Requirements Specification Document
Study Room Booker

Acrosoft

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Contents

Revision History

Name	Date	Reason for Changes	Version
Everyone	25 Sept 2019	Initial start to RD	RD 0.5
Everyone	28 Sept 2019	Completed first draft	RD 0.6
Everyone	29 Sept 2019	Glossary updated and formatting	RD 0.7
Ashley, Keegan	30 Sept 2019	Fixed page numbering	RD 1.0
Everyone	12 Oct 2019	Updated RSD with TA and Client feedback	RSD 0.5
Everyone	15 Oct 2019	Added Use Cases	RSD 0.6
Everyone	15 Oct 2019	Added Use Case Diagram, updated page numbering.	RSD 1.0

1 Introduction

1.1 Purpose

This is a requirements specification document for Study Room Booker, a room reservation application for Green Meadows University (GMU). GMU is a post-secondary institution in Victoria, BC offering education in a variety of subjects including arts, sciences, and humanities. Study Room Booker will replace the current systems where study rooms located in different buildings on campus require users to navigate to different websites to book a study room.

This document will describe both functional and non-functional requirements of the Study Room Booker system.

1.2 Project Scope

Study Room Booker will be a web-based application that will support mobile accessibility.The design will utilize aspects from the current system, including the GMU's database containing student and faculty information.

The goals of Study Room Booker system are to provide the following:

- Stream-lined study room bookings across GMU campus
- Allow users to easily create and cancel bookings
- Real-time information on room availability

1.3 Glossary of Terms

Term	Definition
Authenticated	A user who logged in with a valid account.
API (Application Program Interface)	Application Program Interface. A defined set of endpoints where a request can be sent for processing.
Available Booking Times	The time period where there is no booking scheduled and is at least 15 minutes in-between other booking schedules.
Booking	Reservation of an area and/or service by an individual or group.
Booking End Time	A booking's finishing time.
Booking Schedule	A schedule displaying study room availability for authenticated users to see on the website.
Cancellation	The removal of a booking from the booking system.
Double Bookings	A booking conflict when two users receive confirmation for the booking of the same study room at the same time on the same day.

GMU	Abbreviation for Green Meadows University.
GMU Username	An identification of a GMU account, which should be a GMU email address.
HTTPS (Hypertext Transfer Protocol Secure)	An extension of the Hypertext Transfer Protocol (HTTP). It is used for secure communication over a computer network[5]
SMTP (Simple Mail Transfer Protocol)	A communication protocol for electronic mail transmission[6]
Session	A shortened version of the term "Study Room Session"
Study Room Booker	Reservation software for authenticated users to book a study room.
Study Room Session	A study room session is a confirmed booking of a study room. It consists of a start time, an end time, and a location. Any user must specify all these information in order to book a study room session.
System Administrators	GMU staff who are tasked with maintaining computer systems and network infrastructure.
System Administrators Mobile Platforms	The hardware and software developed for portable devices such as laptops, tablets, and smartphones.
TLS (Transport Layer Security)	A cryptographic protocol designed to provide communications security over a computer network[7]

1.4 References

[1] Green Meadows University Team (17 September 2019). *Green Meadows University*. [Webpage]. Available: https://docs.google.com/document/d/1Ygj7CGOqTqQd6M-qyQOcHNJ[illegible]F4ZAaMsuoH5bIsBLT0/edit and https://sites.google.com/view/seng321university-of-learning/open-projects

[2] Personal Information Protection Act. (11 September 2019). Retrieved 26 September 2019, from http://www.bclaws.ca/civix/document/id/complete/statreg/03063_01#part3

[5] HTTPS definition. Retrieved 26 September 2019, from https://en.wikipedia.org/wiki/HTTPS

[6] Simple Mail Transfer Protocol definition. Retrieved 26 September 2019, from https://en.wikipedia.org/wiki/Simple_Mail_Transfer_Protocol

