Final Report - KristMed

- Project III -

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Contents

1. System Architecture and Database Design

The architecture of a system describes its structure and makes it understandable. There are different factors that influence the development of an architecture such as:

- functional requirements
- performance, reusability, scalability
- experience with existing architecture
- technical aspects

Architecture patterns are used to describe recurring design problems, which have been solved in the past and have helped develop certain design solutions which can be used for applications which have similar purposes (online shops, micro-transactions, etc…). We need to remind ourselves that patterns are just guidelines that need to be adapted for the required application.

For the Web Application "KristMed", I have used the MVC and repository patterns.

The MVC pattern helped ease the development of the application as my experience with software engineering for web applications was limited. MVC gave me a lot more room to work with in developing and implementing the system requirements that were specified in the previous report. It also facilitates the ability to display large chunks of data on different pages.

I used the repository patterns in order to layer the access of my application and have the services access the repositories and not the data directly, thus having a smaller degree of dependency and facilitating future development of the application.

1.1 Requirements

1.2.1 Functional requirements:

1.2.1.1 User Class 1 – The User

1.2.1.1.1 Functional requirement 1.1

Title: User registration

Description: In order to use the application, each new user must go through the registration process. In order to create a new account, the user must provide his first and last name, an username, an email, a phone number, his type of user, a photo and a password, etc..

Dependencies: None

1.2.1.1.2 Functional requirement 1.2

Title: User Log-in

Description: After the user has successfully registered, the user must go through the log in process. In order to enter in his account, the user must provide username and his password.

Dependencies: FR1

1.2.1.1.3 Functional requirement 1.3

Title: User changes password

Description: In case the user wants to change his password, he must go through the change password process. In order to change the password, the user must provide his old password, his new password twice as to confirm he has written it correctly.

Dependencies: FR2

1.2.1.1.4 Functional requirement 1.4

Title: User adds contact message

Description: If the user wants to send a contact message with tips or complains for the clinic they will be able to do that from the “Add Contact Message Tab”.

Dependencies: FR2

1.2.1.1.5 Functional requirement 1.5

Title: User sees contact messages
Description: If the user wants to see his own sent contact messages he will be able to do so by clicking the “Contact Messages” after logging in
Dependencies: FR2

1.2.1.1.6 Functional requirement 1.6

Title: User display all appointments
Description: The user can display all appointments and also filter through them by medics
Dependencies: FR2

1.2.1.1.7 Functional requirement 1.7

Title: User can buy a ticket
Description: The client user can buy tickets. In order to buy a ticket, the user must provide the details needed. He can also buy tickets for other persons, as long as he provides the required information.
Dependencies: FR2

1.2.1.1.8 Functional requirement 1.8

Title: User display past appointments
Description: The user can display past appointments
Dependencies: FR2

1.2.1.1.9 Functional requirement 1.9

Title: User display future appointments
Description: The user can display future appointments
Dependencies: FR2

1.2.1.1.10 Functional requirement 1.10

Title: User can delete appointment
Description: The user can delete his future appointments
Dependencies: FR2

1.2.1.1.11 Functional requirement 1.11

Title: User can log out.
Description: The user can log out of his account.
Dependencies: FR2

1.2.1.1.12 Functional requirement 1.12

Title: User can delete account
Description: The user can delete his account.
Dependencies: FR2

1.2.1.1.13 Functional requirement 1.13

Title: User can edit account
Description: The user can edit his account.
Dependencies: FR2

1.2.1.2 User Class 2 – The Administrator

1.2.1.2.1 Functional requirement 2.1

Title: User registration
Description: In order to use the application, each new user must go through the registration process. In order to create a new account, the user must provide his full name, a username, a password, etc… as well as his type of user.
Dependencies: None

1.2.1.2.2 Functional requirement 2.2

Title: User Log-in
Description: Given that the user has registered, in order to use the application, each user must go through the log in process. In order to enter in account, the user must provide username and his password.
Dependencies: FR1

1.2.1.2.3 Functional requirement 2.3

Title: User changes password
Description: In case the user wants to change his password, he must go through the change password process. In order to change the password, the user must provide his old password and his new password.
Dependencies: FR2

1.2.1.2.4 Functional requirement 2.4

Title: User adds medication
Description: If the user wants to add a medication type they will be able to do that from the “Add Medicine” Tab.
Dependencies: FR2

1.2.1.2.5 Functional requirement 2.5

Title: User sees medications
Description: If the user wants to see the available medicine he will be able to do so by clicking the “Medicine” after logging in
Dependencies: FR2

1.2.1.2.6 Functional requirement 2.6

Title: User adds equipment
Description: If the user wants to add an equipment type they will be able to do that from the "Add Equipment" Tab.
Dependencies: FR2

1.2.1.2.7 Functional requirement 2.7

Title: User sees equipment
Description: If the user wants to see the available equipment he will be able to do so by clicking the "Equipment" after logging in
Dependencies: FR2

1.2.1.2.8 Functional requirement 2.8

Title: User displays messages
Description: The user can display all the messages sent by clients
Dependencies: FR2

1.2.1.2.9 Functional requirement 2.9

Title: User sees appointments
Description: The user can display all appointments
Dependencies: FR2

1.2.1.2.10 Functional requirement 2.10

Title: User adds appointments
Description: The user can add appointments
Dependencies: FR2

1.2.1.2.11 Functional requirement 2.11

Title: User can log out.
Description: The user can log out of his account.
Dependencies: FR2

1.2.1.2.12 Functional requirement 2.12

Title: User can delete account
Description: The user can delete his account.
Dependencies: FR2

1.2.1.2.13 Functional requirement 2.13

Title: User can edit account
Description: The user can edit his account.
Dependencies: FR2

1.2.1.3 User Class 3 – The Medic

1.2.1.3.1 Functional requirement 3.1

Title: User registration

Description: In order to use the application, each new user must go through the registration process. In order to create a new account, the user must provide his full name, a username, a password, etc… as well as his type of user.

Dependencies: None

1.2.1.3.2 Functional requirement 3.2

Title: User Log-in

Description: Given that the user has registered, in order to use the application, each user must go through the log in process. In order to enter in account, the user must provide username and his password.

Dependencies: FR1

1.2.1.3.3 Functional requirement 3.3

Title: User changes password

Description: In case the user wants to change his password, he must go through the change password process. In order to change the password, the user must provide his old password and his new password.

