Software Requirements Specification

for

PatientNow!

Version 1.0 approved

Prepared by Johnathan Nicholson

Antebellum

10/31/2016

Table of Contents

Revision History

Name	Date	Reason For Changes	Version

1. Introduction

1.1 Purpose

This SRS describes the software functional and nonfunctional requirements for release 1.0 of the PatientNow! System. This document is intended to be used by the members of the project team that will implement and verify the correct functioning of the system.

The development team conducted client interviews and independent research to gather the information compiled in this document. The purpose of our software requirements specification is to form the basis to guide further planning and implementation of the project. The paper is the first revision of the document.

1.2 Document Conventions

The team has organized the document into five major sections, plus the appendices. Each section may itself be comprised of smaller subsections. The main headings and three appendices appear in boldface 18-point font. Subheadings appear in boldface 14-point font. Subsequent sections (minor subheadings) appear in boldface 12-point font. Hierarchical numbering is used to label all requirements. Examples of the different heading font styles follow:

1. Main Heading

1.1 Subheading

1.1.1 Minor subheading

Section 4 (System Features) utilizes use cases to describe the system’s major services. Each use case contains a description of the interactive steps an external actor performs along with the system to achieve a major task. Section 4 provides a more detailed outline of the use case format.

1.3 Intended Audience and Reading Suggestions

Antebellum has prepared this document for use by the medical office service firm and by developers who are implementing or will be modifying the system.

The client and developers of this system should read this entire document thoroughly. However, if a quick overview is needed, please refer to **Section 2: Overall Description**. This section provides a broad high-level overview of the Web Advising system.

For members of the medical office service firm, **Section 4: System Features** would be the primary focus of their reading. This section covers the different tasks that will be possible on the system, as well as how the doctors, administrative assistants, and patients will be able to interact with the system.

This document is the primary guideline for the requirements of the proposed system. Every thorough reading of this document helps create a better product. Any issues, concerns, or errors can be brought to the attention of Antebellum.

1.4 Product Scope

Please refer to the Vision and Scope document; section Scope and Limitations.

1.5 References

The references listed below were used to help create this document.

- Antebellum, 2016. *Vision and Scope Document*
- https://polylearn.calpoly.edu/AY_2016-2017/pluginfile.php/278050/mod_assign/introattachment/0/SRS%20example.pdf

2. Overall Description

2.1 Product Perspective

Medical offices currently have separate solutions to a set of problems including scheduling and sharing care plans with their patients. Patients are forced to keep track of their care plans themselves. This forces patients to be unable to review their care plans unless they request a copy. The main goal of this project is to provide one unified system for both scheduling appointments and viewing past care plans.

As we understand, the current solution is problematic due to its segregated, individual systems of scheduling and care plan management. In addition the current solution lacks efficient ways of communicating medical records and recommendations with the patient out of the office.

The proposed application would replace the existing system for scheduling while extending the existing medical record system to allow sharing of selected files. This would allow practices to increase their patient satisfaction and therefore increase adoption of this software.

2.2 Product Functions

This section provides an outline of the functionality needed to meet the needs of all the anticipated user classes as defined in section 2.3.

The major features of the Patient Care Plan and Scheduling software will include:

- Medical Professionals and administrative staff will be able to schedule appointments, this includes rooms and medical professionals needed
- Patients will be able to schedule basic appointments during hours dedicated to those general appointments.

- Medical Professionals will be able to view and edit patient care plans including sharing select medical records with the patient in a secure fashion.
- Medical Professionals and administrative staff can add patients to the system.
- Patients will be able to see up-to-date care plans and scheduled appointments without leaving our application
- Patients will be able to see their bill and access the payment system from our application, however we will not process payments

For a high-level picture of the groups required for these major requirements, refer to the following diagrams in Appendix B:

- DFD Level 0
- DFD Level 1
- DFD Level 2

2.3 User Classes and Characteristics

During the design of this system we identified the following user classes, they are described in depth below:

- Patients
- Administrative Assistants
- Medical Professionals

2.3.1 Patient

This system is designed to allow patients access to their care plan and schedule. Patients will generally use this as a convenient collection of information and a way of scheduling basic appointments. The system will also generally help patients keep track of their medical professionals current recommendations for care and records that the doctor has shared with the patient

2.3.2 Administrative Assistant

Administrative Assistants will be able to enter patient information. This system will make it easier for Administrative assistants to edit schedules and bill patients. The Administrative assistants will be allowed to access any information shared between the patient and the Medical Professional on a read only basis.

2.3.3 Medical Professional

Medical Professionals will be able to perform all of the actions allowed to an administrative assistant for the event that in smaller practices they are required to perform those responsibilities. In addition the system will allow them to share information with the patient via the patient's care plan and associated medical records. The system will also allow the Medical professional to set their available hours.

2.4 Operating Environment

Our system will operate on the medical offices own servers and will be accessed by patients via a modern web browser such as Chrome 43.0 or Firefox 45.0 . This website will only be accessible via SSL/TLS (Secure Sockets Layer/Transport Layer Security)to avoid medical records being transmitted over unsecure connections. This system will need a secure link to the existing medical record system to allow for sharing of medical records with patients. The care plans need to be stored in a new database separate from the existing medical record database.

2.5 Design and Implementation Constraints

The following constraints will define the system's implementation.

- Users must be using a browser that supports SSL to access the website due to security concerns
- The practice must have a constant outward facing IP and concurrent users are limited by the practice's bandwidth

2.6 Assumptions and Dependencies

We are assuming the that each practice is able to host an external facing website. This includes the cost of a static IP and server upkeep.

3. External Interface Requirements

3.1 User Interfaces

All user interfaces for the product will be web-based. This will include the interface for the patient, the medical professional, and the administrative assistants. We will support any modern web browser (Chrome, Safari, Internet Explorer, Firefox). We will provide a general navigation style for the website. Specific customizable style options, such as color scheme, will be chosen by the specific medical office. Error messages will appear in a separate window and adhere to the style of the rest of the website.

3.2 Hardware Interfaces

Our software will interact with a server that must include a web server that can handle simultaneous web-client connections. The server should be able capable of running a networking operating system on a Unix based system.

- 900 MHz quad core CPU
- 256 MB memory
- Java 1.8 JRE
- Servlet engine

3.3 Software Interfaces

Our system requires a web server application that should be able to provide simultaneous web client connections numbering at least half the size of the medical office patient base. Our application will have to interface with various 3rd party payment systems, supporting online credit card payment and perhaps other venues such as PayPal. The databases provided by the medical office that our product will have to access will be:

- The medical office patient database. We will have to be able to add new patients and edit current patient's basic information.
- A MySQL database

3.4 Communications Interfaces

Web browsing will be the most essential communication interface. All interactions between people and the system will go through a web browser.

There will be two separate types of user access. The first will be for patients users accessing the system for their personal information. These users will connect through the Internet with a web-browser.

The second type of user will be staff (medical professionals or administrative assistants). They will have access to modify the web pages on the site from a web client, more security will be required for this user class. They also will be able to access the medical records database to upload documentation.

4. System Features

At a high level, the system is limited to a small number of main features--these features can be used by three different groups of users. More specifically, features are available to users in a cascading style, so that the most 'powerful' user has access to all features of the system, while each level of sub-user is limited to a smaller subset of features. In order to illustrate this concept, we have constructed a chart, which follows this text. Each user group is privy to all features at or below its level in the chart:

USER	**FEATURE**
Medical Professional (Doctor, Dentist, etc.)	Upload and edit care plan
Administrative Assistant	Schedule/cancel non-routine appointment Upload bill invoice Modify availability of rooms/medical professionals

Patient	Schedule/cancel routine appointment View schedule View bill View care plan

As shown above, medical professionals are capable of interacting with all features in the chart, while patients are limited to modifying routine appointments and viewing documents.

4.0.1 General User Interaction with Application

In order to access this application, all user groups will log into the website associated with their medical practice. As such, the application will be served up by a web browser, and all actions will be performed by interacting with the website GUI. Given that different users have varying levels of access, certain features will be hidden from certain users (for instance, patients will not be able to schedule non-routine appointments).

4.0.2 Format of System Features

For clarity, we have outlined high-level features as use cases below. These use cases describe how users interact with the system. Accompanying these use cases are sequence diagrams, which represent interactions with the system--sequence diagrams can be found in Appendix B.

We standardized our use cases with the following convention:
ID and Name
Modification Information
Description of Feature/Actor
Pre/Postconditions
Feature prominence
Steps that occur throughout feature (including all routes and exceptions)
Information that may affect use case path

4.1 Use Cases

4.1.1 Patient Account Registration

Use Case ID: UC - 1
Use Case Name: Patient Account Registration
Created By: David McIntyre
Date Created: October 16, 2016
Actor: Patient
Description:

Allows a user to register as a patient for the web service.

