Requirements Document
Study Room Booker

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Acrosoft

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Contents

Revision History

Name	Date	Reason for Changes	Version
Initial Start	25 Sept 2019	Original draft	0.5
RD 0.6	26 Sept 2019	Completed first draft	0.6
RD 0.7	28 Sept 2019	Glossary Update	0.7
RD 0.8	29 Sept 2019	Formatting Update	0.8
RD 0.9	30 Sept 2019	Wording Update	0.9
RD 1.0	30 Sept 2019	Page Numbers Fixing	1.0

1 Introduction

1.1 Purpose

This is a requirements specification document for Study Room Booker, a room reservation application for the Green Meadows University. The Green Meadows University, often referred to as GMU, is a post-secondary institution in Victoria BC for learning, offering courses in a variety of subjects including arts, sciences, and humanities. Study Room Booker will replace the current study room booking system in place hosted through the Green Meadows University website.

Some features the new upgrade entail include:

- ability for students/faculty to see available rooms in real-time
- book rooms available through either the mobile or web application
- cancel future or current bookings (for both users and administrators)
- see history of bookings for individuals (user) and for buildings (administrator)

The document will describe both functional and non-functional requirements of the system such as the scope of the project, the objectives, cases, and models.

1.2 Project Scope

The scope of this project is an application that allows for real-time information about availability of study rooms at the Green Meadows University. It will allow for students to see available rooms and have the ability to book rooms that are available based on the information provided or cancel a reservation. This upgraded system will replace the current system, a web-based application.

The design will utilize aspects from the current system, including the Green Meadows University's database containing student and faculty information. The newer model will support mobile accessibility - in addition, physical design changes are to be expected. The design model of Study Room Booker including system features and requirements is covered in the project scope. Actual implementation of the physical system, Study Room Booker is not part of the scope of the project.

1.3 Glossary of Terms

Term	Definition
Authenticated	A user who logged in with a valid account.
API	Application Program Interface. A defined set of endpoints where a request can be sent for processing.
Available Booking Times	The window 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 general schedule for all authenticated users to see on the website. Usually is an online calendar with all of the approved booking information (including but not limited to: time, location, booking reference).
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.
HTTPS (Hypertext Transfer Protocol Secure)	An extension of the Hypertext Transfer Protocol (HTTP). It is used for secure communication over a computer network. [5]
NPM (Node Package Manager)	A package manager for the JavaScript programming language. It is the default package manager for the JavaScript runtime environment Node.js. [3]
React	React (also known as React.js or ReactJS) is a JavaScript Library for building user interfaces. [4]
Schedule	A weekly calendar which displays dates and times, where sections are blocked out to reflect study room bookings.
SMTP (Simple Mail Transfer Protocol)	A communication protocol for electronic mail transmission. [6]
Study Room Booker	Reservation software for study rooms by students and faculty at the Green Meadows University.
System Administrators	Green Meadows University 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 8. (17 September 2019). *Green Meadows University*. [Webpage]. Available: https://docs.google.com/document/d/1Ygj7CGOqTqQd6M-qyQOcHNJmPF4ZAaMsuoH5bIsBLT0/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

[3] npm (software) definition. Retrieved 26 September 2019, from https://en.wikipedia.org/wiki/Npm_(software)

[4] React (web framework) definition. Retrieved 26 September 2019, from https://en.wikipedia.org/wiki/React_(web_framework)

[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 will initially go over the product features, perspective and characteristics in the *Overall Description*. It will also include design constraints, assumptions, dependencies and a description of the operating environment. *System Features* contains the functional requirements and major services offered by the product. The product description, along with priorities and functional requirements can be found defined in the *System Features*. *External Interface Requirements* details the characteristics of each interface between the software and the users. This 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. Any remaining requirements not defined in the *External Interface Requirements* or *Other Functional Requirements* will be found in *Other Requirements* including budget constraints, reuse objectives, and legal requirements. The *Appendix: Issues List* 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 Green Meadows University website and will be accessible to the user classes that are listed in section 2.3. This web application 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's main feature is a log-in system which users must use their student ID number and password. Once a user has logged into the application the system 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 users will be able to view their upcoming bookings, and may also cancel any bookings they have created. The application will also show a history of the users room bookings. 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:

Students or Faculty (General Users)
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. These users must log-into the application using their student ID number and a password to gain access to the other functions. General users 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.

Administrative Faculty
Administrative Faculty, also known as administrators, will oversee each study room booking within their scope delegated by GMU. The administrators must have access to the name and student number of each person that has booked a study room. The administrators have the ability to cancel bookings if a booked room is unoccupied after the first 15 minutes.