Dependencies: FR2

1.2.1.3.4 Functional requirement 3.4

Title: User display past appointments

Description: The user can display past appointments

Dependencies: FR2

1.2.1.3.5 Functional requirement 3.5

Title: User display future appointments

Description: The user can display future appointments

Dependencies: FR2

1.2.1.3.6 Functional requirement 3.6

Title: User adds treatments

Description: The user can add treatments to past appointments with clients

Dependencies: FR2

1.2.1.3.7 Functional requirement 3.7

Title: User displays treatments
Description: The user can display all treatments
Dependencies: FR2

1.2.1.3.8 Functional requirement 3.8

Title: User can log out.
Description: The user can log out of his account.
Dependencies: FR2

1.2.1.3.9 Functional requirement 3.9

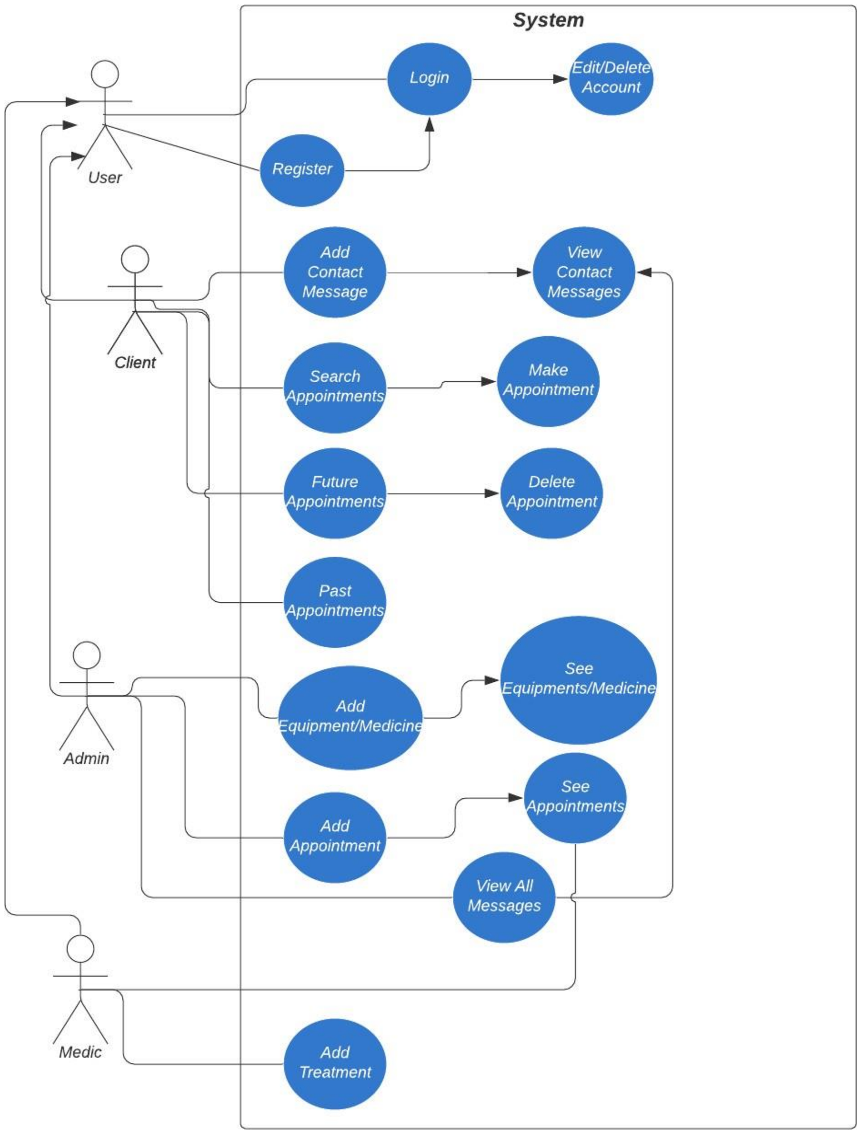
Title: User can delete account
Description: The user can delete his account.
Dependencies: FR2

1.2.1.3.10 Functional requirement 3.10

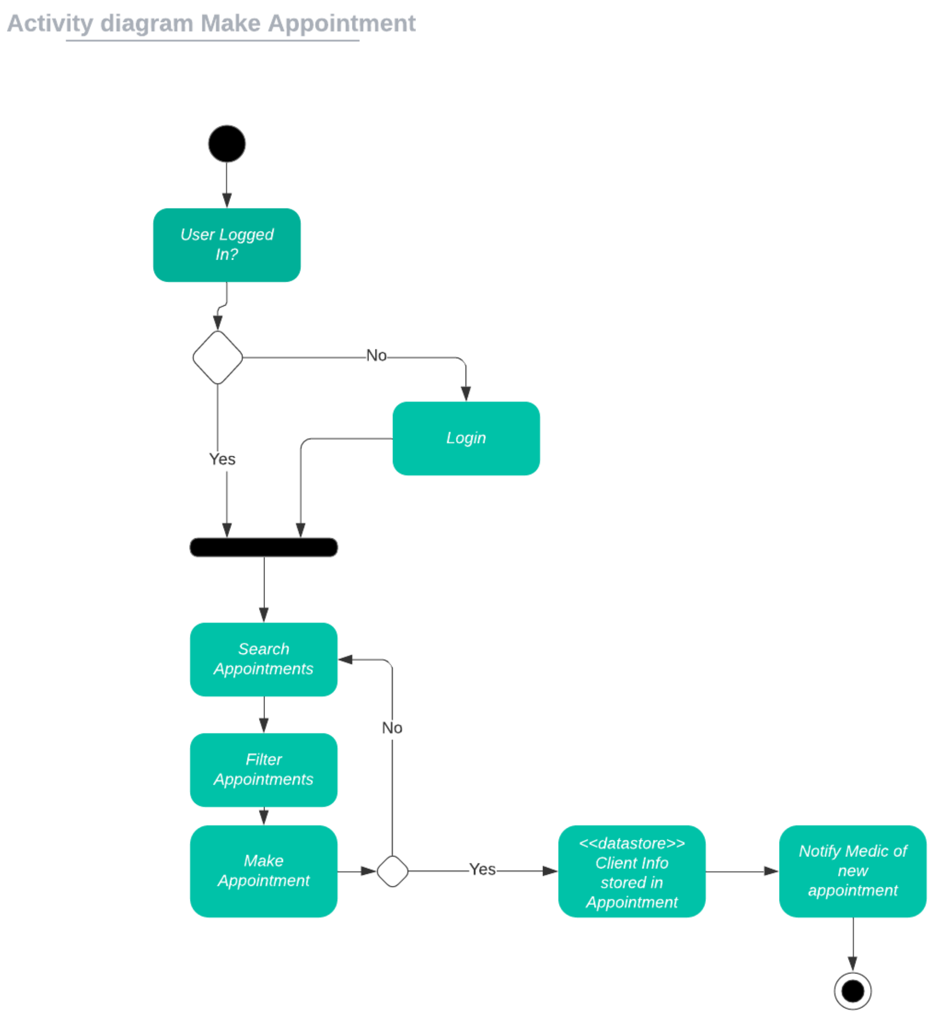
Title: User can edit account
Description: The user can edit his account.
Dependencies: FR2

