

QuickBook Conference Room Reservation System	Version: 1.2
Software Requirements Specification	Date: 11/20/2016

# Software Requirements Specification

Version 1.2

for

## *QuickBook* Conference Room Reservation System

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## **1. Introduction**

### **1.1. Purpose**

This document provides a detailed description and specific requirements of the *QuickBook* conference reservation system. The nature of this product is an academic one and therefore, the document is intended for developers of the application and will be submitted to the professor for review and assessment.

### **1.2. Scope**

This application will be used by members of the Engineering and Computer Science (ENCS) faculty from Concordia University to reserve a conference room. The number of rooms in the facilities are limited, thus a reliable and efficient reservation system is needed in order to guarantee a room is available for use. Users of the system will be able to reserve available rooms for their team via an online system, accessible everywhere where an internet network is available. The reservations can also be canceled should the user change their mind. By providing students and other members of the ENCS faculty with an accessible way of reserving rooms, the application will not only make it convenient for them, but it will also lessen the responsibilities of the manager or administrator of the facilities to manually manage the reservations. Moreover, this application will have imposed restrictions on how many rooms a single user can reserve per week as well as the number of consecutive time slots occupied.

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### 1.3. Definitions, acronyms, and abbreviations

Term	Definition
User	A user who can create, modify and delete reservations
Guest	A person viewing the application. A viewer can only view and thus cannot modify or create a reservation.
Reservation	A reservation is made by a user for a room. It includes the room number, a timeslot and the name of the user who made the reservation.
Waiting List	A list of users who are waiting for a room to become available for a certain timeslot
Registry	List of all the reservations

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## 2. Overall description

The *QuickBook* conference room reservation system will allow ENCS students and faculty members to reserve rooms that have available time slots. It will be accessible and usable by users already registered in the system. *QuickBook* is a new self-contained product that will be created in the form of a web application. The user will interact with the displayed graphical interface in a web browser to make use of the application's functions. The web server will handle the logic and the requests received and sent back to the client browser. It will handle all the access controls, constraints and will provide functionality to the application. Since most of the information shown on the interface will need to be stored somewhere, a connection exists between the web server and a database. The information shown to the user on the web application will be a result of the communication between the web server and the database where requests will be sent to retrieve, modify or delete data.

### 2.1. Product perspective

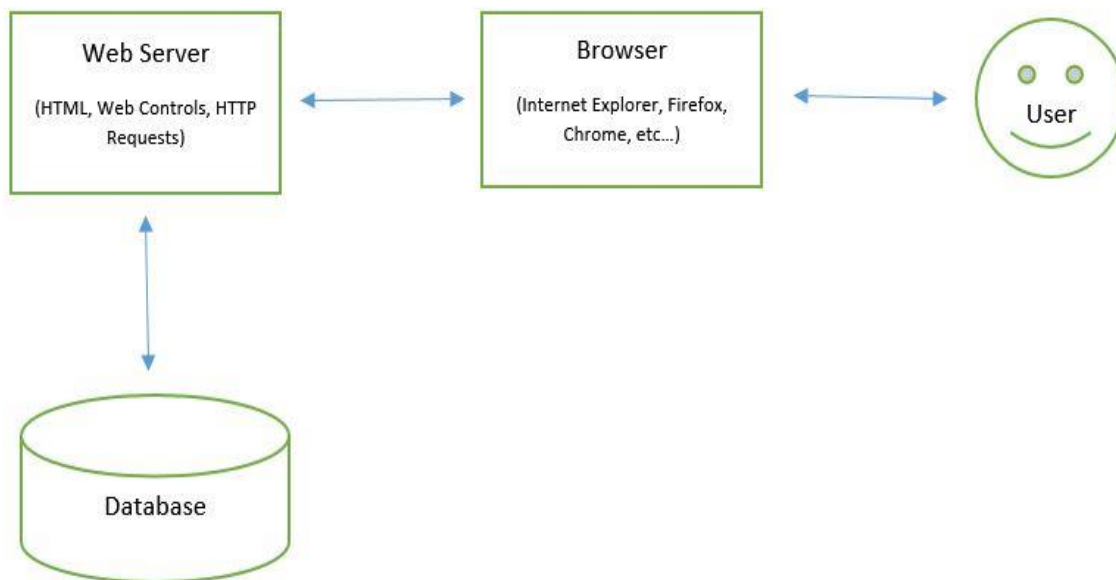


Figure 1 : Product Perspective Block Diagram

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## **2.2. Product functions**

