Revision History

Date	Version	Description	People
18 Feb 2018	1.0	First draft	Project Group:

Table of Contents

Software Requirements Specification

1. Introduction

1.1 Purpose of Project

The purpose of this document is to provide the complete description of the working of the Sport Equipment Management System. It will show the complete description of the system with the help of required diagrams and procedures. It will also include assumptions, requirement and system constraints. This document is meant mainly for Administration of the institute as well as for the other developers who may be interested in leading the project further.

1.2 Scope of Project

This software system is designed to increase the efficiency and performance of the administration for proper allocation and management of the hostel sports equipment. This software can be used by any institute to manage the hostel sports equipment.

Administration can use the software to allocate sports equipment to students, for personal use, as well as to sports society, for any sports competition. The software will check the availability of the required sports equipment whenever any issue request is made. Software will also keep track of the number of days student is holding some particular equipment and accordingly calculate fine if any.

Student can also check the availability of the equipment and can also make a special request to the management so as to add some more equipment to the inventory. Student can submit any equipment he/she is possessing through the software, software will update the equipment availability accordingly so as to make equipment available for other students. If the equipment is found damaged than the software will keep this particular equipment in the category of damaged equipment, and concerned authority will be informed so that further action can be taken.

Also all the issuing and submitting processes will be done under the surveillance of the security worker for the better security of equipment, so a password with be required to complete any of the above two processes to complete, which will be available with the security worker.

1.3 Constraints

a. No student can possess more than five equipment at the same time.
b. No student can issue an equipment till his previous dues are cleared.
c. No student can possess more than one equipment of same category.

1.4 Assumptions

a) A security worker is always present at the inventory.
b) Every student is given username and password by the Institute already.
c) A permanent system is allotted in the sport room.
d) All the students follow the rules.
e) There is only single sports room, common for all the hostels.
f) Secretary is also given rights of other normal students in addition to some extra rights.

g) Guard is already given a password to verify every process.
h) Every Equipment is issued till next day 23:59 .
i) Equipment of the already available category can only be added by the secretary.

1.5 Definitions, Acronyms and Abbreviations

Term	Definition
Student	A person who is studying or want to study at Institute
Secretary	An student elected sport authority
Security Worker	Present all time at the sport room to take care of the sport equipment
Administration	The Management authority of the Institute
Person	Includes only Students and Secretary
Guard	Security person present at sport room

1.6 References

a) IEEE. IEEE std 830-1998 IEEE Recommended Practice for Software Requirements Specifications. IEEE Computer Society, 1998.
b) https://helloacm.com/model-view-controller-explained-in-c/
c) https://www.linkedin.com/pulse/top-6-characteristics-good-requirements-srs-abhishek-srivastava/
d) https://reqtest.com/requirements-blog/understanding-the-difference-between-functional-and-non-functional-requirements/