2. UML Diagrams

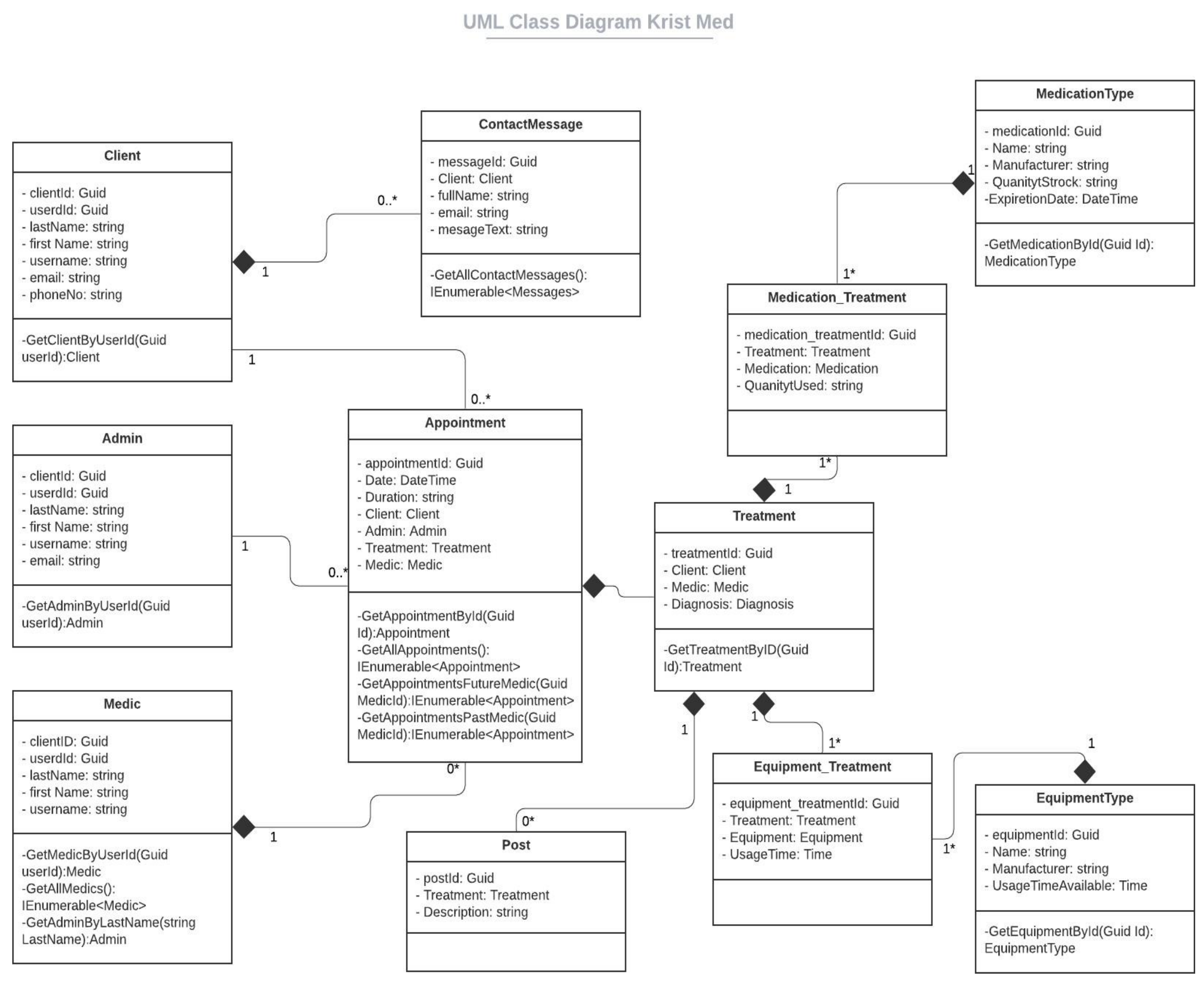
- Use case diagram



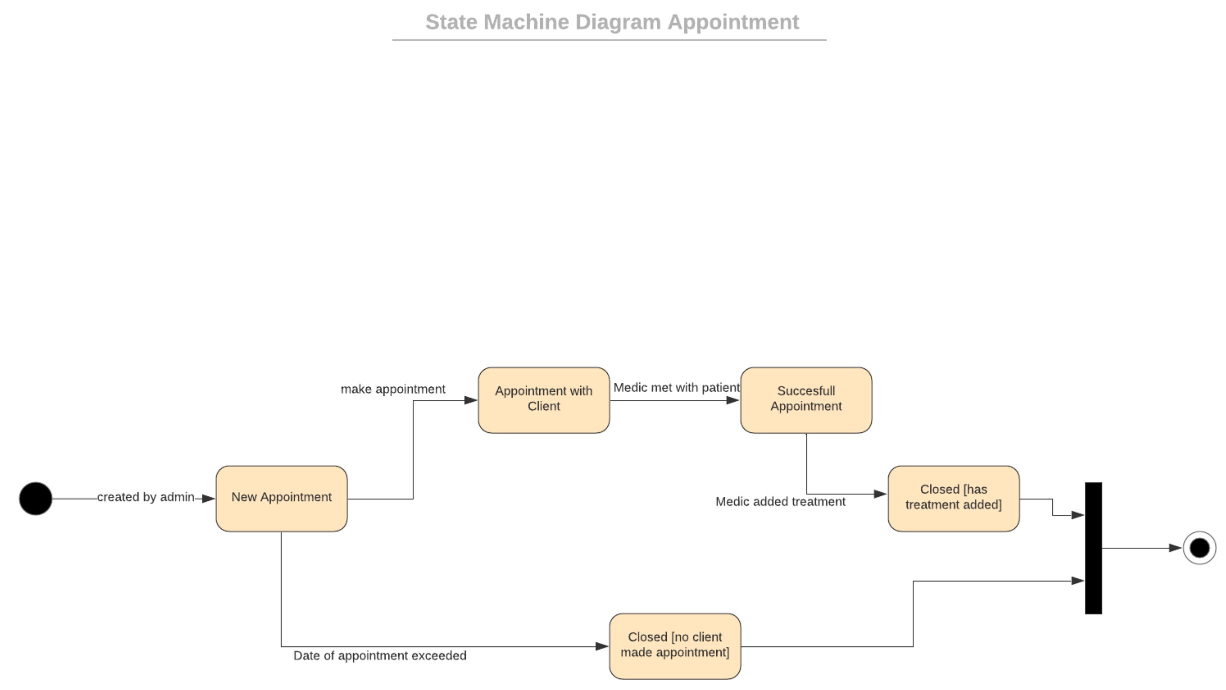
- Activity diagram


Activity diagram Make Appointment
User Logged In?
No
Login
Yes
Search Appointments
Filter Appointments
Make Appointment
No
Yes
<<datastore>> Client Info stored in Appointment
Notify Medic of new appointment

