

Lab Inventory Management System

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Course : CSE 326(Information System Design Sessional)

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Overview Of the Project

Aim

The project is to look into the inventory management system of the laboratories of our institute and implement it in a more sophisticated way for the laboratory users, be it students , laboratory assistants or teachers, to use more conveniently.

Motivation

The motivation is that there are sufficient scope to improvise the existing laboratory management system of our institute. The suitable ideas and efforts that will make this project successful will be taken into account



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Corrections made to the project

Error and Corrections to BPMN

[Click here](#)

Error and Corrections to ERD

[Click here](#)

Error and Corrections to Sequence Diagram

[Click here](#)



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The Full BPMN Diagram

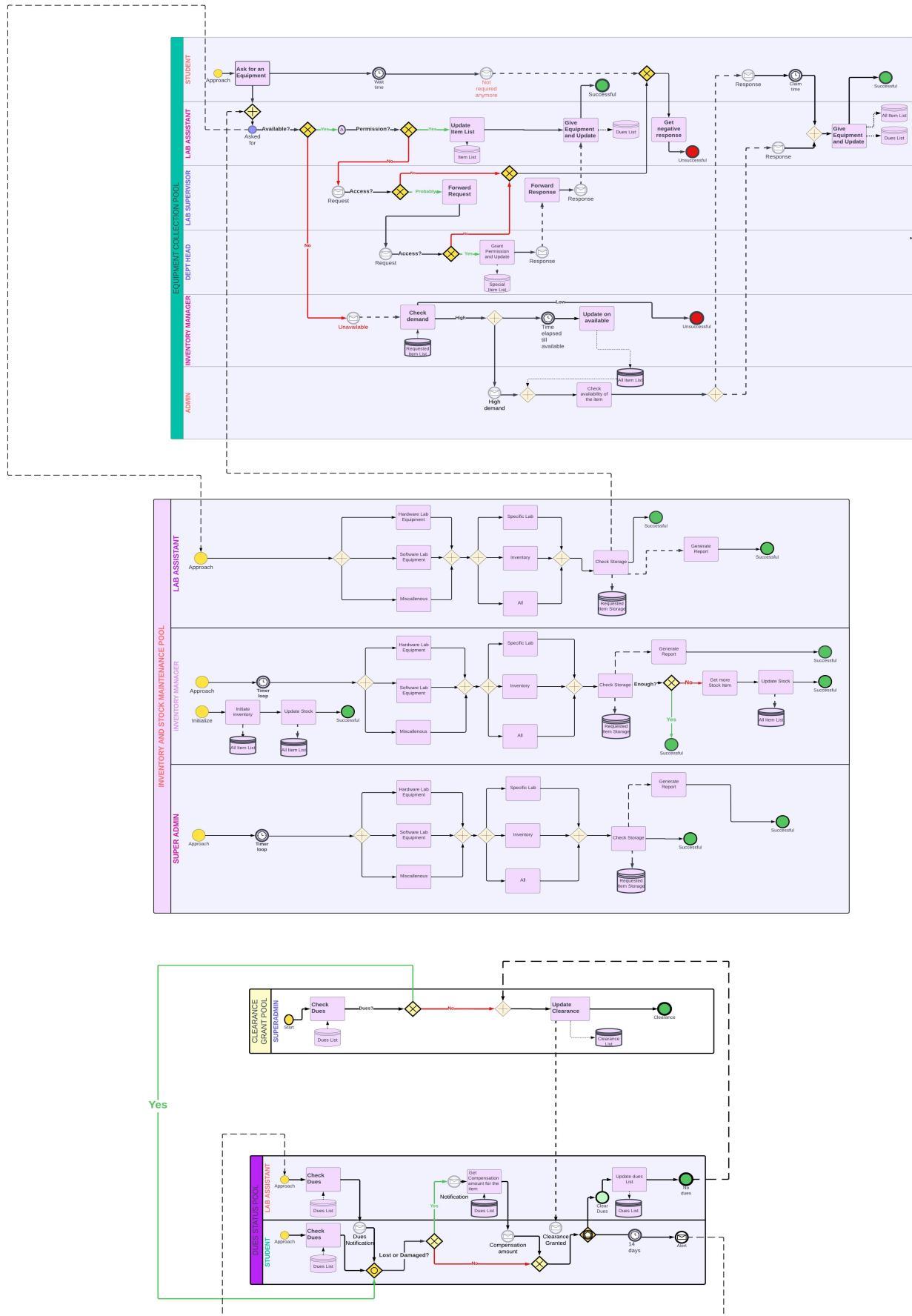


Figure 3.1: Full BPMN Diagram



The Full BPMN Diagram

Pools and Lanes of BPMN

- **Equipment Collection Pool:** This pool handles the process of requisition of stuff from inventory to students over an ongoing turn of events and might be unsuccessful in certain cases. The pool has 6 lanes :
 - 1) Student
 - 2) Lab Assistant
 - 3) Lab Supervisor
 - 4) Department head
 - 5) Inventory Manager
 - 6) Admin
- **Inventory and Stock Maintenance Pool:** This pool takes in account initialization of an inventory and handles the process of frequent checking and updating of stock based on recently occurring events, triggered unconditionally over a certain interval of time or conditionally for any requisition event. The pool has 3 lanes :
 - 1) Lab Assistant
 - 2) Inventory Manager
 - 3) Super Admin



The Full BPMN Diagram

Pools and Lanes of BPMN

- **Dues Status Pool:** This pool deals with the process of not only checking out the dues of a student from the lab but also, in a case of losing or damaging any inventory goods, it keeps a track of the amount of money for compensation. For each due pointed by the lab assistant, the lab assistant is allowed to notify a student with the due in every 14 days until clearance. Having no dues is a successful state of this pool which opens a pathway to the clearance grant for a student. The pool has 2 lanes :
 - 1) Student
 - 2) Lab Assistant
 - **Clearance Grant Pool:** This pool handles the process of granting clearance to the student. If dues are found, it connects to the dues status pool. Only the superadmin can provide a clearance grant.



Equipment Collection Pool

Properties and Connectivities

The Equipment Collection pool connects to the Inventory and Stock Maintenance pool. When a product is asked for in the requisition pool, the inventory manager has to check the existence of the stock which is handled by the stock maintenance pool.

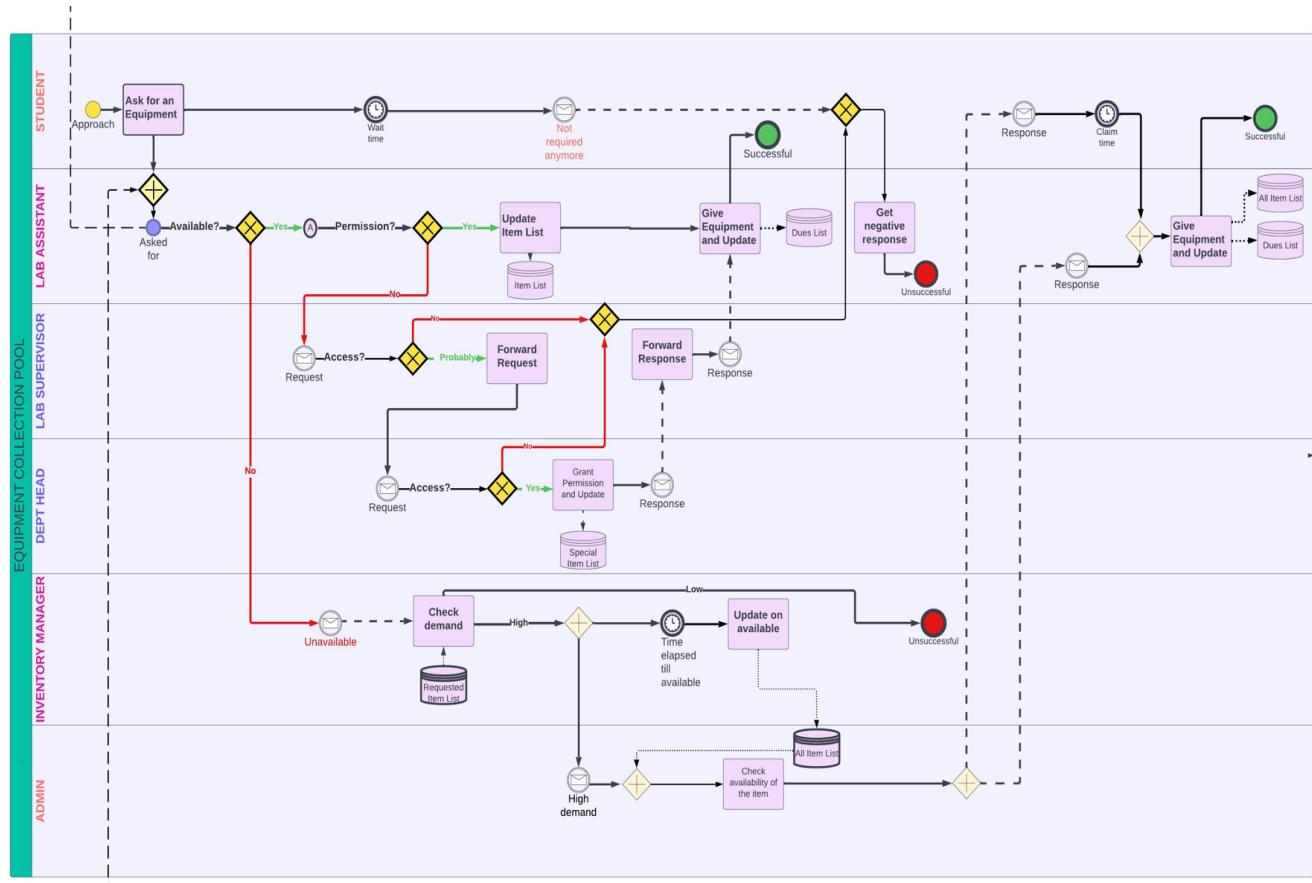


Figure 3.2: The Equipment Collection Pool



Inventory and Stock Maintenance Pool

Properties and Connectivities

The Inventory and Stock Maintenance pool responds to the pool of Equipment Collection. This pool is supposed to represent a frequently running process, as maintenance is spontaneous .

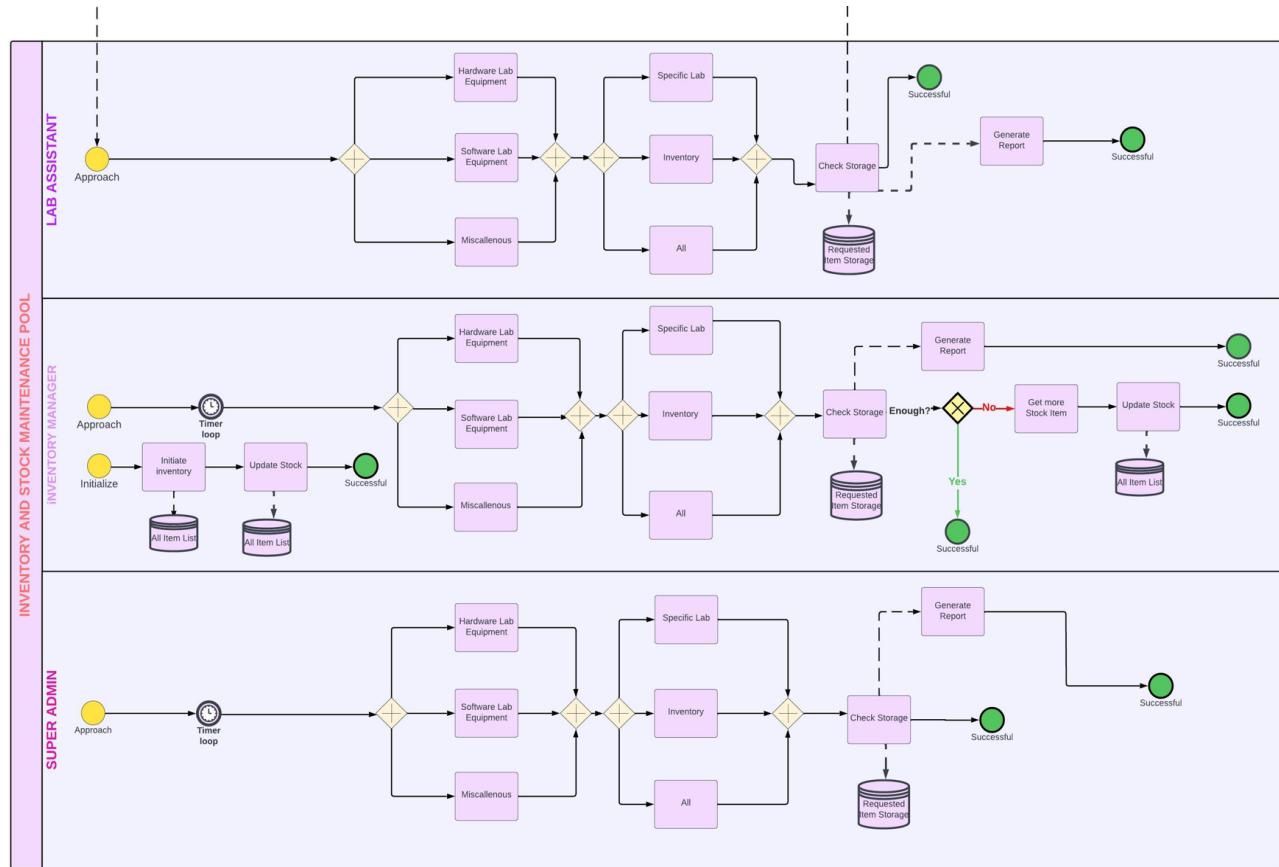


Figure 3.3: The Inventory and Stock Maintenance Pool



Dues Status Pool and Clearance Pool

Properties and Connectivities

This pool maintains a relation among student, lab assistant and the superadmin , where the student can check dues and communicate with lab assistant for clearing dues, or lost and damaged stuff. And the lab assistant communicates with superadmin for the clearance of any student. Moreover, the lab assistant, at a regular interval of 14 days, can notify students of their pending equipments to return.

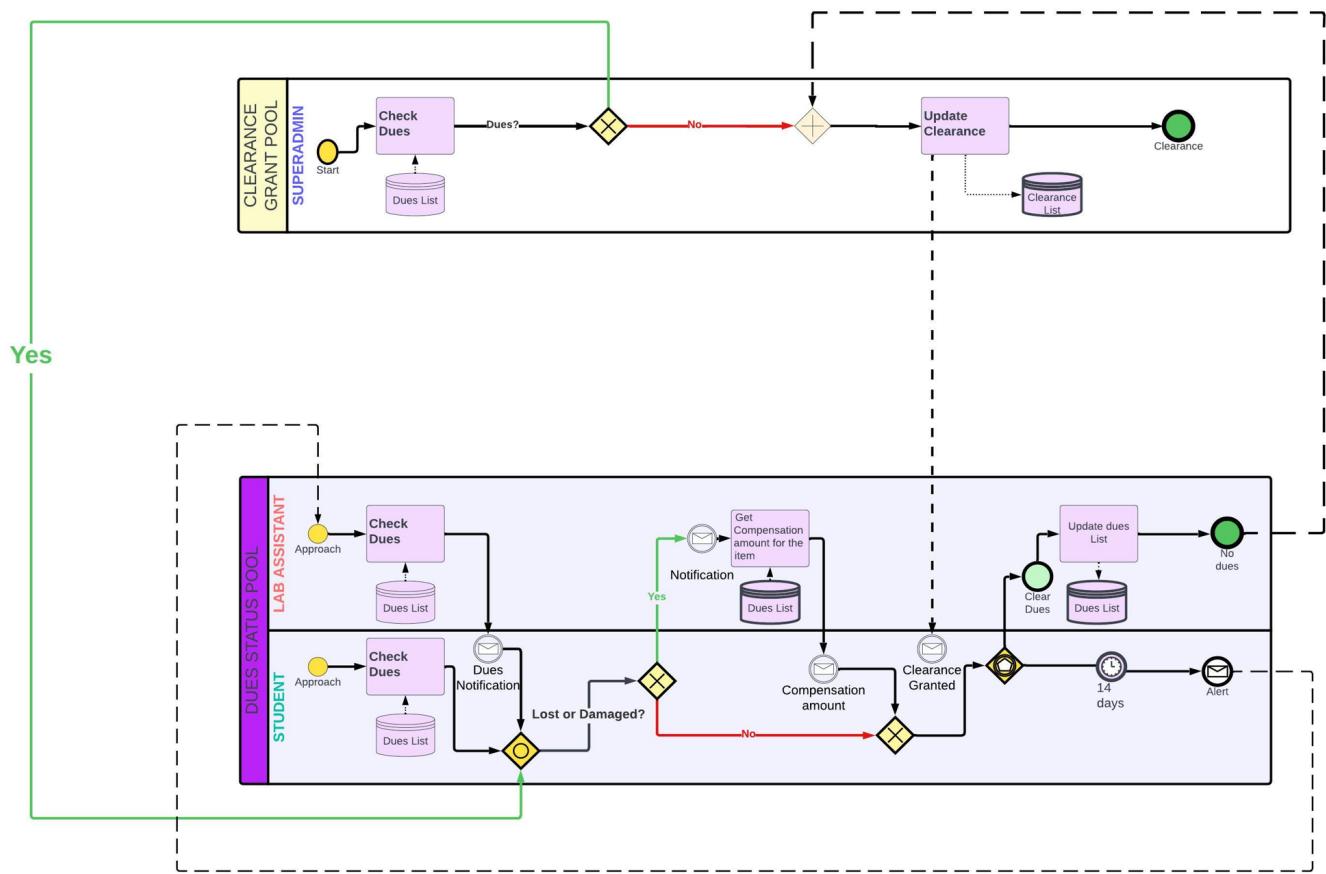


Figure 3.4: The Dues Status Pool and Clearance Grant Pool



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The Register Page

The diagram illustrates the 'End-to-end Solution' with five interconnected components:

- Inventory**: Represented by a blue circle with a shelf icon.
- Requests**: Represented by a blue circle with a clipboard icon.
- Notification & Alert**: Represented by a blue circle with a bell icon.
- Communication**: Represented by a blue circle with two people icons.
- Integration**: Represented by a blue circle with a network icon.

Arrows indicate a clockwise flow between these components, centered around a large circular arrow labeled 'End-to-end Solution'.

CSE LAB INVENTORY MANAGEMENT SYSTEM

Logging as

Student

Email: demo@gmail.com

Password: *****

Confirm Password: *****

Register

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Figure 4.1: Registration Page



The Login Page

The diagram shows a central circle labeled "End-to-end Solution" connected to five surrounding nodes:

- Inventory**: Represented by a blue icon of a storage unit.
- Requests**: Represented by a blue icon of a clipboard.
- Integration**: Represented by a blue icon of a network connection.
- Communication**: Represented by a blue icon of two people talking.
- Notification & Alert**: Represented by a blue icon of a bell.

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CSE LAB INVENTORY MANAGEMENT SYSTEM

Logging as

Student

Email: demo@gmail.com

Password: *****

Remember me Forgot password [Forgot password](#)

[Log in](#)

[Register as new student](#)

Figure 4.2: Login Page



The Student Home Page

Options

[Add Request](#)[View Dues](#)[Monetary Dues](#)[Get clearance](#)

Popular in the Website

search

Arduino UNO
Micro-controller : ATmega328.
Operating

[Details](#)

Atmega
The low-power, high-performance
Microchip 8-bit AVR®

[Details](#)

Breadboard
A construction base used to build semi-permanent prototypes of electronic circuits

[Details](#)

LED
A light-emitting diode (LED) is a semiconductor device that emits light when an electric current flows through it.

[Details](#)

Figure 4.3: Home Page from students' end



The Product Page

Arduino UNO

Status : Available now

Stock : 10 Borrowed : 2

Demand 70%

- 2 +

Request

Features

- Micro-controller : ATmega328.
- Operating Voltage : 5V.
- Input Voltage (recommended) : 7-12V.
- Digital I/O Pins : 14 (of which 6 provide PWM output).
- Analog Input Pins : 6

Download Usage

The economic Arduino Uno R3 incorporates the core components of its original variant while addressing the needs of educational institutions, hobbyists, and professionals. This variant offers an accessible entry point for those interested in learning about microcontroller technology without compromising on quality or reliability. While maintaining the core specifications and compatibility of the Arduino Uno R3, the economic version presents a streamlined design that maximizes cost efficiencies without sacrificing essential capabilities. It features a robust microcontroller unit, reliable power management, and a range of digital and analog input/output pins. These provisions allow users to interface with an extensive array of sensors, actuators, and communication modules, making it an ideal choice for a diverse range of projects. The economic Arduino Uno R3 is fully compatible with the Arduino software environment, which provides an intuitive and user-friendly programming interface. This enables users, regardless of their expertise level, to easily write and upload code to the microcontroller board, empowering them to bring their ideas to life.

[CHECK OUT THE HIGHER QUALITY VARIANT OF ARDUINO UNO R3](#)

Figure 4.4: Product Page



The Dues Page from Students' end

Figure 4.5 shows the 'Monetary Dues' section of the student interface. On the left, a sidebar lists 'Options' with buttons for 'Add Request', 'View Dues', 'Monetary Dues', and 'Get Clearance'. The main area displays a table of dues:

Item	Amount	Fine
LED	15	50/=
Ic 7404	5	50/=
	Total	100/=

Below the table, it says 'Choose payment method' with icons for bKash, BanglaPay, and Sonali Bank Limited.

Figure 4.6 shows the 'Dues' section of the student interface. On the left, a sidebar lists 'Options' with buttons for 'Add Request', 'View Dues', 'Monetary Dues', and 'Get Clearance'. The main area has two sections: 'To be returned' (highlighted with a red box) and 'Lost or Damaged'.