Preconditions:

- User is a registered patient of the practice
- User is not already registered
- User is not logged in

Postconditions:

- User is a registered patient with the system

Priority: High
Frequency of Use: Medium
Normal Course:

Actor Actions	System Responses
1. Patient clicks ‘register as patient’	
	2. System redirects user to the patient registration form
3. Patient enters personal information into the registration form and hits submit	
	4. System checks form for appropriate data (repeat steps 3 & 4 until form is correctly filled)
	5. System sends user a confirmation email
	6. User is redirected to email confirmation page
7. User clicks link in confirmation email	
	8. System redirects user to registration confirmation page

4.1.2 Logging In

Use Case ID: UC - 2
Use Case Name: Logging in
Created By: Jackson Darrow
Date Created: October 16, 2016
Actor: Patient, Administrative Assistant, Medical Professional
Description:

Actor enters their username and password into the login page, the username is linked to a user object that was created during the “register account” step. The user then receives a cookie that will maintain the user's session. The login feature is only available if the user has an expired or terminated cookie.

Preconditions:

- User is connected to the website.
- User has registered.
- User has an expired or invalid session cookie.

Postconditions:

- User has an active session cookie that is tied to their user state.

Priority: Medium
Frequency of Use: High
Normal Course:

<u>Actor Actions</u>	**<u>System Responses</u>**
	1. System prompts the user for their credentials.
2. Student enters credentials.	
	3. System checks the credentials against database. 4. System displays message: <Username> is successfully logged in. 5. System gives the user's browser a session cookie. 6. Subsequent requests will be tied to their user object which has the proper permissions.

Exceptions:

2.E.1 Username does not exist

<u>Actor Actions</u>	**<u>System Responses</u>**
	1. Display message regarding lack of user in system 2. Start Normal Course over.

2.E.2 Password is not correct

Actor Actions	**System Responses**
	1. Display message regarding incorrect password 2. Start Normal Course over.

4.1.3 Change User Password

Use Case ID: UC - 3
Use Case Name: Change User Password
Created By: David McIntyre
Date Created: October 16, 2016
Actor: Any
Description:
Allows a user of PatientNow! to change their password
Preconditions:

- User is registered to PatientNow!

Postconditions:

- User's password has been changed

Priority: Med
Frequency of Use: Low
Normal Course:

Actor Actions	System Responses
1. User is logged in and clicks 'view account details'	2. System redirects user to account details page
3. User clicks 'change password'	4. System redirects user to confirm current password form
5. User enters their current password in both fields	6. System checks user's current password (repeat 5 & 6 until it matches)
	7. System redirects user to choose new password form
8. User enters a new password in both fields	9. System checks if passwords match and if they meet all security criteria (repeat 8 & 9 until they do)
	10. System redirects user to changed password confirmation page

Alternative Course:
3.A.1 Forgotten Password

Actor Actions	System Responses
1. User is not logged in and clicks 'forgotten password?' on the login page'	2. System sends a link to change password to the user's email

4. User clicks ‘change password’ in their email 6. User enters a new password in both fields	3. System asks user to confirm their email 5. System redirects user to choose new password form 7. System checks if passwords match and if they meet all security criteria (repeat 6 & 7 until they do) 8. System redirects user to changed password confirmation page

4.1.4 View Care Plan

Use Case ID: UC - 4
Use Case Name: View Care Plan
Created By: Jackson Darrow
Date Created: October 16, 2016
Actor: Patient, Administrative Assistant, Medical Professional
Description:

Patients are able to see a link to view their own care plan, and doctors and admins are able to see the care plans of all patients. When one of these users selects to see a care plan, the correct plan is displayed in their browser.

Preconditions:

- User is logged into the website.

Postconditions:

- User has seen their care plan documents.

Priority: High
Frequency of Use: Medium
Normal Course:

Actor Actions	**System Responses**
1. User asks for a list of their care plans. (Or care plans they have permission to see)	2. System responds with a list of the available care plans.
3. Users clicks on ‘view care plan’ for either themselves or another patient.	
	4. System checks against database to make sure that the user is permitted to view the plans, if they are, the system responds with the file. The web portal displays the document and makes it available for download. 5. System logs the interaction.

Exceptions:
4.E.1 User does not have permission

Actor Actions	**System Responses**
	1. Display message regarding lack of permission 2. Start normal course over.

4.E.2 User does not have available care plans.

Actor Actions	**System Responses**
	1. Display message regarding lack of care plans to patient 2. Start normal course over.

4.1.5 View Bill

Use Case ID: UC - 5
Use Case Name: View Bill
Created By: Johnathan Nicholson
Date Created: October 14, 2016
Date Last Updated: October 19, 2016
Actor: Patient
Description:

Allow the patient to see their current bill, including outstanding charges and current balance

Preconditions:

- Patient is logged in

Postconditions:

- Patient has a view of their current bill and charges

Priority: Medium
Frequency of Use: Medium
Normal Course:

Actor Actions	System Actions
1. User requests bill 4. User can view bill	2. System asks payment system current status 3. Parses current information, returns outstanding charges and balance

Alternative Course:
5.A.1 User has no charges

Actor Actions	System Actions
1. User requests bill 4. User sees clean requests	2. System asks payment system current status 3. Payment system returns empty charges

Exceptions:
5.E.2 User cannot be found in payment system

Actor Actions	System Actions
1. User requests bill 4. User sees message instructing them to contact the medical office	2. System asks payment system current status 3. Payment system returns not found

Assumptions:

- All users should be registered with the payment system

Notes and Issues:

We have no control over the payment system. Therefore our system cannot resolve users not having accounts

4.1.6 View List of Scheduled Appointments

Use Case ID: UC - 6
Use Case Name: View List of Scheduled Appointments
Created By: Seth Barrios
Date Created: October 16, 2016
Actor: Patient
Description:

The user can view his/her appointments that he/she is scheduled to attend.

Preconditions:

- User is logged in

Postconditions:

- Existing appointments are displayed on screen. Without interaction, user can see basic information about appointment

Priority: High
Frequency of Use: Very high. User is anticipated to use this each time he/she logs in.
Normal Course:

Actor Actions	System Actions
1. User navigates to schedule-viewing screen	2. System requests list of user's upcoming appointments 3. System retrieves list of user's upcoming appointments 4. System displays list of user's appointments and basic information associated with each appointment

Exceptions:
6.E.1 System is unable to retrieve list of upcoming appointments
-- Branch after 6.2

Actor Actions	System Actions
3. User attempts to view schedule again if desired	1. System is unable to retrieve list of user's upcoming appointments 2. System displays error message informing user that the system is temporarily unavailable

Assumptions:

User has one or more future appointments.

4.1.7 Schedule Routine Appointment

Use Case ID: UC - 7
Use Case Name: Schedule Routine Appointment
Created By: Seth Barrios
Date Created: October 16, 2016
Actor: Patient
Description:

The user can elect to schedule a general appointment with the medical practice.

Preconditions:

- User is logged in

Postconditions:

- The patient and the medical practice are aware of the newly scheduled appointment.

Priority: High
Frequency of Use: Medium-high. User will likely not use this feature every time he/she logs in.
Normal Course:

Actor Actions	System Actions
1. User elects to schedule new appointment	
	2. System determines appointment types and prompts user to select type
3. User selects appointment type	
	4. System determines which professionals service selected type and prompts user to select preferred professionals
5. User selects 1+ medical professionals	6. System prompts user to select a time period for retrieving appointments
7. User selects time period in which potential appointments should be	
	8. System uses selected values to generate potential appointments 9. System displays possible appointments to user
10. User finds desired appointment and elects to reserve it	
	11. System attempts to reserve appointment for user 12. Appointment is officially reserved. User receives confirmation of the reservation

Alternative Courses:
7.A.1 User does not find an appointment he/she wishes to schedule
--Branch out after 7.9

Actor Actions	System Actions

1. User selects new group [1+] of preferred medical professionals and/or new time period	2. System generates and displays new set of possible appointments

--Branch in at 7.10

Exceptions
7.E.1 System is unable to reserve appointment, due to technical error
--Branch out after 7.11

Actor Actions	System Actions
3. User can choose to reserve appointment again if system allows	1. System is unable to validate reservation of appointment 2. System displays error message and/or displays option to retry action

Assumptions:

Office has already specified what type of appointments are available, which medical staff can service those appointments, and when those medical staff are available.

4.1.8 Cancel Routine Appointment

Use Case ID: UC - 8
Use Case Name: Cancel Routine Appointment
Created By: Seth Barrios
Date Created: October 16, 2016
Actor: All user types
Description:

The user can elect to cancel an appointment.

Preconditions:

- User is logged in and viewing appointment they wish to cancel.

Postconditions:

- The patient and the medical practice are aware of appointment cancellation status.

Priority: High
Frequency of Use: Medium-low.
Normal Course:

Actor Actions	System Actions
1. User elects to cancel an appointment 5. User acknowledges that cancellation was approved.	2. System requests cancellation 3. System approves cancellation and updates to reflect it 4. System replies and displays confirmation prompt to user

Alternative Courses:
8.A.1 Cancellation is not allowed
Branch out after 8.2

Actor Actions	System Actions
3. User acknowledges denial message	1. System denies cancellation and responds with reason for denial 2. System displays denial message

Exceptions
8.E.1 System is unable to confirm or deny cancellation
Branch after 8.2

Actor Actions	System Actions
	1. System does not respond or responds with

	error 2. System displays error message
3. User acknowledges system inability and may elect to submit cancellation again	

Special Requirements:

Cancellation must conform to guidelines laid out by practice (time and other constraints).

Assumptions:

Practice has determined guidelines that cancellations must conform to.