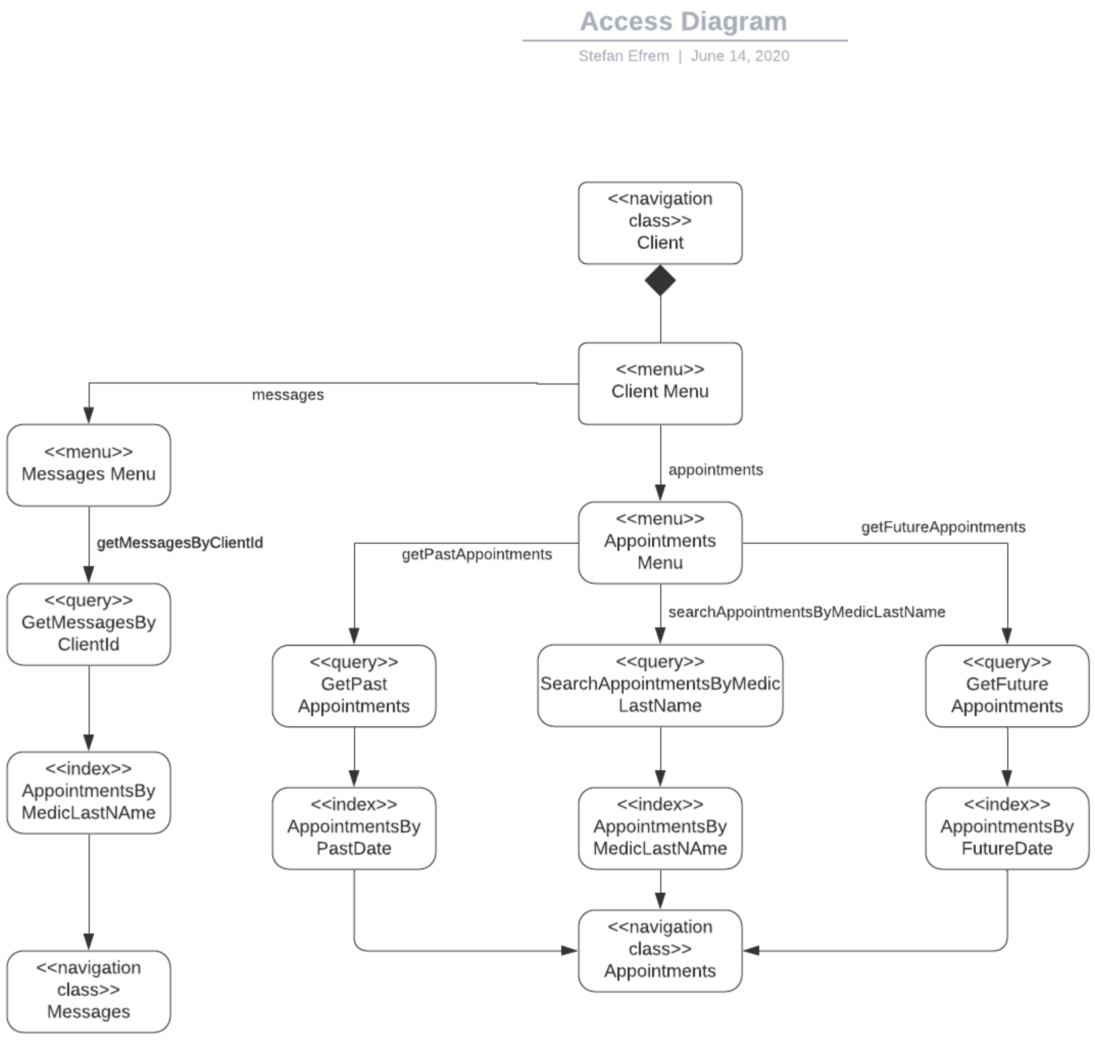
- Class diagram



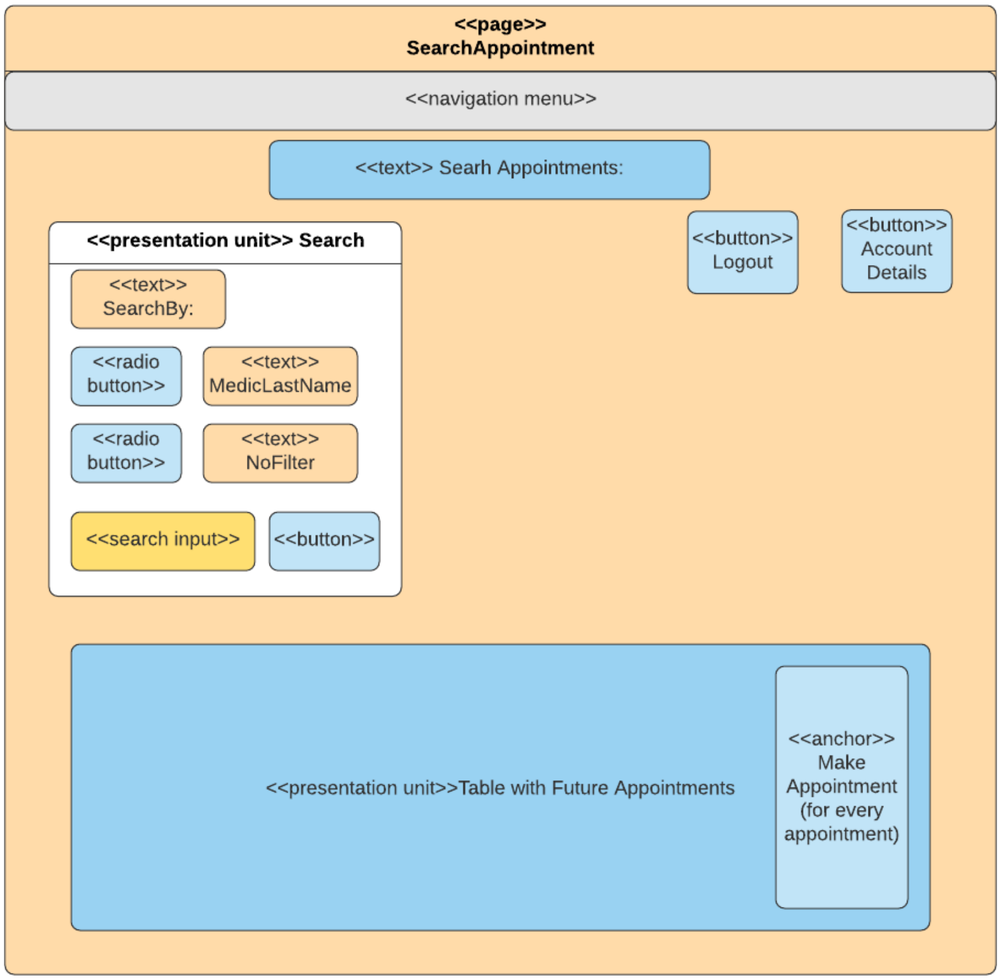
- State machine diagram



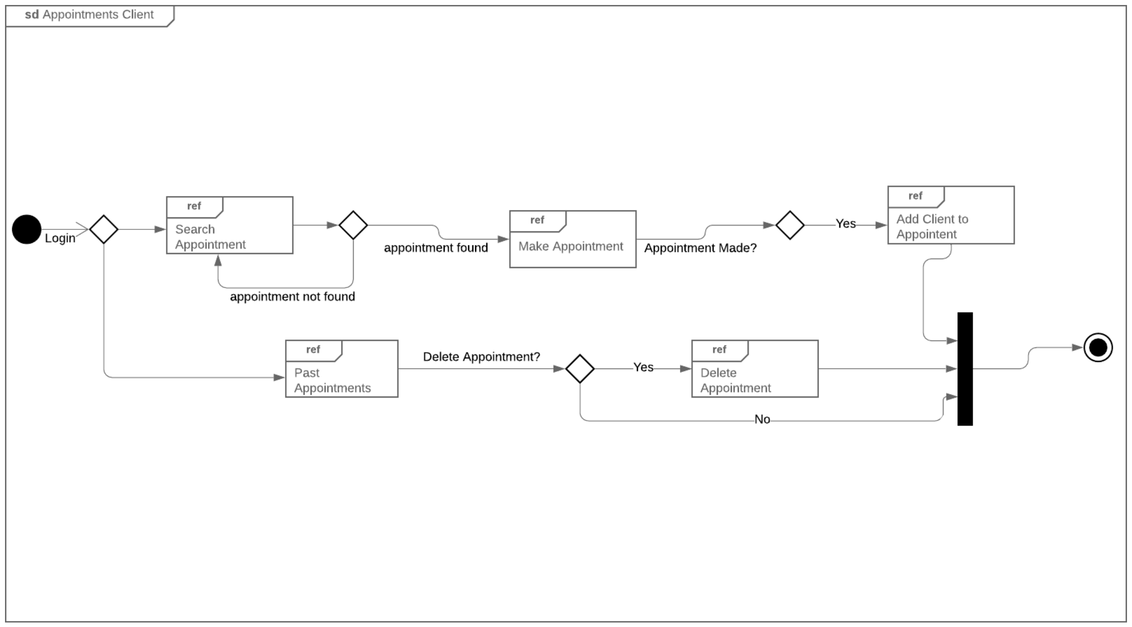
- Access model


Access Diagram
Stefan Efrem | June 14, 2020
<<navigation class>> Client
<<menu>> Client Menu
messages
appointments
<<menu>> Messages Menu
getMessagesByClientId
<<query>> GetMessagesBy ClientId
<<index>> AppointmentsBy MedicLastNAme
<<navigation class>> Messages
<<menu>> Appointments Menu
getPastAppointments
getFutureAppointments
searchAppointmentsByMedicLastName
<<query>> GetPast Appointments
<<query>> SearchAppointmentsByMedic LastName