2. Overall Description

2.1 Product Functions

2.1.1 Functional Requirements

2.1.1.1 Use Case Diagram

Figure 1 : Use Case Diagram

2.1.1.2 Class Diagram

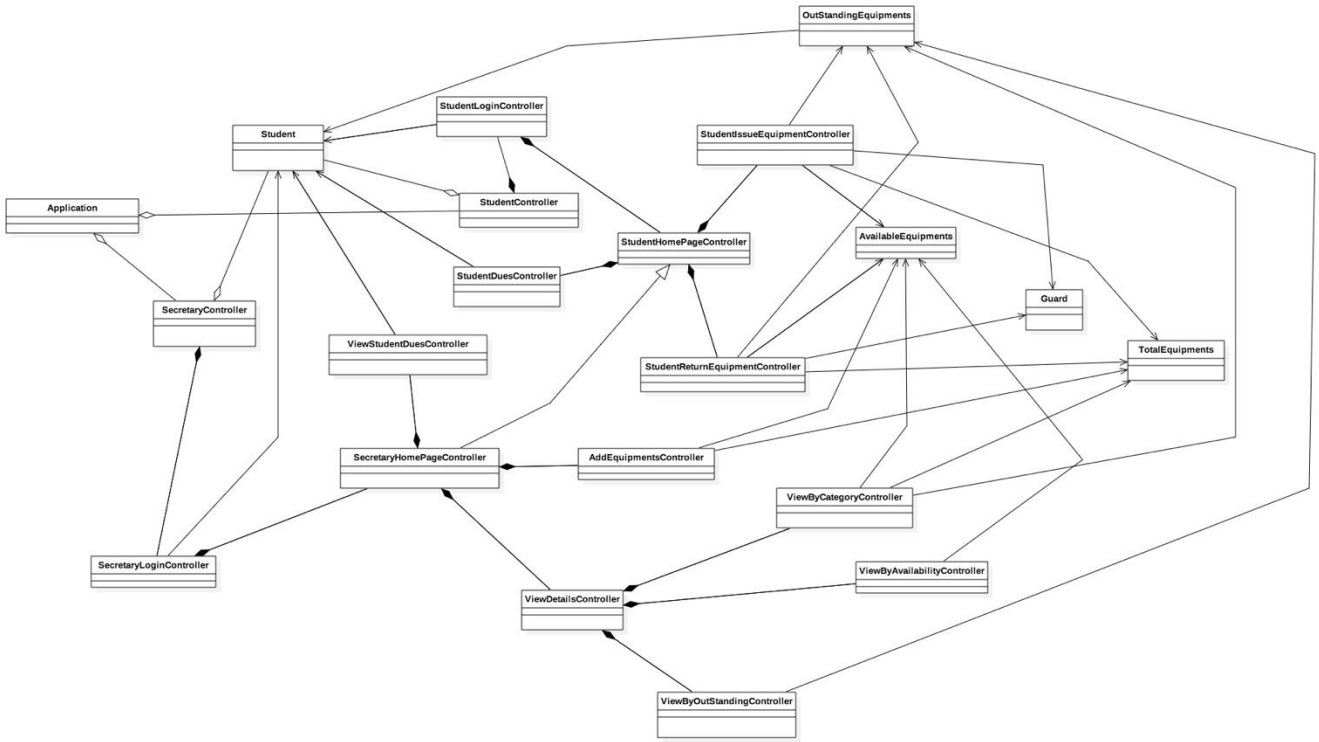


Figure 2 : Class Diagram

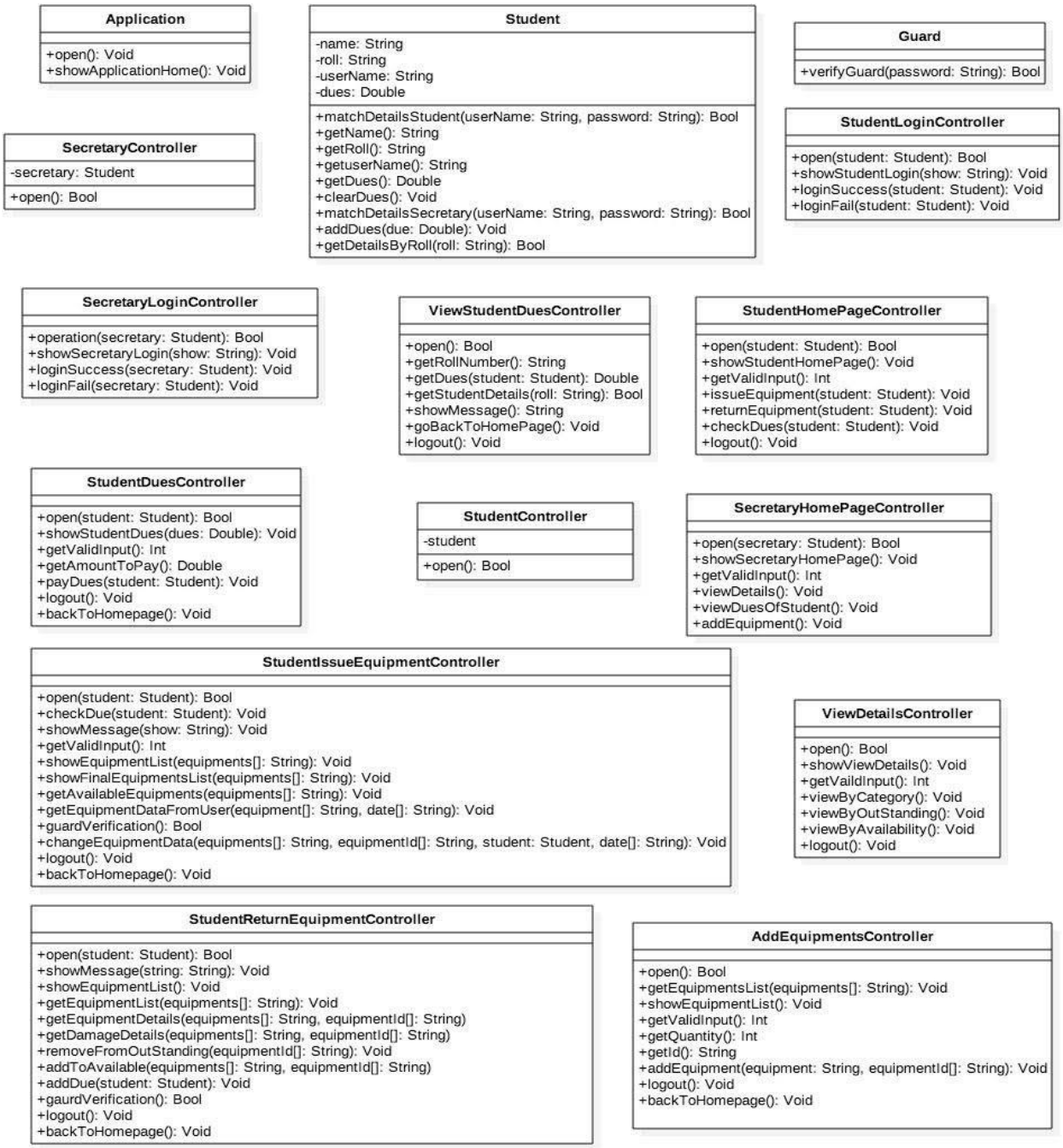


Figure 3 : Class contents_1

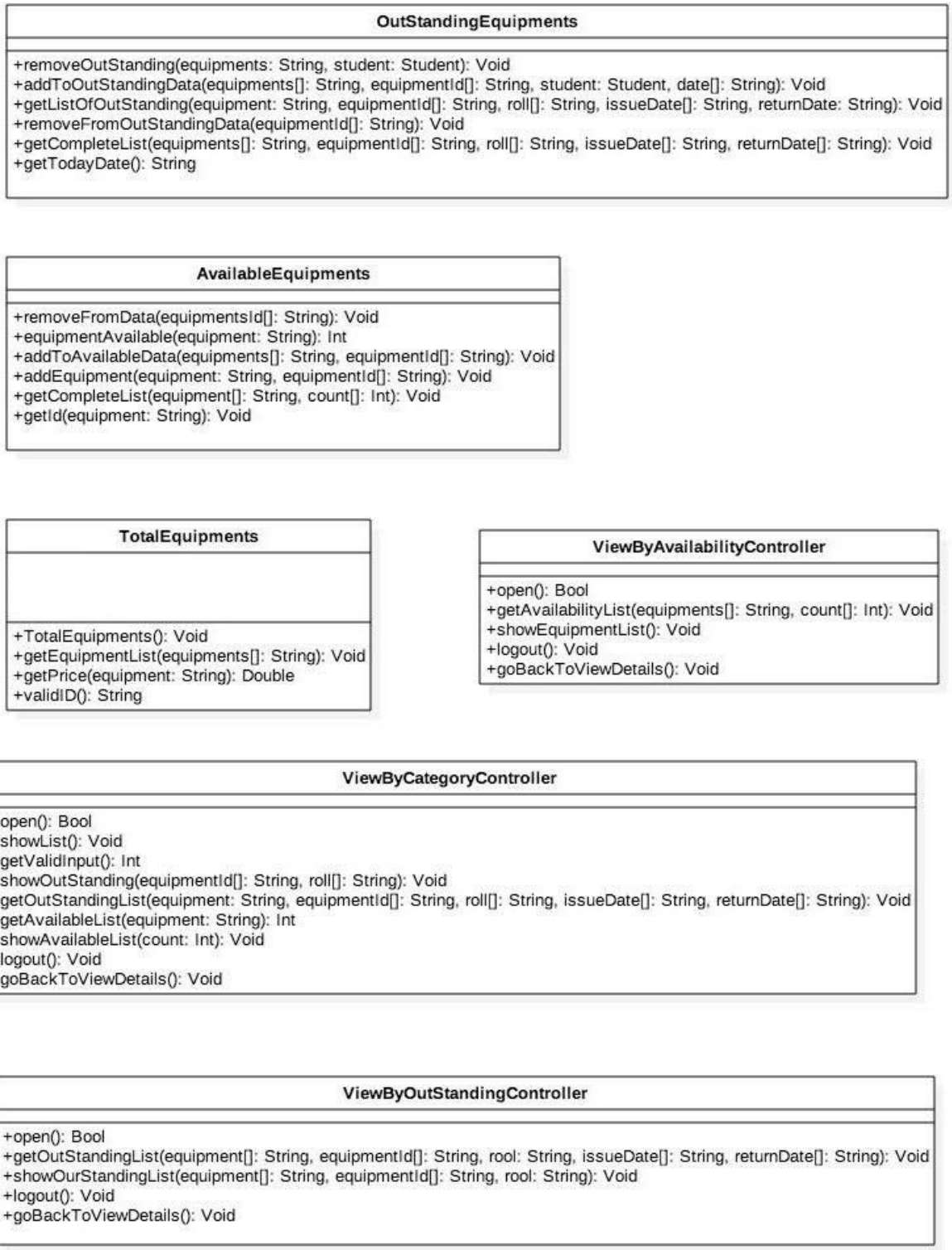


Figure 4 : Class contents_2

2.1.1.3 Sequence Diagram

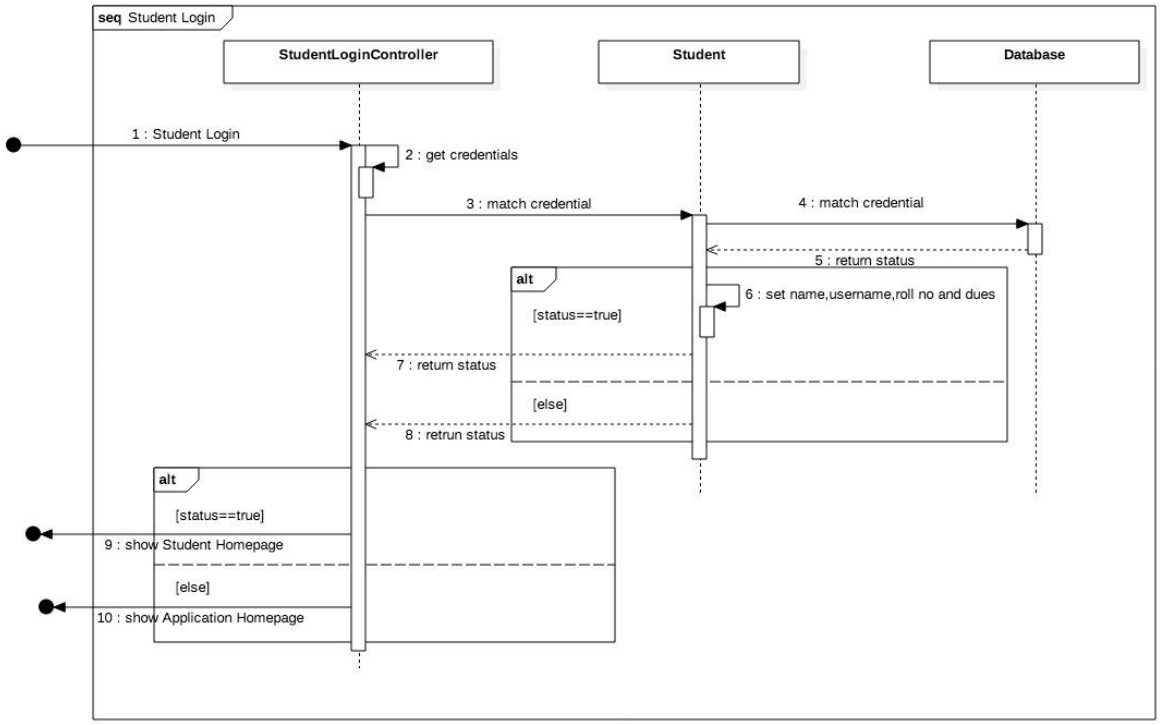


Figure 4 : Student Login Sequence Diagram

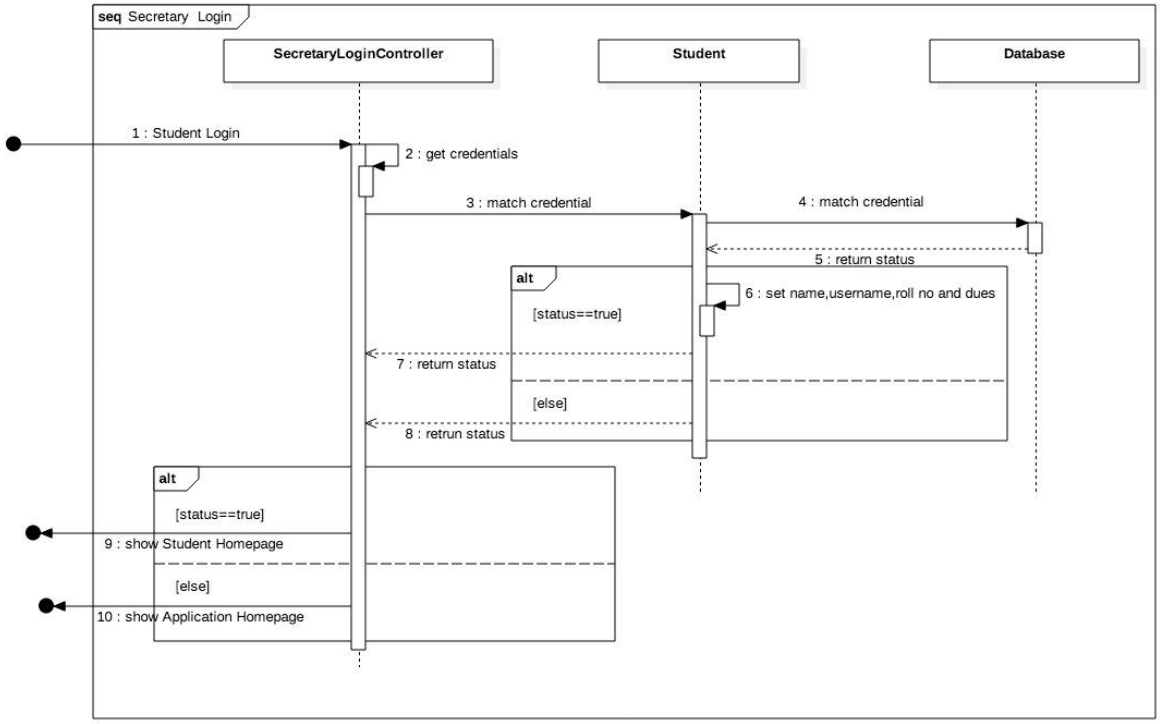


Figure 5 : Secretary Login Sequence Diagram

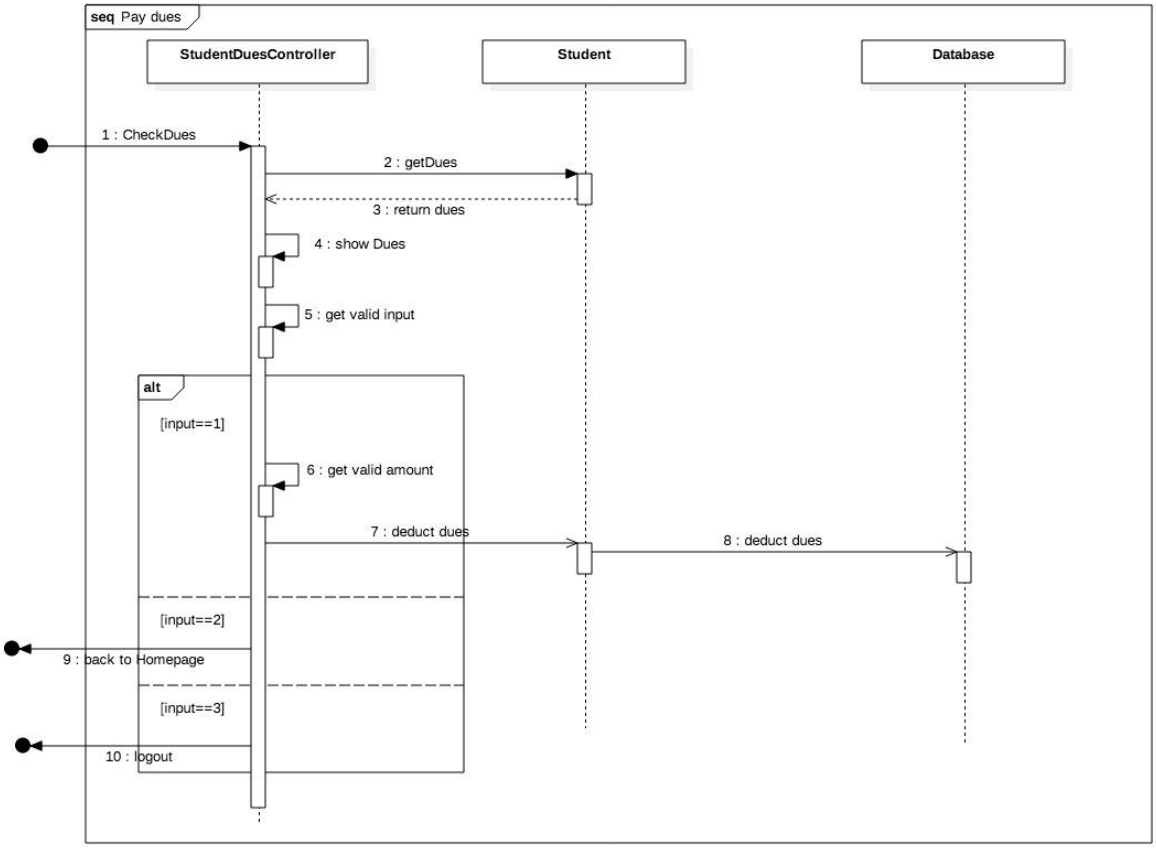


Figure 6 : Pay Dues Sequence Diagram

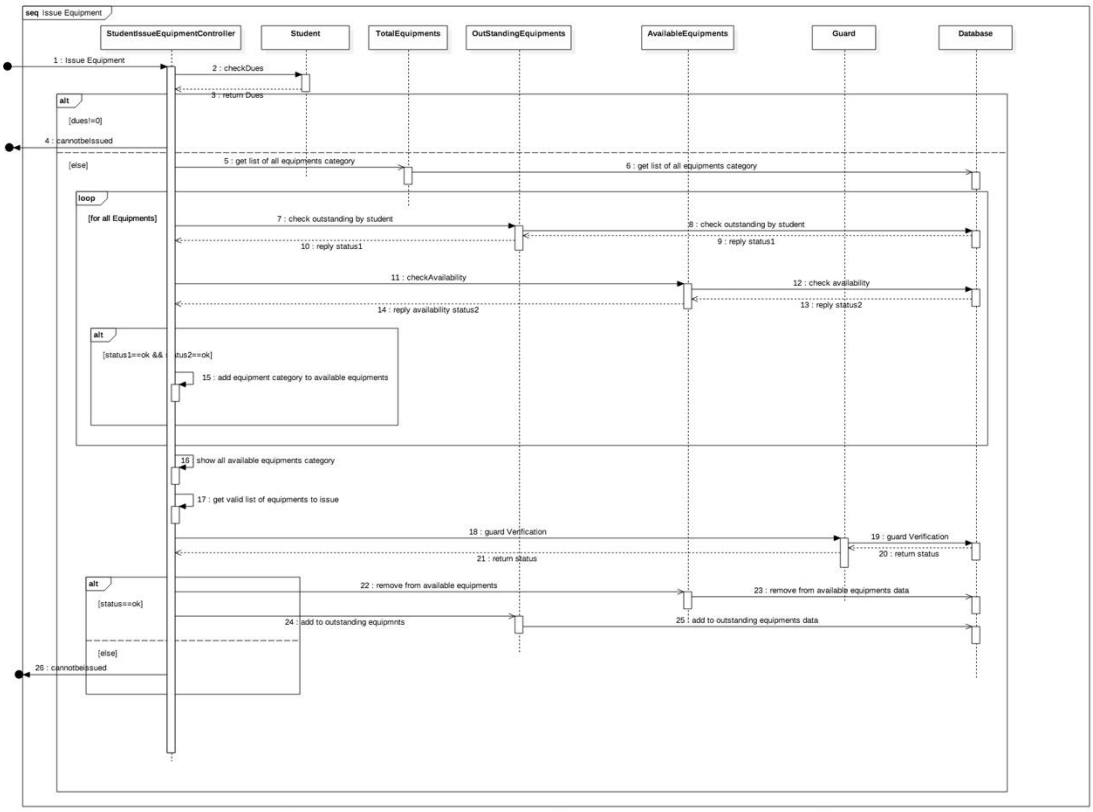


