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**Software Design and development project**

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## **1. Introduction**

CQU lab management system is an application designed to help students and staffs easily find the lab equipment available in their respective campuses. It is made on a foundation of features that will allow it to manage the various aspects of a lab operation.

The main goal of this system is to eliminate the usage of spreadsheet to record the details of the lab equipment which we believe that will save a lot of time and effort.

In this document, we are going to see more detail about, how we can initialize the project and system operation, design, requirement, purpose, quality management, risk management etc. And the tools which helps to fuel up for the application are NetBeans IDE for developing the application, Scene builder for developing User Interface designs and for data storage purposes, we are using Java DB database.

## **1.2 Scope**

The scope of the project is the develop the application for CQU laboratory to perform multiple tasks. It will be useful for the students who can search, book, and return equipment with limited period. The application carried out by admin users and student users. The admin users have access to create, view, delete information. In terms of student users, they can access to view equipment details and book equipment if they required. This will be useful for CQ university to keep track of all the information and retrieve if its required.

# **2.Funtional and Non-functional requirement**

## **2.1 Functional requirement**

Ian Sommerville (2011) defines the functional requirement as the behaviour of the system-how it reacts to inputs and the services it should provide.

This application will be a basic lab management system for CQU university. The application will have access to two different users, one for admin who can have access to everything and students who can have access to view and book the equipment.

* The system will allow the admin users to create new access to the students by registering his / her details in student registration form.
* The system will allow admin users to add, delete, search edit and view equipment and campus related details.
* The system will allow students to view, search and book equipment by using his/her login credentials.
* The system will show the history, due date and return equipment once the student users logged into the application.

## **2.2** **Non-Functional Requirements**

Bennett, Mcrobb and Farmer (2010, p.137) defines non-functional requirement as relating to how well the system performs rather than what it does. Non- functional requirements of CQU lab management system are documented as follows:

* Security: CQU lab management system requires authorised user to access the system. Since the system have different roles (admin and user), these users have different privileges. Only admin can add or delete the staff and student details. Except admin and user, no one else should have access of the system.
* Performance: The performance of the application should be fast enough and should be able handle unexpected and expected errors. The system should respond to the user within the two seconds from the time of the request submittal.
* Data Storage: The data and information of CQU lab management are stored securely. The lab stock inventory, user details are kept on the backend SQL database. These records can be easily backed up by the admin.
* Usability: CQU lab management system should be easy to use. The user-interface of the system is simple, easy to use.

# **Architecture**

CQU lab Management system follows Model View presenter pattern (MVP). The MVP patter is evolved from MVC patter. They both have same place: Model is data layer, which is responsible for accessing data, view is the view layer which is responsible for data display and presenter layer responsible for logic processing (li,Dan 2020).

aDiagram

Description automatically generated

Figure 1 : MVP architecture

The presentation layer of the system will translate all the requested task and the outcome results are understandable to user. The business layer data form the database layer and transfers it to the presentation layer and the database layer handles all the data and transfers it to business layer.

# **4. Feasibility types**

Feasibility study is simply an assessment of the practicality of a proposed plan (Bridges, 2019). Considering the requirements, a full-scale feasibility was undertaken for testing the CQU lab management system.

The feasibility study plays the major role in initial stage of project plan. The main objective of feasibility study is to focus on strengths and weakness of our proposed project (CQU lab management system). It will be useful to identify opportunities and threads for our proposed project. It is nothing but, self-analyses report whether our project team have required bandwidth in terms of people and technology to drive our project in right direction.

The feasibility study is classified into five different types:

1. Technical feasibility

2. Economic feasibility

3. Social Feasibility

4. Legal feasibility

5. Operational feasibility

# **4.1** **Technical feasibility study**

Technical feasibility is the process of validating the technology assumptions, architecture, and design of a product (Spacey, 2017). The main objective of technical feasibility study is to understand the project technical team who have required knowledge in NetBeans IDE, Java programming skills, Scene builder, SQL management. For our proposed project (lab equipment sourcing) it is mandatory to have knowledge in this area. If not, it could be the serious threat for our project. The project manager or lead must find the resources who have necessary knowledge in those area. At the same time, it is important to focus on system requirements like, necessary software, tools, CPU with required configurations to have a capability to convert ideas to the working module. (Simplilearn 2021)

## **4.2 Economic feasibility study**

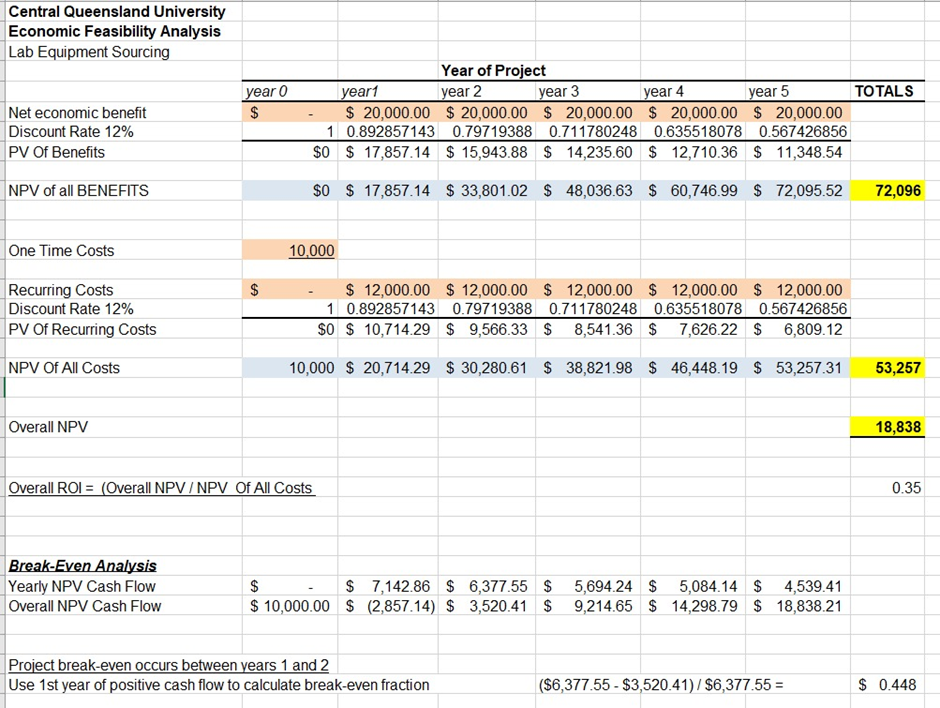
****The main objective of economic feasibility study is to focus on cost – benefit analysis. It could be the decision maker whether the organisation must take this project or not. In organisation point of view, it is necessary to analyse the profitability rate of the product. We are using cost – benefit analysis report to find the break even for this project. If the product doesn’t even cover up with fixed cost, there is no use of taking up this project. For this case, we need to negotiate with our client to revaluate the cost for this application. (Simplilearn 2021)

Figure 2: cost benefit analysis

We have done with cost – benefit analysis for this application (CQU lab equipment management system)

In this cost – benefit analysis report, we have break even in the year of three. It could be beneficiary for our organisation if we take up this project. (Simplilearn 2021)

## **4.3 Social feasibility**

Computerization brings fear of unemployment among the existing staff however the system will not create any unemployment problems in the university but will create new job positions like system manager, data entry staff, operators, programmers etc. The existing organizational structure will remain still. Also, at the time of implementing the application, training programs will be arranged for all the existing staffs of the laboratory for 5 to 7 days. (Simplilearn 2021)

## **4.4 Legal feasibility study**

The legal feasibility study is used to check whether the proposed project conflicts with any other legal system. There are the laws where the organisation must need to consider while developing the project. There are some legal acts like, Zoning laws, data protection acts and social media acts.

In our project (CQU lab management system), it doesn’t conflict with any other legal acts. The data about the lab is completely secured, and it will be managed with high level security measures which we mentioned in non – functional requirements. As per the legal feasibility study, it is good to go with our proposed project. (Simplilearn 2021)

## **3.5 Operational feasibility study**

Operation feasibility is the feasibility of deploying, managing, and operating the project including consideration of operational risks such as downtime (Spacey, 2017). It helps to identify the deviations from the scope of the product. It could be easy to resolve the problem arises during the development of the product. And it also used to check whether it satisfies the requirements which the project team collected from our client (CQU University).