2.4 Operating Environment

Study Room Booker will be a web application hosted on the GMU server. The system 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 is a web application so users must have an internet connection in order to use the application.

Additionally, the application needs to abide by the university's privacy policy, and provincial/federal privacy policies. Finally, the primary language of the university 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:

- React[4]

  This is needed to create the UI that the user will be using. If it is no longer available, we will have to find another library/framework to get the job done (ie. Angular, Vue.js).

- npm (Node Package Manager)[3]

  This will be needed to create and build the project and also to install any other needed addons for react. Without this, the project will need to be done manually and take much more time.

- Database from old project

  The databases from the former system will be used to cut on time and costs.

3 System Features

3.1 Log-in System (High Priority)

3.1.1 Description and Priority

The log-in feature has the highest priority in the Study Room Booker application. A user must be able to sign up, log in, and log out of an account with a valid university identification. Due to the importance of this feature, it will be labelled under the highest priority.

3.1.2 Functional Requirements

A user must be able to sign up, log-in, and log-out of an account with a valid identification information.

REQ-1: A user must be able to create an account with a valid identification from his or her corresponding university account, a valid email address, a username, and a password. (High Priority)

REQ-2: A user must be able to log-in to their account with the previously provided email address and password during a successful sign-up process. (High Priority)

REQ-3: A user must be able to log-out of their account at any time. (High Priority)

3.2 Study Room Booking (High Priority)

3.2.1 Description and Priority

The study room booking feature has the second highest priority in the Study Room Booker application. An authenticated user must be able to create new booking(s) during available

booking times. The importance of the ability for an authenticated user to create bookings by this feature labels it as a high priority.

3.2.2 Functional Requirements

An authenticated user must be able to create new booking(s) providing valid booking information.

REQ-1: An authenticated user must be able to create new booking(s). (High Priority)

> REQ 1.1: An authenticated user must be able to specify a booking's start time. (High Priority)
>
> REQ 1.2: An authenticated user must be able to specify a booking's end time. (High Priority)
>
> REQ 1.3: An authenticated user must be able to specify a booking's location. (High Priority)

REQ-2: An authenticated user must be able to view the specified information from his or her booking(s) after a successful booking. (High Priority)

> REQ-2.1: An authenticated user must be able to view the start time of his or her booking(s) after a successful booking has been confirmed. (High Priority)
>
> REQ-2.2: An authenticated user must be able to view the end time of his or her booking(s) after a successful booking has been confirmed. (High Priority)
>
> REQ-2.3: An authenticated user must be able to view the location of his or her booking(s) after a successful booking has been confirmed. (High Priority)

3.3 Booking Cancellation (High Priority)

3.3.1 Description and Priority

The booking cancellation feature has the same priority as the booking feature in Study Room Booker. An authenticated user must be able to cancel booking(s) until the end time of the booking. As booking cancellation by both authenticated user(s) and administrator(s) is important to accurately determining the availability of study rooms, the booking cancellation feature has a high priority.

3.3.2 Functional Requirements

An authenticated user must be able to cancel a booking he or she made previously until the end time specified for the booking has passed. An administrative user must have the ability to cancel any booking(s) created by a user until the end time specified for the booking has passed.

REQ-1: An authenticated user must be able to cancel his or her previously created booking(s) before the booking(s)' end time. (High Priority)

REQ-2: An administrative user must be able to cancel any previously created booking(s) before the booking(s)' end time. (High Priority)

3.4 Booking Schedule Checking (Medium Priority)

3.4.1 Description and Priority

Booking schedule checking feature has a medium priority in the Study Room Booker application. An authenticated user must be able to check the booking schedule provided by the administrative staff(s) responsible for the maintenance and availability of the study room. As the primary feature of Study Room Booker is the booking feature, the booking schedule checking feature is considered a convenience feature for user(s), and is seen as having a medium priority.

3.4.2 Functional Requirements

An authenticated user must be able to check what study rooms are available for a building at the university in the schedule at any given time during the day. The authenticated user must be able to see hours of operation including hours the study rooms are available, and the times of current bookings for the study rooms.

