
SE3352a: Software Requirements and Analysis

Ademidun Hart & Co

Ademidun Hart & Company
Modern Software Requirements Specification
For Self Start On-line Clinic at Marcotte Physiotherapy

Version 7.2

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Modern Software Requirements Specification

1. Introduction

1.1 Purpose

The purpose behind the creation of this Modern SRS is to capture the complete software requirements for the Self Start On-line Clinic at Marcotte Physiotherapy– a system that will allow patients to receive treatment remotely and enable clinicians to improve upon traditional assessments for a patient’s progression through an online platform. This document serves as the conceptual model of the On-line Clinic system and describes all the external behaviors, activities, and interactions between the patients, physiotherapists, and the system administrator that needs to be facilitated. It also provides detailed documentation on all nonfunctional requirements, design constraints, and other factors necessary to satisfy the needs of patients and physiotherapists at Marcotte Physiotherapy and provide the optimal user experience.

1.2 Scope

The system that will be developed under the guidance of this Modern SRS is the Marcotte Physiotherapy On-line Clinic. The system provides value to clinicians and patients by removing the requirement for in-person interactions while still facilitating all services that are normally available through an in-person visit. The system will store and organize information on patients, injury records, exercises, assessments, and rehabilitation plans. This information can be accessed, used, and modified through a web-application by patients and physiotherapists to facilitate successful treatments with added convenience. In addition to fulfilling functional requirements, the system will be available 24/7 and will be aesthetically pleasing, easy to use, secure, and reliable. With this system, a patient will be able to successfully sign-up, get assessed, receive treatment, and provide payment all through a smooth and streamlined process.

1.3 Definitions, Acronyms and Abbreviations

Term	Definition
SRS	Software Requirements Specification – A document that describes the complete external behavior of the system through the definition of functional and non-functional requirements. It serves as a conceptual model of the system to be built.
Administrator (Admin)	A system user with elevated privileges that are above the norm.
HTTPS	Hypertext Transfer Protocol Secure – an internet communication protocol that can provide authentication to the site and protection of the privacy and integrity of the exchanged data. It can generate secure encryption keys between the web server and the client’s browsers.
Node.js	An open-source, cross-platform JavaScript runtime framework that uses an event-driven, non-blocking I/O model
W3C	The World Wide Web Consortium – the standard governing body for web technologies.
ISO	International Standards Organization – a governing body for standards.
IBM CUA	IBM’s standard for Common User Access - define a user interface in terms of common elements, such as the way information appears on a screen, and interaction techniques, such as the way users respond to what appears on a screen.

1.4 References

Title	Reference
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Assignment 1: Developing the Software Requirements Specification SRS	Ouda, A. "Assignment 1: Developing the Software Requirements Specification SRS" SE3352a Software Requirements and Analysis. Western University, Fall, 2016. < https://owl.uwo.ca/access/content/attachment/672f3446-c1d2-46a8-9426-90707ad34952/Assignments/8ebc5171-3538-47ba-adeb-85d4791f515c/SE3352a_assignment1%20_2017_.pdf >
IBM CUA	IBM Common User Access Standards, < https://www.ibm.com/support/knowledgecenter/en/SSLTBW_2.1.0/com.ibm.zos.v2r1.f54dg00/cuahlp.htm >
RFP	Request for proposal - request for proposal (RFP) is a document that solicits a proposal, often made through a bidding process, by an agency or company interested in procurement of a commodity, service, or valuable asset.

1.5 Overview

The Modern SRS document is divided into three sections. The first section serves as an introduction to the project and outlines the purpose and scope of the project while providing a glossary and reference table to provide additional information and aid for reading.

The second section of the document, Overall Descriptions, provides an informal description of the required functionalities and provides the background for those requirements. It provides the factors that affect the system and its requirements and aids in the transition into the third section where the requirements are defined in more detail. This section can be understood by technical and non-technical audiences.

The third section of the document, Requirements, contains the detailed descriptions of use cases, non-functional requirements, as well as any other technical aspects such as interfaces, user documentation, and licensing. This section will contain all the details needed to develop the system that is being described.

2. Overall Description

2.1 Use-Case Model Survey

2.1.1 Introduction

A use case is a fundamental tool used to describe the functionality of a system. It highlights the basic functionality flow and the interaction between the system and external entities, referred to as actors. The use cases in this project work in unison to bring the treatment of the physiotherapist into the home. The system is going to be used by Marcotte Physiotherapy and will provide them with tools to improve the traditional approaches of the patient's progression assessment. Each use case in this model is going to serve one main functionality which will allow Marcotte Physiotherapy the ability to offer clients treatment from home.

2.1.2 Survey Description

Self Start is a web-based system that will provide two-way communication between physiotherapists and clients. The purpose of this system is to automate the assessment, diagnosis, and treatment activities that are currently carried out in-person. The system will provide patients with access to the same services without having to book an in-person appointment. The system is maintained by an administrator and allows physiotherapists to assess injuries, create treatment plans, and monitor patient progress. The system also handles client payment. Additionally, the system authenticates each user at login and loads an appropriate user-interface based on the user's role.

2.1.3 Use-Case Model Hierarchy

Actors	Description
Admin	The administrator of the system is responsible for ensuring 24/7 maintenance of the system. Controls the management of user accounts.