4.1.9 Schedule All Kinds of Appointments (With Patients)

Use Case ID: UC - 9
Use Case Name: Schedule All Kinds of Appointments with Patients
Created By: Christiana Ushana
Date Created: October 14, 2016
Last Updated: October 24, 2016
Actor: Administrative Assistant
Description:

Administrative Assistant will be able schedule general and more important appointments through the system.

Preconditions:

- Administrative Assistant is logged in and can view the schedule

Postconditions:

- Selected patients will be scheduled to the schedule with varying types of appointments

Priority: High
Frequency of Use: Very high frequency, will be used everyday
Normal Course:

Actor Actions	**System Actions**
	1. Schedule appears on screen with available sections open to schedule appointments in.
2. User views the schedule and looks for an available time to schedule an appointment. 3. User requests the system to add/edit/cancel appt or update information.	
5. User fills in necessary information requested by the system. 6. User saves to finalize schedule and information changes.	4. System prompts user to fill in necessary information for appointment. System asks if user wants to add/ edit/cancel appt or update information.
	7. System checks for conflicts, save data, and notifies user about completion of scheduled appointment or changed data.

4.1.10 View Schedule (Non-patient)

Use Case ID: UC - 10
Use Case Name: View Schedule
Created By: Christiana Ushana
Date Created: October 14, 2016
Last Updated: October 24, 2016
Actor: Administrative Assistant
Description:

Administrative Assistant will be able to view all appointments on the schedule.

Preconditions:

- Administrative Assistant is logged in.

Postconditions:

- Administrative Assistant will be able to view the schedule.

Priority: High
Frequency of Use: Very high frequency
Normal Course:

Actor Actions	System Actions
1. User requests schedule. 3. User is now viewing the schedule.	2. System displays the available schedule

Assumptions: Administrative Assistant is registered on the system.

4.1.11 Modify Availability of Medical Professional

Use Case ID: UC - 11
Use Case Name: Modify availability of medical professional
Created By: Paula Ledgerwood
Date Created: October 14, 2016
Date Last Updated: October 26, 2016
Actor: Medical professional, administrative assistant
Description:
The system must understand the work hours of the office's medical professionals. Additionally, when the medical professional is sick or needs a day off, they need to change their schedule and the availability needs to be changed.
Preconditions:

- User is logged in
- User is viewing schedule

Postconditions:

- Schedule of medical professional is changed,and list of notifications given out

Priority: Medium
Frequency of Use: Low
Normal Course:

Actor Actions	System Actions
1. Click on individual work schedule 3. Click on specific event 5. Edit specific day's information 6. Click save. 8. They can choose to confirm that they they will be affecting the listed scheduled appointments 10. If no, they can edit the chosen event again and start the cycle from step 3 again.	2. Individual's work schedule is displayed 4. Specific day/event's information appears, with options to edit name, time start, time end, to delete 7. After the person saves, the scheduled appointments that will be affected will appear so the medical professional can choose if they want to continue with their save. 9. If they continue saving, the necessary information will be changed, and a list of affected parties will be generated. If not, the editing screen will appear again with no changes saved.

Assumptions:
The medical professional is registered in the system and already has a schedule in place to delete events from.

4.1.12 Edit Basic Patient Information

Use Case ID: UC - 12
Use Case Name: Edit basic patient information
Created By: Paula Ledgerwood
Date Created: October 14, 2016
Date Last Updated: October 26, 2016
Actor: Medical professional, administrative assistant
Description:
The user will be able to change basic information about a patient, like their name, address, billing information, phone number, and email.
Preconditions:

- Patient whose info will be edited is registered
- User is logged in
- User is viewing current patients

Postconditions:

- The patient’s new information will be in the system, replacing the old information.

Priority: Medium
Frequency of Use: Medium
Normal Course:

Actor Actions	System Actions
1.Click on patient whose information user would like to change.	
2. Requests patient information from patient database.	3. Patient information appears in editable form.
4. Edits patient information	
5. Clicks Save.	6. After they press save, the patient’s information in the database will be updated. 7. The general list of patients will appear again.

Assumptions:
The patient is already in the medical office’s database.

4.1.13 Add New Patient to Patient Database

Use Case ID: UC - 13
Use Case Name: Add new patient to patient database
Created By: Paula Ledgerwood
Date Created: October 14, 2016
Date Last Updated: October 26, 2016
Actor: Medical professional, administrative assistant
Description:
New patients of the office require some initial setup (which may include personal and account information), in order to be managed by this software.
Preconditions:

- User is logged in
- User is viewing current patient list

Postconditions:

- New patient will be added to patient list

Priority: High
Frequency of Use: Medium
Normal Course:

Actor Actions	System Actions
1. Click button to Add New Patient	2. A form appears for the user to add information, requiring name, contact information, and address.
3. Enter necessary information	4. Option to save is at the bottom of the form.
5. Click save.	6. Information is saved in database.

4.1.14 Charge Patient

Use Case ID: UC - 14
Use Case Name: Charge a patient for a service provided
Created By: Paula Ledgerwood
Date Created: October 14, 2016
Date Last Updated: October 26, 2016
Actor: Medical professional, administrative assistant
Description:
After a service has been provided, the admin or medical professional will be able to charge the patient the appropriate cost.
Preconditions:

- User is logged in
- Patient is in database
- User is viewing patient in database

Postconditions:

- A post on the patient's account regarding the amount due will be visible.

Priority: High
Frequency of Use: High
Normal Course:

Actor Actions	System Actions
1.Click Charge patient 3. Enter amount due. 4. Press Charge	2. A form taking in an amount of money will appear 5. The charge will appear on the patient's billing page.

4.1.15 Add Room Type to Scheduling Software

Use Case ID: UC - 15
Use Case Name: Add type of room to scheduling software
Created By: Paula Ledgerwood
Date Created: October 26, 2016
Date Last Updated: October 26, 2016
Actor: Medical professional, administrative assistant
Description:
When setting up the software, an office staff member should input the types of rooms that exist in the medical office for appointments. This will be necessary later for the office staff to correctly book appointments and schedule within the office.
Preconditions:

- User is logged in
- Looking at scheduling software settings home interface

Postconditions:

- There is an additional type of room available for appointments

Priority: High
Frequency of Use: Low
Normal Course:

Actor Actions	System Actions
1.Click Edit Room Types 3. Clicks on Add new room type button. 5. Press Save. 7. Repeat steps 3 - 6 to add additional types of rooms.	2. The current list of room types will appear, along with the option to add another option. 4. An input field appears to take the room type. 6. Room type is added in scheduling database.

4.1.16 Add Appointment Type to Software

Use Case ID: UC - 16
Use Case Name: Add type of appointments to set up scheduling software
Created By: Paula Ledgerwood
Date Created: October 26, 2016
Date Last Updated: October 26, 2016
Actor: Medical professional, administrative assistant
Description:
When setting up the software, an office staff member can input the types of appointments that the medical office offers.
Preconditions:

- User is logged in
- Looking at scheduling software settings home interface

Postconditions:

- One or more types of appointments have been added to the settings of the scheduling software.

Priority: High
Frequency of Use: Low
Normal Course:

Actor Actions	System Actions
1.Click button to edit types of appointments available	2. The current list of appointment types will appear, along with the option to add another option.
3. Clicks on Add New button.	4. A small form appears to take the appointment type and any additional information about the appointment type (who can schedule it, or whether or not it can be requested by a patient).
5. Press Save.	6. All changes are updated in scheduling database.
7. Repeat steps 3 - 6 to add additional appointment types.	

4.1.17 Medical Professional Account Registration

Use Case ID: UC - 17
Use Case Name: Medical Professional Account Registration
Created By: David McIntyre
Date Created: October 16, 2016
Actor: Medical Professional
Description:
Allows an administrator or doctor to register as a professional for the web service.
Preconditions:

- User is a registered employee of the practice
- User is not already registered with the web service
- User is not logged in

Postconditions:

- User is a registered professional on the web service

Priority: High
Frequency of Use: Low
Normal Course:

Actor Actions	System Responses
1. User clicks ‘register as professional’	
	2. System redirects user to the professional registration form
3. User enters personal and professional information into the registration form and hits submit	
	4. System checks form for appropriate data (repeat steps 3 & 4 until form is correctly filled)
	5. System redirects user to a page asking them to confirm their email
6. User clicks link in confirmation email	
	7. System redirects user to registration confirmation page

4.1.18 Edit Patient Care Plan

Use Case ID: UC - 18
Use Case Name: Edit Patient Care Plan
Created By: Johnathan Nicholson
Date Created: October 16, 2016
Actor: Medical Professional
Description:
Allow a Medical Professional to edit and upload information to share with the patient
Preconditions:

- Medical Professional is logged in

Postconditions:

- Patient can see the uploaded information.

Priority: High
Frequency of Use: Medium
Normal Course:

Actor Actions	System Actions
1. Doctor requests a patient's current care plan 3. Doctor edits an existing care plan or creates a new care plan	2. System returns current care plans 4. System saves changes to existing care plan, or creates a new one 5. System notifies patient of change to care plan. 6. System notifies doctor of request completion

Assumptions:
Patient is already registered.

5. Other Nonfunctional Requirements

This section contains a list of qualities and requirements the proposed system shall embody and adhere to.