With this online reservation application, authenticated users will be able to reserve rooms for a certain amount of time. Creating, modifying or deleting a reservation are the main functions a user can do. Users are also able to view all the rooms in the system. When a user accesses a room, the system will allow other users to access the same room only in read mode as to prevent unfairness and errors. If a room is already reserved for a given timeslot, users can place themselves on a waiting list for that timeslot. Upon room cancellation of the current reservation, the first user on the waiting list can obtain the reservation, in which case he or she is removed from any other waiting list over the same time slots for the same day. Users are restricted by the system on the number of reservations possible for a week as well as the number of consecutive timeslots for a reservation. The system will also restrict the number of weeks a reservation can be repeated.

When viewing the reservations, the time slots of the room are represented in the form of a calendar. The available rooms and reserved rooms can be distinguished on the calendar using different colors. From the calendar, users can select a time slot to reserve the room or enter a waiting list if it is already reserved.

## **2.3. User characteristics**

The intended users of the system are users registered in Concordia University, such as the students and faculty members belonging to the Engineering and Computer Science (ENCS) programs. Users can make use of the system to create reservations, edit reservations, view the status of reservations, or cancel their reservations. They are the intended users for the system in order to reserve rooms for a conference or for working on projects, for instance. Their allowed actions are limited to the CRUD (create, read, update, delete) access to room reservations. They do not have CRUD access to other users' reservations, nor can they view another user's reservations profile. These users are expected to be technically literate and understand how to navigate through a web application.



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## 2.4. Constraints

The system provides several constraints and limitations that affect the users. A couple of them are based on the regulations of the application, while others are more dependent on the technology that supports the system.

- A regulation based on the system's requirements is that each room may be reserved for, if space permits, a maximum of four consecutive hours per user per day. In addition, a user may only create up to three reservations per week to prevent overbooking and give all users a chance to find a time slot suitable for themselves. In the case where a user wants to reserve a time slot that is already booked by another user, they will be placed on a waiting list designed as a queue, which in case of the original user deleting their reservation, will secure the time slot.
- To ensure safety and fairness in the system, limitations are placed on the users' operations. Only one user can access a certain room at a given time to create, edit or delete a reservation. Another user attempting to access that room will be prohibited until the current user is finished with their operation. Safety of the system is maximized by placing constraints on the users accessing the application. The users of the system are all registered with the ENCS faculty, and this is guaranteed by authenticating them with ENCS usernames and passwords to allow them access to the system console.
- The performance of the system is also affected by constraints. The database is used to hold user information, reservations, users on waiting lists and a list of rooms. The time of an operation being performed can be affected by the databases fetch requests, and therefore provides limitations in the system performance. Hardware constraints are limited to internet connection. A user with no internet connection cannot connect to the application's web server, which means they cannot access the system.

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## 2.5. Assumptions and dependencies

For the reservation system to function as intended, there are a couple of assumptions and dependencies placed on the situation.

- As stated in the constraints section, an assumption for proper use of the system is that the user is assumed to have a strong and stable internet connection. No connection means no way of accessing the server and the console, a weak internet connection means that user operations can be slowed down leading to inefficient use and possible misuse of the system, and an unstable connection leads to possible network crashes or difficulty accessing the database on the client-side.
- Certain web browsers may not handle the website and web server in the same way as it was intended. The system is optimized to run with perfect performance on the Google Chrome web browser, therefore it is assumed that other possible web browsers can handle the server and console in a similar way as it was intended.
- The system's intended use depends on pop-up windows being enabled. This is because a user wanting to create or modify a reservation opens a JavaScript pop-up window that displays all available options. If a user has pop-ups disabled, the user won't be able to view the reservation creation or editing window.