Figure 7 : Student Issue Equipment Sequence Diagram

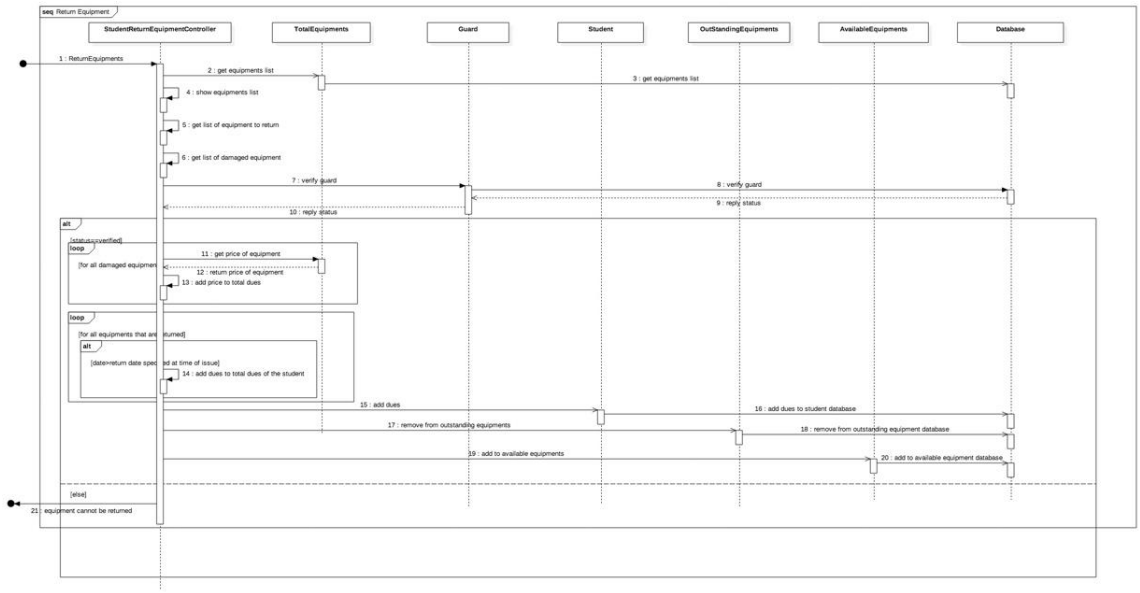


Figure 8 : Student Return Equipment Sequence Diagram

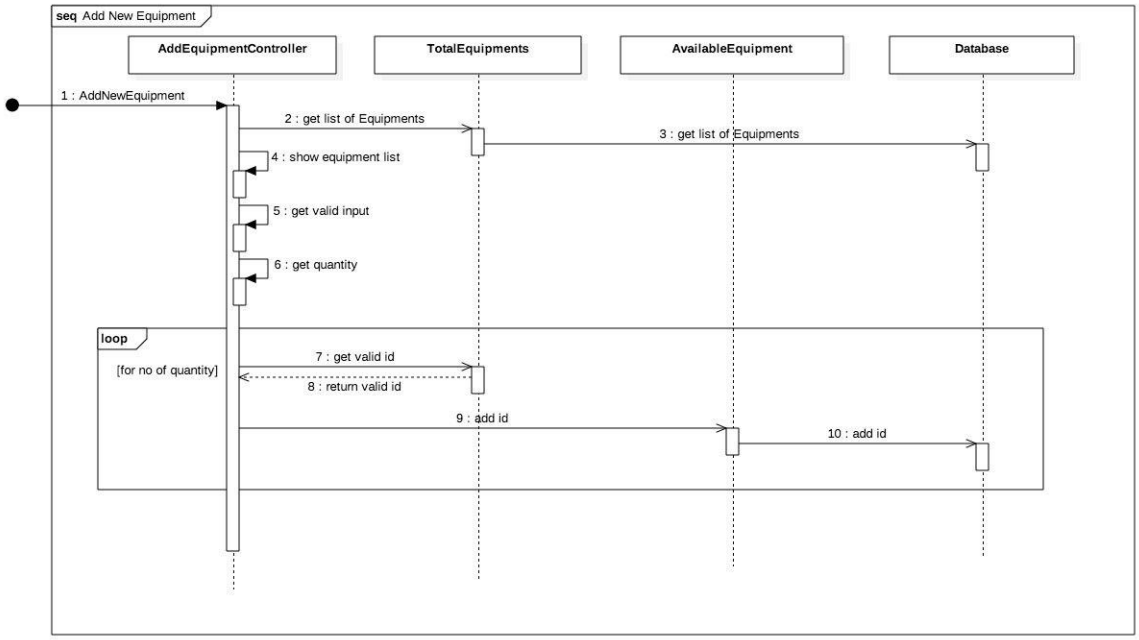


Figure 9 : Secretary Add New Equipment Sequence Diagram

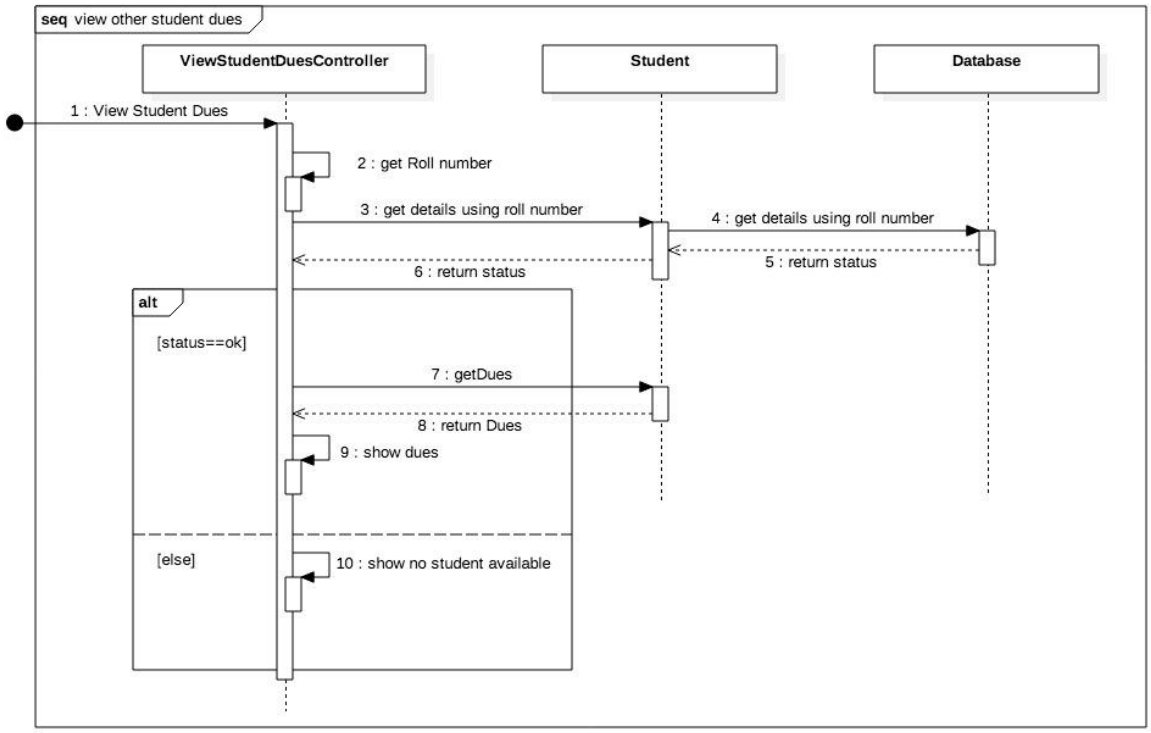


Figure 10 : View Dues Of Other Students Sequence Diagram

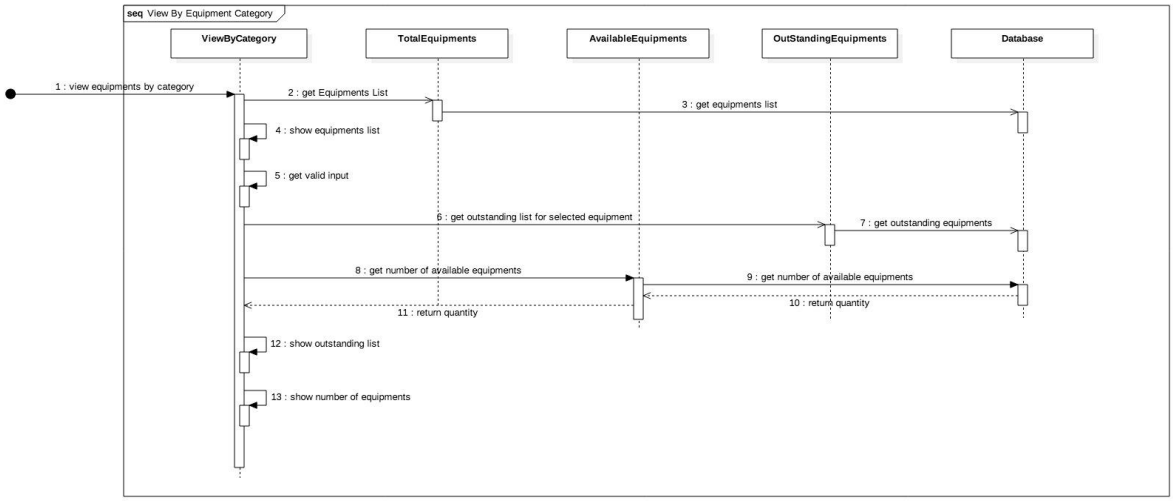


Figure 11 : View By Equipment Category Sequence Diagram

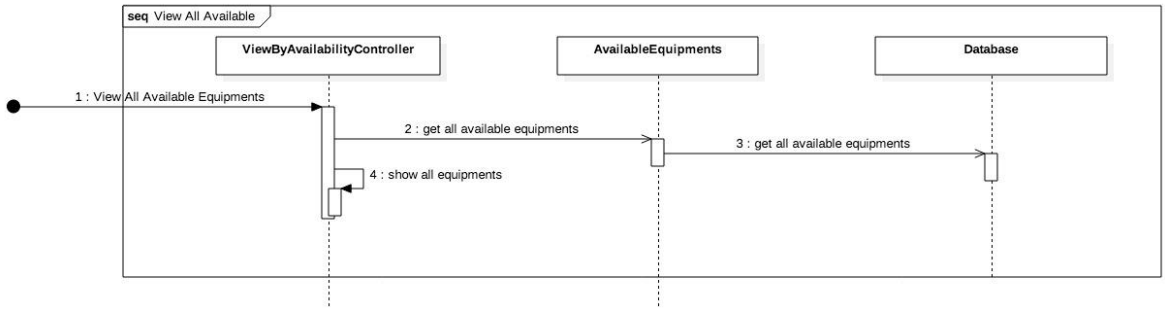


Figure 12 : View All Available Equipments Sequence Diagram

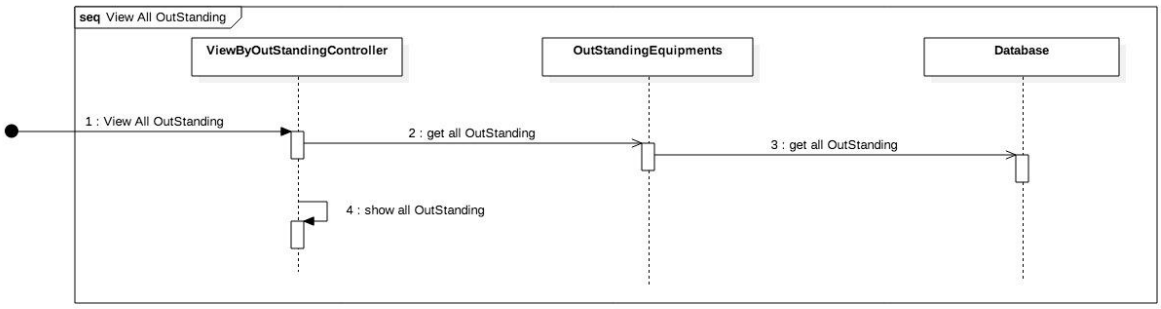


Figure 13 : View All Outstanding Equipments

2.1.1.4 Activity Diagram

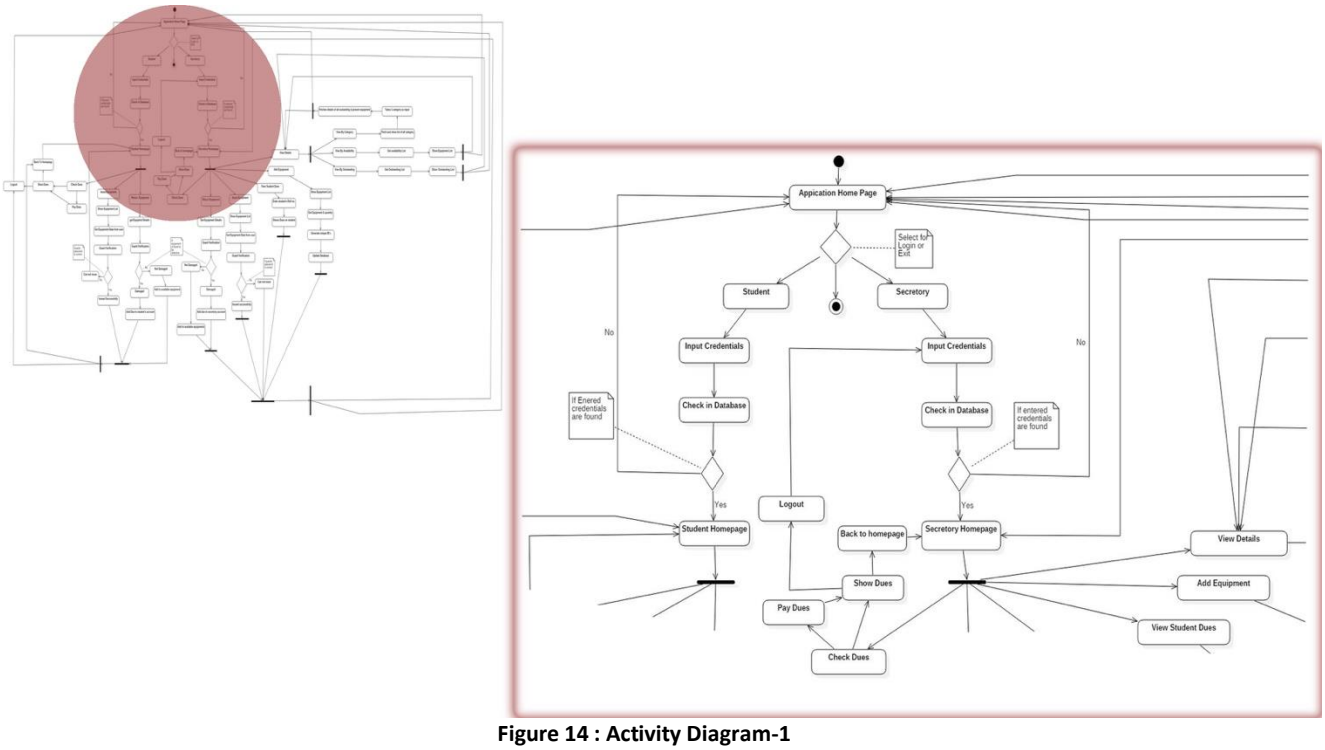


Figure 14 : Activity Diagram-1