5.1 Performance Requirements

Minimum Usability Requirements

End User (Patient, Medical Doctor, Administrative Assistant)

- Access to a PC with internet connection.
- Must be able to run a modern web browser (Chrome, Firefox, Safari, Edge)

System Server

- Unix based
- 900 MHz quad core CPU
- 256 MB memory
- Java 1.8 JRE
- Servlet engine (Tomcat)
- Web server (Apache)

Since our product is a web based solution, users will need access to a computer with a modern web browser installed. End users that meet these requirements will have access to all of the sites features.

5.2 Safety Requirements

This system does not perform any tasks that could directly threaten personal safety or property. In addition this system aims to be fully compliant with ADA accommodation guidelines.

5.3 Security Requirements

Due to the sensitive nature of the information we are distributing, our team has come up with a set of guidelines that aims to ensure that the visibility of patient data is achieved by policy. Since our website deals with medical information we also take into account required HIPAA guidelines, which requires there be no ‘Admin’ (not to be confused with Administrative Assistant) level users.

5.3.1 General

In general all connections to the website are required to use HTTPS (SSL). The requirement of modern browsers use also improves the security of our end users. As mentioned before there will not be anyone that has the power to access unauthorized content, including the engineers working with the system.

5.3.2 Patients

All patients are required to enter their username and password before they can have access to their scheduling and medical data. Users can only change their passwords when they are signed in or if they request a ‘reset password’ and open an email from the website.

5.3.3 Administrative Assistants

Administrative assistants have the permissions to change any patients or doctors schedules and view patient care plans. These users will also log into the site with a username and password. The accounts are created with access codes granted by the Doctors.

5.3.4 Doctors

Doctors will have access to all of the practice’s patient care plans. Since their accounts have the most privileges, they will be required to maintain strong passwords that are replaced every six of months. In order to create a doctor level account a doctor must first verify that he/she is a Medical Doctor with official documentation before they are granted an access code.

5.4 Software Quality Attributes

5.4.1 Attributes Important to Users

Availability

It’s important that our users are able to access our site so that regular dealings at the medical practice can go smoothly rare or nonexistent problems. The site’s usage does not have any specific peak hours, meaning that the load will be spread out throughout mainly daylight hours. All site maintenance including updates is to be done at night when most users are expected to be sleeping. With best practices in place the site should be able to maintain 99% uptime.

Reliability

The site will deliver the users content free of bugs or errors. The scheduling component of the software should notify people when things change, and schedules should not disappear or change times due to errors.

Usability

The site’s user interface should be understandable and easy to look at. The menu layout will be intuitive to navigate and performing various tasks should take the smallest amount of time as possible.

5.4.1 Attributes Important to Developers

Maintainability

This pertains both to the customers, along with ongoing maintenance of the product down the line. As far as maintenance the entire product will use modern software engineering paradigms like continuous integration and sufficient test coverage. The code itself should be well thought out and use SOLID design principles. As far as updates to our clients (since our product is a self hosted service) updates should be painless and complete within a couple of hours.

5.5 Business Rules

This site must comply with all guidelines specified by both the ADA and the HIPAA.

Appendix A: Data Dictionary

Name	Account Info
Representation	Email Address, Password, Name, Address, Phone Numbers
Format	String
Precision	Exact
Range	Valid email address

Name	User Password
Representation	Password
Format	String
Precision	Exact
Range	Must have 8 or more characters and contain one of each of the following: ● Uppercase letter ● Lowercase letter ● Number ● Symbol

Name	New/Changed Password Info
Representation	2 copies of the same password
Format	Strings
Precision	Exact
Range	2 matching non-empty strings that meet all password security requirements

Name	General Appointment Request
Representation	Preferred professional’s name, patient’s name, date & time of appointment, appointment type
Format	Data structure containing: 3 strings (names & appointment type) 1 Datetime (appointment start)
Precision	Exact
Range	Datetime within office hours and at least 1 week after request

Name	Appointment Data
Representation	Professional’s name, patient’s name, date & time of appointment, room number, appointment type, duration
Format	Data structure containing: 3 strings (names & appointment type) 2 Ints (room & duration) 1 Datetime (appointment start)
Precision	Exact
Range	Datetime within office hours, professional and room available at that time for the the set duration

Name	Financial Account Information
Representation	Patient account, charge name, amount owed, due date, details
Format	Data Structure containing: Strings (name & details), Float (Amount owed), Date
Precision	Exact
Range	Non-empty patient account and charge name strings, float value equal to or greater than 0.0, date on or after current date.

Name	Patient Bill
Representation	Account Name, charges, total amount owed
Format	Data Structure containing: String (account), patient charge data structures, Float (Amount owed)
Precision	Exact
Range	Non-empty account string, float value equal to or greater than 0.0

Name	Schedule Data
Representation	List of dates and times professional is in office, list of dates and times professional has appointments
Format	Data Structure containing 2 lists of datetimes
Precision	15 min intervals
Range	All appointment times entries are limited to the range of availability times.

Name	Medical Care Plan Request
Representation	Account Information and Care Plan ID
Format	ID is an integer
Precision	Exact
Range	Positive integer

Name	Medical Care Plan Information
Representation	Description of medical recommendations as submitted by medical professional
Format	Account Info data structure,care plan string
Precision	Exact
Range	Non-empty string

Name	Error Report
Representation	List of errors resulting from user data requests such as schedules and care plan
Format	Data Structure containing list of error codes and errors that occurred
Precision	Exact
Range	Non-empty string

Name	Schedule Request
Representation	A request from user (medical professional or administrative assistant) for viewing schedule
Format	Data Structure containing 1 datetime for starting time, 1 datetime for ending time, and 1 String for name of medical professional
Precision	15 min intervals
Range	All schedules entries are limited to the range of available times within one day.

Name	Conflict Report
Representation	List of appointments and their information that will no longer be possible with the desired schedule modifications.

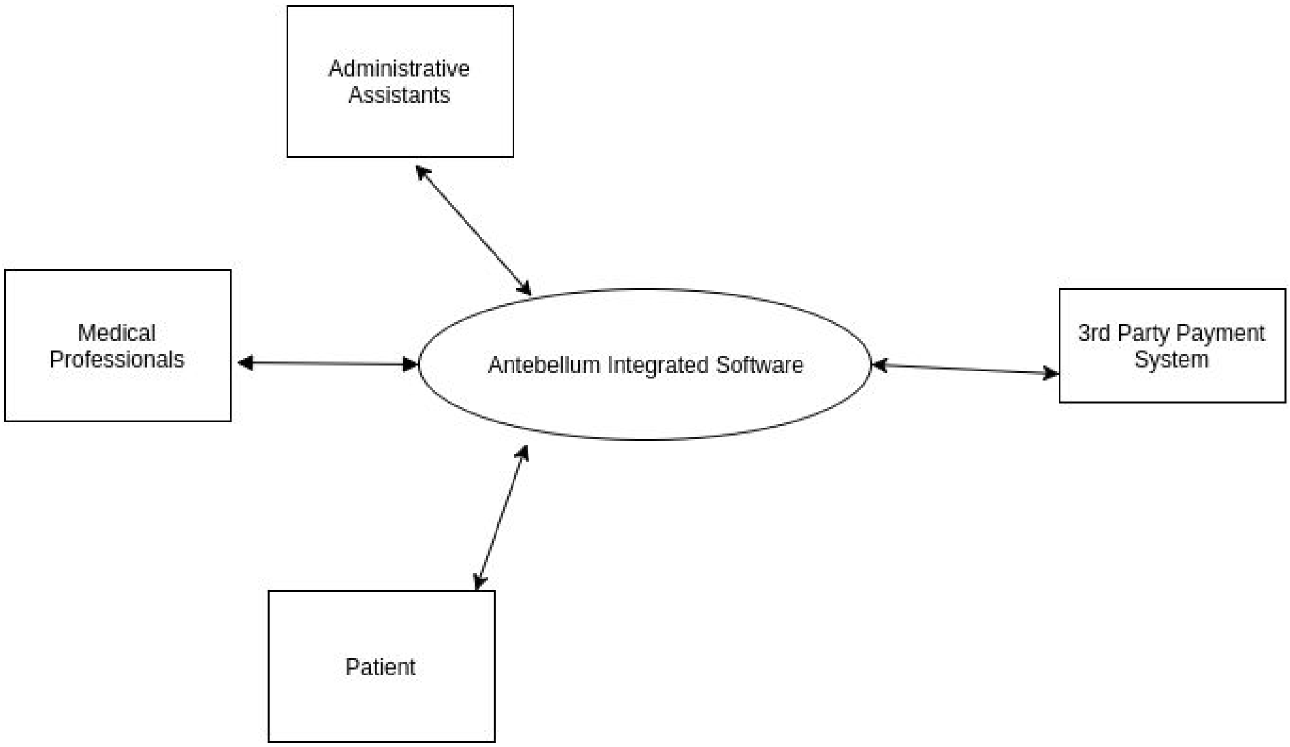
Format	Data Structure containing a list of Appointment Info data structures
Precision	15 min intervals
Range	All appointment times entries are limited to the range of availability times. Zero to 100 appointment data structures

Name	Confirmation
Representation	General confirmation from a system handler indicating whether attempt was successful
Format	Message body
Precision	15 min intervals
Range	String of any length