[7] Transport Layer Security definition. Retrieved 26 September 2019, from https://en.wikipedia.org/wiki/Transport_Layer_Security

1.5 Overview

The requirements specification document has 4 main sections:

- *Overall Description* will discuss design constraints, assumptions, dependencies and a description of the operating environment.
- *System Features* breaks down each Study Room Booker feature into the following: description, functional requirements, and use cases.
- *External Interface Requirements* details the characteristics of each interface between the software and the users. This section will include descriptions of the user, hardware, software and communication interfaces and how these components will be utilized.
- *Other Functional Requirements* includes details of software functionality such as performance, safety, and security requirements, along with the quality of software attributes.

Lastly, the appendix contains unresolved requirements such as pending decisions, background information, and conflict resolution.

2 Overall Description

This section of the document will provide a brief overview of the project.

2.1 Product Perspective

Study Room Booker will be a web application that is separate, but accessible, from the GMU website and will be accessible to the user classes that are listed in section 2.3. Study Room Booker will replace the university's current system, which consists of separate booking systems for different buildings that offer a booking service.

2.2 Product Features

The Study Room Booker application features include: a log-in system, booking and cancelling study rooms, and real-time scheduling. Once a user has logged in with their GMU username and password, Study Room Booker allows users to search for available rooms and book one study room per day up to a week in advance. Once a booking is created each user will be able to view their upcoming bookings, and may also cancel any bookings they have created. The application will also show each user their booking history. These features are further explained in section 3.

2.3 User Classes and Characteristics

The Study Room Booker application will be used by the following two user classes:

General User
Any individual with a valid GMU student ID number, which is most often students or faculty, is considered a general user of the Study Room Booker application. Each user must log-into the

application using their student ID number and a password to gain access to the other functions. Each user will be able to search for available study rooms, book a room, and cancel a booking. General users will also be able to view their own past room bookings, and upcoming bookings. General users personal information must not be accessible by other general users.

GMU Administrator
A GMU administrator will oversee each study room booking within their building. The administrator must have access to the name and student number of each person that has booked a study room. The administrator has the ability to cancel bookings if a booked room is unoccupied after the first 15 minutes.

2.4 Operating Environment

The Study Room Booker web client must be supported on the following operating systems: Windows, Linux, Android, and iOS and must be supported on Mozilla Firefox, Google Chrome, Safari, and Microsoft Edge. See section 4.3 for details on specific versions.

2.5 Design and Implementation Constraints

The Study Room Booker system must abide by British Columbia's Personal Protection Information Act [2]. Additionally, the primary language of GMU is English and their website is in English, therefore the applications interface must be in English.

2.6 Assumptions and dependencies

The main assumption that this project has is that all users have the knowledge to use the basic functions of a web browser and navigate a website.

This project's application is also dependant on the following:

- Log-in API

  This is needed to verify if the user is actually a GMU student.

- Database from old project

  The study room database from the former system will be used to cut on time and costs.

3 System Features

3.1 View Schedule

3.1.1 Description and Priority

The study room schedule feature has a high priority in the Study Room Booker application. Each user must view the schedule to see available study rooms.

3.1.2 Functional Requirements

REQ-1: Each user must be able to view the hours of each building through the schedule.

REQ-2: Each user must be able to view the availability of each room through the schedule.

REQ-3: Each user must be able to view each study room session's information.

REQ-4: Each user must be able to view the whole schedule in real-time with a delay of up to 2 minutes.

3.1.3 Use Cases

Use Case: ViewSchedule
ID: UC-1
Brief Description: A user checks the GMU study room booking schedule.
Actor: A user
Preconditions 1. The user has accessed the GMU Study Room Booker page.
Main Flow: 1. Displays a list consisting of the next 7 days's schedule 2. The user clicks on desired day 3. Displays a calendar that consists of a list of all study room sessions for that day.
Postconditions: 1. The user has gained all necessary information to make an informed booking for their own study room.
Alternative Flow(s): None

3.2 User Management

3.2.1 Description and Priority

User management feature has a high priority in the Study Room Booker. A user must be able to log in and log out of a GMU account with a valid GMU username and its corresponding valid password. If a user has forgotten their password, or provide an invalid GMU ID, they will be directed to the GMU computer help desk web page.