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Physiotherapist	The physiotherapist uses the system to assess patient injuries, create exercises, assign treatment plans, and monitor patient rehabilitation.
Client	The client utilizes the system to submit injuries, book appointments, view exercises, and complete self-assessments.
Payment Platform	Processes payments between client credit card companies and Marcotte Physiotherapy.

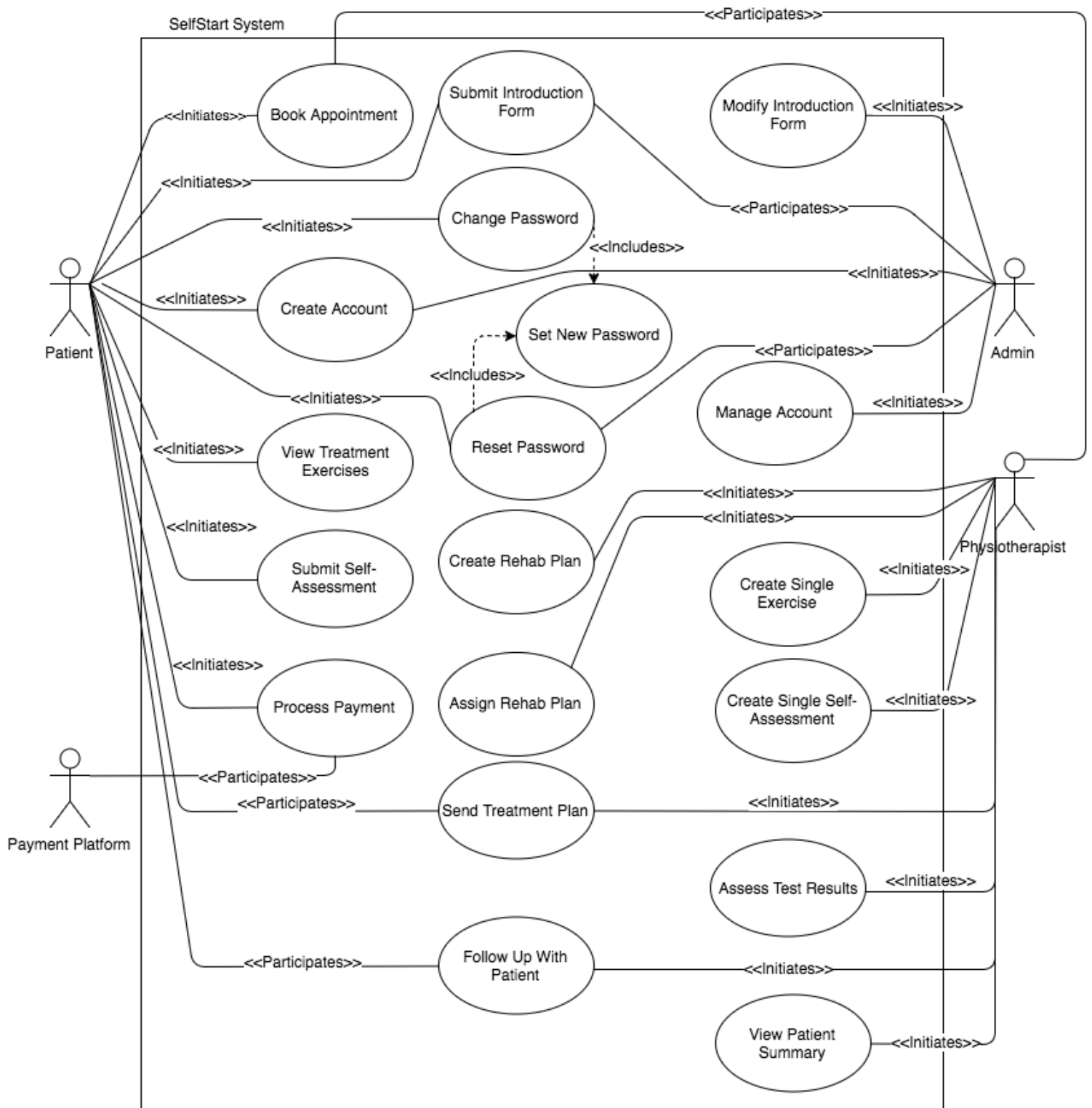
Use Case	Description
Book Appointment	System allows the client to book appointments with a physiotherapist on-line with a self-confirmation message.
Create Account	System provides the ability for the client to create an online account. The account includes basic personal information like name, gender and date of birth etc.
Submit Introduction Form	System provides an online form that helps the client describe their injury and submit the form for assessment by the physiotherapist.
Process Payment	System accepts and processes the client's online payments.
Change Password	System allows the client to change their password.
Set New Password	System allows the client to enter their own new password.
Reset Password	System sends a request to reset the password for clients who have forgotten their password.
View Treatment Exercises	System provides the ability for the client to view their treatment exercises.
Create Single Exercise	System provides the ability for the physiotherapist to create a single exercise.
Create Single Self-Assessment	System provides the ability for the physiotherapist to create an assessment test that includes test.
Submit Self-Assessment	System provides online forms to let the client respond to assessment test questions.
Create Rehab Plan	System provides the ability for the physiotherapist to create clinic-defined standard rehabilitation plans that include exercises and self-assessment activities.
Assign Rehab Plan	System provides the ability for the physiotherapist to assign a set of exercises to custom rehabilitation plans.
Send Treatment Plan	System provides the ability for the physiotherapist to generate and print or send a written report to the client that includes examination finds and a treatment plan.
Assess Test Results	System provides the ability for the physiotherapist to generate data analysis that describes the impact of rehabilitation plans.
View Patient Summary	System provides the ability for the physiotherapist to display and print a summary report for each client. Report includes the clients personal information, the diagnosed case, treatments, appointments, invoices and final outcome.

