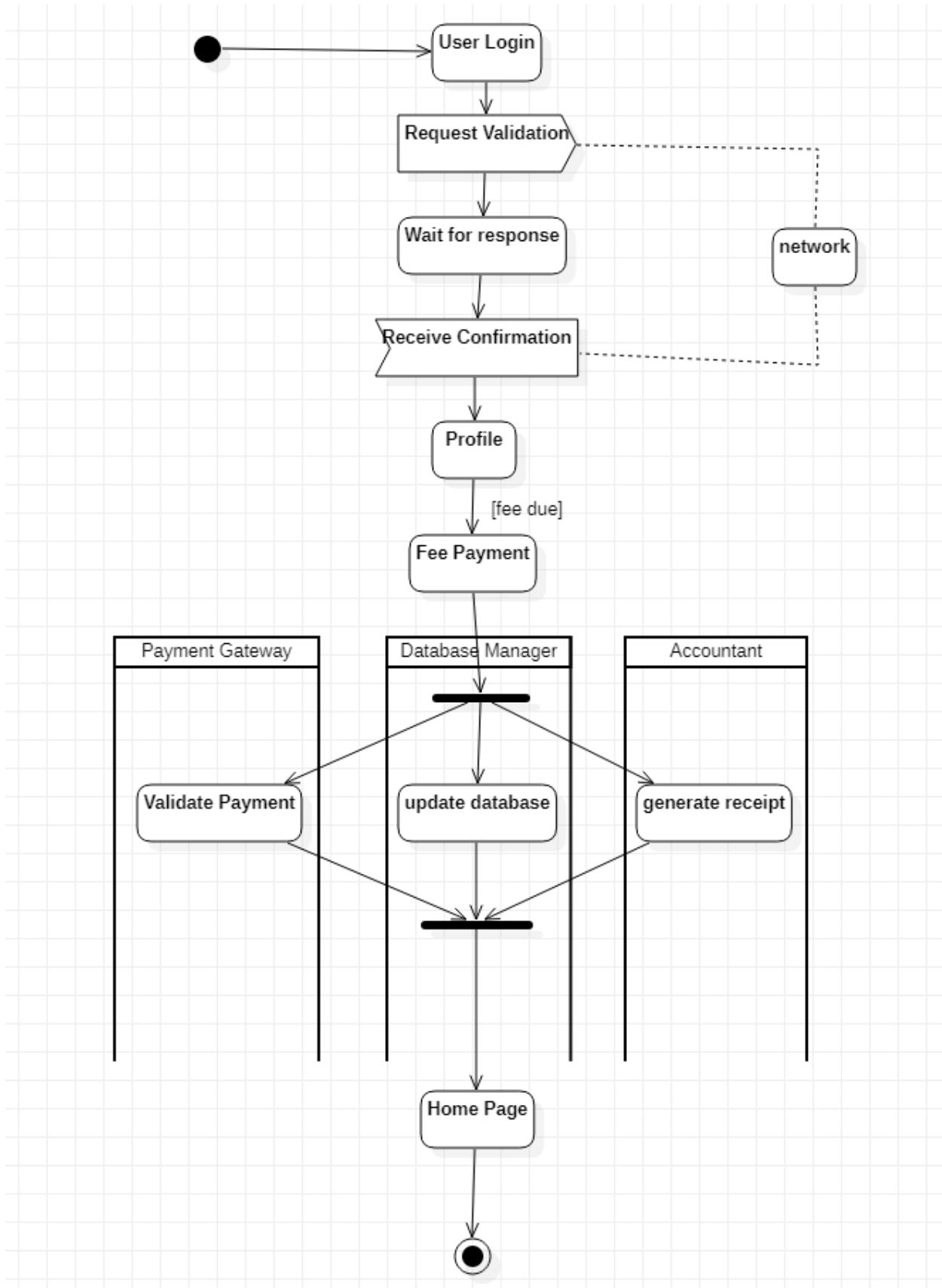
Justification: The given sequence diagram shows the complete order of all the interactions taking place between the user and user interface, database, payments and shows detailed information of payment, search and display in the system.



f) Activity Diagram:



Justification: The given diagram explains the complete working of the system from start, login to end of the session, and depicts various activities in the given application and shows the registration process of the system.



2. Hostel Management System-

a) SRS:

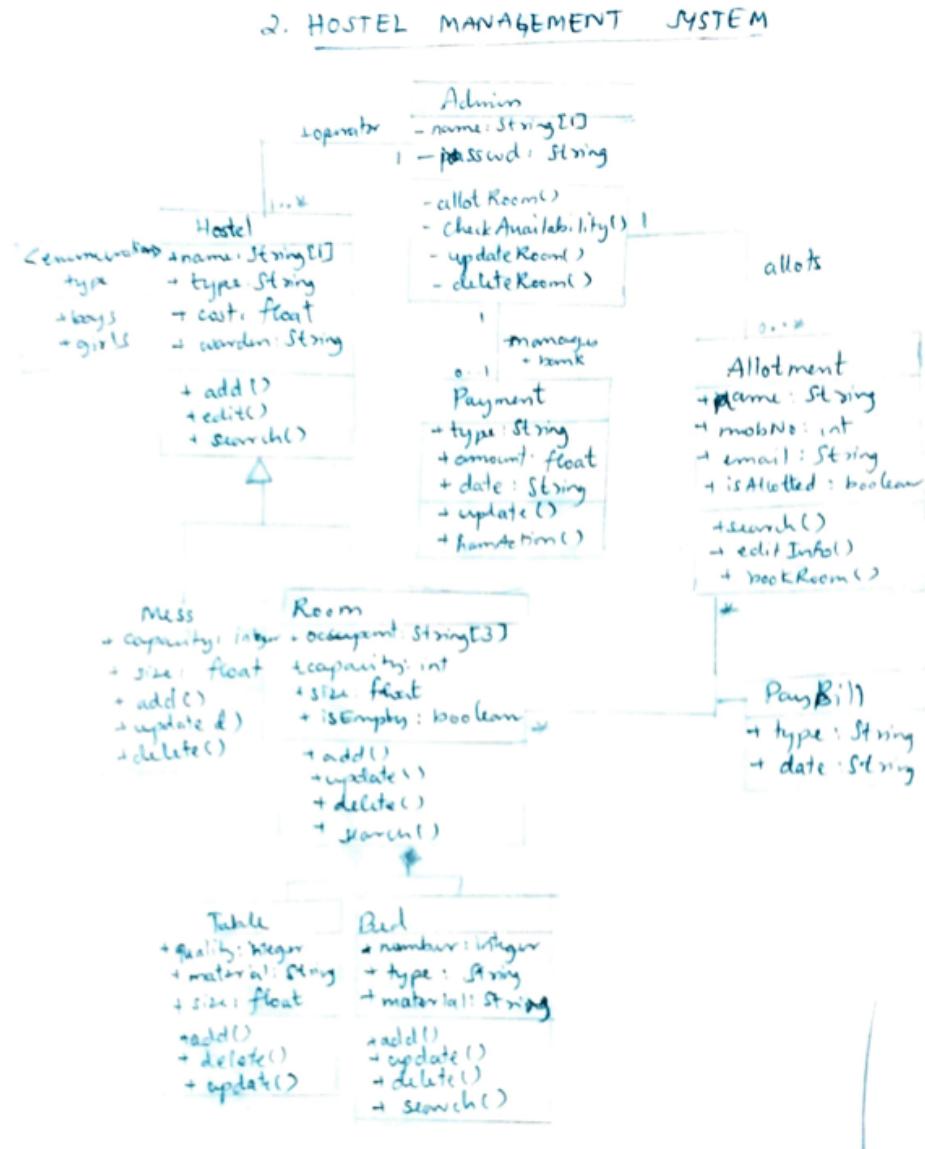
2. HOSTEL MANAGEMENT SYSTEM

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 an online application for hostel.

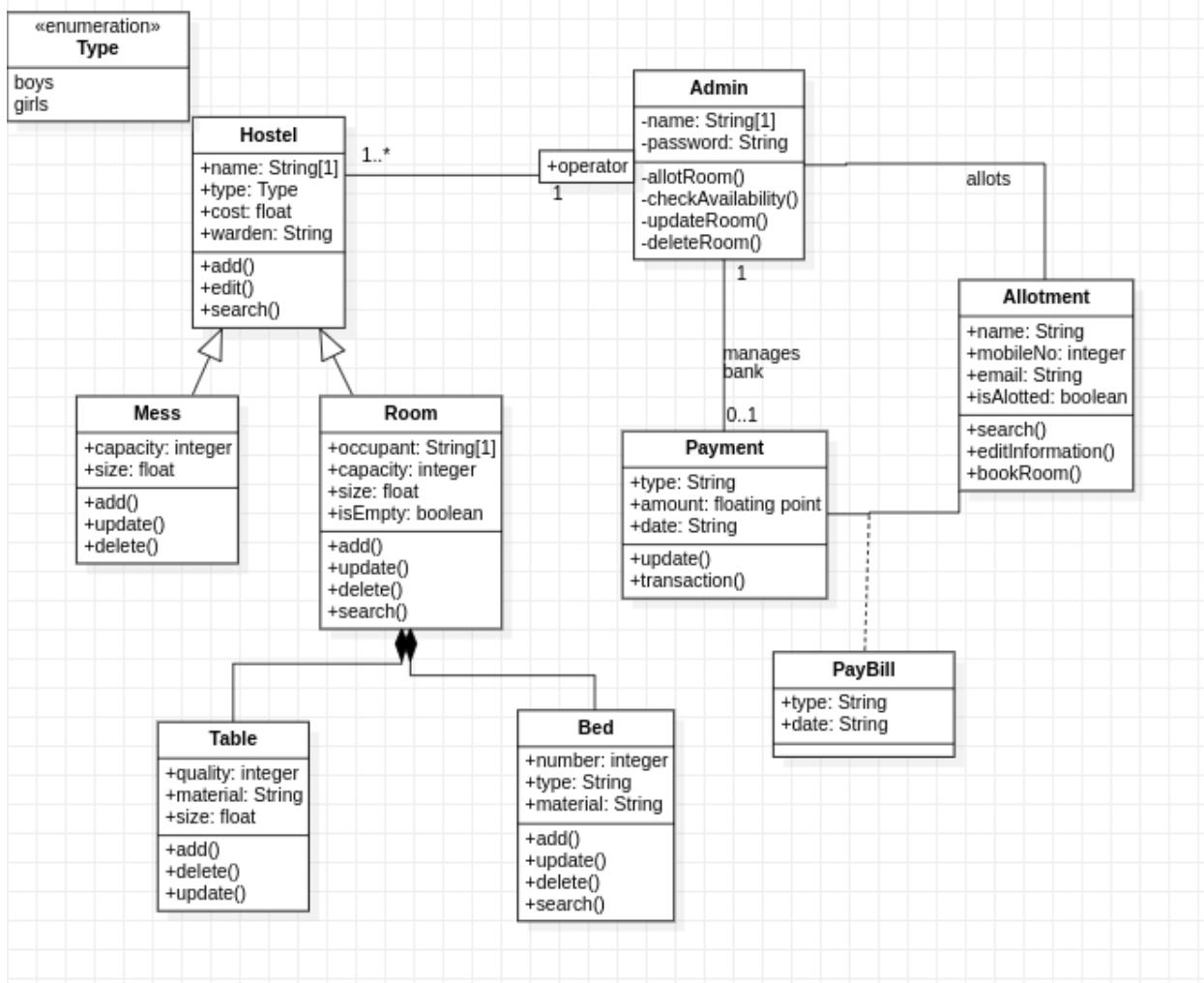
Software Requirement Specification:

- * Hostel management system has admin who manages the hostel, allotees and payment methods. The admin will allocate a room to student according to the section or class. The admin will also keep track of the payment made by student/allotees.
- * As the student's course is over they will vacate their rooms. So it is required for the administrator to remove their records from the database tables.
- * The allotees makes payment according to the bill generated which have the attributes bill number, type and date.
- * The details of the students staying in the hostels like name, place, address, contact details is maintained in the database.
- * 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. On the base of this account monthly, charges of mess of a student will be defined.
- * The hostel management system will allow renewing the student's registration every year. The rooms of hostel are composed of table and beds, where a count of few same is maintained and the allotees can use them as they wish.

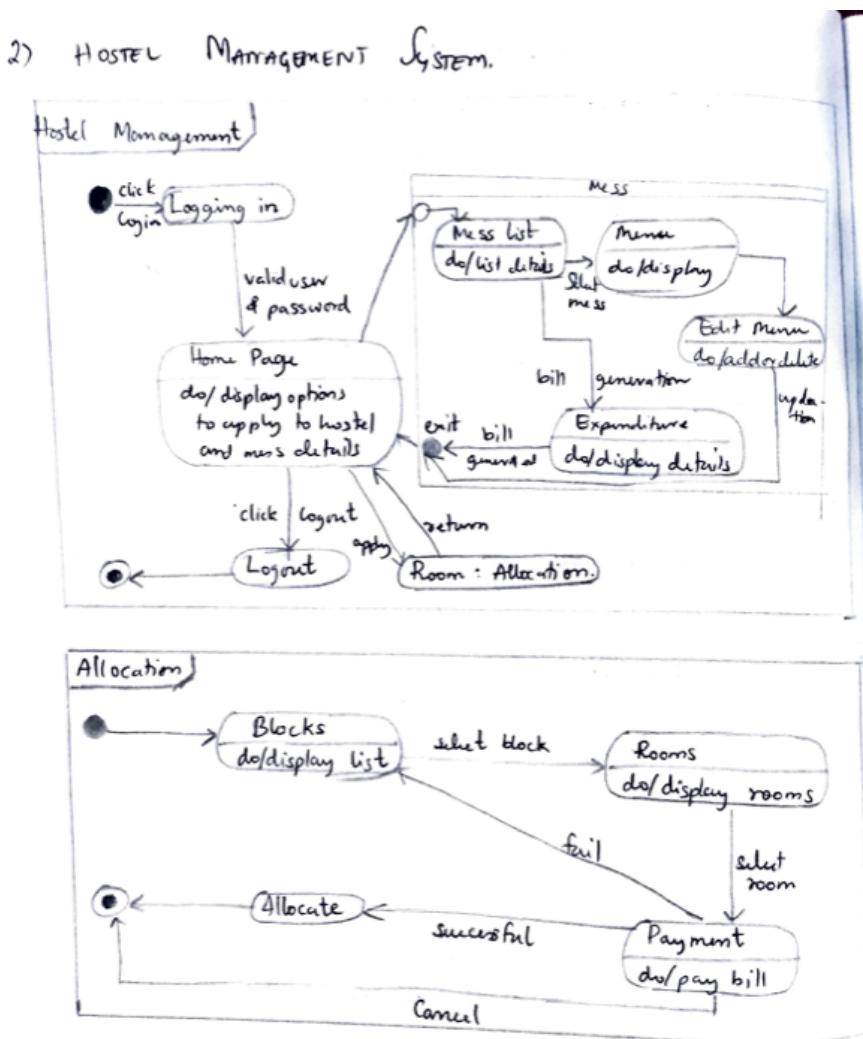
b) Advance Class Diagram:



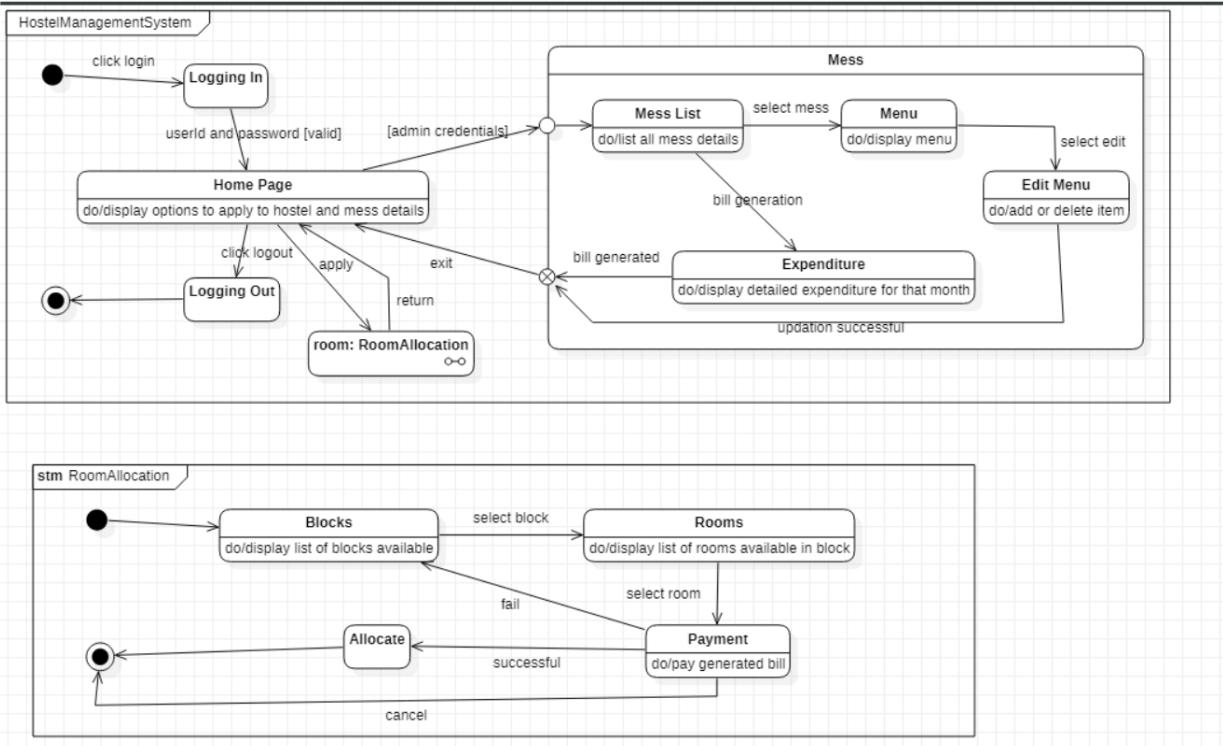
Justification: Admin controls and allotts the room, hence association, which can give feedback to the room, hence association. The students make payments through various payment methods, hence it is an enumeration. For every hostel block, a warden is assigned making it a composition.



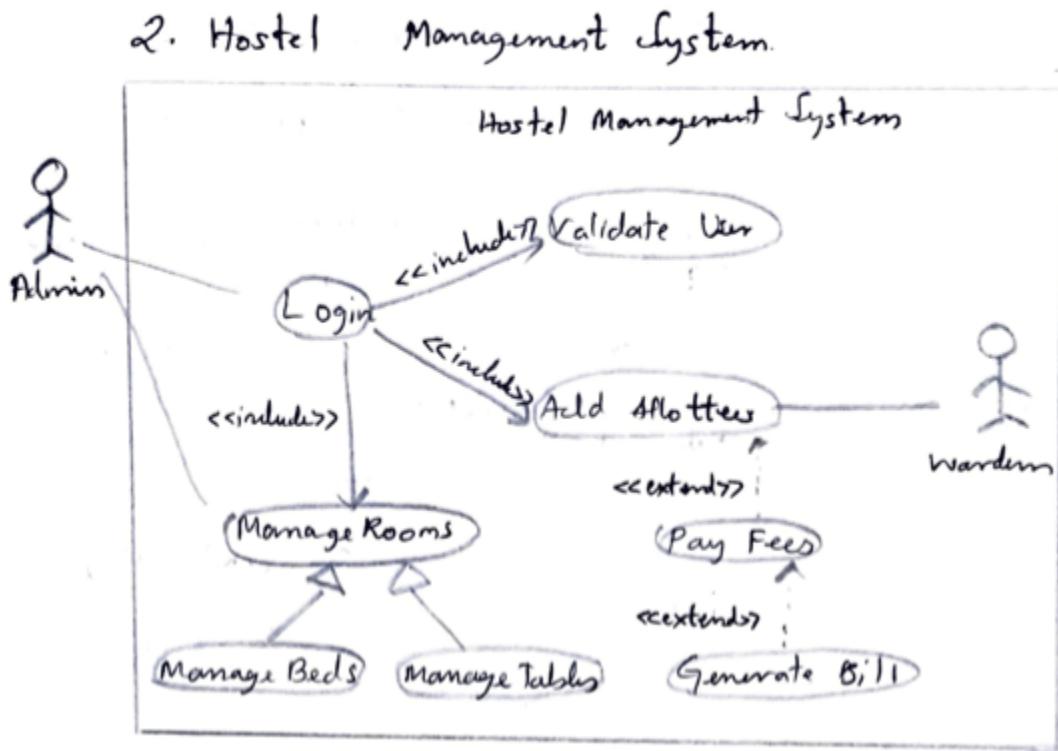
c) Advance State Diagram:



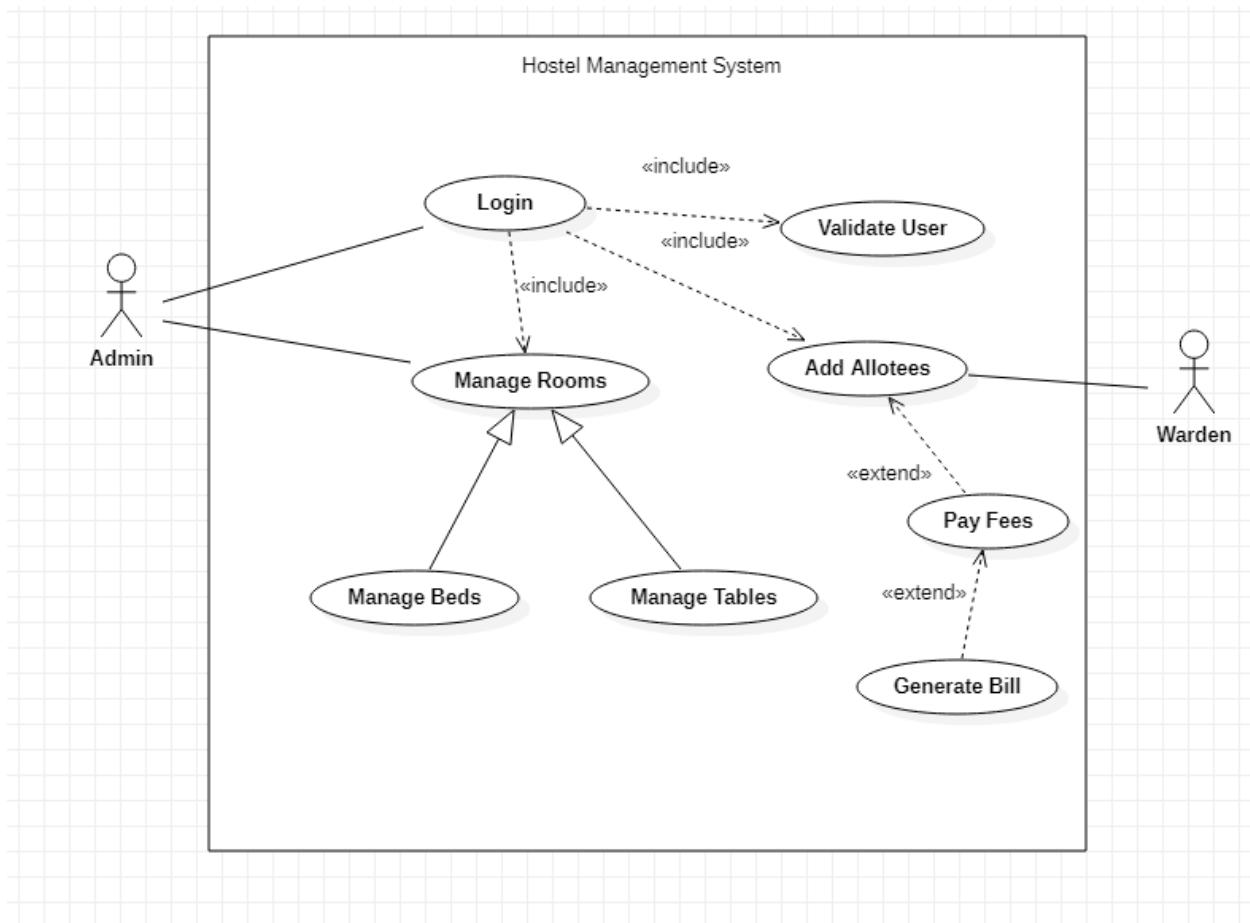
Justification: The given diagram gives a detailed description of the case with respect to a room allocation and mess menu details where it is explained with a sub machine in depth for room allocation. All the transitions and actions are mentioned.



d) Advance Use Case Diagram:

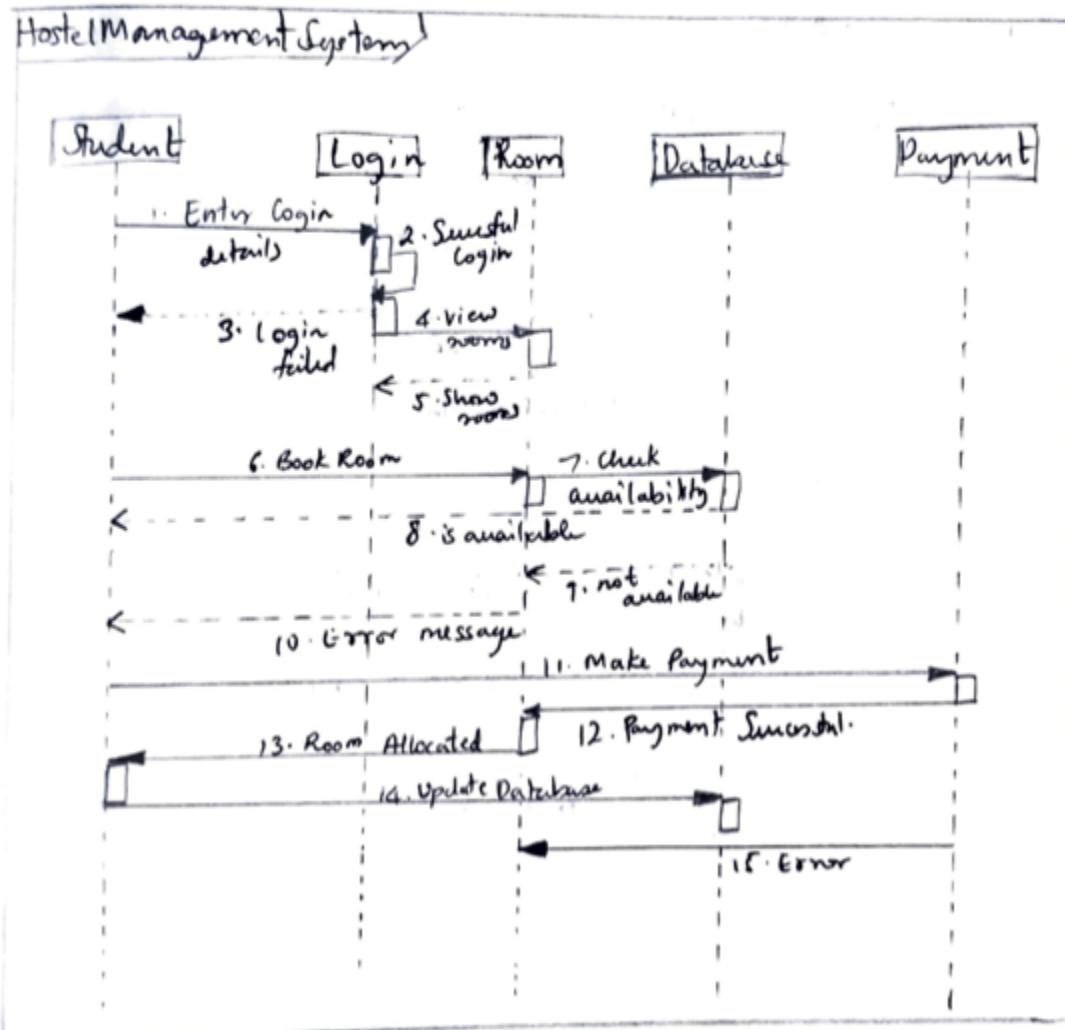


Justification: For the given case, all the functionalities are accounted for and respective actors are given the right functionalities. All the roles and tasks have been allotted.