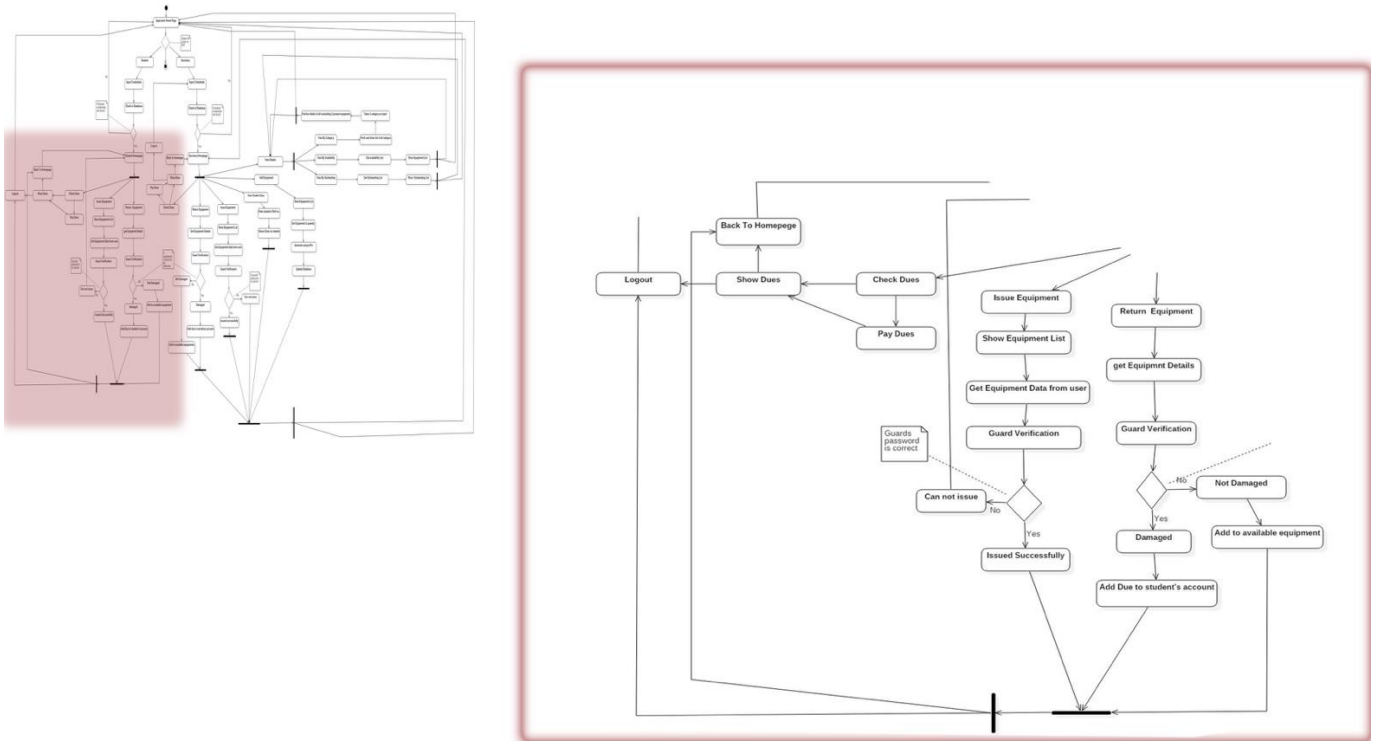


Figure 15 : Activity Diagram-2

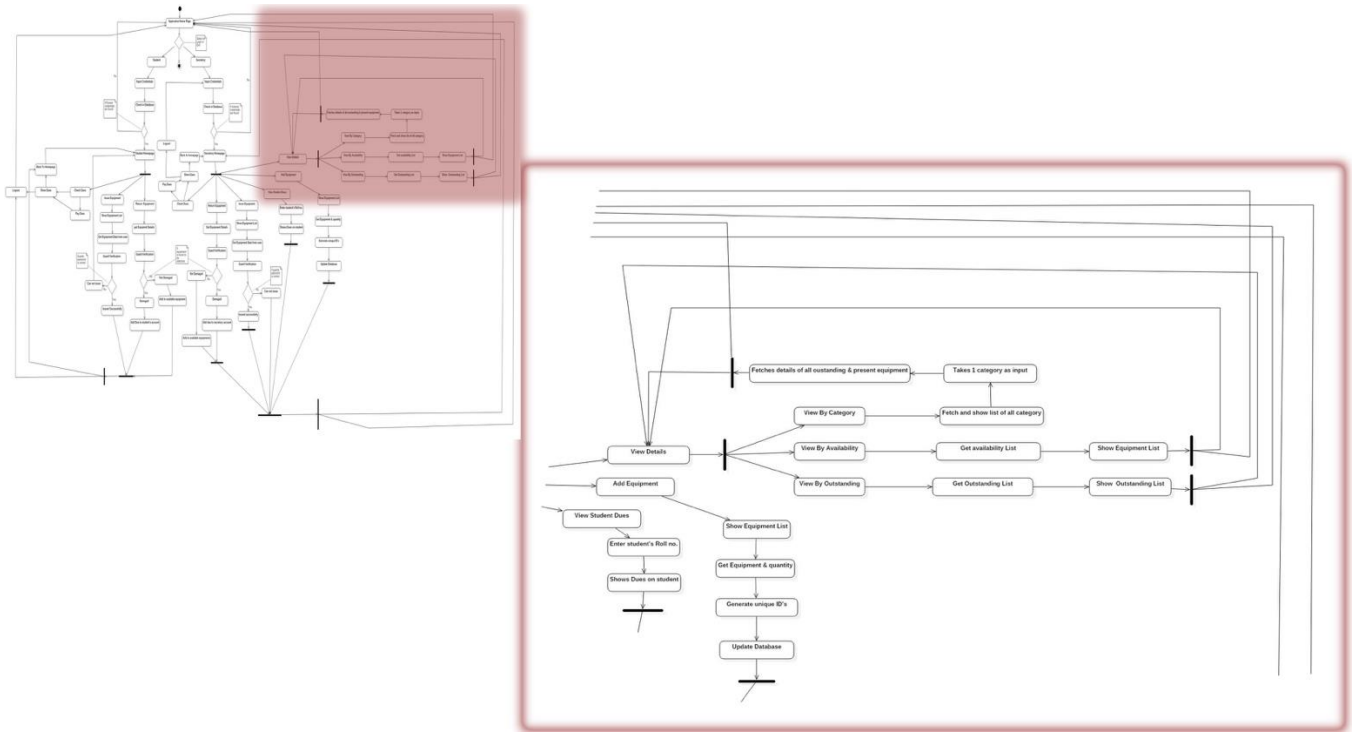
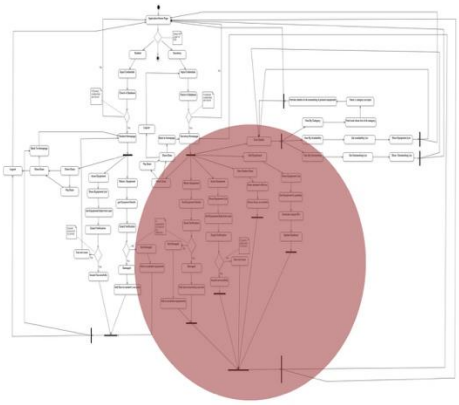


Figure 16 : Activity Diagram-3



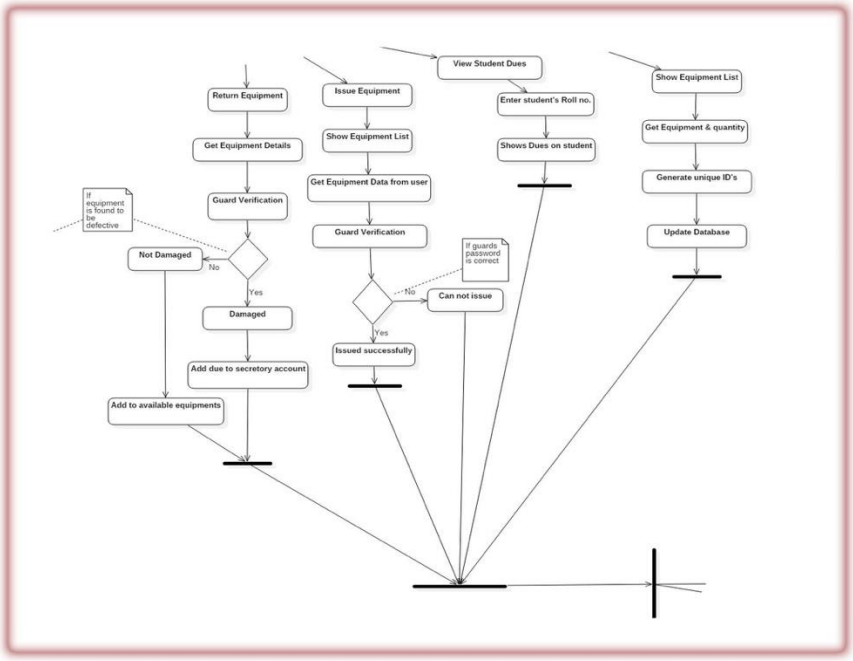


Figure 17 : Activity Diagram-4

2.1.2 Non-Functional Requirements

The Sports Equipment Management system will work on a local computer in sports room by interacting with database available in hard disk of computer by keeping the data of details of all equipment and rules of the society and depending upon those it will allow/disallow student to issue or submit some equipment.

2.2 User Characteristics