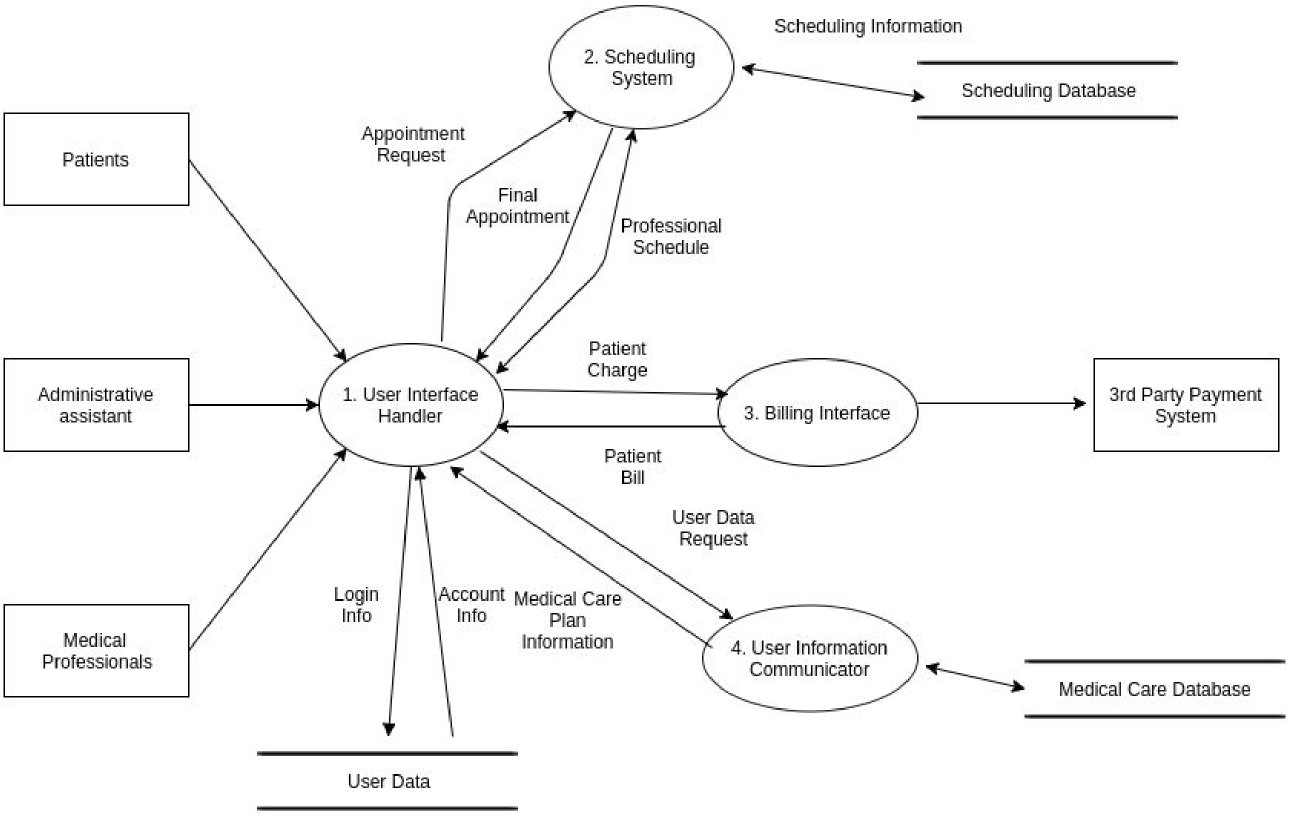
Name	Payment Account ID
Representation	The unique ID associated with a patient’s financial account with medical office
Format	Integer
Precision	15 min intervals
Range	Zero to highest positive integer