## 3. Specific requirements

This section contains all requirements in detail: Functional as well as non-functional requirements (quality attributes and constraints). The quality attributes are listed per the *ISO/IEC 25010* standard that classifies software quality in a structured set of characteristics and sub-characteristics.

### 3.1. External interfaces

#### *User Interface*

A user of web application should see the calendar upon accessing the reservation system. If the user wishes to make a reservation or make changes to an existing reservation (such as canceling

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or modifying a reservation), the user must log in. Only registered members of the ENCS faculty have credentials to access the system. After logging in, the user will be directed to a page where he/she can see a calendar displaying the facilities and their availabilities for a given period. The user can reserve any one of the available time blocks for any of the rooms. The user must click on a time block and drag the mouse vertically until their desired time block. Once this action is done, a pop up form will appear on which the user must submit the request to reserve a room for a certain number of time blocks. A user can also place him or herself on a waiting list for a specific timeslot of a given room that is already reserved.

#### *Hardware Interface*

The hardware components are the following: any number of computers, a server and a database. The operating system of the computer and the server will manage the hardware connection to the MySQL database.

#### *Software Interface*

The database and the web portal communications consist of every operation that modifies, creates and reads data stored in the database. The web application must be able to make such communications with the database for every user of the system.

#### *Communications interfaces*

Since the system is dependent upon many different hardware and software components, the communication between them is important for the success of the system. On the other hand, the details of how this communication is made can be negligible since they are handled by the operating system.

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### 3.2. Functionality

This section describes the functional requirements of the *QuickBook* conference room reservation system.

#### 3.2.1 Actor goal list

Actor	Goal
User	Make reservation
	Cancel reservation
	Modify reservation
	View reservations
	View room availabilities
	Add to waiting list