3.2.2 Functional Requirements

REQ-5: Each user must be able to log-in to Study Room Booker with a valid GMU account.

REQ-6: Each user must be able to log-out of Study Room Booker at any time.

REQ-7: Each user must be directed to the GMU computer help desk web page if they forget their password or GMU ID.

3.2.3 Use Cases

Use Case: Login
ID: UC-2
Brief Description: A user logs in to Study Room Booker using their GMU username and password.
Actor: A User
Preconditions: 1. User has a GMU account.
Main Flow: 1. The user clicks the login button on the top right corner of Study Room Booker 2. The user inputs their GMU username and password 2.1 If GMU username is not found or password is invalid: 2.1.1 Direct user to GMU computer help desk web page 2.2 If the login was validated: 2.2.1 Continue to Study Room Booker
Postconditions: 1. The user is logged in.
Alternative Flow(s): None

3.3 Booking a Study Room Session

3.3.1 Description and Priority

An authenticated user must be able to book an available study room session. If the user books a session for less than the maximum time allowed per day (2 hours), the user can book multiple rooms in increments of 15 minutes. The importance for an authenticated user to book a study room session makes this feature a high priority.

3.3.2 Functional Requirements

REQ-8: Each authenticated user must be able to create an available study room session.

REQ-9: Each authenticated user must be able to view information about their confirmed study room session(s).

REQ-10: Each authenticated user will have their study room session booking rejected if the study room session is already booked.

3.3.3 Use Cases

Use Case: BookRoom
ID: UC-3
Brief Description: An authenticated user wants to book a study room session.
Actor: An Authenticated User
Preconditions: 1. The user has a GMU account. 2. The user has logged in to the GMU account.
Main Flow: 1. Include (ViewSchedule) 2. The user selects an available study room 3. The user specifies a start and end time 4. The user selects the “book” button 4.1 If the room is already booked 4.1.1 The user is presented with an error code and returns to booking page 4.2 Else 4.2.1 The booking was successful
Postconditions: 1. The authenticated user has booked a study room session
Alternative Flow(s): None

3.4 Study Room Session Cancellation

3.4.1 Description and Priority

The study room session cancellation feature has a high priority. An authenticated user must have the ability to cancel any of their booked study room sessions.

3.4.2 Functional Requirements

REQ-11: Each authenticated user must be able to cancel their confirmed study room session(s) before its end time.

REQ-12: Each authenticated user must receive a notification after cancelling a study room booking.

3.4.3 Use Cases

Use Case: CancelRoom
ID: UC-4
Brief Description: An authenticated user wants to cancel a study room session.
Actor: Authenticated User
Preconditions: 1. The user is logged in 2. The user has booked a study room session. 3. The booked study room session has not ended yet.
Main Flow: 1. The user selects the booked study room session they want to cancel 2. The user selects the cancel button 2.1 A success message is displayed on the page 2.2 The user receives an email confirming the cancellation
Postconditions: One of the authenticated user's study room sessions is canceled.
Alternative Flow(s): None

3.5 Booking Notification

3.5.1 Description and Priority

The booking notification feature has a medium priority in the Study Room Booker application. Each user must receive reminder(s) about their confirmed booking(s) at least 30 minutes beforehand by email. Additionally, users must be notified of any changes made by an administrator to a study room session.

3.5.2 Functional Requirements

REQ-13: Each authenticated user must be able to receive a notification of his or her upcoming approved booking(s) at least 30 minutes beforehand by email.