Figure 4.5: Monetary Dues

Figure 4.6: View Dues

Figure 4.7 shows the 'To be returned' section of the student interface. On the left, a sidebar lists 'Options' with buttons for 'Add Request', 'View Dues', 'Monetary Dues', and 'Get Clearance'. The main area lists items to be returned:

Arduino uno	Amount 1	Submit in 2days
Breadboard	Amount 10	Submit in 2days
7432 IC	Amount 5	Submit in 2days

Figure 4.8 shows the 'Lost or Damaged' section of the student interface. On the left, a sidebar lists 'Options' with buttons for 'Add Request', 'View Dues', 'Monetary Dues', and 'Get Clearance'. The main area lists items lost or damaged:

Led	Amount 15	Damaged
IC 7404	Amount 5	Lost

Figure 4.7: Goods to be returned

Figure 4.8: Goods lost or damaged



The Students' Clearance Page

The screenshot shows a user interface for a clearance system. On the left, a vertical sidebar titled "Options" contains four buttons: "Add Request", "View Dues", "Monetary Dues", and "Get Clearance". The "Get Clearance" button is highlighted with a light blue background. The main content area has a header "Clearance" and a search bar with a magnifying glass icon. A message in the center states: "Your Application has been submitted for lab clearance you will be notified through a message .". In the top right corner, there is a "Student" profile icon with a number "8" and a checkmark icon.

Figure 4.9: Page for getting clearance



The View Request Page

About this page

The page for viewing requests of any student is only for lab assistant, inventory manager and the authorized faculty. Those who have direct access to inventory stuff can handle requests only.

The screenshot shows a user interface for managing inventory requests. On the left, a sidebar titled "Options" contains buttons for "View my lab", "View inventory", "View Requests" (which is highlighted in light blue), and "Add request". The main area is titled "Requests" and shows "Lab Assistant" status with a search bar and filter icons. Three requests are listed:

- Arduino UNO**: Amount 1, Student id 1905103, Stock 10. Actions: Accept, Decline, Forward.
- Atmega**: Amount 1, Student id 1905091, Stock 10. Actions: Accept, Decline, Forward.
- LED**: Amount 10, Student id 1905102, Stock 10. Actions: Accept, Decline, Forward.

A "Generate Report" button is located at the bottom right.

Figure 4.10: Request Viewing Page



The Lab Request Page for the end of Lab Assistant

Options

Add requests

search

Lab Assistant

Lab 1

Lab 2

Lab 3

Lab 4

Figure 4.11: Request Page from the end of Lab Assistant



The Item Adding Page

About this page

The page for adding an item is accessible to the Inventory Manager. The inventory manager has a frequent access to checking and updating stock.

The screenshot shows the 'Add Item' page of the Inventory Manager. On the left, there is a sidebar titled 'Options' containing four buttons: 'Check Inventory', 'Add item', 'Add new item', and 'View requests'. The main area is titled 'Add Item' and features a search bar with a magnifying glass icon. Below the search bar are two input fields: 'Name' and 'Amount', each with a corresponding grey input field. To the right of these fields is a blue 'Add' button. The top right corner of the page has the text 'Inventory Manager' and three icons: a user profile, a gear, and a checkmark.

Figure 4.12: Item Adding Page



The New Item Adding Page

About this page

The page for adding a new item is also accessible to the Inventory Manager. This page helps inventory manager to bring new stock. In fact, this page is necessary while initiating the inventory.

The screenshot shows the 'Add New Item' page of an inventory management system. On the left, there is a sidebar titled 'Options' containing four buttons: 'Check Inventory', 'Add item', 'Add new item', and 'View requests'. The main area is titled 'Add New Item' and includes a search bar with a magnifying glass icon. To the right of the search bar are three icons: a user profile, a gear, and a checkmark. The form itself has four input fields labeled 'Name', 'Amount', 'Features', and 'Description', each with a corresponding text input box. A blue 'Add' button is located at the bottom right of the form area.

Figure 4.13: Item Adding Page



The Inventory Checking Page from the end of SuperAdmin

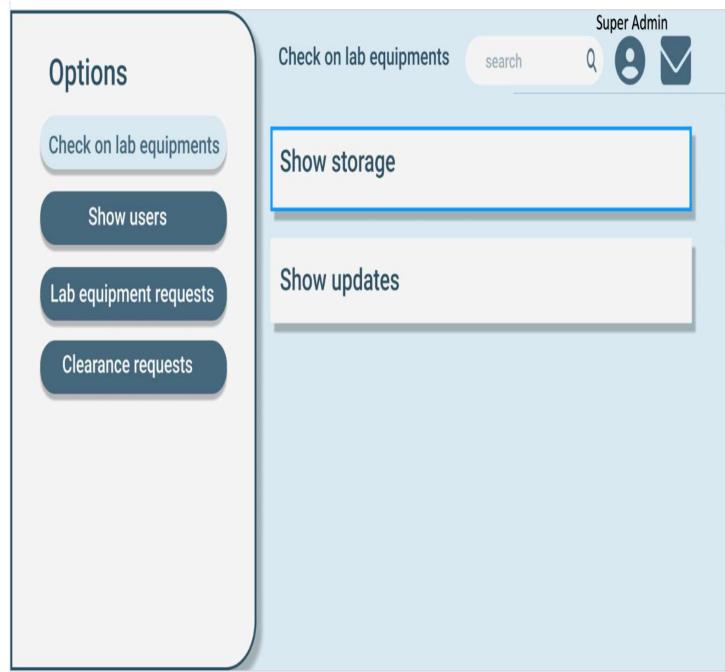


Figure 4.14: Inventory Checking Page



Figure 4.15: View Stock Storage

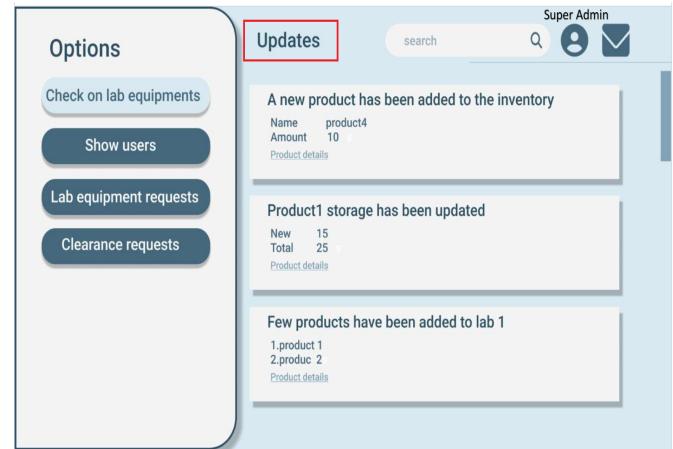


Figure 4.16: View Stock Updates



The User viewing Page

The screenshot shows a user management interface. On the left, there is a sidebar titled "Options" containing four buttons: "Check Inventory", "Show users", "Lab equipment requests", and "Clearance requests". The main area is titled "Users" and shows a list of five users: "Student 1", "Student 2", "Lab assistant 1", "Inventory manager", and "Teacher 1". Each user entry includes a profile icon and a mail icon. At the top right, there is a "Super Admin" title, a search bar, and user management icons.

User	Action
Student 1	✉️
Student 2	✉️
Lab assistant 1	✉️
Inventory manager	✉️
Teacher 1	✉️

Figure 4.17: Page for showing Userlist



The Clearance Approval Page

The screenshot shows a web-based application interface for managing clearance requests. On the left, a vertical sidebar titled "Options" contains four buttons: "Check Inventory", "Show users", "Lab equipment requests", and "Clearance requests". The "Clearance requests" button is highlighted with a light blue background. The main content area has a header "Requests" and a "Super Admin" status indicator with icons for search, user profile, and email. Below the header, a section titled "Students whom requested for clearance report" displays a table of student IDs and their level-term. The table data is as follows:

ID	Level-Term
1905091	3-2
1905099	3-2
1905102	3-2
1905103	3-2
1905104	3-2
1905119	3-2

Figure 4.18: Page for approving clearance



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Entity Relationship Diagram(ERD)

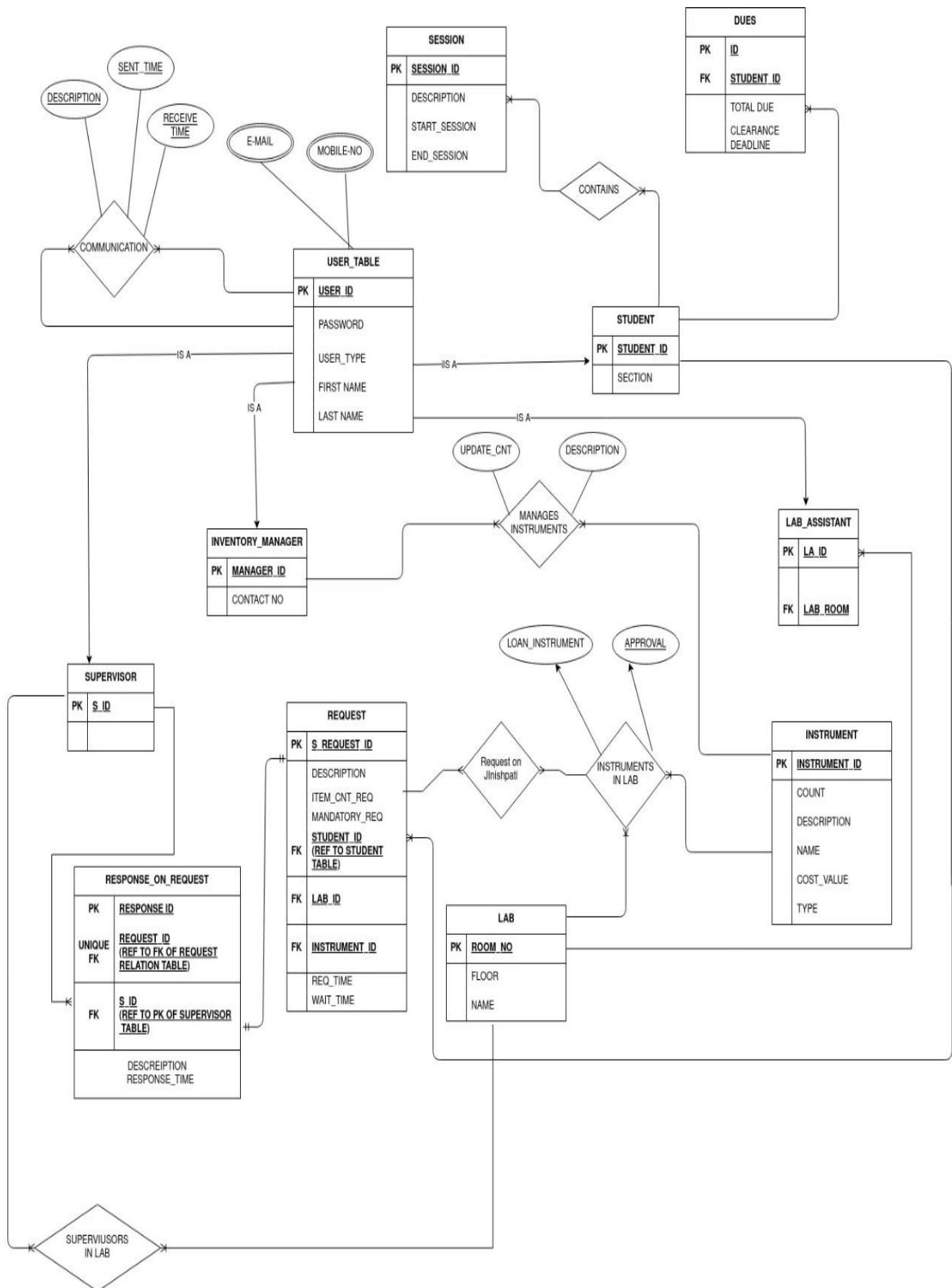


Figure 5.1: Entity Relationship Diagram



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Login Class Diagram

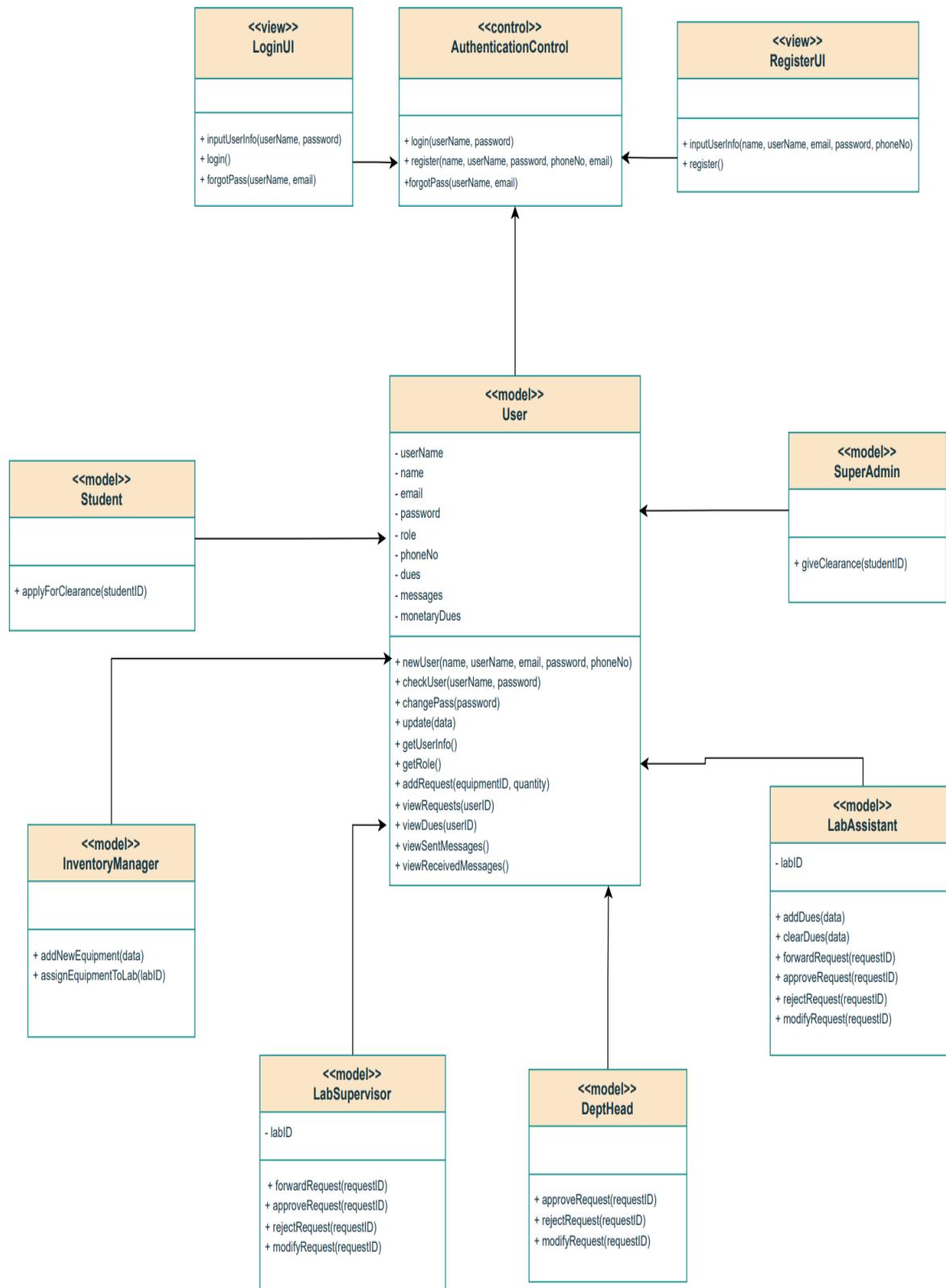


Figure 6.1: Login



Home Page Class Diagram

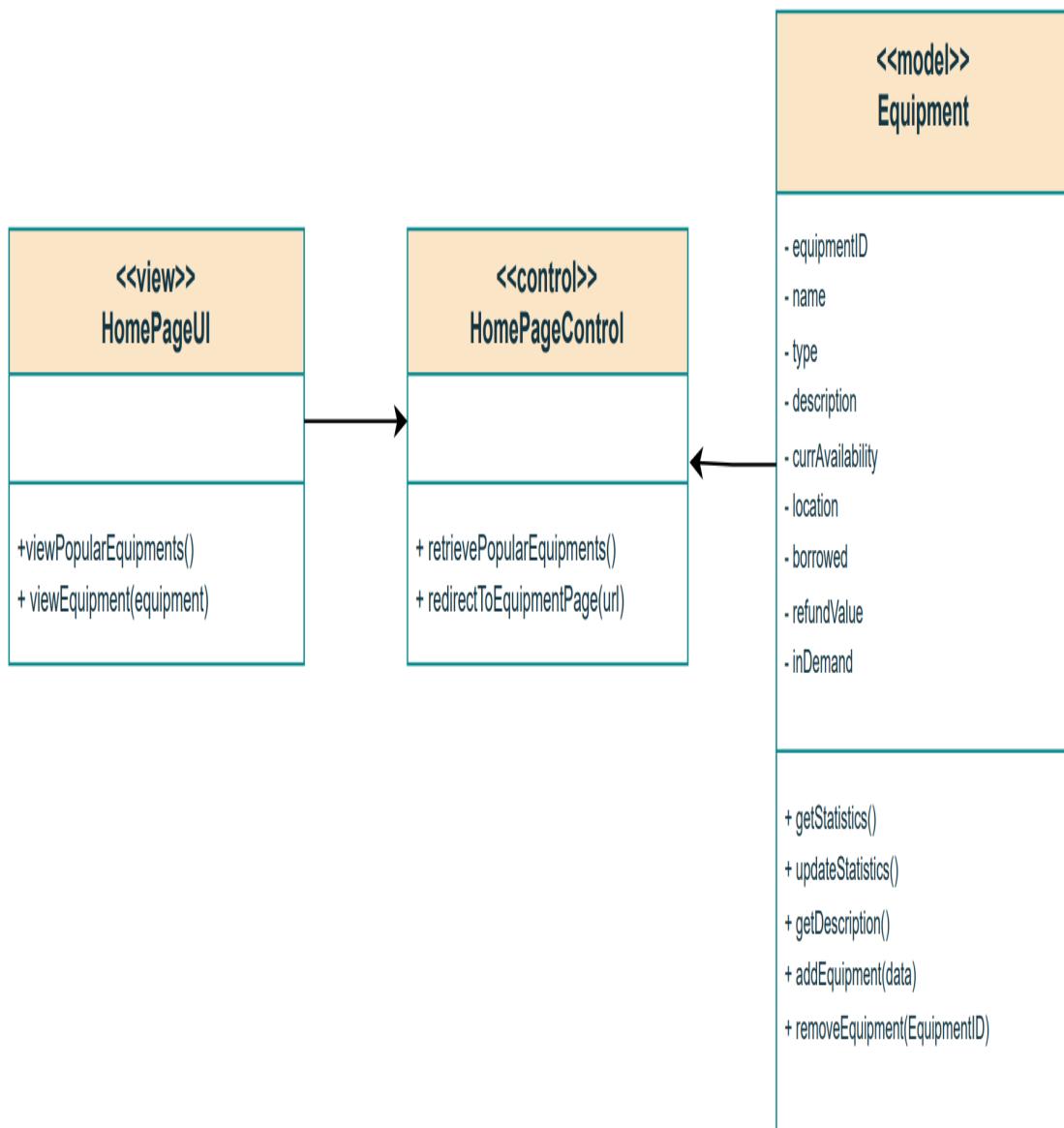


Figure 6.2: Home Page



Search Equipment Class Diagram

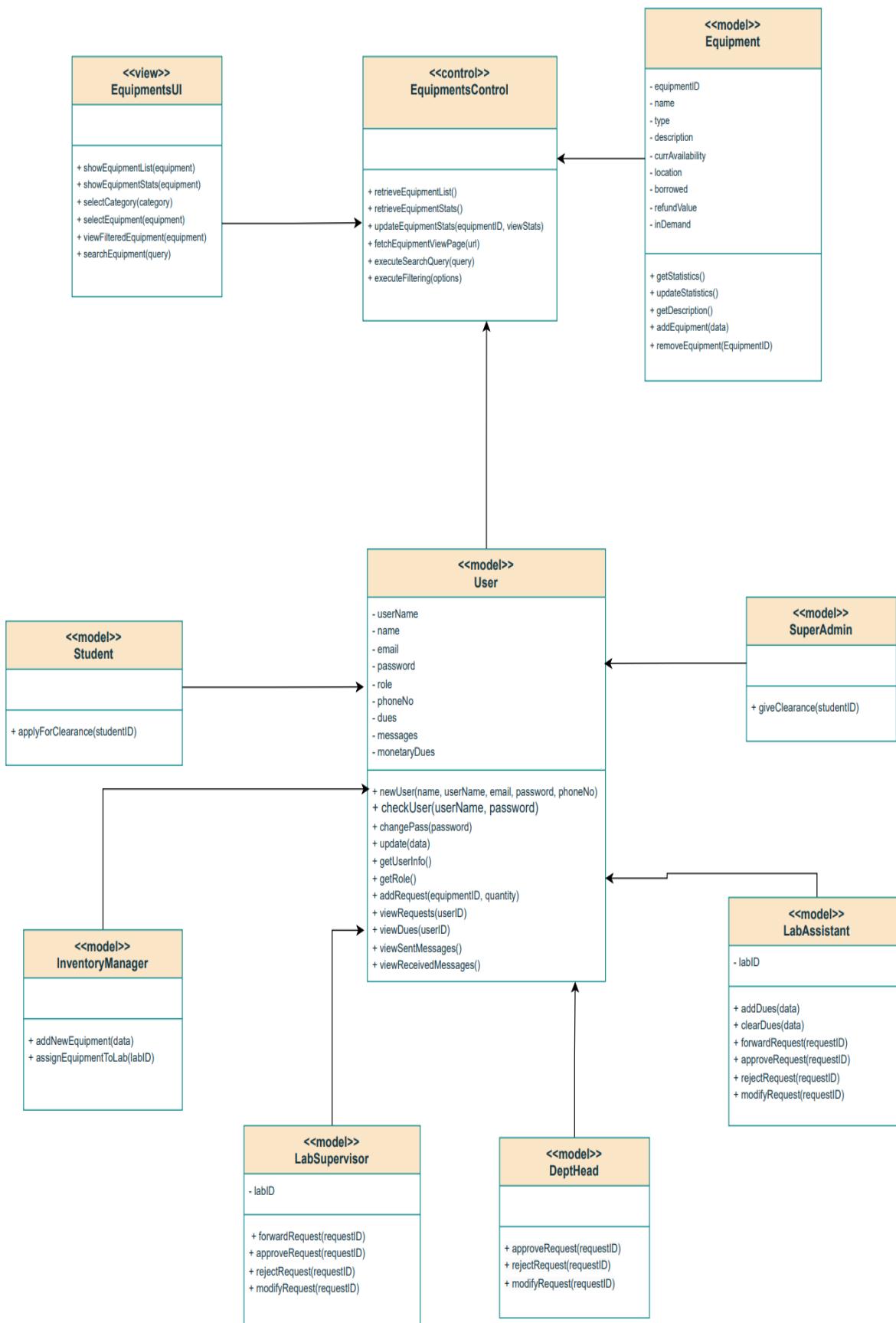
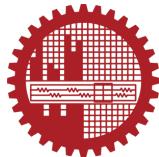