REQ-1: An authenticated user must be able to check an approved booking's information on the booking schedule at any time. (Medium Priority)

REQ-1.1: An authenticated user must be able to check an approved booking's start time. (Medium Priority)

REQ-1.2: An authenticated user must be able to check an approved booking's end time. (Medium Priority)

REQ-1.3: An authenticated user must be able to check an approved booking's location. (Medium Priority)

3.5 Booking Reminder (Low Priority)

3.5.1 Description and Priority

The booking reminder feature has a low priority in the Study Room Booker application. An authenticated user must be able to receive reminder(s) about his or her approved booking(s) at least 15 minutes beforehand by email. Booking reminder feature is an additional feature by the client request. As such, booking reminder feature is put as a low priority feature.

3.5.2 Functional Requirements

An authenticated user must be able to receive a notification of his or her upcoming booking(s) via a verified email at least 15 minutes beforehand about the information and deadline of the booking(s).

REQ-1: An authenticated user must be able to receive a notification of his or her upcoming approved booking(s) at least 15 minutes beforehand by email. (Low Priority)

REQ-1.1: An authenticated user must be able to receive a notification of his or her upcoming booking(s). (Low Priority)

REQ-1.2: An authenticated user must be able to receive an accommodating reminder that reminds the user of the deadline to check in to their study room. (Low Priority)

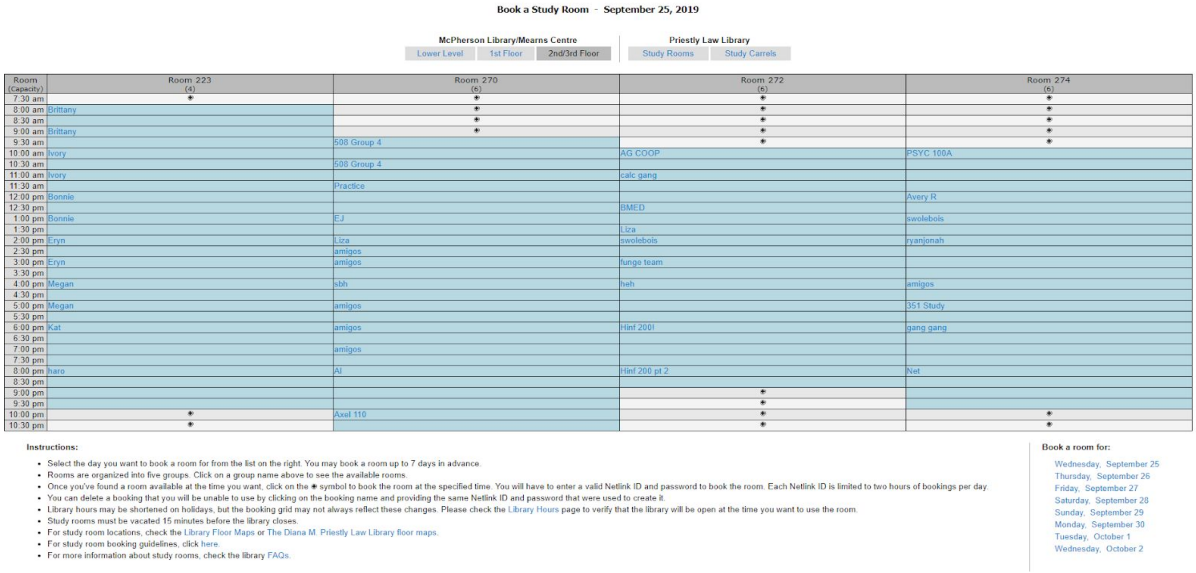
4 External Interface Requirements

4.1 User Interfaces

Our user interface will succeed the current study room booking page on the Green Meadows University website. The main function will remain the same, but some changes will be made to accommodate the new system and make the site mobile friendly.

The current page features a set of location selection buttons, which will bring up a timetable for all the study rooms available to book in the selected location. There will be a list of dates, where users may click on a date to book rooms for that day. Clicking on an available spot on the timetable will bring the user to the booking page, which will require the user to enter the name of their study group, the time they need to use the room for, and their university account credentials.

The new page will replace the selection buttons and date list to a catalog. The user will need to pick a date, building, and room to bring up the timetable for that room on the day chosen. Clicking on an available spot on the timetable will instead bring up a pop up window in the same page, and the user can then complete their booking process by filling in the required information.