REQ-14: Each user that has a study room session that is affected by a change made by an administrator must receive an email of the change.

3.5.3 Use Cases

Use Case: EmailNotification
ID: UC-5
Brief Description: A user must be able to receive a reminder(s) about their confirmed booking(s)
Actor: A User
Preconditions: 1. The user have at least one confirmed booking 2. The user have enabled the remind feature
Main Flow: 1. The user receives a notification of his or her upcoming approved booking(s) 30 minutes before the session starts by email
Postconditions: 1. The user was reminded to attend or cancel the booking in time
Alternative Flow(s): None.

3.6 Administrator Panel

3.6.1 Description and Priority

The admin panel is a high priority feature in the Study Room Booker. The admin panel will be used to allow administrators to manage building hours, manually edit room bookings, manually delete room bookings, and the panel will automatically send an email to inform a user of any changes. This is a critical feature which helps users know the availability of rooms during holidays or and the maintenance schedule of rooms. Therefore it has a high priority.

3.6.2 Functional Requirements

REQ-14: Each administrative user must be able to access the Study Room Booker Administrator panel.

REQ-14.1: Each administrator must be able to manually change the operating hours of any building within the Study Room Booker.

REQ-14.2: Each administrator must be able to manually cancel any existing study room session in the Study Room Booker.

REQ-14.3: Each administrator must be able to manually update any existing study room session in the Study Room Booker.

REQ-14.4: Each administrator must be able to create a study room session.

REQ-14.5: Each user that has a study room session that is affected by a change made by an administrator must receive an email of the change.

3.6.3 Use Cases

Use Case: ViewAdminPanel
ID: UC-6
Brief Description: An administrative user must have the ability to access the administrative panel
Actor: Administrative User
Preconditions: 1. The administrator must have an administrative account
Main Flow: 1. Include (Login) 2. Display a list of administrator actions.
Postconditions: 1. A list of administrator actions is shown
Alternative Flow(s): None

Use Case: AdminChangeHours
ID: UC-7
Brief Description: An administrative user must have the ability to change operation hours for specific buildings
Actor: Administrative User
Preconditions: 1. The administrator must be logged into an administrative account
Main Flow: 1. Include (ViewAdminPanel) 2. The administrator selects “change operational hours” 3. A list of available buildings is displayed 4. The administrator selects the desired building to change operational hours. 5. A calendar of the next 7 days is displayed 6. The administrator selects the day they want to change 7. A form containing prompts for the opening and closing time of the building is shown 8. The administrator enters a new closing time 9. A list of choices is displayed to the user prompting the user to choose between “just this day” or “every day after selected day” 10. The administrator selects “every day after selected day” and then selects submit 11. The administrator views the schedule and observes that the updated hours are displayed
Postconditions: 1. Any administrator that views study rooms for that building is shown the updated operation hours.
Alternative Flow(s): 8.1 The administrator enters a new opening time

Use Case: AdminUpdateSession
ID: UC-8
Brief Description: An administrative user must be able to change existing sessions
Actor: Administrative User
Preconditions: 1. The administrator must be logged into an administrative account 2. An existing study room session must exist

Main Flow:

1. Include (ViewAdminPanel)
2. The administrator selects “Update sessions”
3. Extends (ViewSchedule)
4. The administrator selects the session which needs to be updated
5. An editable form of current booking information is displayed
6. The administrator changes the end time of the session
7. The administrator selects the submit button
   7.1 If Success:
      7.1.1 A success message is displayed and the affected user receives an email.
   7.2 Else:
      7.2.1 An error message is displayed

Postconditions:

1. The study room session has been updated on the calendar for all users
2. The affected user receives an email notifying them of the change

Alternative Flow(s): None

Use Case: AdminDeleteSession

ID: UC-9

Brief Description: An administrative user must be able to delete existing sessions

Actor: Administrative User

Preconditions:

1. The administrator must be logged into an administrative account
2. An existing study room session must exist

Main Flow:

1. Include (ViewAdminPanel)
2. The administrator selects “Update sessions”
3. Include (ViewSchedule)
4. The administrator selects the session which needs to be updated
5. An editable form of current booking information is displayed
6. The administrator selects the delete button
7. A confirmation popup is displayed
8. The administrator selects the confirm button
   8.1 If Success:
      8.1.1 The study room session is deleted from the calendar and the affected user receives an email
   8.2 Else:
      8.2.1 An error message is displayed

Postconditions: 1. The study room session has been deleted on the calendar for all users 2. The affected user receives an email notifying them of the change
Alternative Flow(s): None

4 External Interface Requirements

4.1 User Interfaces

The user interface features a study room booking page on the GMU website. A new webpage will be designed to replace the current one and accommodate the new system. The user must have the ability to filter the study rooms by certain criteria, view the schedule of a certain room in a timetable, click on an available spot on the timetable to bring up a pop up window in the same page, log in and complete their booking process in the pop up window by filling in the required information. If the service API is down, an error page will be shown to the user instead.

UI-1: The user interface must feature a single webpage.

UI-2: The webpage must scale to fit on the screen of a mobile device if needed.

UI-3: The user must be able to filter the study rooms by location, capacity and hours of operation.

UI-4: The user must be able to view the schedule of a certain room in the timetable.

UI-4: The user must be able to click on an available spot on the timetable to start booking.

UI-5: The user must be able to log in and complete booking in a pop up window within the page.

UI-6: The user must be shown with an error page if the service API is down.

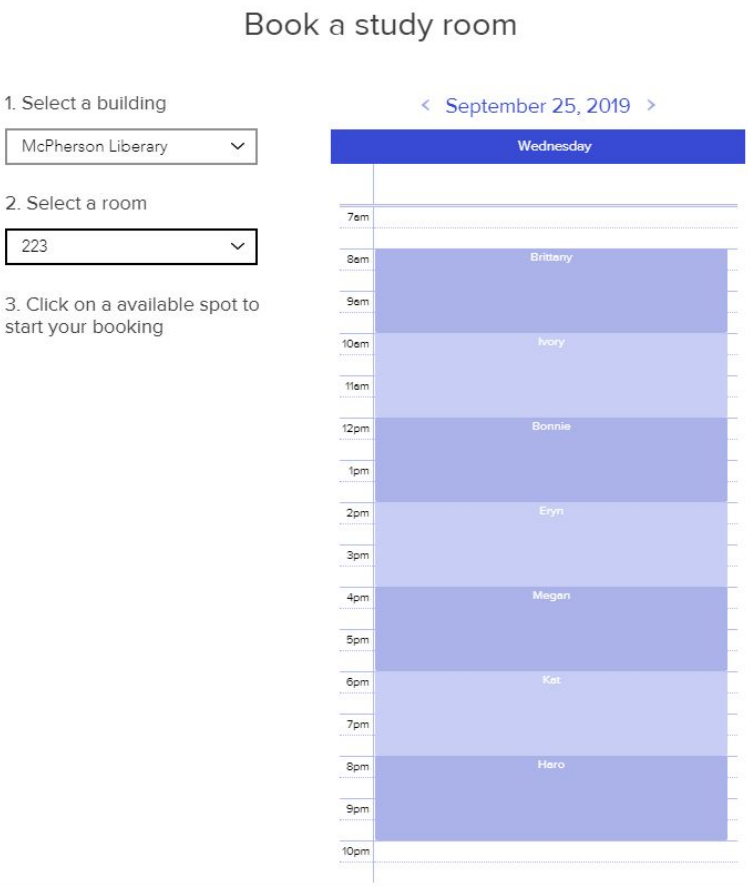

Figure 4-1 Provisional study room booking page

4.2 Hardware Interfaces

The Study Room Booker needs to be accessible to all students/faculty on campus. As a result, the application must be accessible on many different forms of hardware, including, but not limited to, mobile phones, tablets, laptop computers, and desktop computers. For a list of supported operating systems for each of the listed devices, refer to section 4.3.