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Follow Up With Patient	System allows the physiotherapist to assign a follow-up session with the client or close the case.
Modify Introduction Form	System provides the ability for the administrator to customize the introduction form's questions without changing system codes.
Manage Account	System allows the administrator to reset the user passwords and disable and enable existing user accounts.

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2.1.4 Diagrams of the Use-Case Model



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2.2 Assumptions and Dependencies

The feasibility of the system depends on the following assumptions and dependencies:

- Actors have access to functioning internet via up to date internet browsers.
- Exercise animations/videos/descriptions will be provided by Marcotte Physiotherapy.
- A third-party payments platform (such as Moneris) will be required to process payments from users.

3. Requirements

3.1 Use-Case Specifications

Use Case Name	Book Appointment
Participating Actors	Initiated by Patient, Physiotherapist participates
Entry Condition	<ul style="list-style-type: none"> - A logged in, registered Patient has accessed the main page and has requested to book an appointment, or - A new, unregistered Patient has accessed the main page and has requested to book an appointment.
Flow of Events	<ol style="list-style-type: none"> 1. The Patient requests to book an appointment. 2. The Patient is presented a form that is used to coordinate appointment bookings. 3. The Patient fills out the form with the appropriate information requested, the Patient will have to specify the time for the appointment. If the patient is new and unregistered, they be presented contact information fields for which they will have to fill. 4. The Patient submits the form, which will be handled by the Physiotherapist to ensure that they make note of the appointment. The patient is presented with a confirmation message that indicates the appointment has been booked.
Exit Condition	The patient has an appointment booked with Marcotte Physiotherapy.
Quality Requirements	The information submitted should use TLS/SSL to create a secure connection to the server that will protect the Patient's personal information.

Use Case Name	Create Account
Participating Actors	Initiated by Patient or by the System Administrator
Entry Condition	Patient has accessed the main page and has not registered an account with Marcotte Physiotherapy yet.
Flow of Events	<ol style="list-style-type: none"> 1. The patient requests to create an account on the main screen. 2. The patient is served with a form requesting account related information including a password. 3. The patient fills out the form and confirms their information to create their account.

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	4. If form is filled incorrectly, system displays error messages above fields that are not filled correctly, prompting the user to make changes and submit again.
Exit Condition	The user has created an account.
Quality Requirements	The information submitted should use TLS/SSL to create a secure connection to the server that will protect the Patient's personal information. Additionally, the password for the user should be hashed using an algorithm, such as SHA-256 or and equivalent, before being stored in the database. Lastly, the system should require that the user input a robust password of a specified minimum length and mix of characters.

Use Case Name	Submit Introduction Form
Participating Actors	Initiated by Patient
Entry Condition	Patient has opened the introduction form
Flow of Events	<ol style="list-style-type: none"> 1. System displays the introduction form and empty fields to be filled. 2. Patient fills in the form by answering the questions. 3. Patient upload static photos to respond to the questions. 4. Patient clicks "submit" to submit the form. 5. If form is filled correctly, system displays a message for successful submission and navigates back to the home page. 6. If form is filled incorrectly, system displays error messages above fields that are not filled correctly, prompting the user to make changes and submit again.
Exit Condition	Patient successfully submits the form and the Patient navigates away from the page.
Quality Requirements	None.

Use Case Name	Process Payment
Participating Actors	Initiated by Patient, Payment Platform participates
Entry Condition	The patient has logged into the system and has a balance outstanding on their account.
Flow of Events	<ol style="list-style-type: none"> 1. The patient elects to pay the outstanding balance on their account. 2. The system serves the patient with a payment form requesting information regarding insurance coverage and the payment amount. 3. The patient fills out the required information and is transferred to a secure Payments Platform to input their payment method and complete payment. 4. If form is filled incorrectly, system displays error messages above fields that are not filled correctly, prompting the user to make changes and submit again.

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	5. The patient returns to the system and is notified by the Payment Platform if the payment was processed successfully or not.
Exit Condition	The patient has made a payment and has been notified.
Quality Requirements	The payment system should submit payment information using TLS/SSL to create a secure connection to the server that will protect the Patient's payment information.

Use Case Name	Change Password
Participating Actors	Initiated by Patient
Entry Condition	Logged in patient has clicked on change password.
Flow of Events	<ol style="list-style-type: none"> 1. System displays a change password form. 2. Patient enters current password and new password. 3. System checks to see if current password is correct. 4. If current password is accurate, system display message to indicate success. 5. The Set New Password use case is included here. At the end of the Set New Password use case, the system has received and set a new password for the Patient. 6. If current password is inaccurate, system displays error message and prompts for a new entry.
Exit Condition	Patient navigates away from the page.
Quality Requirements	None.