Appendix B: Analysis Models

Level 0 DFD

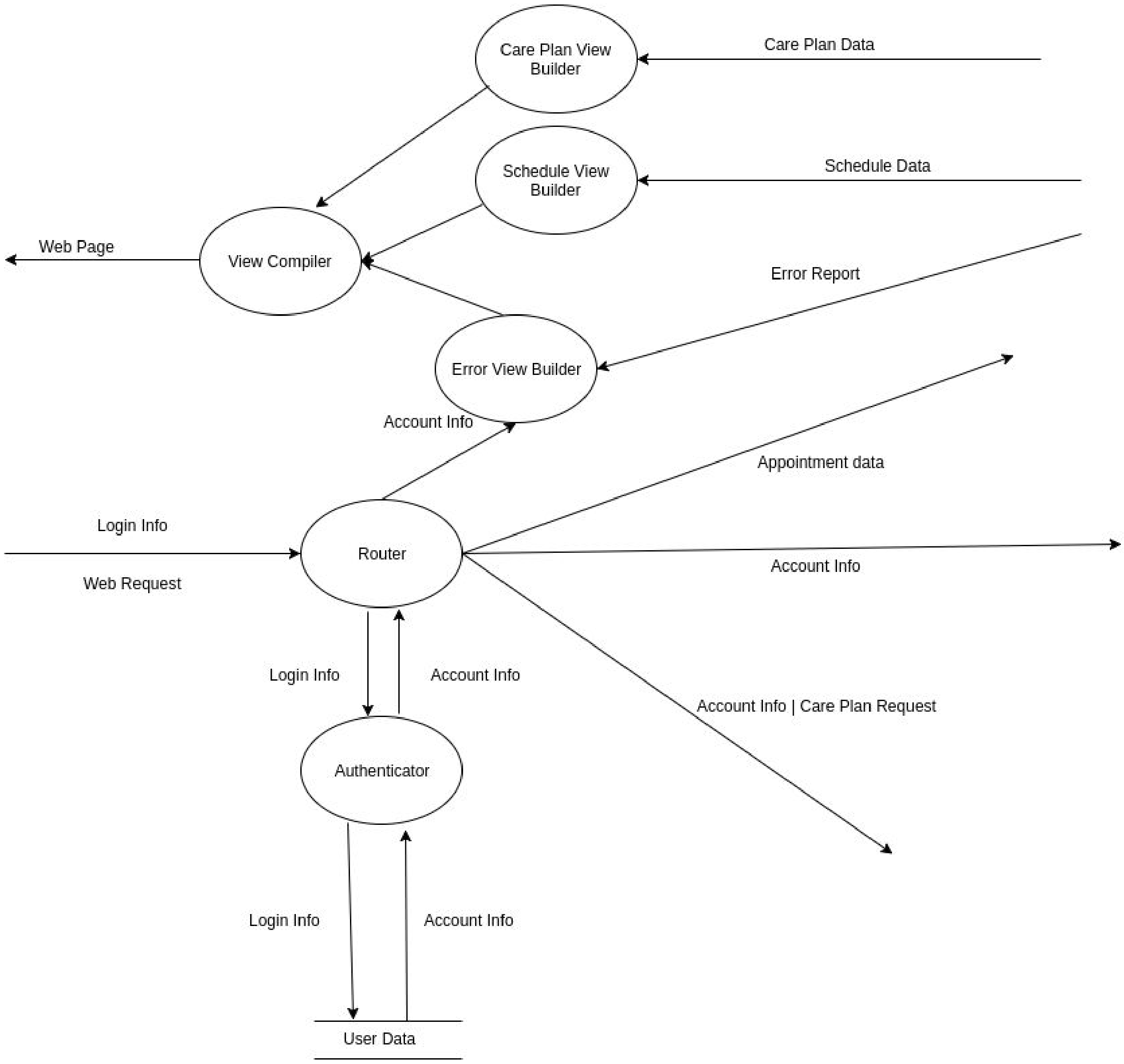


Level 1 DFD

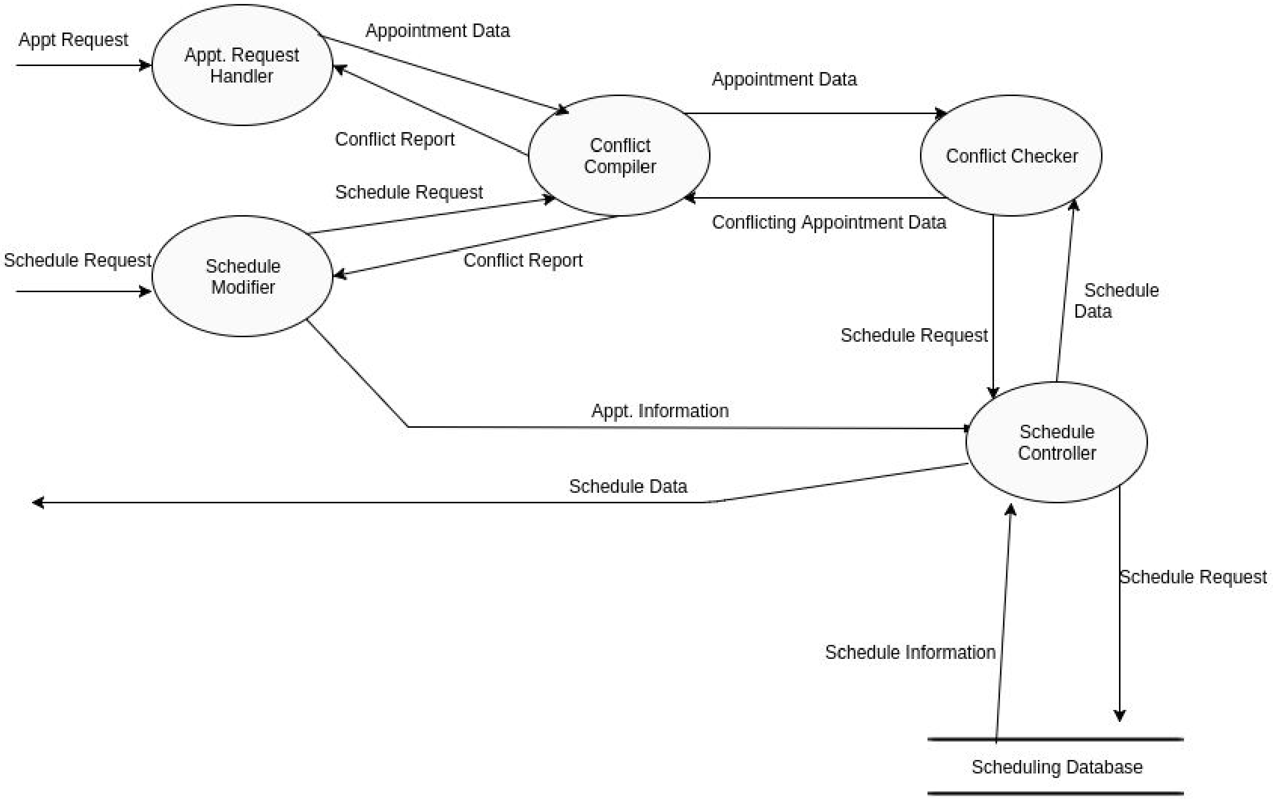

2. Scheduling System
Scheduling Information
Scheduling Database
Patients
Appointment Request
Final Appointment
Professional Schedule
Administrative assistant
1. User Interface Handler
Patient Charge
3. Billing Interface
3rd Party Payment System
Patient Bill
User Data Request
Medical Professionals
Login Info
Account Info
Medical Care Plan Information
4. User Information Communicator
Medical Care Database
User Data