Figure 6.3: Search Equipments



Individual Equipment Class Diagram

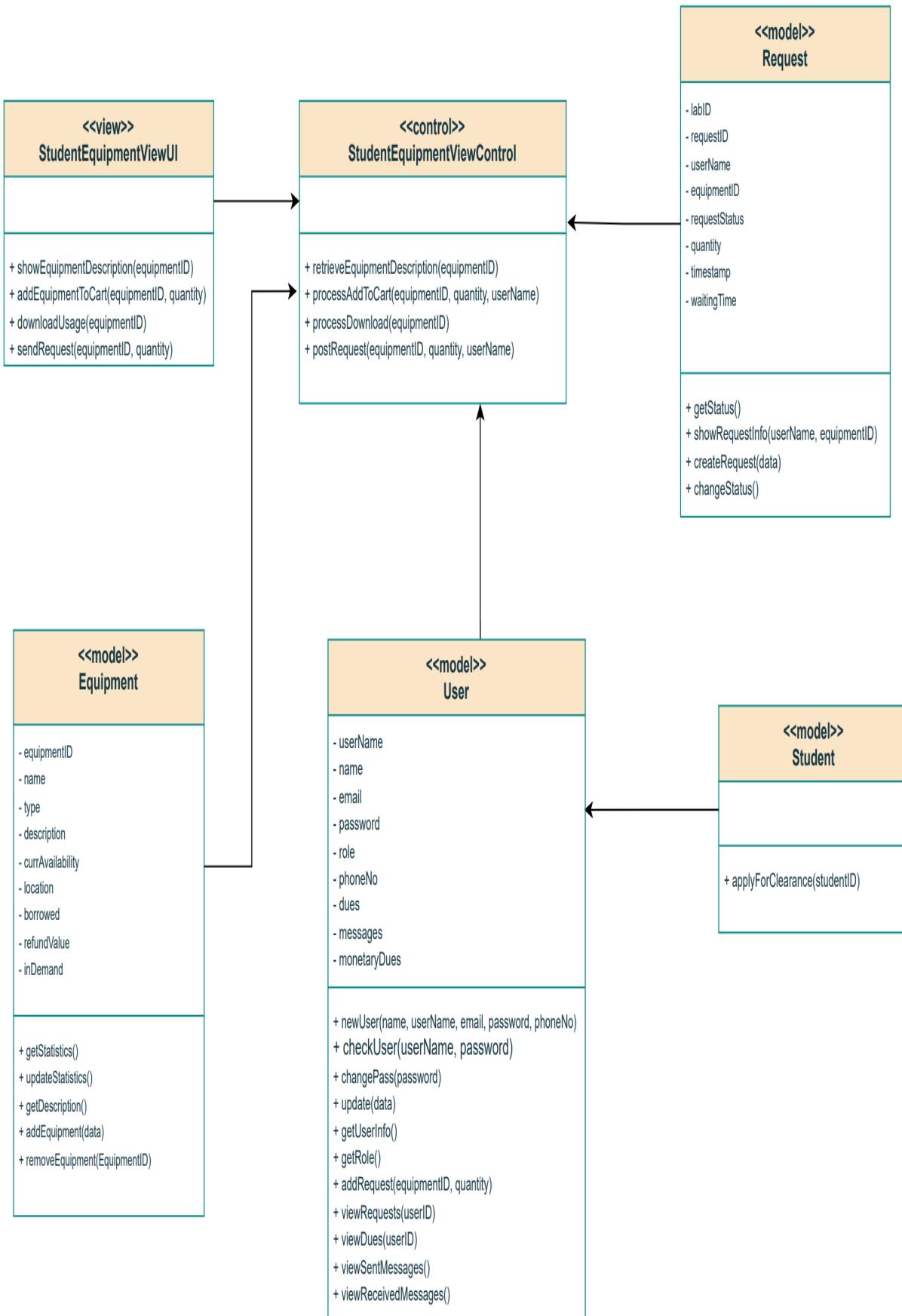


Figure 6.4: Individual Equipments



Add Equipment Class Diagram

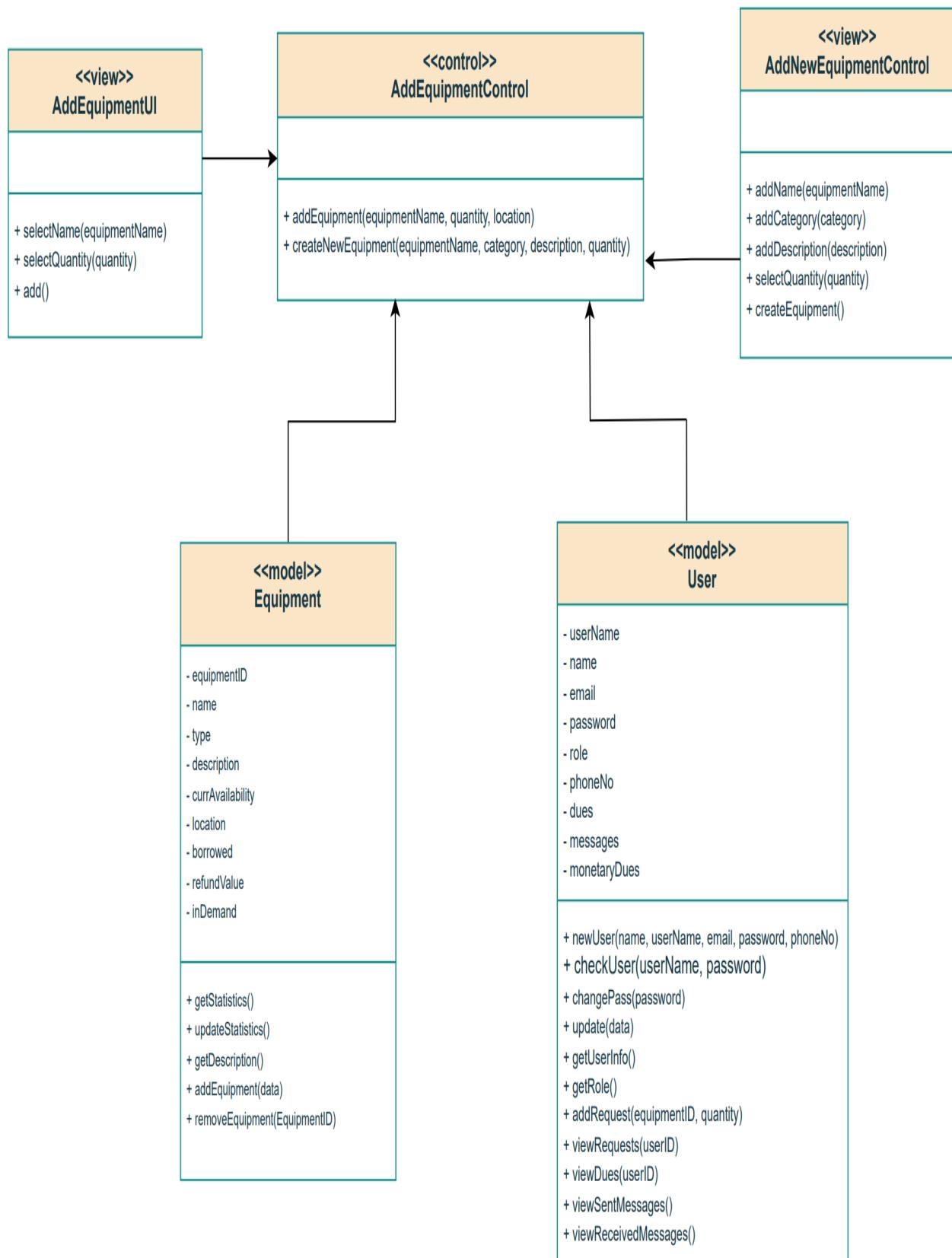


Figure 6.5: Add Equipments



Respond on Request Class Diagram

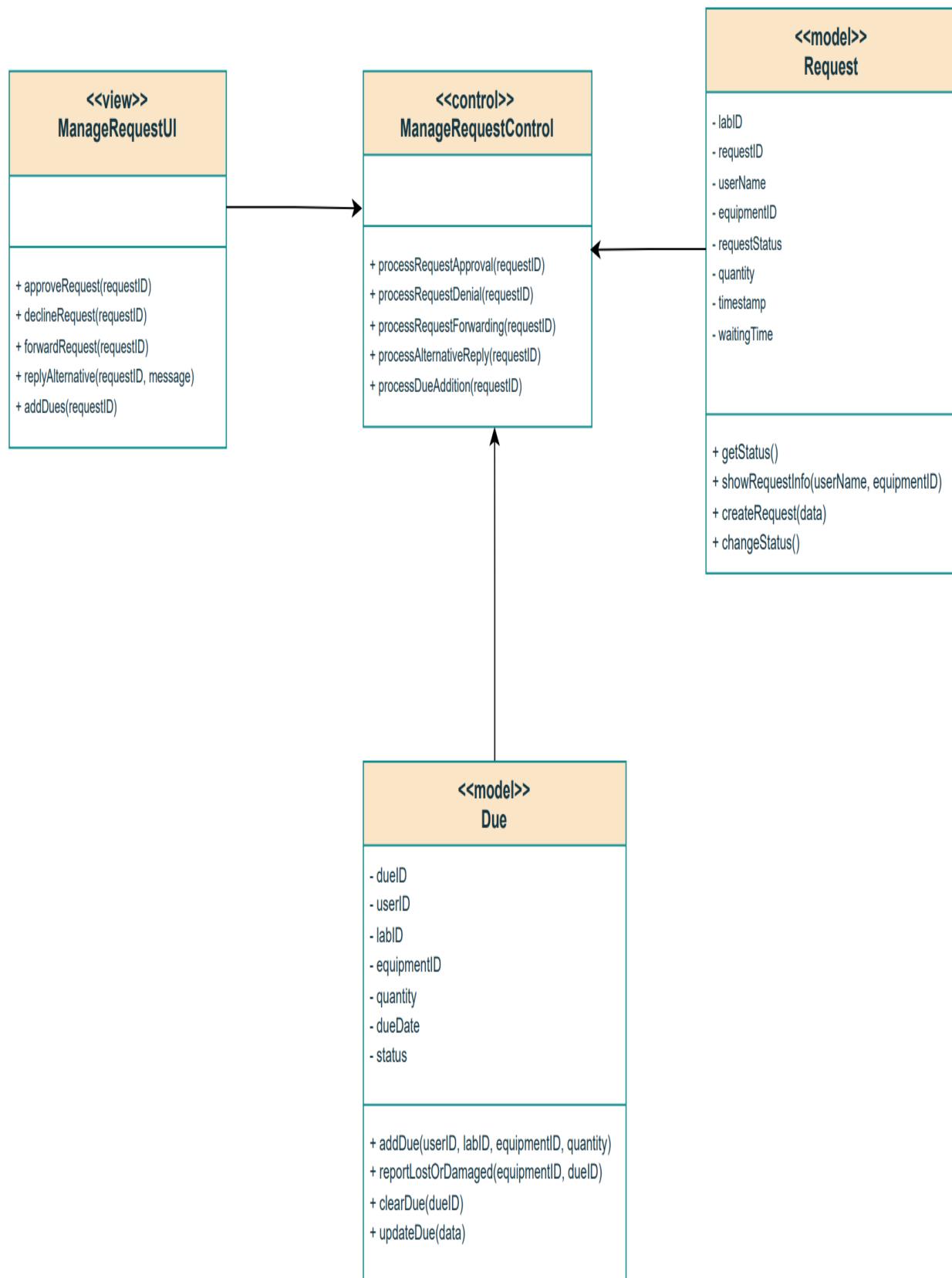


Figure 6.6: Response on Request



Apply Clearance Class Diagram

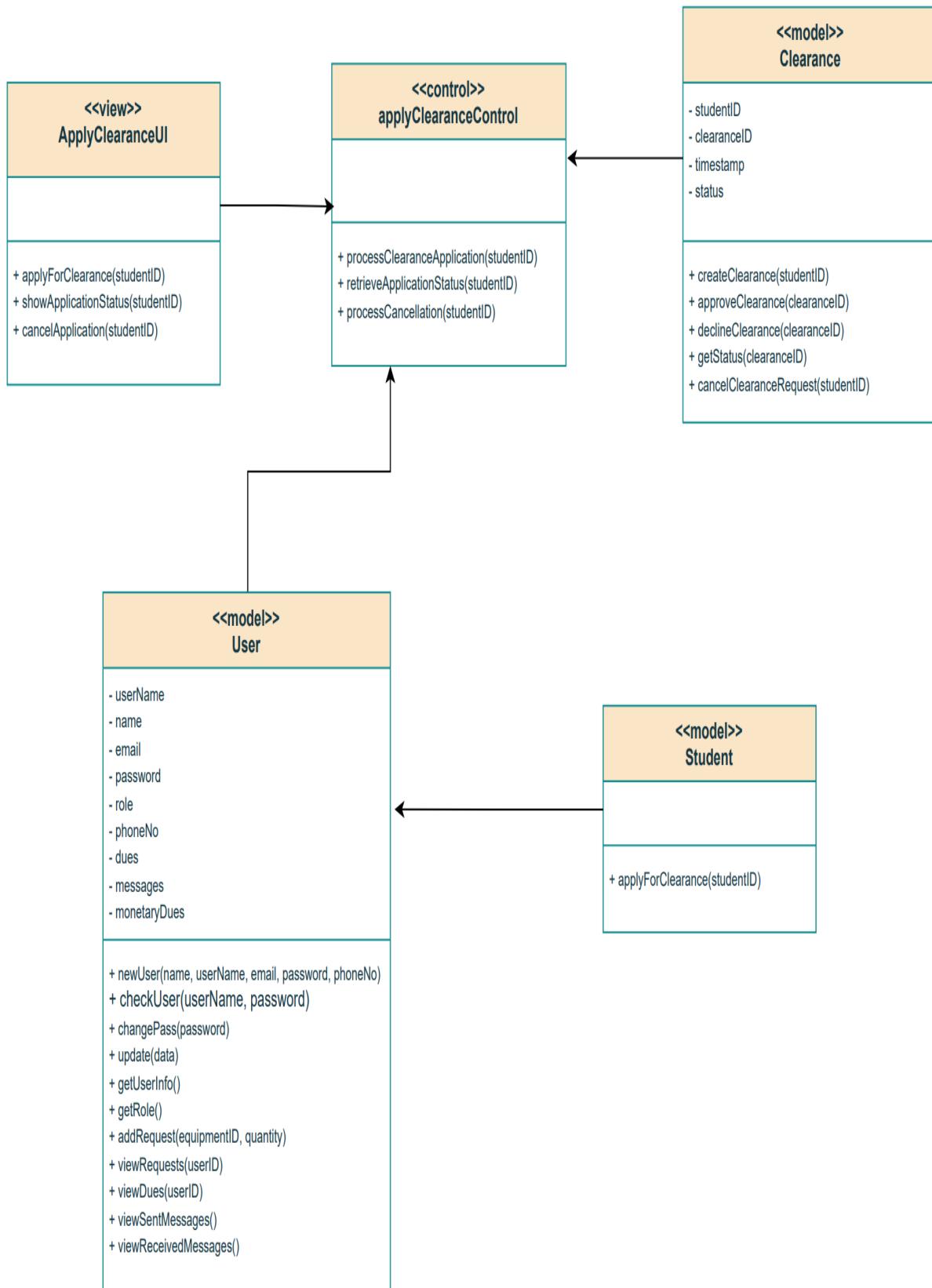
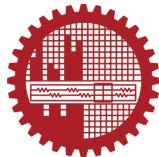


