VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT
on

Object-Oriented Modeling 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
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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 Modeling and Design**" carried out by **S Skanda (1BM19CS137),** who is 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 year 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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Index Sheet

Course Outcome

CO4	**Ability to conduct practical experiment to solve a given problem using Unified Modelling language.**

1. College Information System

1.1 Problem Statement and SRS

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

The entitles that combe usually found in a college are:- Admission, Departments /Branches, COE, faculty ,students, Courses and Administration (Admin)

• Admission: - It is responsible for admission of students, performing background checks, collect fees. It is also responsible for handling Scholarships and issue ID cards.

• Department: - Each department is assigned with A HOD and set of faculties. Department offers various courses

• COE: COE is responsible for the conduction of exams (both internals & externals). It issues hall tickets, releases timetables for exams and announce the exam results.

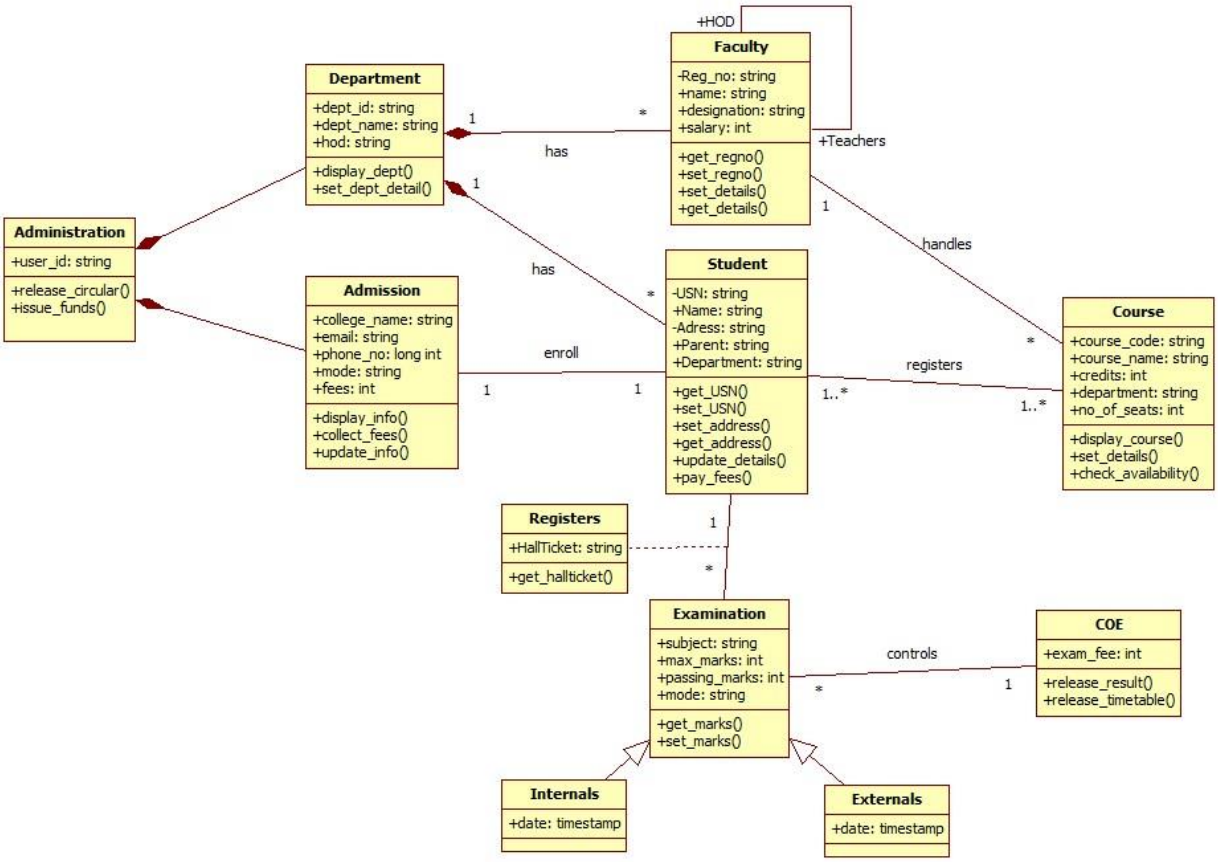
•Faculty: Faculty handles the courses assigned to them by the respective department. They are also involved in designing the syllabus and guiding the students in various projects

• Course: - Every Subject has a unique code and is offered by some department. Students are allowed to register to the course. Faculty to the course is assigned by offering department.

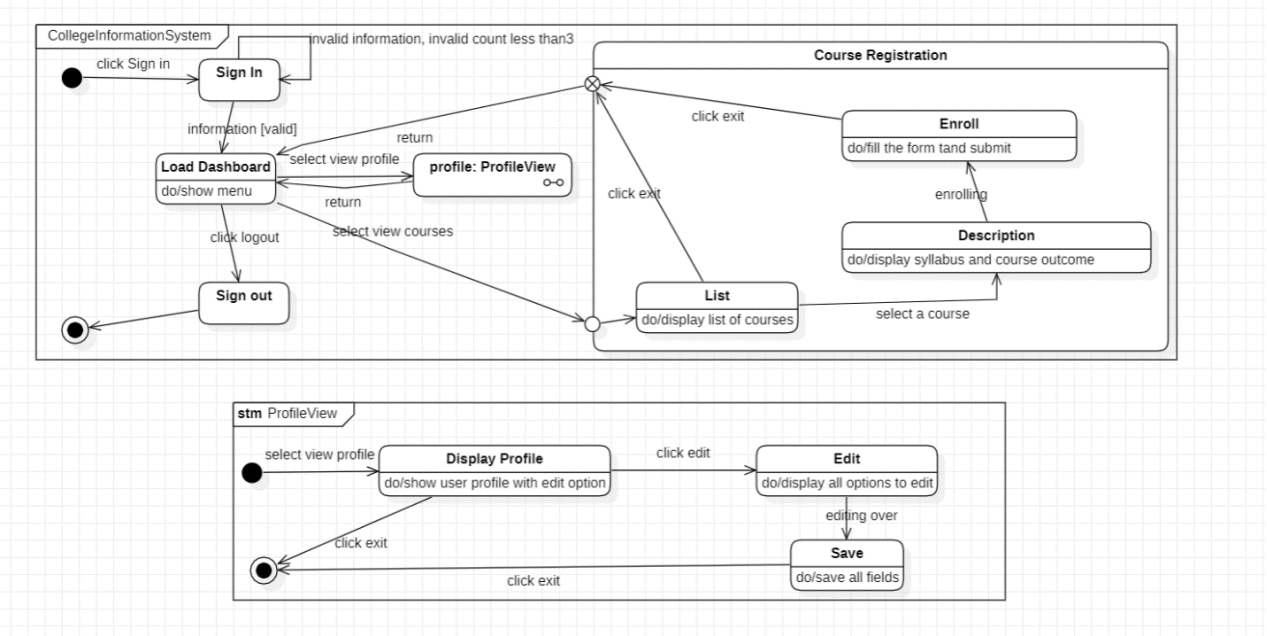
•Student: - Student has a unique id in the college known as USN after getting admitted into the college. Students are allowed to register to the courses offered by their department. Student is eligible to take exam if he/she passes in internals and maintains good attendance

Administration. It is responsible adding, modifying or deleting data on the system. It is also responsible for issuing salary, issue circular about various events and buy new materials required for the college.

1.2 Class Diagram



1.3 State Diagram



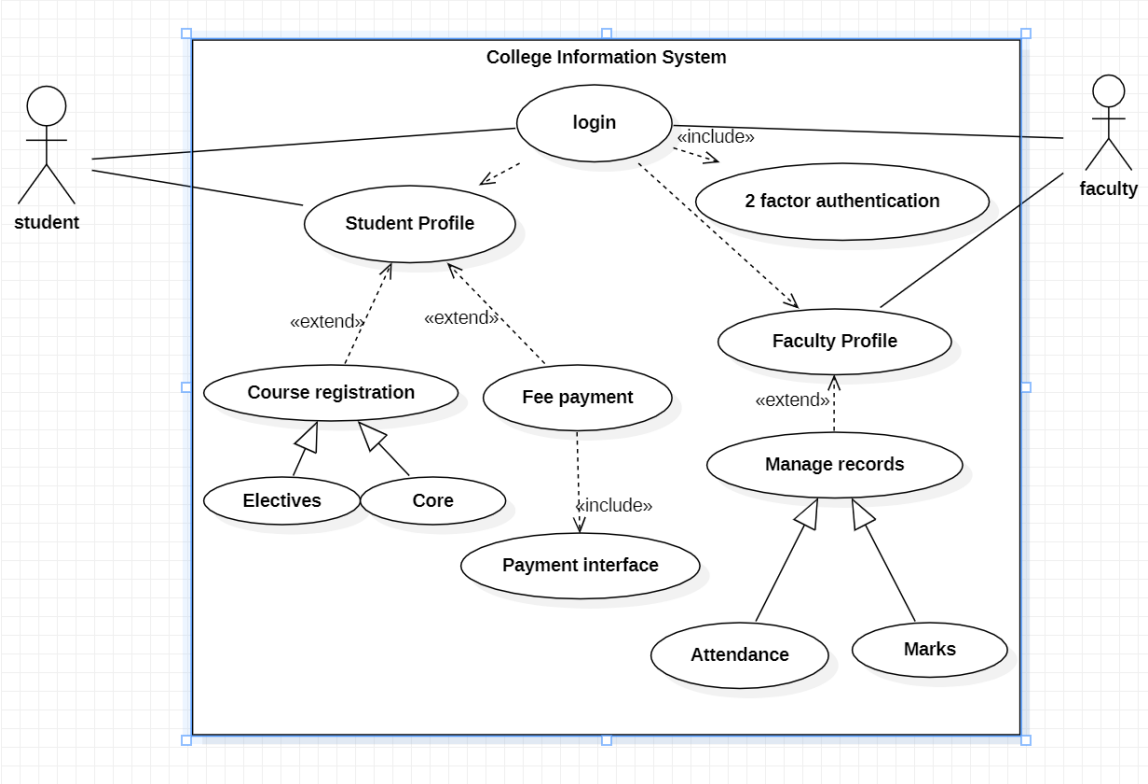
The above state diagram represents the process of course registration.

Upon successful login, one is redirected to dashboard. From there the student can view and edit profile using ProfileView.

Or one can choose course registration. Initially we display the list of courses from which we can expand and get more details about the course. Then register to the selected course.

Finally ,one can logout from the portal.

1.4 Use Case Diagram



Actors

Student, Faculty

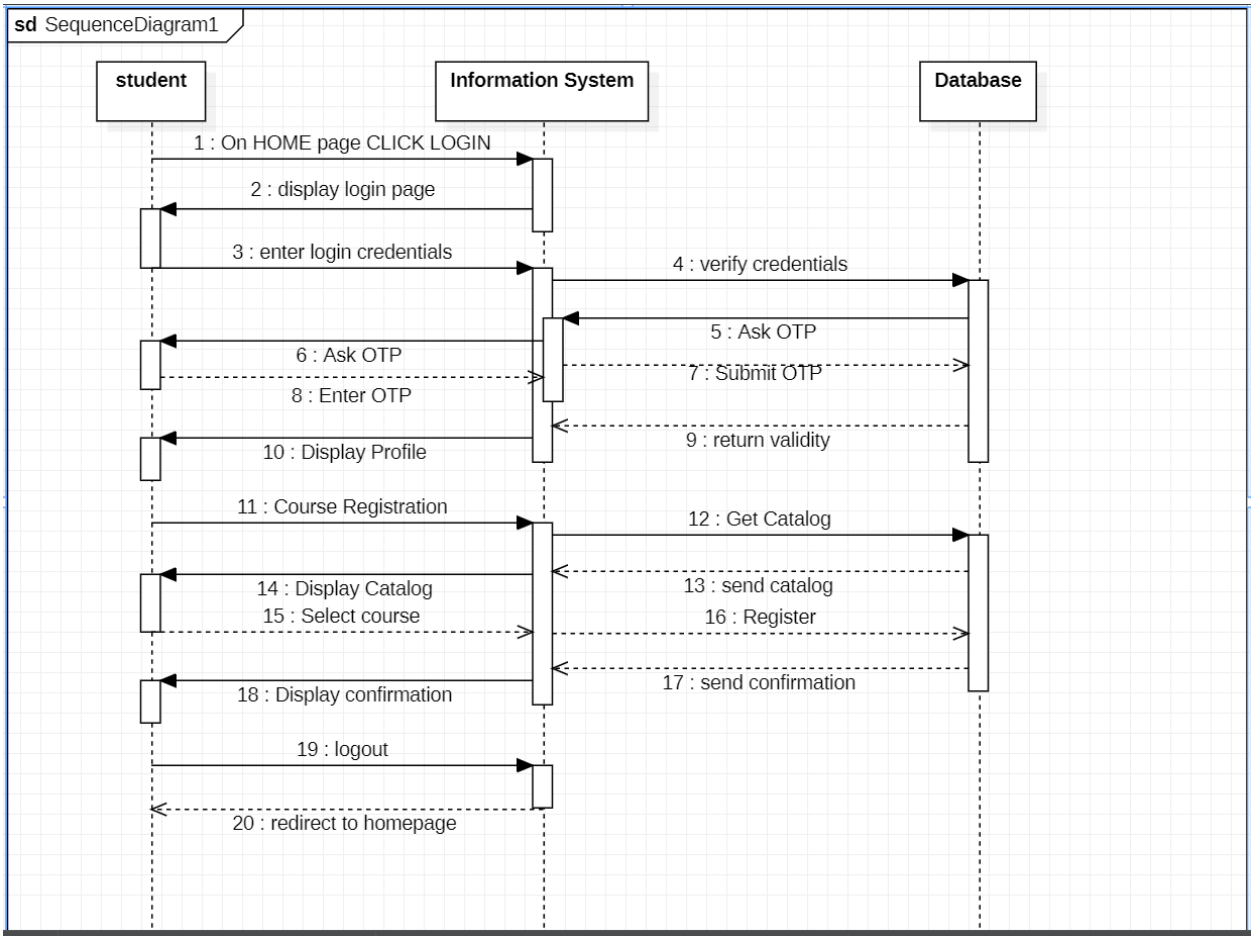
Use cases

Login : To login into portal, includes 2FA.

Student Profile: Contains all options related to student such as Fee Payment, Course Registration

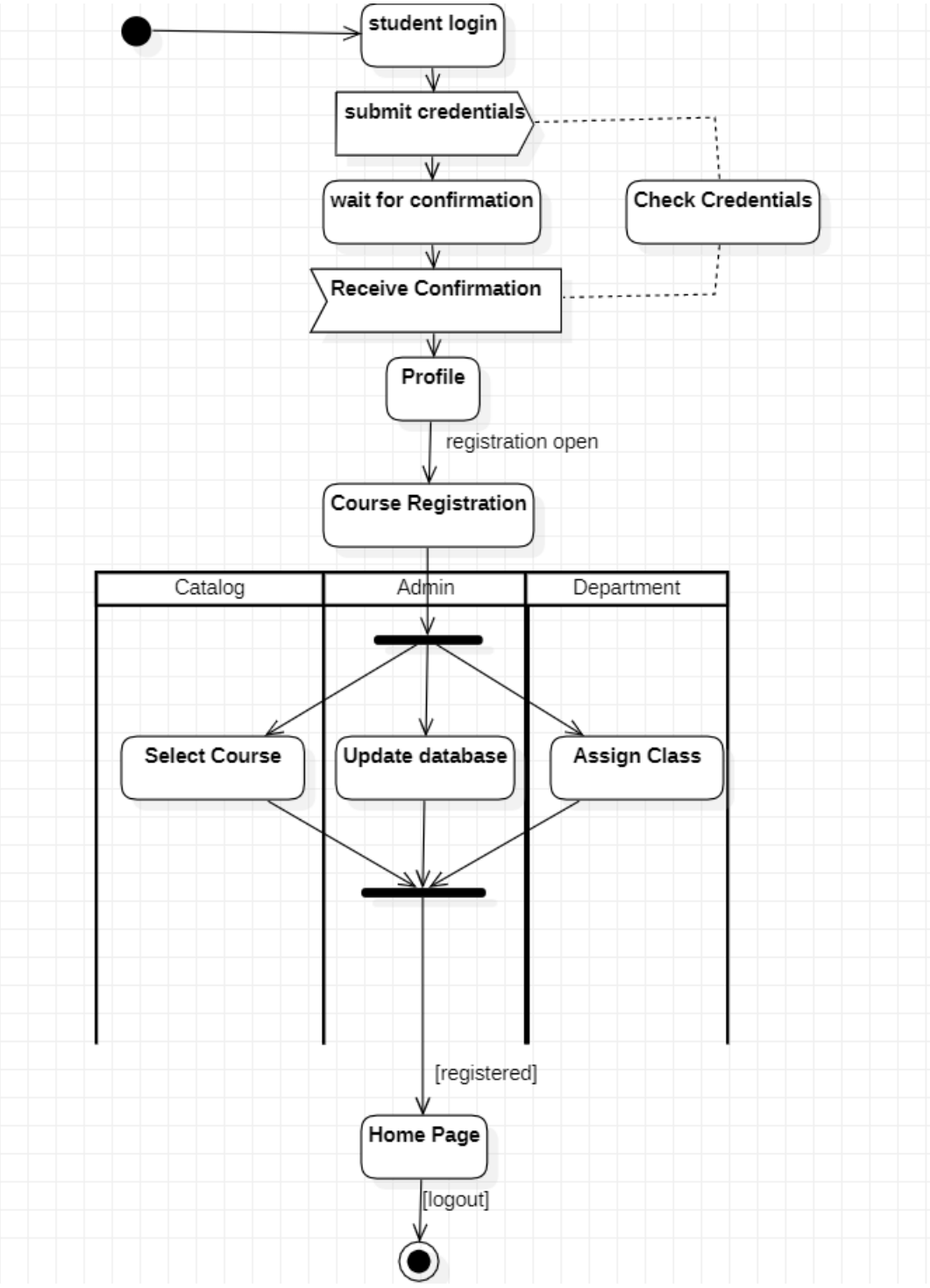
Faculty Profile: The view point of faculty, related to management of records of students

1.5 Sequence Diagram



The above diagram depicts the interactions between Student, Information System and Database during the process of course registration. It includes logging in, selection of courses and confirmation of the registration

1.6 Activity Diagram



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 hostelers 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.