#### 3.2.2 Use case view

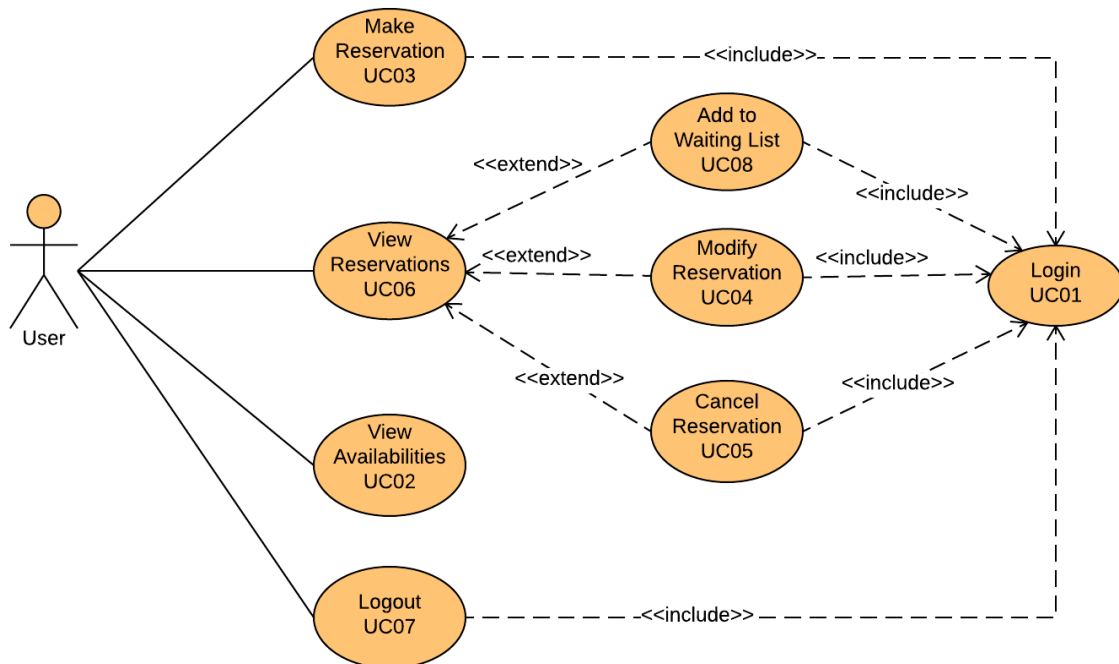


Figure 2 : Use Case Diagram

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### 3.2.3. Use cases

Use Case number	Use case name	Actor	Description
UC01	Login	User	User is authenticated and can access the system, implying he/she is registered with the facility.
UC02	View room availabilities	User	On the index page, user sees facility rooms with their available/taken time slots in a calendar view week by week for the entire academic semester.
UC03	Make reservation	User	User selects an available time slots for room and proceeds to reserve it by entering the required information.
UC04	Modify reservation	User	User chooses to modify the time and day by making an alternative selection from the “view room availabilities calendar”. User saves the modification.
UC05	Cancel reservation	User	User cancels one or many of the reservations made.
UC06	View reservations	User	User views all the reservations made with their respective information (location, time).
UC07	Logout	User	User logs out of the system and is denied permission to make/modify/view or cancel a reservation until a successful login.
UC08	Add to Waiting List	User	User selects a timeslot for a room that is already reserved and adds him or herself to the waiting list.

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### 3.2.4. Critical use cases

Use Case UC03:	Make Reservation
Primary Actor:	User
Pre-conditions:	User is authenticated and logged into the system. User chooses a time slot for an available room.
Success guarantee (post-conditions):	Reservation is saved.
Main success scenario (basic flow):	<ol style="list-style-type: none"> <li>1. System prompts the user to enter all required information.</li> <li>2. User submits all required information.</li> <li>3. System displays reservation summary.</li> </ol>
Extensions (alternative flow):	If entered information is not sufficient or invalid, the system will prompt to complete it after the user confirms the reservation.
Special Requirements:	None
Open issues:	<p>Students from which classes have higher priority to reserve the facilities?</p> <p>How many days in advance can a reservation be made?</p>

### 3.3. Non-functional requirements

#### 3.3.1. Reliability

The system shall handle more than one users at once without failure. The database shall keep all relevant information as not to allow user loss of his or her reservations made upon system crash. It shall be continuously tested as to avoid potential crashes and to track occurrences of failures.

#### 3.3.2. Usability

Usability, based on the ISO 25010 standard, has the following characteristics: Appropriateness, Recognisability, Learnability, Operability, User Error, Protection, User Interface, Aesthetics and Accessibility. The system shall allow user goals to be encountered, therefore its accessibility shall be at its best. It is important that the system has clear terminology, intuitive placement of buttons and other features. The User Interface (UI) shall be well responsive, and it shall be easy to pattern

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complex and simple operations (operability). The system shall be intuitive enough so that users will not require the use of an instruction manual. The system shall be easily accessible.

### **3.3.3. Efficiency**

The system shall use minimal resources (such as memory) and store in the database only relevant data in an organized manner. The system shall also be efficient for the user in that the interface shall provide the user to get information quickly without having to perform numerous clicks.

### **3.3.4. Maintainability**

The system shall be extendable, in that new functions can be further implemented into the system. Following the ISO 25010 standard, maintainability has multiple quality characteristics that can be monitored throughout the milestones of project using a tool that provides the capability of measuring those quality characteristics. The software *Logiscope* is indeed capable of measuring analyzability, changeability, stability and testability for software written in C# and shall be used.

### **3.3.5. Portability**

The system shall be functional on devices that support web browsers such as Google Chrome, Internet Explorer or Firefox. It shall be functional on most operating system, such as Windows, UNIX or LINUX platforms and on computers that support latest versions of web browsers, considering the web application nature of the system.

## **3.4. Design constraints**

### ***Languages and tools***

The conference room reservation system is developed in C# with the ASP.NET framework using Microsoft Visual Studio Community Edition as the integrated development environment. All artefacts produced during development are found on the password-protected GitHub repository.