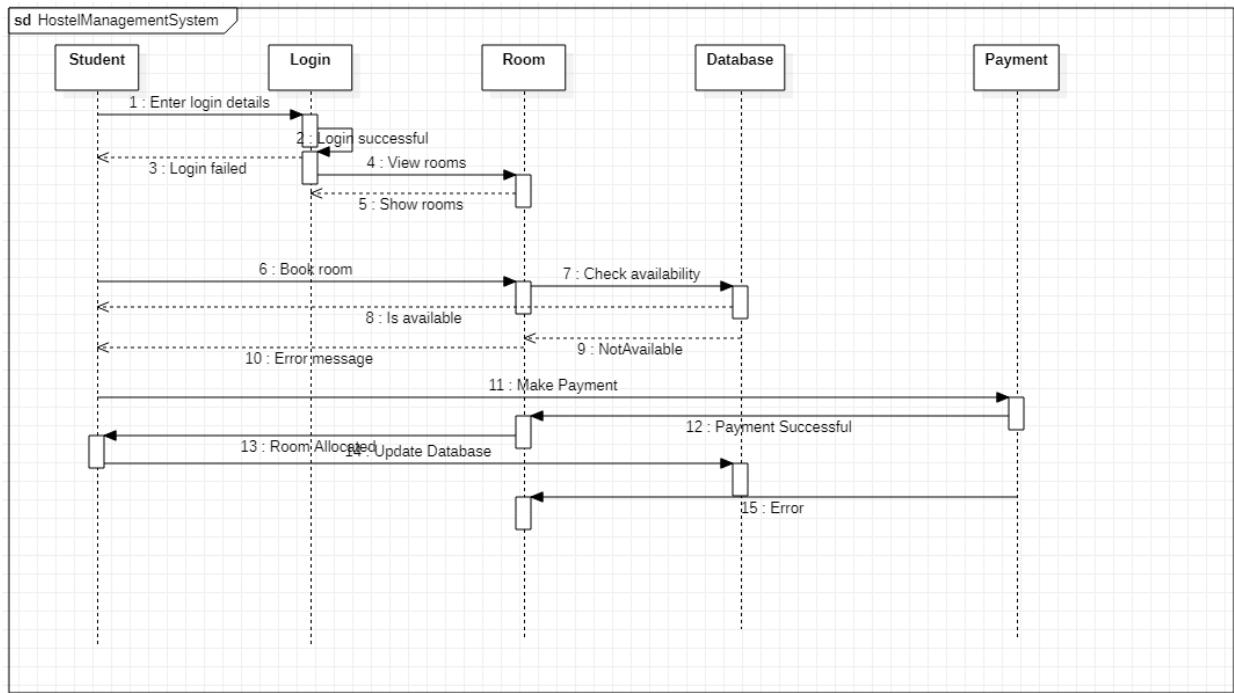


e) Sequence Diagram:

2. Hostel Management System.

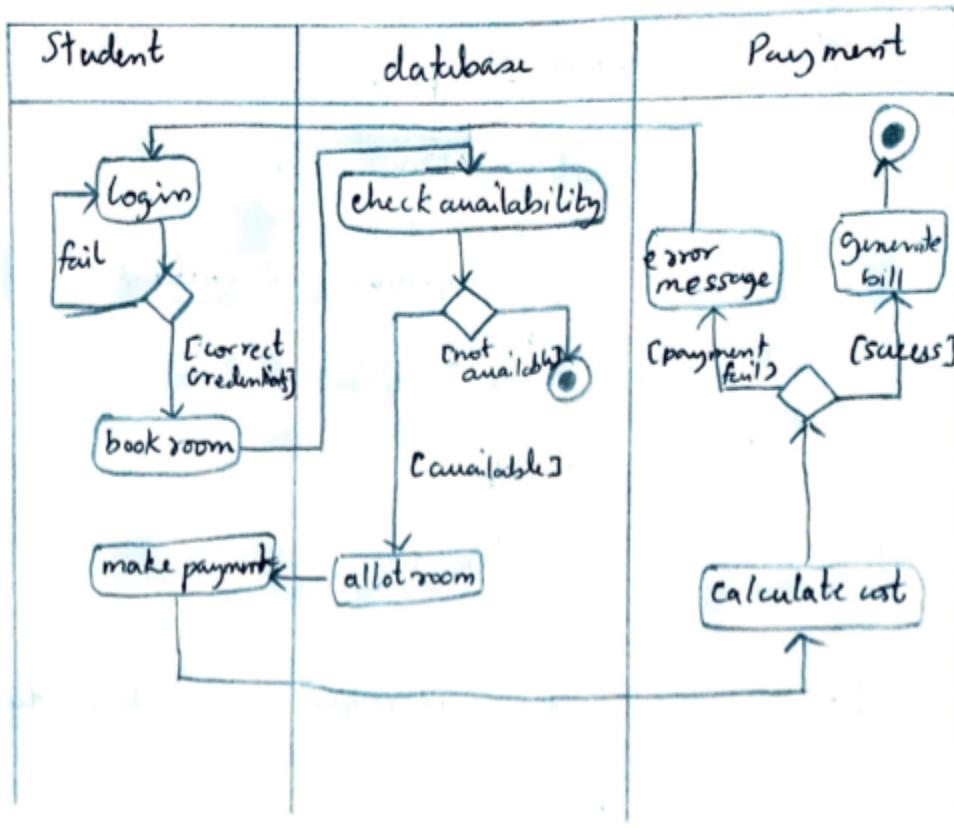


Justification: The given model shows the complete steps in the whole process of registration, allocation of rooms. The payment procedure is also shown and accounted for.

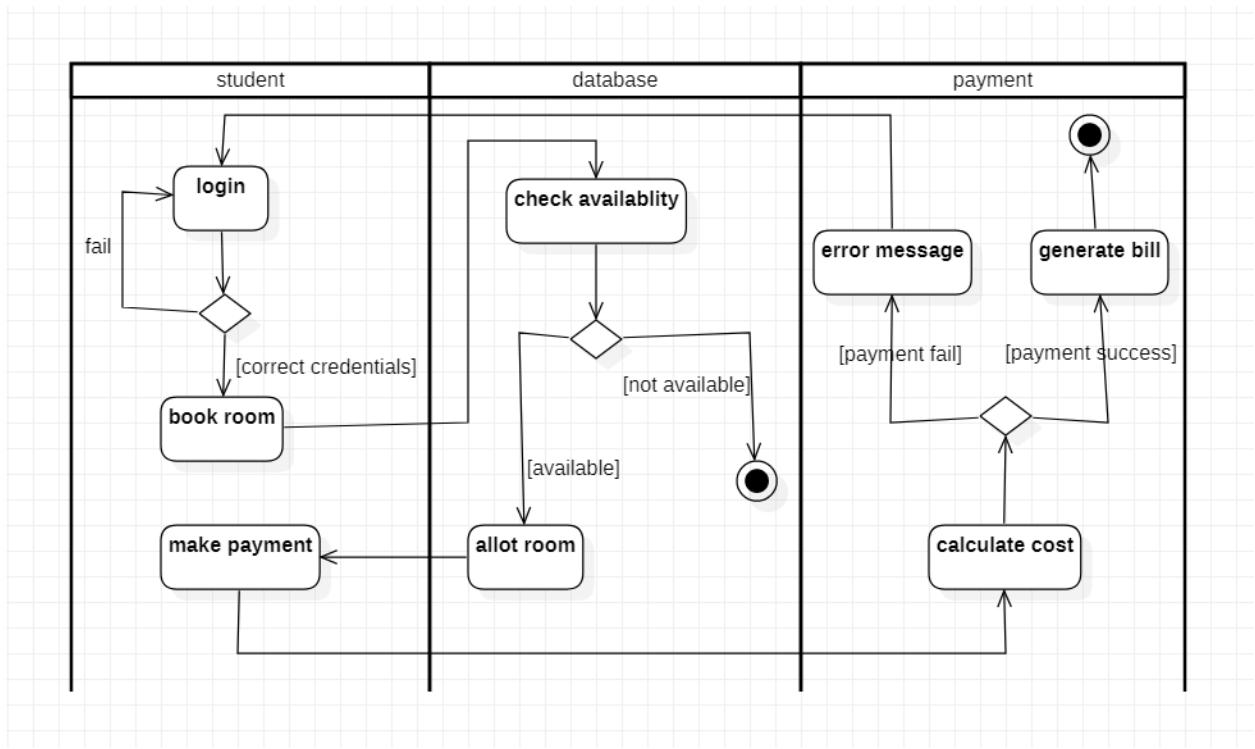


f) Activity Diagram:

2. Hostel Management System.



Justification: The given figure explains the working of the application system with all the functions and interactions with respect to the actors involved in the system. It accounts for modifications and additions on the database and payment procedures.



3. Stock Maintenance System-

a) SRS:

3. STOCK MAINTENANCE SYSTEM

Problem Statement :

The stock maintenance system is basically for the customer who access the information about the stock and retrieves 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 supplier giving product to the organization.

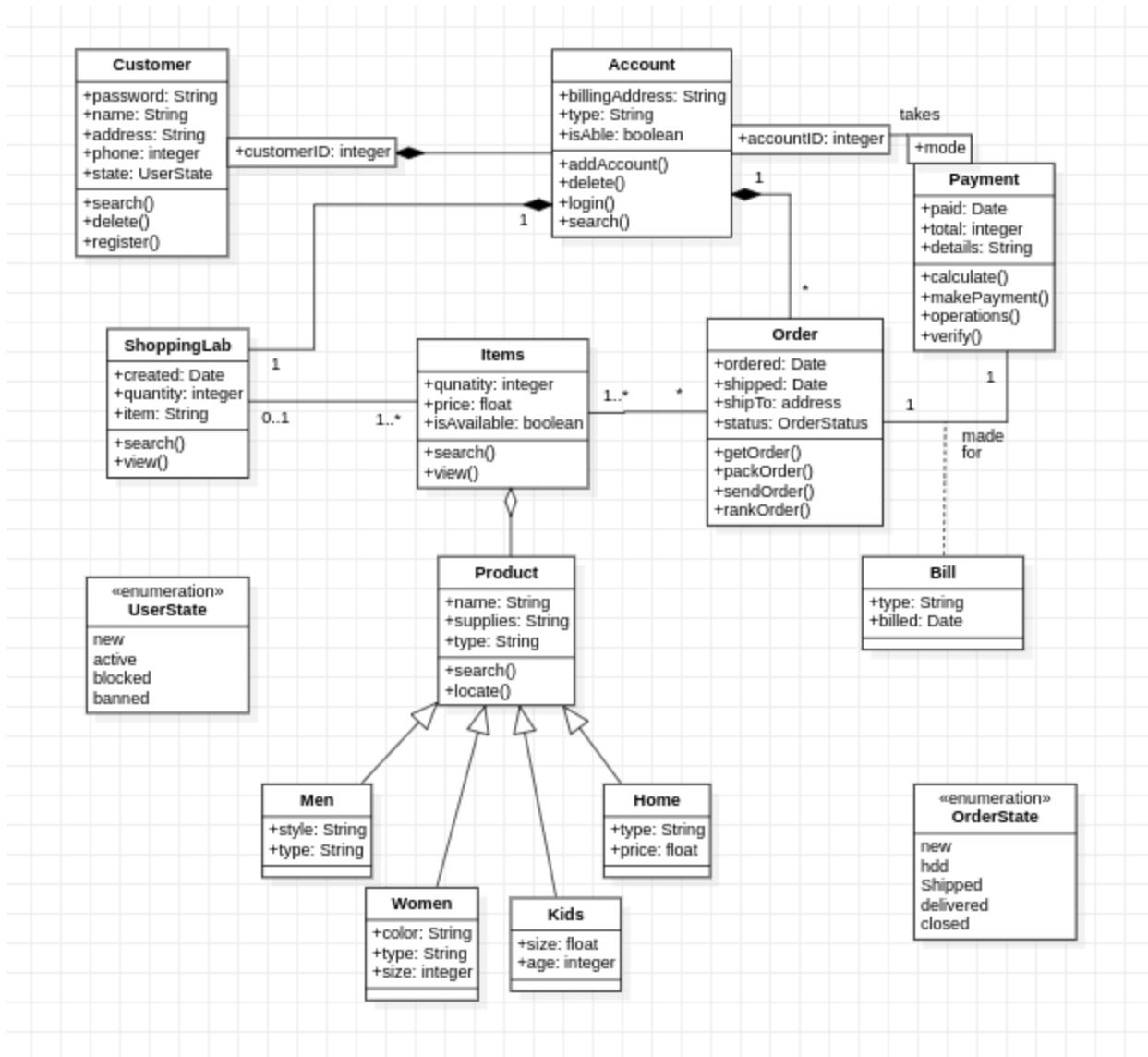
Software Requirement Specification :

- * The customer can purchase one or more product on any day, which will have a code price and quantity.
- * The customer will need to pay the bill for the products he or she has purchased. The bill number, type, description and customer who is paying the bill is maintained.
- * The stock of the products is maintained separately. The stock deals with information about the details of the product that the concern handling.
- * Stock consist of details such as the name of the product, id generated, quantity, unit, etc. This information is retrieved during the sales and purchase of a product.
- * The vendor deals with the information about the details of the suppliers giving product to the organization.
- * Vendor consists of details such as name, address, email, sales tax no, etc. This info is retrieved when a purchase is done.
- * The products are displayed in stores across the city or world. All the information regarding the store such as id, name, address and type are used to locate the product.

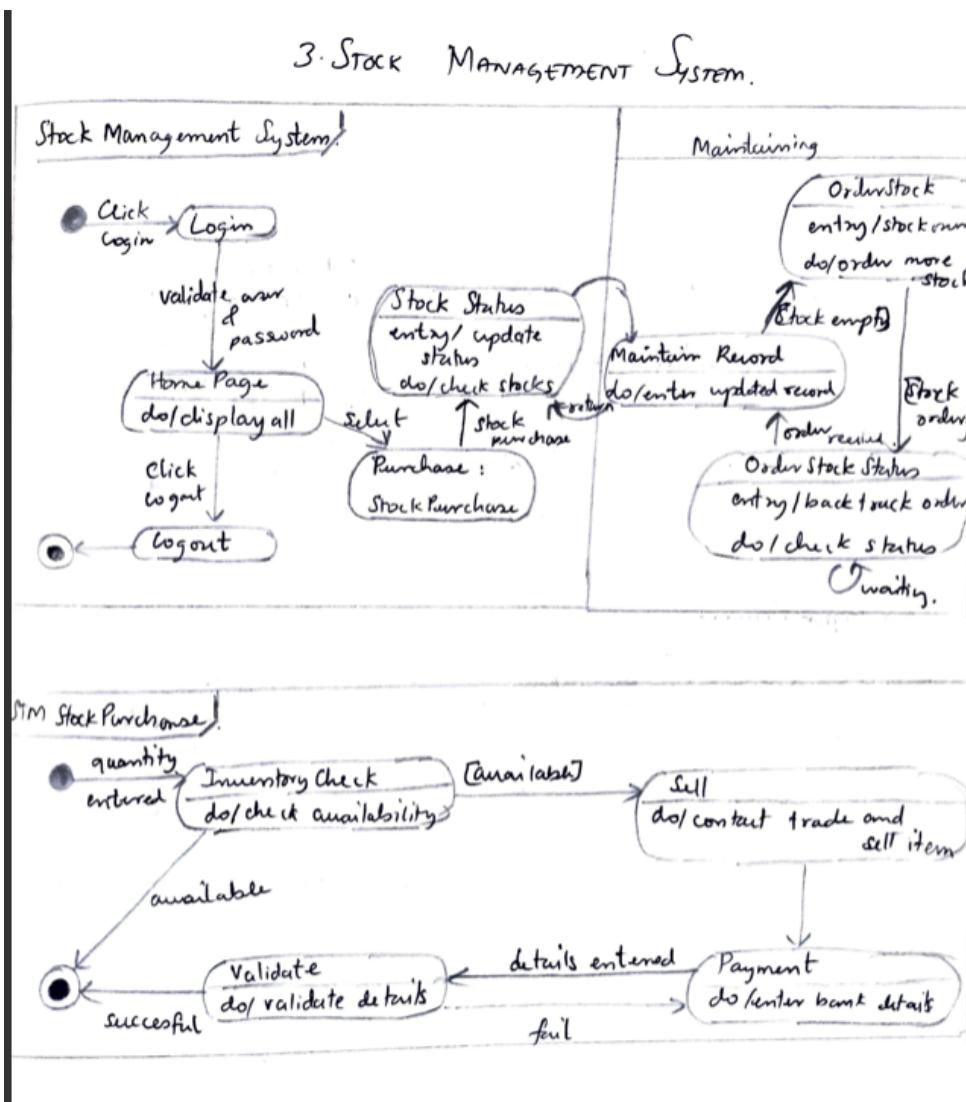
b) Advance Class Diagram:



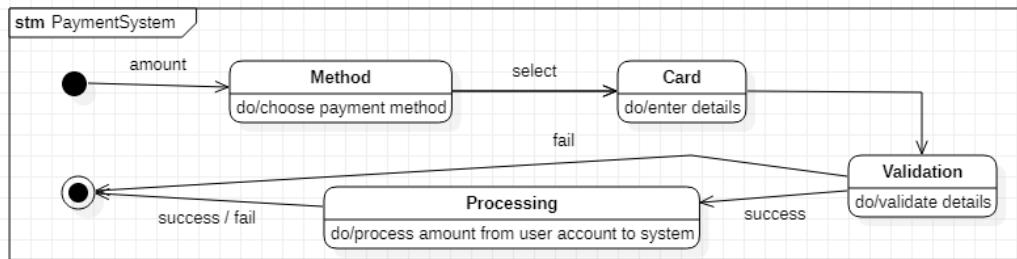
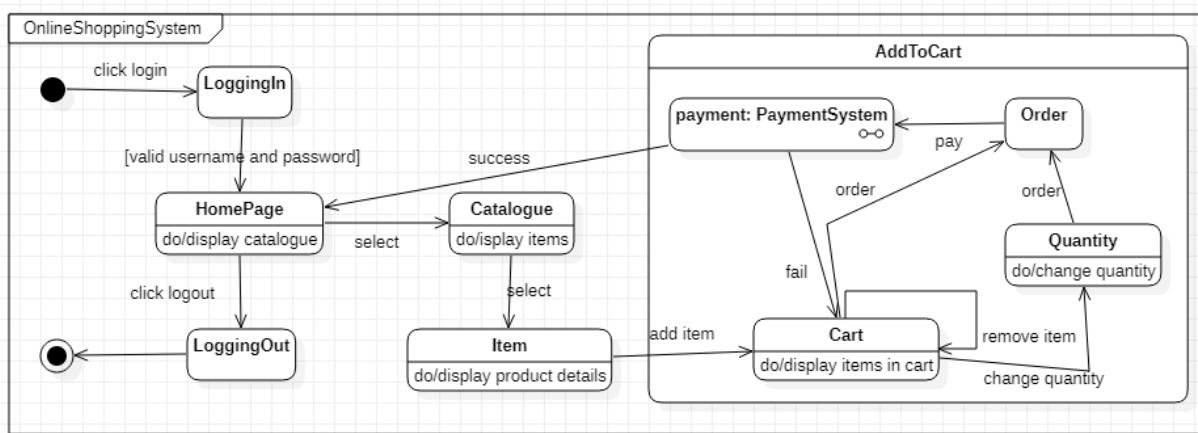
Justification: A store has several substores generalized and composed of many products which are in turn associated with vendors. Every customer buys a product hence associated and pays the bill for stock purchased. All the stocks are aggregated to the product.