Software Requirement Specification

The entities that can be usually found in a Hostel are: - Admission, Mess, Rooms, Warden, Student and Administration (Admin)

Hostel can be of two types Girls Hostel & Boys Hostel.

Admission: - It is responsible for admission of student who has applied after collecting, relevant details and fees from the student.

Mess: Mess is responsible for fulfilling the food needs of the students, it has a definite menu which is developed based on student feedback. The mess keeps account of food consumed by the student and charges them monthly accordingly.

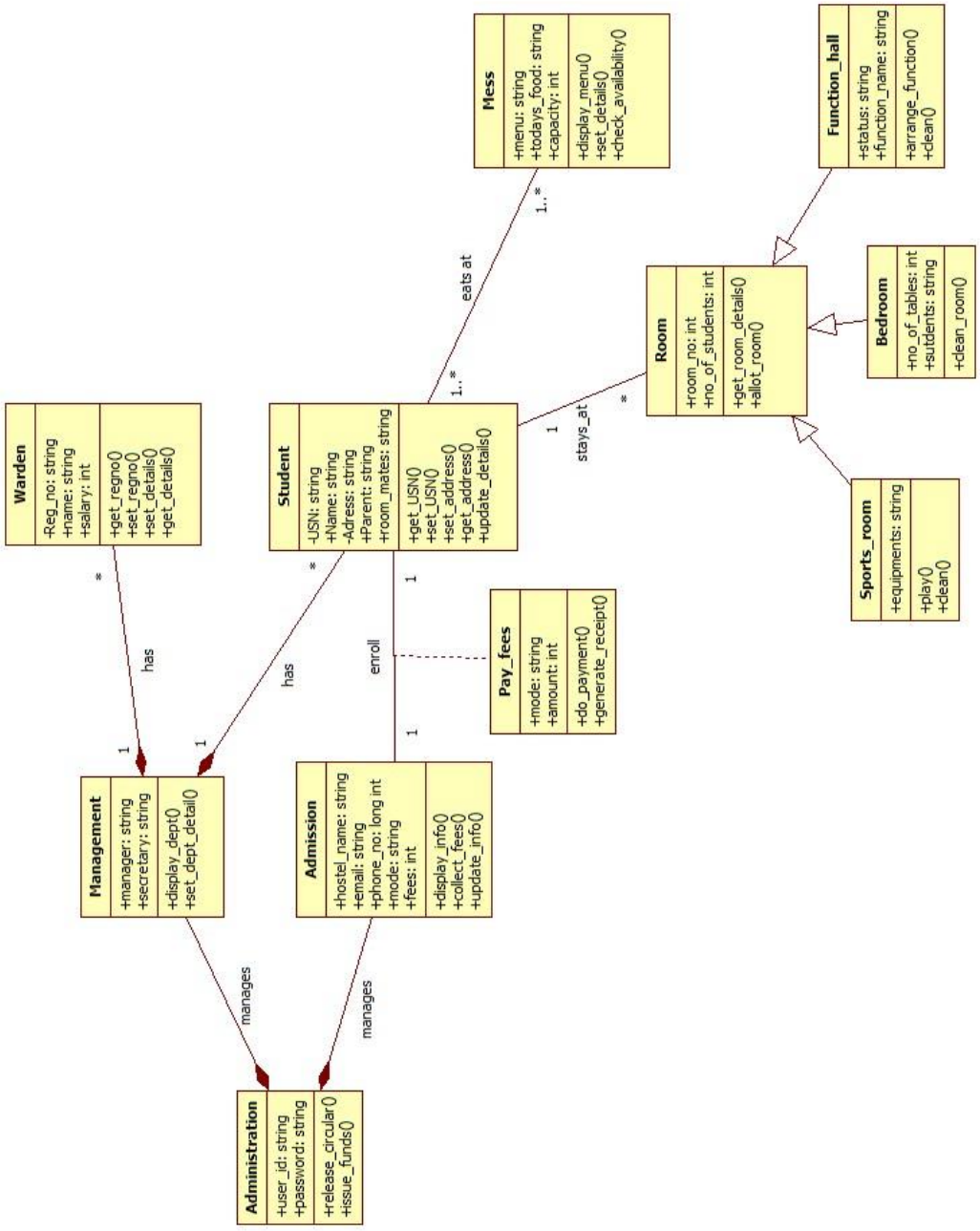
Rooms: It is the place where students live. It has cots and tables, the number of students living in a room varies according to cost. Every year students who finish the course empty the room and re-allocation is done

Student: Each student is assigned with an ID, the contact details of student (phone, email) are collected and then a room is allotted to a student. Then student is required to pay. Lodging Cond Mess food.

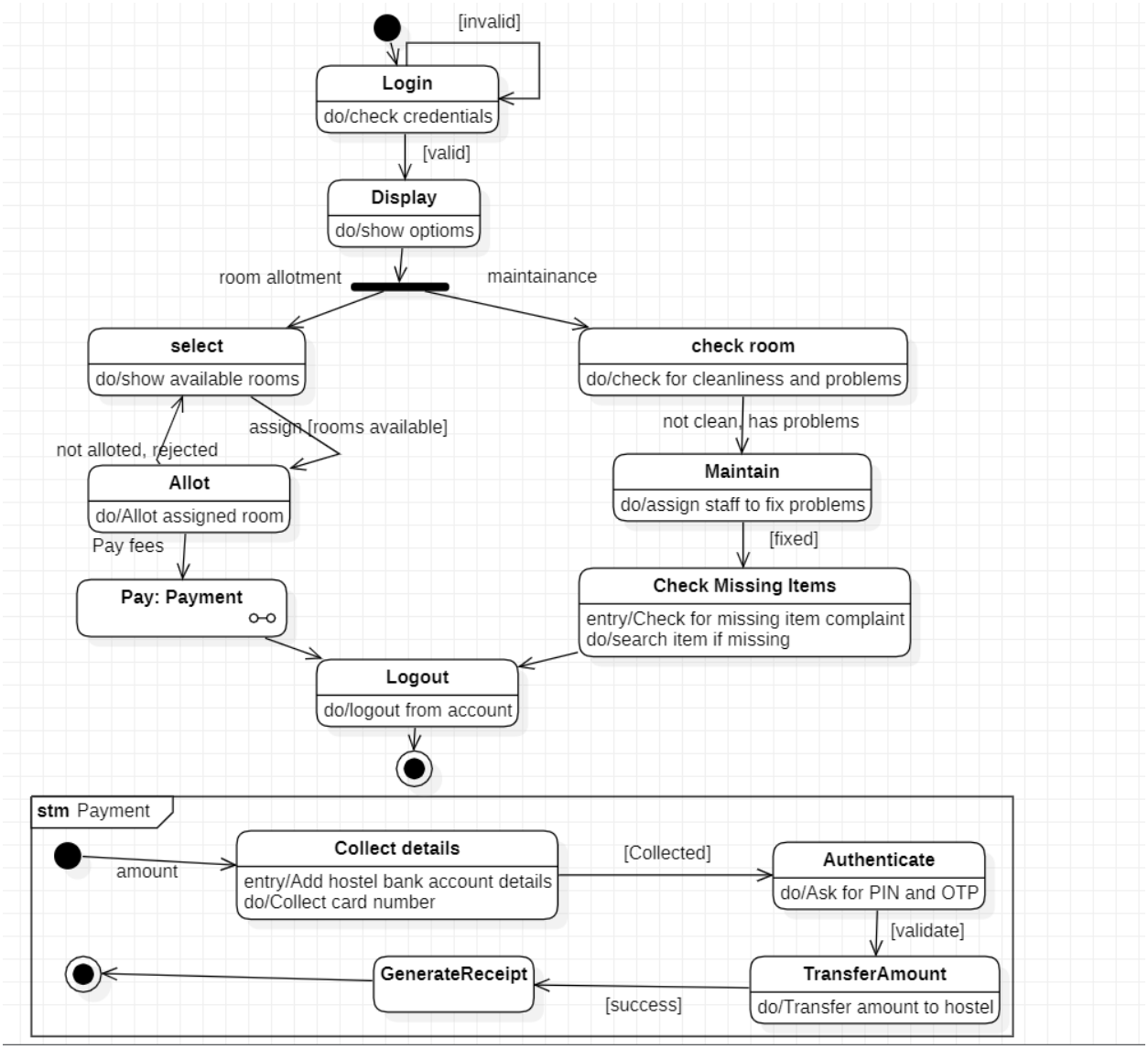
Warden: Warden is allotted to look after a certain group of students. He is also given an ID and his contact details are collected. He gives feedback about students.

Administration: - It is responsible for the maintenance of rooms and mess, room allotment and warden allotment It also releases circulars in Hostel. And is responsible for maintenance of data.

2.2 Class Diagram

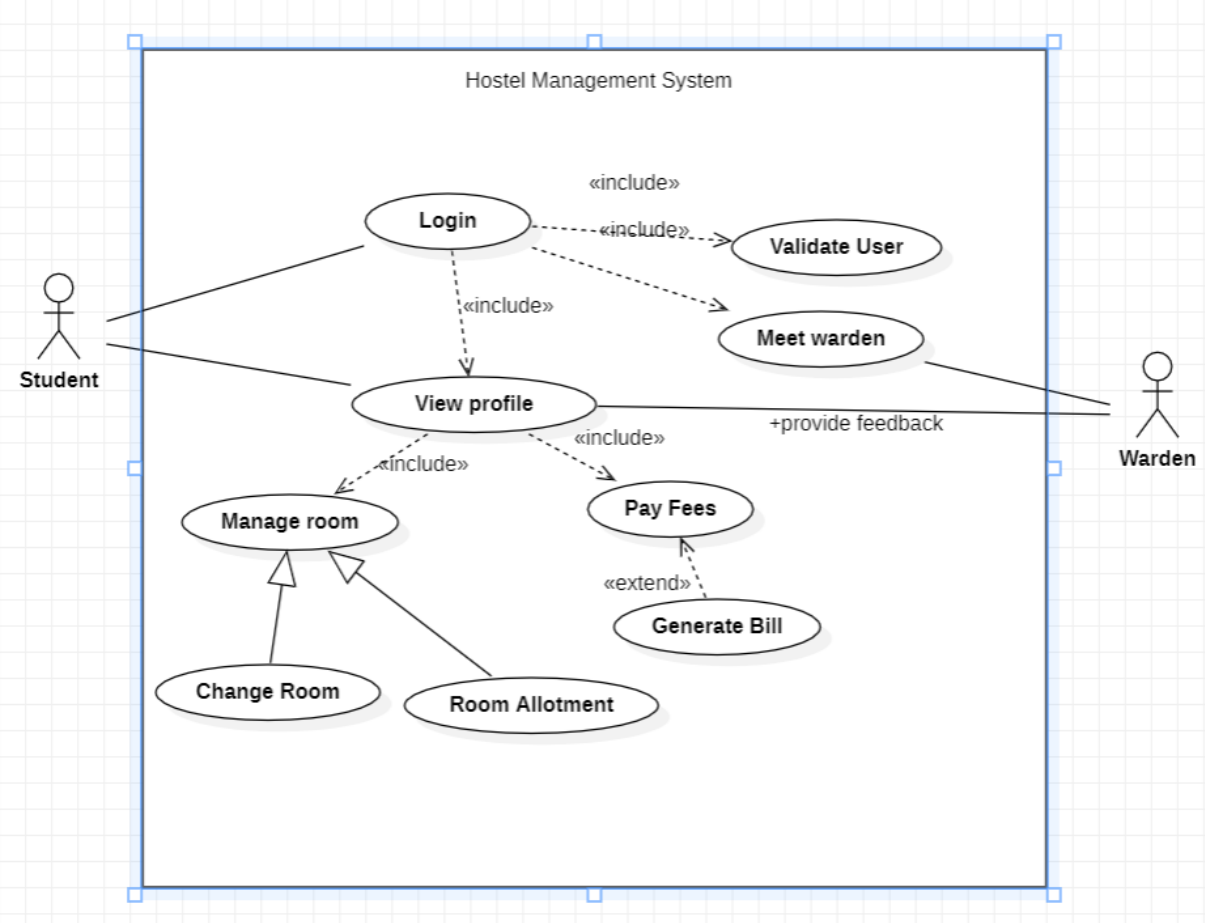


2.3 State Diagram



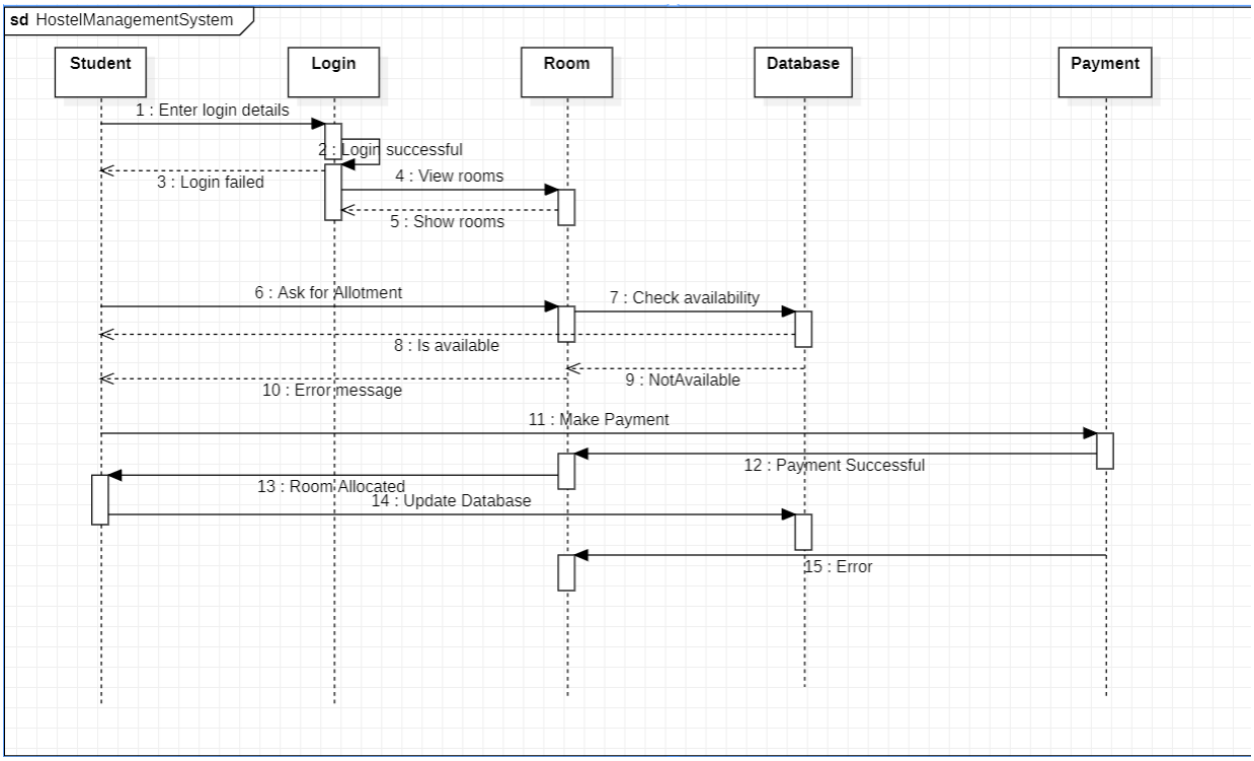
The above state diagram represents various events and states involved in the process of room allotment and maintenance of the room.
Payment is represented as a expanded state as it involves many events by itself