For our project, we are using Agile methodology with multiple sprints to analyse and monitor performance of the project team. The JIRA tool used to handle with those circumstances. (Simplilearn 2021)

# **Database Design**

Database design starts with a conceptual data model and produces specification of a logical schema (Watt, 2014). The main objective of database design is to produce logical and physical design models of the database system. The

database design will then decide how and what data must be stored in the system. Here is the ERD diagram of the CQU lab management system:

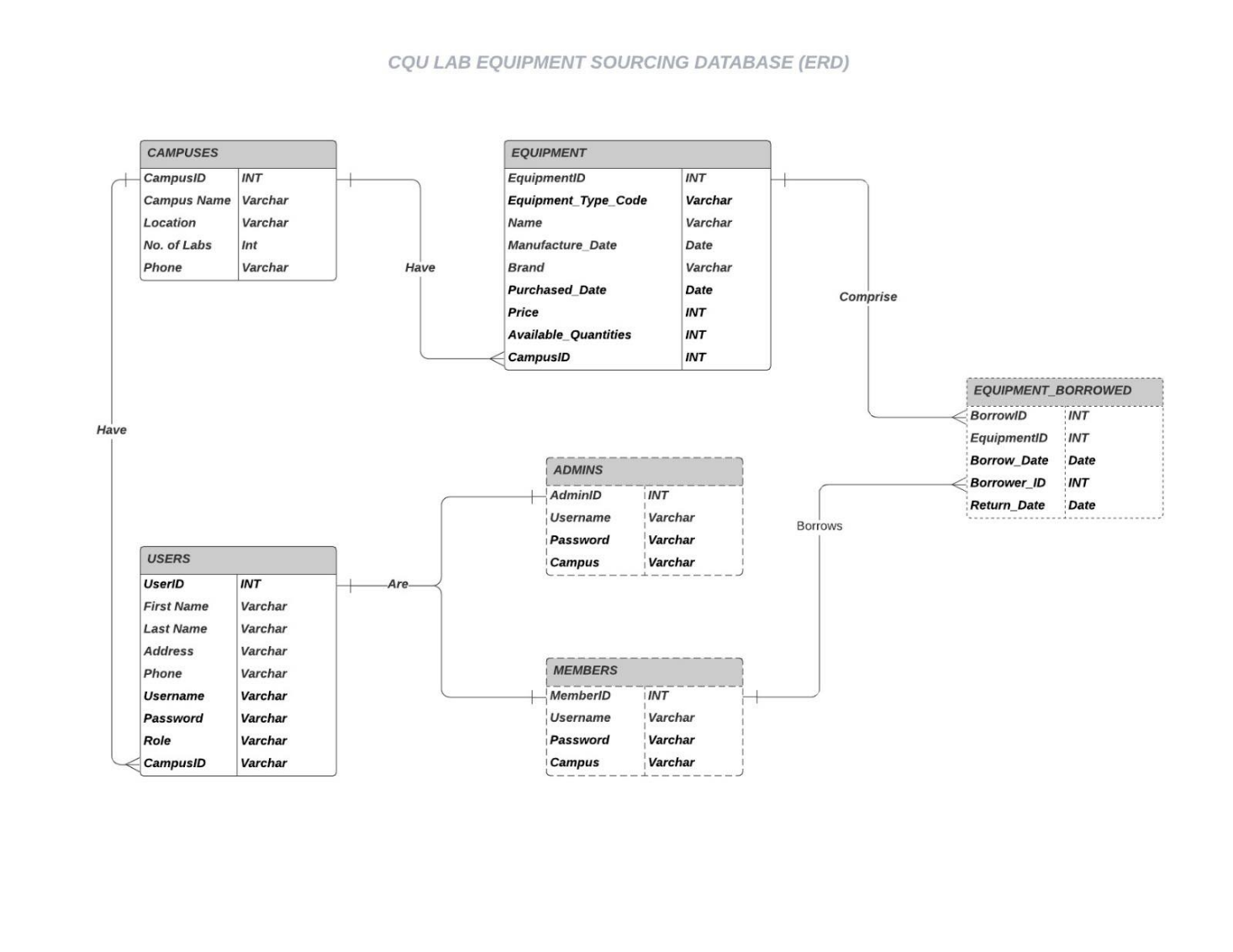


Figure 3 : Database (erd)

# **Work Breakdown Structure (WBS)**

Diagram

Description automatically generatedWork Breakdown Structure is “a deliverable-oriented hierarchical decomposition of the work to be executed by the project team to accomplish the project objectives and create required deliverables” (cohen,2018). Following figures depicts the work down structure of CQU Lab management system:

Figure 4: work breakdown structure

At the top of the work breakdown structure is the final deliverable. Immediately beneath that is the next stage of deliverables, which are the main tasks required to complete the project. Each of those five project phases—initiation, planning, execution, control, and closeout—branch off the main deliverable at the top. Once decided, they are then broken down into a series of tasks. These tasks, however, can be further distilled into smaller subtasks. The WBS, when created as thoroughly as possible, is the roadmap to guide us to completion of what would seem to be a very complicated project. However, when broken down with a WBS, the project suddenly becomes much more manageable.

# **Schedule (Gantt Chart)**

A Gantt chart is commonly used for graphical depiction of a project that helps in scheduling, managing, and monitoring specific tasks and resources in a project (Grant, 2021). The follow figures depict the Gantt chart of CQU lab management system:

Graphical user interface

Description automatically generated with medium confidence

Figure 5 : gantt chart

As shown in the Gantt chart displayed below, we can see the project progress by stages where it is divided into three major tasks that consists of different subtasks.

The project starts on 12th July with the requirement analysis and gathering part which took around 16 days to finish up on 31st July with subtasks containing identifying requirements, analysis & data collection, hardware & software costs, specific lab design requirements.

Then comes the coding, testing & implementation phase where the subtasks were divided into programming, testing, error fixing. We can see this phase took approximately 1 month i.e., starting on 22nd July & ending on 31st August.

Finally comes the documentation & maintenance stage with a duration of around 29 days starting from 18th August & ending on 27th September with the subtasks that includes user & system documentation, updates & improvement.

# **Use case**

According to Brush (2019), use case is a methodology used in the system to identify, clarify, and organise system requirements. A use case can help the team to identify where errors may occur and how to resolve them. It also serves as the basis for the actor, the system user, and the goal.

6.1 Use case diagram

Use case diagram describes the high-level functions and the scope system. Use case diagram model describes the behaviour of the system and helps to capture all the requirements of the application. The figure below shows the Use case diagram of the Lab Equipment System:

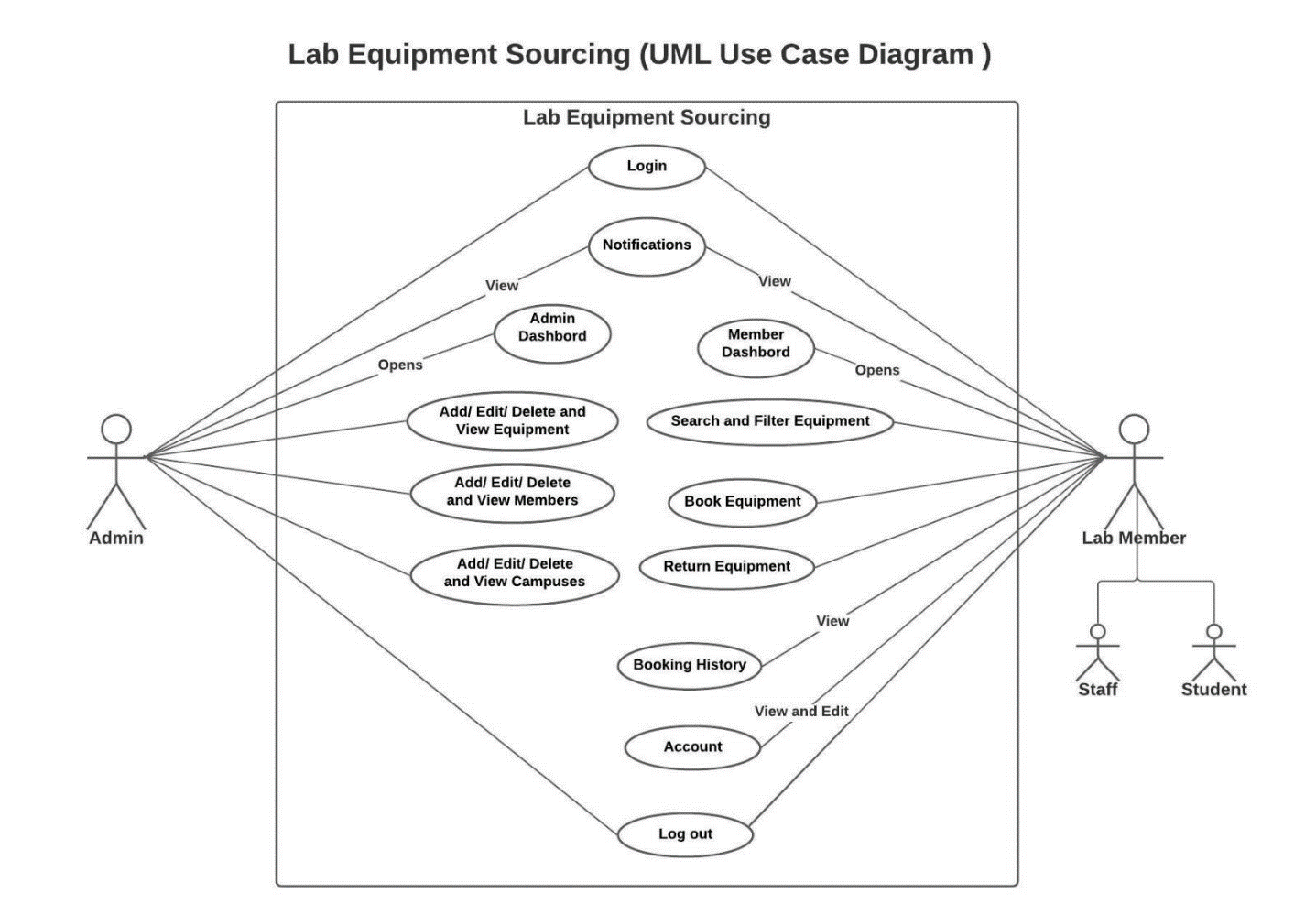


Figure 6 : Use case diagram

# **Class Diagram**

Class diagram describes the structure of a system by showing the system’s classes, their attributes, and the relationship among these classes (Elgendy,2016). Class diagrams are the building blocks in the object-oriented language. Class diagrams are used to show the different entities and attributes of the system. Classes in the class diagram are represented in the box, the top part contains the name of the class whereas the middle part contains attributes, and the last bottom part represents the operations which are associated with the class.