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Those include the Software Requirements Specification (SRS), the Software Architecture Document (SAD), the code, and the test cases. The link to the repository is the following:

<https://github.com/maeghtesadi/Capstone-Room-Scheduler>

### ***Processes***

The development life cycle followed for the development of the online conference room reservation system is an iterative process in which each iteration follows the waterfall development life cycle. More precisely, the requirements are reviewed at the beginning of each iteration. The design and architecture is adjusted if necessary. The code is updated to correspond to the design changes, and test cases are created to cover the new requirements.



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## 4. Analysis Models

### 4.1. Domain Model Diagram

The Domain Model diagram consists of a total of ten domain level objects (DLO). This diagram shows the relationship between conceptual classes for a reservation system.

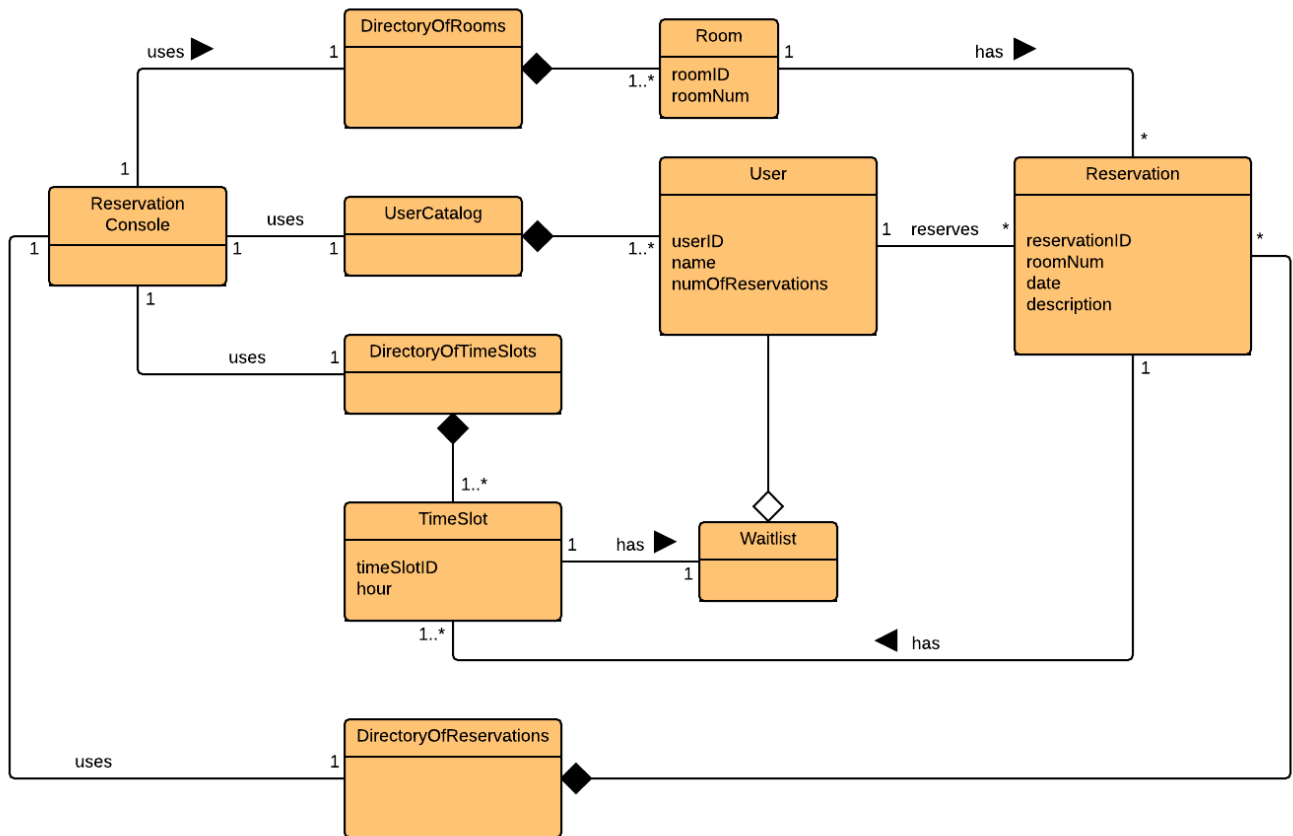


Figure 3 : Domain Model

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## 4.2. System Sequence Diagrams

In this section, system sequence diagrams (SSD) represent the critical use case Make Reservation. A system operation is derived and is followed by an operation contract.