<<query>> GetFuture Appointments
<<index>> AppointmentsBy PastDate
<<index>> AppointmentsBy MedicLastNAme
<<index>> AppointmentsBy FutureDate
<<navigation class>> Appointments

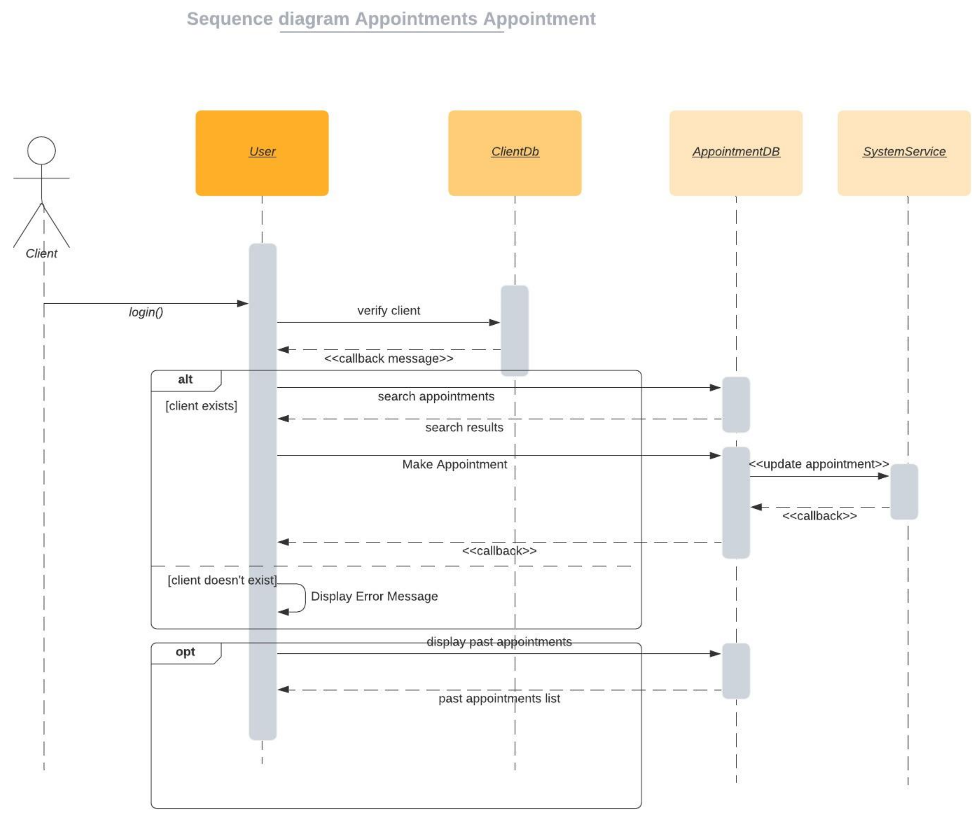
- Presentation page


<<page>>
SearchAppointment
<<navigation menu>>
<<text>> Searh Appointments:
<<presentation unit>> Search
<<text>> SearchBy:
<<radio button>>
<<text>> MedicLastName
<<radio button>>
<<text>> NoFilter
<<search input>>
<<button>>
<<button>> Logout
<<button>> Account Details
<<presentation unit>>Table with Future Appointments
<<anchor>> Make Appointment (for every appointment)