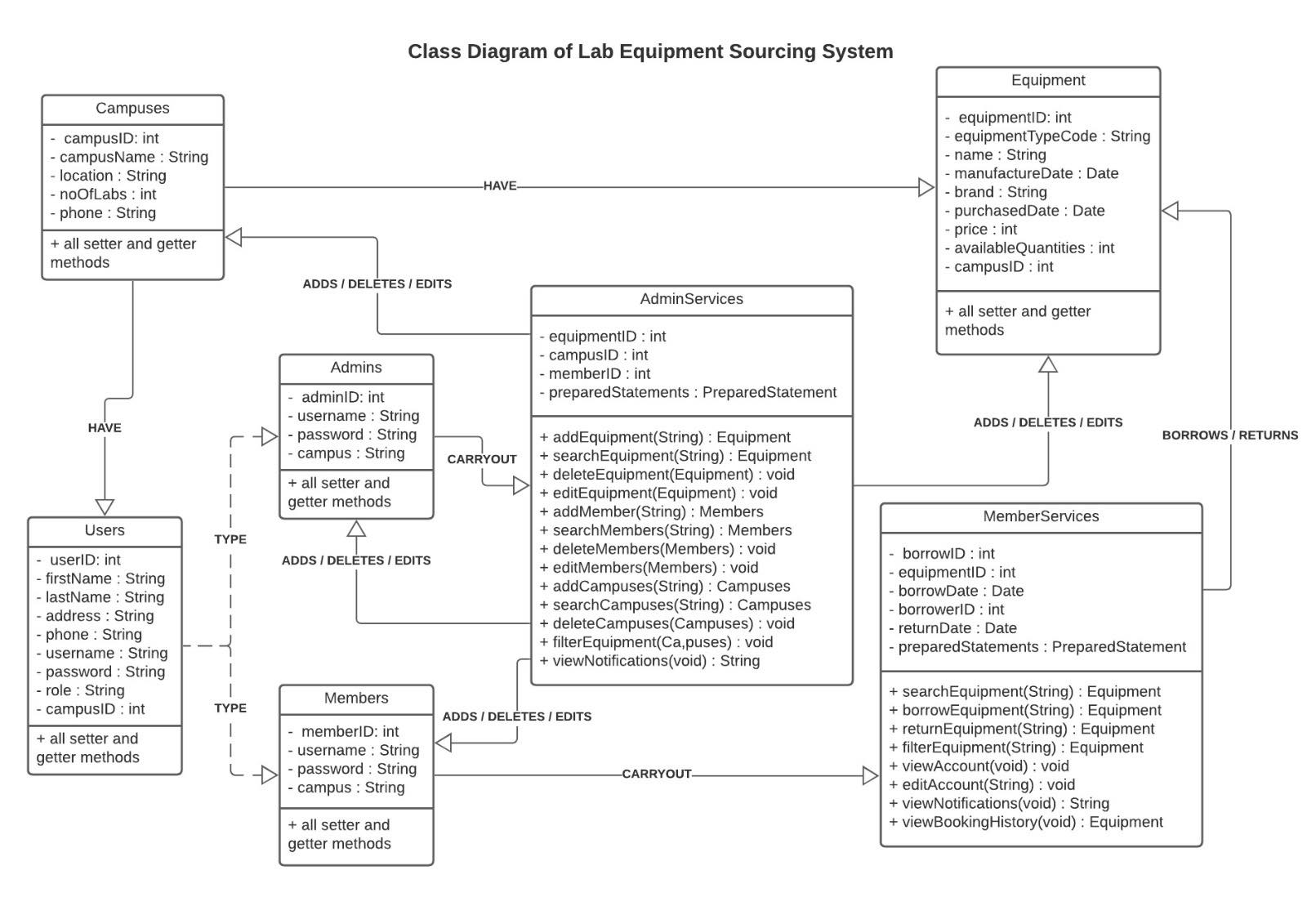
The following figures is a class diagram of CQU lab equipment system:

Figure 7 : Class diagram

# **Sequential diagram**

Sequence diagram is defined by the UML manual as “a diagram that shows object interactions arranged in time sequence” (Baqais and Alshayeb, 2018). Sequence diagram is a UML diagram which illustrates the sequence of the message between the objects. Sequence diagram helps to understand the relation between the objects. Figure below shows the interaction of admin(actor) and the layer entities:

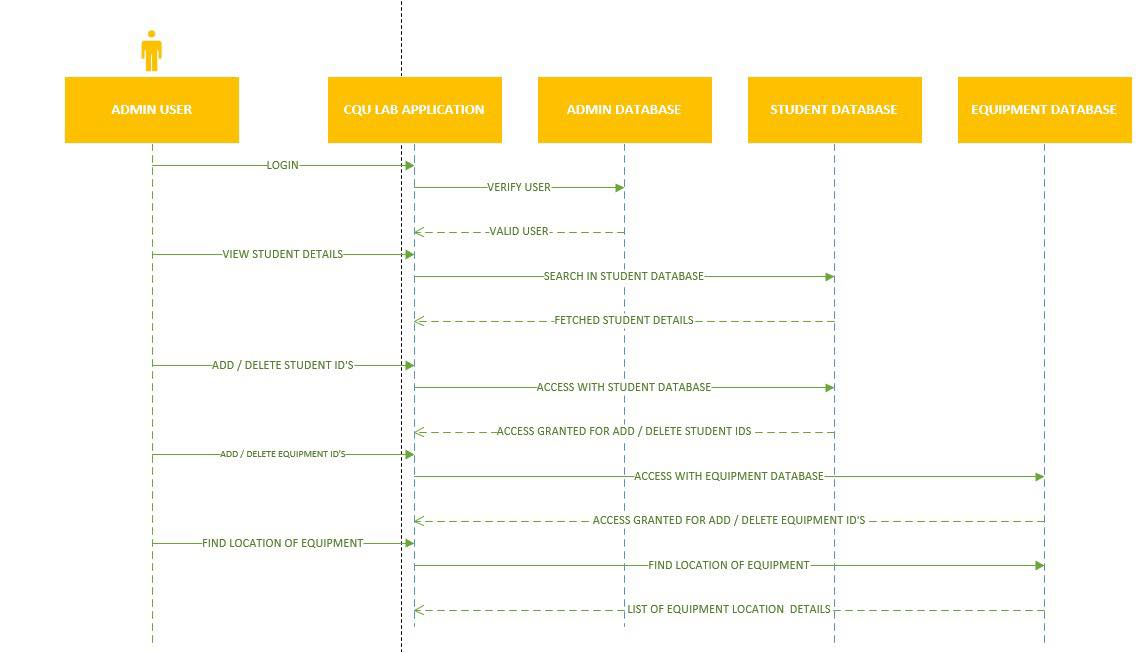


Figure 8 : Sequential diagram (Admin)

Above diagram shows the interaction between admin and the layer entities. The admin logins to the CQU application. In the homepage we can see admin logins with their credentials authentication and only admin can view staff and student details and can add, delete staffs and students.

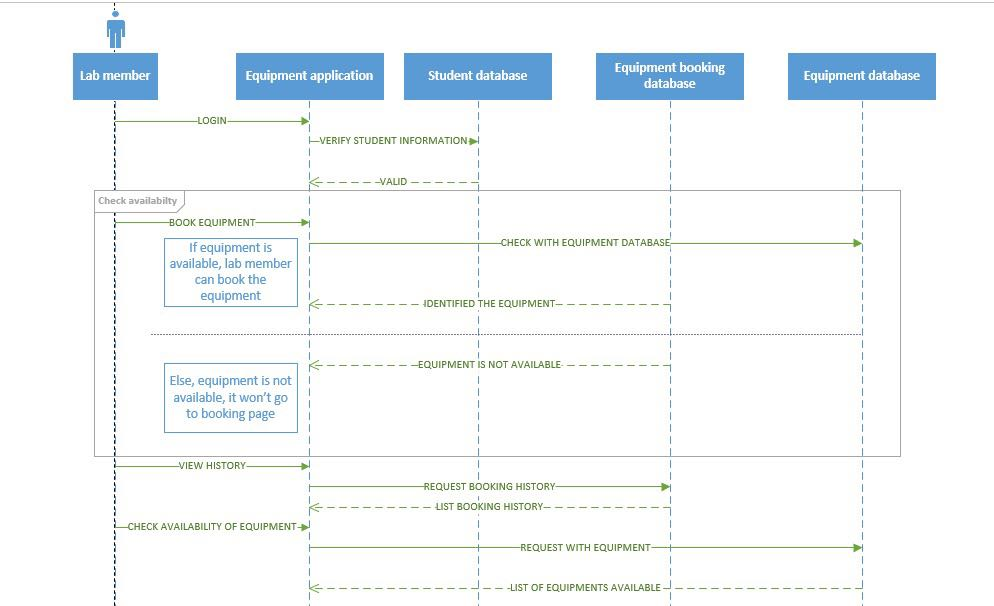


Figure 9 : Sequential Diagram (User)

Here in the above diagram, we can see the interaction between the lab members and the layers. In the homepage we can see that the lab members logins with their credentials and if that is valid then the lab members can use rest of the function like booking equipment and checking the availability of the equipment.

# **User stories**

A user is a general explanation of a software feature written from the end user perspective. The main purpose of the user stories is to articulate how a software will provide and information to the customer (Rehkoph, 2021). The user stories provide important context to development team before a project begins. This can help development team think more critically and creatively (Franchino, 2019). So, for the CQU lab management system there are three types of users:

* Admin
* User (Student)

The requirements of the system can lure the following user stories:

## **9.1 As an admin**

* I can login into the system
* I can add new student details, delete, edit and view
* I can add equipment details (Name, ID, Location), delete, edit and view
* I can add/Delete campus details
* I can track the student history
* I can see student details individually
* I can logout of the system

## **9.2 As a student**

* I can login into the system
* I can view, search, and book the equipment in the laboratory
* I can view the history which I borrowed from the laboratory
* I can see the due date of the equipment which I borrowed from the laboratory
* I have an option to withdraw my equipment before the due date
* I can logout of the system

# **Implementation of User Stories**

## **10.1 User Story (User):**

1. The system actors need to be able to access their own services assigned to them according to their role.

**Implementation of the user story:**

* The system actors are divided mainly into Admins and Members.
* A single login page appears at first when the system is started.
* According to their individual login credentials, they are identified as admins or members of the system.
* If the user is Admin of the Lab System, he is redirected to the admin dashboard where all the services assigned to an administrator is displayed and he will be able to access them all.
* If the user is Member of the Lab System, he is redirected to the Member dashboard where all the services assigned to a member is displayed and he will be able to access them all.