HI-1: Each user must be able to access the Study Room Booker on a mobile phone. (High Priority)
HI-2: Each user must be able to access the Study Room Booker on an electronic tablet. (High Priority)
HI-3: Each user must be able to access the Study Room Booker on a laptop computers. (High Priority)
HI-4: Each user must be able to access the Study Room Booker on a desktop computer. (High Priority)

4.3 Software Interfaces

The data that flows between software interfaces in the study room booker consists of authentication data, study room database, and email notifications. For authentication, the Study Room Booker will rely on GMU's existing accounts, therefore the Study Room Booker must connect with GMU's login API. In addition, GMU currently has a study room database but does not have an API that handles database transactions, so the Study Room Booker must connect directly to the study room database. Finally, email notifications will leverage GMU's existing email service so the Study Room Booker must connect to GMU's email API. In addition to the external API's, a user must be able to access the study room booker on a variety of hardware as mentioned in section 4.2 (SI-4 to SI-8).

SI-1: The Study Room Booker must connect to the GMU's login API for user authentication. (High Priority)

SI-2: The Study Room Booker must connect to the GMU's study room database. (High Priority)

SI-3: The Study Room Booker must connect to the GMU's email API for user notifications. (High Priority)

SI-4: Each user must be able to access the Study Room Booker on Android 5.0 and above. (High Priority)

SI-5: Each user must be able to access the Study Room Booker on iOS 9.0 and above. (High Priority)

SI-6: Each user must be able to access the Study Room Booker on Windows XP and above. (High Priority)

SI-7: Each user must be able to access the Study Room Booker on macOS Yosemite and above. (High Priority)

SI-8: Each user must be able to access the Study Room Booker on Ubuntu 16.04 and above. (Low Priority)

4.4 Communications Interfaces

The Study Room Booker requires that a user sends personal information including, but not limited to, GMU account credentials for user authentication. In order to protect users, the Study Room Booker must transmit all data through a secure communication channel such as HTTPS over TLS. In addition, a user must receive email notifications for booking reminders and updates; therefore, the system must be able to connect to SMTP. In addition, the system must be able to operate on various web browsers as described below.

CI-1: The Study Room Booker must send all data using HTTPS over TLS. (High Priority)

CI-2: The Study Room Booker must receive all user data using HTTPS over TLS. (High Priority)

CI-3: The Study Room Booker must connect to SMTP to send emails. (High Priority)

CI-4: Each user must be able to operate the Study Room Booker on Internet Explorer 11 and above. (Low Priority)

CI-5: Each user must be able to operate the Study Room Booker on Microsoft Edge 44.18362.1.0. (High Priority)

CI-6: Each user must be able to operate the Study Room Booker on Firefox 69.0.1 and above. (High Priority)

CI-7: Each user must be able to operate the Study Room Booker Google Chrome 77.0.3865 and above. (High Priority)

CI-8: Each user must be able to operate the Study Room Booker on Safari 12.1.2 and above. (High Priority)

5 Other Non-Functional Requirements

5.1 Performance Requirements

New study room bookings are to be reflected in the schedule in real time. Cancellations of existing bookings are to be reflected in the schedule in real time. The implementation of these requirements will provide users with an accurate schedule. An accurate schedule also provides users with the assurance that their booking was entered correctly. A user will also be redirected to a confirmation screen upon entering their booking to provide further assurance that the booking was entered correctly. An accurate schedule also ensures that booking conflicts are impossible. Assuring a user that their booking was entered correctly reduces the user's stress and allows them to manage their time effectively.

5.2 Safety Requirements

A user who is inside a study room which they have booked must be able to evacuate in the case of a building emergency. A study room occupied by users must not exceed the maximum occupancy requirement as mandated by fire marshalls as well as GMU room occupancy policies.