Figure 6.7: Apply Clearance



Respond on Clearance Request Class Diagram

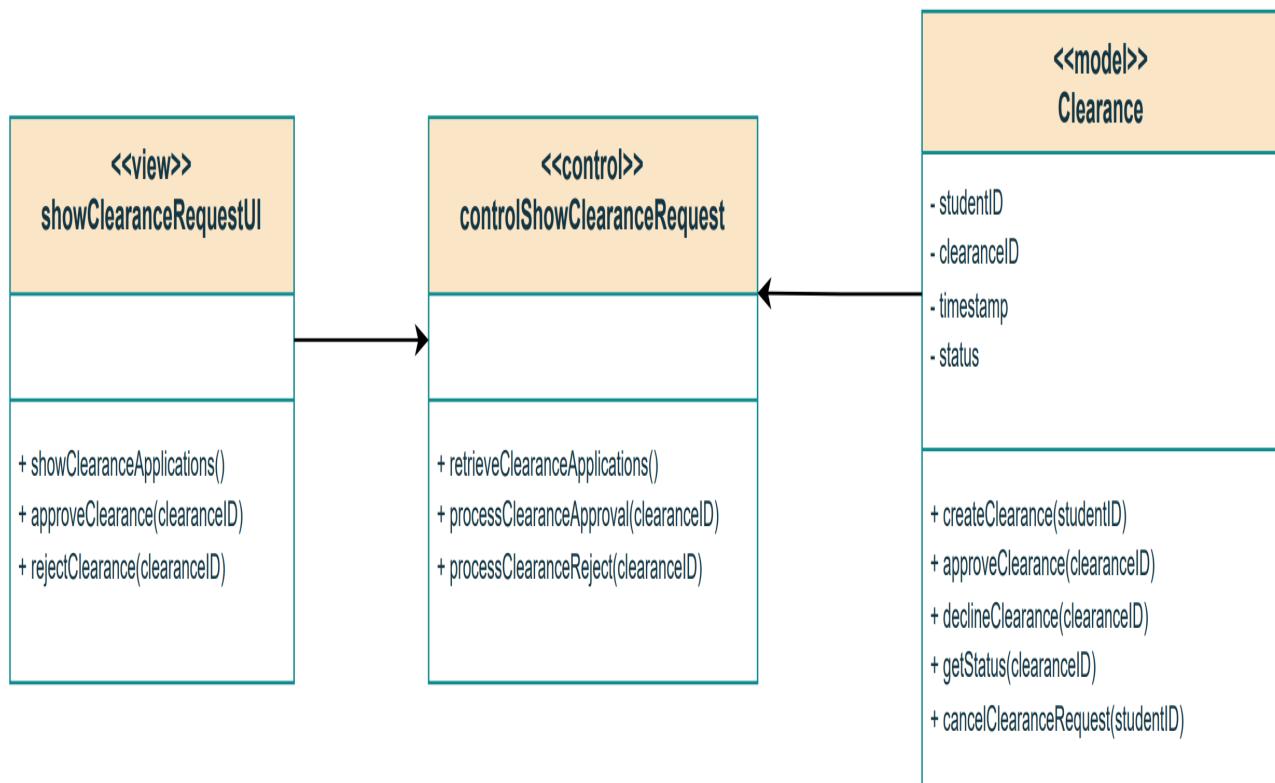


Figure 6.8: Response on Clearance Request



Monetary Dues Class Diagram

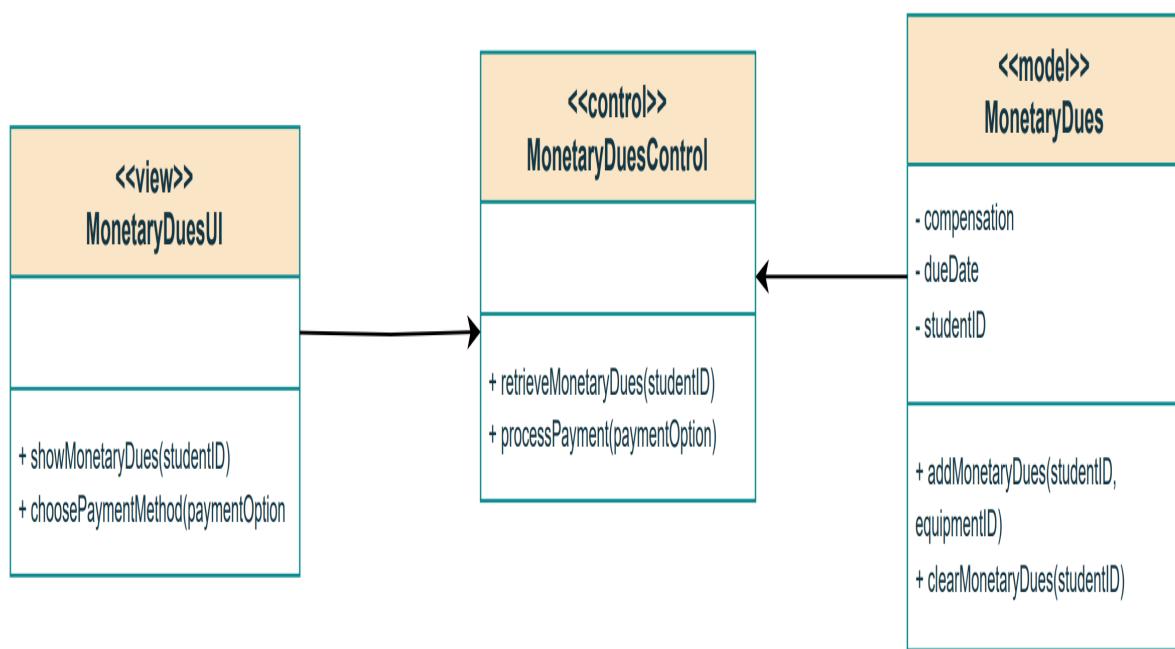


Figure 6.9: Pending Monetary Dues



Messages Class Diagram

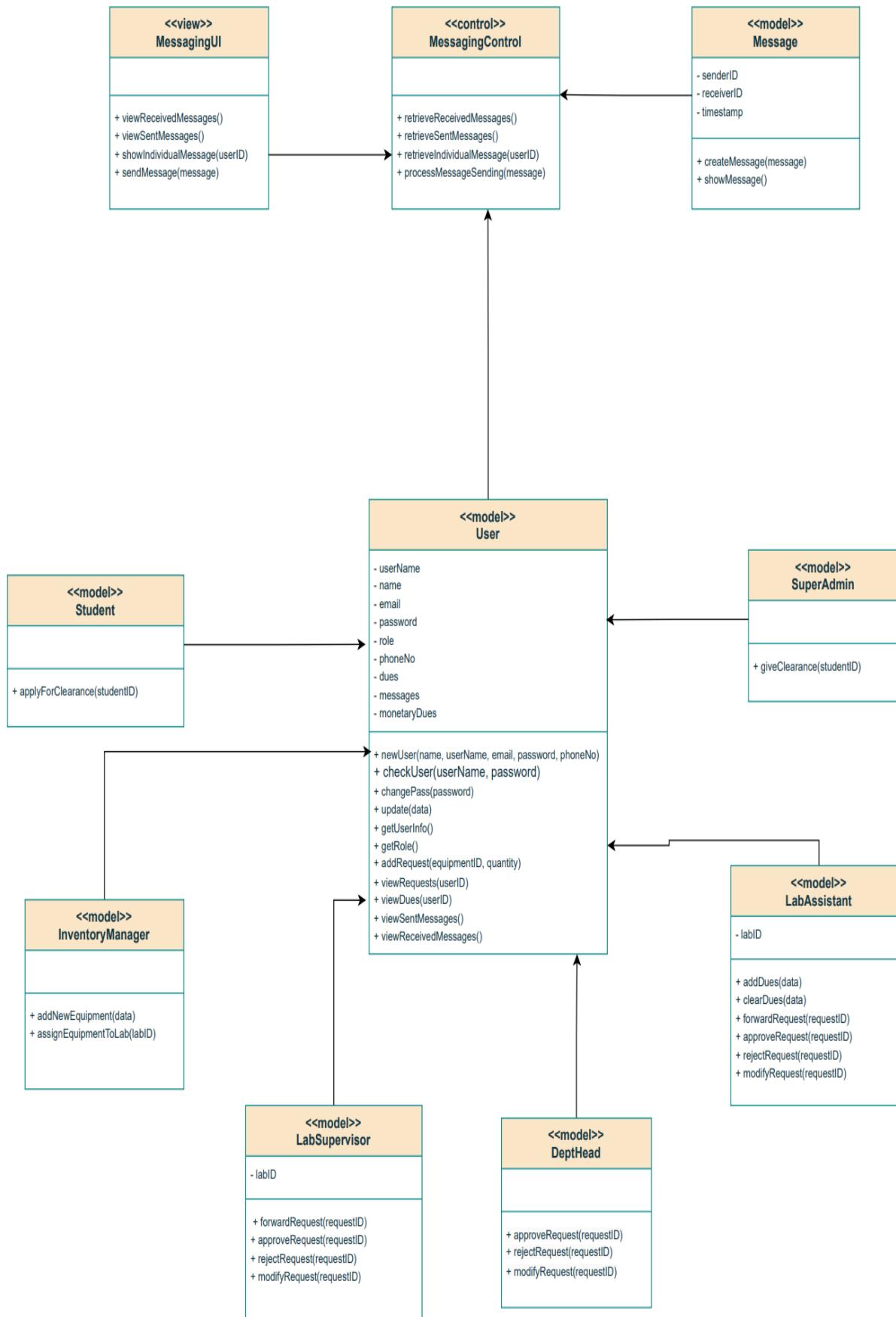
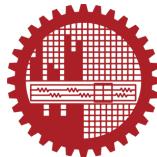


Figure 6.10: Messages



View Dues Class Diagram

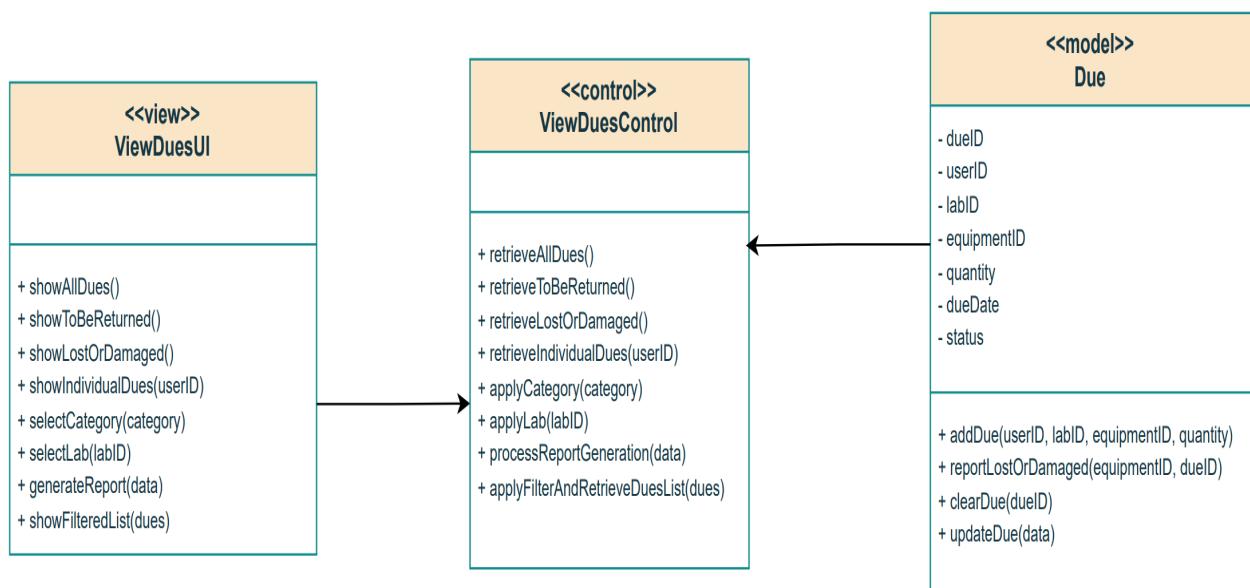


Figure 6.11: View Dues



Check Storage Class Diagram

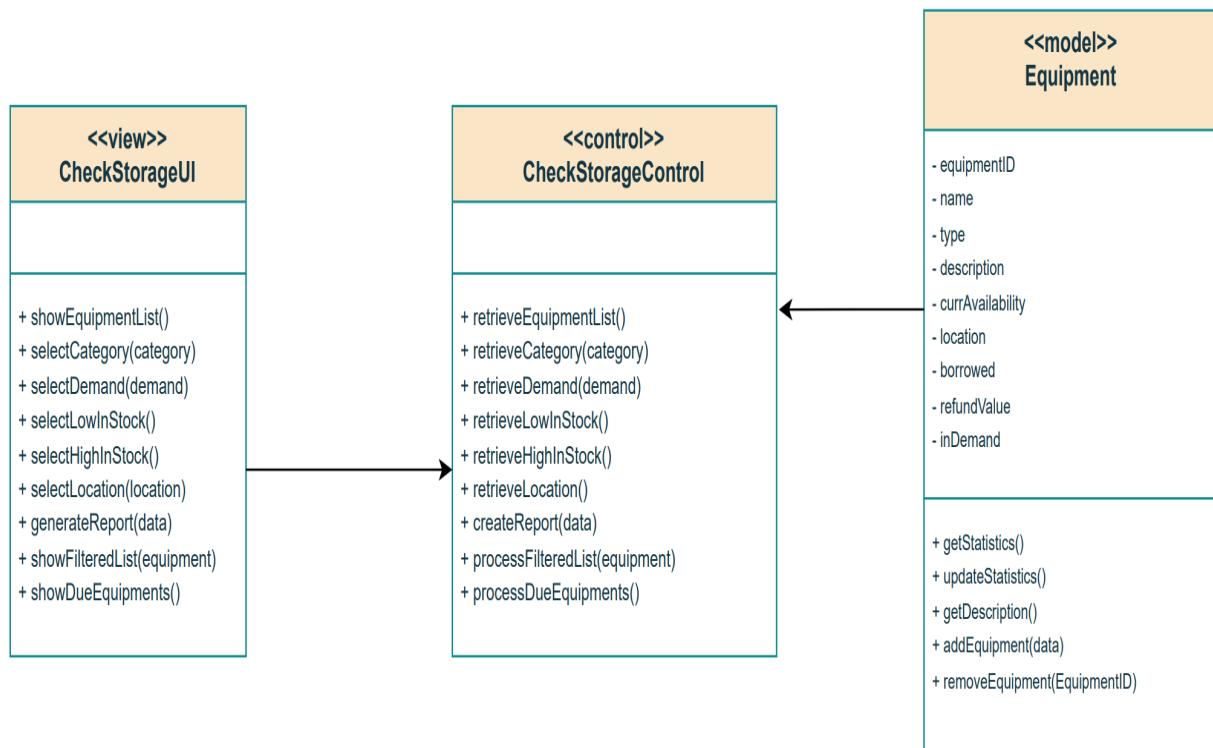
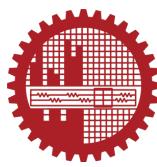


Figure 6.12: Check Storage



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Home Page Collaboration Diagram