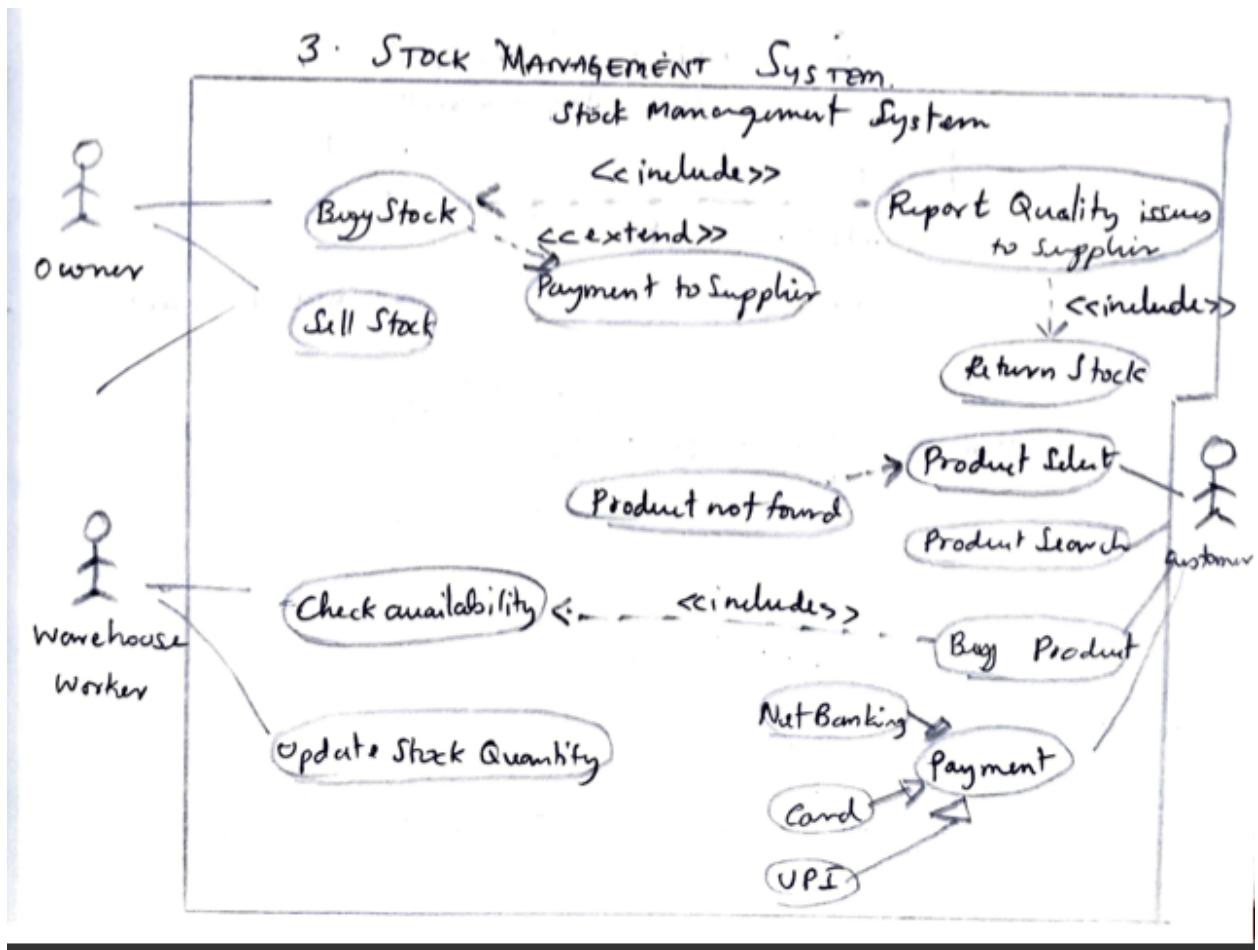
c) Advance State Diagram:



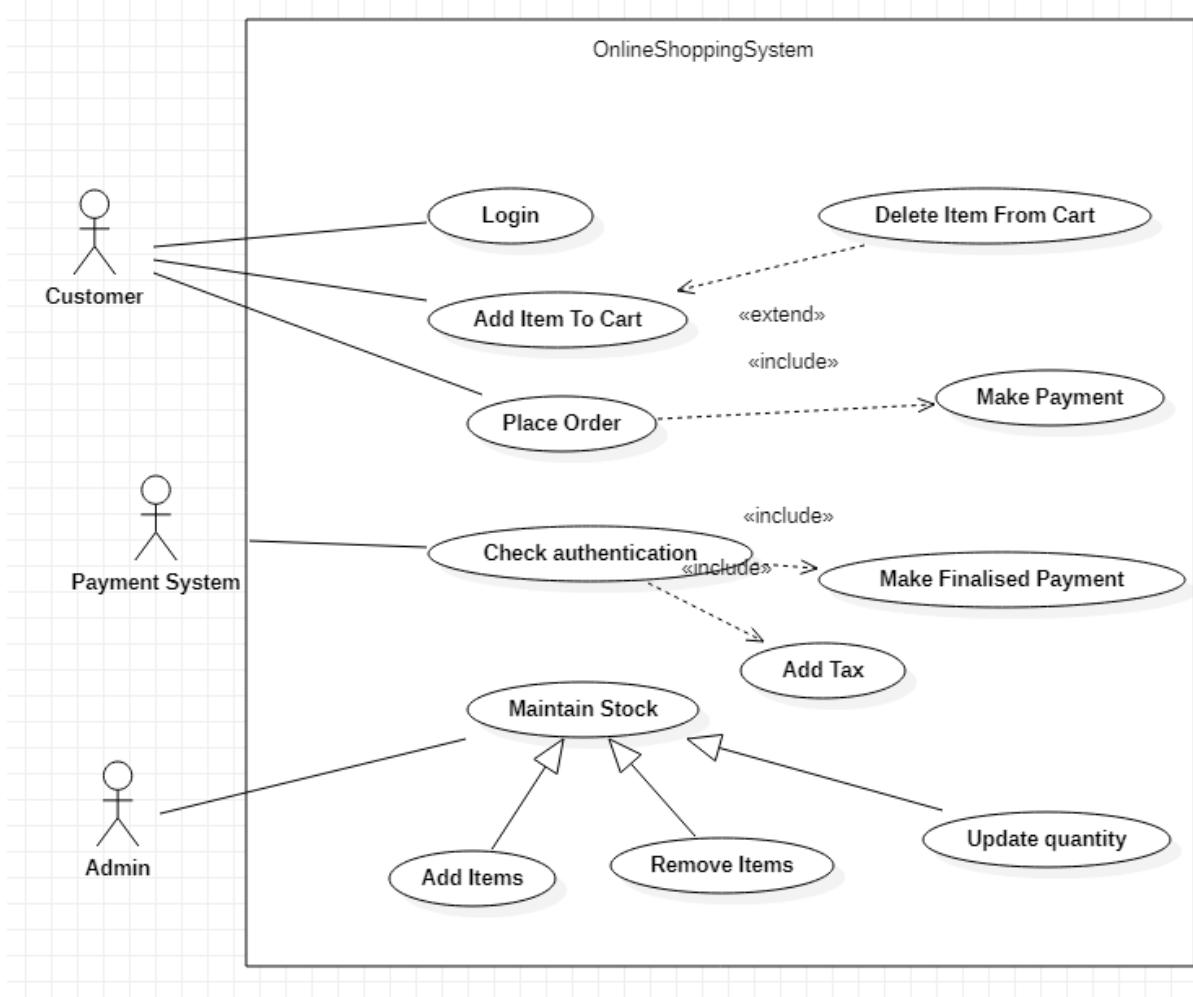
Justification: This machine explains a scenario of maintaining stocks and order of purchase. The details of the management are mentioned in the sub machine and all the respective transition and conditions are mentioned with all activities in detail.



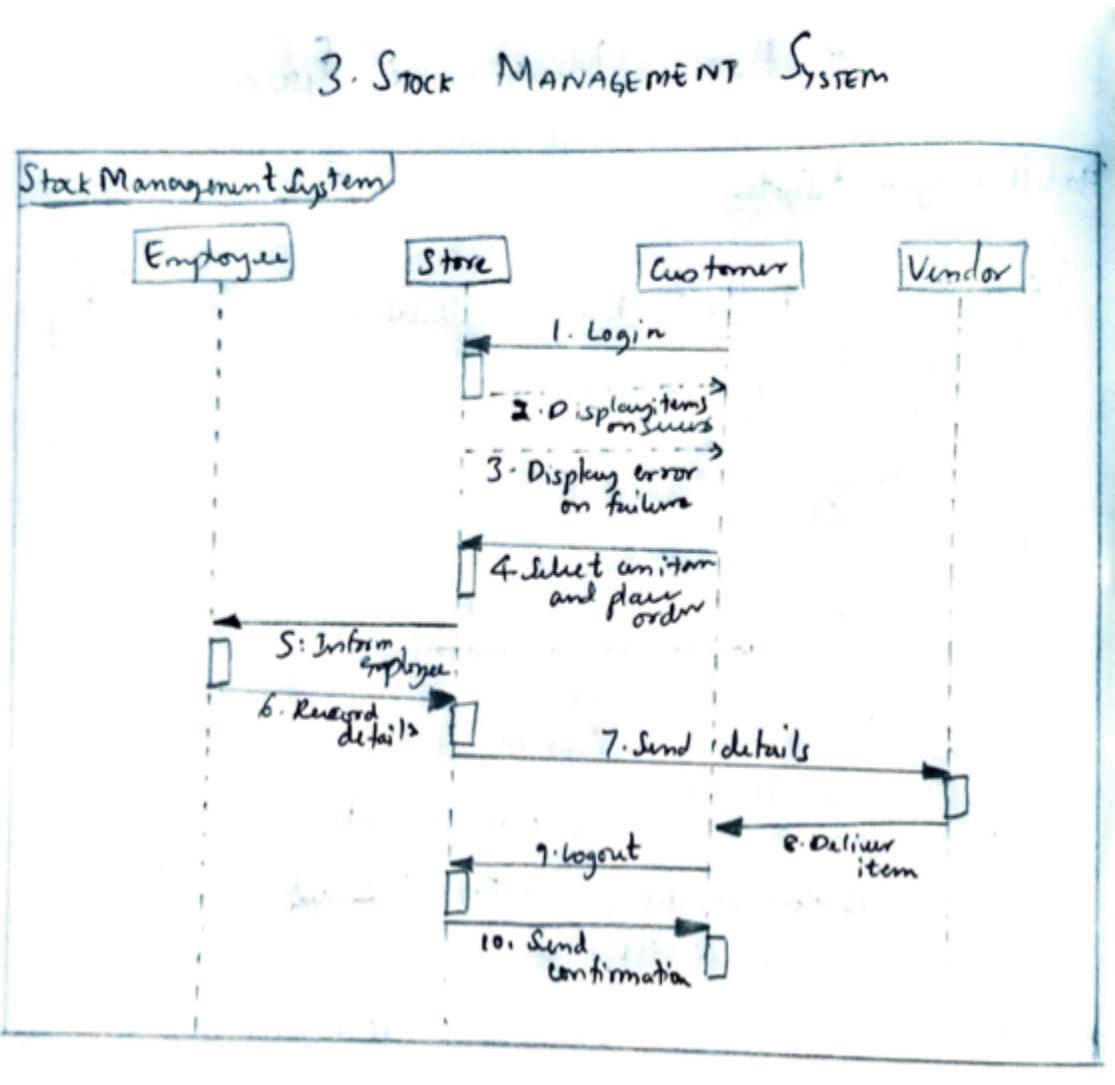
d) Advance Use Case Diagram:



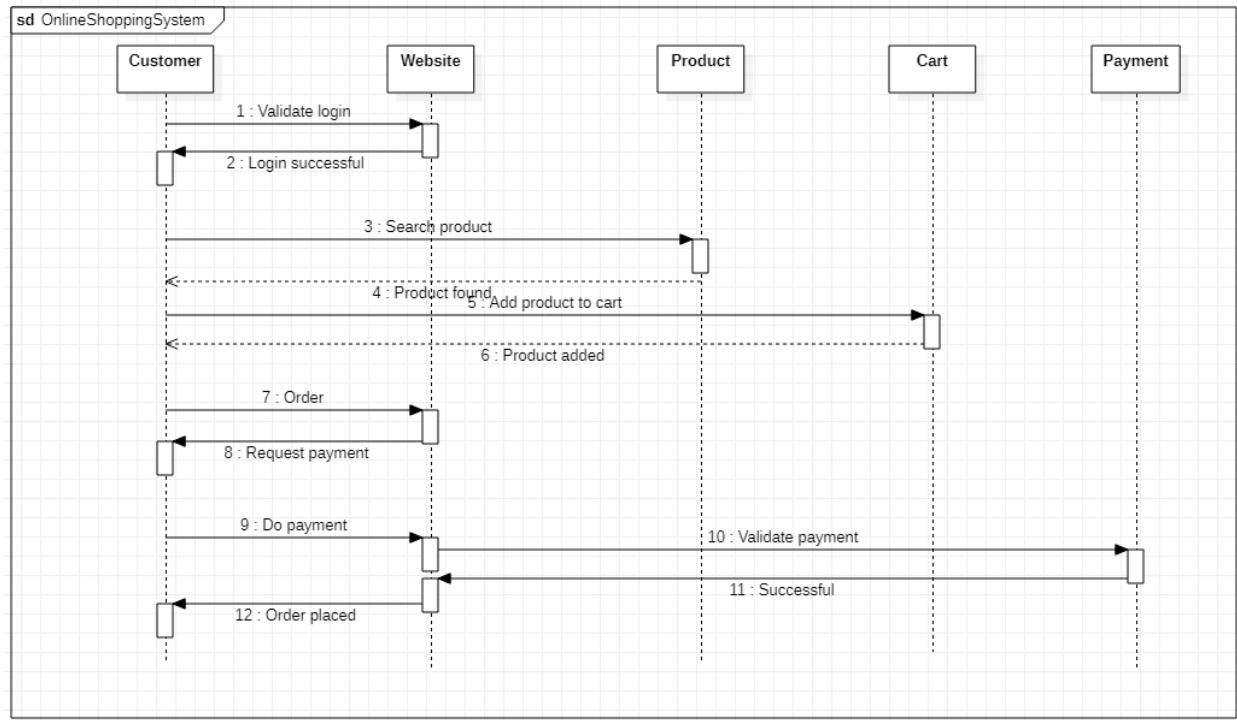
Justification: All function for the given system are mentioned and actors such as customer, worker and owner are assigned appropriate roles and functionalities.



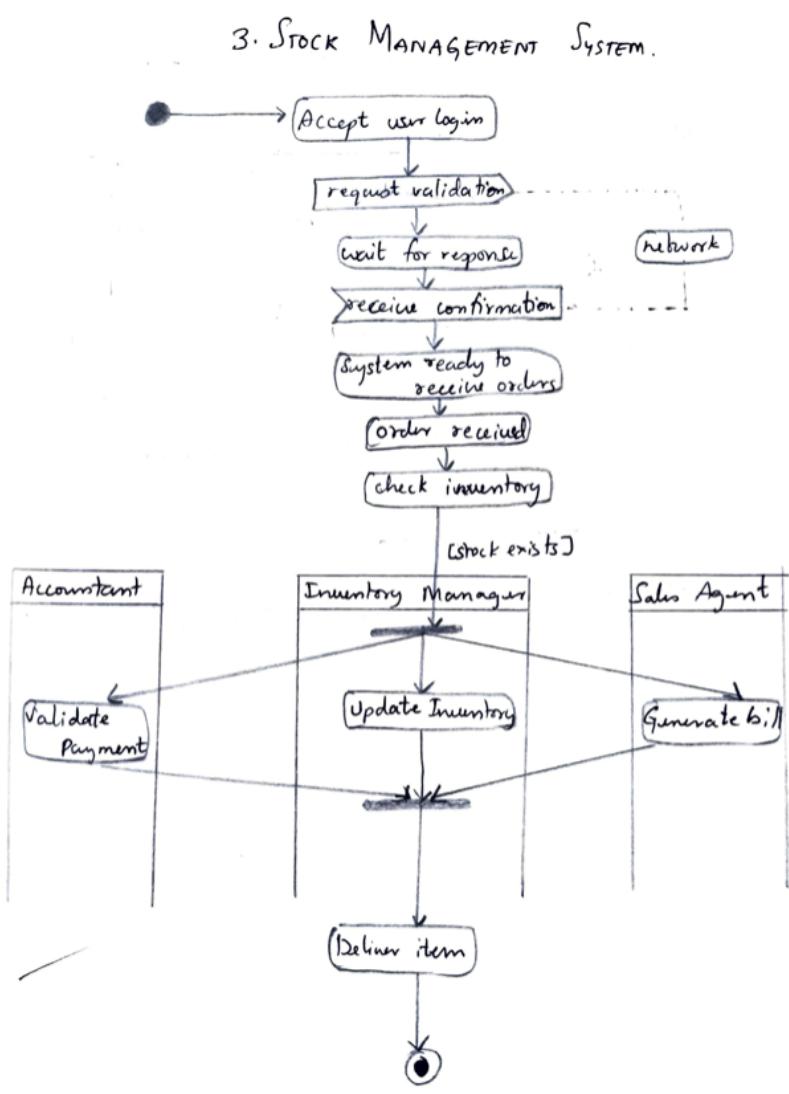
e) Sequence Diagram:



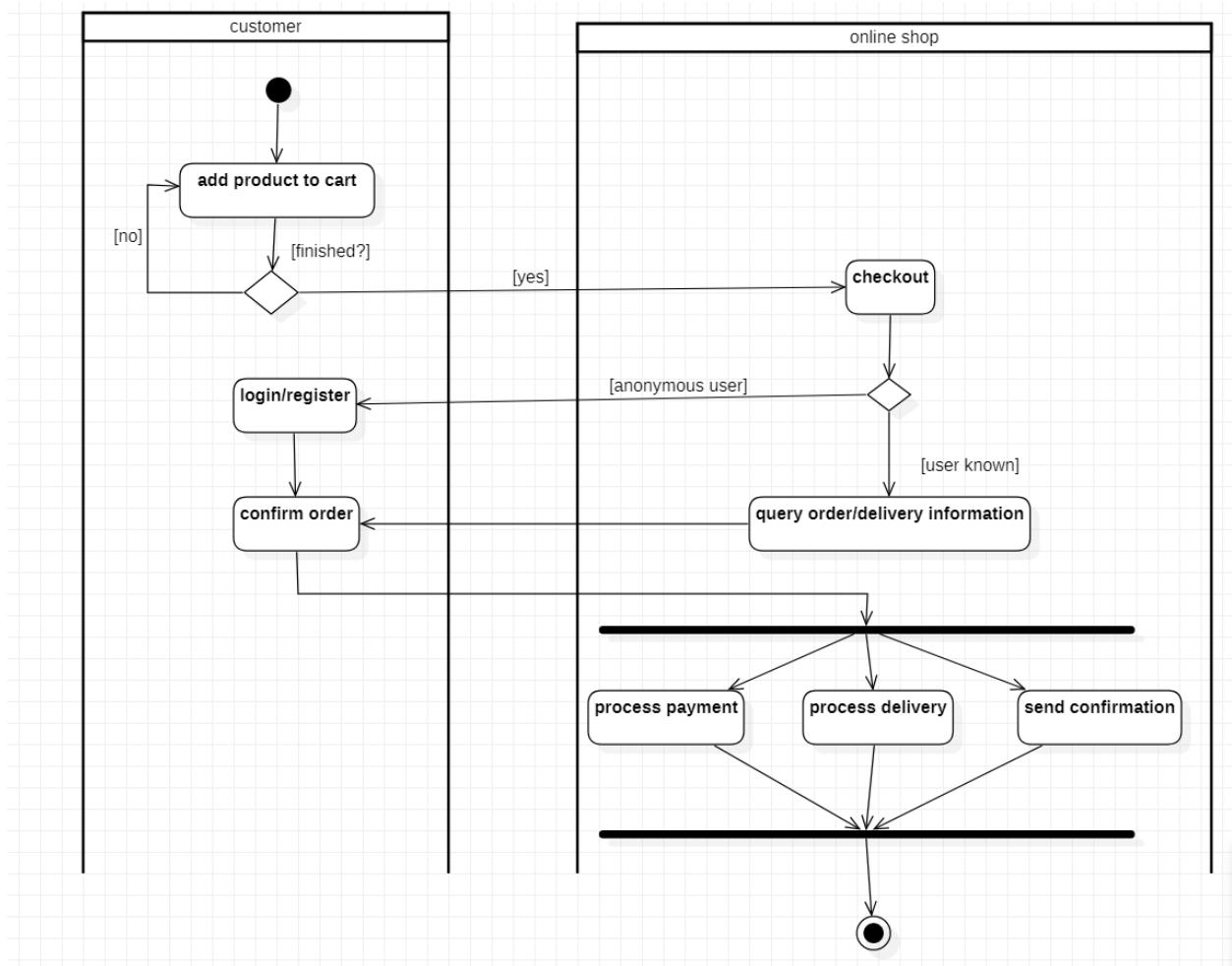
Justification: The given model shows the complete interactions of the customer with the vendor and all the steps in the process of login, search and selecting the stocks and purchasing them. All fields are updated accordingly



f) Activity Diagram:



Justification: The given activity diagram gives complete system interaction with user, explains from user's login, validation of credentials and management activities.



4. Coffee Vending Machine-

a) SRS:

4. COFFEE VENDING MACHINE

Problem Statement:

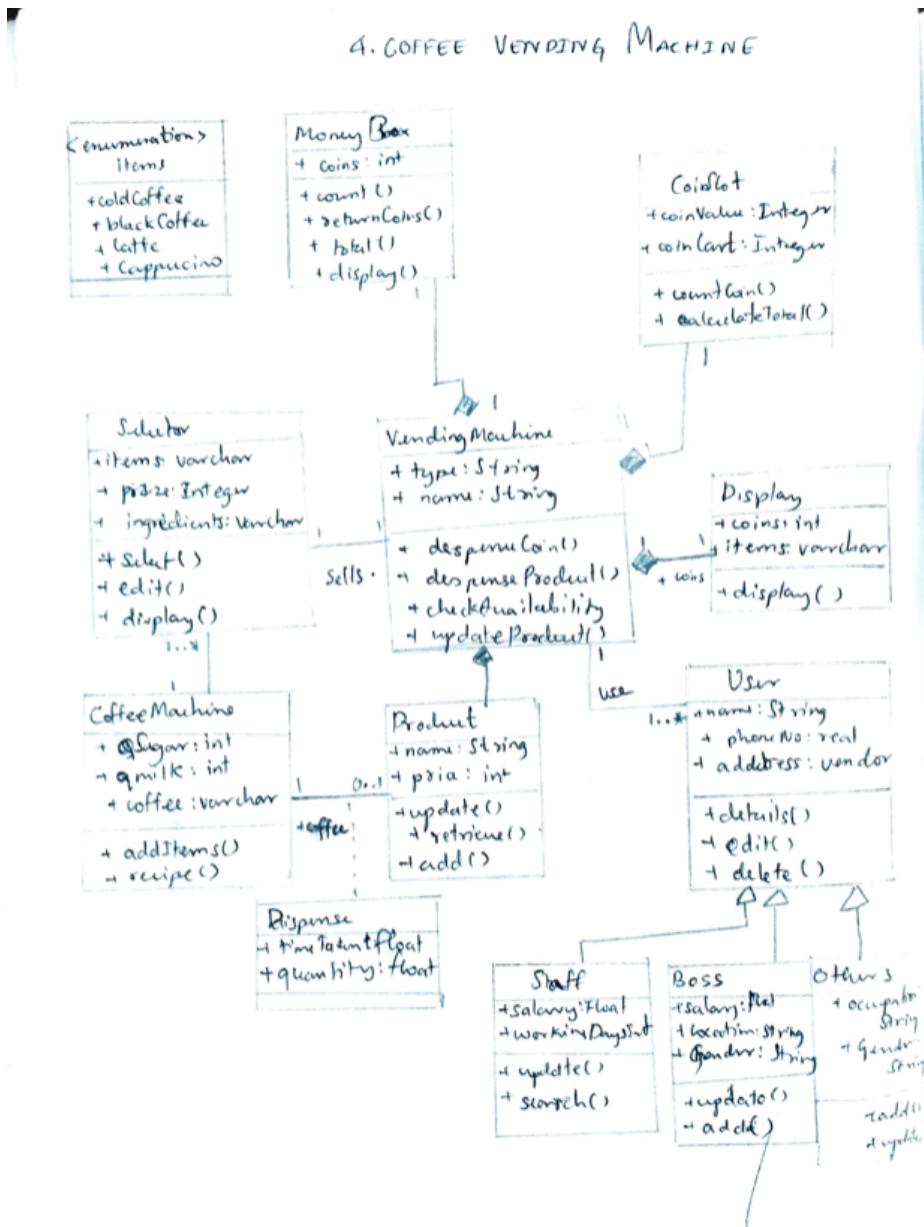
The coffee vending machine is basically for the customers to buy coffee by themselves without any third person being involved.

A coffee vending machine sells different types of coffee such as cappuccino, latte, etc. 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.

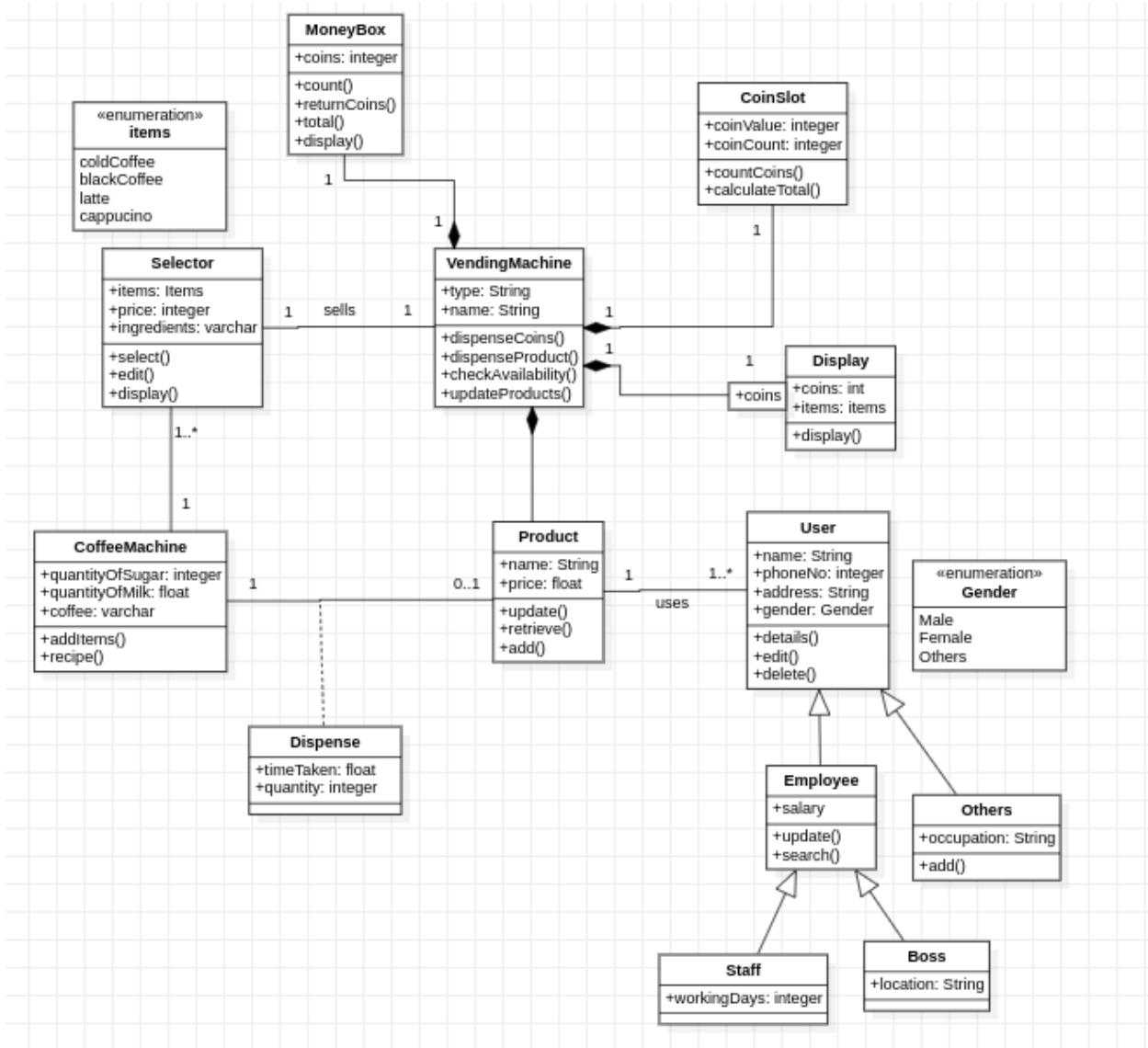
Software Requirements Specification:

- * The vending machine must have money box, coin slot, display screen and products i.e coffee to the user.
- * 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 must be buttons for user to interact with the system.
- * The user shall be able to purchase one kind of available drink at a time and get back the exact changes if he has put extra money. The user shall be able to quit the dispensing of any beverage at any time during dispensing.
- * The system shall check for properly inserted coins.
- * The system shall be able to dispense coffee after coin insertion.
- * The system must accept coins of different amount and the system must compare the item cost with entered coin.
- * The system must check the validity of coins.
- * The system shall be able to detect the low amount of ingredients and low number of cups and indicate with an indicator.