Use Case Name	Set New Password
Participating Actors	Initiated by Patient
Entry Condition	This Use Case is included by the Change Password and Reset Password use case. It is initiated by the system when the Patient has been authenticated to set a new password
Flow of Events	<ol style="list-style-type: none"> 1. System displays fields for Patient to enter the new desired password. 2. Patient enters new desired password. 3. System verifies if password format is valid. 4. If valid, System displays message to indicate success and navigate away from page. 5. If not valid, System displays red error messages above the password field and prompts for another attempt.
Exit Condition	Patient navigates away from the page.

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Quality Requirements	The system should require that the user input a robust password of a specified minimum length and mix of characters. The information submitted should use TLS/SSL to create a secure connection to the server that will protect the Patient's personal information. Additionally, the password for the user should be hashed using an algorithm, such as SHA-256 or and equivalent, before being stored in the database.
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Use Case Name	Reset Password
Participating Actors	Initiated by Patient, Admin receives request
Entry Condition	Patient that is not logged in has clicked on forgotten password.
Flow of Events	<ol style="list-style-type: none"> 1. System displays reset password form. 2. Patient fills the form by providing the associated email and the answer to 2 security questions. 3. System verifies the accuracy of the email and security question responses. 4. If valid, Admin receives request to reset password. 5. Admin resets password. 6. The Set New Password use case is included here. At the end of the Set New Password use case, the system has received and set a new password for the Patient.
Exit Condition	Patient navigates away from the page.
Quality Requirements	None.

Use Case Name	View Treatment Exercises
Participating Actors	Initiated by Patient
Entry Condition	The Patient has logged into the system.
Flow of Events	<ol style="list-style-type: none"> 1. The patient chooses to view their treatment exercises. If more than one rehabilitation plan is assigned, they will first have to select the plan from which the exercises will come from. 2. The patient is served with a page detailing the exercises prescribed under their current treatment plan. If the patient is not under a treatment plan currently, this page will be blank. 3. The patient chooses a specific exercise if applicable and is served detailed information regarding the exercise. This can be in the form of a text description or a video depiction of the exercise. 4. The patient may navigate away to another portion of the site at any time.
Exit Condition	The patient has viewed an exercise and has now navigated away from the page.
Quality Requirements	The exercise list and accompanying descriptions should be laid out in an intuitive manner that is easy for new clients to adapt to.

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Use Case Name	Create Single Exercise
Participating Actor	Initiated by the Physiotherapist
Entry Conditions	The Physiotherapist is logged into the system and clicks the “Create Exercise” button.
Flow of Events	<ol style="list-style-type: none"> 1. A blank form is displayed to the Physiotherapist with many blank fields (as detailed in Quality Requirements). 2. The Physiotherapist fills in the fields to create the exercise. 3. The Physiotherapist saves the form by click the “Save” button. 4. The Physiotherapist exits the screen by clicking the “Exit” button.
Exit Condition	The Physiotherapist terminates the process by clicking the “Exit” button.
Quality Requirements	<p>The system maintains the following information for each exercise:</p> <ul style="list-style-type: none"> – Unique identification code – Name – Description – Author name – Objectives – Action Steps – Location – Frequency & Duration – Target Date – Multimedia URL

Use Case Name	Create Single Self-Assessment
Participating Actor	Initiated by the Physiotherapist
Entry Conditions	The Physiotherapist is logged into the system and clicks the “Create Assessment” button.
Flow of Events	<ol style="list-style-type: none"> 1. A blank form is displayed to the Physiotherapist with many blank fields (as detailed in Quality Requirements). 2. The Physiotherapist fills in the fields to create the assessment. 3. The Physiotherapist saves the form by click the “Save” button. 4. The Physiotherapist exits the screen by clicking the “Exit” button.
Exit Condition	The Physiotherapist terminates the process by clicking the “Exit” button.
Quality Requirements	<p>The system maintains the following information for each assessment:</p> <ul style="list-style-type: none"> – Unique identification code – Name – Description – Author name – Assessment tools (e.g., Rating/ranking questions, Multiple choice questions) – Assessment Rubric

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Use Case Name	Submit Self-Assessment
Participating Actors	Initiated by Patient
Entry Condition	The patient has logged into the system.
Flow of Events	<ol style="list-style-type: none"> 1. The patient chooses to start a self-assessment test. 2. The system serves the patient with an online form to complete the self-assessment. 3. The patient fills out the required information and submits the form. 4. If form is filled incorrectly, system displays error messages above fields that are not filled correctly, prompting the user to make changes and submit again.
Exit Condition	The patient has completed the form and has submitted their self-assessment test.
Quality Requirements	The completion of the form should be simple and easy for patients to reduce their barriers to receiving treatment.

Use Case Name	Create Rehab Plan
Participating Actors	Initiated by Physiotherapist
Entry Condition	Physiotherapist has requested to create a new rehabilitation plan
Flow of Events	<ol style="list-style-type: none"> 1. System displays form to collect information for rehabilitation plan. 2. Physiotherapist provides form by entering the additional information required (i.e., name, description, overall rehabilitation goal).
Exit Condition	Physiotherapist navigates away from the page.
Quality Requirements	None.