Level 2 DFD

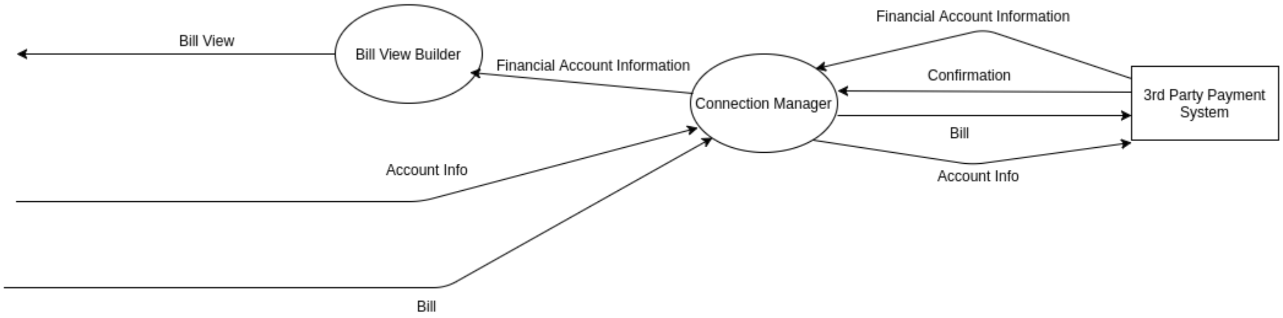
2.1 User Interface Handler



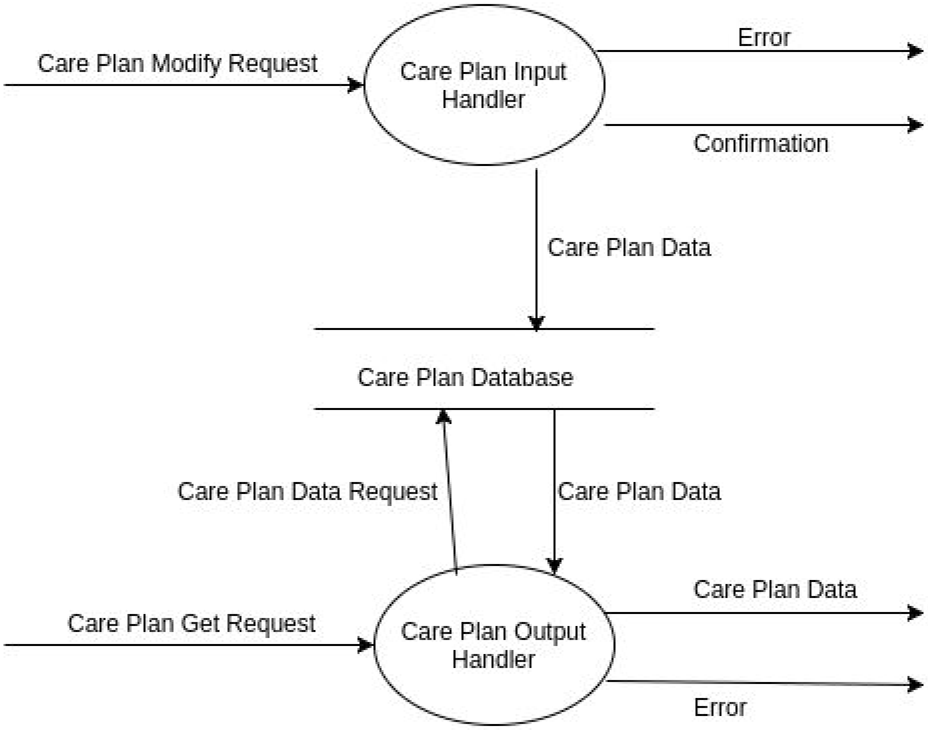
2.2 Scheduling System



2.3 Billing Interface

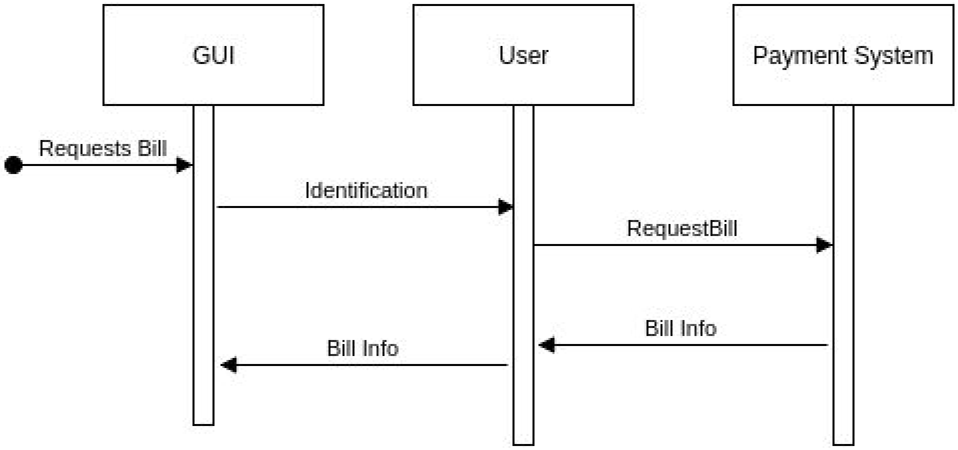


2.4 Communicator

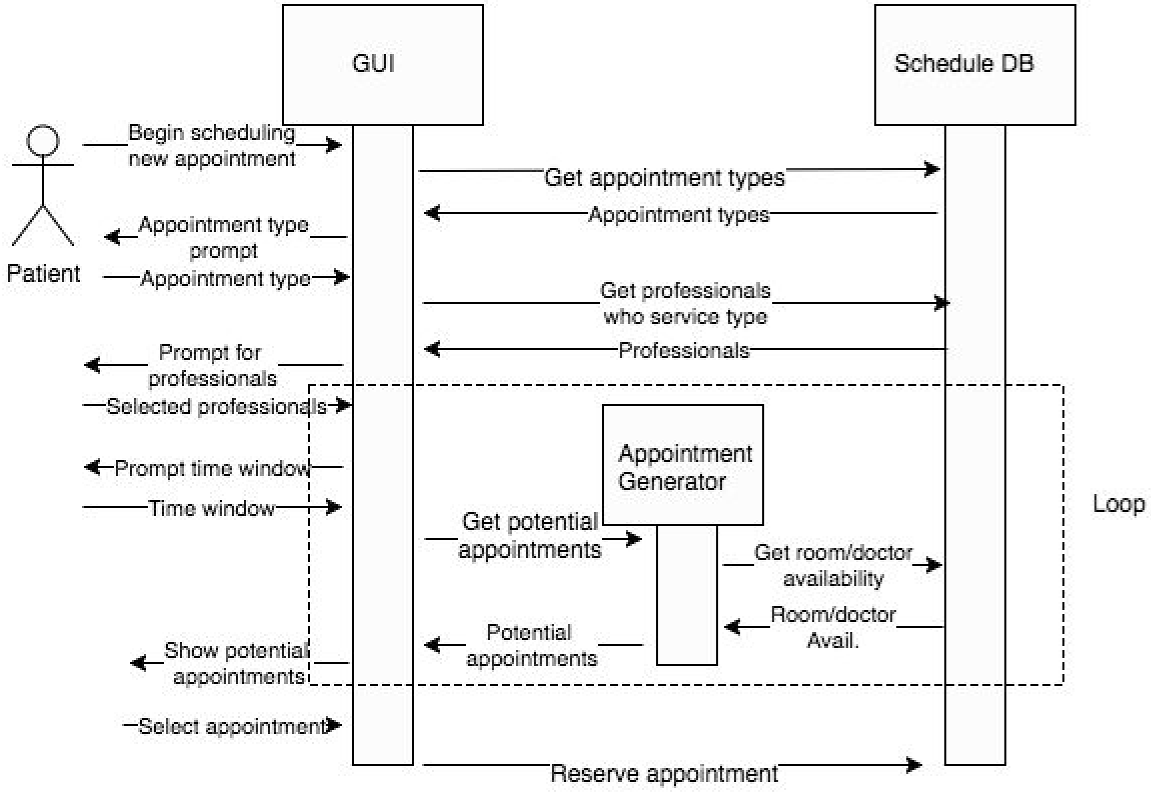


Sequence Diagrams

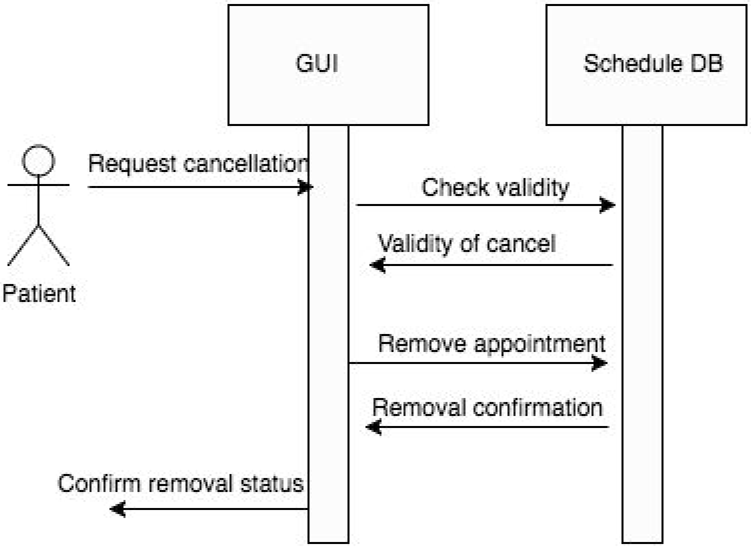
View Bill



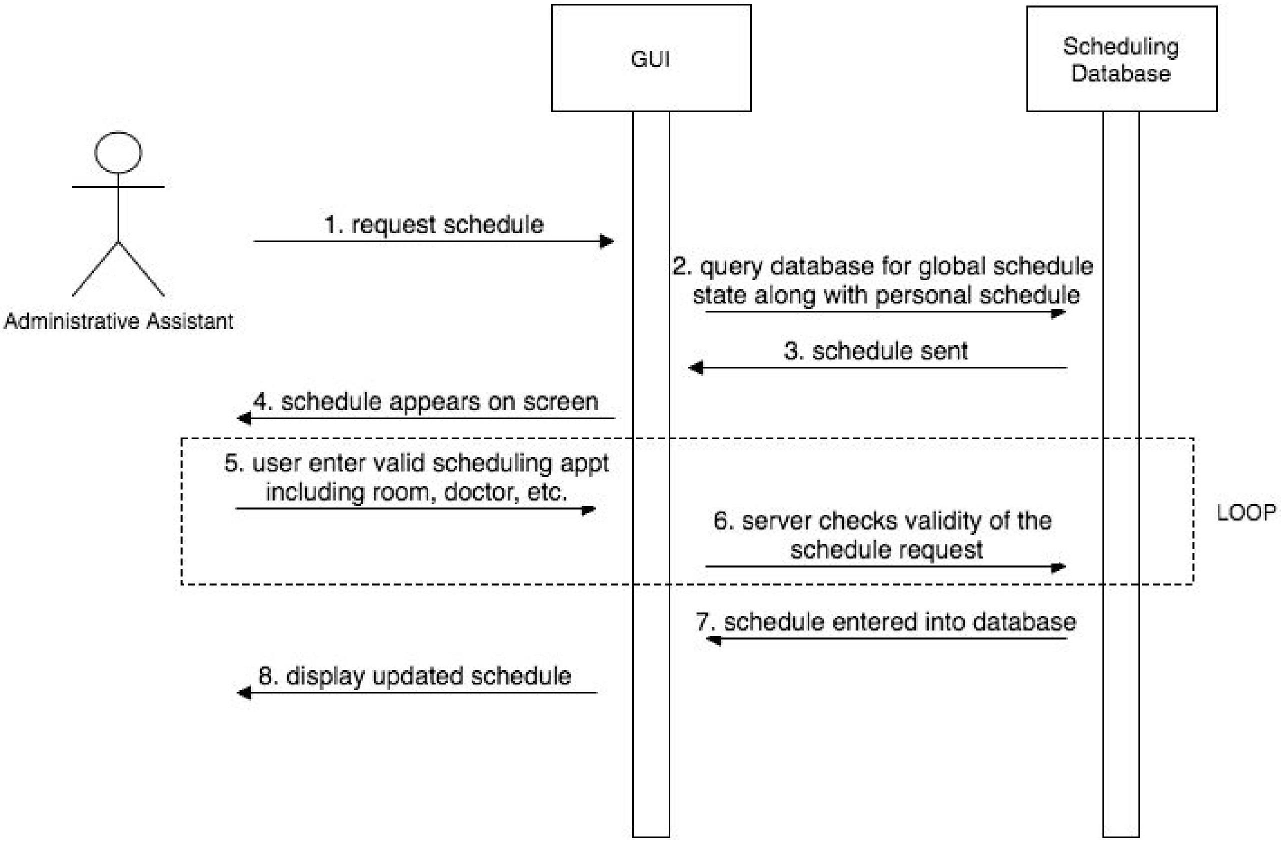
Schedule Routine Appointment (as a patient)