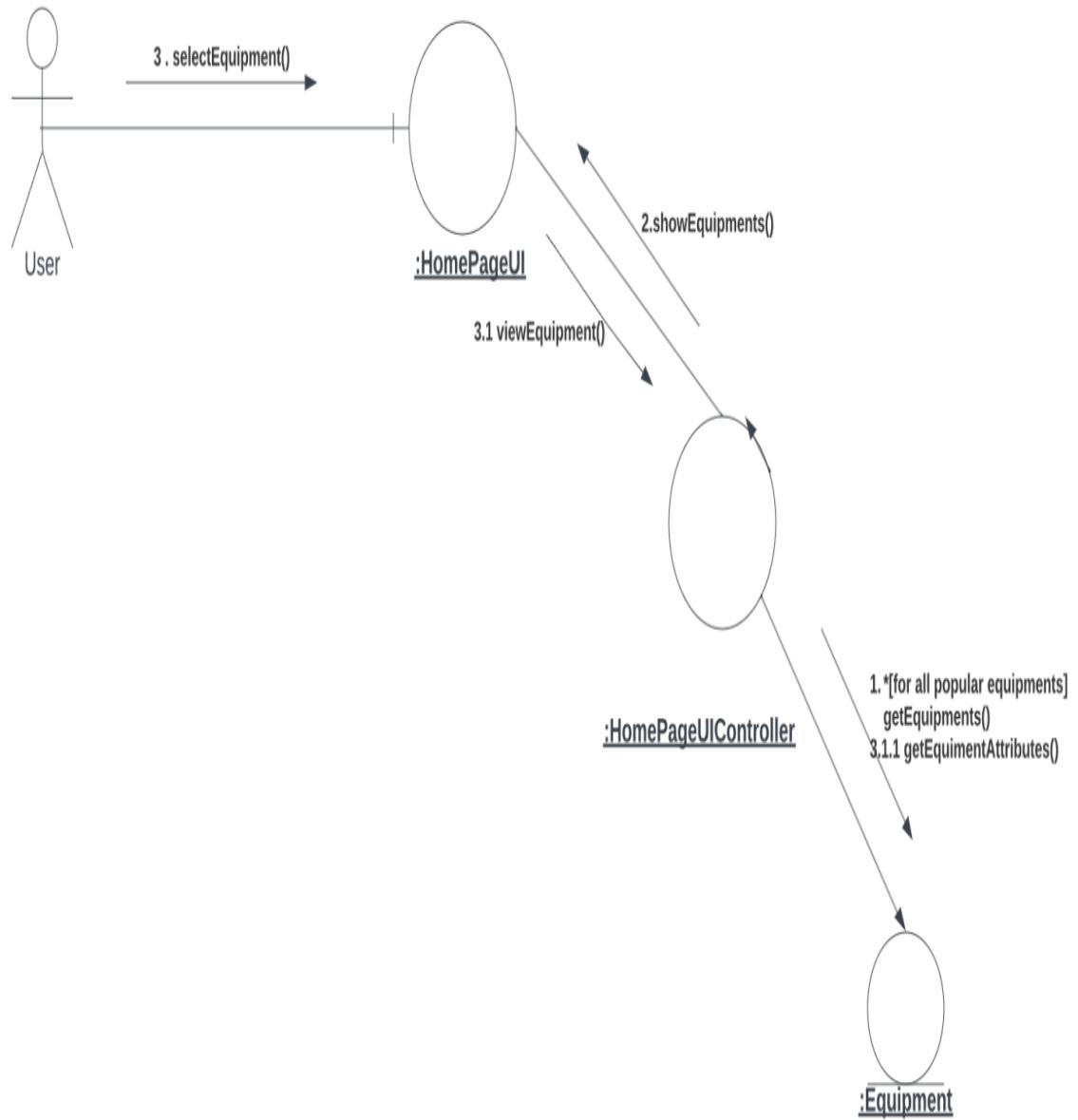


Figure 7.1: Home Page



View Equipments Collaboration Diagram

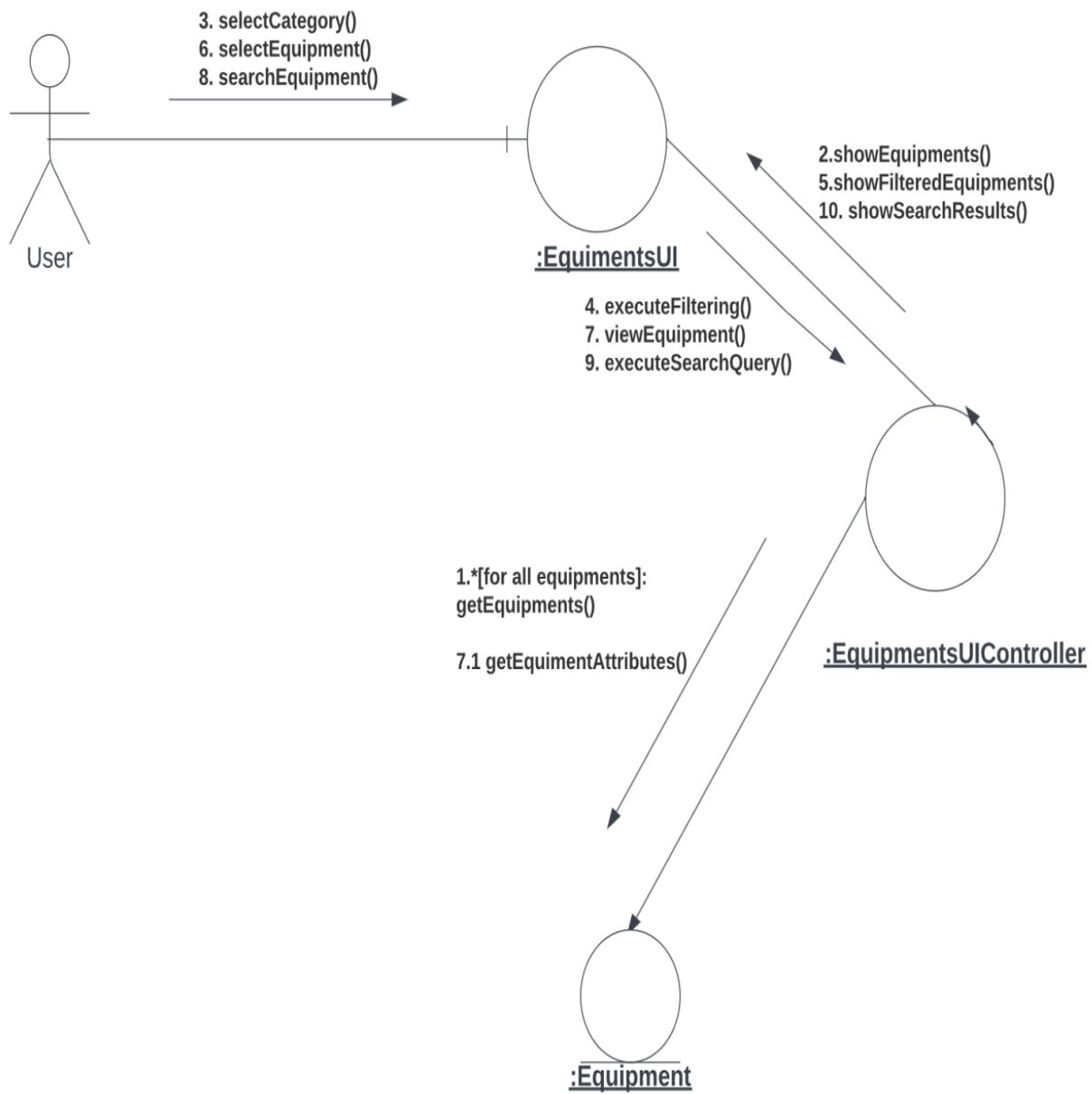


Figure 7.2: View Equipments



Individual Equipments Collaboration Diagram

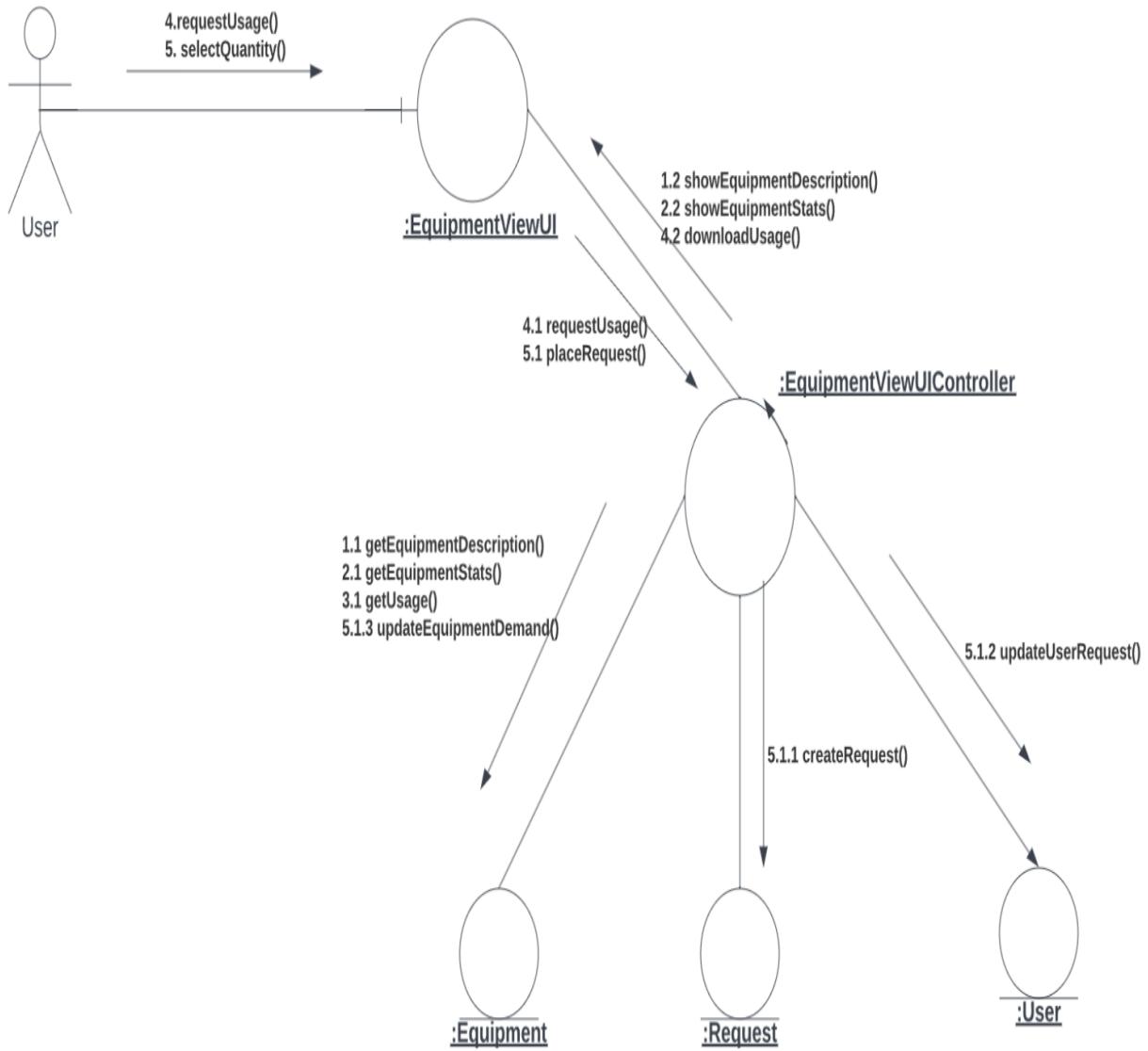


Figure 7.3: Individual Equipments



Add New Equipments Collaboration Diagram

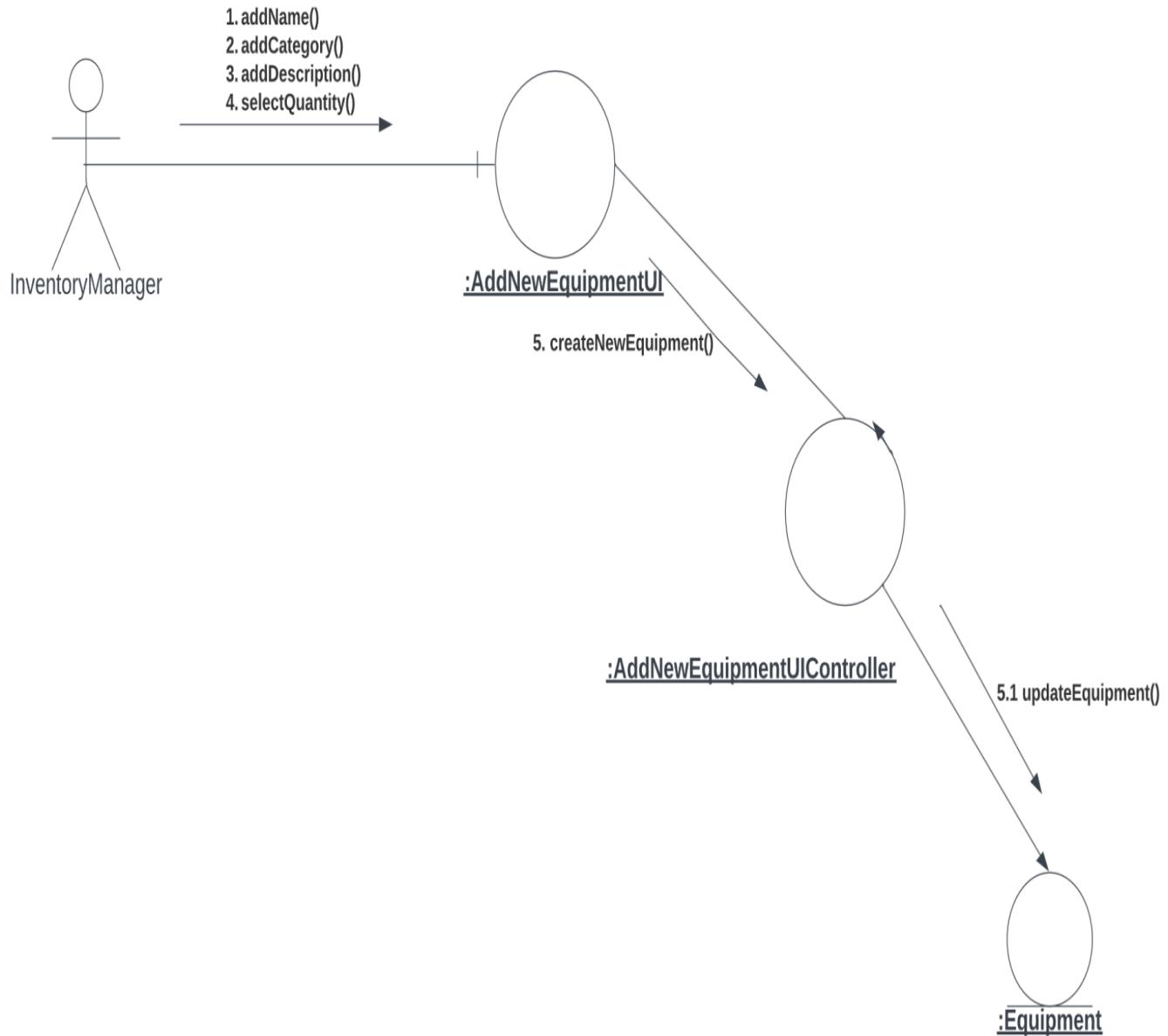


Figure 7.4: Add New Equipments



Add Equipments Collaboration Diagram

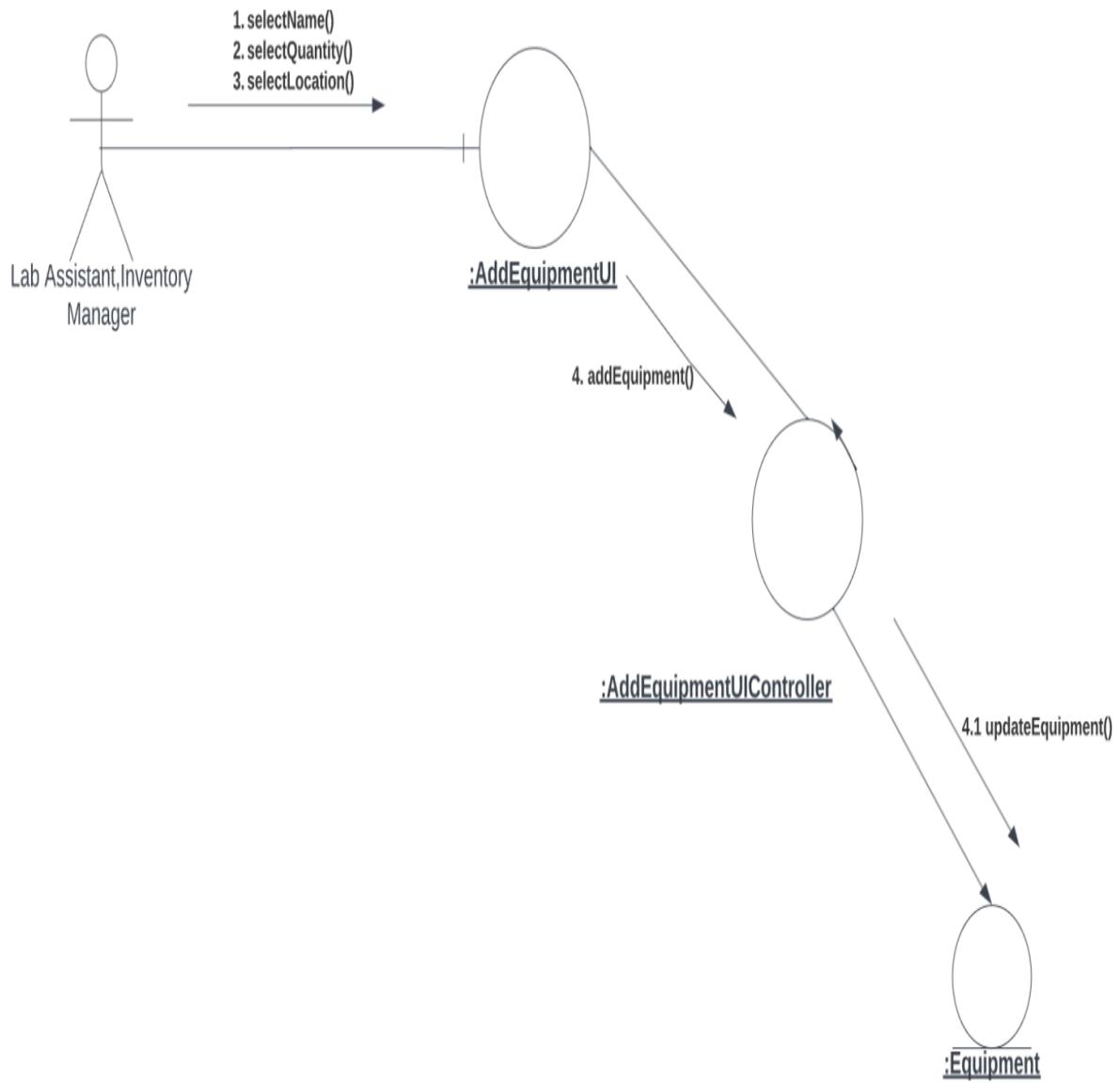


Figure 7.5: Add Equipments



Manage Requests Collaboration Diagram

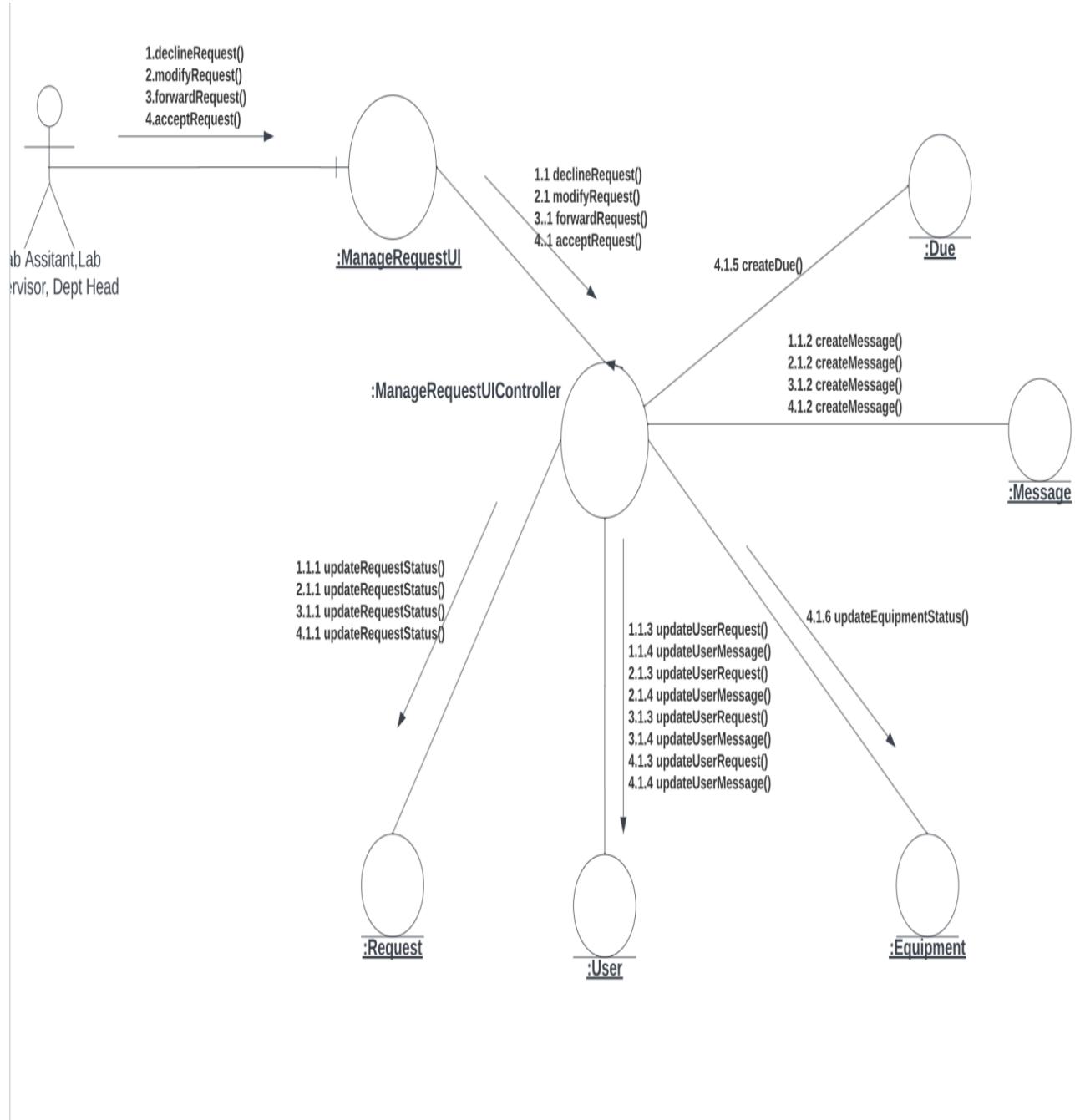


Figure 7.6: Manage Requests



Messages Collaboration Diagram

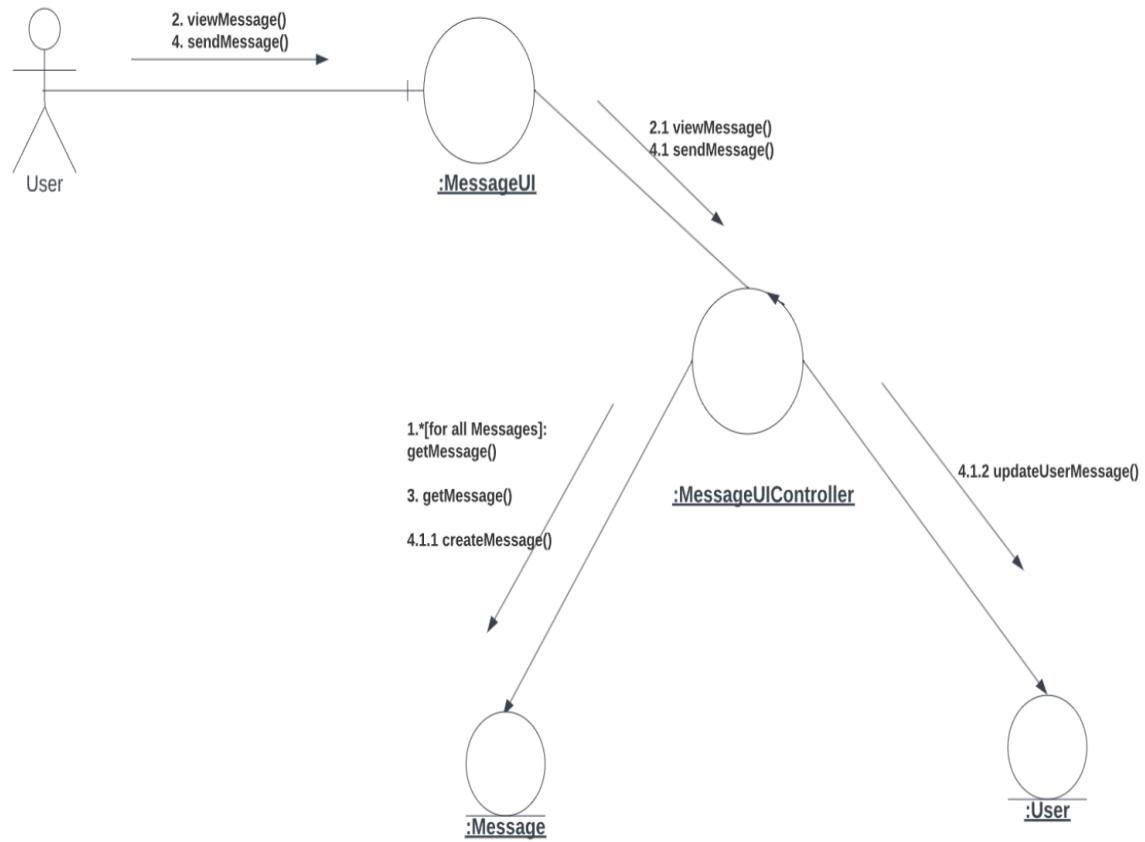


Figure 7.7: Manage Messages



View Dues Collaboration Diagram

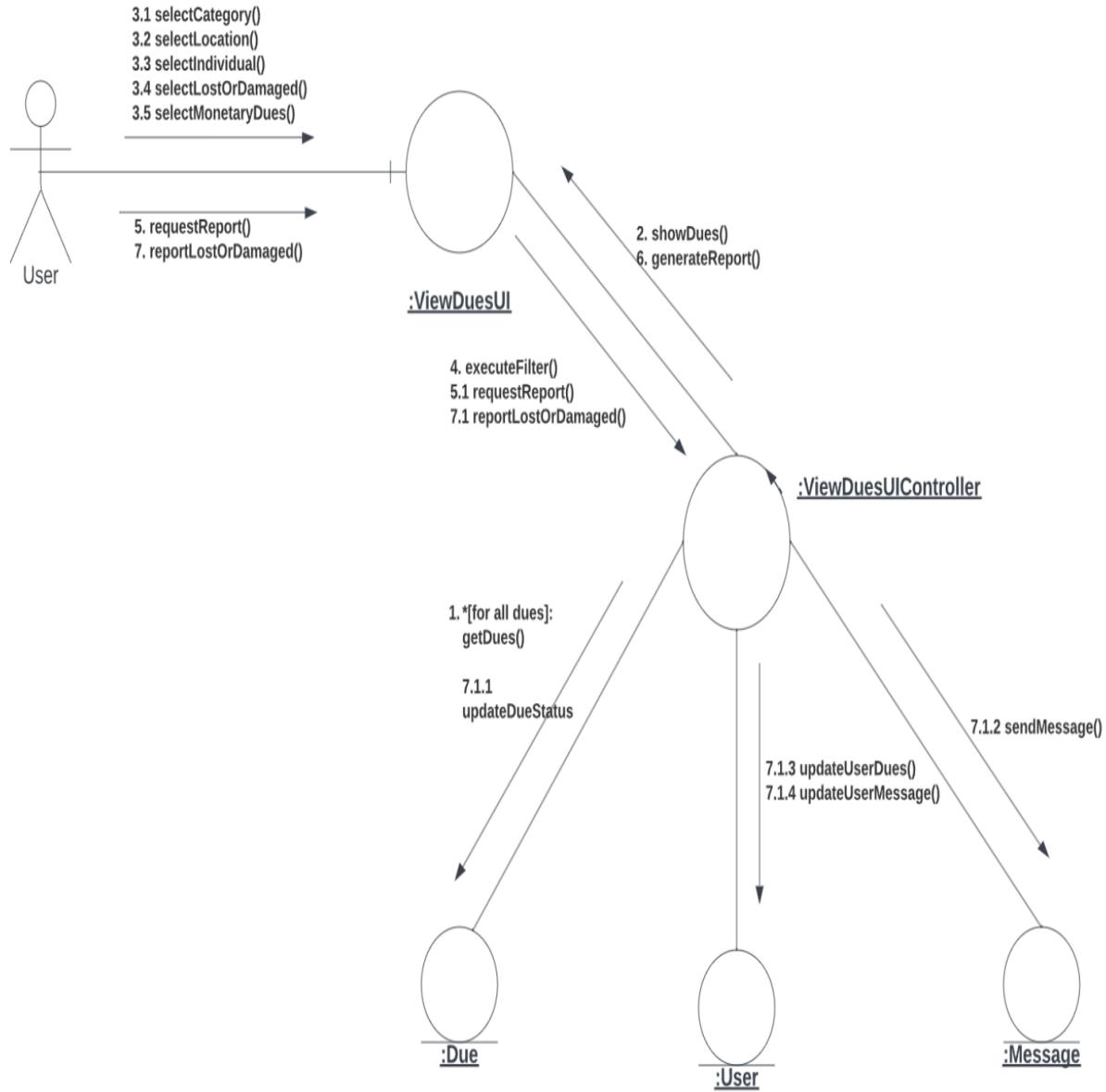


Figure 7.8: View Dues



Check Storage Collaboration Diagram

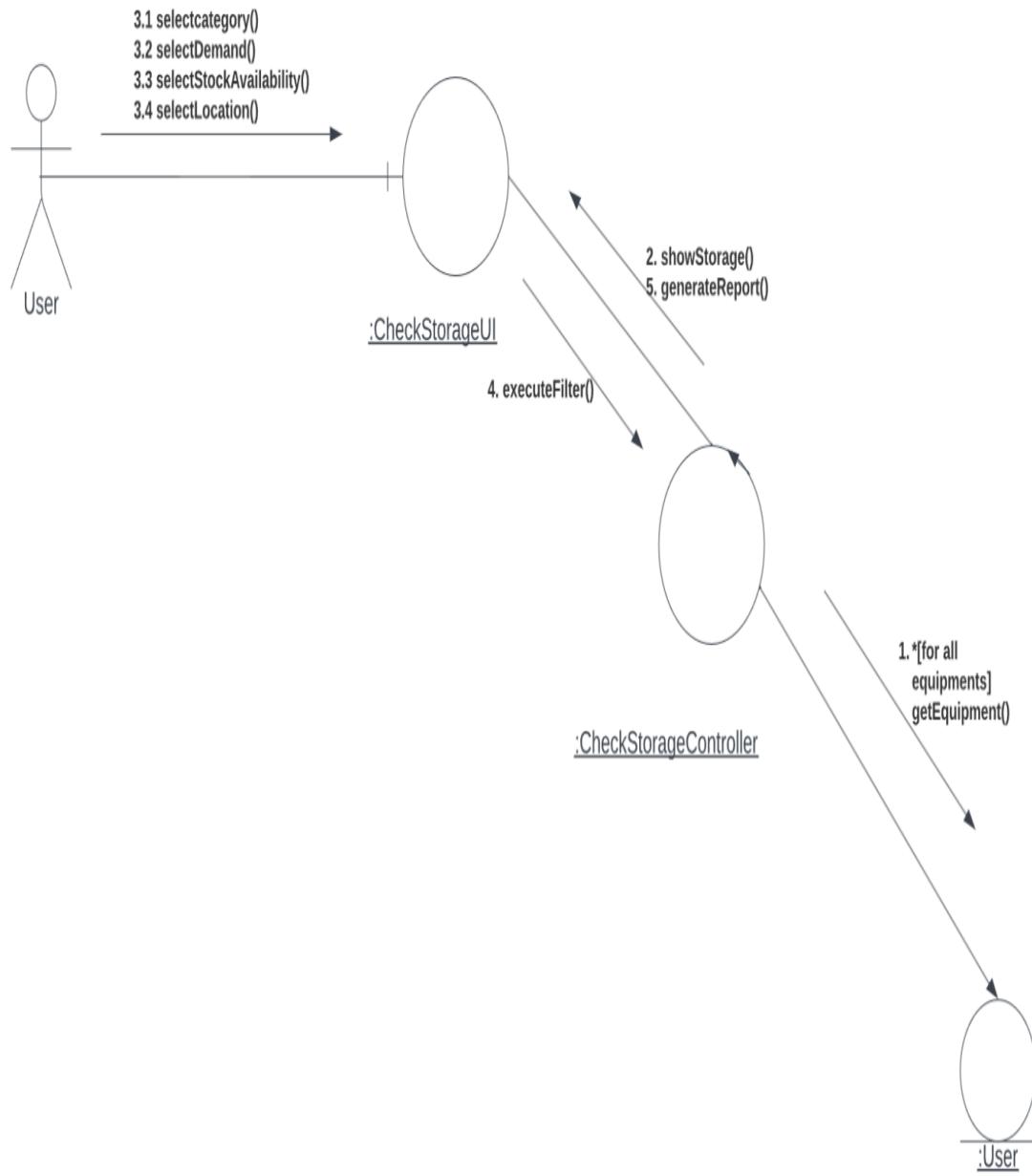


Figure 7.9: Check Storage



Clearance Grant Collaboration Diagram

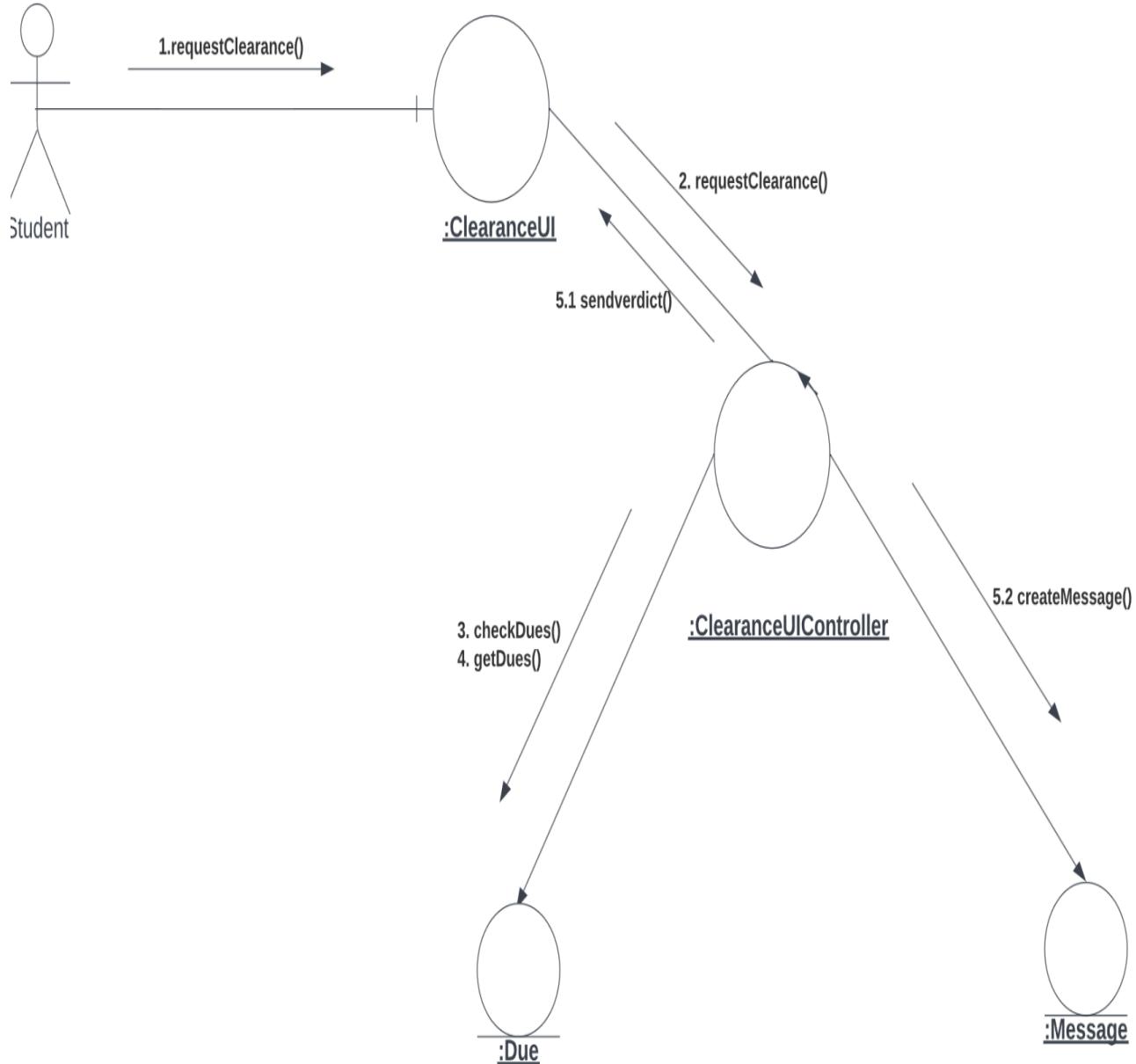


Figure 7.10: Clearance Grant



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Home Page Sequence Diagram

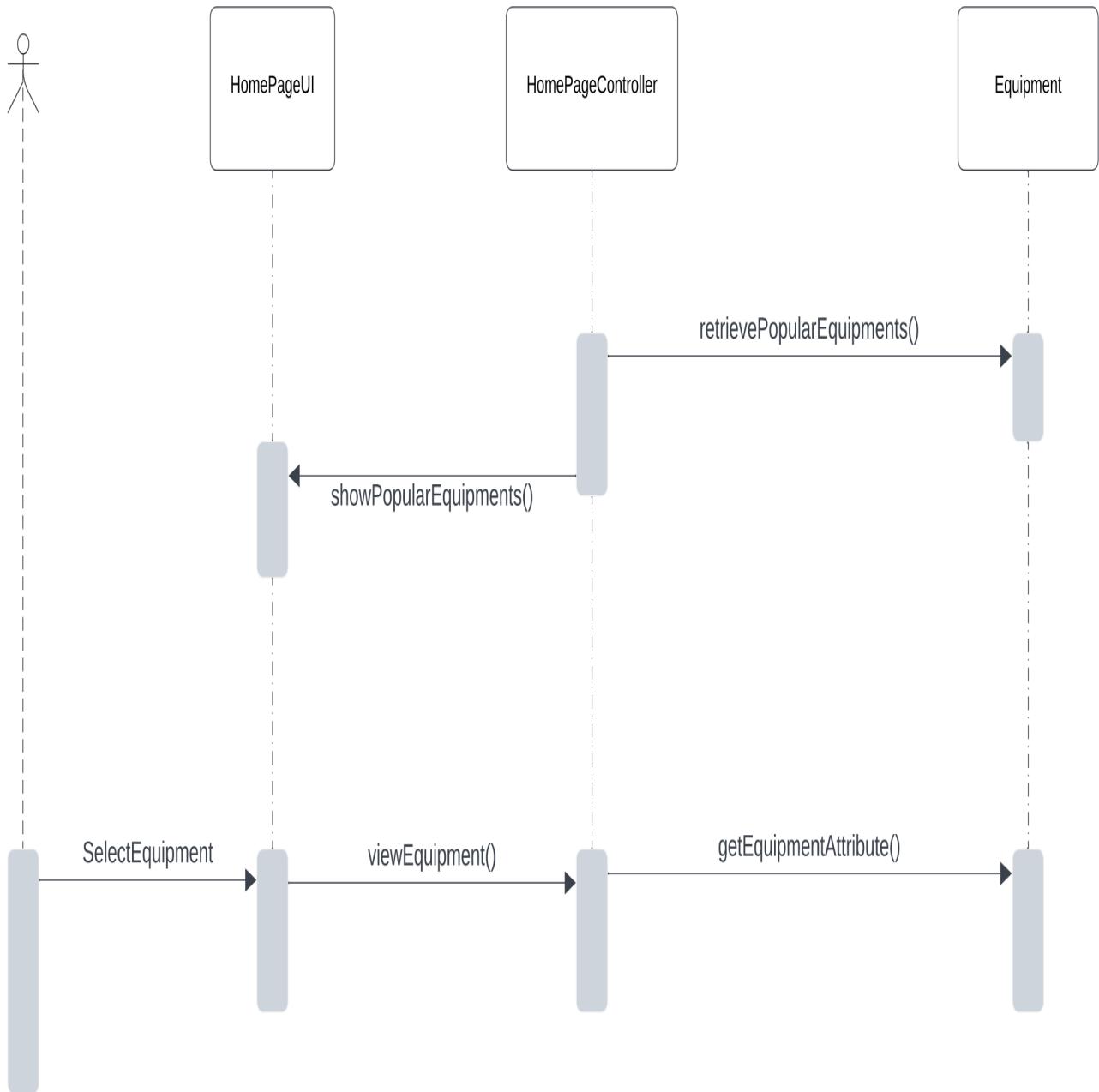


Figure 8.1: Home Page



View Equipment Sequence Diagram



Figure 8.2: View Equipments



Add Equipments Sequence Diagram

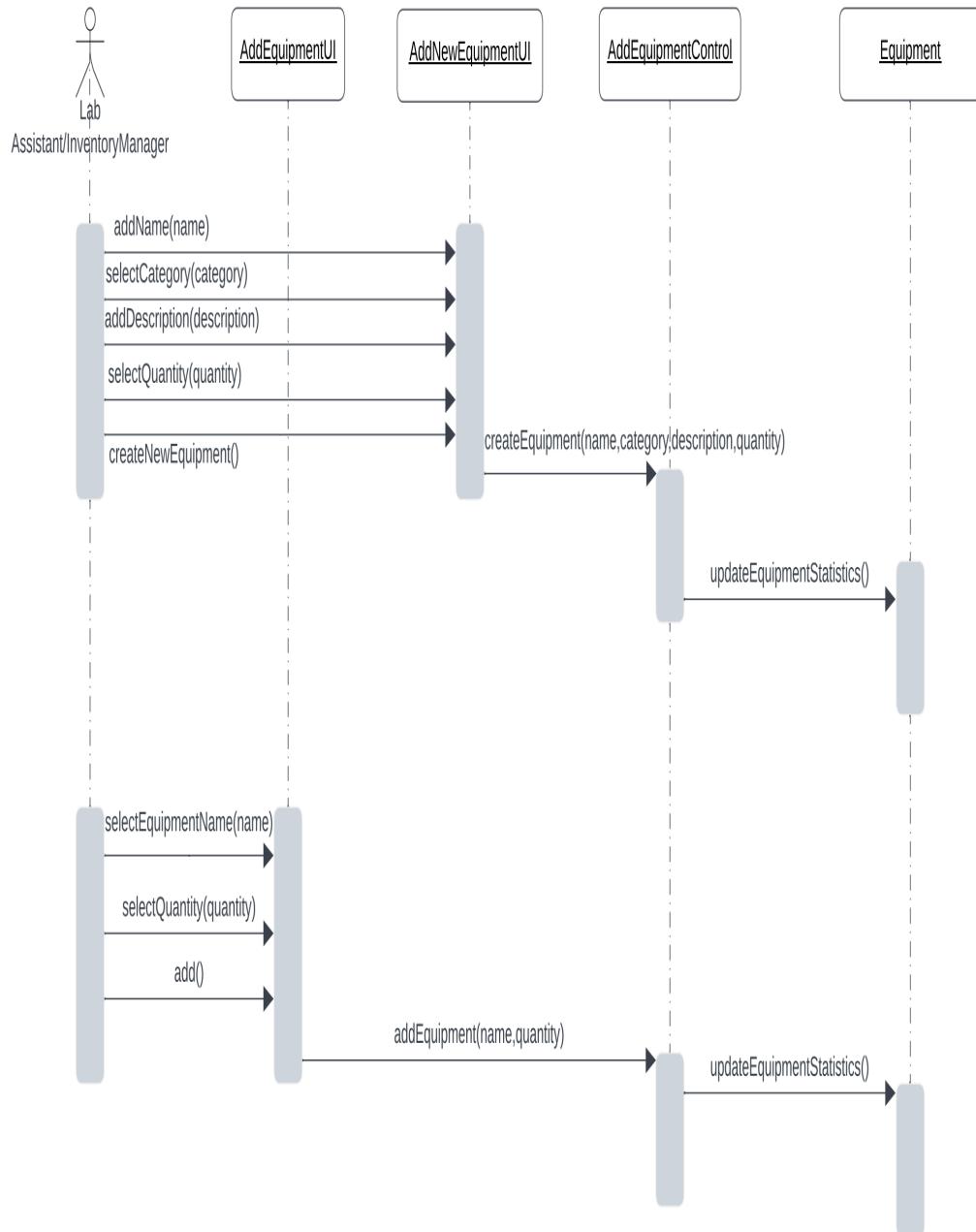


Figure 8.3: Add Equipments



Individual Equipments Sequence Diagram

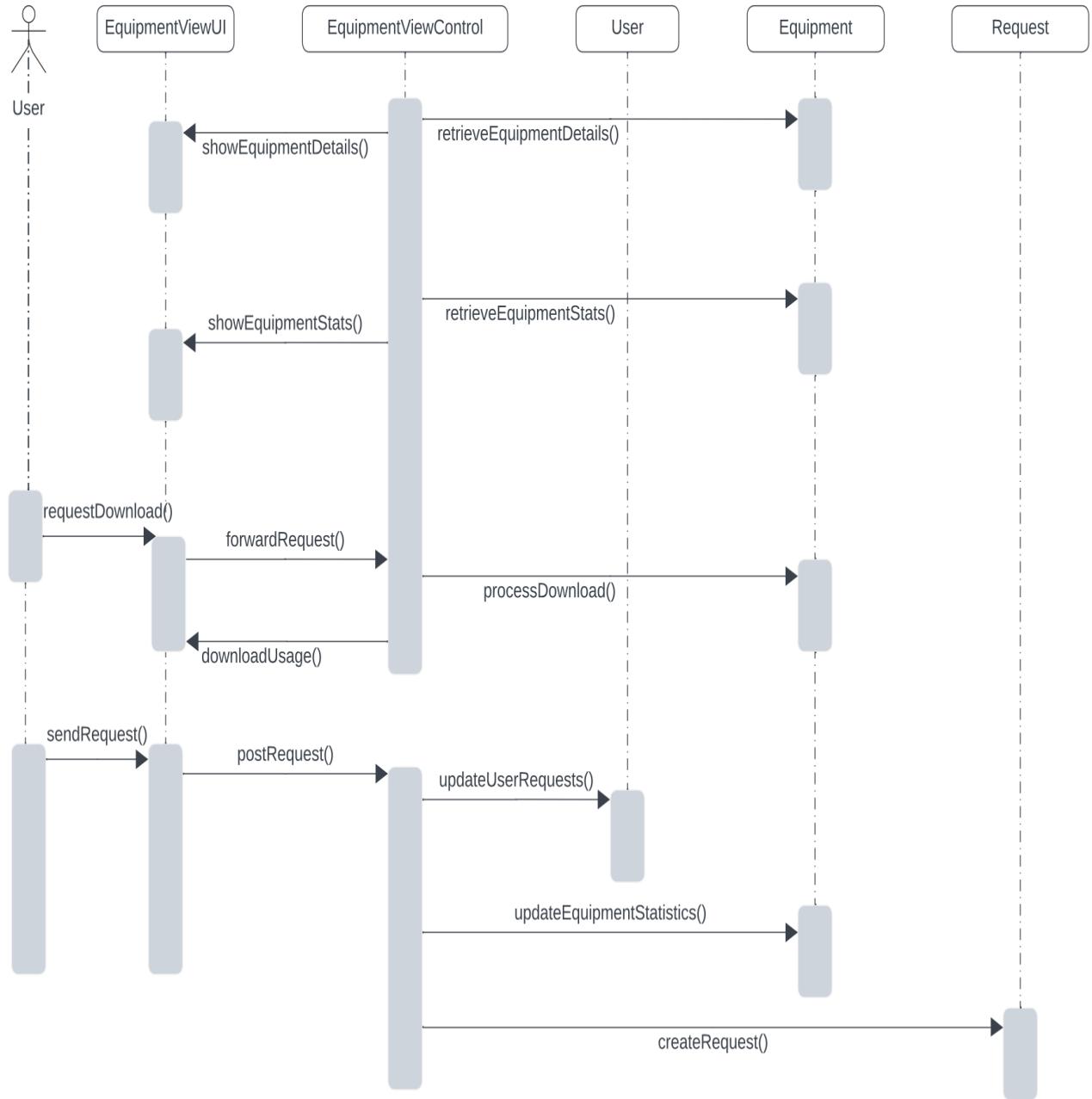


Figure 8.4: Individual Equipments



View Requests Sequence Diagram

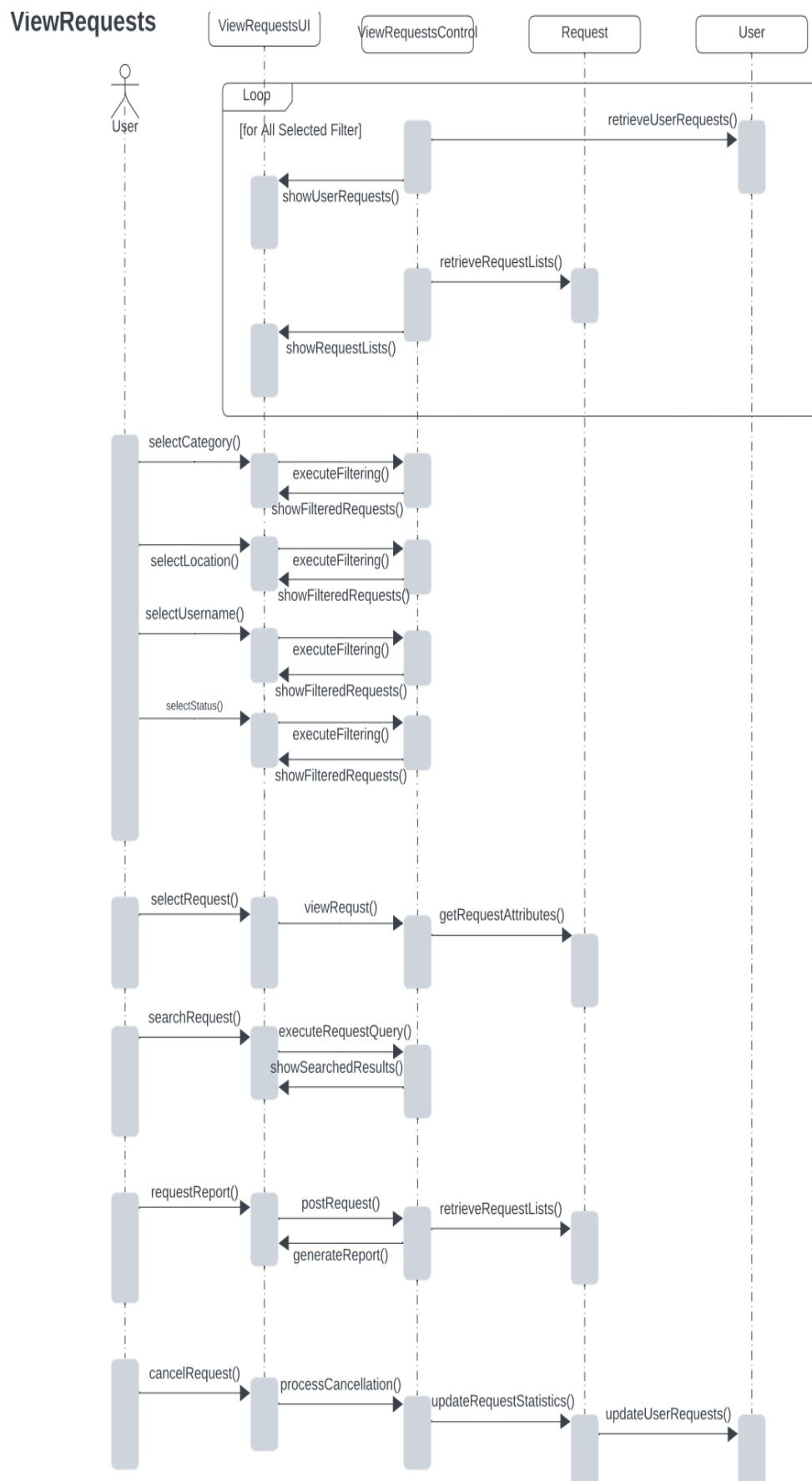


Figure 8.5: View Requests



Manage Requests Sequence Diagram

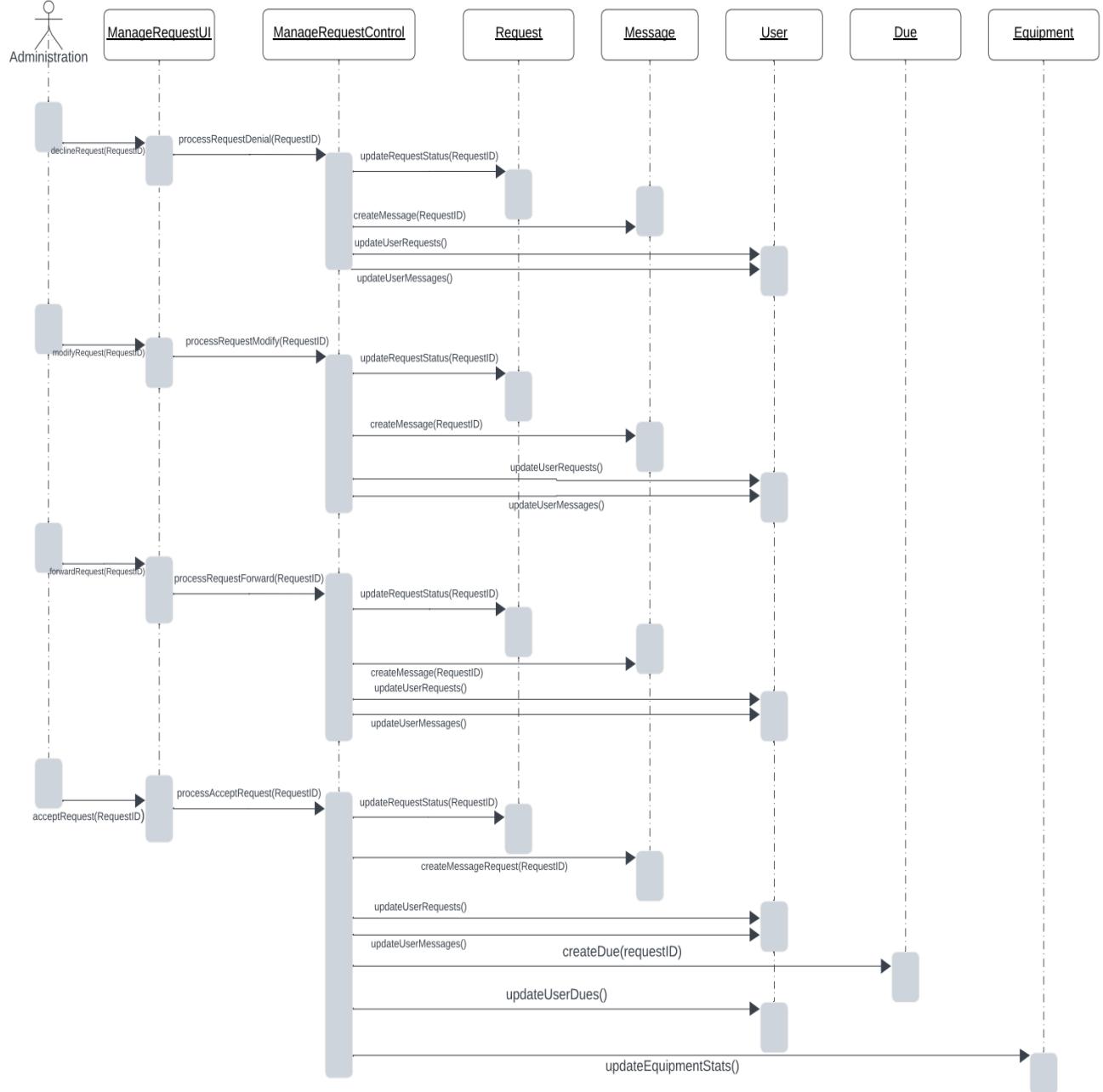


Figure 8.6: Manage Requests



View Dues Sequence Diagram

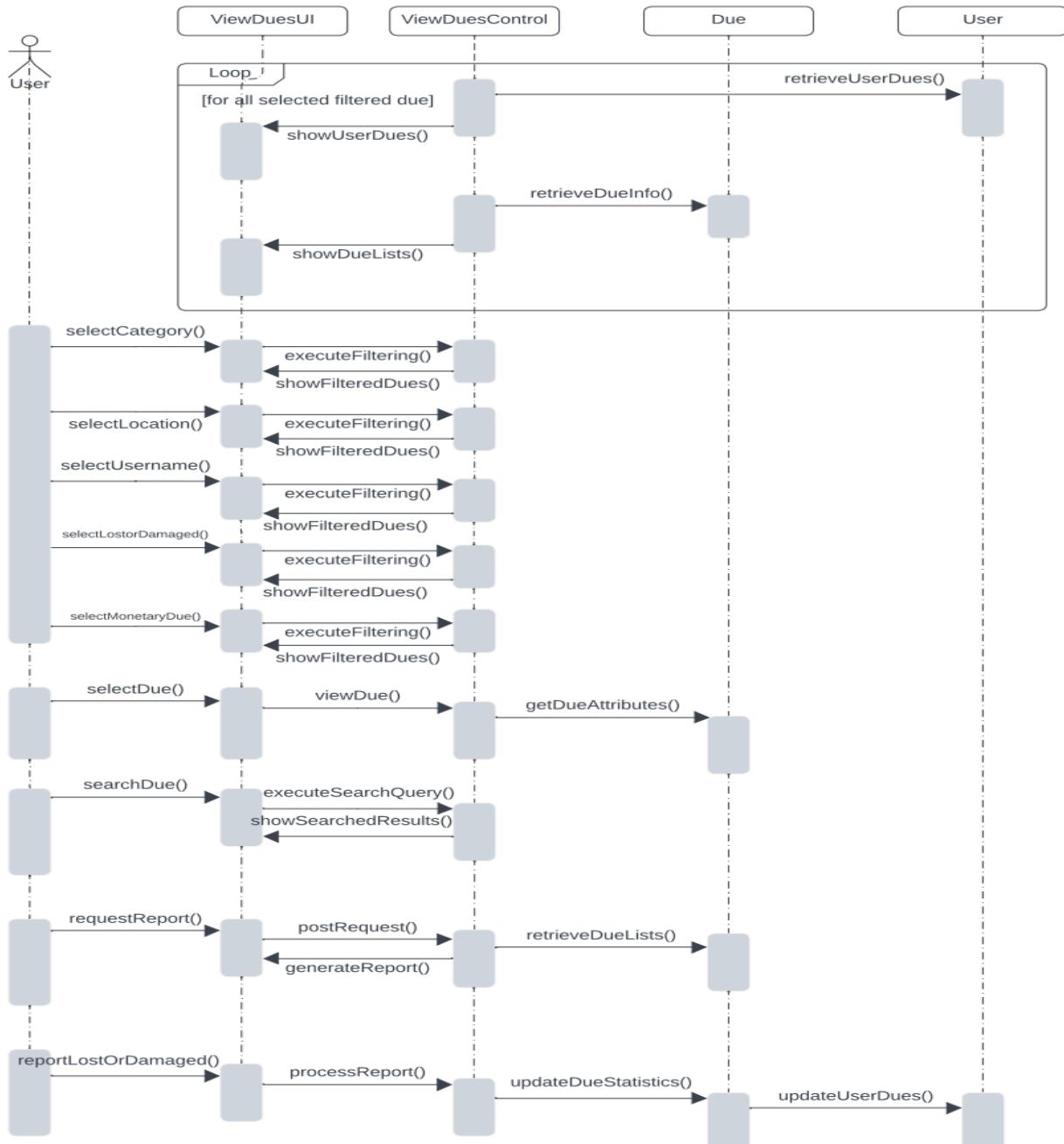


Figure 8.7: View Dues



Manage Dues Sequence Diagram

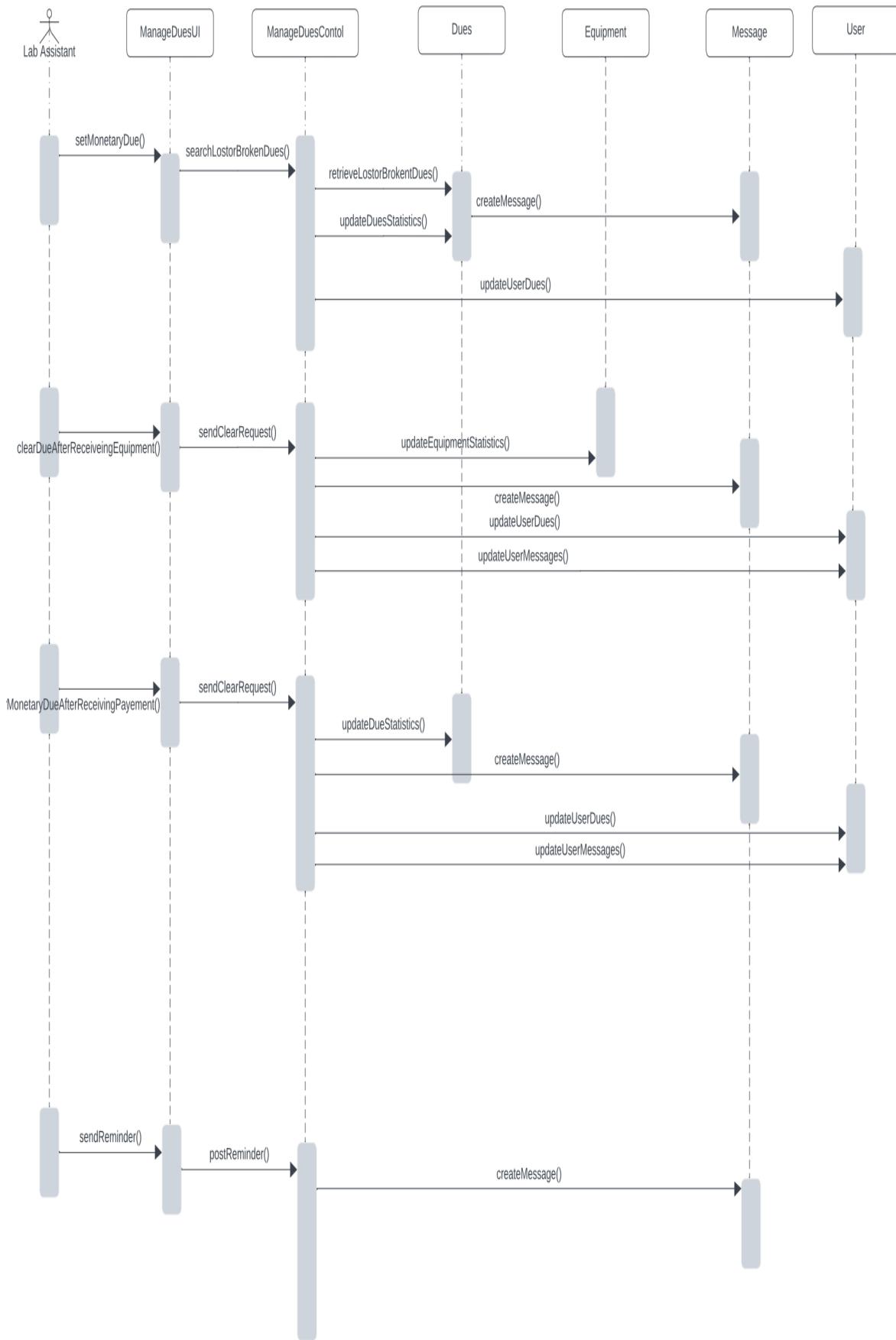


Figure 8.8: Manage Dues



Check Storage Sequence Diagram