Book a Study Room - September 25, 2019

McPherson Library/Mearns Centre: Lower Level | 1st Floor | 2nd/3rd Floor

Priestly Law Library: Study Rooms | Study Carrels

Room (Capacity)	Room 223 (4)	Room 270 (6)	Room 272 (6)	Room 274 (6)
7:30 am	*	*	*	*
8:00 am	Brittany	*	*	*
8:30 am		*	*	*
9:00 am	Brittany	*	*	*
9:30 am		508 Group 4	*	*
10:00 am	Ivory		AG COOP	PSYC 100A
10:30 am		508 Group 4		
11:00 am	Ivory		calc gang	
11:30 am		Practice		
12:00 pm	Bonnie			Avery R
12:30 pm			BMED	
1:00 pm	Bonnie	EJ		swolebois
1:30 pm			Liza	
2:00 pm	Eryn	Liza	swolebois	ryanjonah
2:30 pm		amigos		
3:00 pm	Eryn	amigos	lunge team	
3:30 pm				
4:00 pm	Megan	sbh	heh	amigos
4:30 pm				
5:00 pm	Megan	amigos		351 Study
5:30 pm				
6:00 pm	Kat	amigos	Hinf 200!	gang gang
6:30 pm				
7:00 pm		amigos		
7:30 pm				
8:00 pm	haro	Al	Hinf 200 pt 2	Net
8:30 pm				
9:00 pm			*	
9:30 pm			*	
10:00 pm	*	Axel 110	*	*
10:30 pm	*		*	*

Instructions:

- Select the day you want to book a room for from the list on the right. You may book a room up to 7 days in advance.
- Rooms are organized into five groups. Click on a group name above to see the available rooms.
- Once you've found a room available at the time you want, click on the * symbol to book the room at the specified time. You will have to enter a valid Netlink ID and password to book the room. Each Netlink ID is limited to two hours of bookings per day.
- You can delete a booking that you will be unable to use by clicking on the booking name and providing the same Netlink ID and password that were used to create it.
- Library hours may be shortened on holidays, but the booking grid may not always reflect these changes. Please check the Library Hours page to verify that the library will be open at the time you want to use the room.
- Study rooms must be vacated 15 minutes before the library closes.
- For study room locations, check the Library Floor Maps or The Diana M. Priestly Law Library floor maps.
- For study room booking guidelines, click here.
- For more information about study rooms, check the library FAQs.

Book a room for:

Wednesday, September 25
Thursday, September 26
Friday, September 27
Saturday, September 28
Sunday, September 29
Monday, September 30
Tuesday, October 1
Wednesday, October 2

Diagram 4-1 Current study room booking page

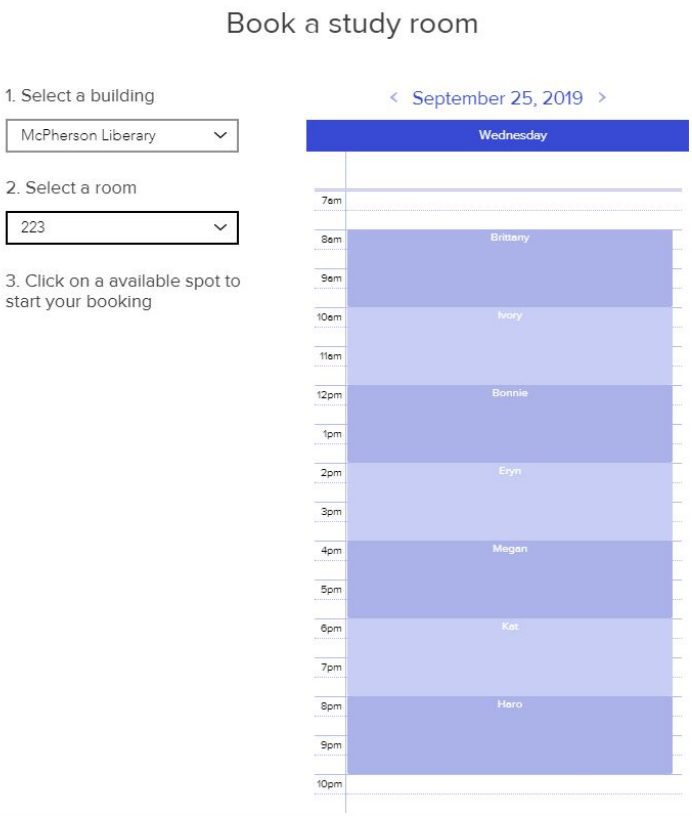


Diagram 4-2 Provisional study room booking page

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.

Hardware Interface Requirement	**Priority**
HI-1: The user must be able to access the Study Room Booker on mobile phones.	High

HI-2: The user must be able to access the Study Room Booker on electronic tablets.	High
HI-3: The user must be able to access the Study Room Booker on laptop computers.	High
HI-3: The user must be able to access the Study Room Booker on desktop computers.	High

4.3 Software Interfaces

Due to the requirement of the user being able to access the application on a variety of devices as listed in section 4.2, the system must support the most common operating systems as listed in the "Software Interface Requirements" table as shown below.