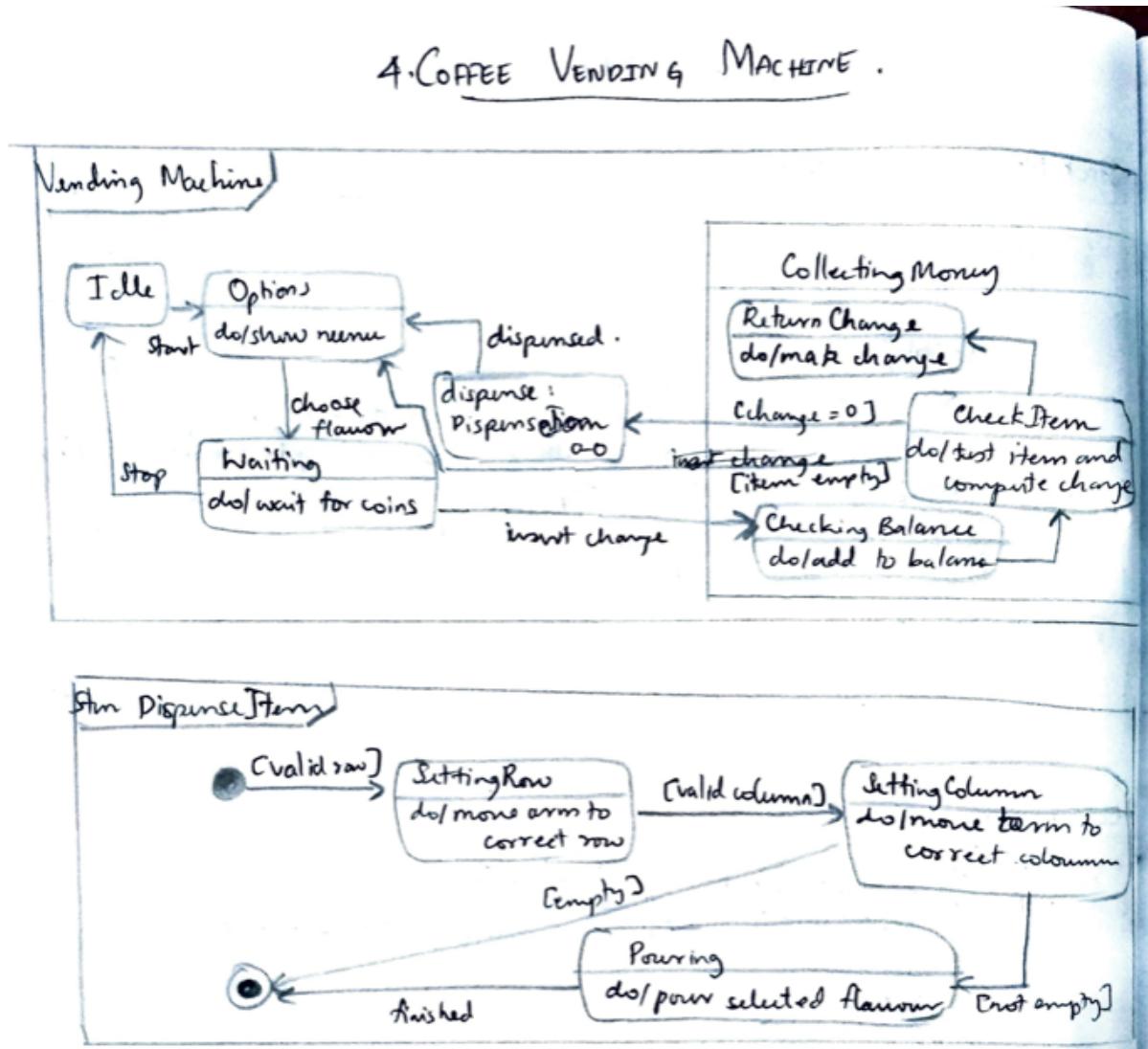
b) Advance Class Diagram:



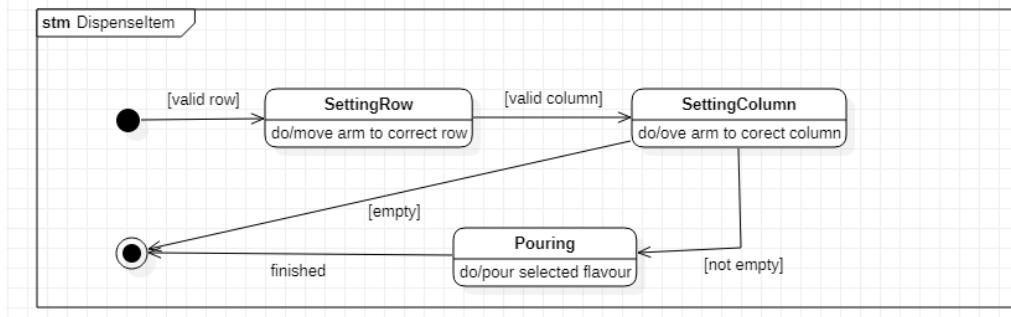
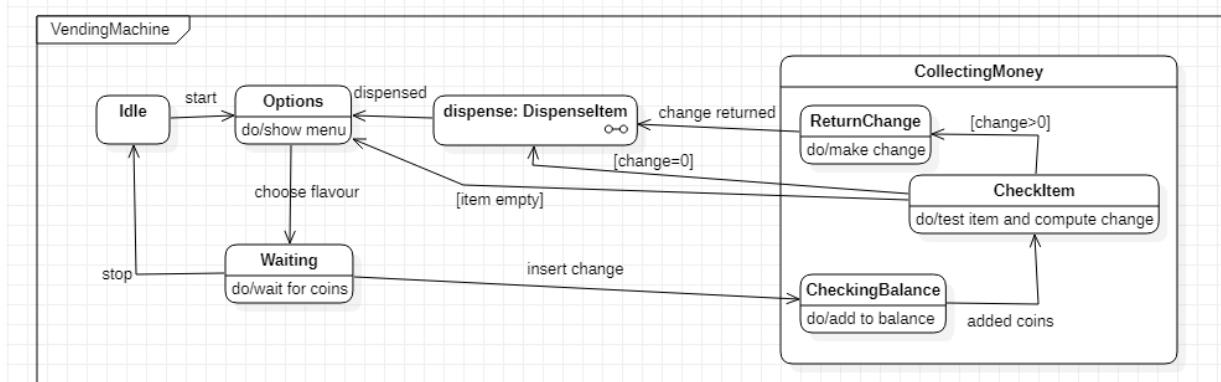
Justification: A coffee vending machine which has coin, product dispenser and coin collector as independent parts and hence they are aggregated, which is composed of product which is in turn composed of coffee, tea and milk. We use association with direction to link to them. Product dispenser is composed of products hence composition.



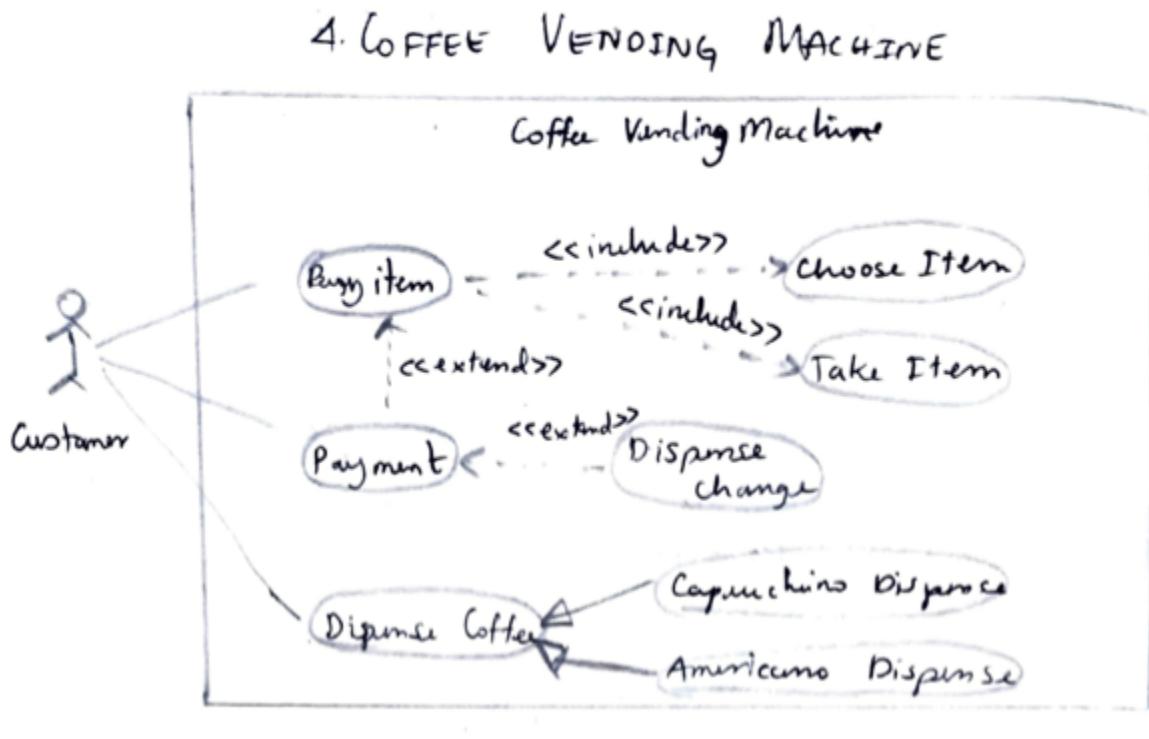
c) Advance State Diagram:



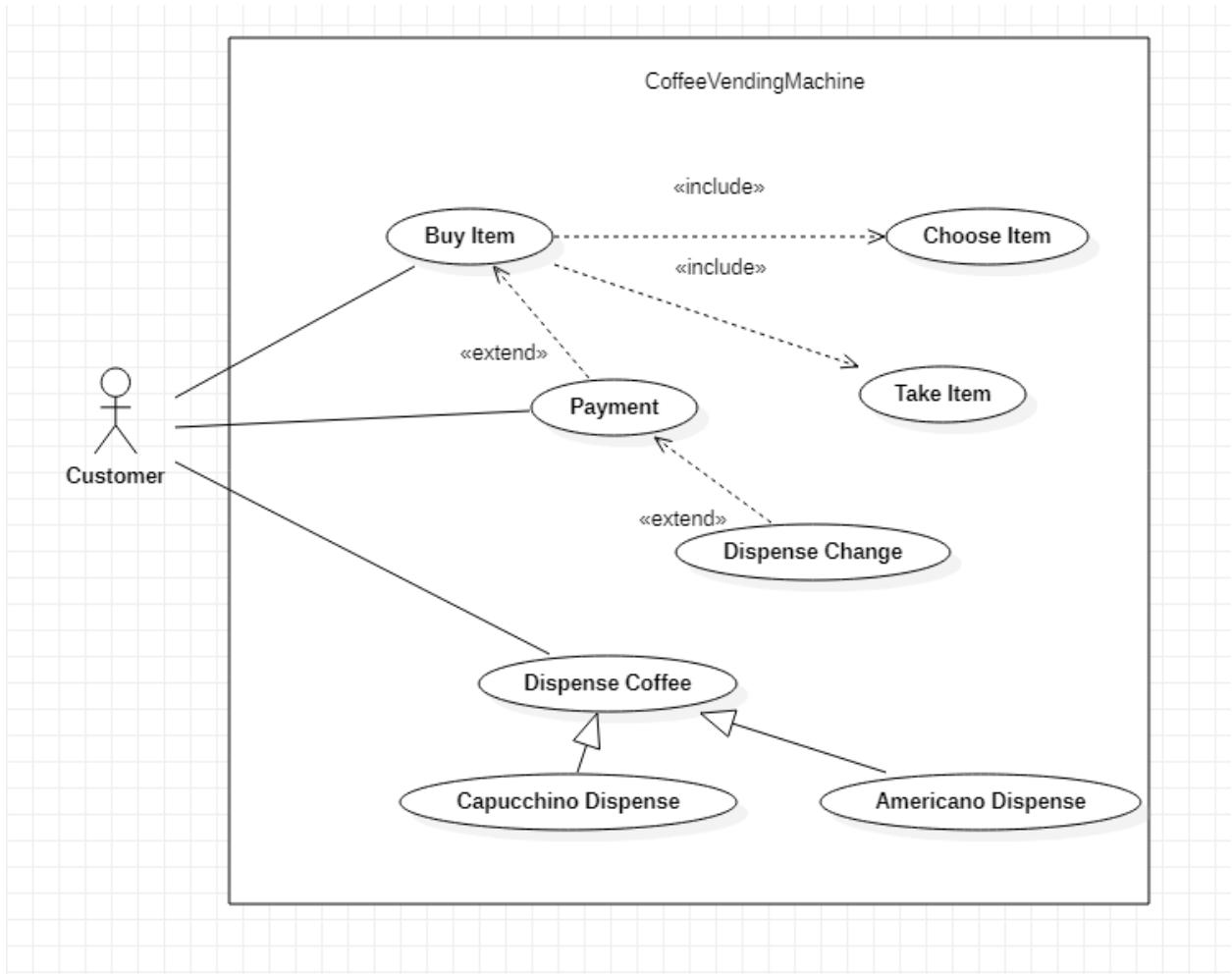
Justification: For the given application, all the respective functions of all the parts are mentioned with all involved actors customer, seller, system and operator.



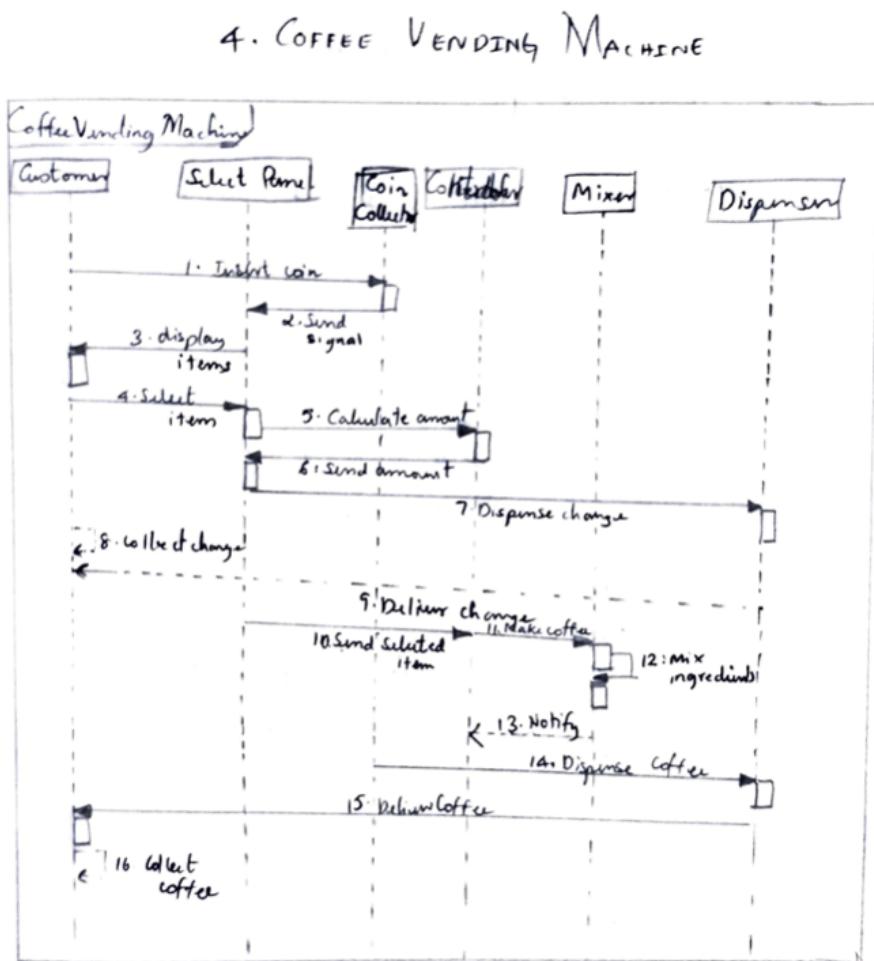
d) Advance Use Case Diagram:



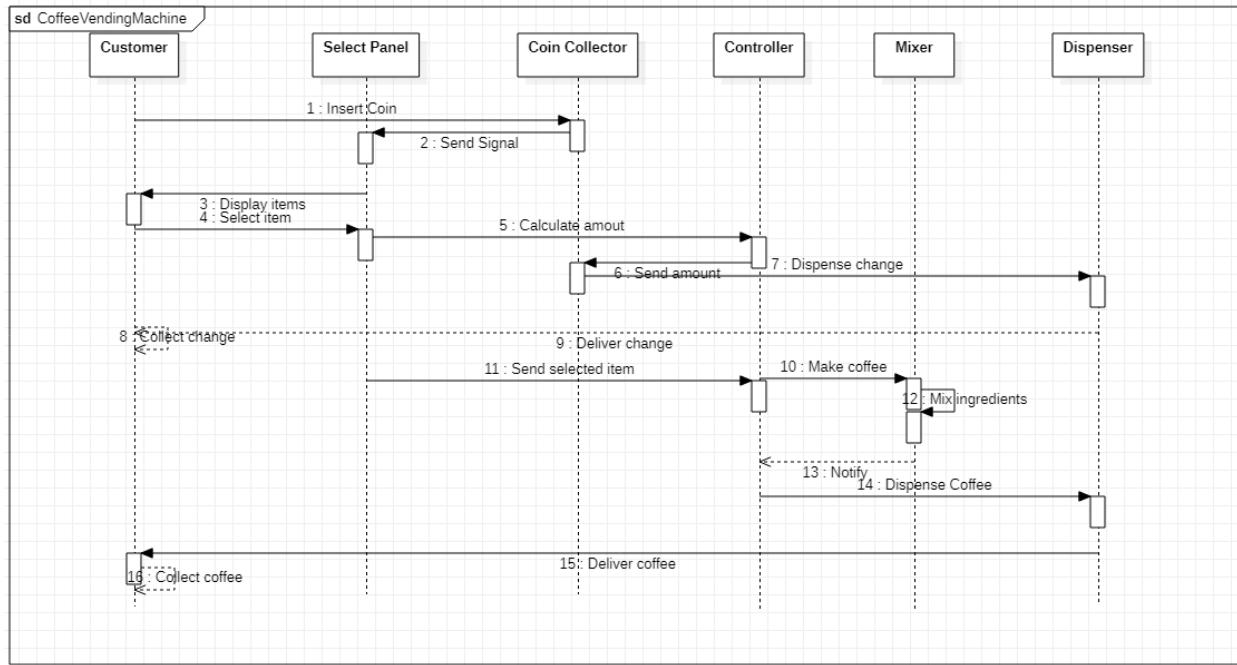
Justification: The given model shows all the interactions of the customer with the coffee vending machine with all respective parts and shows the complete process of how the coffee is dispensed by the system and delivers change.



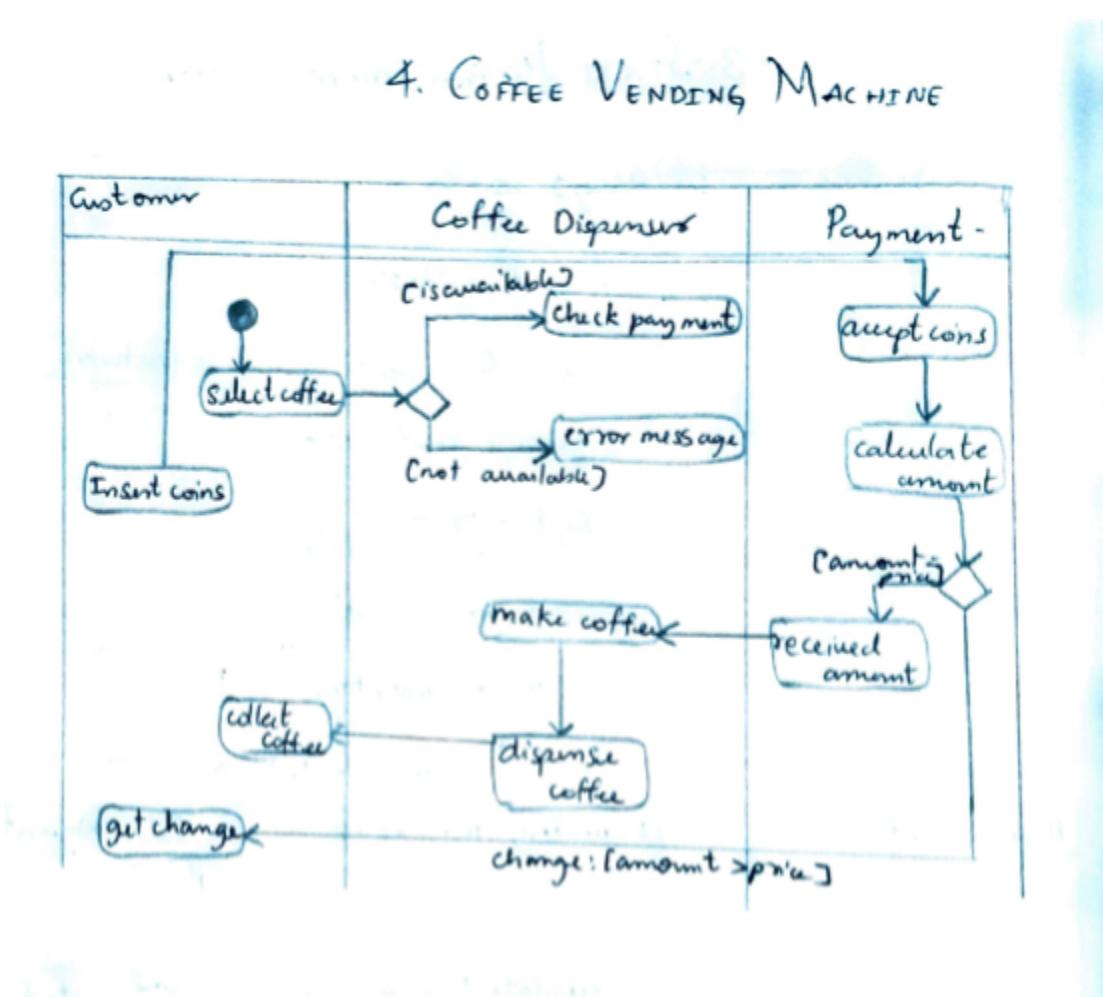
e) Sequence Diagram:



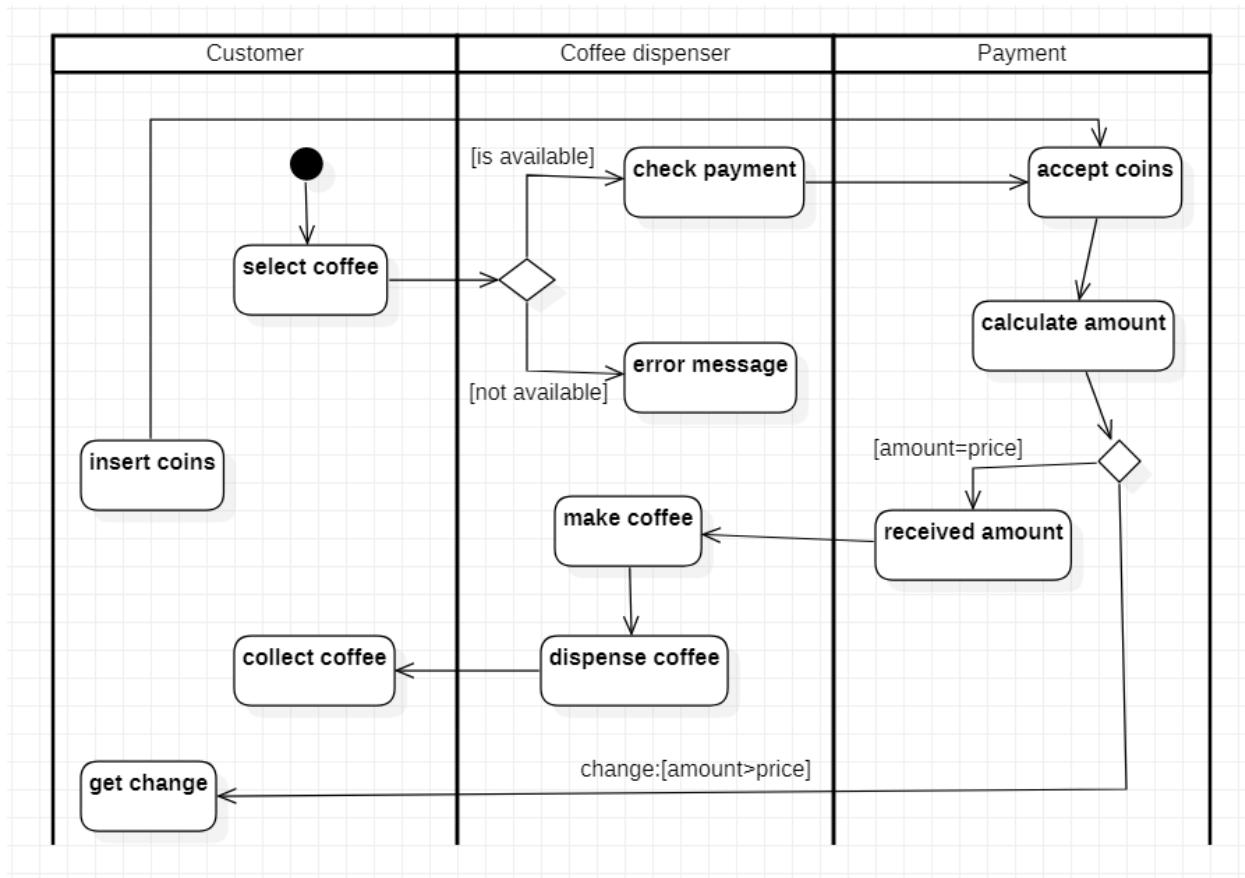
Justification: The given sequence diagram shows the appropriate sequence of processes with respect to the given system. It shows how user enters input and system responds appropriately.



f) Activity Diagram:



Justification: The given model explains the complete interaction between customer and the system from selecting the type of coffee, entering money into the machine and dispensation of the same.