There are two types of users who will access this software, they include the secretory and the students. However they have different characteristics. students will use this software in order to issue/submit the sport equipment, they can also use it to check the things which they are currently holding or to check their fine amounts whereas secretory can access the software either for issue/submit or for checking availability of products in the inventory or to check if any special request for some particular equipment is made or not. In except to both these user there is one more person security person who will also interact with the system to securely facilitate all processes.

3. Specific Requirements

3.1 Use case description

3.1.1 Student Login

Use Case Name	Student Login
Trigger	By student only
Precondition	1. Student data should be present in database 2.Username and password entered should be correct
Basic Path	1.Enter valid input as shown for Student Login. 2.Enter username and password carefully. 3.Enter required input to confirm
Alternative Paths	No alternative paths for Login are present
Post condition	Student Is now logged in system and can access other features

Exception Paths	Student forgot his/her credentials
Other	None

3.1.2 Issue Equipment

Use Case Name	Issue Equipment
Trigger	By Person(Student/Secretary) only
Precondition	1.Total fine on student should be zero. 2.Item should be available in the inventory.
Basic Path	1.First login into the system. 2.Check availability of equipment in inventory. 3.Select equipment and get confirmation of guard.
Alternative Paths	No alternative paths for Issue Equipment are present
Post condition	He/She can issue maximum of 5 equipment, 1 of each category.
Exception Paths	No exception paths are present.
Other	None

3.1.3 Return Equipment

Use Case Name	Return Equipment
Trigger	By Person(Student/Secretary) only
Precondition	1.Equipments should be issued on the name of that student only which is logged in into the system.
Basic Path	1.First login into the system. 2.Enter input for Return Equipment and enter Id's of equipment you want to return. 3.Get final confirmation of guard and deposit equipment to guard.