- Interaction overview diagram



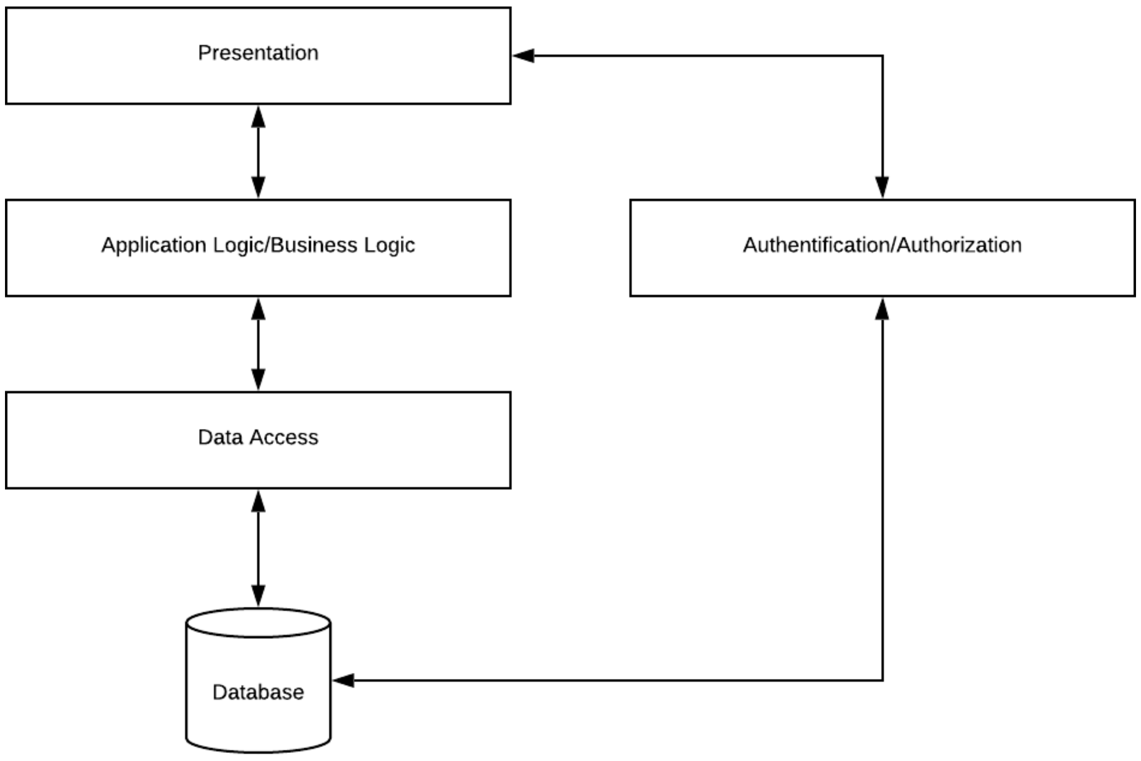
- Sequence Diagram



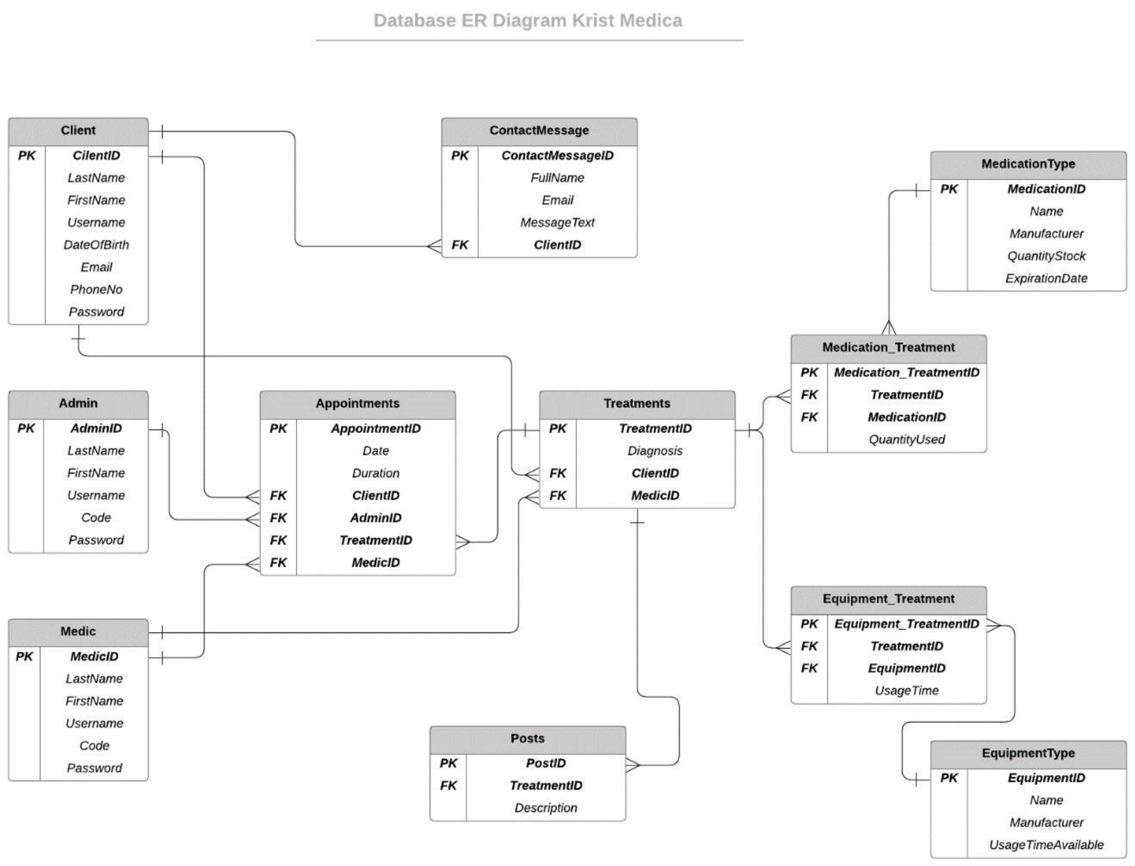
3. System Architecture and Database Structure

My application uses a 5-layer architecture:

- The Presentation layer which is represented by the web-server
- The Business layer which includes the application logic with the services and models
- The Data Access layer which includes the repositories
- The Database of the application
- The Authentication - Authorization layer


Presentation
Application Logic/Business Logic
Authentification/Authorization
Data Access
Database

The Database structure is presented in the diagram below. The Access to the database is made through repositories which update/manage the data.