## **10.2 User Story (Admin):**

1. Admin will be able to add, edit, delete, search and view the campuses, admins, students and lab equipment.

**Implementation of the user story:**

* Once admin logs in from the login page, he enters the Admin Dashboard.
* He can see all the accessible services on the dashboard itself and can choose to enter any of them by clicking on the corresponding button.
* Admin has the full CRUD authority to carry out on all the models of the system. The models are Admins, Campuses, Lab Equipment, and Students.
* Upon clicking each button to access a service, the system will redirect the Administrator to a new page where he can either add, search, view, edit or delete the elements of the system.

**Test of the user story implementation:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test No. | Test Name | Input | Expected Output | Actual Output | Remarks |
| LOGIN PAGE | | | | | |
| 1 | Login Portal Check  (For Admin Login) | * Username: **admin** * Password: **admin1** * **Login** Button Clicked | Admin Dashboard needs to be displayed. | Admin Dashboard was displayed. | **PASSED** |
| 2 | Login Portal Check  (For Member Login) | * Username: **student** * Password: **student1** * **Login** Button Clicked | Member Dashboard needs to be displayed. | Member Dashboard was displayed. | **PASSED** |
| ADMIN DASHBOARD PAGE | | | | | |
| 3 | ADD ADMIN BUTTON | * Clicked Add Admin Button | A new window to add a new admin will be displayed. | A new window to add a new admin was displayed. | **PASSED** |
| 4 | ADD STUDENT BUTTON | * Clicked Add Student Button | A new window to add a new Student will be displayed. | A new window to add a new Student was displayed. | **PASSED** |
| 5 | ADD EQUIPMENT BUTTON | * Clicked Add Equipment Button | A new window to add a new equipment will be displayed. | A new window to add a new equipment was displayed. | **PASSED** |
| 6 | ADD CAMPUSES BUTTON | * Clicked Add Campuses Button | A new window to add a new campus will be displayed. | A new window to add a new Campus was displayed. | **PASSED** |
| 7 | STUDENT DETAILS BUTTON | * Clicked Student Details Button | A new window to search the student will be displayed. | A new window to search the student was displayed. | **PASSED** |
| 8 | EQUIPMENT DETAILS BUTTON | * Clicked Equipment Details Button | A new window to search the equipment will be displayed. | A new window to search the equipment was displayed. | **PASSED** |
| 9 | LOG OUT BUTTON | * Clicked Log Out Button | Admin will return to the login page. | Admin returns to the login page. | **PASSED** |
| ADD ADMIN PAGE | | | | | |
| 10 | REGISTER NOW BUTTON | * Admin (Adarsha) details entered. * Clicked Register Now Button | “New Admin Added” prompt will be displayed. | “New Admin Added” prompt was displayed. | **PASSED** |
| 11 | CHECK ADMINS TABLE ON DATABASE | * Open [localhost / 127.0.0.1 / cqulabequipmentsourcing / admins | phpMyAdmin 5.1.0](http://localhost/phpmyadmin/index.php?route=/sql&server=1&db=cqulabequipmentsourcing&table=campuses&pos=0) on browser | Updated Admins Table will be displayed. | Updated Admins table with new Admin (Adarsha) displayed. | **PASSED** |
| 12 | BACK TO HOME PAGE BUTTON | * Clicked Back to Home Page Button | Admin will return back to the admin dashboard. | Admin returns back to the admin dashboard. | **PASSED** |
| ADD STUDENT PAGE | | | | | |
| 13 | REGISTER NOW BUTTON | * Clicked Register Now Button | “New Student Added” prompt will be displayed. | “New Student Added” prompt was displayed. | **PASSED** |
| 14 | BACK TO HOME PAGE BUTTON | * Clicked Back to Home Page Button | Admin will return to the admin dashboard. | Admin returns to the admin dashboard. | **PASSED** |
| ADD CAMPUSES PAGE | | | | | |
| 15 | REGISTER NOW BUTTON | * Melbourne Campus details entered. * Clicked Register Now Button | “New Campus Added” prompt will be displayed. | “New Campus Added” prompt was displayed. | **PASSED** |
| 16 | CHECK CAMPUSES TABLE ON DATABASE | * Open [localhost / 127.0.0.1 / cqulabequipmentsourcing / campuses | phpMyAdmin 5.1.0](http://localhost/phpmyadmin/index.php?route=/sql&server=1&db=cqulabequipmentsourcing&table=campuses&pos=0) on browser | Updated Campuses Table will be displayed. | Updated Campuses table with new Campus (Melbourne Campus) displayed. | **PASSED** |
| 17 | BACK TO HOME PAGE BUTTON | * Clicked Back to Home Page Button | Admin will return back to the admin dashboard. | Admin returns back to the admin dashboard. | **PASSED** |
| STUDENT DETAILS PAGE | | | | | |
| 18 | BACK TO HOME PAGE BUTTON | * Clicked Back to Home Page Button | Admin will return to the admin dashboard. | Admin returns to the admin dashboard. | **PASSED** |
| EQUIPMENT DETAILS PAGE | | | | | |
| 19 | BACK TO HOME PAGE BUTTON | * Clicked Back to Home Page Button | Admin will return to the admin dashboard. | Admin returns to the admin dashboard. | **PASSED** |

# **11.Risk estimate in the project**

In software development, risk may arise in various elements. The project manager must take the responsibility to identify the probability of risks and make the necessary plan to mitigate at early stage (Gracia,2019). In this area, the risk management plan came into the picture.

The risk management plan helps to take up the response to each risk and identify the alternative solutions. This will help us to develop the software at high quality manner. In this project, “Equipment lab sourcing”, we have listed the risks which may arise while developing the software, as well as we analysed the impacts which may create from those risks. It helps to prioritize those risks which creates high impact in our project. The PM and BA identified the list of risks which may affect the project in various aspects. It might be the serious thread to time management, scheduling and even in the quality of the software product. Those risks need to be mitigated from various solutions.

P – It stands for the occurrence of risk

I – It stands for the percentage of impact which may rise in the project.

J - P\* I J stands for Jeopardy of the project.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S.NO | Risk | P | I | P\*I | Solution / Mitigation |
| 01 | Requirement changes frequently by client side | 6 | 7 | 42 | The project manager must understand the initial stage of the document, Identify the queries. Have the meeting with the project owner frequently to get clear idea about their requirement before the initiation of work. |
| 02 | Data Integration | 5 | 3 | 15 | In this project “*Lab equipment management system”* it is important to maintain the proper datasets. There are various tools to integrate the multiple datasets. By using those tools, it is easy to mitigate those risks. |
| 03 | Communication problem between team members | 8 | 7 | 56 | It is the serious threat, where it may create serious impact to the project. It is mandatory to have internal discussion with their team members in daily basis. Updating their work in separate portal where every team member in the group can view their workings. It needs to be rectified at the initial stage itself. |
| 04 | Task need to be spitted equally | 7 | 7 | 49 | First stage of reducing those risks by analysing the skillsets of each team member in the group. Based on their understandings and skillsets, tasks need to be listed and shared equally within their group. |
| 05 | Data tracking | 6 | 5 | 30 | If the team members are updating their work in different DB, it creates difficulty in tracking those datasets. To overcome this issue, Centralized is the only option where helps to have access to all the other members in their group. |
| 06 | Lack of Expertise | 5 | 5 | 25 | If the user doesn’t have enough knowledge in handling the application, it may create the risks in multiple ways. To avoid this situation, The PM or other people who have involved in the project has to give KT (Knowledge Transfer) to the users of the application. |
| 07 | Upgrade platform | 4 | 3 | 12 | The application needs to update frequently, it may help to reduce some risks. Currently, the application is running as standalone. But it could be better to have cloud-based application to increase the performance of the system. |
| 08 | Team coordination | 6 | 7 | 42 | If there is any lang in team coordination, it will create the serious damage to the quality of the product. To overcome this issue, team building activities are helps to resolve those risks. |
| 09 | Inventory maintenance | 5 | 4 | 20 | The equipment needs to be checked frequently; it has a chance of getting damaged. The quality of each equipment has to be checked and update at some interval of time. |

# **12. Quality Assurance Plan**

The quality management plan is the necessary document required to manage the quality of the project effectively. Quality management is the process of planning, scoping, implementing, and monitoring of quality into all phases of the project from concept through the delivery aspects of the work (Patterson, 2019). In short, we can say that project quality management plan documents are a necessary document required for effective management of the project from planning to delivery.

This quality plan is prepared during the planning phase of CQU lab management system. Quality management involves planning, managing team, skill forming and other project planning things. The intended audience of this CQU lab management system are the project manager, project teams, senior leaders, and stakeholders.