Alternative Paths	No alternative paths for Issue Equipment are present
Post condition	He/She can issue maximum of 5 equipment, 1 of each category.
Exception Paths	No equipment is issued on the name of student
Other	None

3.1.4 Check Dues

Use Case Name	Check Dues
Trigger	By Person only
Precondition	1.Student can check their own dues only.
Basic Path	1.First login into the system. 2.Enter valid input for Check Dues.
Alternative Paths	Student can check his/her dues by asking to secretary too.
Post condition	
Exception Paths	No such exception paths are present.
Other	None

3.1.5 Pay Dues

Use Case Name	Pay Dues
Trigger	By Person(Student/Secretary) only
Precondition	1.Total fine on student should be non-zero. 2.Student can pay his/her dues only.
Basic Path	1.First login into the system. 2.Go for Check Dues. 3.If dues are non zero go for Pay Dues.
Alternative Paths	No alternative paths for Dues payment are present
Post condition	Only after paying Dues he/she can go for issue.
Exception Paths	No exception paths are present.
Other	None

3.1.6 Dues of a Student

Use Case Name	Dues of a student
Trigger	By Secretary only
Precondition	1.Secretary should have roll number of concerned student.
Basic Path	1.Firstly secretary should login into the system. 2.Then enter input for Dues of a student. 3. Enter the roll number of student.
Alternative Paths	Student can check his/her fine too but secretary has this option only.
Post condition	Secretary can take appropriate action if any.
Exception Paths	No exception paths are present.
Other	None

3.1.7 Verification

Use Case Name	Verification
Trigger	By security person only
Precondition	1.If person want to issue or return some equipment. 2.Database should be updated.
Basic Path	1.Firstly person should complete the process of issue/return. 2.Then security person will enter his/her password to complete the process.
Alternative Paths	No alternative paths are present for this.
Post condition	Process of issue/return gets completed.
Exception Paths	No exception paths are present.
Other	None

3.1.8 Check Availability

Use Case Name	Check Availability
Trigger	By person only
Precondition	1.If person want to issue some equipment.

Basic Path	1.Firstly person should logged in into the system and go for issue equipment. 2.Then availability of desired products are checked in the inventory.
Alternative Paths	No alternative paths are present for this.
Post condition	Feasibility of process of issuing gets confirmed.
Exception Paths	No exception paths are present.
Other	None

3.1.9 View Details

Use Case Name	View Details
Trigger	By secretary only
Precondition	
Basic Path	1.First secretary must be logged in into the system. 2.Then he/she should enter valid input for View Details.
Alternative Paths	No alternative paths are present for this.
Post condition	Secretary can check view all details of equipment regarding which are outstanding or present.
Exception Paths	No exception paths are present.
Other	None

3.1.10 View By Equipment Category

Use Case Name	View by Equipment Category
Trigger	By secretary only
Precondition	1.Secretary should go into view details.
Basic Path	1.First follow the basic path for view details. 2.Then he/she should enter valid input for View Inventory Products. 3.Then List of all available products in inventory are extracted from database and shown.
Alternative Paths	No alternative paths are present for this.

Post condition	Secretary can check if any product is present in fewer or in excess amount than desired.
Exception Paths	No exception paths are present.
Other	None

3.1.11 View All Available

Use Case Name	View All Available
Trigger	By secretary only
Precondition	1.Secretary should go into view details.
Basic Path	1.First follow the basic path for view details. 2.Then he/she should enter valid input for View Equipment Availability. 3.Then List of all equipment of that category(available as well as issued) are counted and listed down.
Alternative Paths	No alternative paths are present for this.
Post condition	Secretary can check if any product is present in fewer or in excess amount than desired.
Exception Paths	No exception paths are present.
Other	None

3.1.12 View All Outstanding

Use Case Name	View all Outstanding
Trigger	By secretary only
Precondition	1.Secretary should be logged in into the system. 2.Secretary should go into view details.
Basic Path	1.First follow the basic path for view details. 2.Then he/she should enter valid input for View Outstanding Products. 3.Then List of all outstanding products with due dates and holder's details etc. gets printed.
Alternative Paths	No alternative paths are present for this.
Post condition	Secretary can check due dates for some particular products may be on some particular student.

Exception Paths	No exception paths are present.
Other	None

3.1.13 Add New Equipment

Use Case Name	Add Equipment
Trigger	By secretary only
Precondition	1.Secretory should go into add equipment.
Basic Path	1.First follow the basic path Secretary Login. 2.Then he/she should enter valid input for adding equipment. 3.Then List of all category products gets printed. 4.Enter Id of one which need to be added. 5. Enter quantity needs to be added.
Alternative Paths	No alternative paths are present for this.
Post condition	Desired equipment in desired quantity gets added in inventory.
Exception Paths	No exception paths are present.
Other	None

3.1.14 Update Database

Use Case Name	Update Database
Trigger	By adding equipment.
Precondition	1.Secretory should go into add equipment.
Basic Path	1.First follow the basic path Secretary Add Equipment. 2.Then add all equipment into the database by generating unique ID's for them.
Alternative Paths	No alternative paths are present for this.
Post condition	Requested equipment will be added into system.
Exception Paths	No exception paths are present.
Other	None

3.1.15 Get Valid Id

Use Case Name	Get Valid Id
Trigger	By system only(On secretory request)

Precondition	1.Secretory should go into add equipment. 2.Database should be updated.
Basic Path	1.First follow the basic path Secretary Add Equipment. 2.Then System will check availability of eqiupment and their id's in database. 3.Next Id which is not used yet will be assigned.
Alternative Paths	No alternative paths are present for this.
Post condition	Required unique will be generated for equipment to be added.
Exception Paths	No exception paths are present.
Other	None

Reliability

3.1.16 Maintenance

The software will not allow multiple logins at the same time. Only one login is permitted at a time. Also the software is developed using concepts of object oriented paradigm which helps to keep the structure of the software and easy to understand. All these factors made the maintenance of the software relatively easy, secure, handy and fast.

3.1.17 Maximum bug rate

There will be a maximum of 1 bug/KLOC.

3.1.18 Security Considerations

Software is designed using the key aspects of object oriented programming which includes encapsulation and most of the data is not in the direct reach of customer because of which project is relatively more secured.

Since database is totally separated from software so in case of any fault (crash) in programme database is in the safe hands.

3.2 Performance Requirements

3.2.1 Response time

Since the software will be developed by cpp14 so it will relatively faster than other languages in the other hand developers have tried to make software algorithms as efficient as possible hence speed of the software will be fast enough.

3.2.2 Capacity

All the programming logic is dynamic nothing as a pre-computation or saved data within the code is required , only memory for code is required which would not exceed few Megabytes. And all the Database will be stored in hard disk of system only which has no fixed upper limit.

3.3 Supportability

3.3.1 Naming Convention

All the variables are naming in such a way so that it is easy to identify it's functionality and which is short too. Except that all the project is prepared by using the Hungarian Naming Convention.

3.4 Design Constraints

3.4.1 Software Language

This software is developed using C++ programming language. The software is not connected to any server it is hosted on a local system.

3.5 Interfaces`

3.5.1 User Interfaces

User Interface is command line which interacts with user by taking valid input using commands for all activities. All classes calls their view functions to show all functionalities on user interface out of which user can enter input for desired activity according to shown on user interface.

3.5.2 Hardware Interfaces

For hardware probably any system would be able to work with this software Just a few megabyte ram and rom for smooth functioning of programme.

3.5.3 Software Interfaces

The software interacts with the operating system, apart from that a C++ compiler a CPP compiler is also needed for execution of the software . The software uses the database which is stored in the hard disk of the system , Also it uses certain other libraries.

4. Supporting Information

4.1 Appendix A – Data Dictionary

4.1.1.1 Actors

An actor in unified modelling language represent the user or may be other system which interacts with system and with it's functionalities.

4.1.1.2 Compiler

Compiler is also a programme which includes necessary files and execution methods to run other programming.

4.1.1.3 Hungarian Naming Convention

In this naming convention variables, methods and other attributes of the programme are named according to their functionalities or the type of work they perform.

4.1.1.4 Interface

It is a Physical or imaginary boundary across which two or more than two software exchange their information.

4.1.1.5 KLOC

It is the measure of the size of a computer programme or application.

4.1.1.6 Software

It is the part of the computer system that consist of computer instructions, data and programs etc.