### 4.2.1. System Sequence Diagram for Make Reservation

**Make Reservation main (success) scenario:** A user accesses an on-line console for a conference room reservation system to reserve a room for a given timeslot. The user enters all required information and submits it. The system displays a confirmation and a reservation number after completion of the reservation. The user may make other reservation requests subsequently.

Pre-conditions:

1. User has been authenticated from a database (user catalog).
2. Room is available on a given time slot.

Post-conditions:

1. One (or more) reservation has been made on a given user.
2. Room is not available for the given time slot.

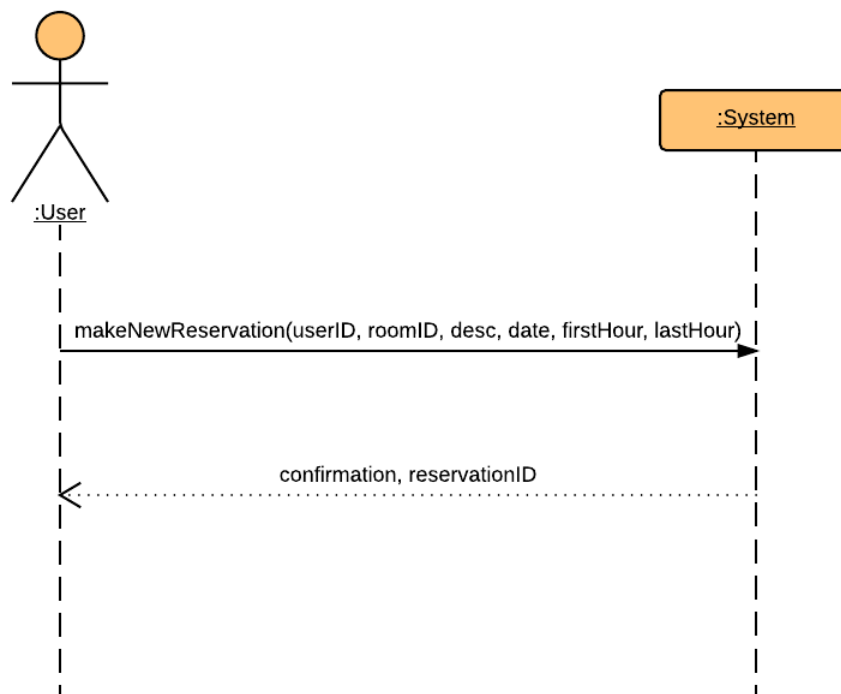


Figure 4 : System Sequence Diagram for Make Reservation

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## System operation for Make Reservation

System
makeReservation(userID, roomID, desc, date, firstHour, lastHour)

## Operation contract

<b><u>Contract CO1: makeReservation</u></b>
<b><u>Operation:</u></b> <i>makeReservation(userID, roomID, desc, date, firstHour, lastHour)</i>
<b><u>Cross References:</u></b> Use Case Make Reservation
<b><u>Pre-Conditions:</u></b> <ol style="list-style-type: none"> <li>1. Room is available on a given timeslot.</li> <li>2. Instance of User, user, has been created.</li> </ol>
<b><u>Post-Conditions:</u></b> <ol style="list-style-type: none"> <li>1. An instance of Reservation <i>res</i> was created. (instance creation)</li> <li>2. Instance <i>res</i> was associated with DirectoryOfReservations (formation of an association)</li> <li>3. Instance <i>res</i> was associated with Room. (formation of an association)</li> <li>4. Instance <i>res</i> was associated with User. (formation of an association)</li> <li>5. An instance of TimeSlot <i>ts</i> was created. (instance creation)</li> <li>6. Instance <i>ts</i> was associated with Reservation. (formation of an association)</li> </ol>