## **12.1 Quality roles and responsibilities**

|  |  |  |
| --- | --- | --- |
| Name | Role | Quality responsibility |
| Dr. Zakiullah Khan | Client Representative | Quality Audit |
| CQU University | Project Owner | Quality Coaching and testing |
| Adarsha Mani Lamichhane  Bandana Kapali  Javagal Srinath Narayan  Maruf Siddique | Software Developers, project planning and testers | Functional testing and quality assurance analyst |
| Jamie Shield | Course Coordinator | Quality Audit |

## **12.2 Quality Metrics**

|  |  |  |  |
| --- | --- | --- | --- |
| Metric | Standard | Measuring Method | Quality Criteria |
| User Friendly | The application needs to be user-friendly and should be easy to use. The application is flexible to use so user of any ages will be able to use the software. | Testing | The application should be user friendly and should run in any devices. |
| Cost of maintenance | The cost maintenance should be minimum | Auditing | The maintenance cost should be minimum that means all the cost of spreadsheet and paperwork should minimize. |
| Implication of the new technology | New tools and technology need to be use when necessary | Auditing | The tools and technology need to be up to date, and the framework must follow the MVP modelling. |
| Functionality | All the functional required that has been discussed should be implemented | Testing | No error must be found |
| GUI | The user interface needs to be simple, so any user can use it. | Testing and auditing | The GUI must be simple and attractive to the user. The colour combination should be simple and photoshop or any other tools must be used if necessary. |
| Performance | The performance of the application should be fast, and no latency should encounter during and tasks. | Testing | The vast data and files should be minimised to avoid latency. |

# **13. GUI Interface of the system**

The user interface can only be accessed by the authorised users. Each user interface is made using the scene builder.

**1. Login screen**

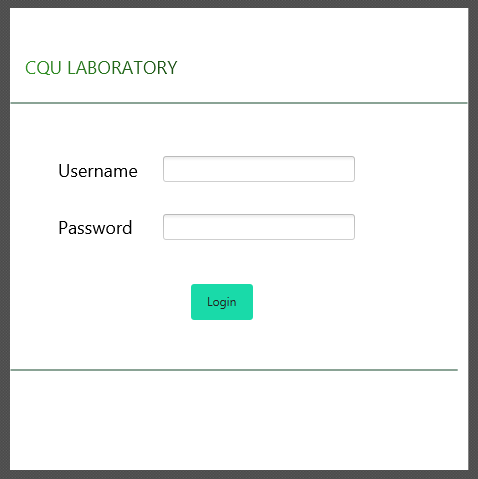


Figure 10 : Login screen

The above diagram represents the login screen for our application. We don’t have login screen for two users (Admin and students). It helps them to get in what they want to end up with.

**2. Admin dashboard**

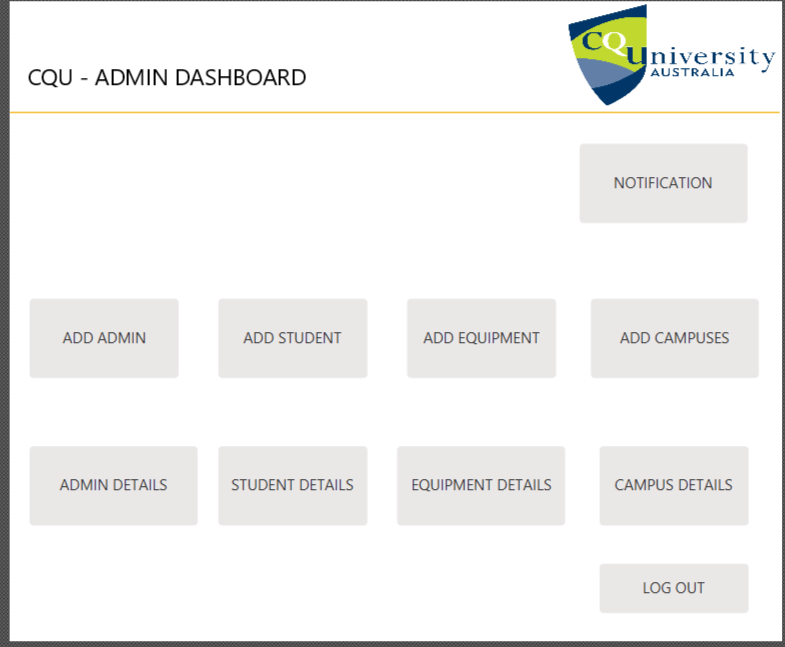


Figure 11 : Admin dashboard

The above diagram represents the CQU -dashboard for admin users. There will be multiple options for admin as we already mentioned in user stories. The admin can add, delete, and view student details. The admin can have access to add/delete new admins if required. The admin can add / delete, and view equipment details as well.

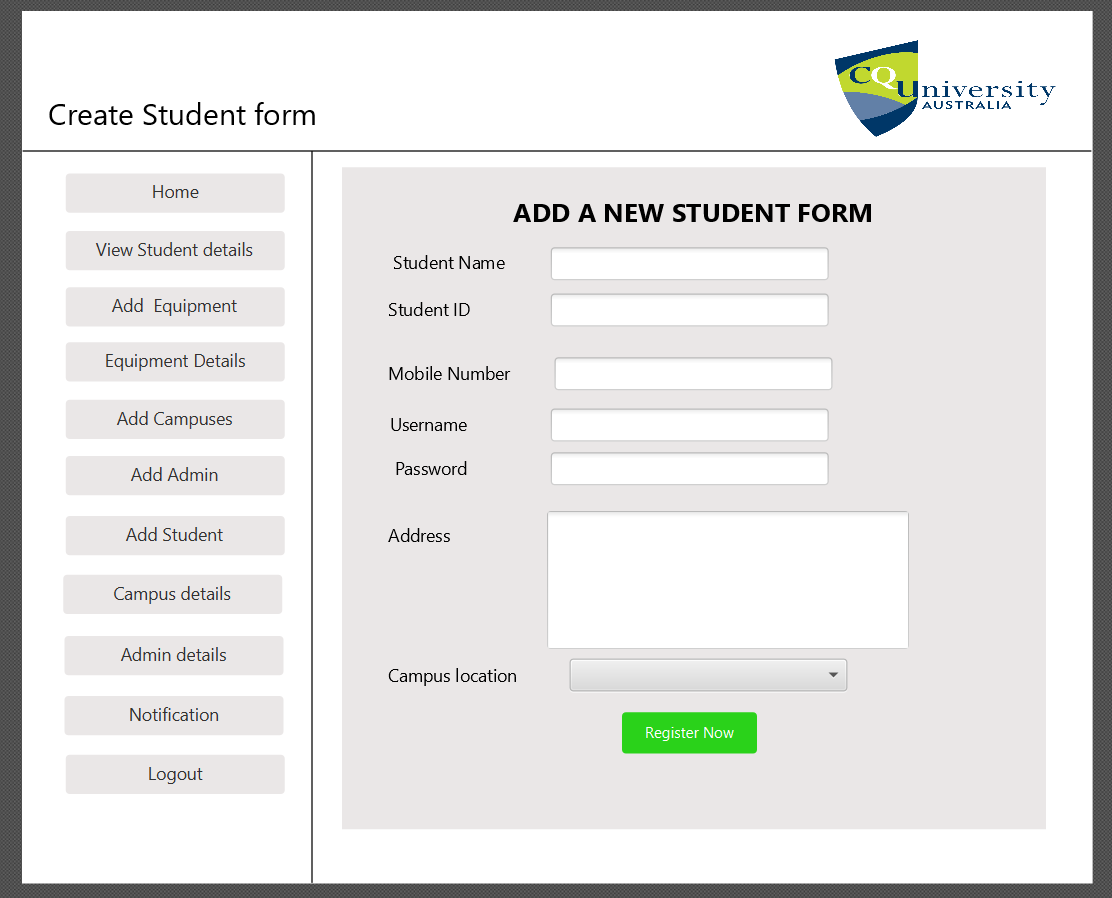
**3. Add student details**

Figure 12 : add student details

The above diagram represents the student registration form, this window helps to add the new student in the student database. This feature is exclusively available to admin users only. In the left side of the application, the list of other features will be available. To make them comfortable, we used to have navigation buttons to move one feature to the another.

**4. View Student details**

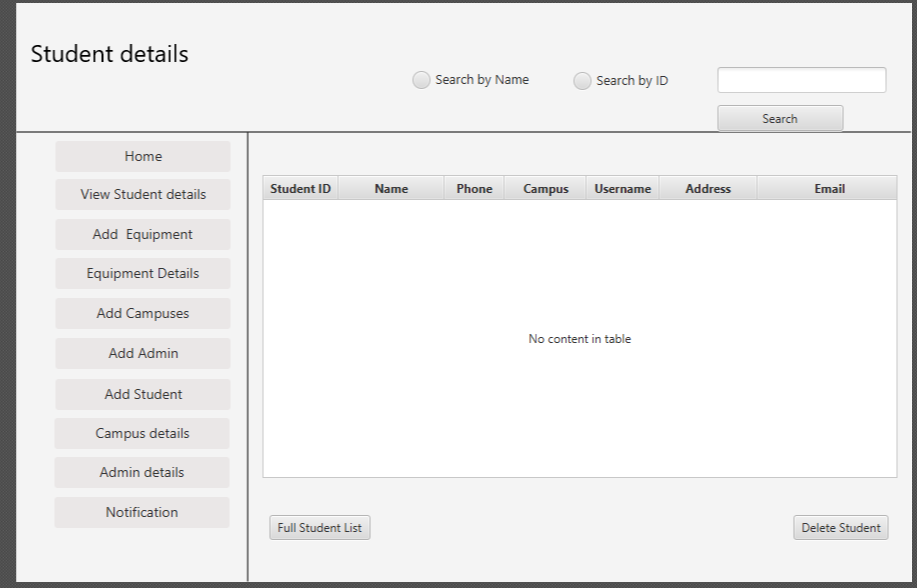


Figure 13 : View student details

In this window, the admin can see all the details related to students. If the admin wants to search by name or ID, we have an option to search, and those details will be displayed in the table. We can also see everyone’s details in the table.