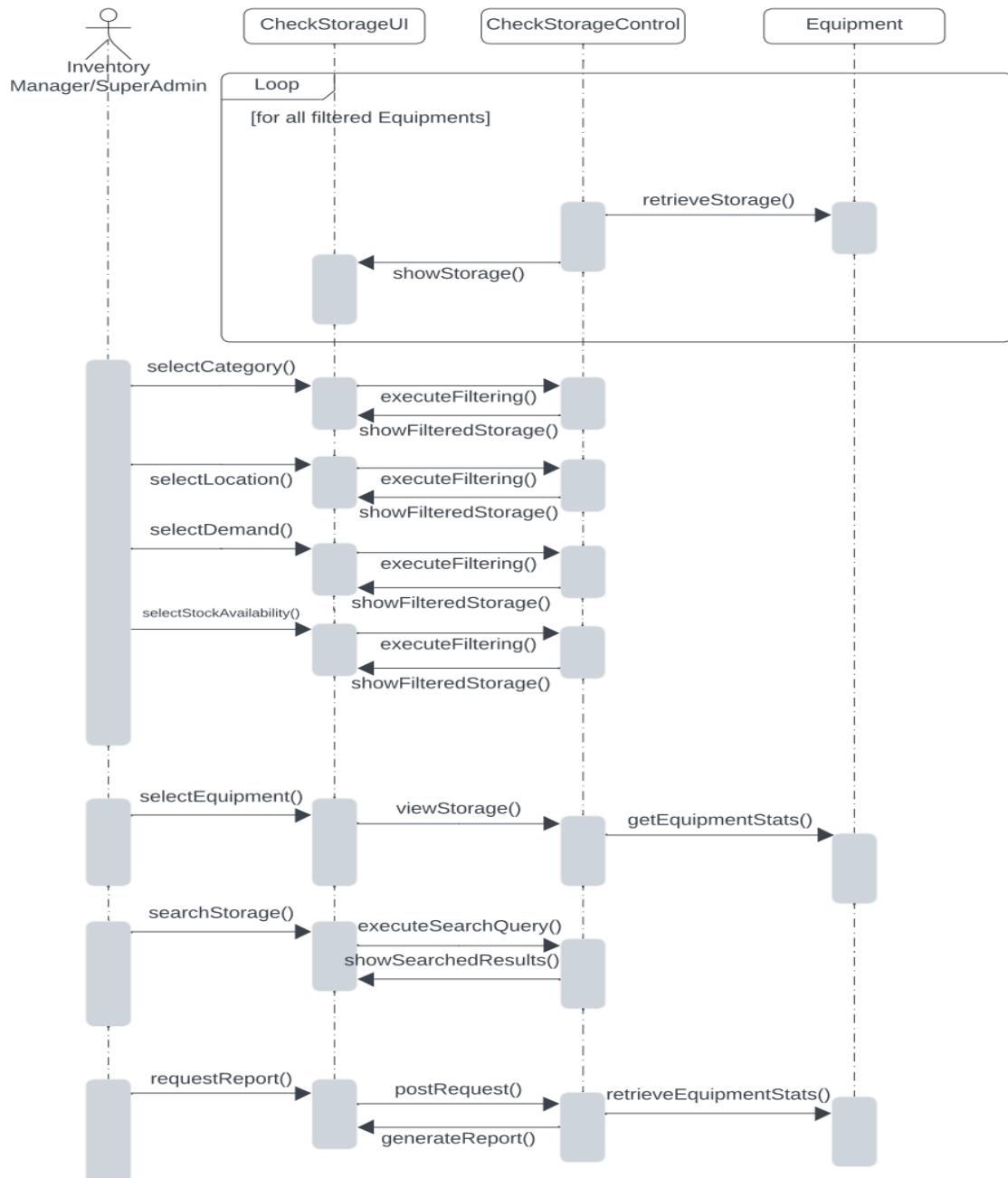


Figure 8.9: Check Storage



Manage Clearance Sequence Diagram

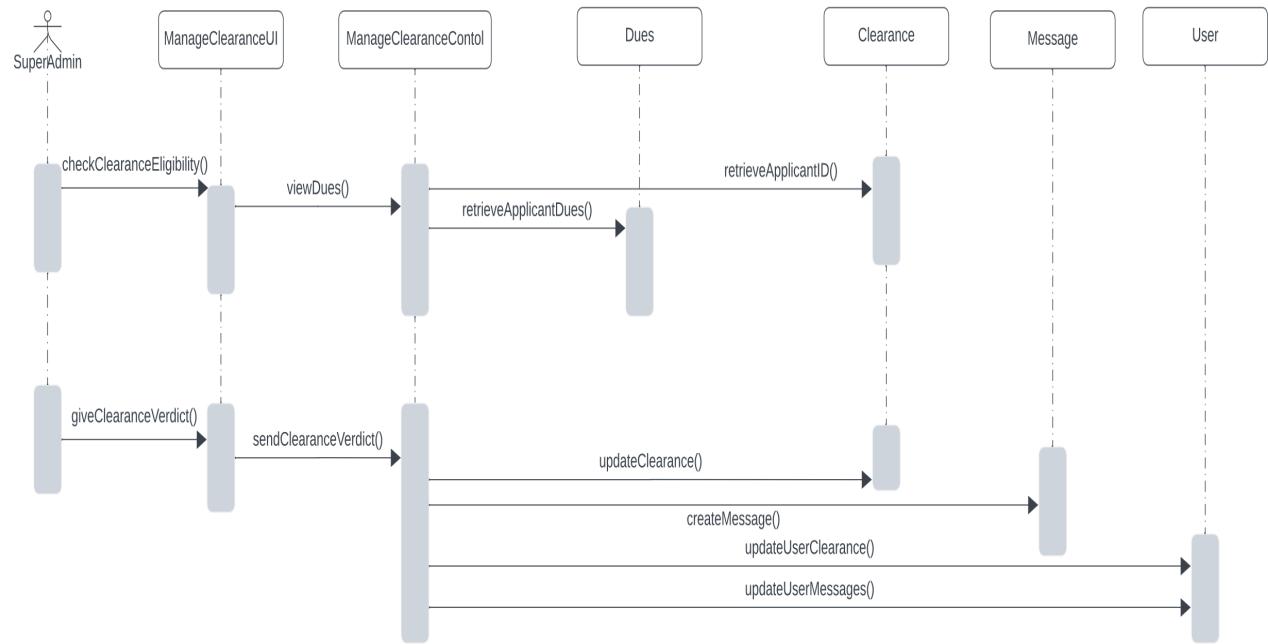


Figure 8.10: Manage Clearance



Messages Sequence Diagram

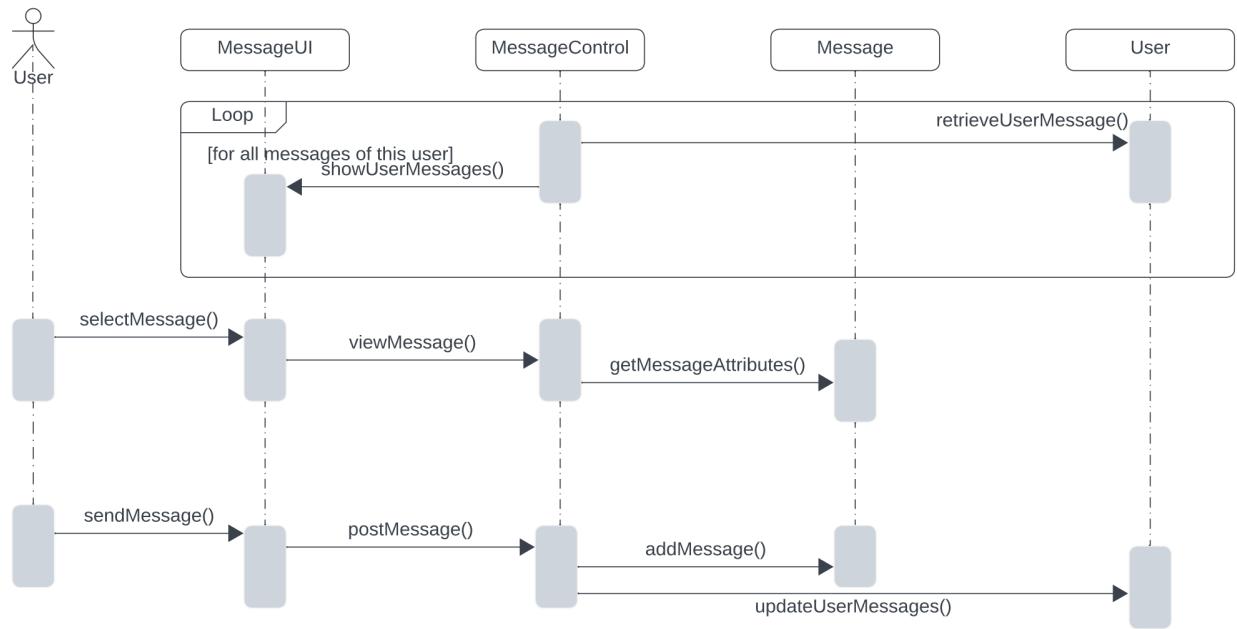


Figure 8.11: Manage Messages



Discussion Topic

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Request State Diagram

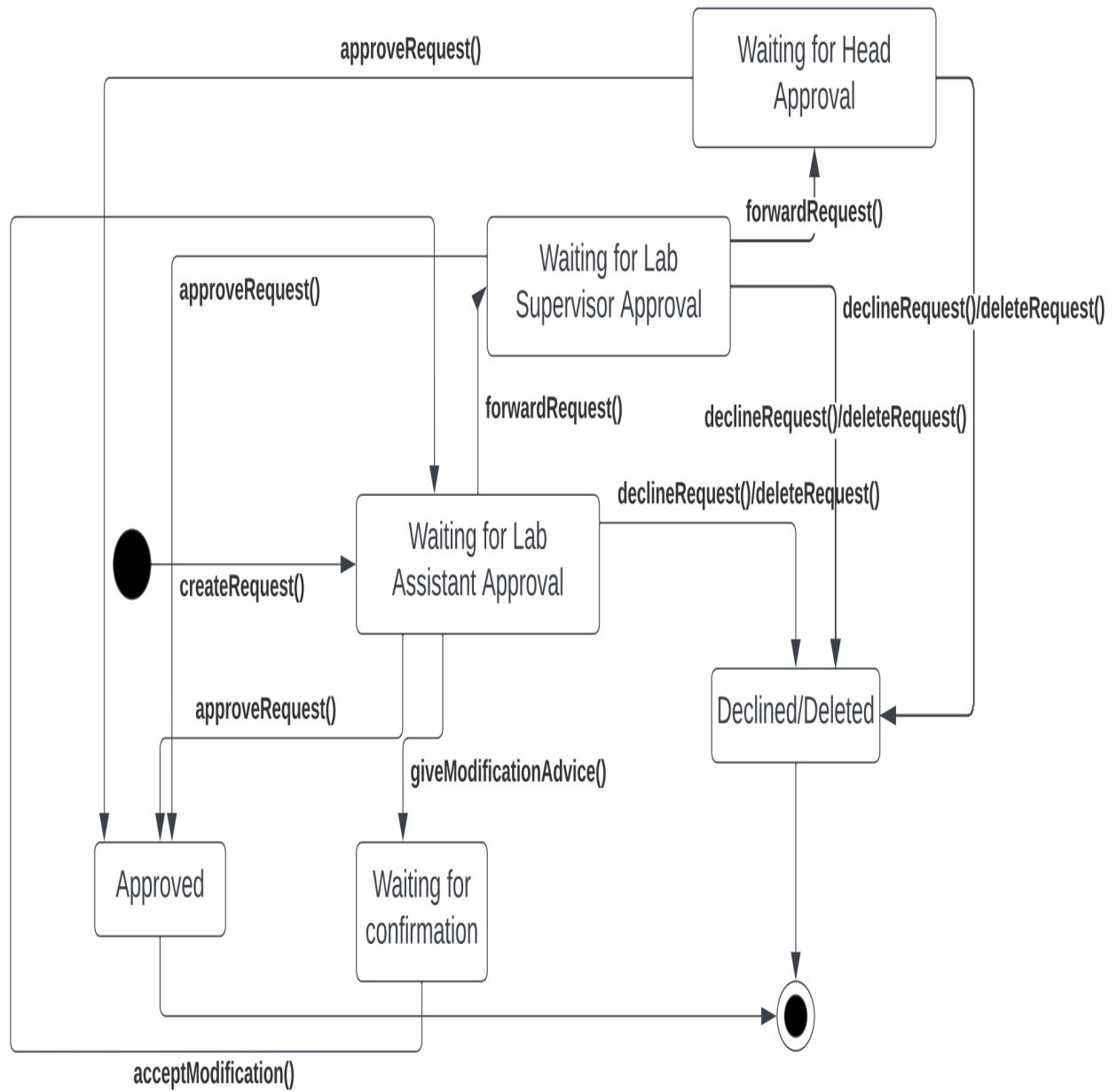


Figure 9.1: Request



Dues State Diagram

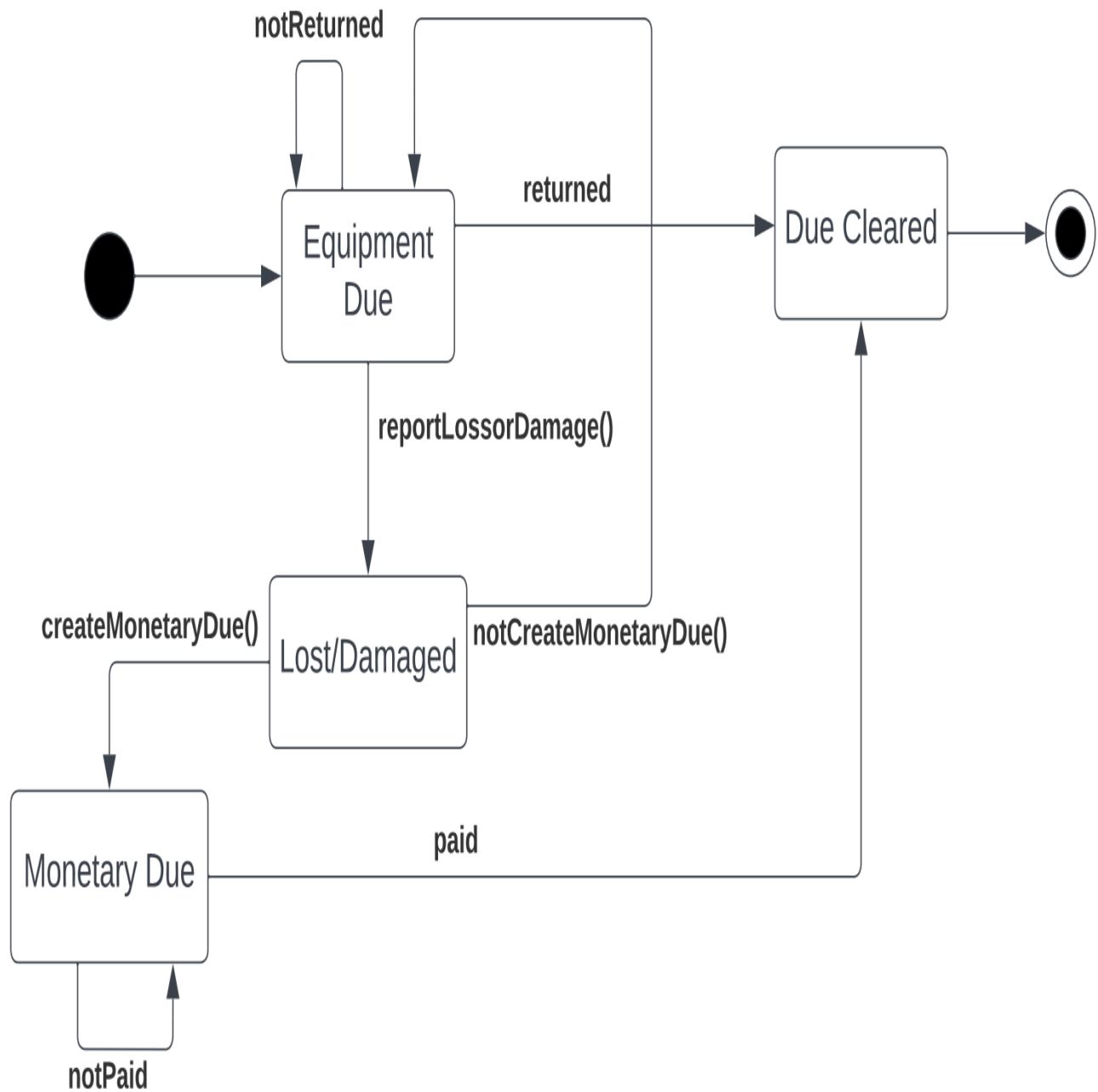


Figure 9.2: Dues



Equipment Storage State Diagram

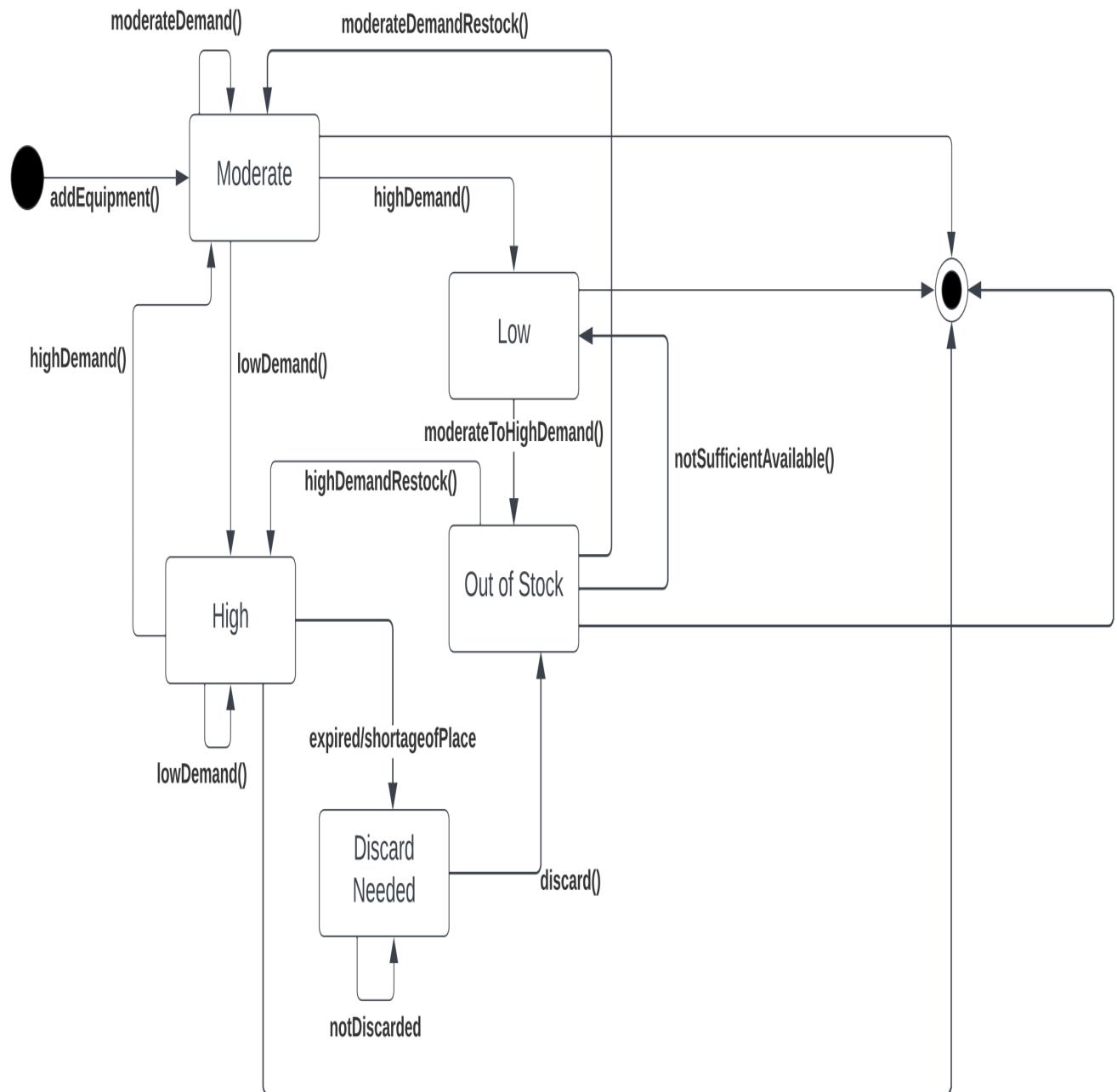


Figure 9.3: Equipment Storage



Clearance State Diagram

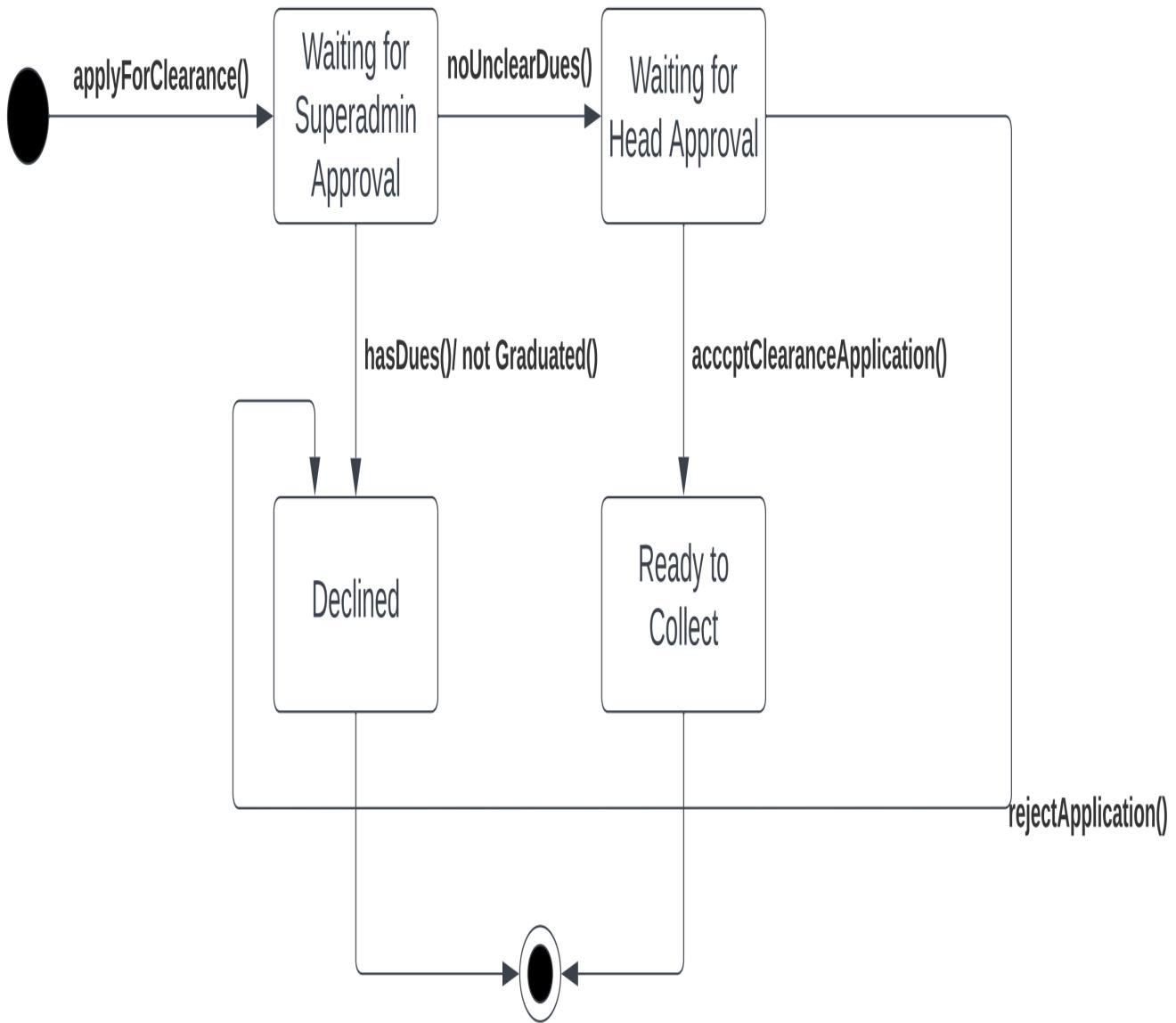


Figure 9.4: Clearance



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Target and Progress

Target

The target for this semester was to completely design the requisition Module. In this module, the students can make a request for a product and obtain response of approval or denial to their request.

Progress

The part where a student can request for a product from a list of products in the inventory is complete. The request is also updated at the end of authorized personnels(Lab Assistant, Inventory Manager or authorized faculty members for permission). However the response of permission (either approval or denial) is not sensitive yet. The implementation of this part of the module will be included to the next relay of the project development



Index Page



Figure 10.1: Index or Landing page



Register Page

The screenshot shows the 'Register' page of the CSE Lab Inventory Management System. The page has a red header bar with the text 'CSE Lab Inventory Management System'. Below it, a white form card contains the title 'Register' and a placeholder 'Enter your information to register'. The form includes fields for 'Register as' (dropdown), 'First Name', 'Last Name', 'Username', 'Email', 'Phone Number', 'Password', and 'Confirm Password'. A