Use Case Name	Assign Rehab Plan
Participating Actors	Initiated by Physiotherapist
Entry Condition	Physiotherapist is logged into the system and on the Create Rehabilitation Plan page.
Flow of Events	<ol style="list-style-type: none"> 1. The physiotherapist double clicks an exercise(s) from the Exercise side bar. System adds the exercise under the Exercise heading on the Rehabilitation Plan form. 2. The physiotherapist double clicks on an assessment test(s) from the Assessment Test side bar. System adds the assessment test under the Assessment Test heading on the Rehabilitation form. 3. The physiotherapist clicks the Create button.
Exit Condition	System sends an acknowledgment that the Rehabilitation Plan has been successfully created.
Quality Requirement	Rehabilitation Plan form must be simple and easy to use.

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Use Case Name	Send Treatment Plan
Participating Actors	Initiated by Physiotherapist. Client participates.
Entry Condition	Physiotherapist is logged into the system
Flow of Events	<ol style="list-style-type: none"> 1. The physiotherapist presses the Send button. 2. System sends an acknowledgment that the treatment plan was sent to the client.
Exit Condition	Client receives a notification on their dashboard that treatment plan is available to view.
Quality Requirement	Client notification will appear on their dashboard within 1 minute of submission.

Use Case Name	Assess Test Results
Participating Actor	Initiated by the Physiotherapist
Entry Conditions	The Physiotherapist is logged into the system and clicks the “Assess Test Results” button.
Flow of Events	<ol style="list-style-type: none"> 1. A screen of assessment test results is displayed to the Physiotherapist. <ol style="list-style-type: none"> a. If no tests are available, display a “No test results available” warning. 2. The Physiotherapist clicks on the assessment test(s) that he/she wishes to analyze. 3. Once clicked, the test result and predefined rubric is displayed to the Physiotherapist. 4. The Physiotherapist can jot down notes regarding the impact of the rehabilitation plans in a text box on the bottom of the screen. 5. The Physiotherapist saves the notes by click the “Save” button. 6. The Physiotherapist exits the screen by clicking the “Exit” button and returns to the screen of the list of assessment test results. 7. The Physiotherapist exits this test results screen by clicked the “Exit” button.
Exit Condition	The Physiotherapist terminates the process by clicking the “Exit” button.
Quality Requirements	None.

Use Case Name	View Patient Summary
Participating Actor	Initiated by the Physiotherapist
Entry Conditions	The Physiotherapist is logged into the system and clicks the “View Patient Summary” button.
Flow of Events	<ol style="list-style-type: none"> 1. A screen with a list of patients is displayed to the Physiotherapist. 2. The Physiotherapist clicks on patient that he/she wishes to view. 3. Once clicked, a screen with the patient’s information is displayed to the Physiotherapist (detailed in the Quality Requirements section).

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	<ol style="list-style-type: none"> 4. The Physiotherapist can print the document by pressing a “Print” button on the screen. 5. The Physiotherapist exits the screen by clicking the “Exit” button and returns to the screen of the list of patients. 6. The Physiotherapist exits this list of patients screen by clicking the “Exit” button.
Exit Condition	The Physiotherapist terminates the process by clicking the “Exit” button.
Quality Requirements	<p>The generated report contains the following:</p> <ul style="list-style-type: none"> – Patient personal information – The diagnosed case – The treatments – Calendar of appointments – Invoices payments – The final outcomes

Use Case Name	Follow Up With Patient
Participating Actors	Initiated by Physiotherapist. Client participates.
Entry Condition	Physiotherapist is logged into the system
Flow of Events	<ol style="list-style-type: none"> 1. The physiotherapist presses the Book Appointment button or Close Case button. 2. System displays a message acknowledging the appointment was booked successfully or the case was closed successfully.
Exit Condition	Confirmation email is send to the client with the appointment information or acknowledging the case is closed.
Quality Requirement	Confirmation email will be sent within 1 minute of submission.

Use Case Name	Modify Introduction Form
Participating Actor	Initiated by the Admin
Entry Conditions	The Admin is logged into the system and clicks a button to modify the questions of the introduction form.
Flow of Events	<ol style="list-style-type: none"> 1. A screen of the current questions is displayed to the Admin, where each question is divided into its own “boxes”. 2. The Admin deletes any unwanted questions by clicking an “x” inside the question’s box. 3. The Admin changes the question by clicking inside the question’s textbox and changing the text. 4. The Admin can add a question by clicking a “+” sign at the bottom of the screen. 5. The Admin saves the form by click the “Save” button. 6. The Admin exits by clicking the “Exit” button.
Exit Condition	The Admin terminates the process by clicking the “Exit” button.

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Quality Requirements	None.
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Use Case Name	Manage Account
Participating Actor	Initiated by the Admin
Entry Conditions	The Admin is logged into the system and clicks the “Manage Accounts” button
Flow of Events	<ol style="list-style-type: none"> 1. A screen of all the user accounts is displayed to the Admin. 2. The Admin disables any unwanted accounts by clicking a “Disable” button beside the account. 3. The Admin can enable any previously disabled accounts by clicking a “Enable” button beside the account. 4. The Admin can reset any user’s password by clicking the “Reset Password” button (unrelated to the Reset Password use case, which is initiated by the patients) beside the account, to return the password to the default password. 5. The Admin exits the screen by clicking the “Exit” button.
Exit Condition	The Admin terminates the process by clicking the “Exit” button.
Quality Requirements	None.