**5. Add New Admin**

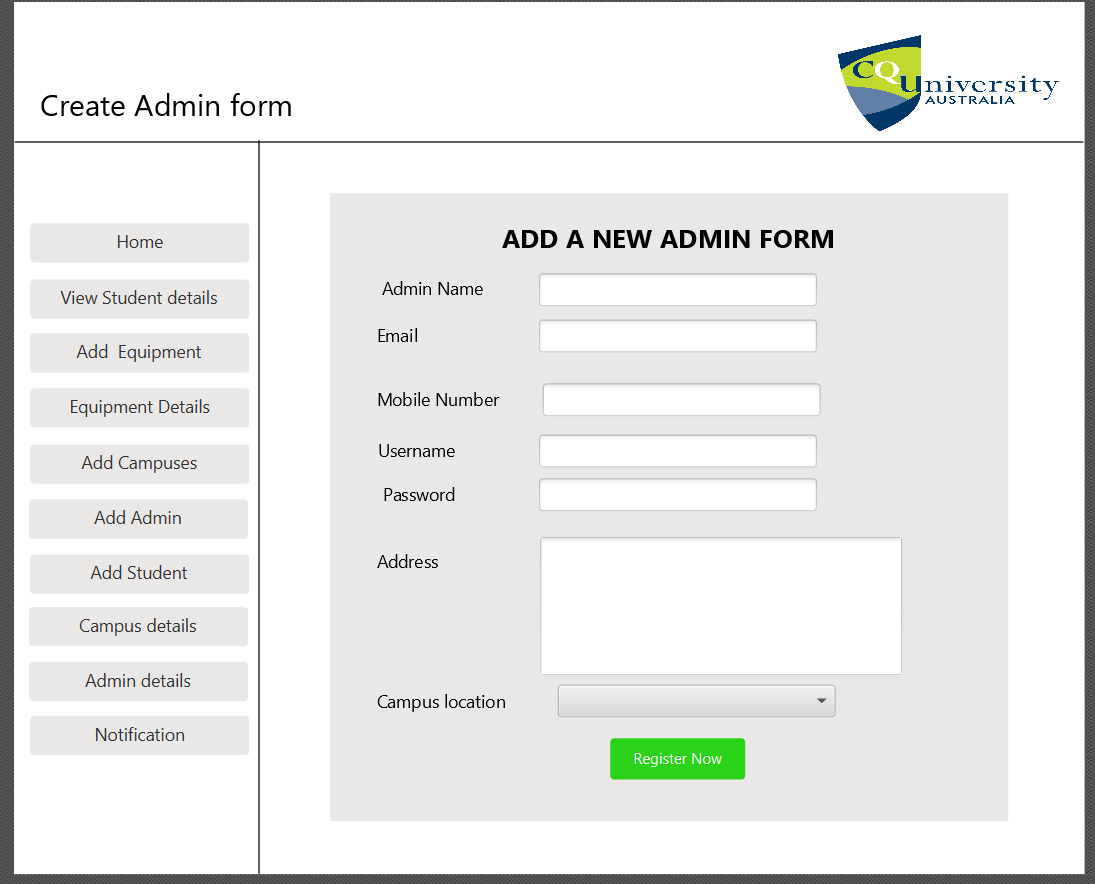


Figure 14 : Add new admin

In this window, the admin has a feature to add new admin if they required. There are some basic details which needs to be filled up. If we click on “Register Now” button, the following details will be added up in the admin table.

**6. Admin details**

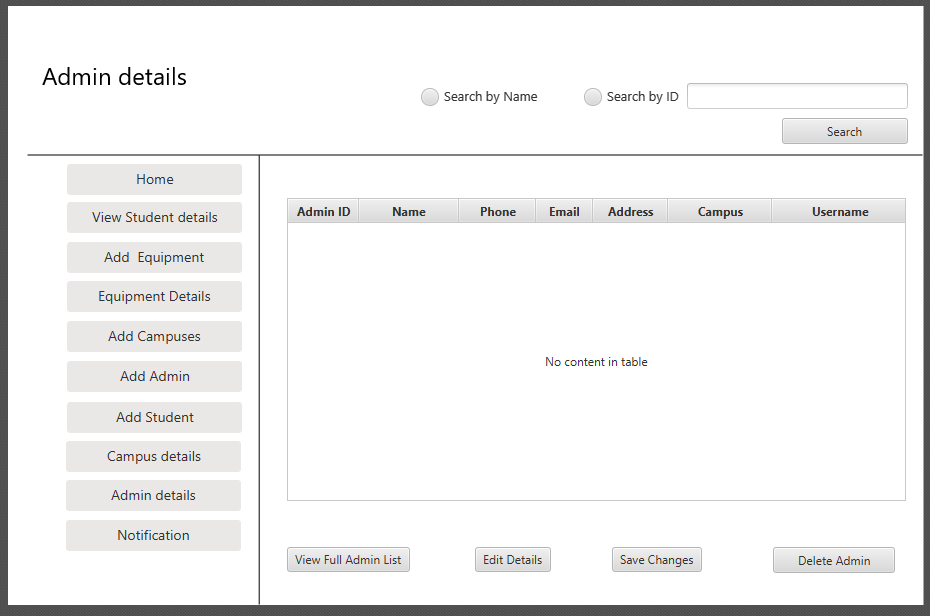


Figure 15 : Admin details

In this window, the admin can search other admin details by entering his / her name or id. By clicking on search button, the following details will be displayed in the screen. We can also see everyone’s details in the table.

**7. Add Equipment**

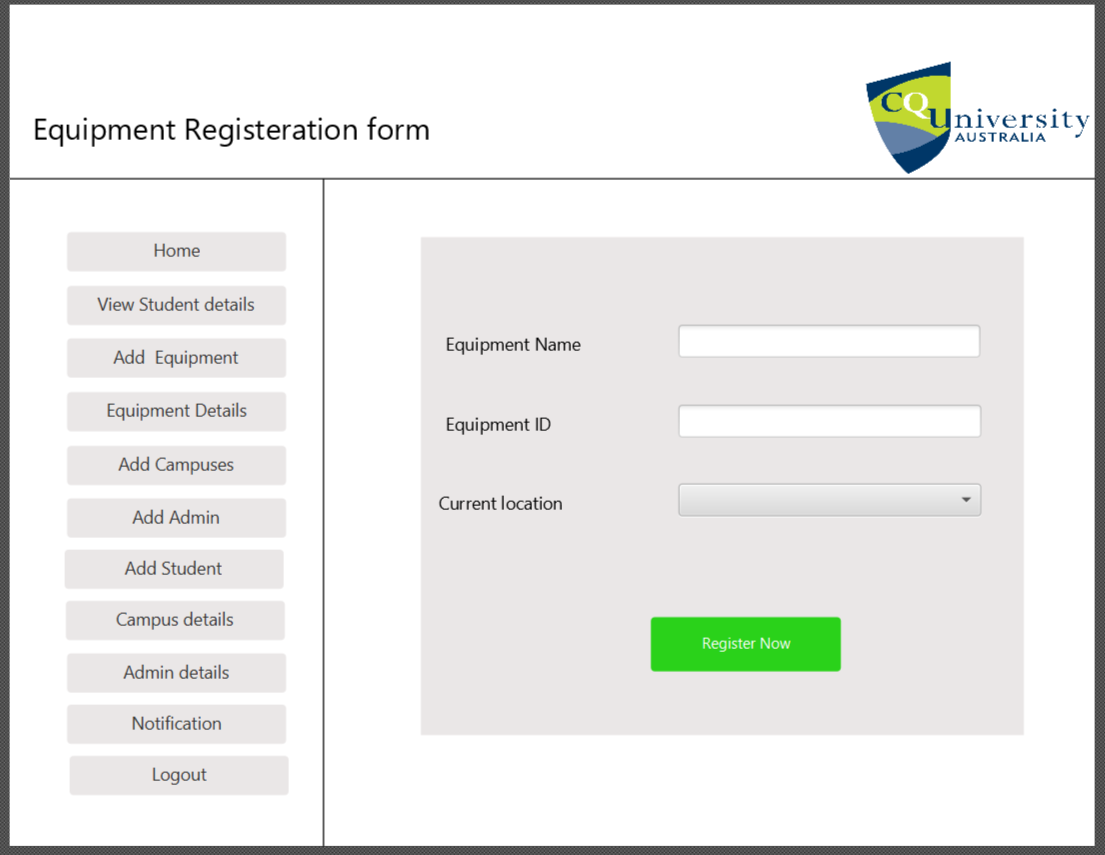


Figure 16 : equipment form

In this window, if the admin wants to add the new equipment details into the database, the admin can enter those details related to equipment and click on “Register Now” button. Those details will be entered in the equipment details table.

**8. Equipment Search**

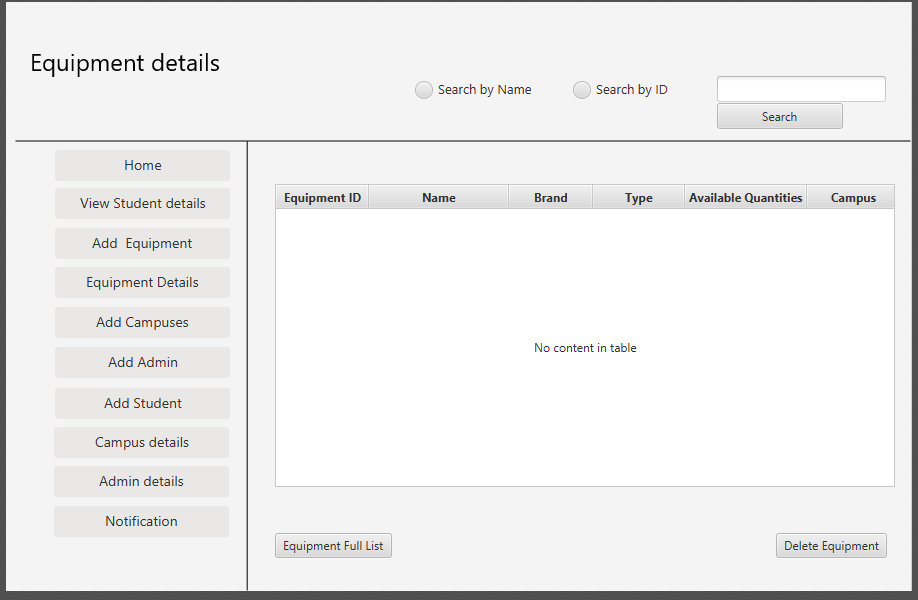


Figure 17 : equipment search

In this window, the admin can search equipment details by its name and ID. By clicking on search button, we can see those equipment details in the table.