2.4 Use Case Diagram



Actors:
student, warden
Use cases:
Login in: includes validate user to validate the user
View profile: it consists of Tomorrow use cases manage room and pay fees
Manage room: it is related to the management of the room
Pay fees: it extends to generate will and is related to the payment of fees by student

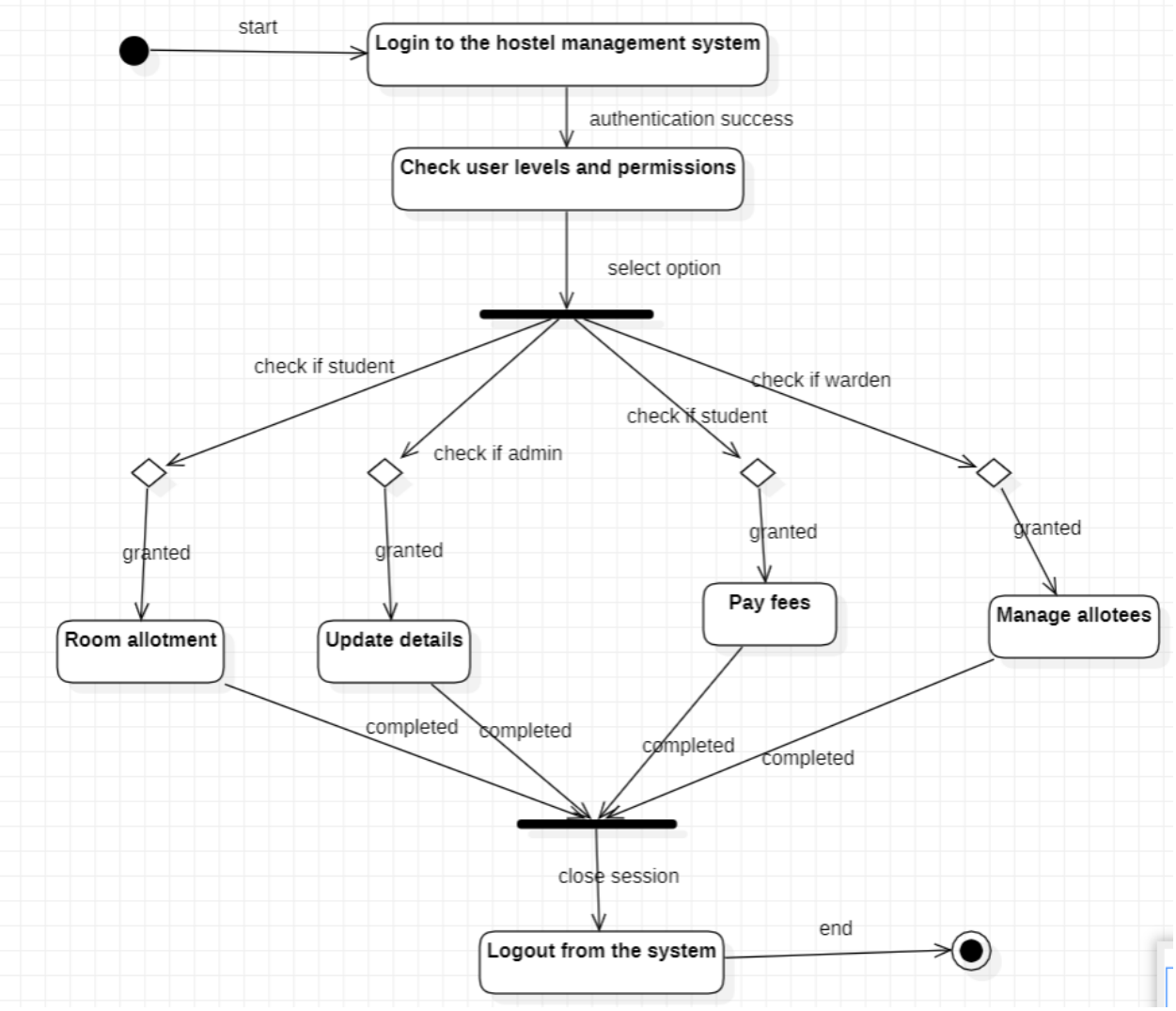
2.5 Sequence Diagram



The above sequence diagram represents the interaction between the student and the hostel management system during the process of room allotment.

First student has to login and then ask for allotment after checking availability the student is assigned the room. after making a successful payment the record is updated in database and room is allotted

2.6 Activity Diagram



3 Stock Maintenance System

3.1 Problem Statement and SRS

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 in efficient. 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.

Software Requirement Specification

The entities that can be found in stock maintaining system are: - Customer, Vendor, Product, Stock

Customer: - Customer retrieves information about the stock present with the vendor and places older according to his requirements, and availability. Customer is identified with Name and contact

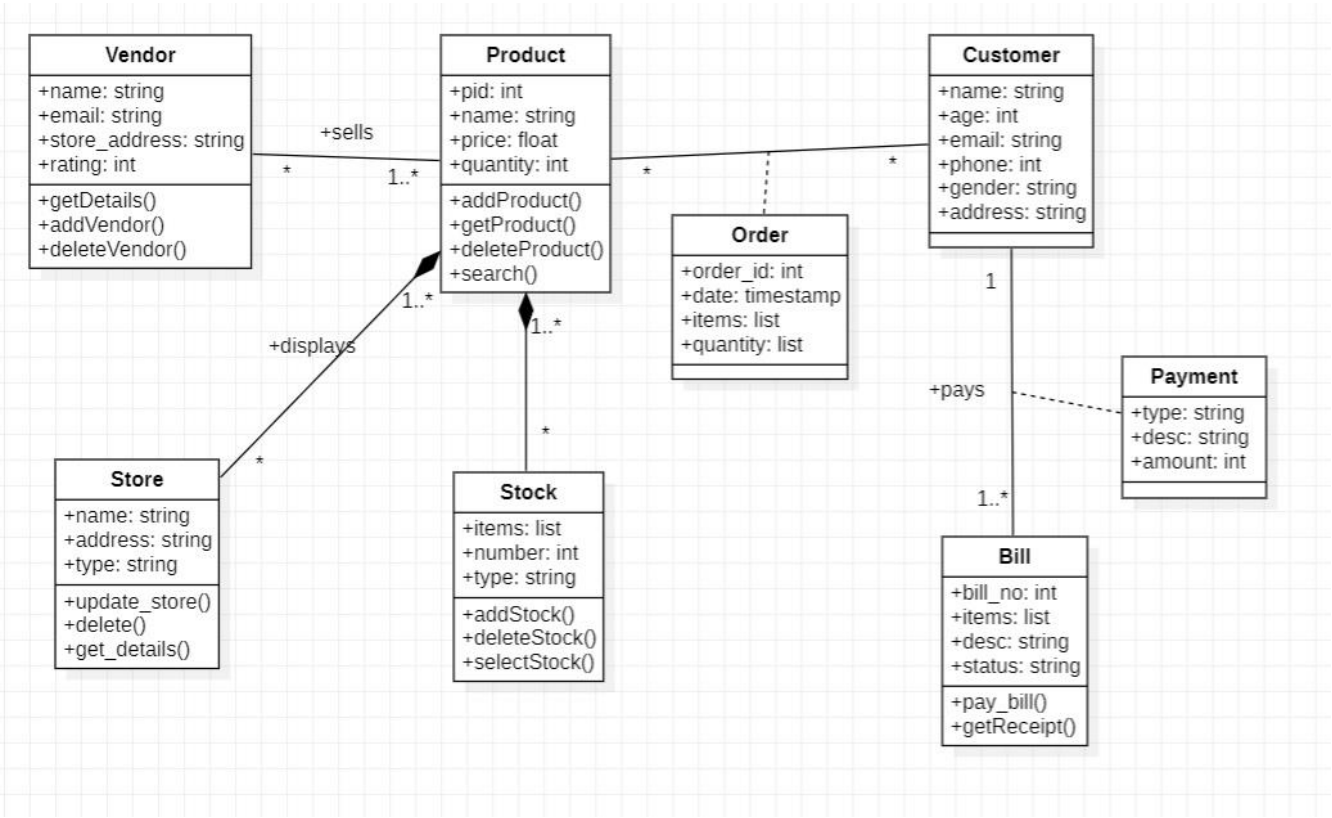
Vendor: - Vendor is identified by a registration ID and contact details Vendor can add modify or remove stock details. Vendor sells the product to customer.

Here at when products are sold a purchase order is created containing the list of products and its estimated price. It is uniquely identified by Order ID. After order is completed, a bill is generated containing price of product, tax details etc. It is uniquely identified by bill no.

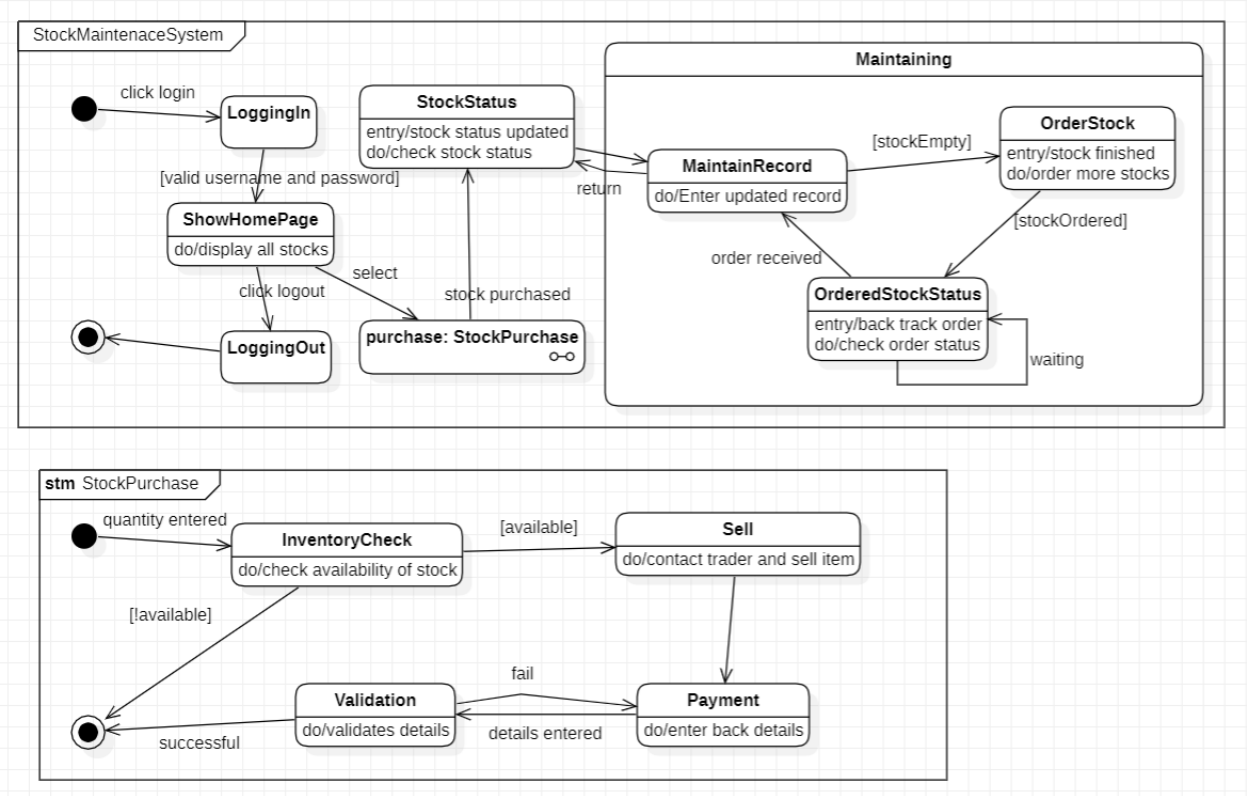
Product: It consists of ProductID, Price, Rate, Date of manufacture and Expiry Date. Also, essential details about the product.

Stock: Stock contains details about availability of products with the vendor. Here we can add, update, delete stock details

3.2 Class Diagram



3.4 State Diagram



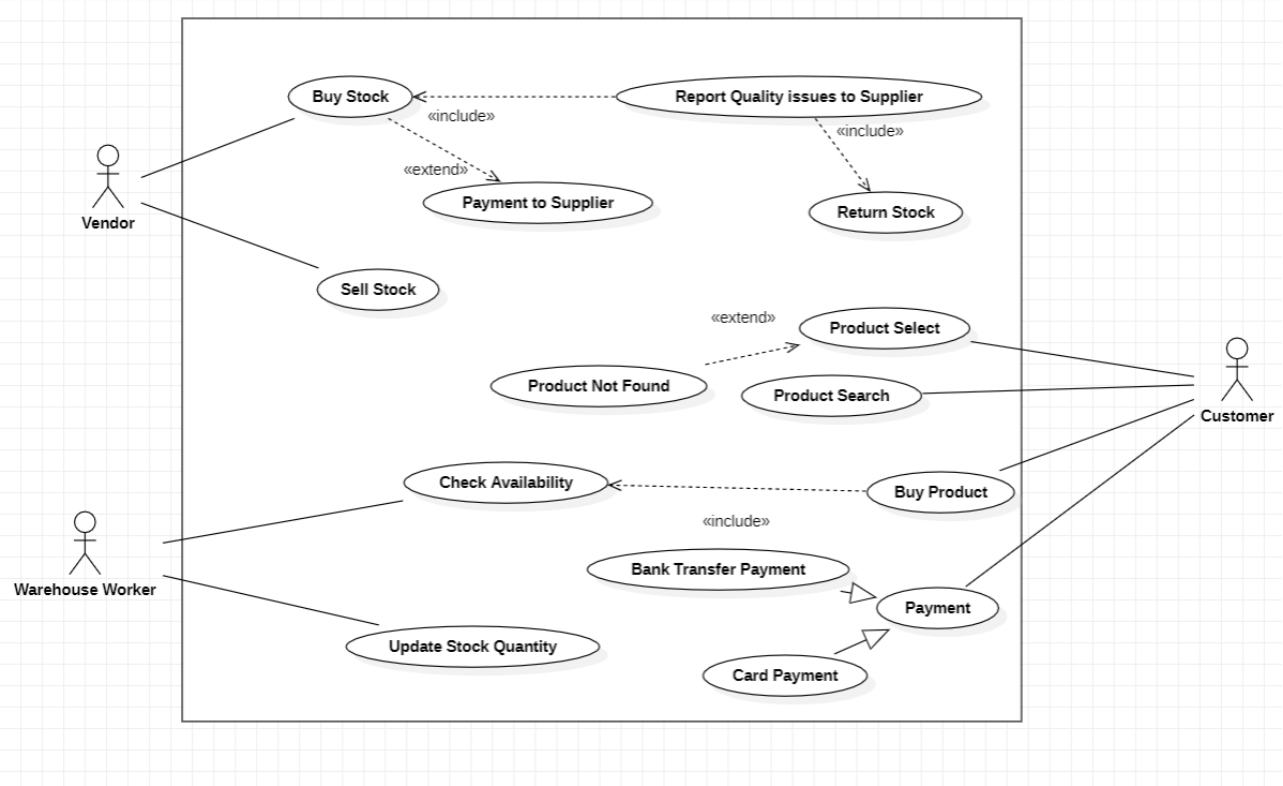
State diagram depicts the various events and states involved in the process of stock purchase and maintenance.

After logging In user is allowed to purchase stock.