3.2 Functionality

3.2.1 For any user visiting the site

1. The system should provide a description of on-line patient services to all users visiting the site.
2. The system should provide an interface for all user types to login by authenticating their username and encrypted password. The system should configure access conditions based on the type of user account and, for patients, which user is logged in.
3. The system should allow prospective patients who would like to contact the clinic for the first time the option to request an appointment or fill out and submit an online form explaining their injury.

3.2.2 For patients

1. The system should allow the patient to create an account. This account will maintain basic personal information for the patients such as name (family name, given name), gender, date of birth, address (including city, region, and postal code), telephone number, health card number, marital status, occupation, and others.
2. The system should allow the patient to change his/her password, or request the system administrator to reset the forgotten password.
3. The system should allow the patient to book appointments with the physiotherapist online and receive immediate confirmation.
4. The system should provide an introductory form to be filled out on the application with the goal of help patients describe their injury in detail. This will be achieved through different levels and types of questions, including the ability to upload static photos of the patient.
5. The patient should be allowed to explore and view their treatment exercises.

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6. The patient should be able to complete their self-assessment test questions through an online form. The system should record these assessments and store them with reference to the patient and treatment plan so that the data can be used to assess the results of the treatment.
7. The patient should be able to perform payment for their services online through the system.

3.2.3 For physiotherapists

1. The physiotherapist must be enabled to create clinic-defined standard rehabilitation plans (for common injuries) that include a set of exercises and self-assessment activities.
2. The physiotherapist must be able to create, and save a single exercise. The system should maintain the following information for each exercise: a unique identification code, name, description, author name, objectives, action steps, location, frequency, duration, target date, and a link to multimedia (via URL).
3. The physiotherapist must be able to create and save a single self-assessment test. The system should maintain the following information for each assessment test: a unique identification code, name, description, author name, assessment tools (e.g., rating/ranking questions, multiple choice questions), and an assessment rubric.
4. The physiotherapist should be able to assign a set of exercises and a set of self-assessment tests to be able to create a custom rehabilitation plan. The system should maintain the following information about each rehabilitation plan: a unique identification goal, name, description, author name, overall rehabilitation goal, an ordered list of exercises, a timeframe to complete the plan, and assessment tests.
5. The physiotherapist should be allowed to assign one or more rehabilitation plans to one or more patients.
6. The physiotherapist should be able to generate and print/send a written report summarizing the examination findings and treatment plan to the patient.
7. Based on the assessment results and pre-defined rubrics, the physiotherapist should be able to generate a data analysis that reflects the impact of the rehabilitation plan on the patient.
8. The physiotherapist should be able to decide whether to assign a follow up session with the patient (to reassess the case and provide an adjusted treatment) or to close the case.
9. The physiotherapist should be allowed to display and print a summary report for each patient. This report should include: patient personal information, the diagnosed case, the assigned treatments, calendar of appointments, invoice payments, and the final outcomes.

3.2.4 For admin

1. The system should be shipped with an administrator account, in addition to two users' roles types: Patient accounts (and corresponding functionalities) and Physiotherapist accounts (and corresponding functionalities).
2. The system should allow the administrator to customize (add, change, or delete) the questions of the introduction form without having to change the system's code.
3. The administrator must be allowed to create user accounts for patients and/or physiotherapists.
4. The administrator should be able to reset a patient's password upon verification of their identity and inform them of their new password.
5. The administrator should be allowed to disable or enable existing Patient and Physiotherapist accounts.

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3.3 Usability

3.3.1 Required Training Time

Physiotherapist and Admin users should be able to become productive at all operations of the system after 5 hours of training. This training can be executed in groups. If one on one training is preferred, productive use of all operations can be achieved in only 4 hours. Patient users should not require any training beyond looking up simple online user documentation that will be provided on the site.

3.3.2 User Interface

All sections of the system, for all user views/configurations, will have an interface that is intuitive and simple. To ensure this is achieved, IBM Common User Access (CUA) standard will be followed. These standards will ensure our application conforms to many other interfaces that our users have most likely used before in the past and are comfortable with. For areas of the application that are slightly more complex (i.e., create a rehabilitation plan from a set of exercises and self-assessment tests or uploading a series of pictures), the field-level help standard will be used to guide the user.

3.3.3 Single Page Application

Increasingly common in web applications is the use of a single, dynamic page. For each core functionality, a single, dynamic page will be used, with a menu bar above that allows access to other features and areas of the system. For example, once a Patient is logged in, a single, dynamic page will be used to display their exercises, and another will be used for their self-assessment tests.

3.3.4 Measurable Times for Typical Tasks

For web applications, it is often easier to use “clicks” as a proxy for the time it takes to navigate to a specific function or complete a specific task. The expected number of clicks for some typical tasks are:

User	Task	Number of Clicks
All users	Login to account	2
Patient	Navigate to rehabilitation plan	2
Physiotherapist	Assign rehabilitation plan to user	4
Admin	Reset a password	3

3.4 Reliability

3.4.1.1 Availability

The application should be available to Patients, Physiotherapists, and Admin 99% of the time. 24/7 availability is the goal with the exception of scheduled monthly maintenance at off-peak times. Scheduled maintenance or ad-hoc maintenance must be posted 48 hours in advance and should not take longer than 6 hours to complete.