**9. Campus Registration**

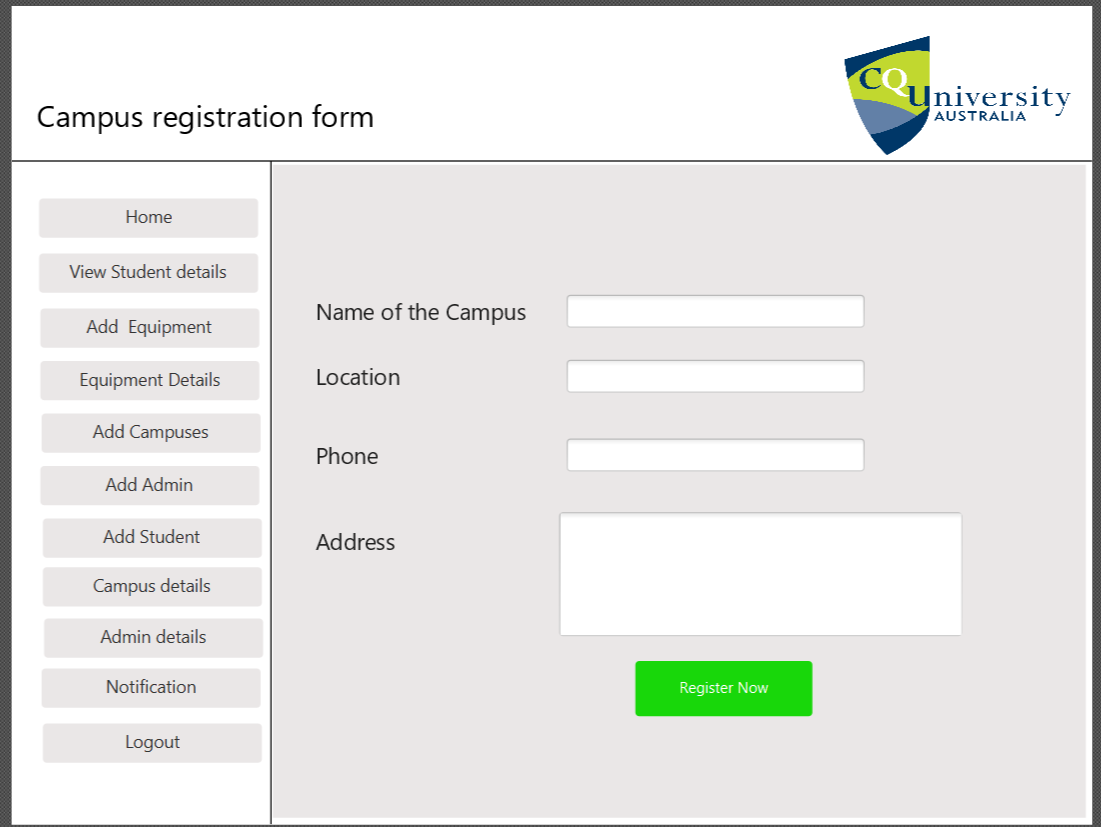


Figure 18 : Campus registration

In this window, the admin can add new campus details if it requires. First, the admin needs to enter all the details which related to campus and by clicking on “Register Now” button, those details will be added up to the campus details table.

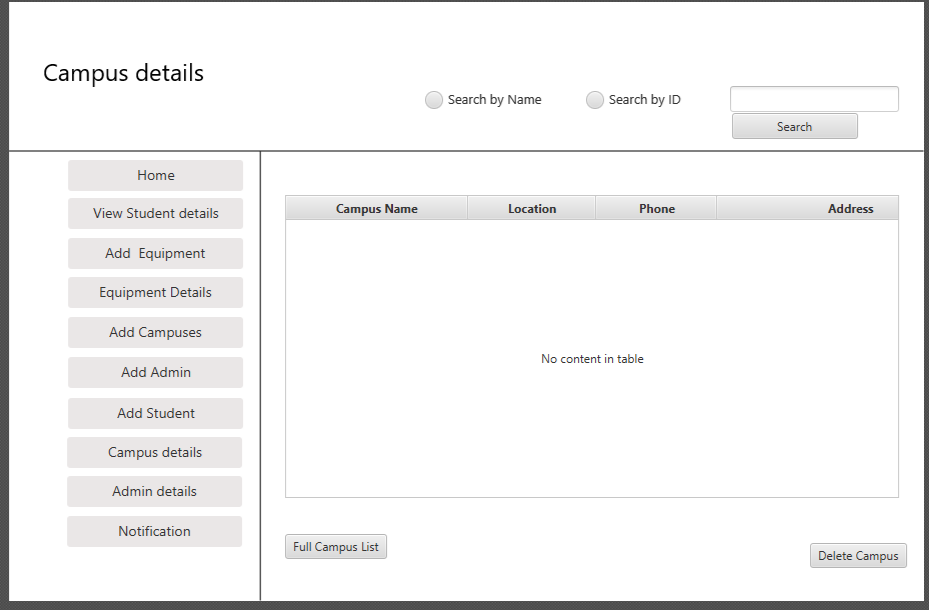
**10. View Campuses details**

Figure 19 : view campus details

In this window, All the details related to campuses will be displayed. If the user wants to search campuses, the admin has an option to search by its name and ID. Those details will be displayed in the table.

**STUDENT DASHBOARD**

**1. Student dashboard**

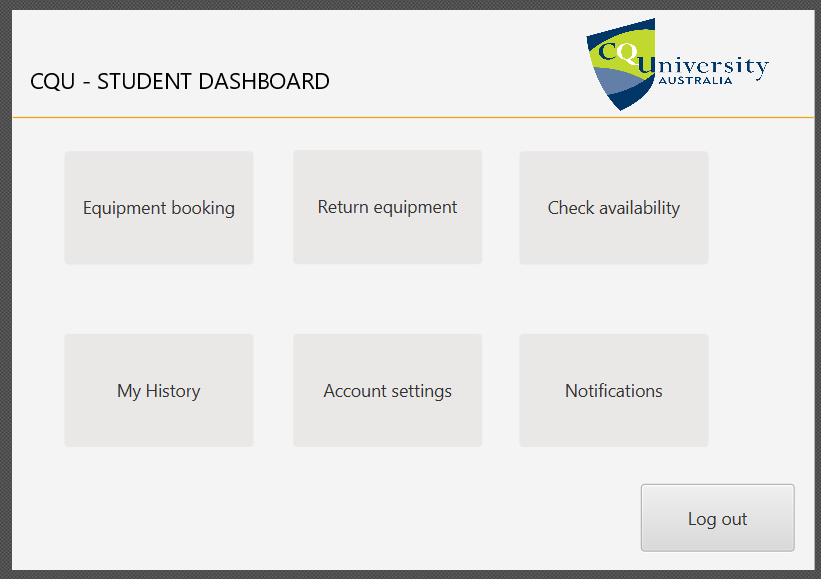


Figure 20 : student dashboard

In this window, this is the student dashboard where the students can access those features like, view equipment details, view his / her booking history and return equipment. If the user wants to log out of the application, we have log out button on right bottom of the screen.

**2. My history**

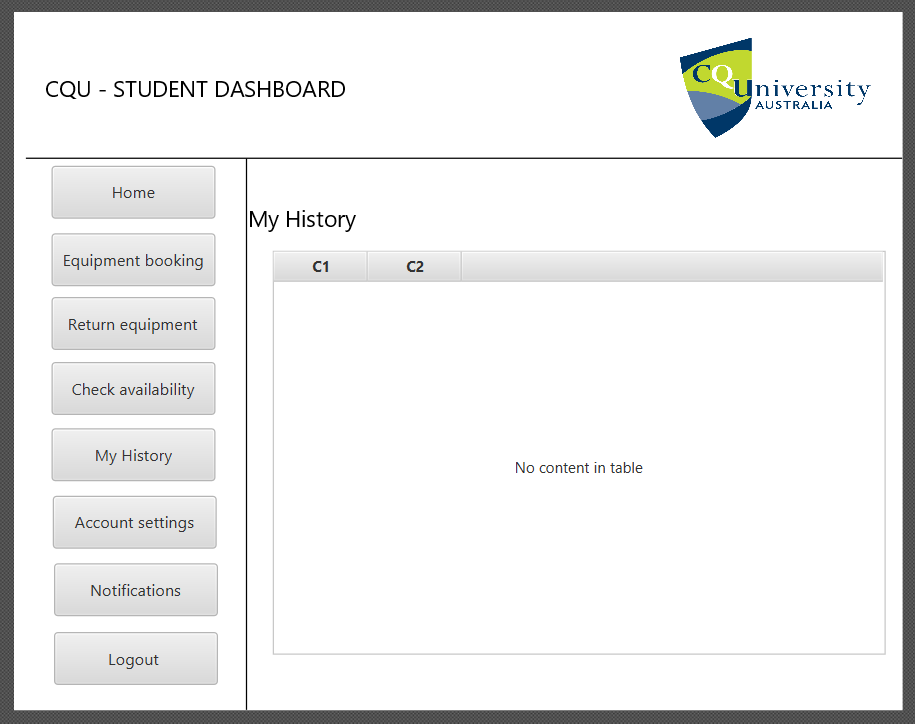


Figure 21 : Student history

In this window, the users can see their history of equipment which they borrowed earlier from the laboratory.