Stock purchase is a expanded state it includes inventory check payment and validation

Purchase of stock with check its availability and after purchase we update the information using maintaining state

3.5 Use Case Diagram



Actors

Vendor, warehouse worker, customer

Use cases

Buy stock: Hair the window is allowed to buy stock and report quality issues to supplier

Sell stock: Vendor sells stock that he has

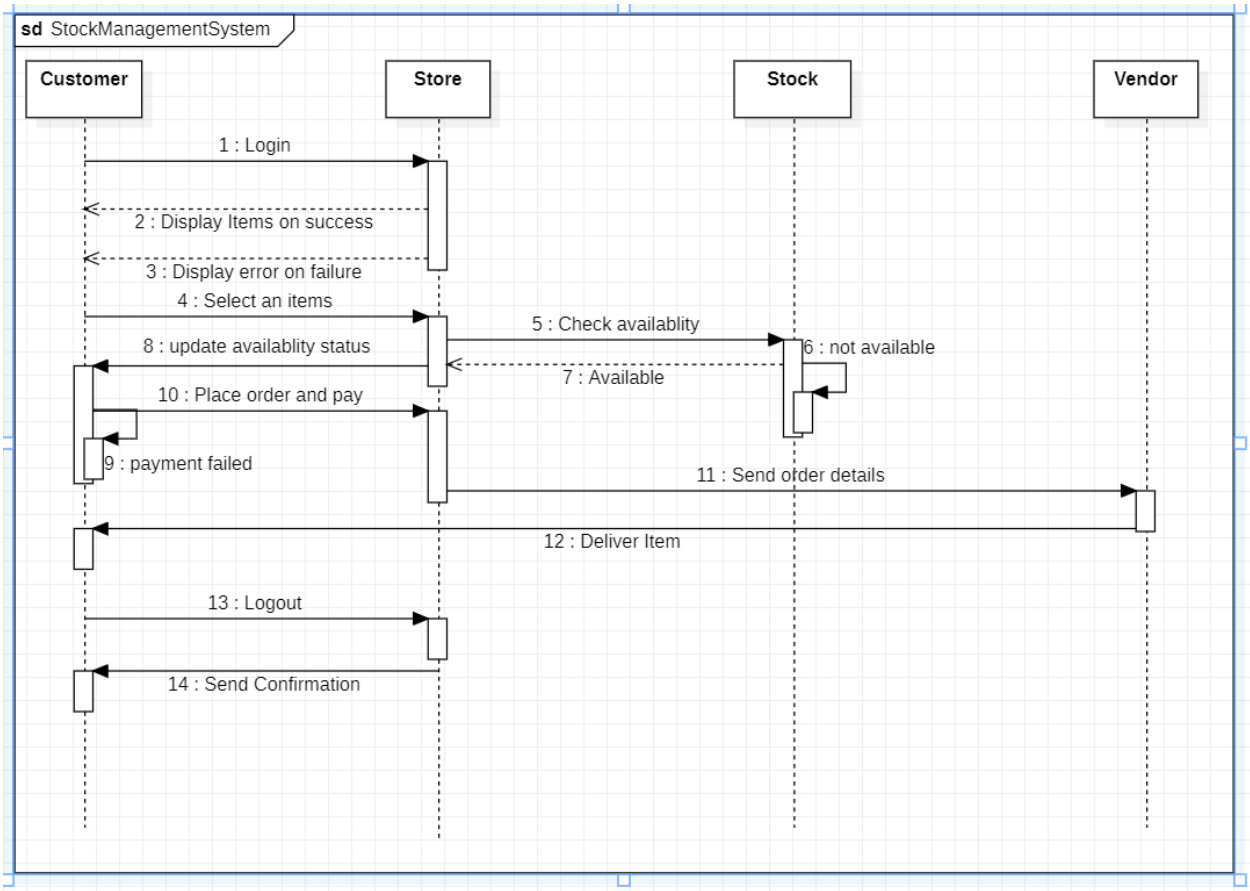
Product search: In this the customer is allowed to search for products

Buy product: your customer is allowed to purchase for products it includes checking for availability

Update stock quantity: The warehouse worker updates the quantity of stocks left

Payment: customer makes payment for the order.

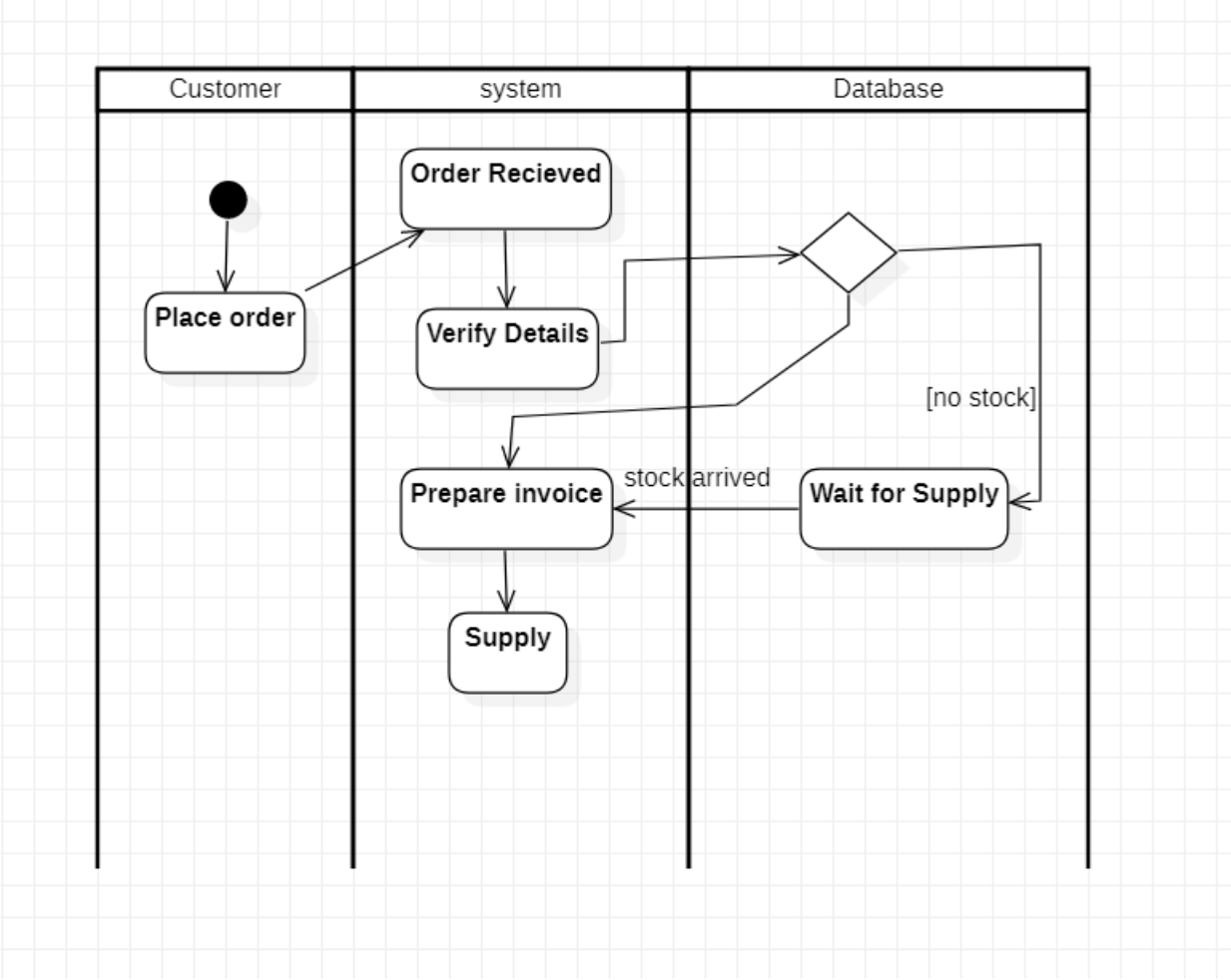
3.6 Sequence Diagram



The state diagram depicts the interaction between customer, store, stock and vendor during the process of stock purchase.

After login in, the customer is presented with a list of items. the customer selected items required after which an availability check is done for the selected items. Once the items are available, customers place Orders and test the bill payment. after that the vendor deliver the items to the customer

3.7 Activity Diagram



Activity diagram represents the interaction between customer, system and database using swimlanes. Customer places an order, after verifying the details of the order, we check for the availability of stock. Once the stocks have arrived, we prepare the order and the invoice and supplied the required stocks

4 Coffee Vending Machine

4.1 Problem Statement and SRS

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. 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 Requirement Specification

The vending machine must have money box, coin slot, display screen, ingredients, and products

The user must be presented with a menu of products based on the availability of ingredients to make the requested product.

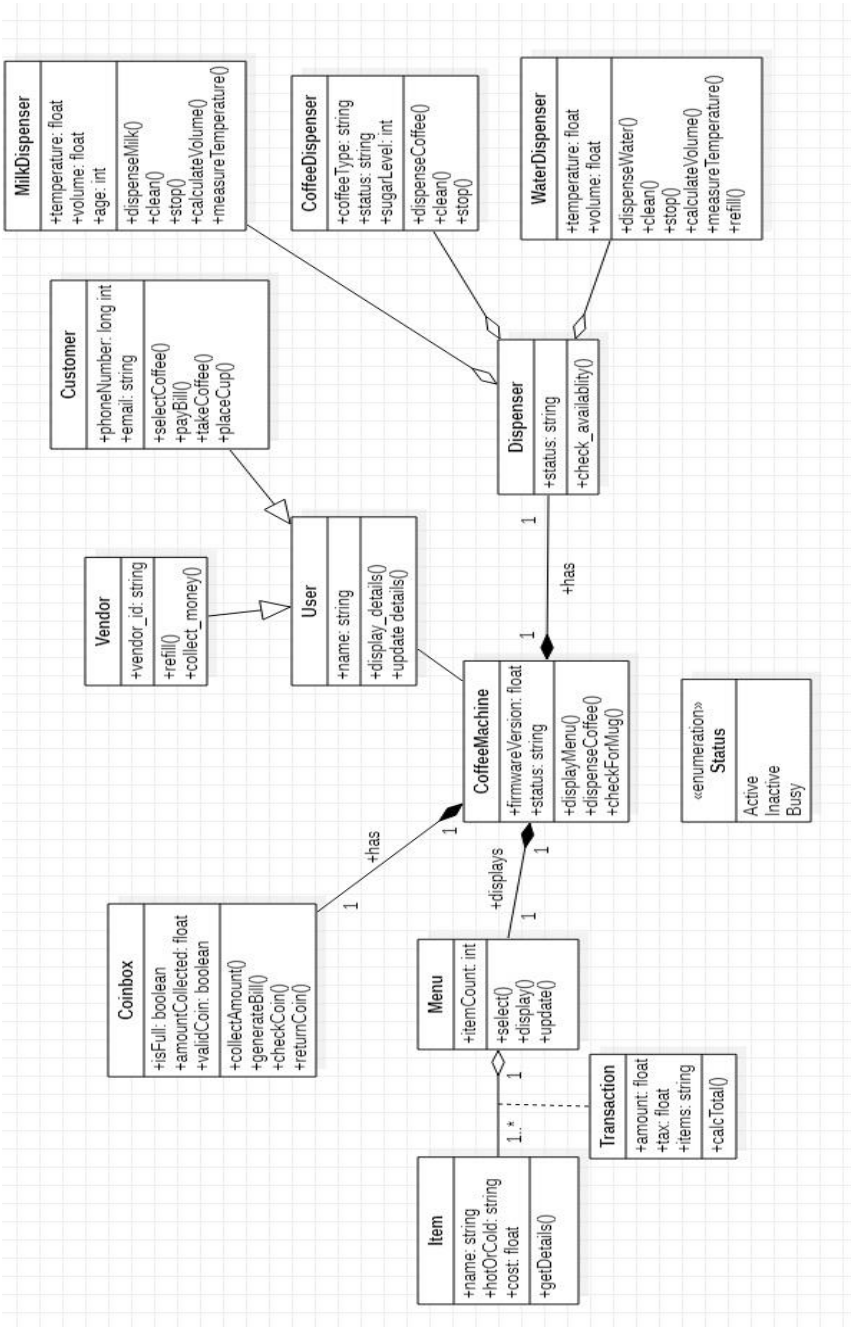
•After selecting the product, user must be asked for payment. The user inserts money into coin slot which checks for validity and correctress of payment. If pay is not proper, the coins are returned or else we move to next step.

• The dispenser must check for the presence of mug before dispensing the product. If mug is not present, the user must be alerted to be place the mug under dispenser

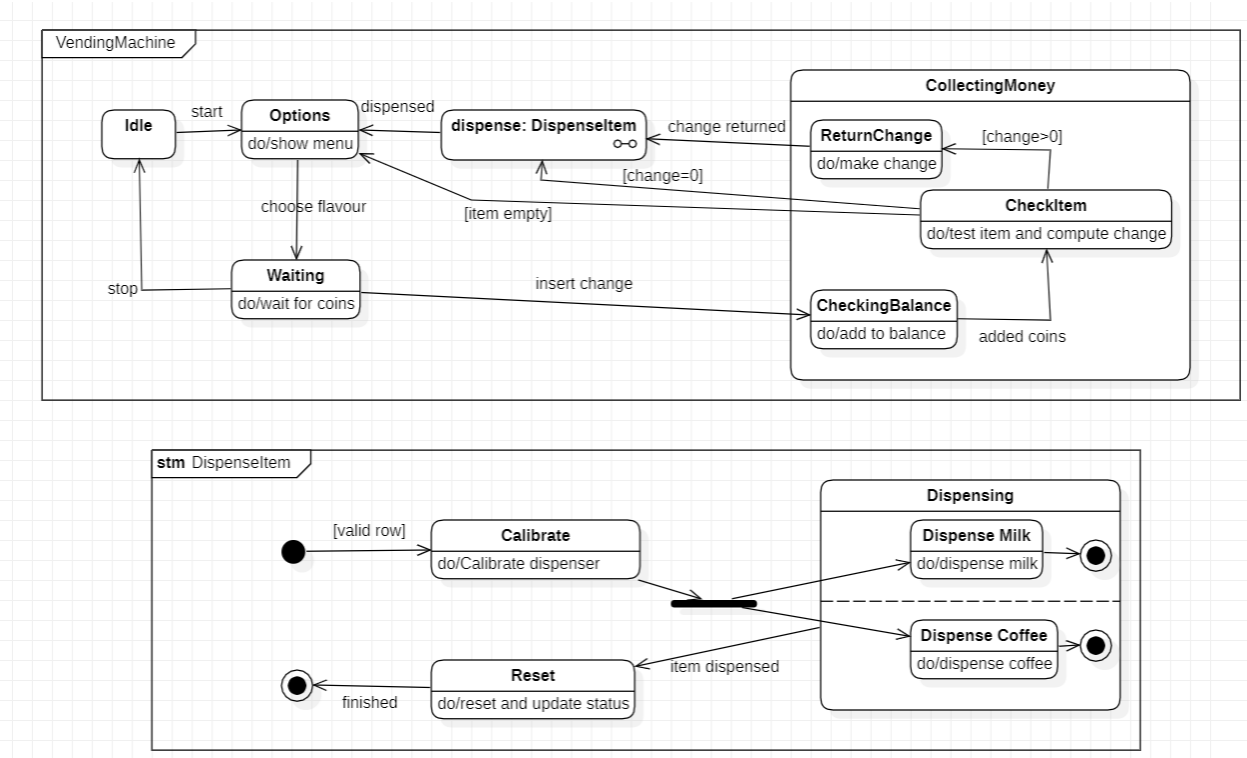
• If the ingredients are low or empty the machine should alert the owner to refill the empty ingredients.

• The user must be allowed to do modification by adding extra buttons for sugar, milk etc.