5.3 Security Requirements

Only a user who possess a GMU student number, may book a study room. A user must enter their student number and password into the Study Room Booker login page in order to gain access to Study Room Booker. A user who does not have system administrator access will be limited to booking their own room, cancelling their own booking, and viewing the booking schedule. A user with system administrator access is permitted to remove any booking from Study Room Booker.

5.4 Software Quality Attributes

Study Room Booker must have 99% uptime.
User who access Study Room Booker on a mobile device must experience the same usability as users who access Study Room Booker on a laptop or desktop computer.
Study Room Booker must be fully interoperable on all devices running Android 5.0 and above as well as iOS 9.0 and above.
Study Room Booker must be fully interoperable with the following operating systems: Windows XP 5.0 and above, macOS Yosemite and above, as well as Ubuntu 16.04 and above.
Study Room Booker must be able to placed into a maintenance mode where a user is not able to make a booking while maintenance/upgrades to Study Room Booker are being undertaken.

6 Other Requirements

Methods used in the current system to collect user data will be reused in the new system. Study Room Booker will utilize the personal information saved on GMU servers of both students and faculty. Post-release, Acrosoft will be responsible for maintenance of the system.

Appendix:

A1: Use Case Diagram

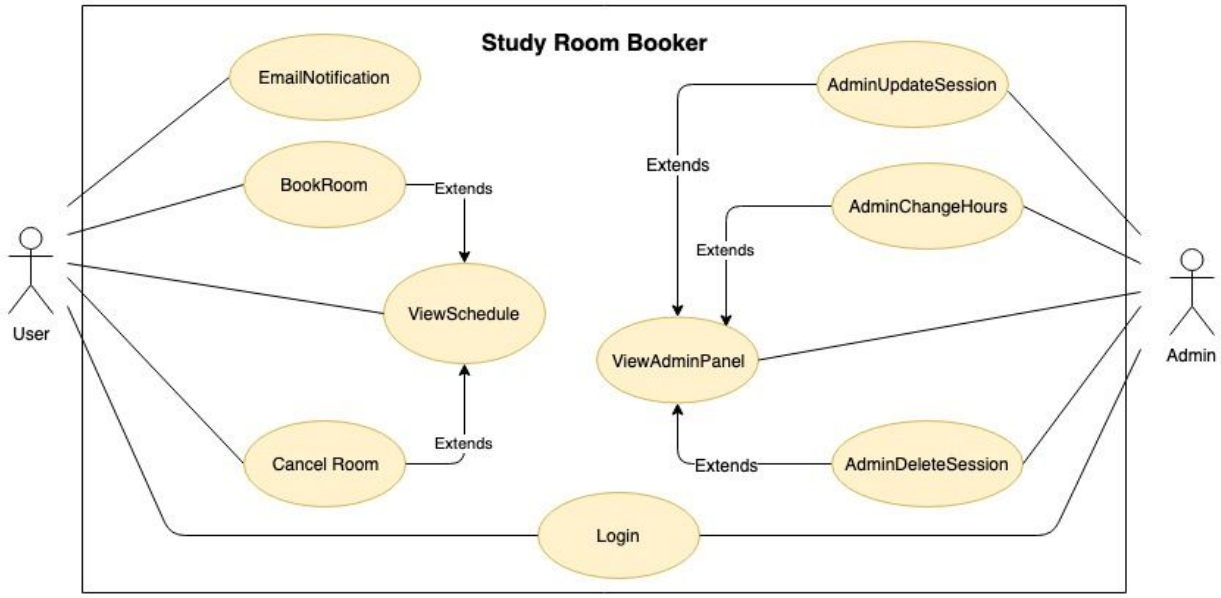

Diagram 1. Use Case Diagram

A2: Issues List

At this time, there are no requirements that require further clarifications from GMU.