**3. Equipment booking**

Note: The students can view, search and book equipment. (Inclusive of 3 user stories)

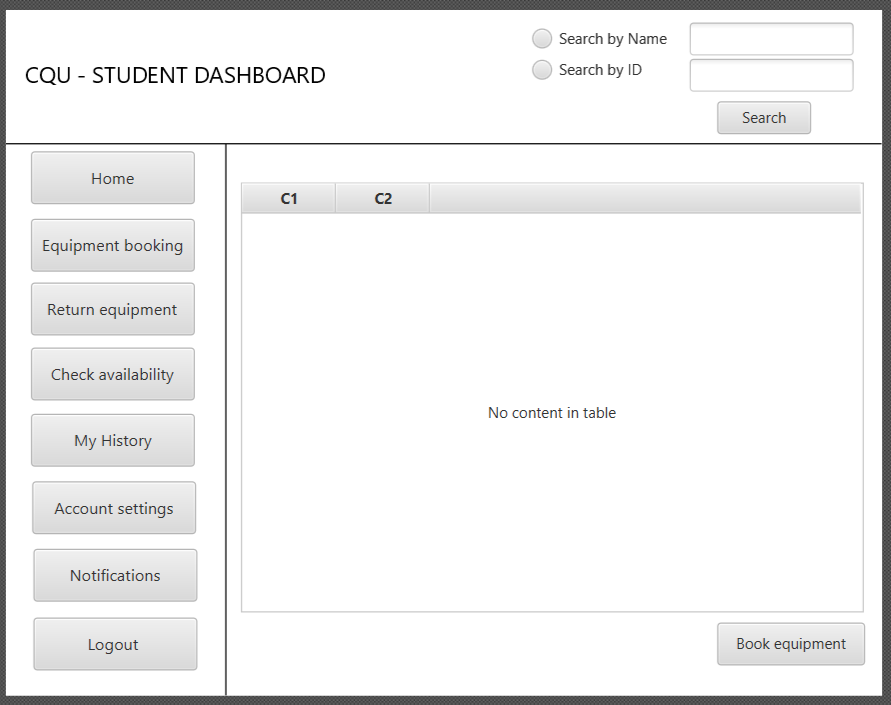


Figure 22 : equipment booking

In this widow, the students can view the equipment, search equipment by its name and id. If the student like to book the equipment, we have an option to book that equipment as well. The book equipment is displayed in right bottom of the screen.

**4. Due date -Notifications**

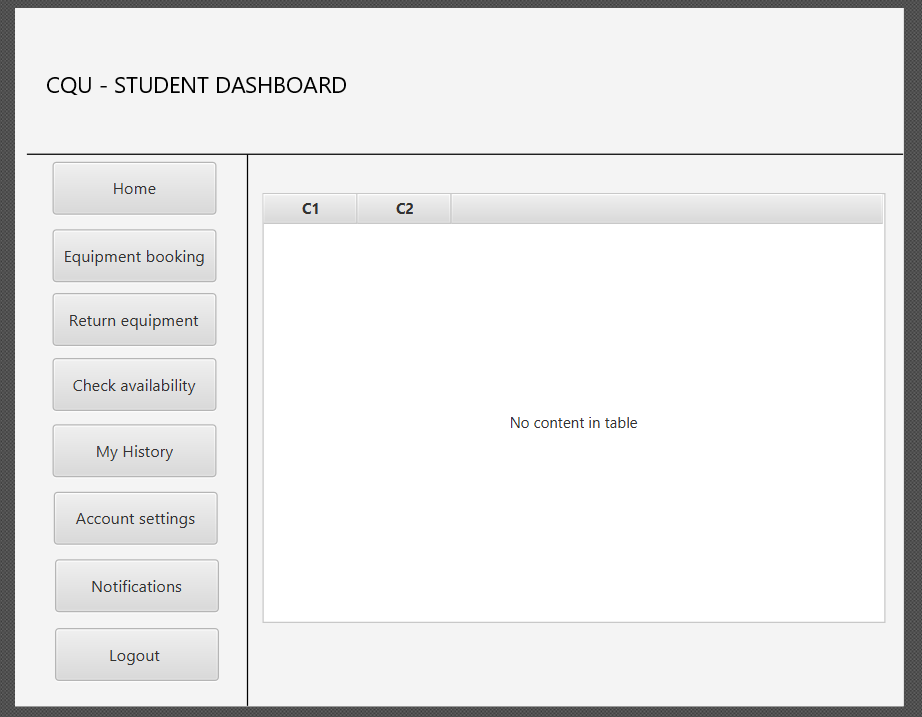


Figure 23 : due date notification

In this window, the students have a feature to see their due dates of their equipment. It could be the remainder for the students. Those details will be displayed in that screen.

# **14. Monitoring and reporting**

Monitoring is an important part in every project. It is the regular collection of information to track the implementation and measure the performance of the project. Monitoring provides project manager with data and information to implement the project.

Reporting is another important aspect in project development cycle. Everything regarding to the project must be report properly so that the problems encountered can be solved during implementation of the project. Project report is an essential part for project implementers to inform partners and stakeholders of the project. To monitor and report of the project the following activities will be done:

* Team Meeting:

Team meeting will be head in every 3 to 4 days interval where the team members and stakeholders will discuss over progress of the application. Because of the covid we are not able to have group discussion so we will be having meeting through zoom and any online media where we will discuss tasks completion, next phase, issues arises and solution of the issues.

* Weekly status report

Weekly status report will be submitted to the tutor by the group of the leader.

**Reference list**

ALTVATER, A. (2017). *What is N-Tier Architecture? Examples, Tutorials & More*. [online] Stackify. Available at: https://stackify.com/n-tier-architecture/.

Baqais, A.A.B. and Alshayeb, M. (2018). Sequence diagram refactoring using single and hybridized algorithms. *PLOS ONE*, 13(8), p.e0202629.

Fowler, M. (2019). *Software Architecture Guide*. [online] https://martinfowler.com/architecture/. Available at: https://martinfowler.com/architecture/.

Sinhal, A. (2017). *MVC, MVP and MVVM Design Pattern*. [online] Medium. Available at: https://medium.com/@ankit.sinhal/mvc-mvp-and-mvvm-design-pattern-6e169567bbad.

slidetodoc.com. (n.d.). *Web Application Architecture multitier 2 tier 3 tier*. [online] Available at: https://slidetodoc.com/web-application-architecture-multitier-2-tier-3-tier/ [Accessed 7 Aug. 2021].

Watt, A. (2014). *Chapter 13 Database Development Process – Database Design – 2nd Edition*. [online] Opentextbc.ca. Available at: https://opentextbc.ca/dbdesign01/chapter/chapter-13-database-development-process/.

Francino, Y. (2019). *What is user story? - Definition from WhatIs.com*. [online] SearchSoftwareQuality. Available at: https://searchsoftwarequality.techtarget.com/definition/user-story.

Gracia, T. (2019). *What is a risk management plan?* [online] Reciprocity. Available at: https://reciprocity.com/resources/what-is-a-risk-management-plan/.

Grant, M. (2021). *Understanding Gantt Charts*. [online] Investopedia. Available at: https://www.investopedia.com/terms/g/gantt-chart.asp.

Rehkoph, M. (n.d.). *User Stories with Examples and Template*. https://www.atlassian.com/agile/project-management/user-stories.

Spacey, J. 2017. 7 Types of Feasibility Analysis. [Online]. [4 September 2021]. Available from: <https://simplicable.com/new/feasibility-analysis>

Richard daniels, R. 2021. What is Feasibility Study? 10 Types of Feasibility Study Explained. [Online]. [4 September 2021]. Available from: <https://www.businessstudynotes.com/finance/project-management/types-feasibility-study/>

Bridges, J. (2019). How to Conduct a Feasibility Study - ProjectManager.com. [online] ProjectManager.com. Available at: <https://www.projectmanager.com/training/how-to-conduct-a-feasibility-study>.

Brandenburg, L. (2018). *How to Write a Use Case*. [online] Bridging-the-gap.com. Available at: <https://www.bridging-the-gap.com/what-is-a-use-case/>

Botha, F. (n.d.). *Functional and Non-functional Requirements – Francois Botha*. [online] Available at: https://francoisbotha.io/2018/05/15/functional-and-non-functional-requirements/ [Accessed 25 Sep. 2021].

Cohen, E. (2018). *A Beginner-Friendly Guide to Work Breakdown Structures (WBS)*. [online] Workamajig.com. Available at: https://www.workamajig.com/blog/guide-to-work-breakdown-structures-wbs.

Elgendy, M. (2016). *UML Diagrams | Business Process Modeling | Elgendy Blog*. [online] mohamedelgendy.com. Available at: <http://mohamedelgendy.com/blog/business-analysis/business-process-modeling.html>.

Simplilearn, 2021. *“Feasibility Study And Its Importance in Project Management”,* Simplilearn. Pp 1-2. Viewed on September 20 2021. https://www.simplilearn.com/feasibility-study-article

Spacey, J. (2017). *14 Types of Technical Feasibility*. [online] Simplicable. Available at: https://simplicable.com/new/technical-feasibility.

What is use case? - Definition from WhatIs.com and Brush, K. (2019). *What is use case? - Definition from WhatIs.com*. [online] SearchSoftwareQuality. Available at: https://searchsoftwarequality.techtarget.com/definition/use-case.