5. Online Shopping System-

a) SRS:

5. ONLINE SHOPPING SYSTEM

Problem Statement: The online shopping system for all kind of products web application is intended to provide complete solution for vendors as well as customers through a single gateway 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 internet.

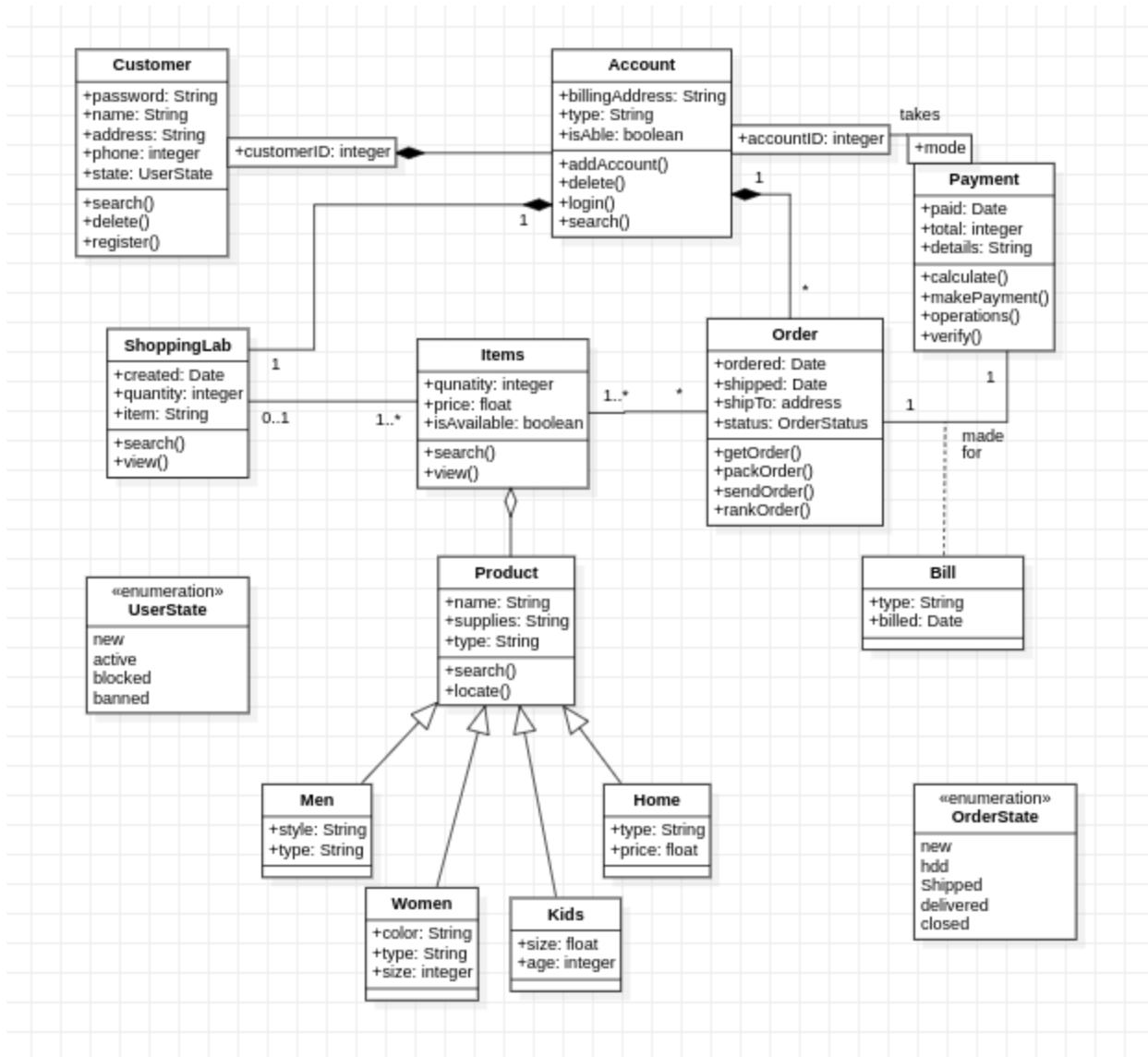
Software Requirement Specification,

- * The customer must have an account in the online website where he/she can purchase products.
- * If customer wants to buy the products 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.
- * Changes to cart means the customer after login or registration can make order or cancel order of the product from the shopping cart.
- * The products sold for customers are sold for various categories like men, women, kids and home products.
- * For customer there are many type of secure billing will be prepaid as debit or credit card, post paid as after shipping cheque or bank draft. The security will be provided by the third party.
- * After the payment or surf the product the customer will be logged out.

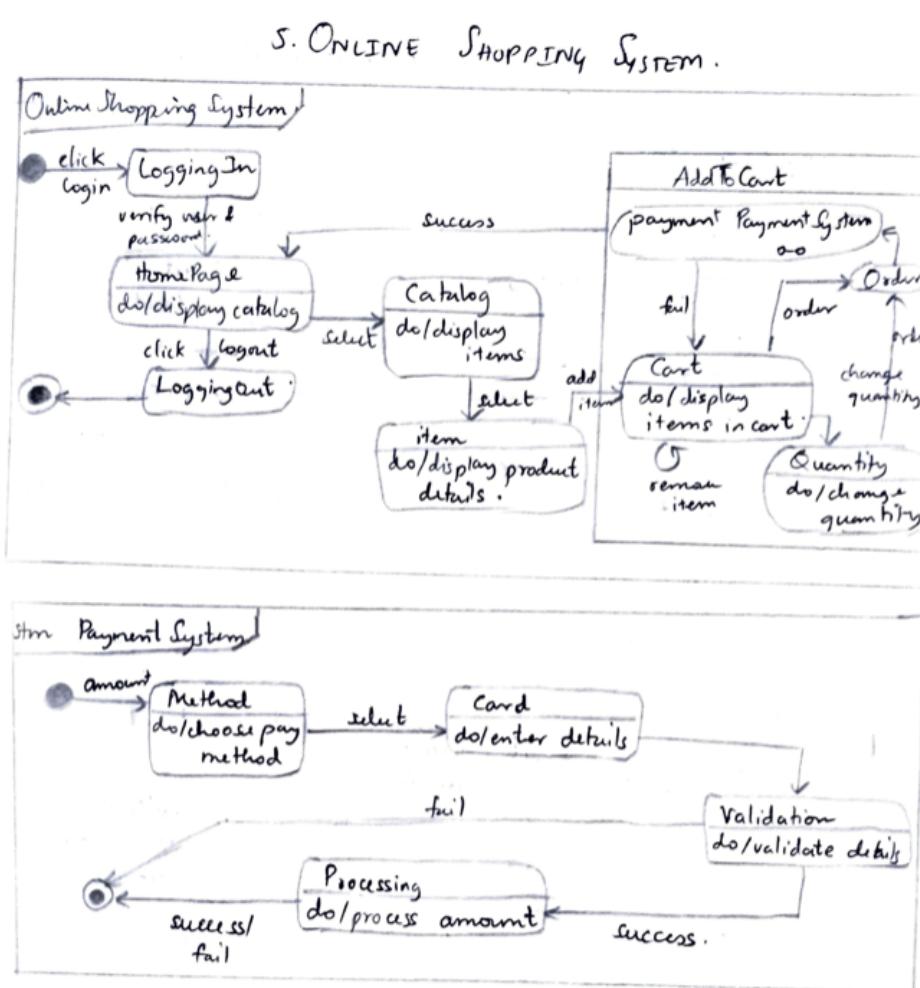
b) Advance Class Diagram:



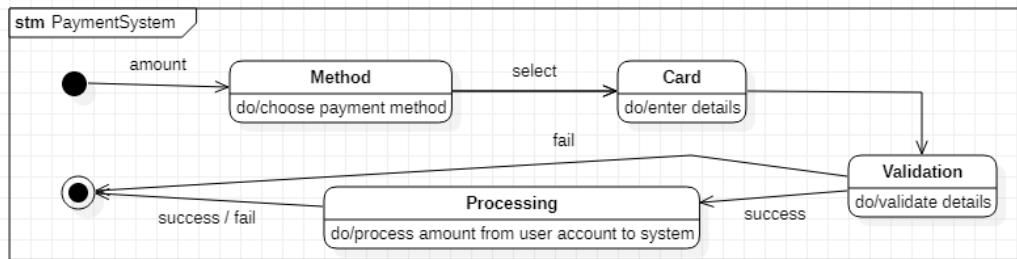
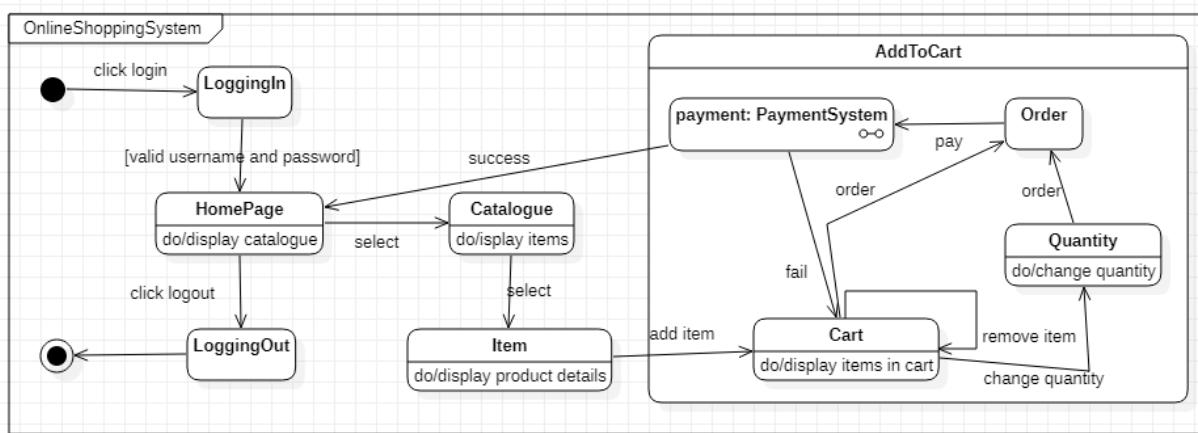
Justification: Every customer is linked with an account using id, where the account cannot exist without the customer, so it is composed. Every account has a shopping cart and order is associated with items which are placed in the shopping cart. Items are aggregated with products which are generalized into various classifications. The account, payment for the order to the bill is linked by association.



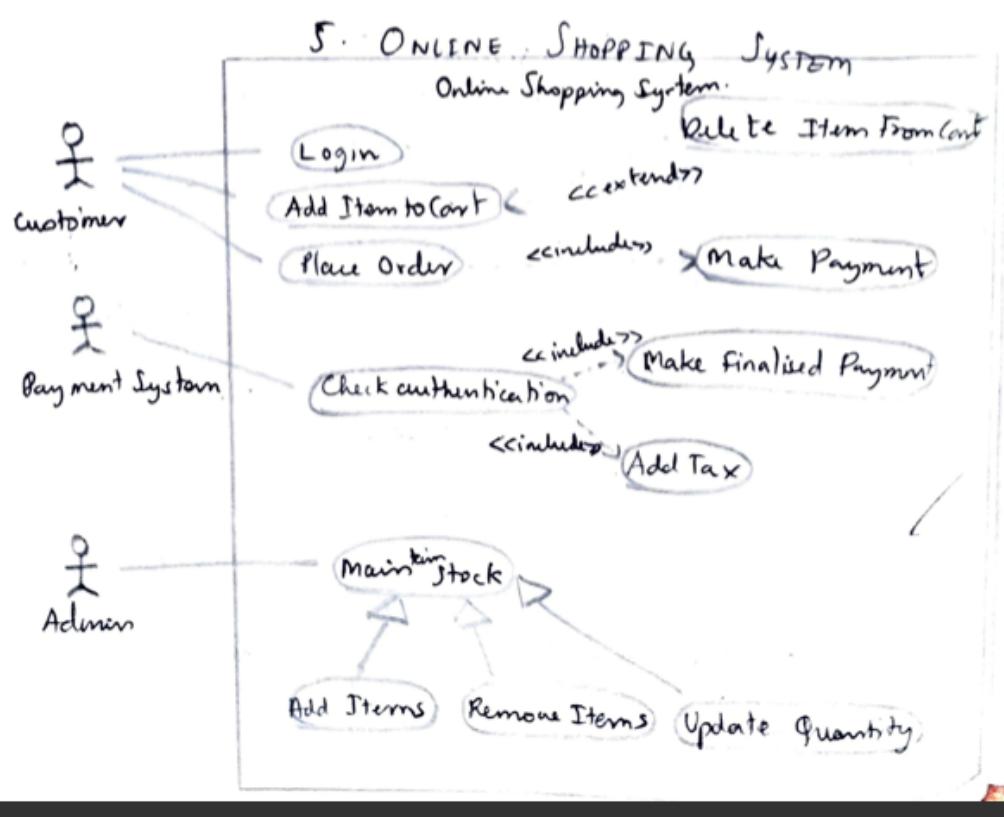
c) Advance State Diagram:



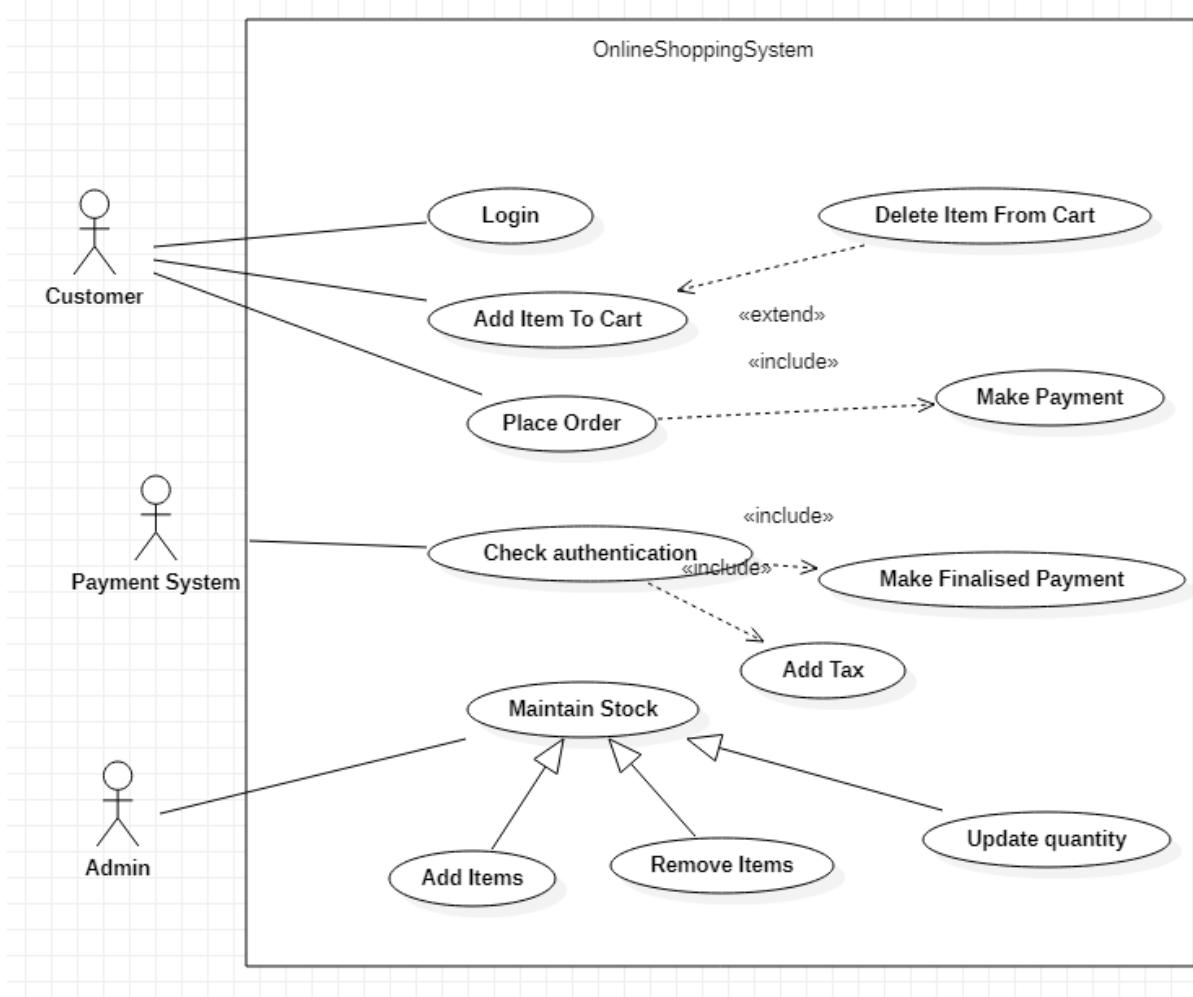
Justification: The given model explains with respect to an add to cart and payment system scenario with proper transactions and actions. The detailed composition and submachine model with the proper details.



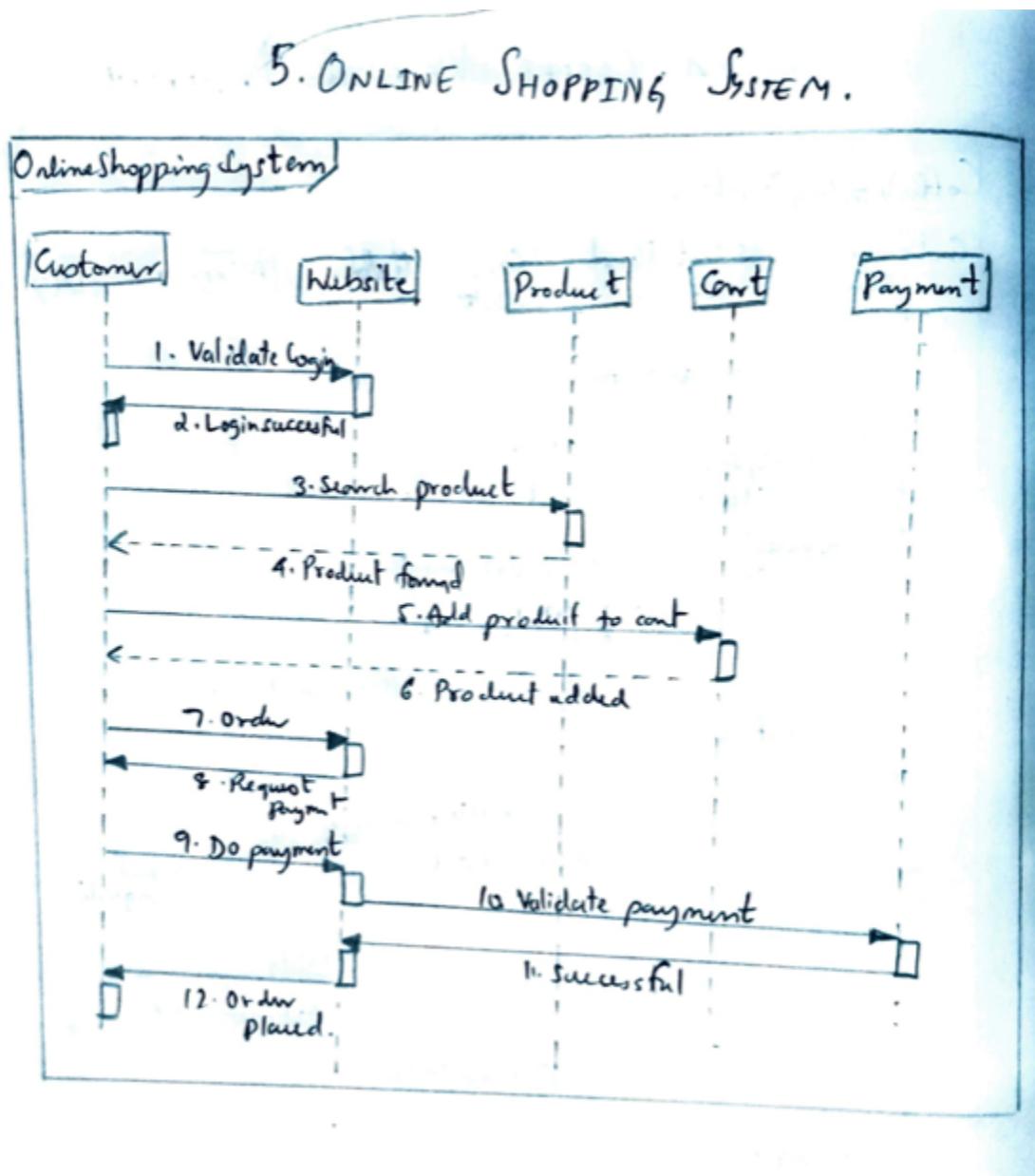
d) Advance Use Case Diagram:



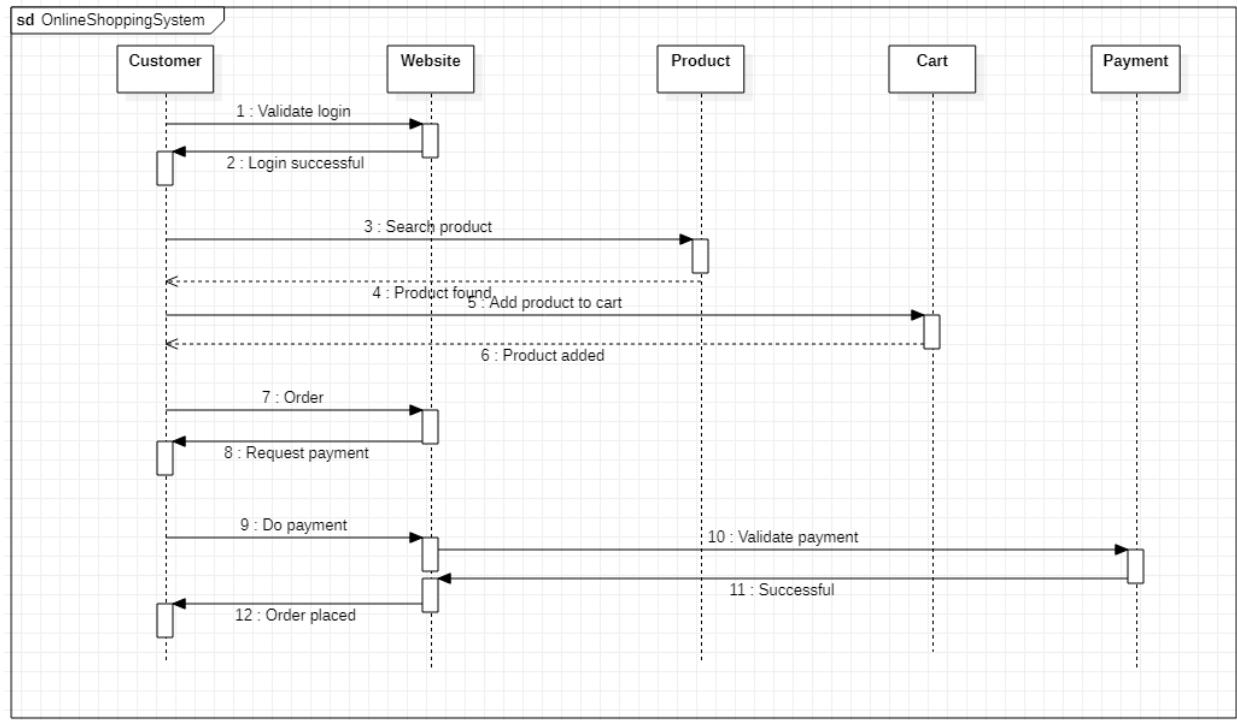
Justification: All the functions for the given system are given properly with all functions of the applications and all the actors are like customer, admin, payment system are given and all the relations for the given working is mentioned clearly.