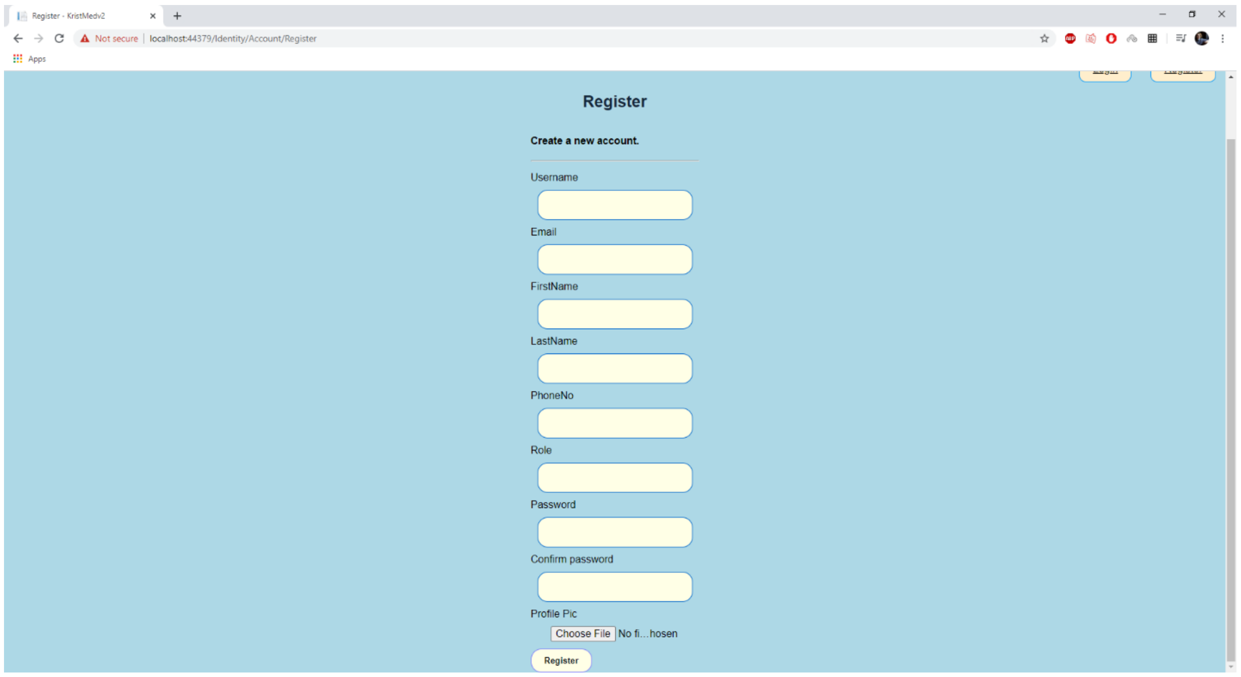


4. Implemented Functionalities

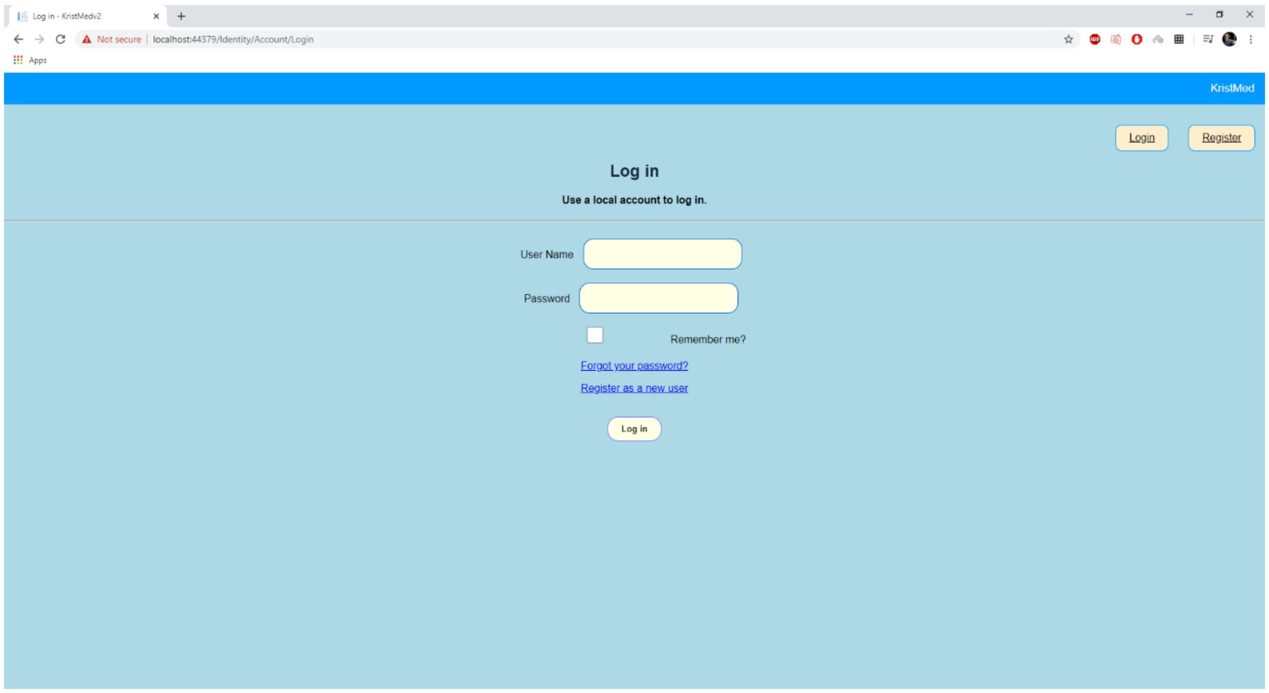
I will separate the functionalities implemented in 4 parts:

4.1 Common functionalities (user authentication/authorization)

The common functionalities of the application are represented by the login/register functionalities. The application uses ASP Identity for its user database and it has designated layouts and authorization for the 3 different user roles: client, admin, medic.



On the Register Page we need to add the required information to create our user. The user will have some of his information stored in the Identity Database (username, email password, photo path) and the rest of the information (first name, last name, phone No, etc..) will be stored in the application's database. The Profile picture is added directly to the identity user. The picture is copied and put in the application's files while also adding a GUID to the name of the picture in order to uniquely identify all the pictures.



Log in

Use a local account to log in.

User Name

Password

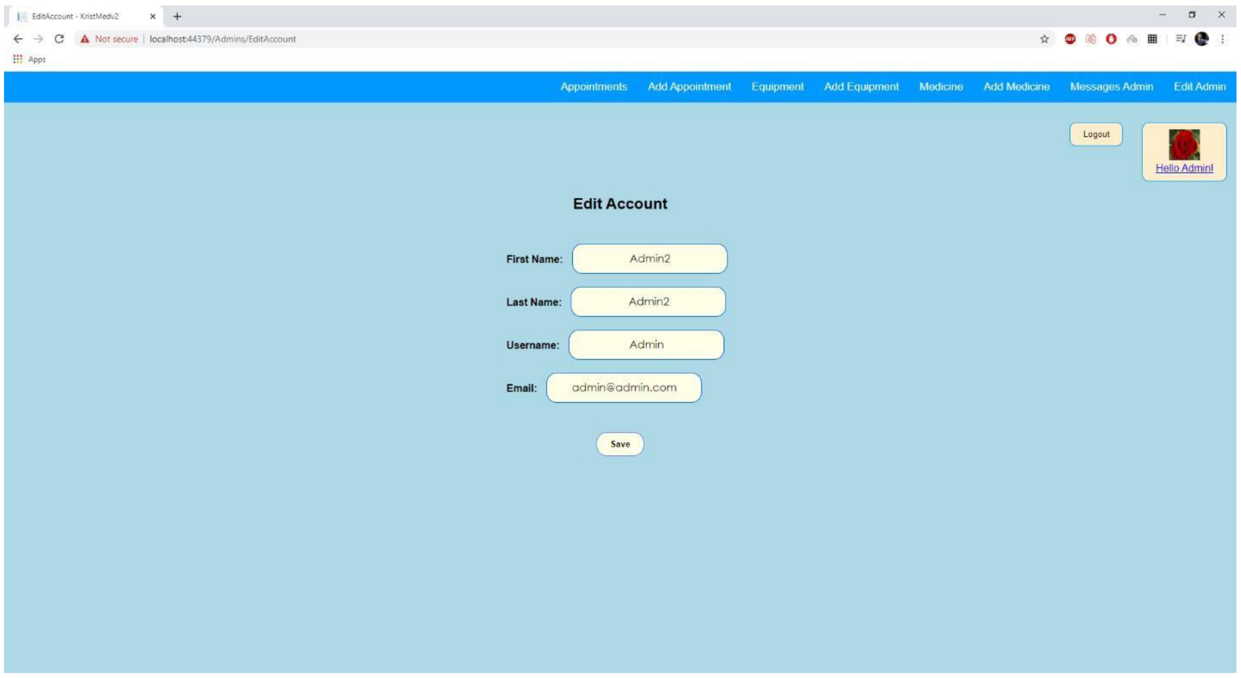
Remember me?