4.2 Class Diagram



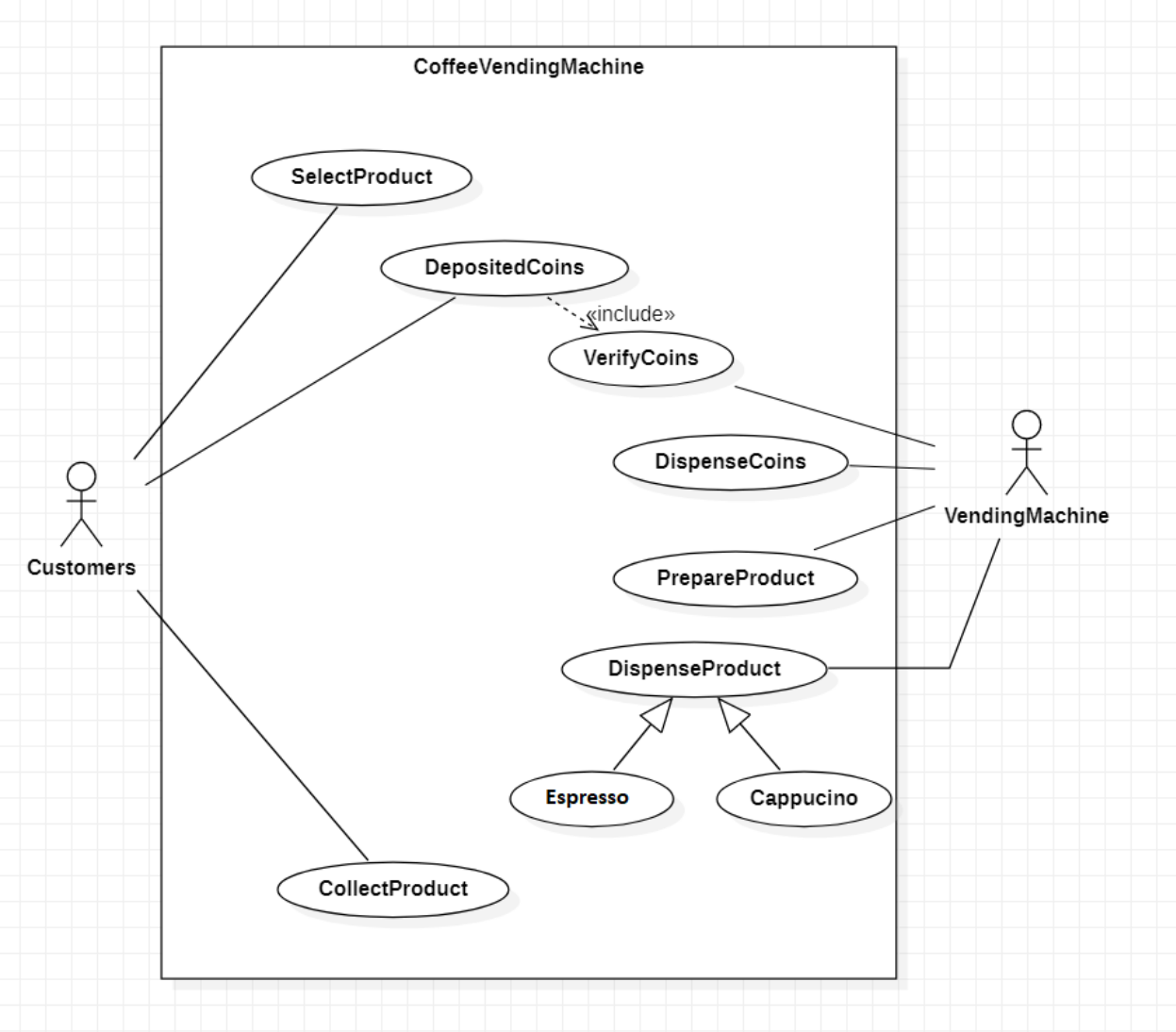
4.3 State Diagram



State diagram represents the various states and events involved in the process of coffee vending. Initially the machine is idle. After the user arrives and selects the items from Menu the machine asks for payment. If the given amount is excess, it returns change to the user.

Dispense item is represented as an expanded state it includes of calibration of the machine dispensing of the items and resetting of the machine and update in status of the machine

4.4 Use Case Diagram



Actors

Customers, vending machine

Use cases

Set product: user is presented with menu and can search for products

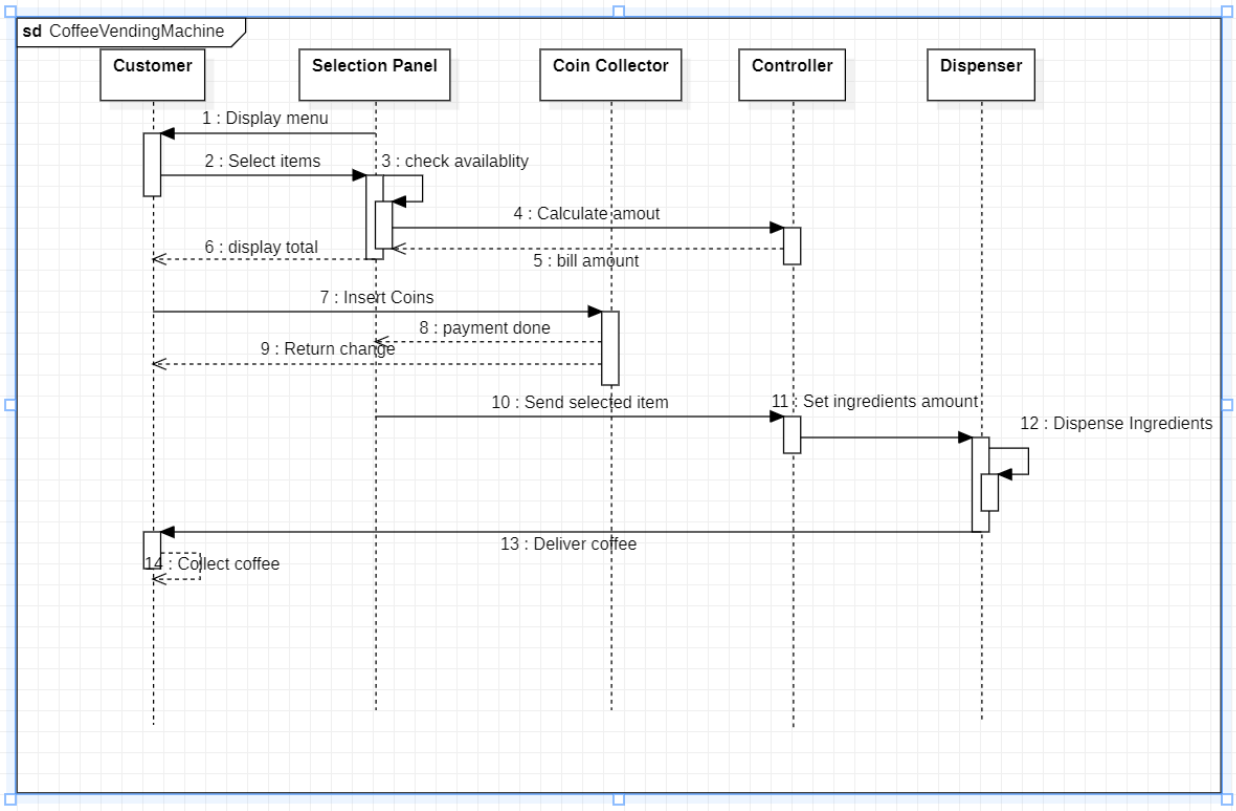
Deposit coins: user inserts coins to make the payment for the product, it includes verifying of coins inserted

Prepare product: the machine prepares the selected product

Dispenser product: the machine dispensers prepared product

Collect product: user collect the product from the machine

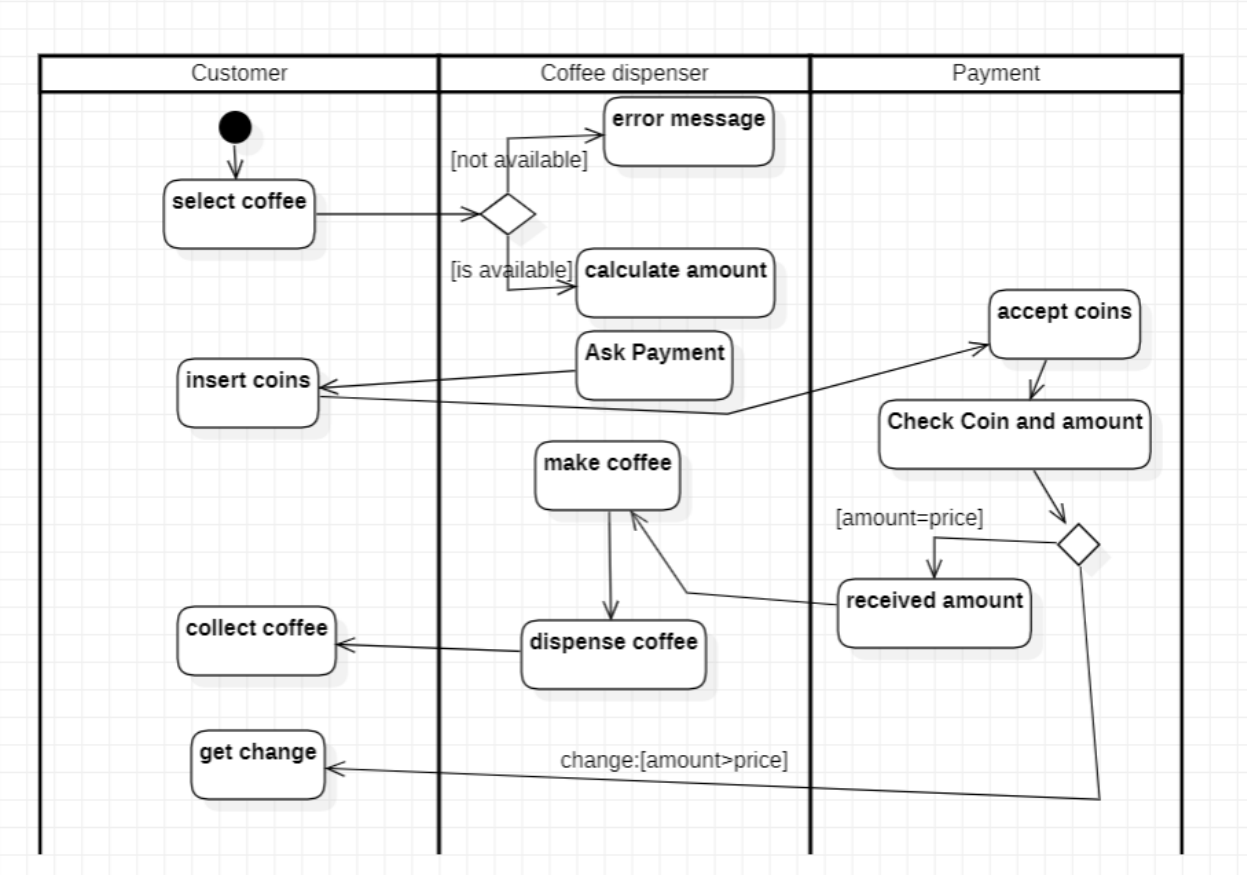
4.5 Sequence Diagram



The above sequence diagram depicts the interaction between the customer and various components of the coffee vending machine during the process of dispensing coffee

User selects an item, after which the controller calculate the bill amount. Then user inserts coins. The machine then a prepares coffee and dispenses it

4.6 Activity Diagram



Activity diagram depicts the various interactions between customer coffee dispenser and the payment that is coin collector during the process of coffee vending

After user selects a product the coffee dispenser checks for its availability and give some message accordingly. If the product is available the machine hacks for payment from user prepares coffee and dispenses the change and coffee

5 Online Shopping System

5.1 Problem Statement and SRS

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 customers to maintain their cart for add or remove the product over the internet.

Software Requirement Specification

The customer must have an account in the online website where he/she can purchase products.

•If the customer is not registered, he/she must be prompted to register by giving essential details such as email ID, address and contact no. And then user is provided with a unique User ID

• Once logged in user can browse through various categories of products, search for product and filter the results

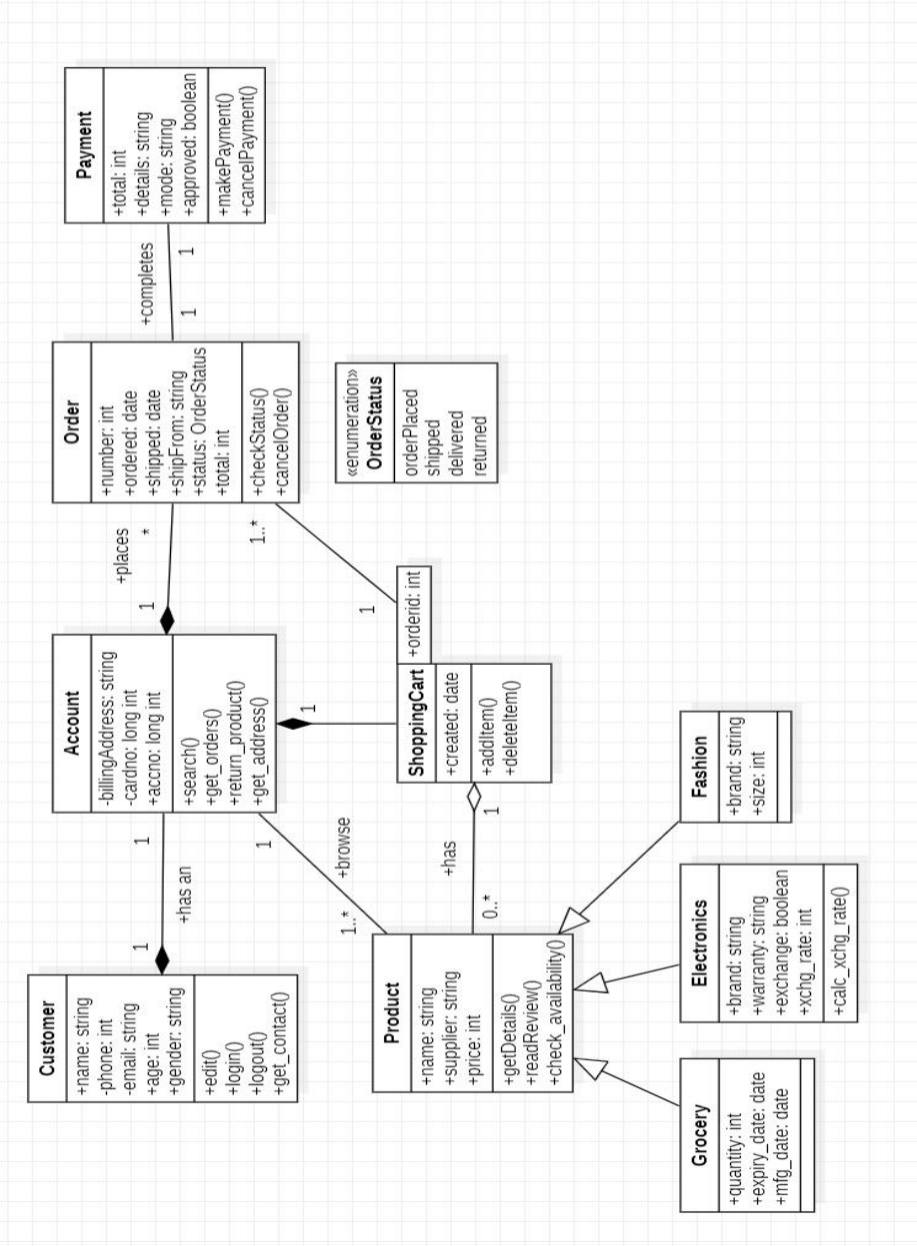
After customer chooses the product, he/she wants to buy, it must be added to the cart.

•Finally, when customer is done with shopping, they can check out the product in the cart, do payment through UPI, debit/credit card or opt for COD and place the order by giving shipping address.