3.4.1.2 Mean Time Between Failures (MTBF)

The MTBF should be no shorter than 24 hours. Upon failure, maintenance team should be notified via email alerts.

3.4.1.3 Mean Time to Repair (MTTR)

The MTTR should be no longer than 10 hours. This includes the time to determine the source of failure and efforts to repair the failure.

3.4.1.4 Accuracy

The system does not perform any complex calculations or time-sensitive actions that require exceptional level of accuracy. However, the system should be consistently accurate in its core functionalities, such as:

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displaying the correct user views, ensuring patients are assigned the correct rehabilitation plan, recording and storing self-assessment responses, and creating treatment analysis reports. There should be no system errors in these types of activities, so 100% system accuracy is required. Note that in some instances user error might affect accuracy (e.g., assign incorrect rehabilitation plan to the patient).

3.4.1.5 *Maximum Bugs or Defect Rate*

The system should have a maximum of 4 bugs/KLOC. These bugs should be minor and not affect the core functionality of the system – they should only affect rare “edge cases” of operation. No significant or critical bugs should exist in the system upon deployment or after maintenance work.

3.4.1.6 *Bugs or Defect Rate*

- Minor Bugs: Affect “edge cases” and are noticed in only rare circumstances. Will not affect the day-to-day functioning of the system.
- Significant Bugs: Issues that affect the logic of the system. For example, patients are viewing incorrect rehabilitation plans, self-assessment tests are unable to be submitted, and new users are unable to sign up. These bugs must be fixed immediately upon notice as they affect the functionality of the system. These bugs must not exist upon deployment or ongoing maintenance. Once these bugs are fixed, the system can return to a recent state and system functionality can resume with minimal issues.
- Critical Bugs: Issues that affect the integrity of the entire system. This could include loss of data, financial information leaks, and complete inability to use parts of the system. These bugs must be prevented at all costs, and the system should be designed to mitigate against critical bugs. For example, extensive security testing on the online payments function is necessary and the database that stores exercises, assessment tests, rehabilitation plans, and customer data should be backed up periodically.

3.5 **Performance**

3.5.1 *Response Time*

All functions performed by the user require little to no processing (primarily “fetch and display” operations), and so the average and maximum response times should be less than 0.5 seconds and 1 second, respectively. The only exceptions are for the online payment processing and resetting an account password. The average and maximum response times for confirming payment should be 3 seconds and 8 seconds, respectively. Resetting an account password requires action to be completed by the admin user, thus the system is unable to guarantee a response time as it is dependent on an external actor.

Almost all functions performed by the admin and physiotherapist are slightly more complex as they make changes to the state of the system. Thus, the average and maximum response times for the functions should be 1.5 seconds 3 seconds, respectively. The only exception is for the “Assess Test Results” use case, where information needs to be aggregated from the database and analyzed. The average and maximum response times for pulling this report will be 5 seconds and 10 seconds, respectively.

3.5.2 *Throughput and Capacity*

The system should be able to serve up to 200 different active patients without degradation to its performance. There will be less than 200 transactions per second of the server for any function. The system should support all these transactions without exceeding the maximum response times state above.

3.5.3 *Degradation Mode*

If performance is degraded in some way (e.g., malicious attack, run-time error, significant or critical bug), the system will take action to resolve it as soon as possible. Upon realization of the system issue, the administrator will be notified via email. The system will then transition into read-only mode – the state of the system will not be able to be modified until the administrator has taken action to reset the system state

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to a time prior to the event. During read-only mode, patients will be able to follow their exercise plans, however assessment responses will not be able to be recorded and will have to be completed at a later time.

3.6 Supportability

3.6.1 Modular Programming

System code will be developed modularly. The system will follow strict folder guidelines, that group pages, features, and assets to together in a logical way. For example, all system features and assets used on a specific page of the site will be required to be grouped together. An effort will be made to separate “structure” (e.g. HTML), “presentation” (e.g. CSS), and “interaction” (e.g. JavaScript) elements of code where possible.

3.6.2 Cross-Browser and Cross-Hardware Support

We are unable to predict which browser and hardware will be used by clients when accessing the system. For this reason, the system must be able to run on all popular browsers (Chrome, Edge, Firefox, Safari, and Opera) on any device. The system must maintain the integrity of its user interface when displayed on a tablet or mobile device.

3.6.3 Code Readability

Non-trivial code must be well-documented and easily understood by someone with a limited knowledge of Ember.js. System maintenance past April 30, 2018 will have to be carried out by external parties. Thus, a high effort must be made to ensure that new developers will quickly understand how the system functions.

3.6.4 System Maintenance

The system must be designed to be low maintenance, as access to technical support is limited upon deployment.

3.7 Design Constraints

3.7.1 Security

The system must use the Hypertext Transfer Protocol Secure (HTTPS) as its internet communications protocol to generate secure encryption keys between the web server and the clients’ browsers. The system will rely on a certified security certificate to enable the use of HTTPS.