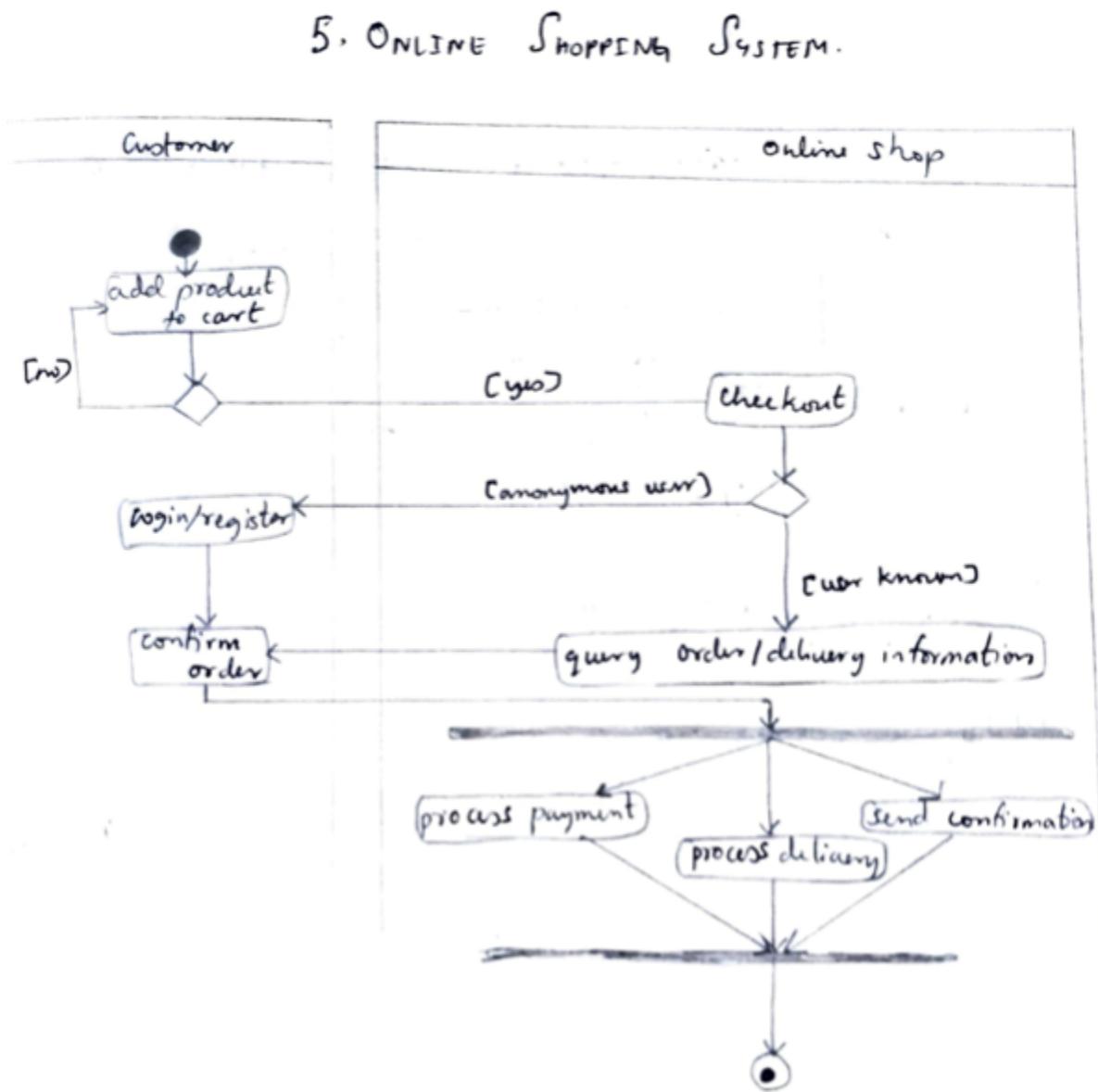
e) Sequence Diagram:



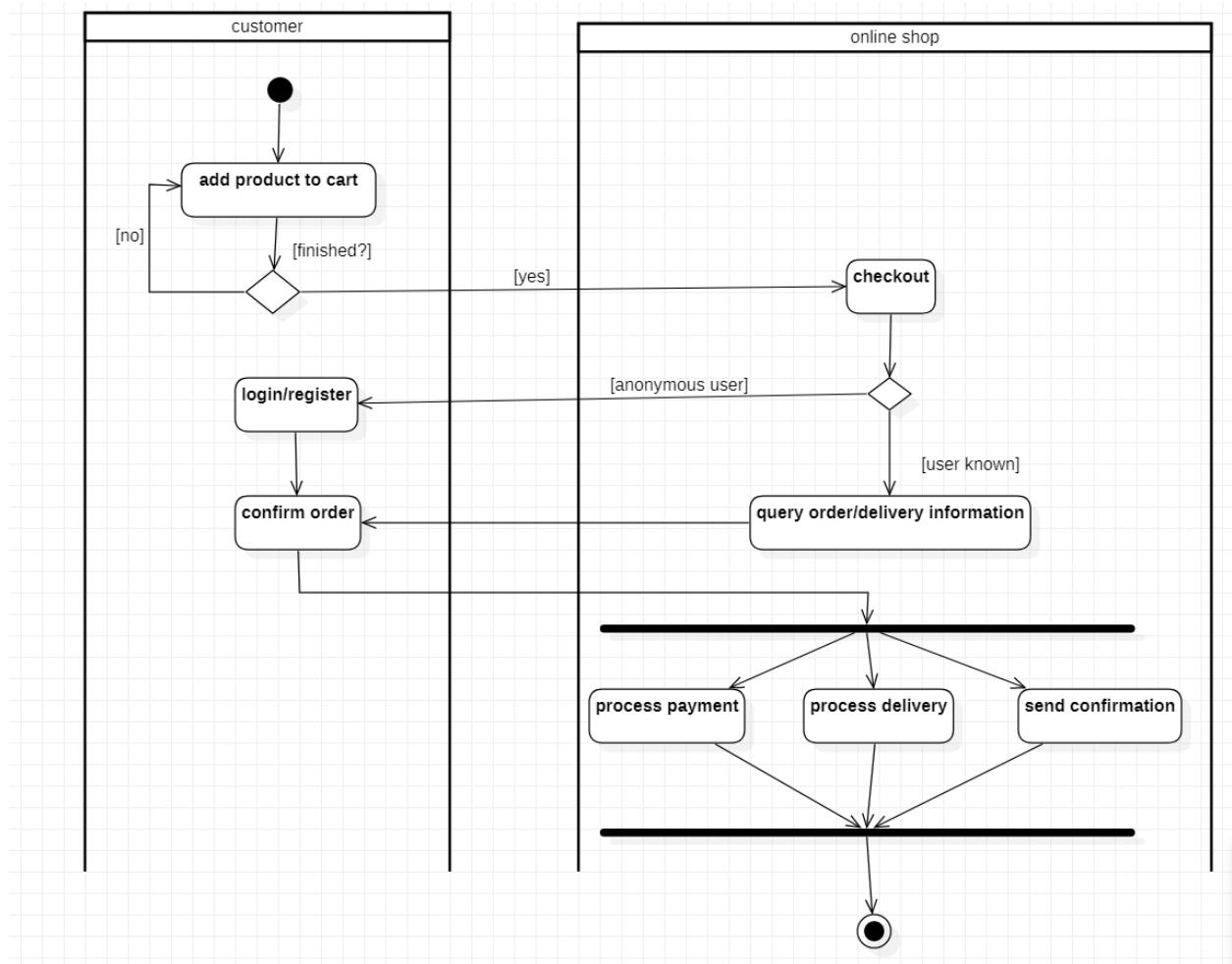
Justification: The given system shows the complete interaction between the customer in the process of purchasing the products from searching to booking to payment and delivery and all the respective activities are mentioned.



f) Activity Diagram:



Justification: The given activity model explains the various interactions between taking place during the given customer login and shops from add to cart checkout and payment to process delivery all the given respective interactions are mentioned.



6. Railway reservation system-

a) SRS:

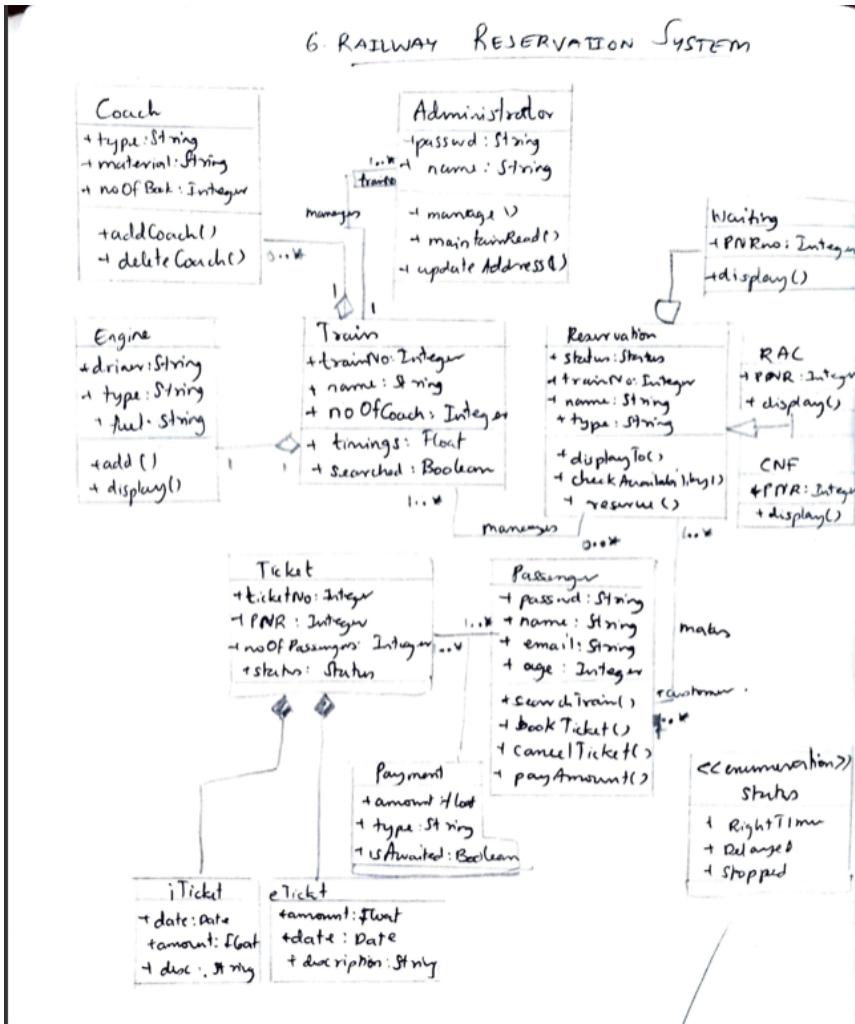
6. RAILWAY RESERVATION SYSTEM

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 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 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 provides the functionality of cancellation of tickets.

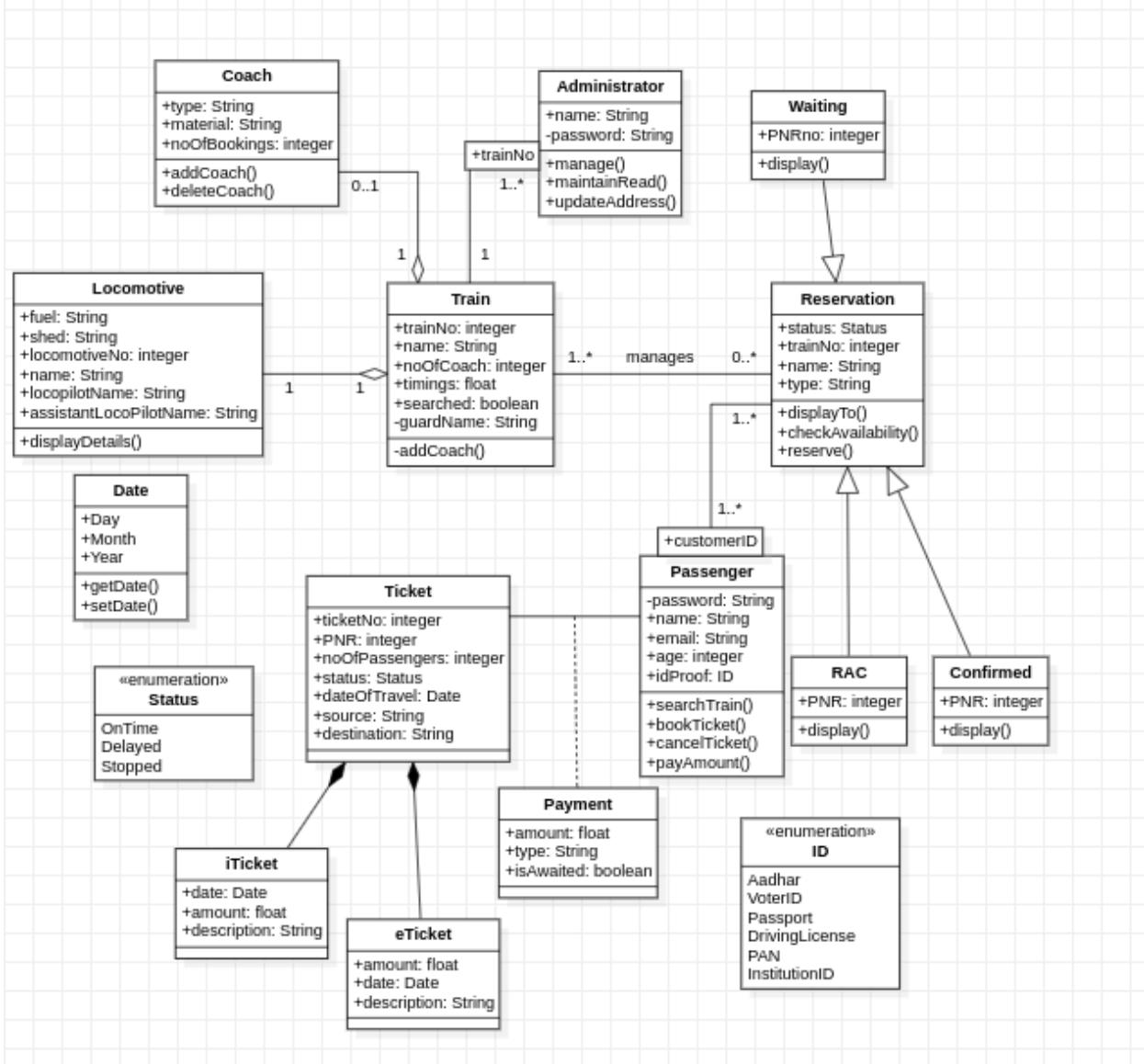
Software Requirements Specification

- * 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 only if the tickets are available. Customer searches for the availability of tickets then if the tickets are available he books tickets by initially filling details in a form.
- * Tickets can be booked in 2 ways - i-Ticket and e-Ticket.
- * In case of i-Ticket booking, customer can book the tickets online and the tickets are couriered to particular customer at their address. But in case of e-Ticketing and cancelling tickets are booked and canceled online at home and customer takes print of ticket. In both cases, the amount is deducted from his/her account.
- * For cancellation of ticket, the customer has to go at reservation office then fill cancellation form and ask the clerk to cancel the ticket, then the refund is transferred to customer account.
- * After booking ticket the customer has to checkout by paying fare amount to clerk.
- * The system displays the details of train of which user enter the name. The information is saved and the corresponding updating take place in the database.

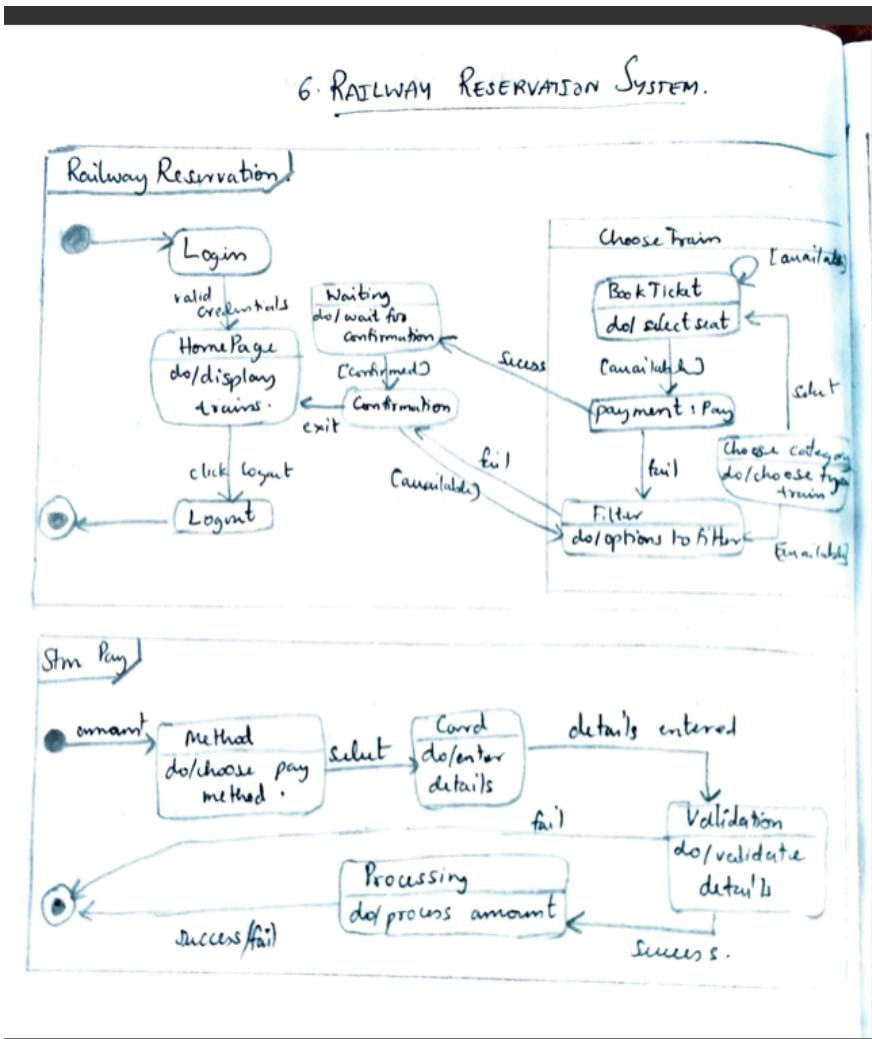
b) Advance Class Diagram:



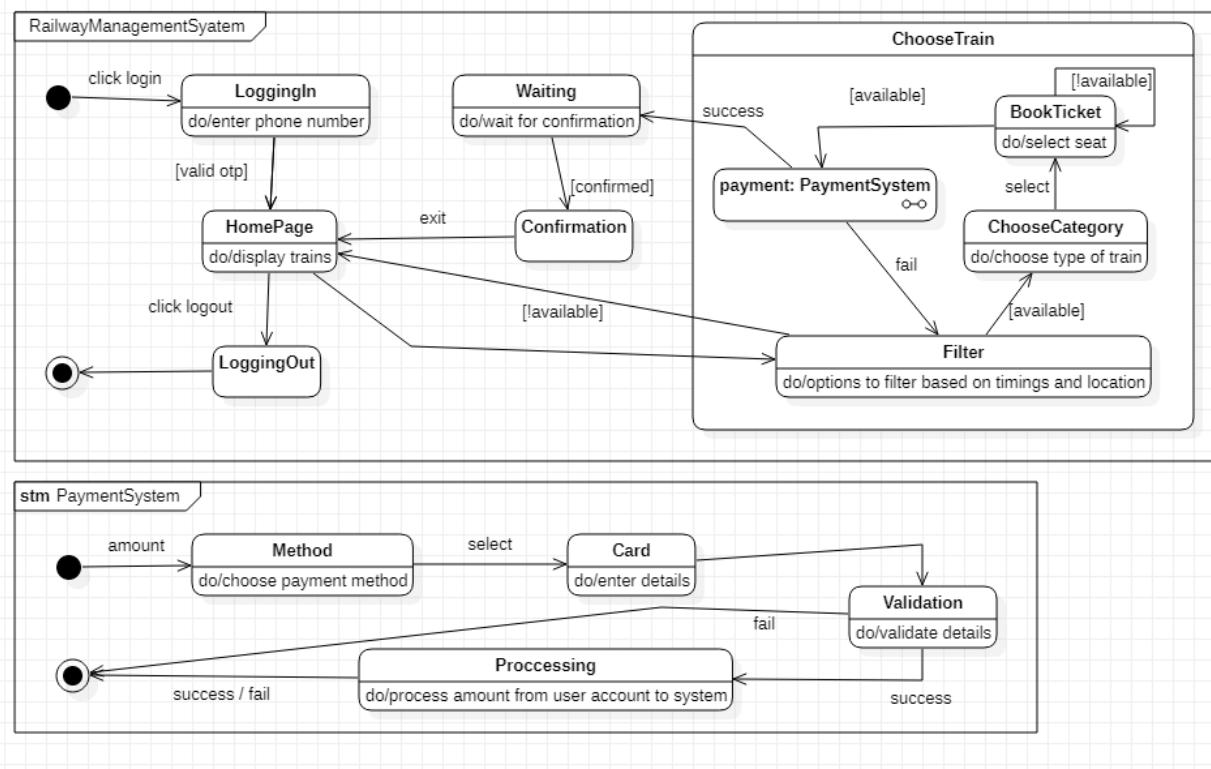
Justification: The reservation system is linked by association and coach and engine are a part of the train but can exist without it as well as it is an aggregation. Administrator is linked to every train by train no. Reservation is generalized into waiting to RAC, Confirmed, Waiting list. Passengers make reservation and book the ticket and after the payment e-ticket is obtained hence composition.