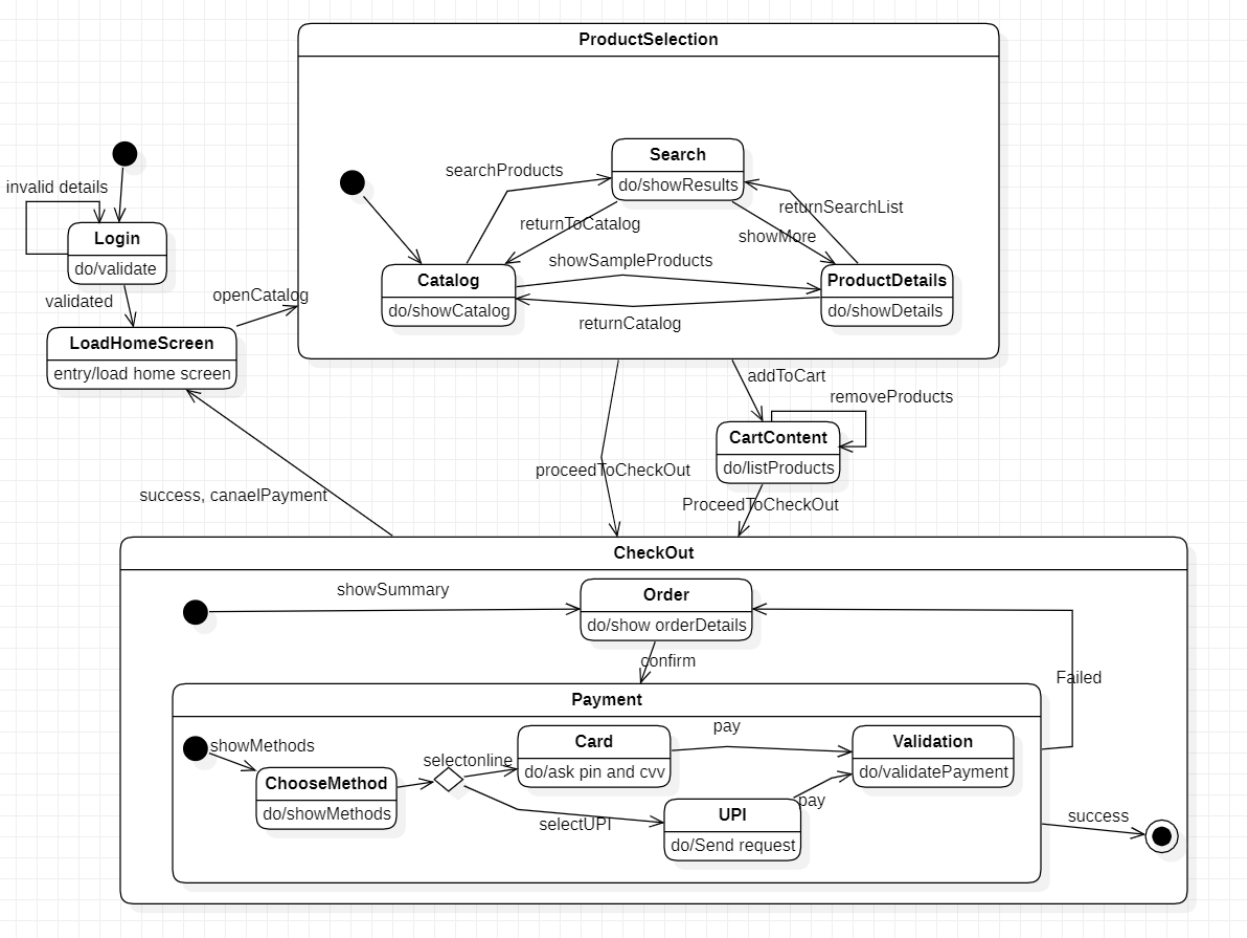
•Once order is confirmed user is sent a copy. of the bill through their email

The vendor is allowed to change the availability and prices of the products listed on the site

5.2 Class Diagram

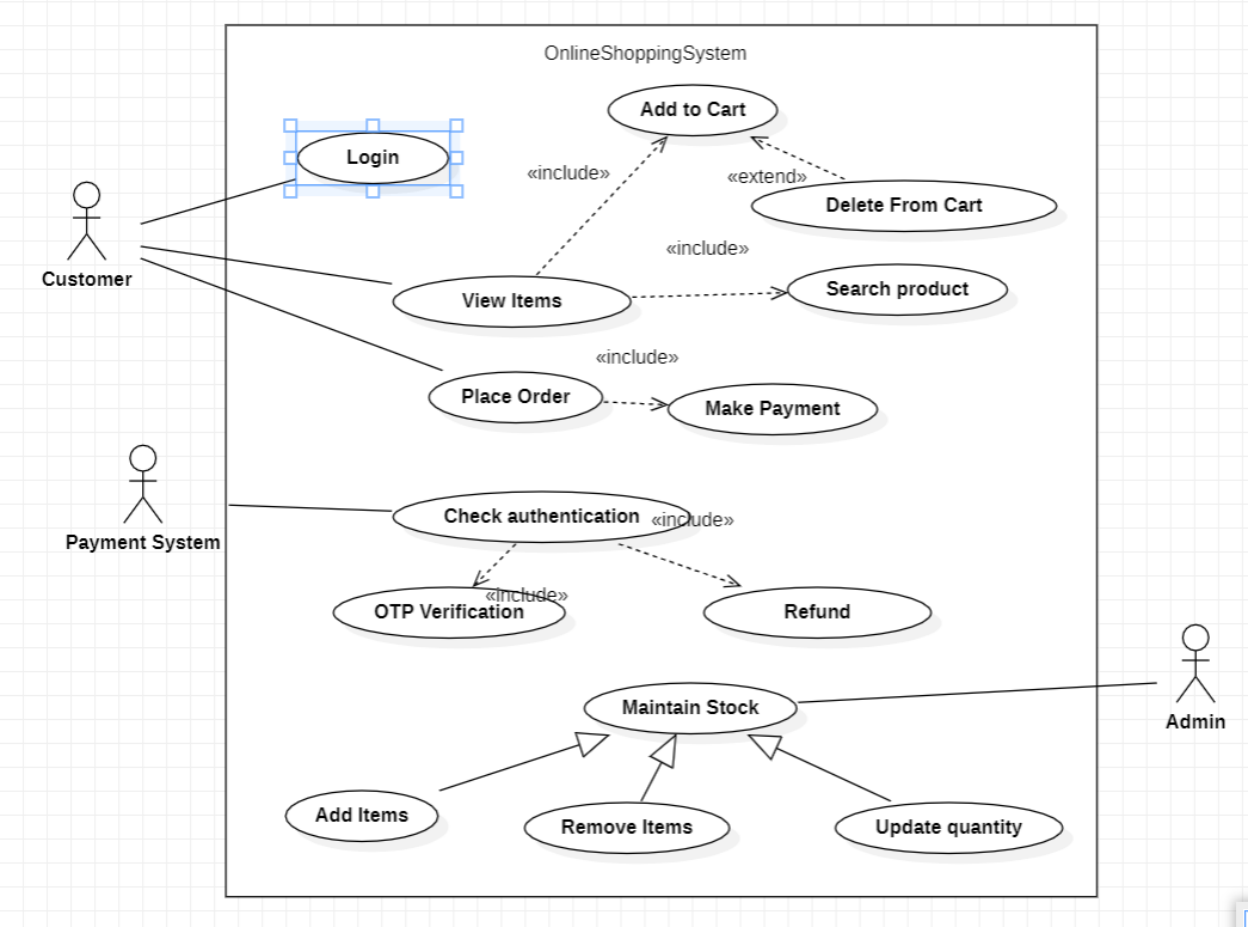


5.4 State Diagram



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.

5.5 Use Case Diagram



Actors:

Customer, Supplier, Payment System

Use Case:

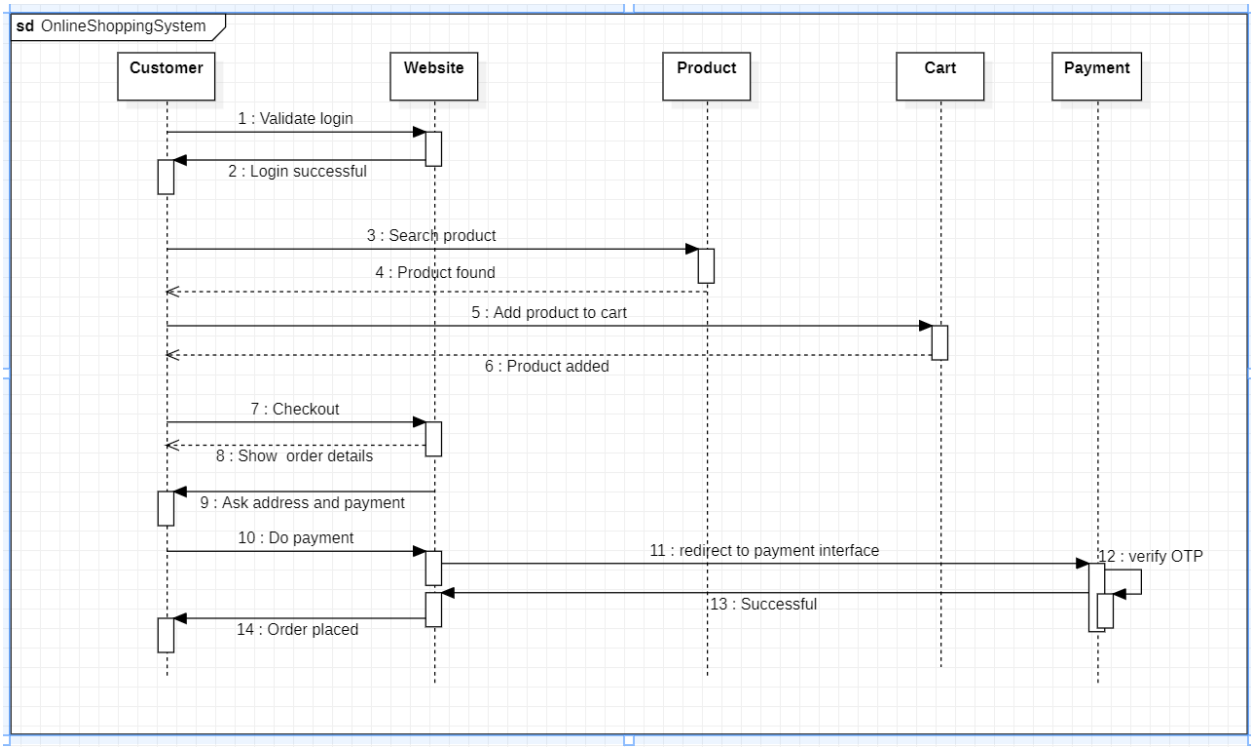
view items: displays all product details

Place order: order the items present in the cart

Make payment: accepts payment for the products purchased

Add to cart: add a product to the cart, it includes removal of a product from the cart

5.6 Sequence Diagram



Customer logs in.

Customer searches of products and adds them to cart

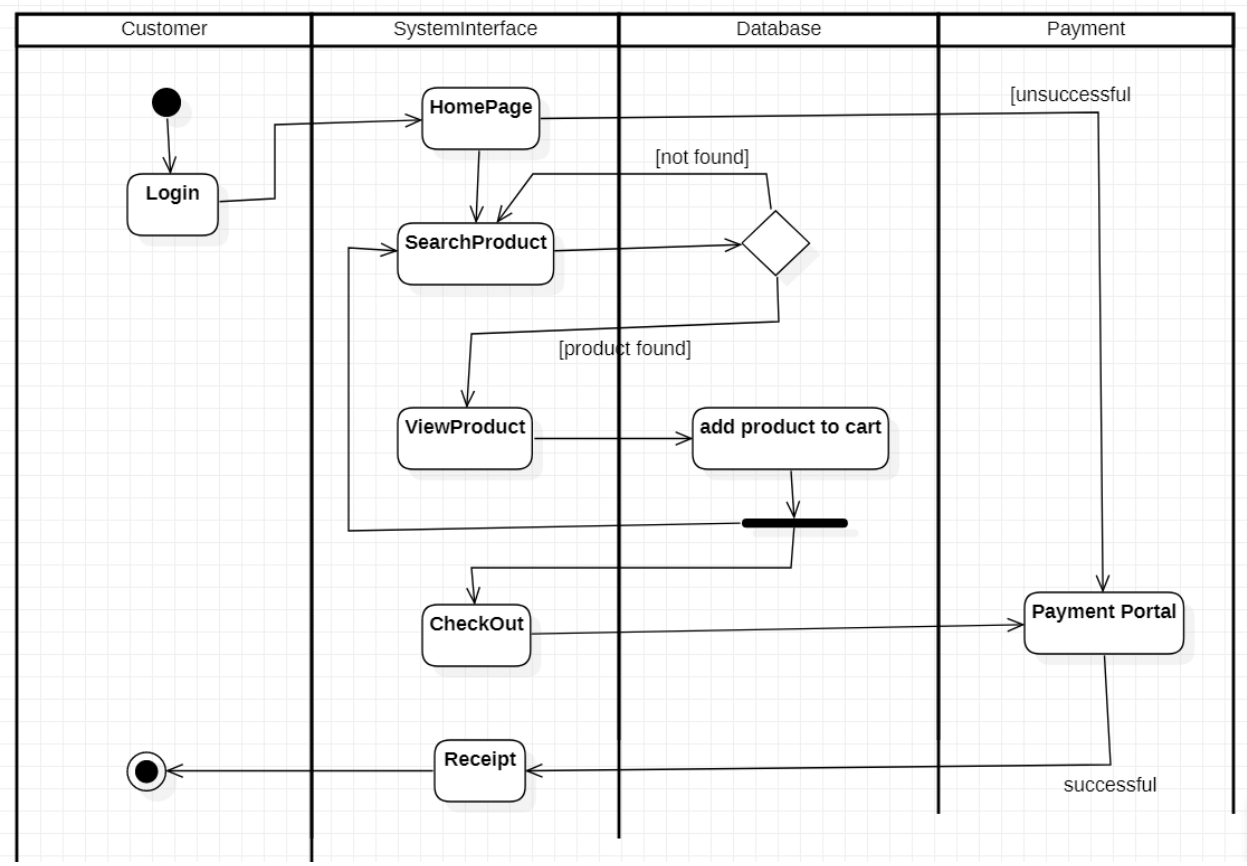
Then customer requests for checkout, the shopping system returns order details

Website asks for address and payment

Customers fills required data and does the payment

The order is placed

5.7 Activity Diagram



The customer can login/register, search and add product to cart and confirm order. The online shop can checkout the products, deliver, process payment and send receipt to customer.

6 Railway Reservation System

6.1 Problem Statement and SRS

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 provides the functionality of cancellation of tickets.

Software Requirement Specification

• Each user must be registered using email ID, contact no, identity proof to use the platform. Upon registration user is provided unique ID.

•Upon successful log in user is, presented with a form to enter day of travel, and no of passengers. After giving above input a list of trains with their seat availability is presented to the user.

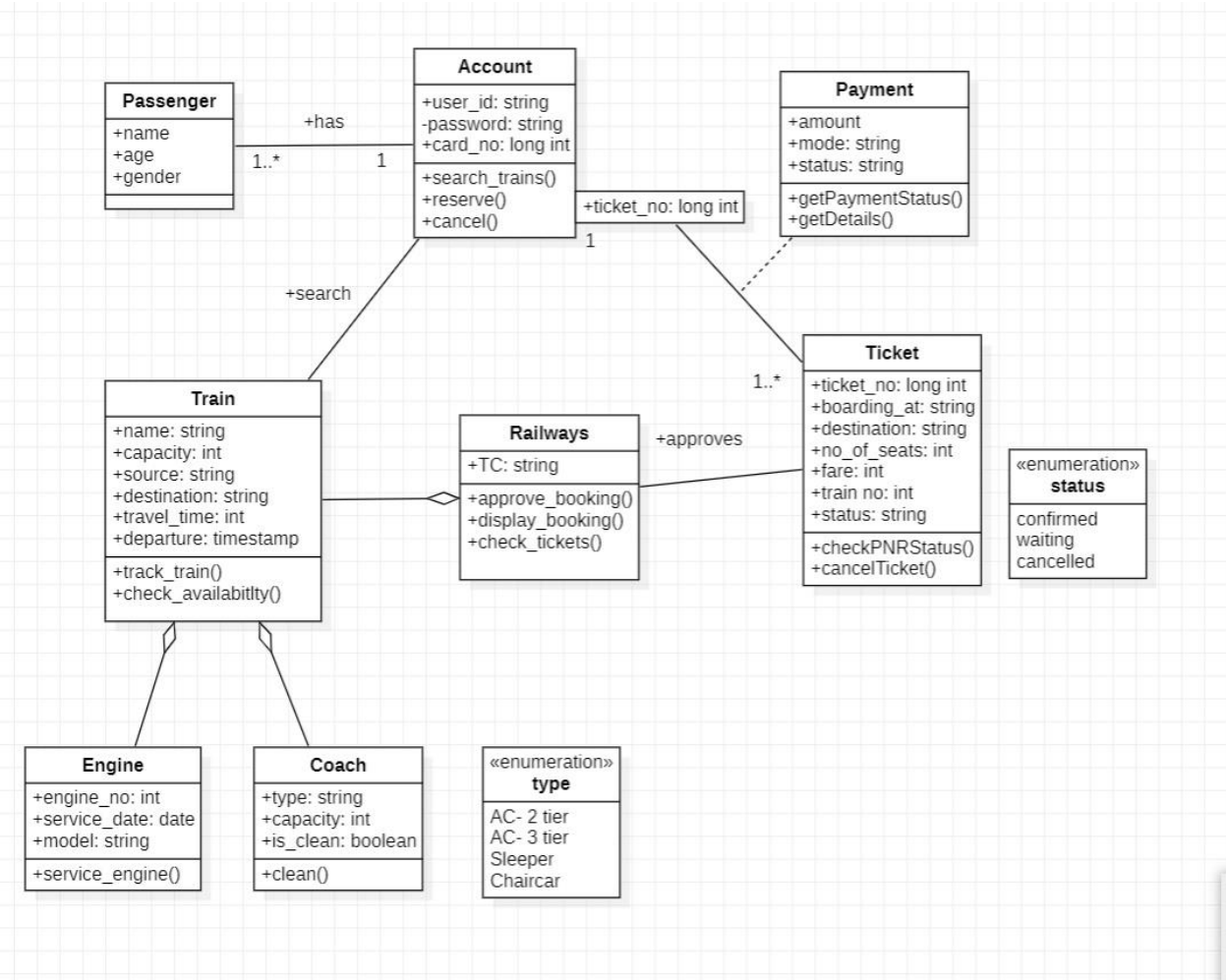
•If the seats available in the train chosen by the user the booking is confirmed and user is redirected to payment.