3.7.2 Hosting

The system must be installed on and hosted by the Marcotte Physiotherapy Clinic central server. The Node.js framework will be used, and the server must be capable to support it.

3.7.3 Web Application Framework

Ember.js will be used as the framework for the system. This framework will aid in achieving the Supportability requirements listed above.

3.8 Online User Documentation and Help System Requirements

Ademidun Hart & Company will provide documentation for simple troubleshooting activities to be carried out by admin and physiotherapists at Marcotte Physiotherapy. If admin and physiotherapists require additional help for advanced troubleshooting, they will be provided with the name, email address, and phone number of a primary, secondary, and tertiary contact at Ademidun Hart & Company. In-person support will continue until April 30, 2018.

All support documentation for patient users will be integrated into the user interface of the system using the field-level help feature of the interface as defined by IBM CUA guidelines. For complex support, we recommend the patient user to contact admin at Marcotte Physiotherapy.

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3.9 Purchased Components

All components of the system will be created by Ademidun Hart & Company with the exceptions of:

- a. Existing MyHealth System – some functionality of Self Start may integrate with the existing system in the future, however it will not be implemented by Ademidun Hart & Company. Ademidun Hart & Company will not be purchasing or licensing this system. Nor do we guarantee the compliance of Self Start with Ontario’s Personal Health Information Protection Act (PHIPA).
- b. Exercise Animations/Videos/Descriptions – these will not be purchased or supplied by Ademidun Hart & Company for this system. Self Start will allow the user to integrate these as necessary when creating an exercise, but are not responsible for the content and can in no way be held liable for patient issues arising as a result of following the prescribed exercises on the Self Start system.

Thus, all features in Self Start are proprietary property of Ademidun Hart & Company. Third-party APIs relating to online payments may be required for the Self Start system. If it is recognized that a paid third-party API or service is necessary to implement this feature, the cost will be passed on to Marcotte Physiotherapy.

3.10 Interfaces

3.10.1 User Interfaces

There will be separate interfaces based on the type of user that is logged in. An administration interface will be provided for administrators, can be used to track client patient profiles and perform account management functionality. There will also be a patient interface where a patient can access and modify their personal, health, and treatment information as well as view their rehabilitation plans and conduct self assessments. The physician will have a separate interface that allows them to create rehabilitation plans for users and view patient progress.

The interface will be designed in a way that is simple and easy to use to provide an intuitive and smooth user experience.

3.10.2 Hardware Interfaces

Hardware interfaces for all users will include desktop and mobile devices that they use to access the system.

3.10.3 Software Interfaces

Software interfaces will include the Node.js and Ember.js framework. The database will be handled by MongoDB. Payments will be processed by a third-party software platform after a RFP process. User authentication will be provided by Auth0.

3.10.4 Communications Interfaces

The application will be served over the HTTPS (Hypertext Transfer Protocol Secure) protocol and relayed on a certified security certificate for communication between the web server and client’s browsers. Ademidun Hart & Company will use TCP/IP layer for the network and transport layer respectively.

3.11 Licensing Requirements

The agreement between Ademidun Hart & Company (“Ademidun Hart & Co” or the “Company”) and Marcotte Physiotherapy Clinic (“Marcotte” or the “Client”) states that any and all works created by the Company during the course of the project will be owned exclusively by the Company. The system developed at the commencement of the project will be sold to Marcotte where it will be licensed for use in operating a tele-health physiotherapy service. Any usage outside this domain is strictly forbidden without the express written consent from the Company.

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3.12 Legal, Copyright and Other Notices

In accordance with the Company's Copyright Policy, the Client agrees to recognize the name and logo of the Company as copyrighted symbols under the World Intellectual Property Organization Copyright Treaty of 1996. The interpretation and enforceability of this agreement and the rights and liabilities of the parties stated herein shall be governed by the laws of the Province of Ontario. To the maximum extent permitted by applicable law, the provisions of this letter shall supersede any contrary provisions of applicable common law.

3.13 Applicable Standards

The Company will follow industry standards during the course of the project to meet compliance expectations. The standards that will be upheld will fall into the following three domains: regulatory standards, accessibility and usability, and web browser compatibility.

Regulatory – The Company will follow the recommendations of the World Wide Web Consortium (W3C) where necessary and applicable to achieve a final system design that is compliant with best practices as set forth by the W3C. This will help to ensure the system is compatible with future web technologies. In addition, the Company will observe the ISO/IEC 25010:2011 standard during the development process. While compliance with this standard is less clearly defined, the Company deems it useful to keep in mind the focus of this standard on achieving maintainability, reliability, efficiency, and security.

Accessibility and Usability – The Company will develop the platform with photosensitive users in mind. To this end, the software should avoid bright, flashing displays where possible. The United States Access Board has defined this in Section 508 as requiring that “software shall not use flashing or blinking text, objects, or other elements having a flash or blink frequency greater than 2 Hz and lower than 55 Hz.”

Web Browser Compatibility – The Company will ensure the system is able to be accessed on the most common web browsers including but not limited to Chrome, Safari, and Firefox. In addition, customers of the Client should be able to access the system from a mobile device. Performance on platforms other than personal computers may be affected due to the potential lack of support for necessary hardware such as cameras used in the interaction with the system.