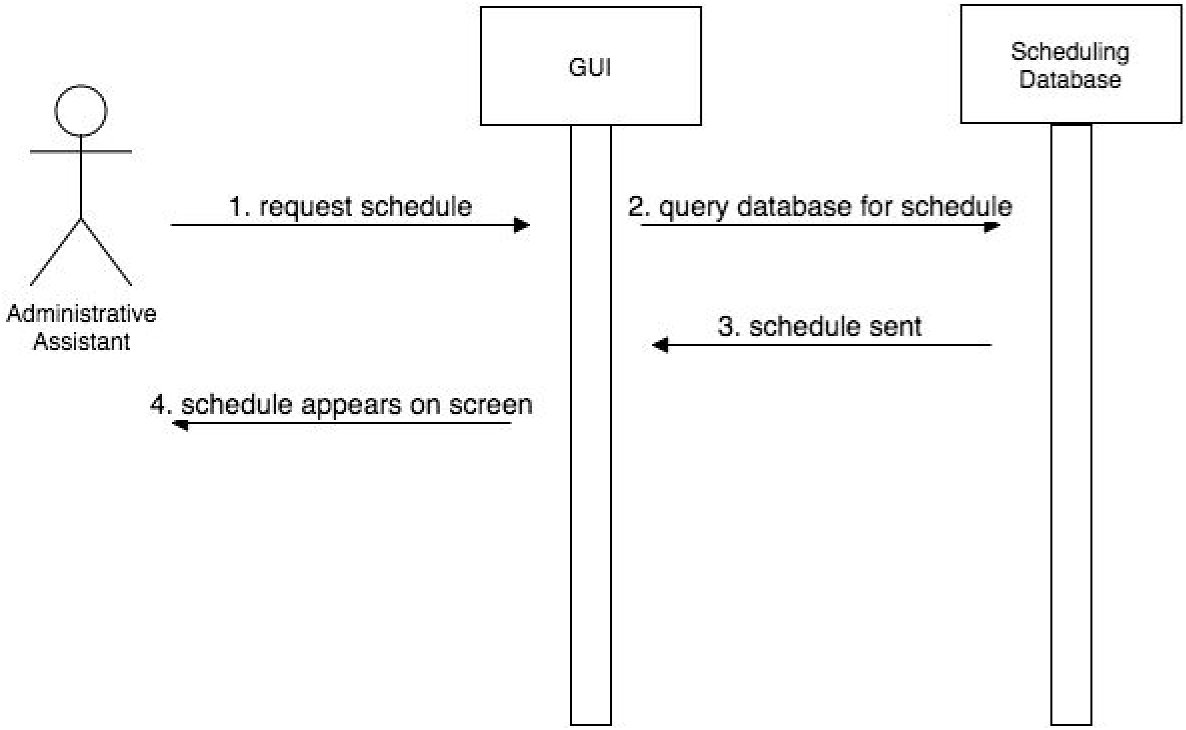
Cancel Routine Appointment



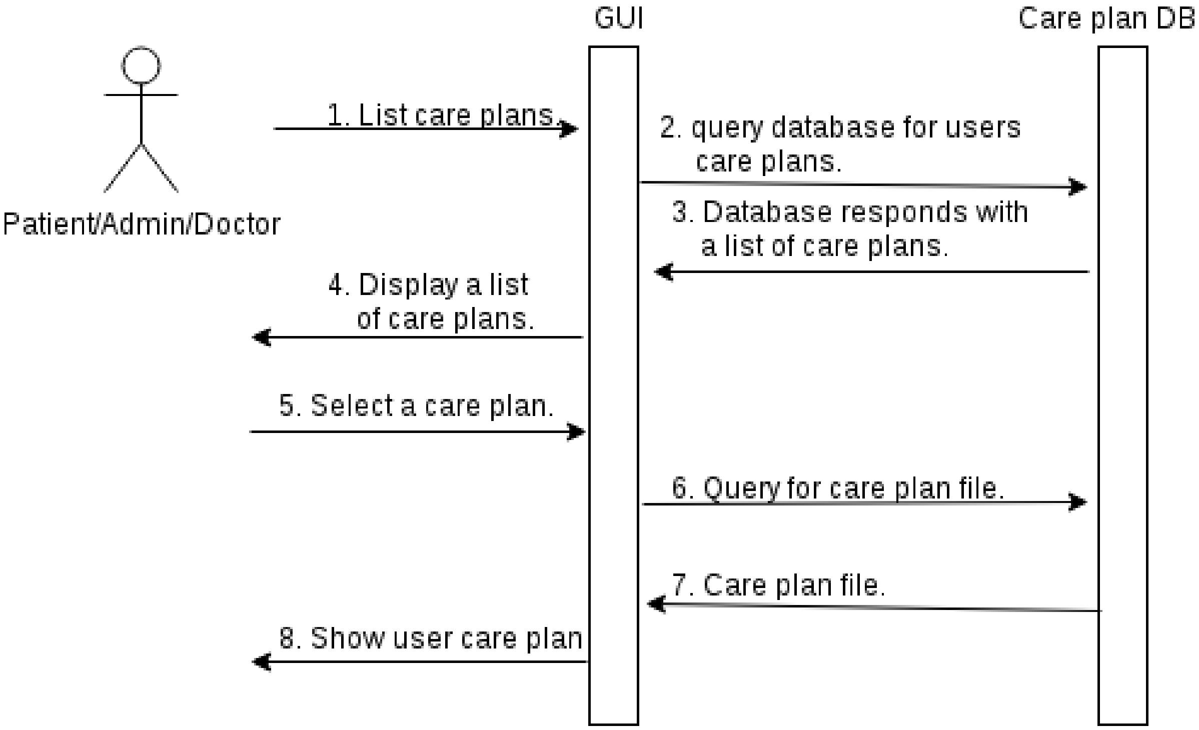
Schedule All Kinds of Appointments (Administrative Assistant/ Medical Professional)


GUI
Scheduling Database
Administrative Assistant
1. request schedule
2. query database for global schedule state along with personal schedule
3. schedule sent
4. schedule appears on screen
5. user enter valid scheduling appt including room, doctor, etc.
6. server checks validity of the schedule request
LOOP
7. schedule entered into database
8. display updated schedule

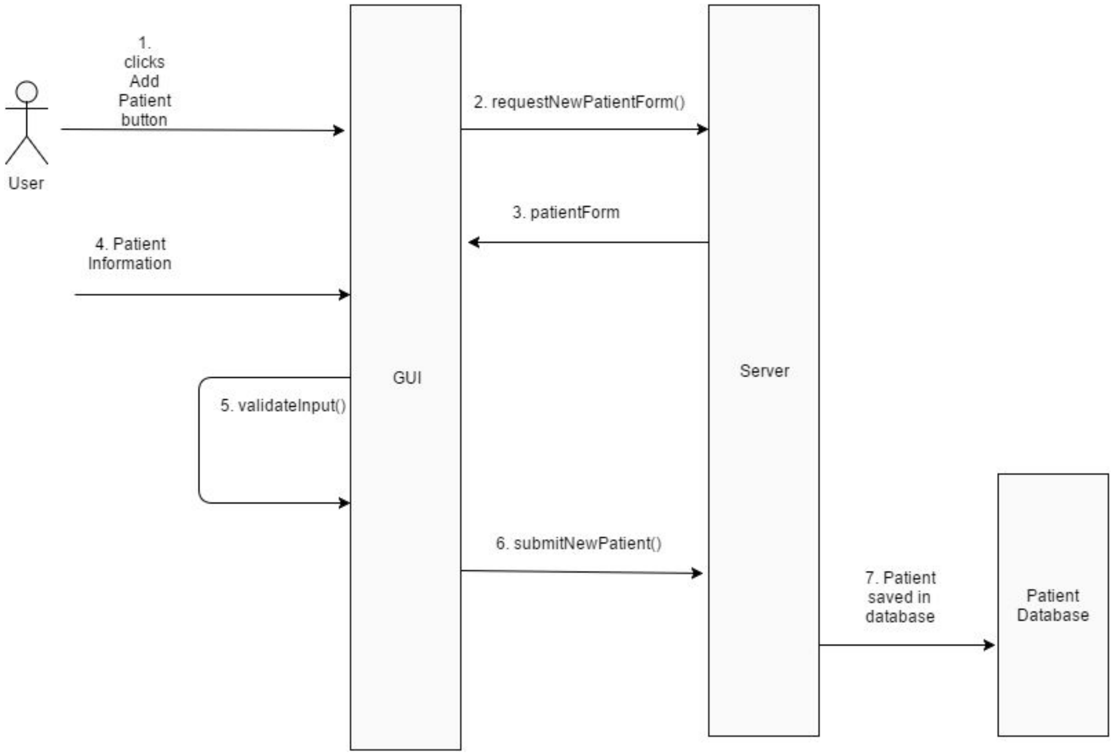
View Schedule



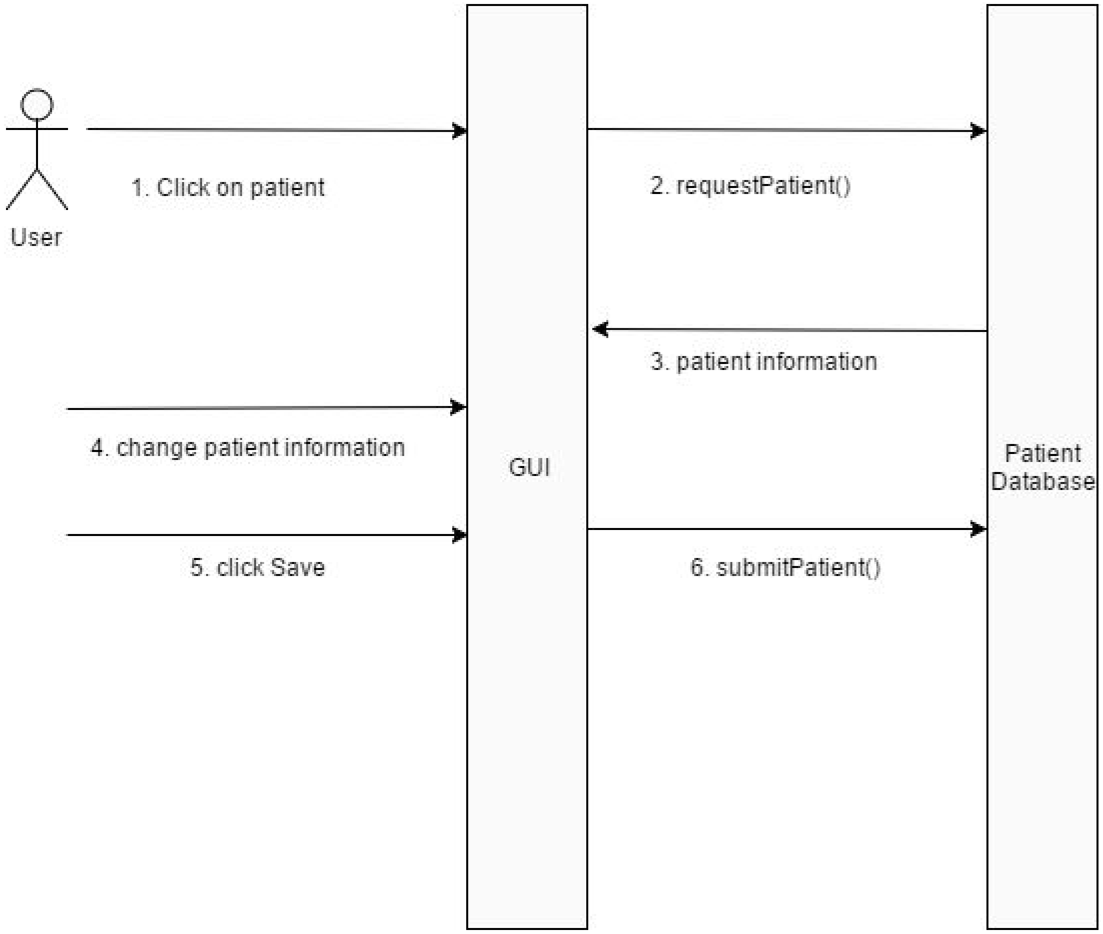
View Care Plan


GUI
Care plan DB
Patient/Admin/Doctor
1. List care plans.
2. query database for users care plans.
3. Database responds with a list of care plans.
4. Display a list of care plans.
5. Select a care plan.
6. Query for care plan file.
7. Care plan file.
8. Show user care plan

Add New Patient to Patient Database



Edit Basic Patient Information


User
1. Click on patient
2. requestPatient()
3. patient information
4. change patient information
GUI
Patient Database
5. click Save
6. submitPatient()