checkbox labeled 'I agree the Terms and Conditions' is checked. At the bottom are 'REGISTER' and 'Forgot Password?' buttons, and a link 'Already have an account? Log in'. The footer contains copyright information ('© 2023, BUET All Rights Reserved.'), navigation links ('Department CSE', 'About Us', 'Blog', 'Contact'), and a small circular logo.

Figure 10.2: Register or Sign-up page



Login Page

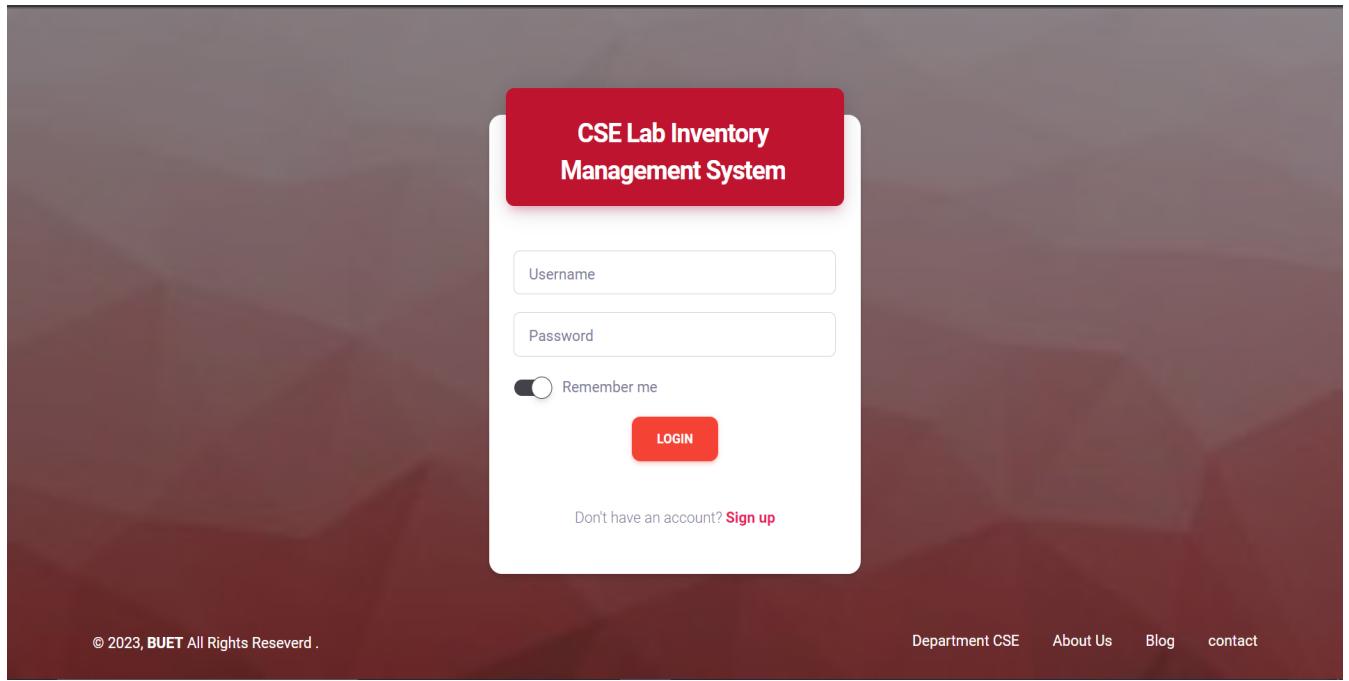


Figure 10.3: Login page



Dashboard

The screenshot shows the homepage of the CSE Lab Inventory Management System. On the left, a red sidebar titled "Your Options" lists links: Search Equipment, View Requests, View Dues, Monetary Dues, Get Clearance, Notifications, and Log Out. The main content area has a title "CSE Lab Inventory Management System". A search bar at the top right contains placeholder text "Type here...". Below the title, a section titled "Popular on website" displays three items:

- Breadboard**: An image of a breadboard, with a "DETAILS" button.
- Arduino Uno**: An image of an Arduino Uno microcontroller board, with a "DETAILS" button. Below it, text reads "Microcontroller : ATmega328 Operating".
- LED**: An image of a red LED, with a "DETAILS" button. Below it, text reads "A light emitting diode(led) is semiconductor device which emits light when current pass through it".

At the bottom of the page, there is a footer with links: "© 2023, BUET All Rights Reserved.", "Department CSE", "About Us", "Blog", and a settings icon. The URL "http://cse.buet.ac.bd/lab-inventory-management-system/" is visible in the browser's address bar.

Figure 10.4: Dashboard or Home page



Add Request Tab

The screenshot shows the 'CSE Lab Inventory Management System' interface. On the left, a red sidebar titled 'Your Options' lists: Search Equipment, View Requests, View Dues, Monetary Dues, Get Clearance, Notifications, and Log Out. The main area has a header 'CSE Lab Inventory Management System'. A