•Upon successful payment user receives e-tickets.

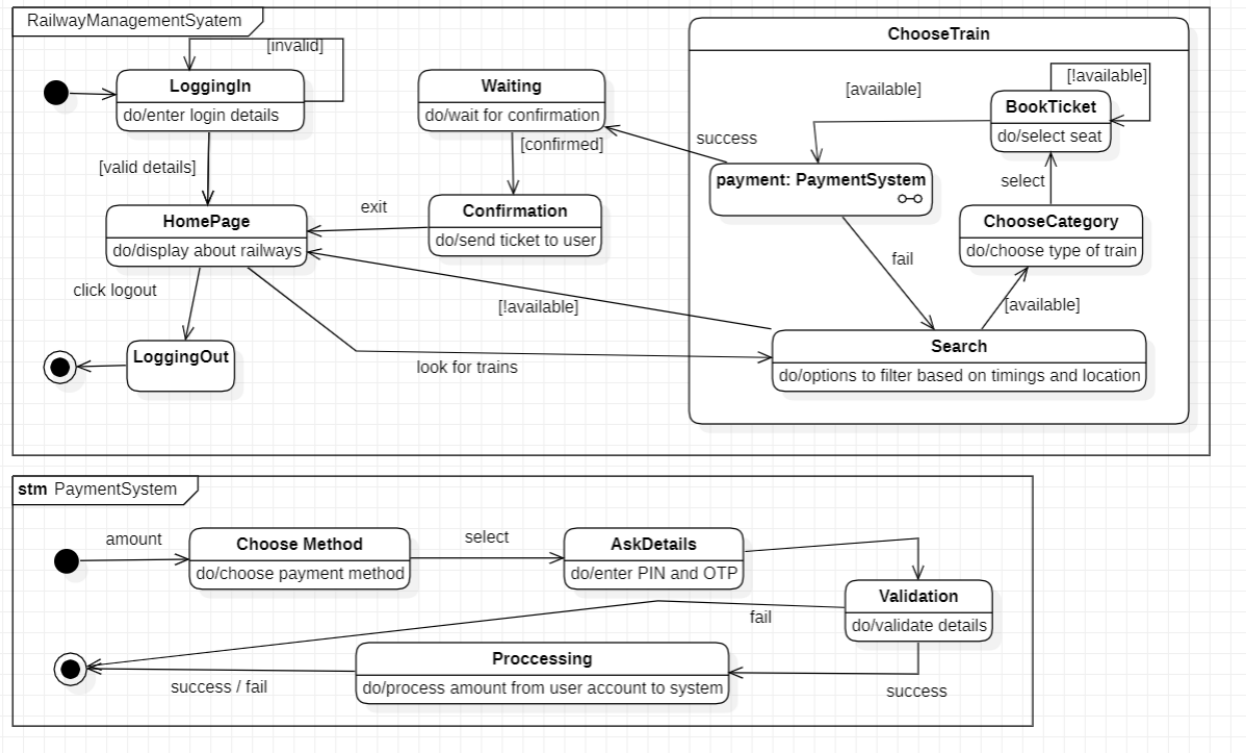
• If seats are not available user is put in waiting list and is notified when seats are available

•The user is allowed to cancel the booked seats within 24 hrs of departure time by charging a nominal fee. Rest of the paid amount is refunded.

6.2 Class Diagram



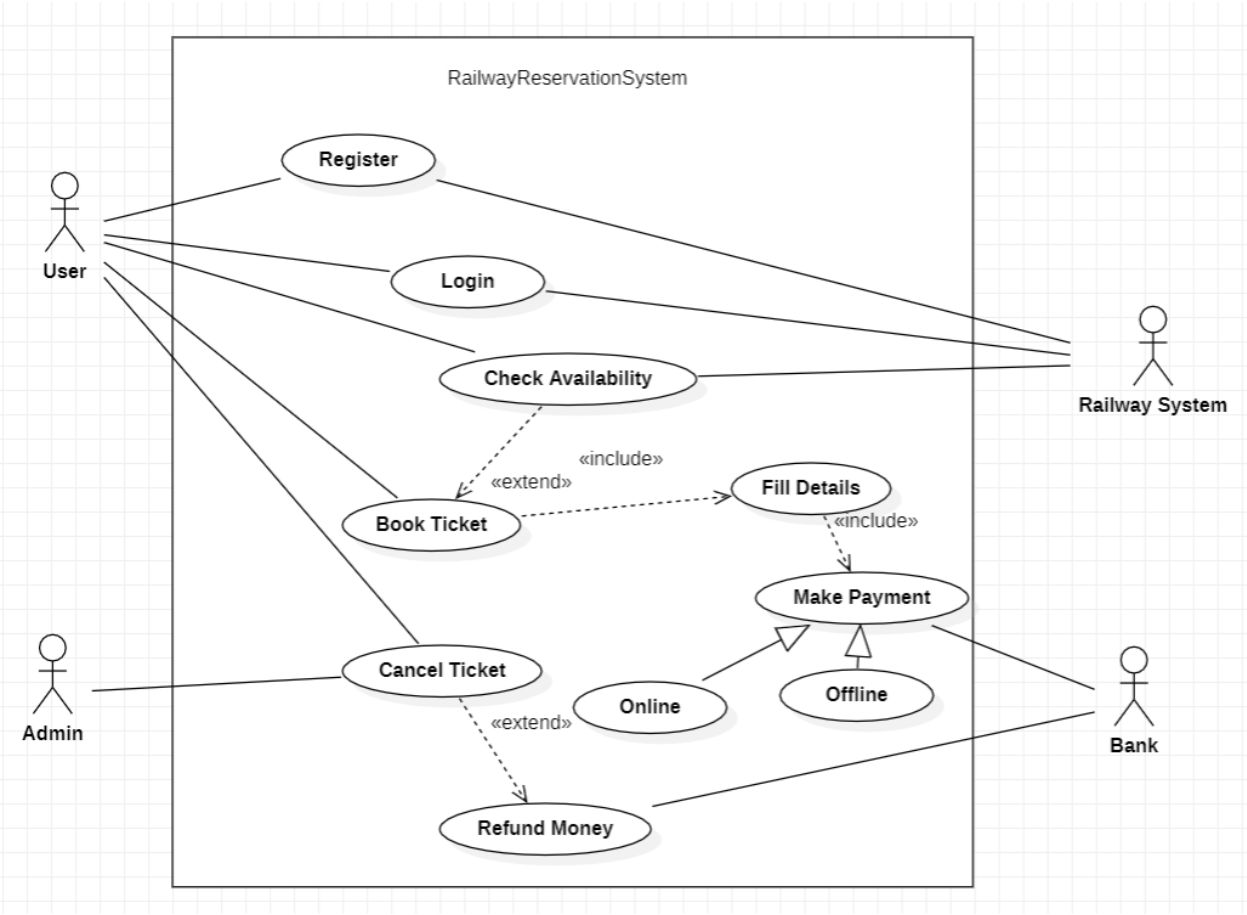
6.4 State Diagram



After login to the homepage the user can search for trains according to their destination and date of travel. After selecting the train and seats the user is redirected to the payment system. Then user is put into waiting list, if seats are available user is sent confirmation.

Payment system is represented as in expanded state where user is allowed to choose payment method and then asked for pin or OTP upon validation of the entered details, the payment is processed

6.5 Use Case Diagram



Actors

User, Railway System, Admin, Bank

Use cases

Register: user creates an account

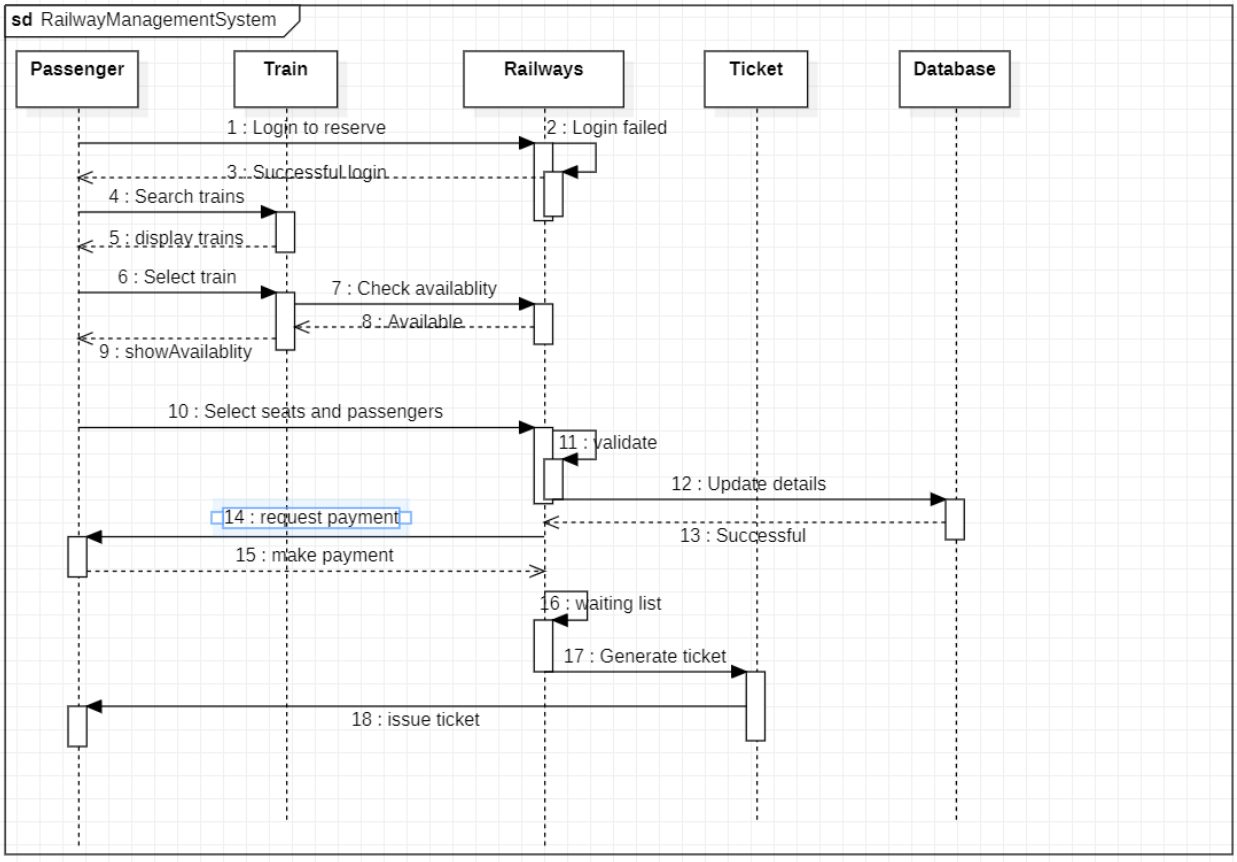
Login: user logs into their account

Check availability: check for availability of train

Book ticket: booking of train tickets, it includes filing data of passengers and making payment

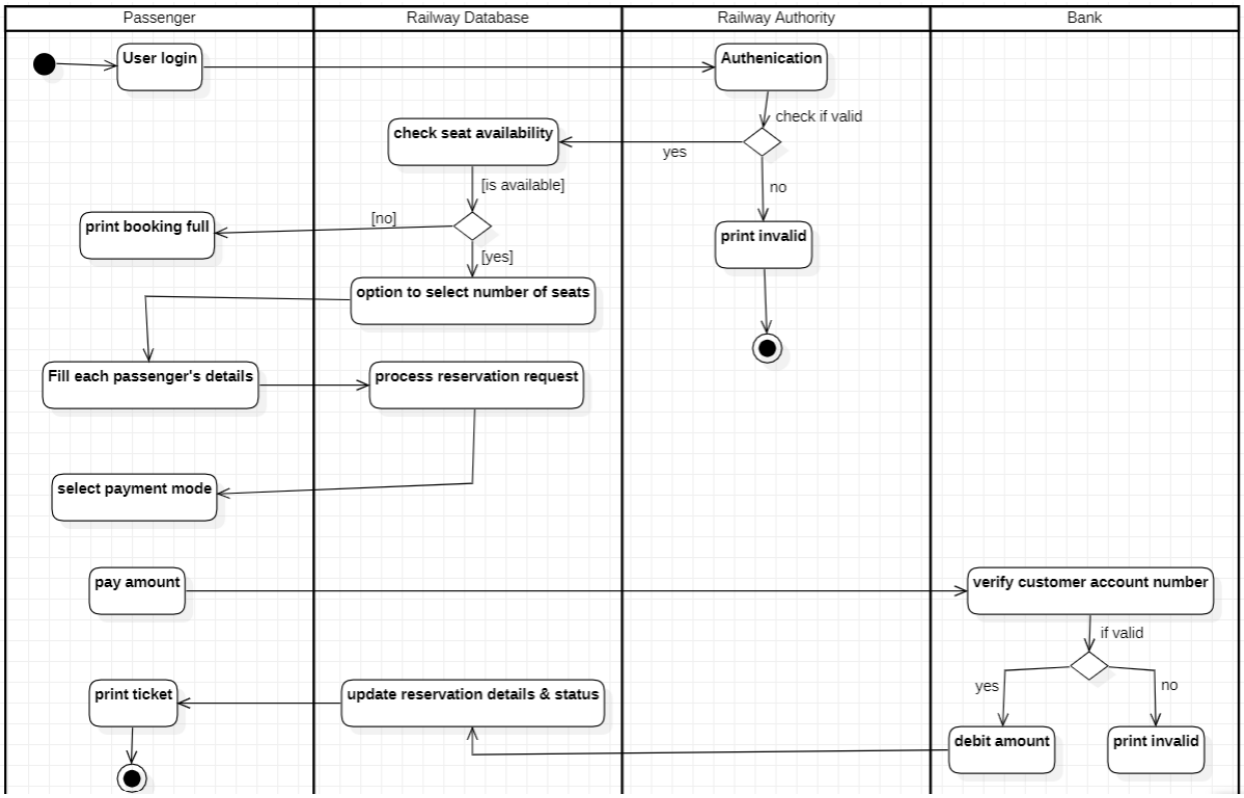
Cancel ticket: cancellation of booked tickets, it includes refund money

6.6 Sequence Diagram



User logs into the railway reservation system.
Admin verifies the login details.
User checks for availability of trains.
Railways displays the train details.
User selects train and seats.
Railways requests payment.
User makes the payment.
If tickets are available, it is issued or else user is put into waiting list
Railways issues ticket
User logs out.

6.7 Activity Diagram



7 Graphics Editor

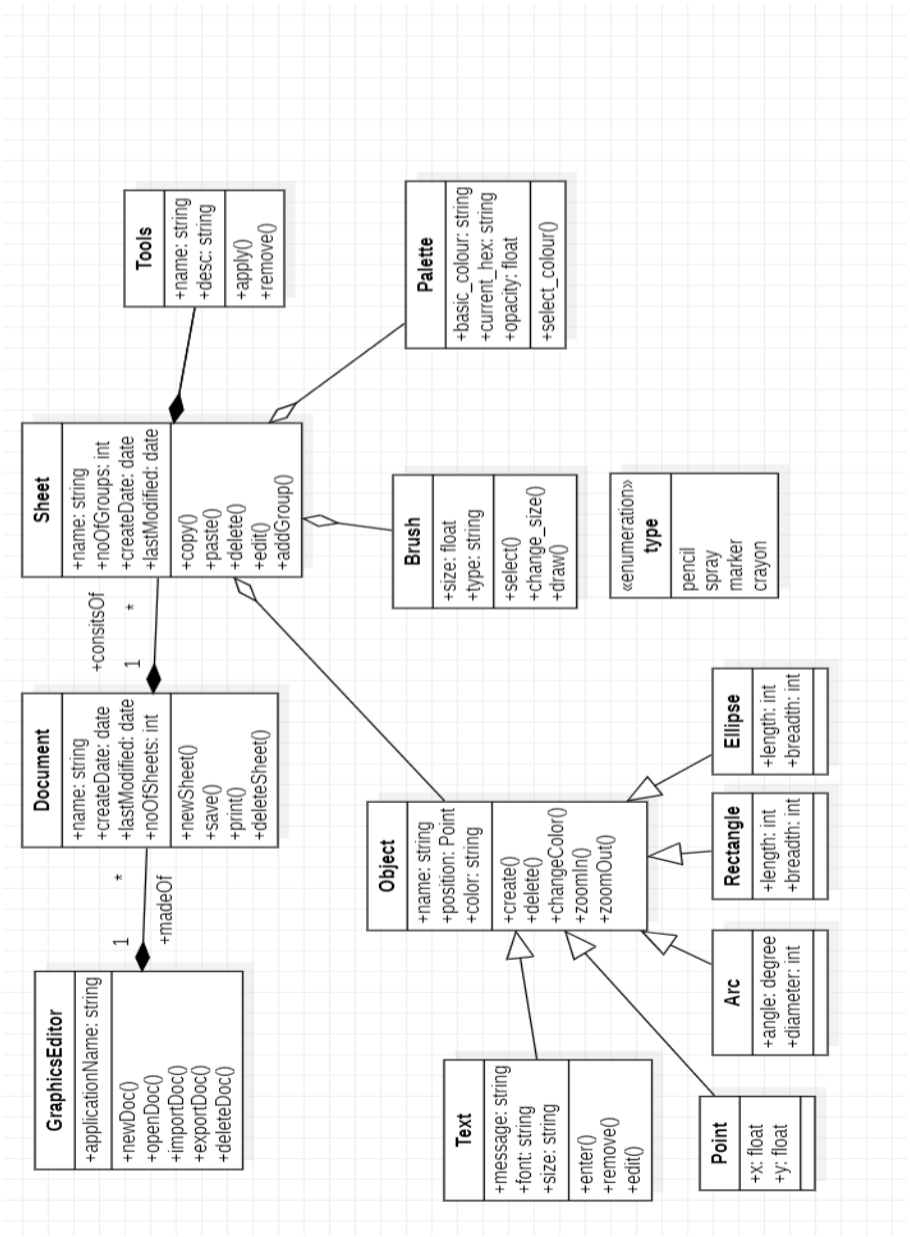
7.1 Problem Statement and SRS

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, provides 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.