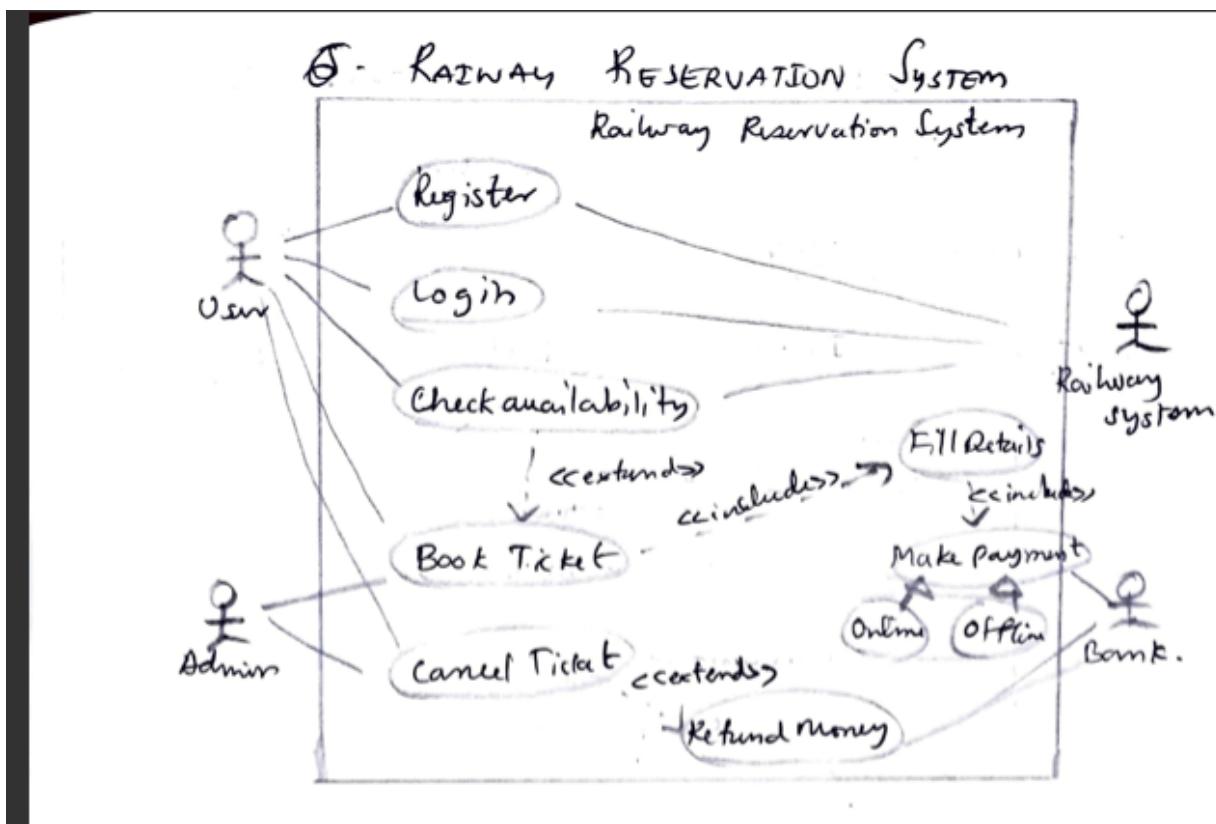
c) Advance State Diagram:



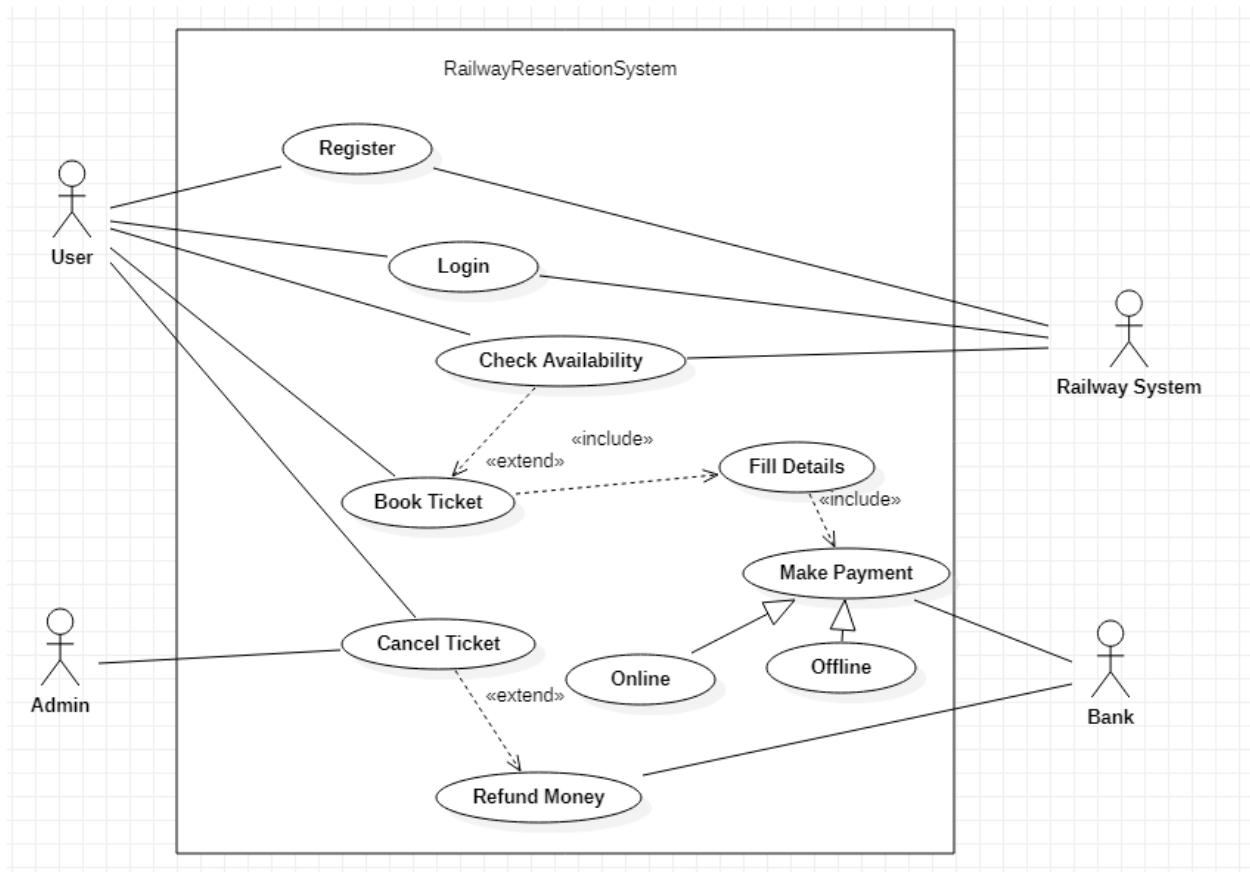
Justification: For the given case selecting train and payment for reservation is the scenario selected for the expansion of the state machine with all advance features and proper transitions mentioned for the detailed design.



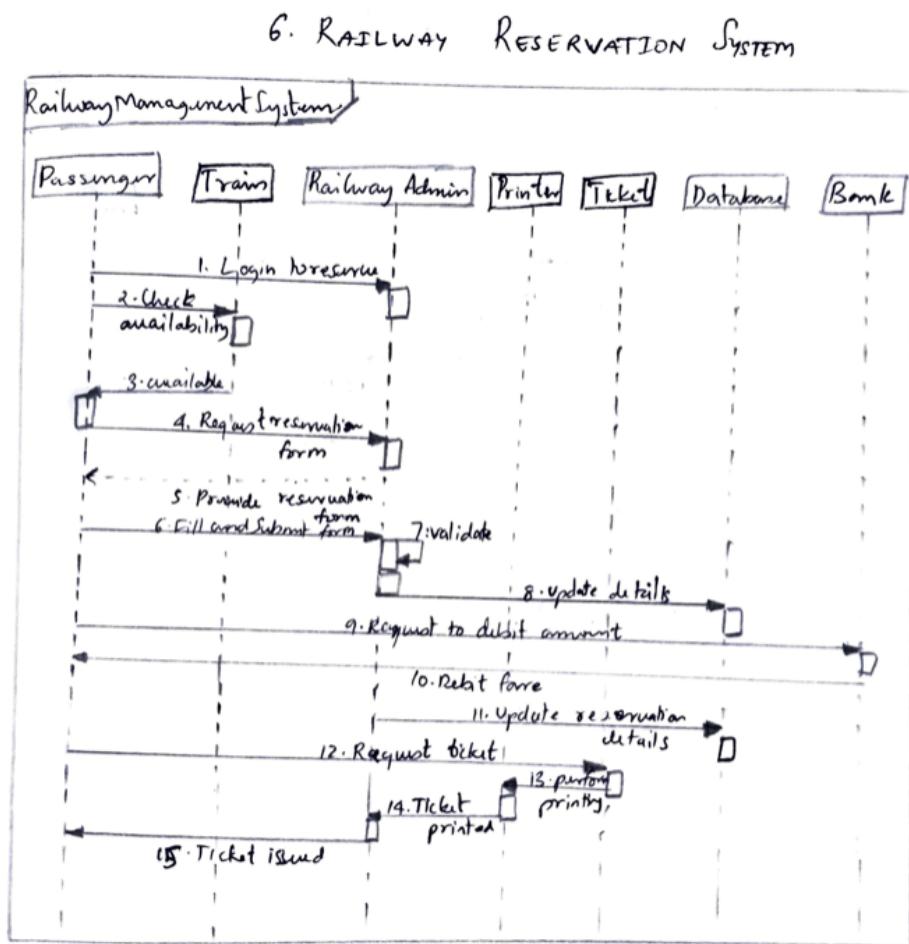
d) Advance Use Case Diagram:



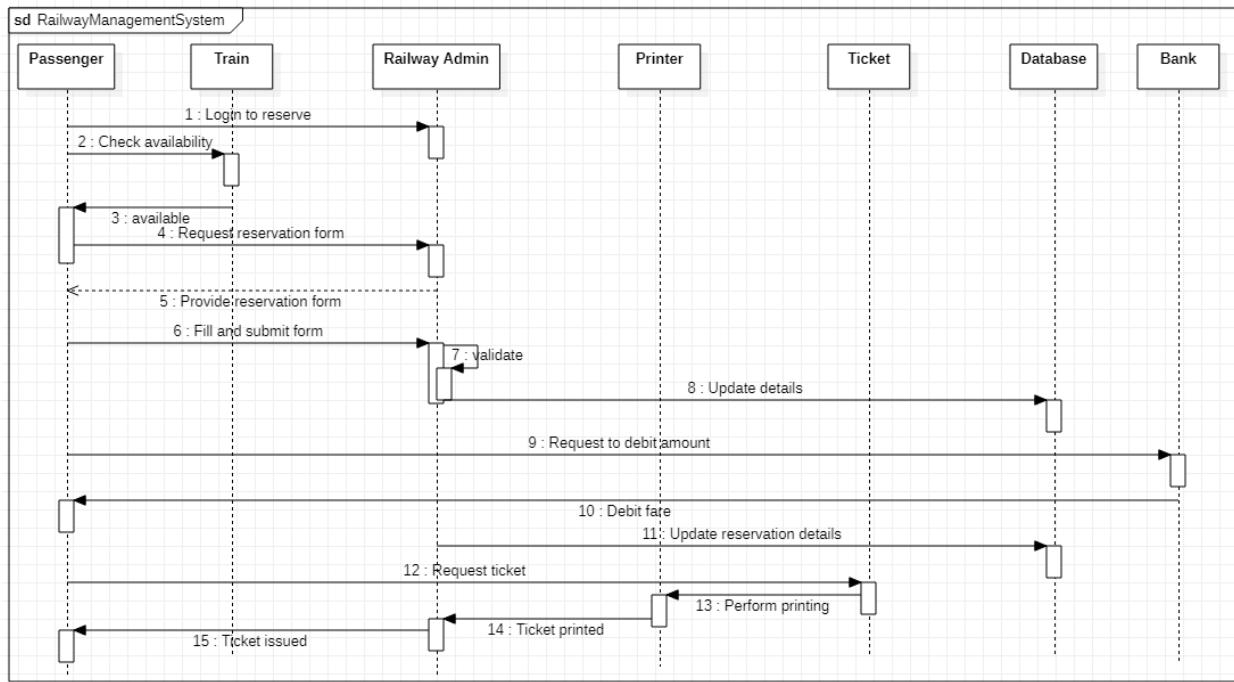
Justification: The given application all the respective functions involved for the given system are mentioned in detail and all the relation between the functions are also mentioned and also actors like user, admin, involving system and bank are mentioned and their relation is mentioned.



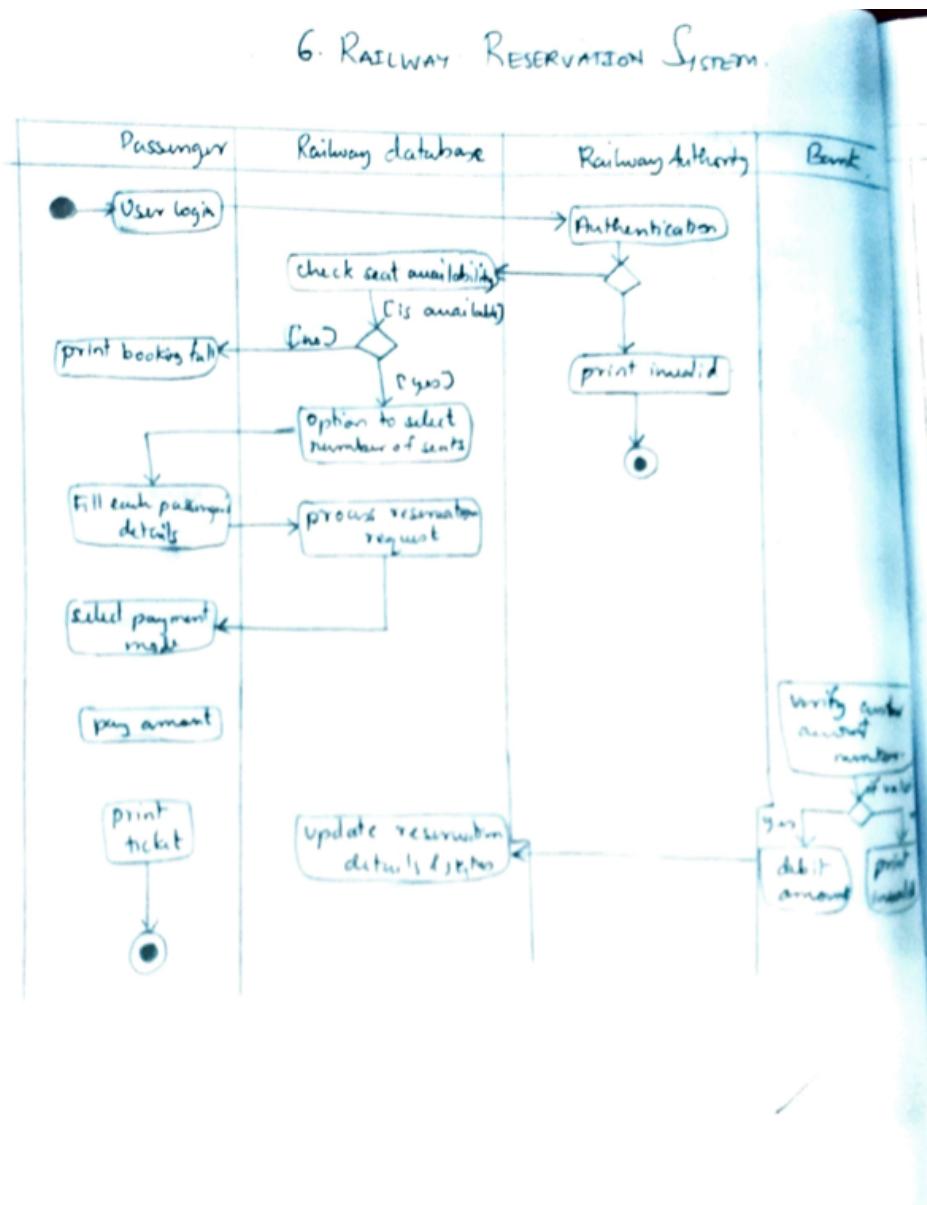
e) Sequence Diagram:



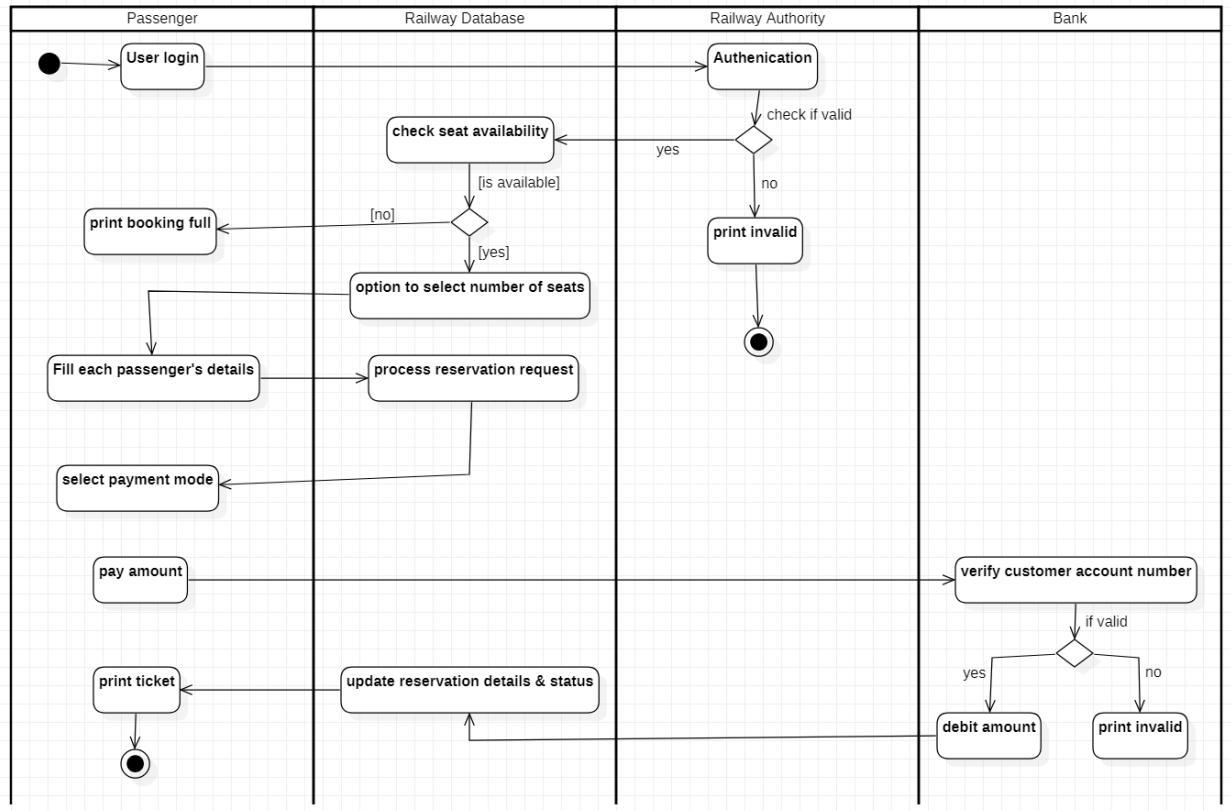
Justification: The given model shows the complete interactions and steps of various procedures taking place for the reservation system, from login to selecting to update details to payment and issue the ticket for the passenger.



f) Activity Diagram:



Justification: The interaction of the passengers with the system is shown in detail with respect to the railway database, authority, payment with all conditions mentioned



7. Graphics Editor-

a) SRS:

7. GRAPHICS EDITOR :

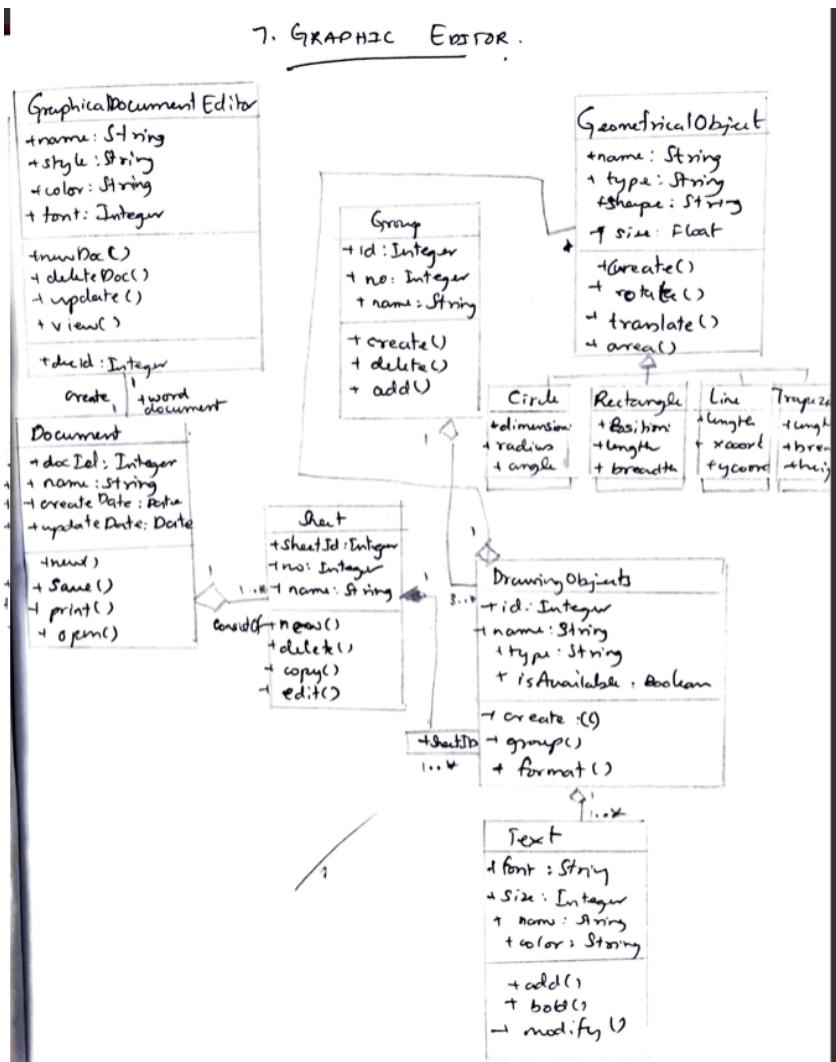
Problem Statement: The graphics editor provides an Application Programmer's Interface that enables a programmer to develop their own graphical model editor for a specific type of model. This API in turn, relies on extending the Eclipse Graphical Editing Framework to provide an environment in which the 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.

Software Requirement Specification

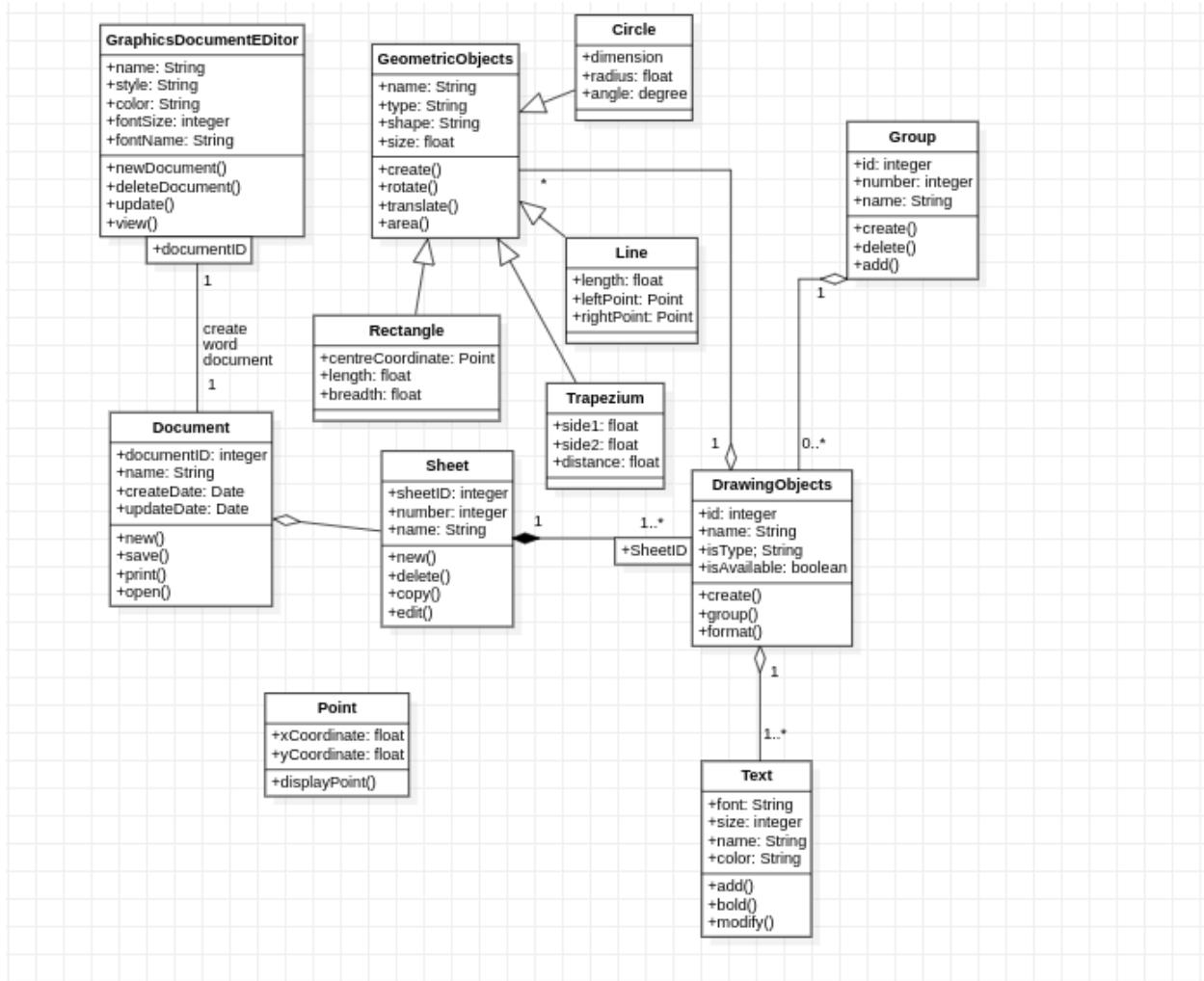
- * The graphical editor consists of a graphical document editor which can be used to create new document, delete document, update or view the document.
- * The graphical document editor consists of many documents, where each document can be saved, opened, printed or create a new one.
- * A document is made up of many sheets which can have graphics included in them.
- * Sheets have multiple number of drawing objects which can be created, grouped or formatted.
- * The programmer must provide implementations of functions that draw objects and their connections, as well as functions that add and remove connection. The latter function will be handled by a specific event listener.
- * The user can also add and remove connections between these objects as needed using the palette supplied, thus modifying the underlying model.