The types of messages entering the system are user credentials and room requests sent by the user to the Study Room Booker's APIs, and authorization codes from the Green Meadows University to the Study Room Booker. Messages leaving the system include user credentials which transfer from the Study Room Booker's APIs to Green Meadows University's APIs to validate and authorize users, and room information which transfers from the Study Room Booker's API to Green Meadows University's APIs to complete the booking transaction.

Software Interface Requirements	**Priority**
SI-1: The user must be able to access the Study Room Booker on Android 5.0 and above.	High
SI-2: The user must be able to access the Study Room Booker on iOS 9.0 and above.	High
SI-3: The user must be able to access the Study Room Booker on Windows XP and above.	High
SI-4: The user must be able to access the Study Room Booker on macOS Yosemite and above.	High

SI-5: The user must be able to access the Study Room Booker on Ubuntu 16.04 and above.	Low
SI-6: The system must connect to the Green Meadows University's existing account API for user authentication when processing a study room booking request.	High
SI-7: The system must connect to the Green Meadows University's existing study room API for processing the booking request.	High

4.4 Communications Interfaces

The Study Room Booker requires that the user transmits personal information such as their student number and account information in order to complete a booking transaction. In order to protect the user, the system must transmit user information through secure communication channel such as HTTPS over TLS. In addition, the user must receive notifications from the system to remind them when their booking begins through an email - for that reason, the system must be able to communicate with the user through SMTP. In addition, the system must be able to operate on various web browsers as described in "Communications Interface Requirements" table shown below.

Communication Interface Requirements	**Priority**
CI-1: The system must send all user data using HTTPS over TLS.	High
CI-2: The system must receive all user data using HTTPS over TLS.	High
CI-3: The system must send all emails using SMTP.	High
CI-4: The user must be able to operate the Study Room Booker on Internet Explorer 11 and above.	Low
CI-5: The user must be able to operate the Study Room Booker on Microsoft Edge 44.18362.1.0.	High
CI-6: The user must be able to operate the Study Room Booker on Firefox 69.0.1 and above.	High

CI-7: The user must be able to operate the Study Room Booker Google Chrome 77.0.3865 and above.	High
CI-8: The user must be able to operate the Study Room Booker on Safari 12.1.2 and above.	High

5 Other Non-Functional Requirements

5.1 Performance Requirements

New study room bookings are to be reflected in the schedule in no more than 2 minutes. Cancellations of existing bookings are to be reflected in the schedule in no more than 2 minutes. The implementation of these requirements will provide users with an accurate schedule. An accurate schedule reduces the possibility of booking conflicts such as double bookings. An accurate schedule also provides users with the assurance that their booking was entered correctly. Minimizing booking conflicts and assuring users that their bookings were entered correctly reduces user stress and allows users to manage their time effectively.

5.2 Safety Requirements

User data must be securely transmitted with the use of TLS over HTTPS. User information related to Study Room Booker that was collected from the users must comply with Green Meadows University privacy policies as well as federal and provincial privacy policies.

5.3 Security Requirements

Only users who possess a Green Meadows University user ID, may book study rooms. Users are to enter their student numbers and password into the Study Room Booker login page in order to gain access to Study Room Booker. Users who do not have system administrator access will be limited to booking their own rooms, cancelling their own bookings, and viewing the booking schedule. Users with system administrator access will gain the access of users who are not system administrators as well as have the permission to cancel any user's booking.

5.4 Software Quality Attributes

System administrators must be able to view all booking information. System administrators must be able to remove bookings from Study Room Booker. When provided with the two preceding permissions, system administrators will be able to remove invalid bookings from Study Room Booker.

Users must receive an email notification from Green Meadows University to notify them of their upcoming booking. The email notification must be sent through SMTP.

6 Other Requirements

Data sourcing methods from the current system will be reused in the new system. Study Room Booker will utilize the personal information of both students attending and faculty employed at the Green Meadows University. The Green Meadows University has specific budget of $20000.

Appendix: Issues List

Below is a list of requirements that have been identified and need further clarification from the Green Meadows University:

- Who will be responsible for maintaining the Study Room booker application once it has been built.
- What kind of notifications will the users receive by email
- If a user books for less than the maximum time (2 hours), what increments can bookings be made in (e.g. 15 minutes, 30 minutes).