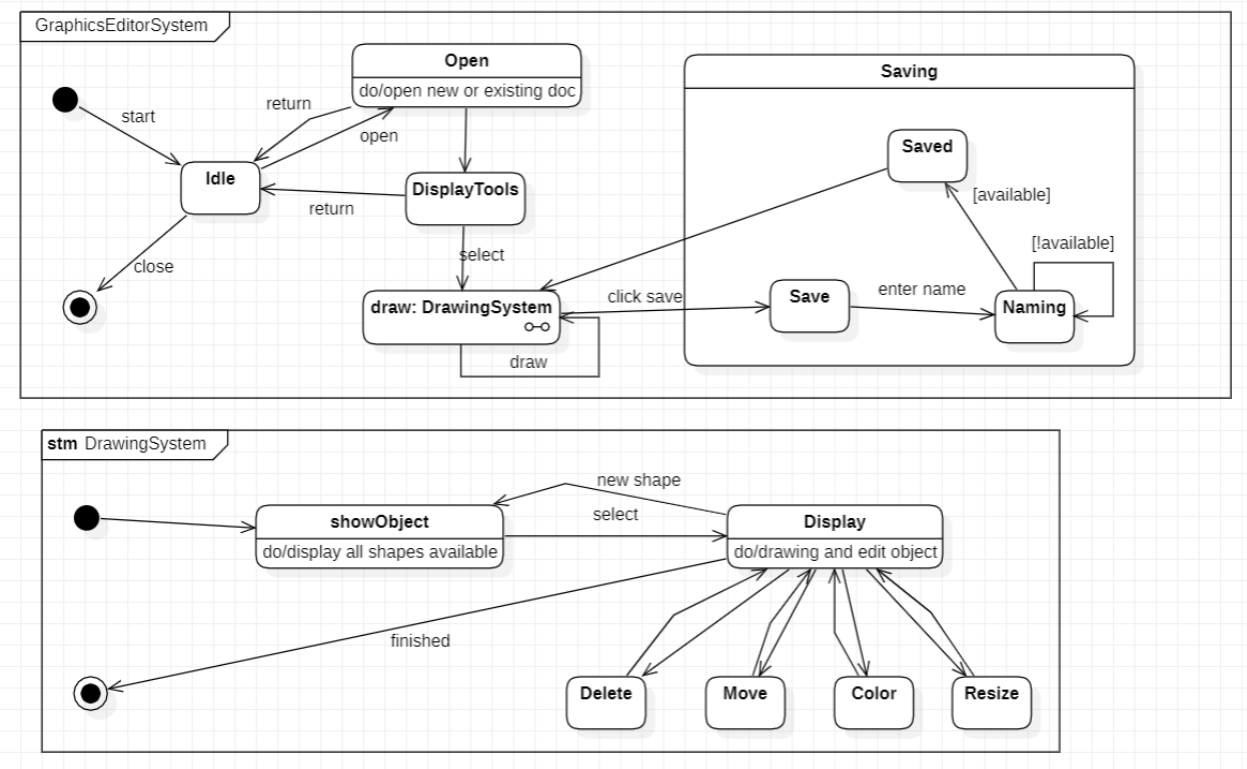
Software Requirement Specification

- 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 connections. The latter function will be handled by a specific event listener. Any changes made in real-time to the underlying model will also be updated in the diagram through a separate 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.

7.2 Class Diagram



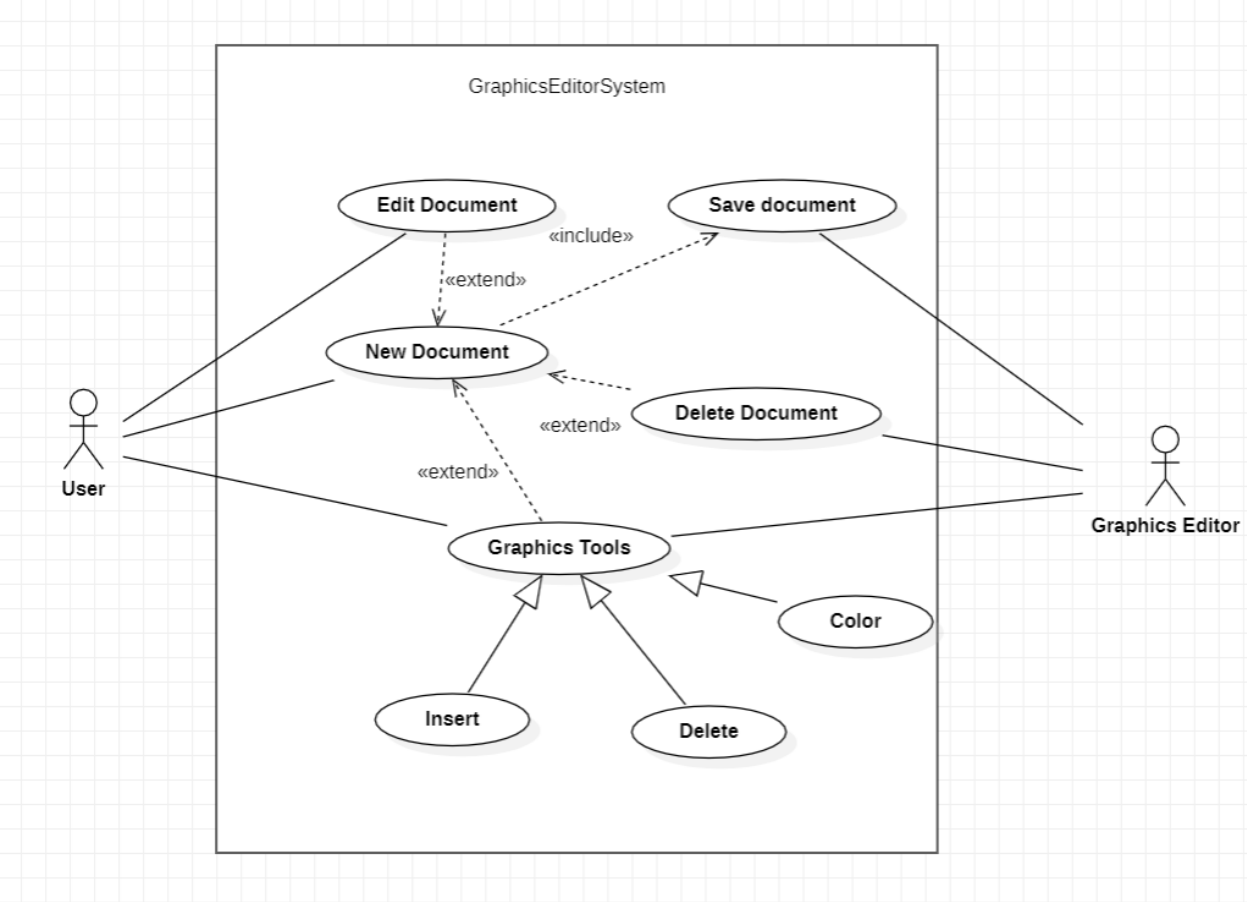
7.4 State Diagram



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 palette. All options related to tools are in expanded state: Drawing System He can then save the file created.

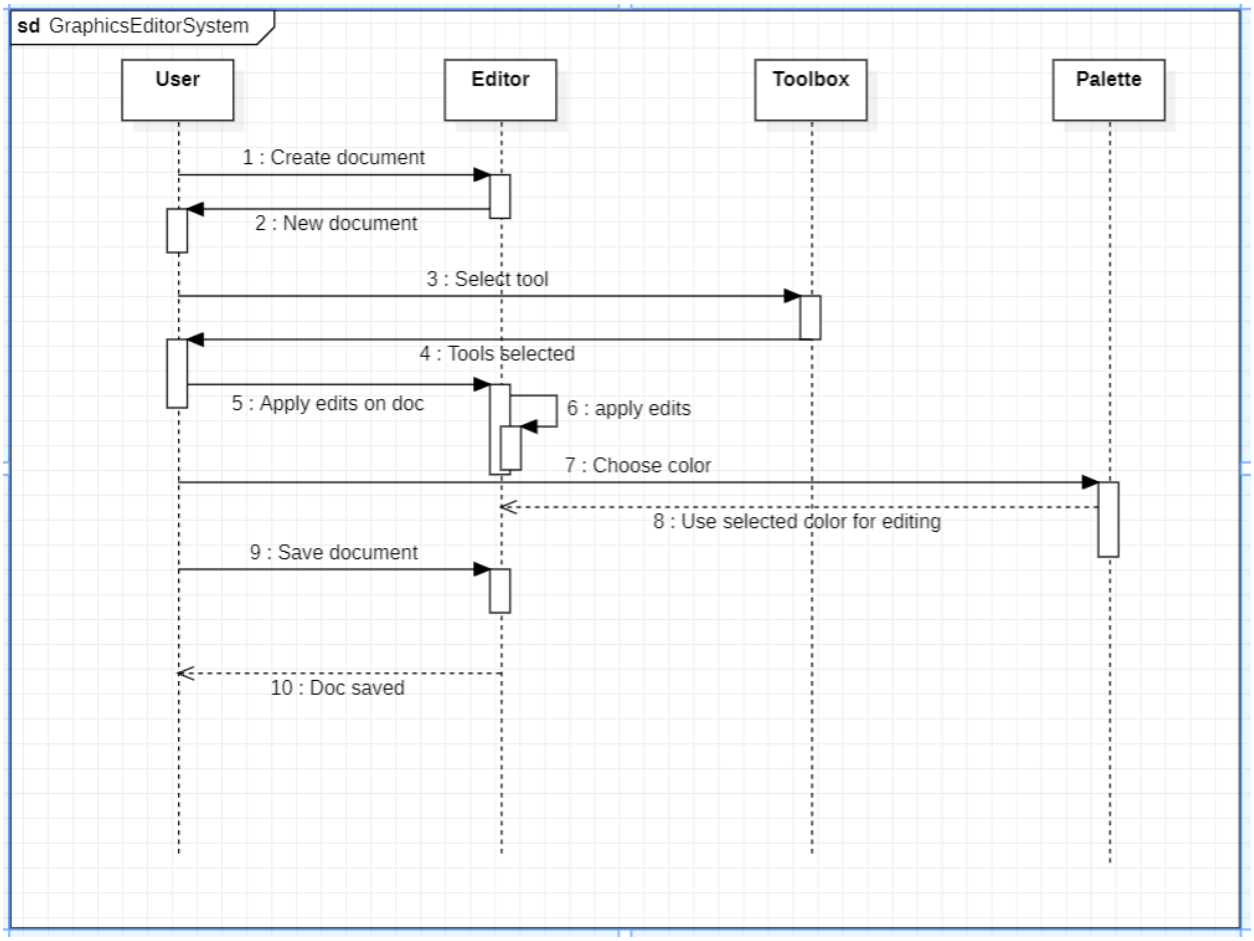
A composite state called saving allows the user to save the file in their desired location.

7.5 Use Case Diagram



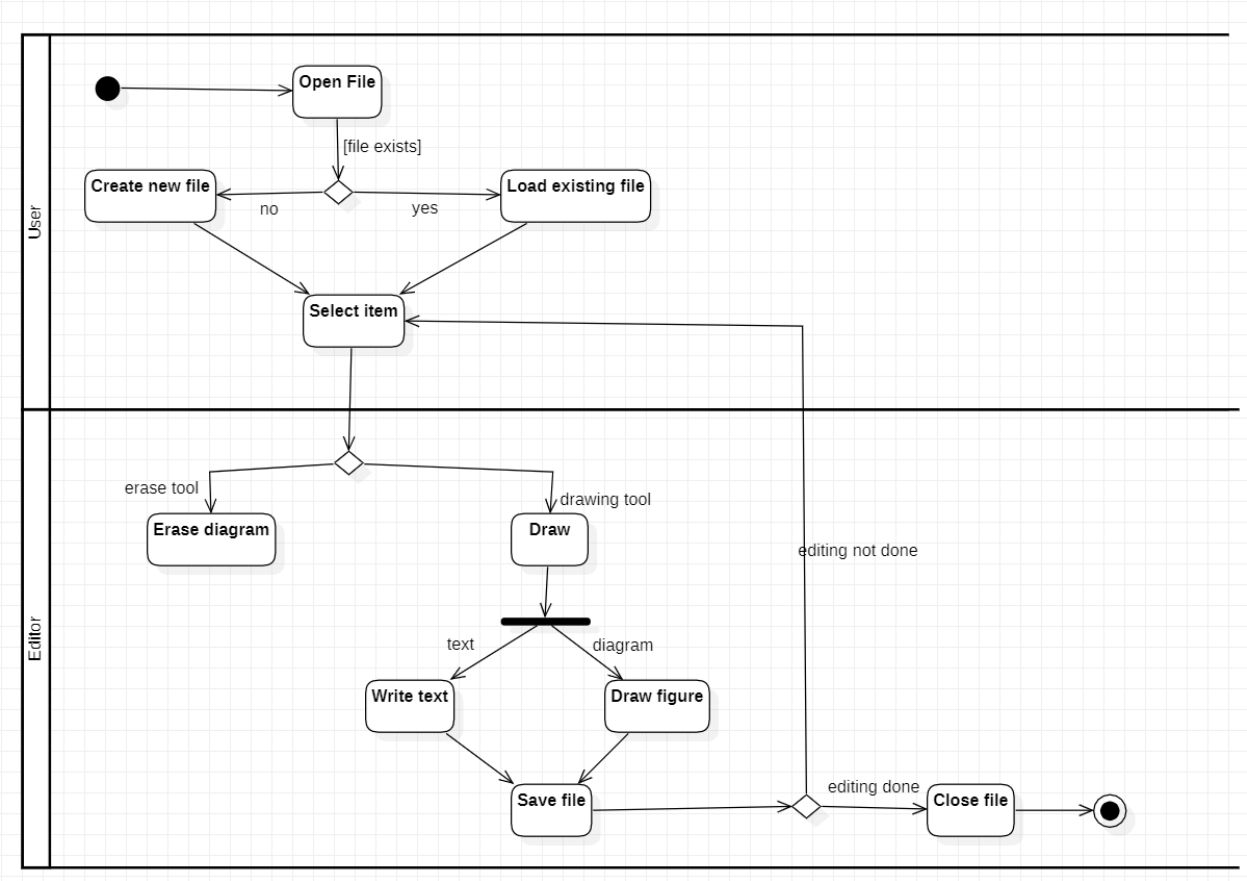
Actors :
User, Graphics editor
Use case:
Edit document: performs editing of document
New document: create a new document
Graphics tools: contains tools various tools for editing, like insert, delete, color
Delete document : Permanently deletes the document

7.6 Sequence Diagram



User creates a document
Editors makes new document and returns it to user
User selects tools for editing
User applies edits on the document using tools
User can change color using change palette
After editing is done user saves the document

7.7 Activity Diagram



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