- * 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, trapeziums which are identified by their respective constraints.

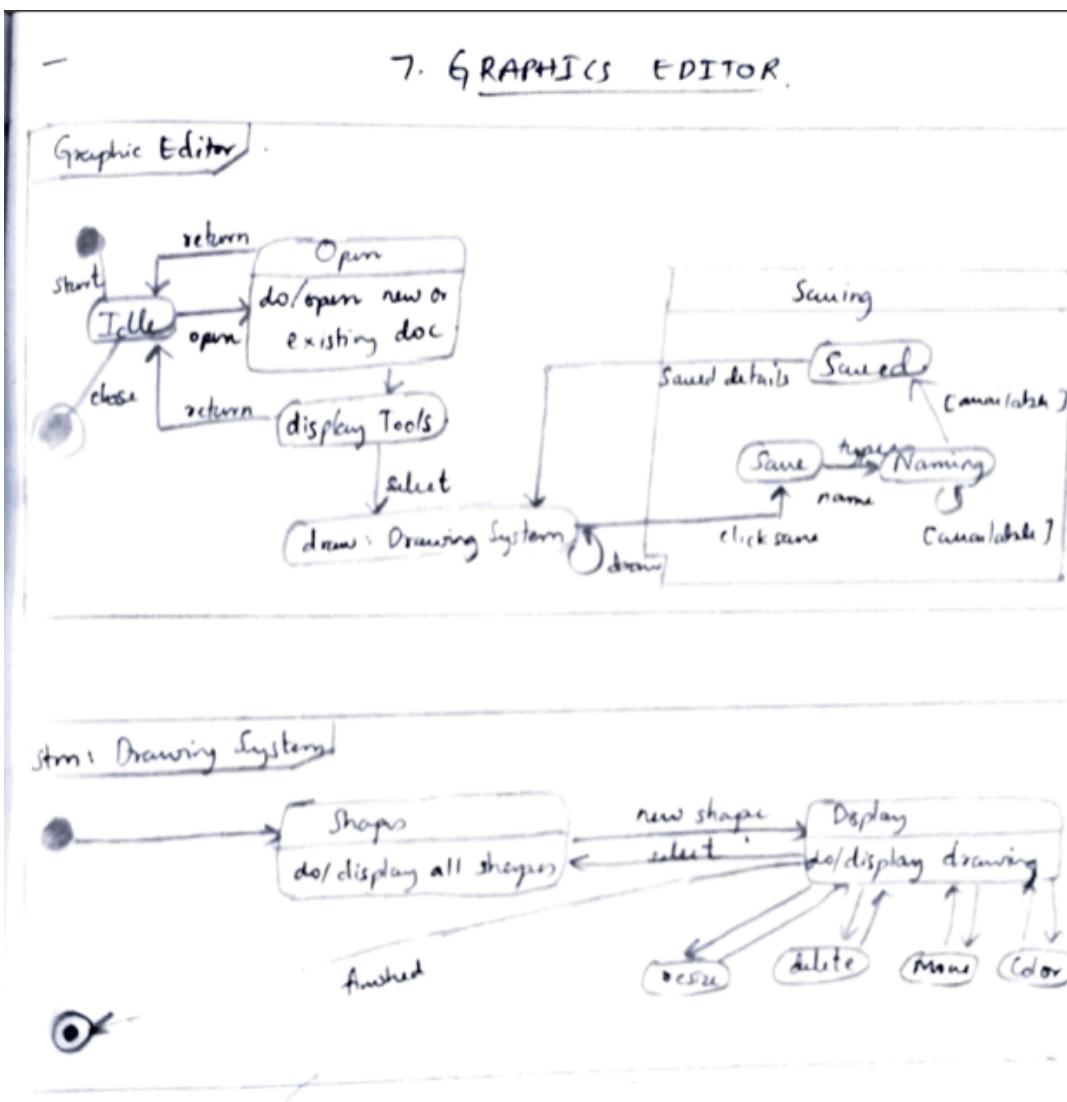
b) Advance Class Diagram:



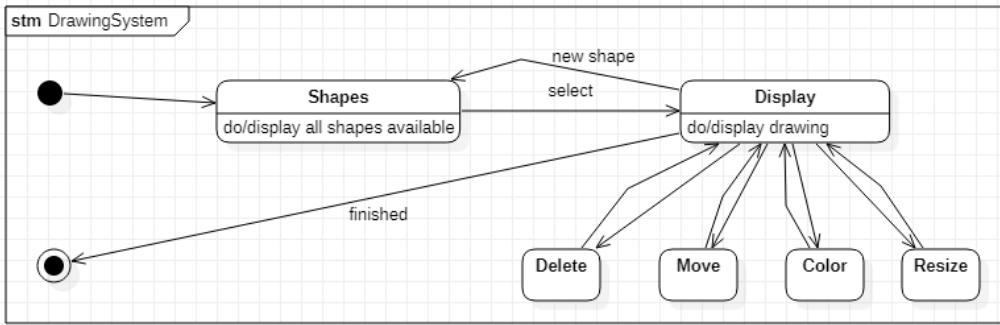
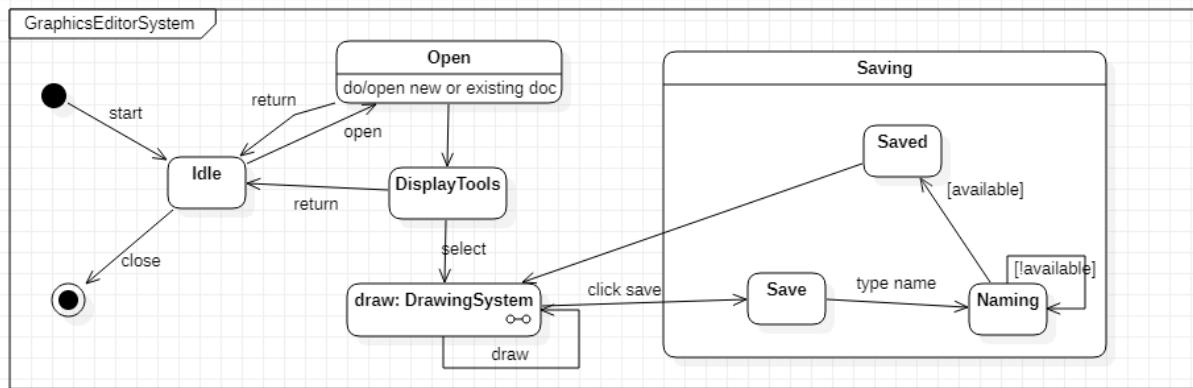
Justification: Every graphic editor has a document with which doc id for association. Document is composed of sheets which are composed of drawing objects. Which has text, geometrical objects which is generalized into several categories , groups which are linked by aggregation.



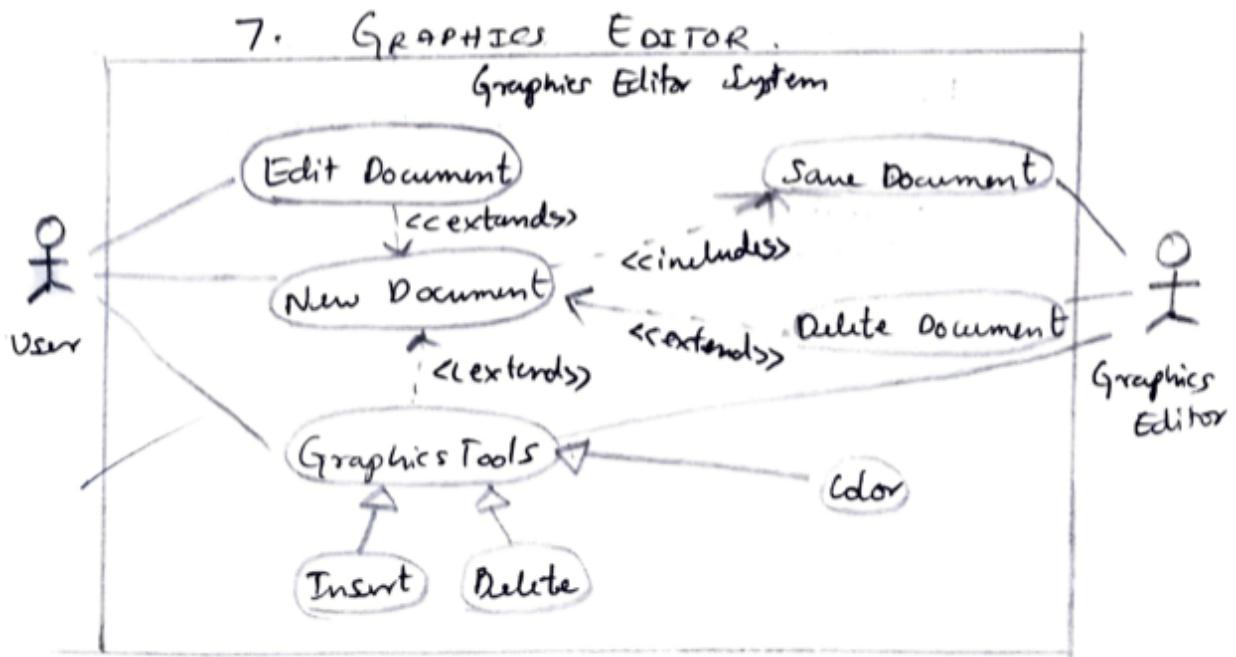
c) Advance State Diagram:



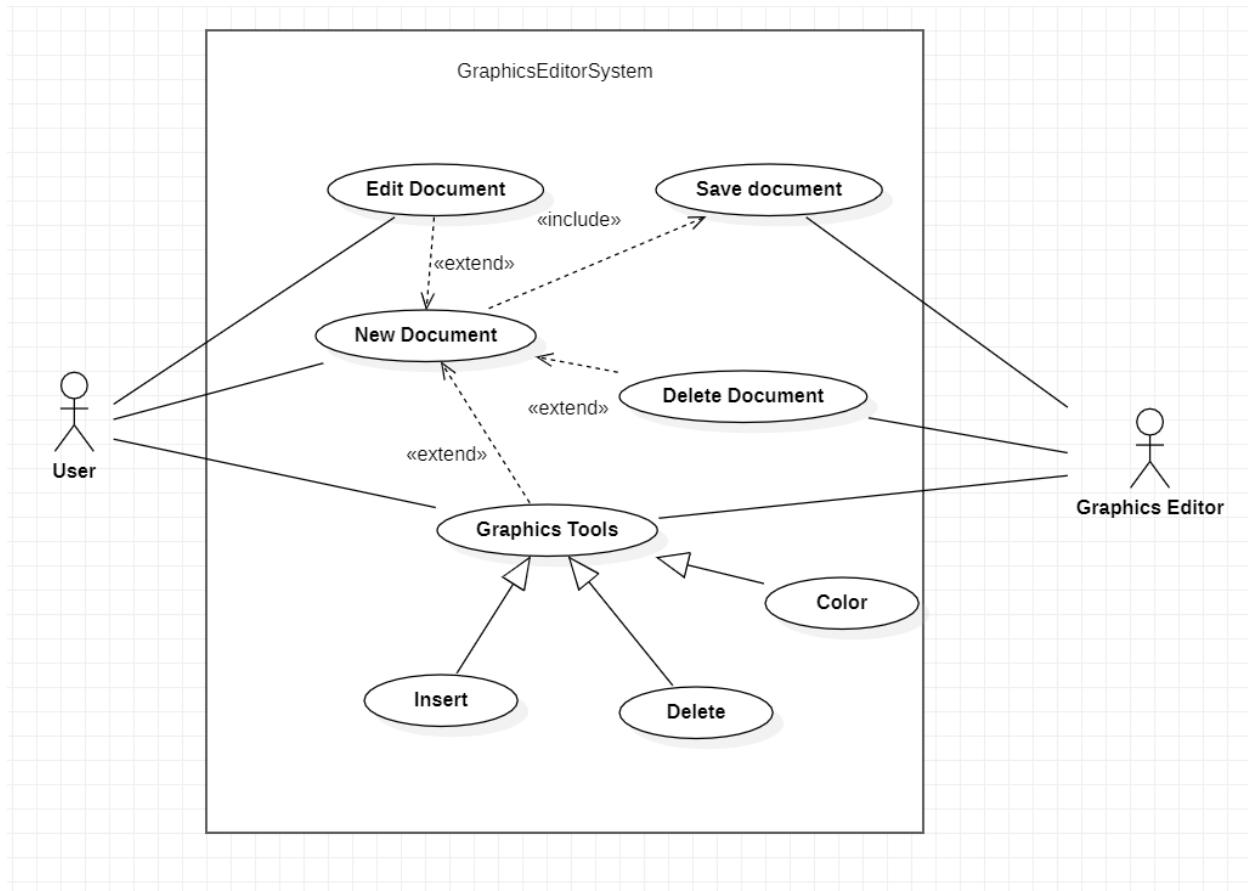
Justification: For the given case, the state machine is drawn with saving a file and drawing system as the scenario with detailed description with advance features included, for proper understanding of system with appropriate transitions and conditions.



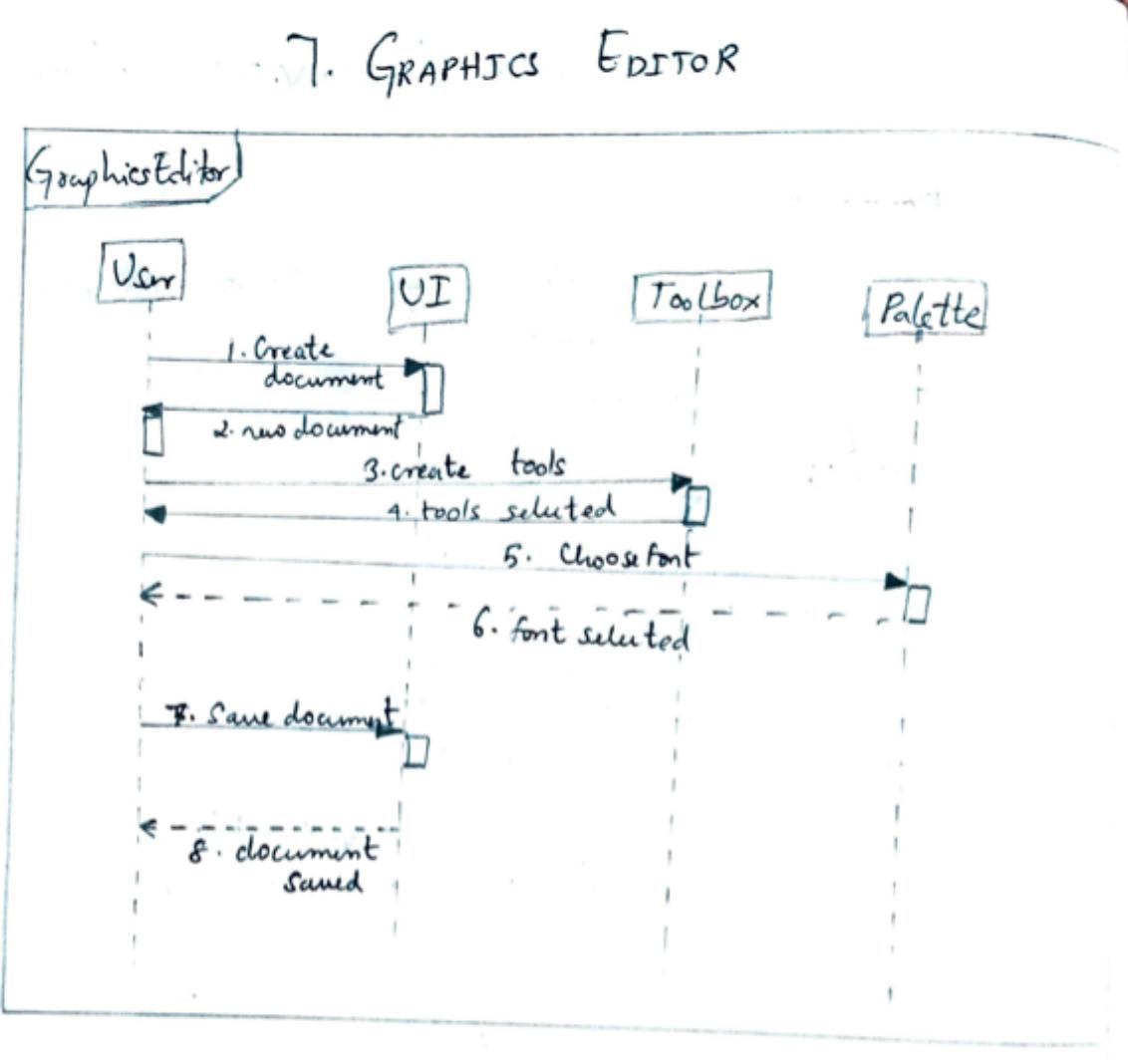
d) Advance Use Case Diagram:



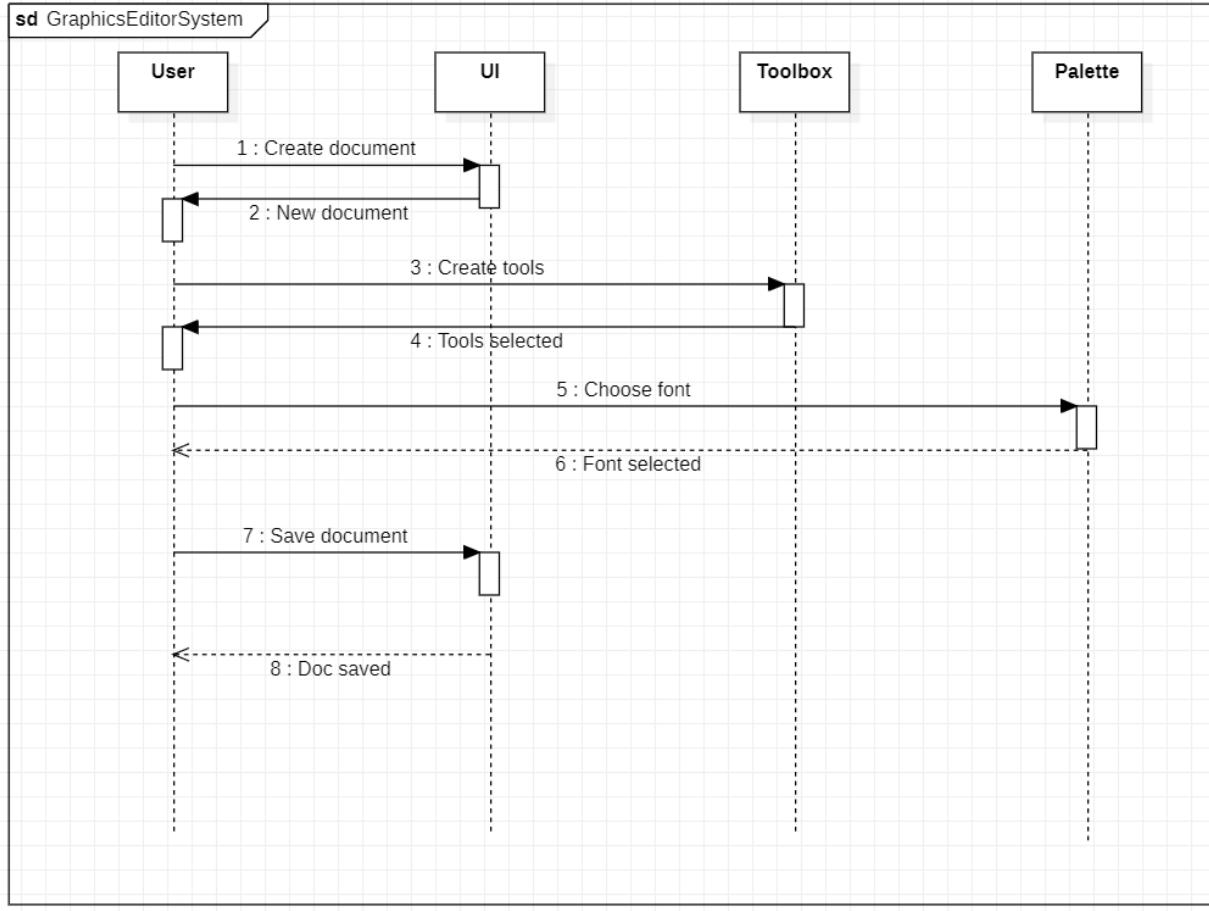
Justification: All the functions for the given application are mentioned and all the relations with the functions are given with all the respective actors like user, graphics system. They are given with appropriate functionalities.



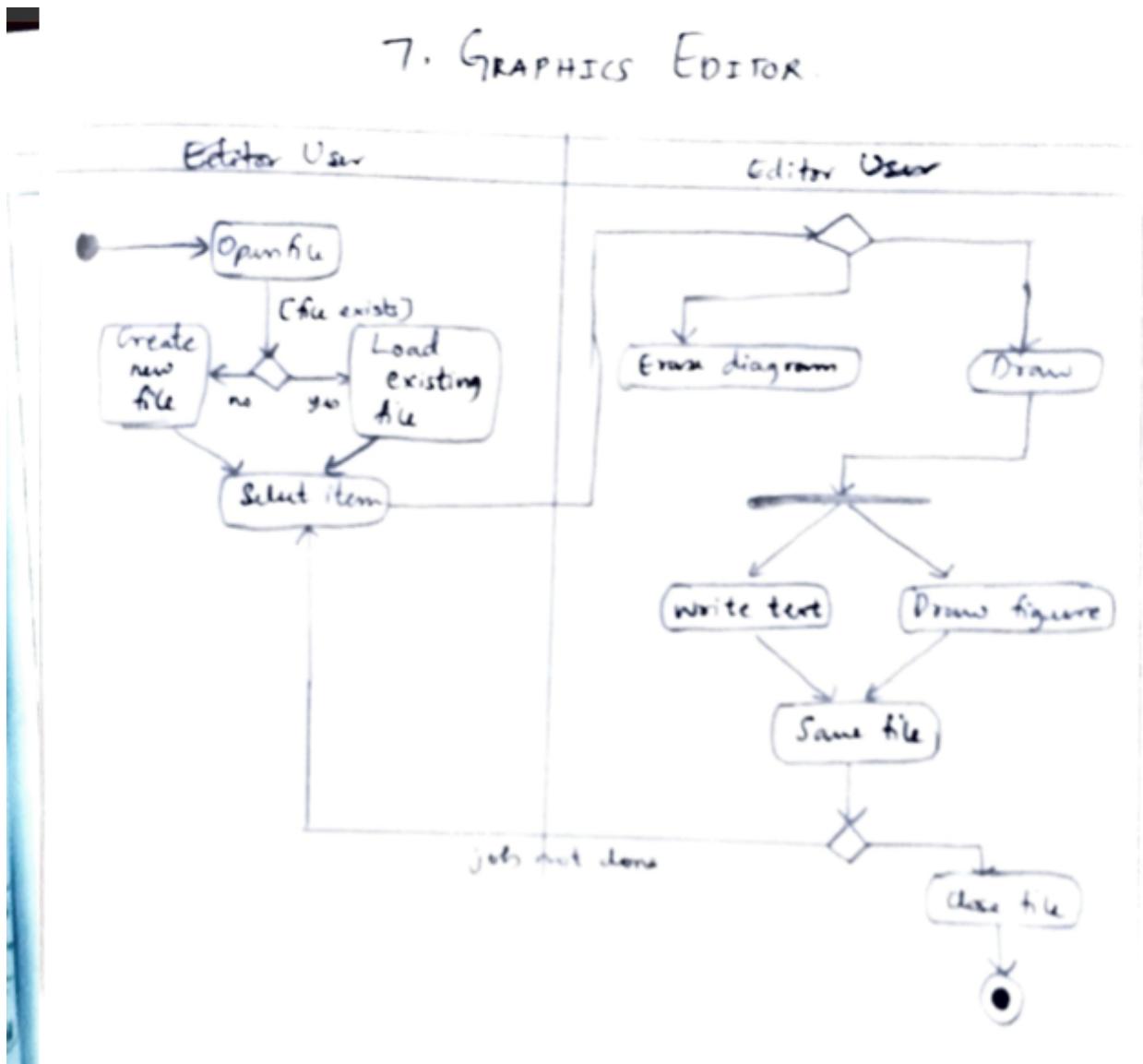
e) Sequence Diagram:



Justification: The given system gives the computer interactions of the system between users and the editor, it gives a detailed step by step procedure from creating the document to saving the document, including typing of text and addition of geometrical objects.



f) Activity Diagram:



Justification: The given activity model explains the complete interaction between the user and the editor and how the various functions are performed, from the diagrams to saving the file.