search bar at the top right contains 'Type here...' and a user icon with '1905103'. Below the header is a table with columns: Equipment Name, Location, Quantity, and Loan. One row shows 'Atmega32', 'IL', '8', and '2'. A note below says 'Equipment Name Atmega32'. The 'Lab Name' field contains 'IL'. Under 'Enter quantity', the value '2' is shown. A 'Select Waiting Date:' dropdown shows '20-Sep-2023'. A red 'SUBMIT' button is at the bottom right, and a gear icon is in the bottom right corner of the main area.

Figure 10.5: Add Request Tab



Request Status Tab (Students' End)

Your Options

- Add Request
- View Requests**
- View Dues
- Monetary Dues
- Get Clearance
- Notifications
- Log Out

CSE Lab Inventory Management System

Type here...

1905103

Equipment Name	Location	Quantity	Request Status
Breadboard	DL	2	Waiting for Lab Supervisor Approval
Breadboard	DL	1	Waiting for Lab Assistant Approval
Breadboard	DL	1	Waiting for Lab Assistant Approval
Breadboard	IL	1	Waiting for Lab Assistant Approval
LED	DL	10	Waiting for Lab Assistant Approval
Atmega32	IL	2	Waiting for Lab Assistant Approval

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Figure 10.6: Request Status Tab



Approval Tab (Incomplete for now)

Your Options

- Add Request
- View Requests**
- View Dues
- Monetary Dues
- Get Clearance
- Notifications
- Log Out

CSE Lab Inventory Management System

Type here...

aislam

Request ID	Requester	Equipment Name	Location	Quantity	Permit
10	1905099	Arduino Uno	DL	1	2
13	1905099	Arduino Uno	DL	2	2
6	1905103	Breadboard	DL	1	1
7	1905103	Breadboard	DL	1	1
11	1905103	LED	DL	10	1

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Figure 10.7: Approval Tab



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References

BPMN

[Click here](#)

Mock UI

[Click here](#)

ERD

[Click here](#)

UML Class Diagram

[Click here](#)

Collaboration Diagram

[Click here](#)

Sequence Diagram

[Click here](#)

State Diagram

[Click here](#)