Forgot your password?

Register as a new user

Log in

The Login page is a simple login page where the user has to login, depending on the type of the user, the interface will be different after login.



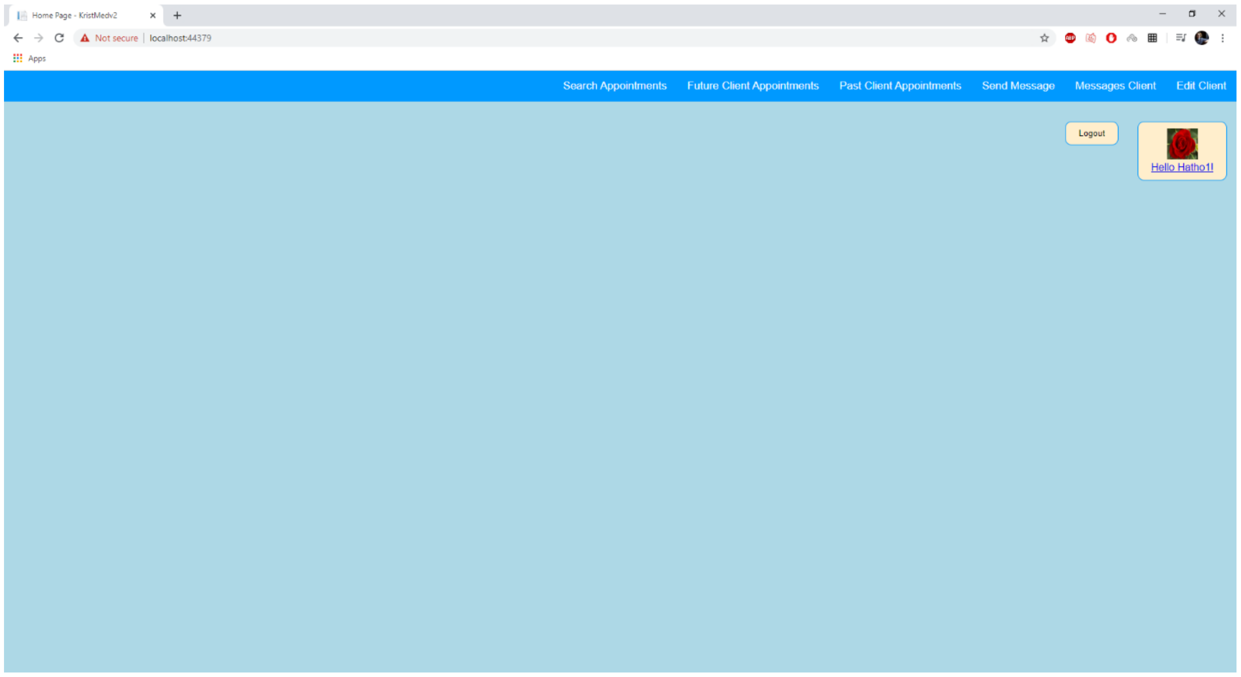
Edit Account

First Name:	Admin2
Last Name:	Admin2
Username:	Admin
Email:	admin@admin.com

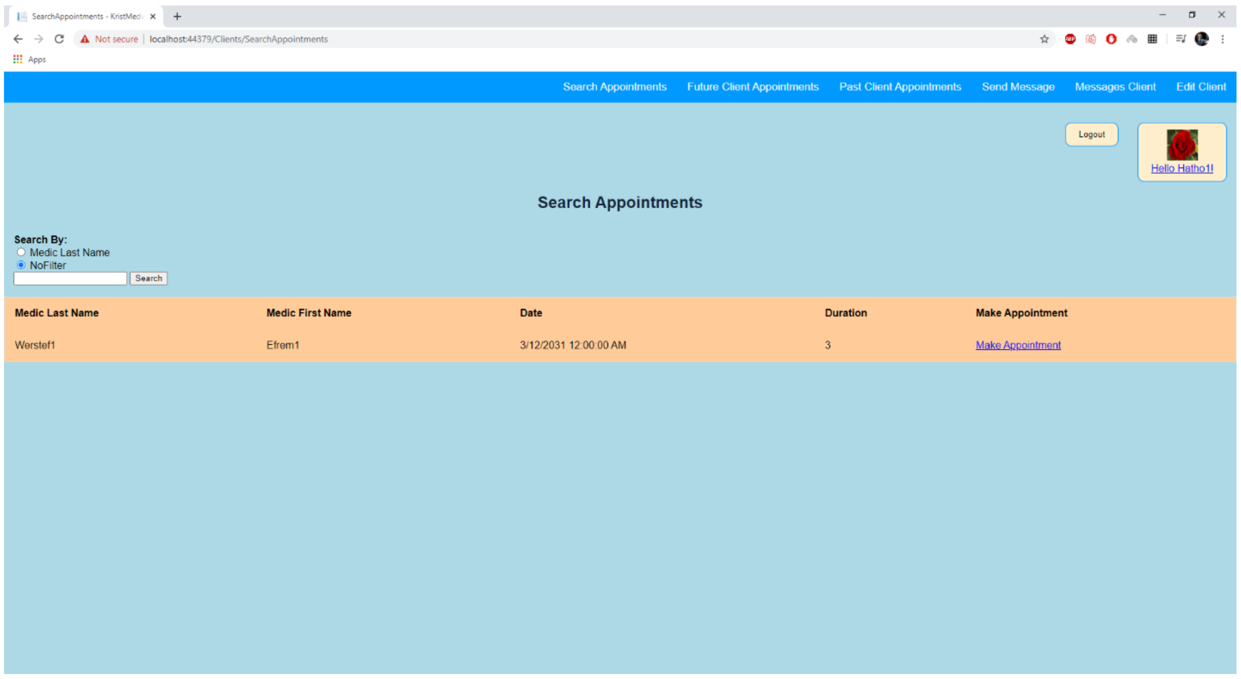
Save

The Edit Account Page is also common to all the users and it allows them to modify their accounts. It has their current information as placeholders in order to help the visibility.

4.2 Client functionalities

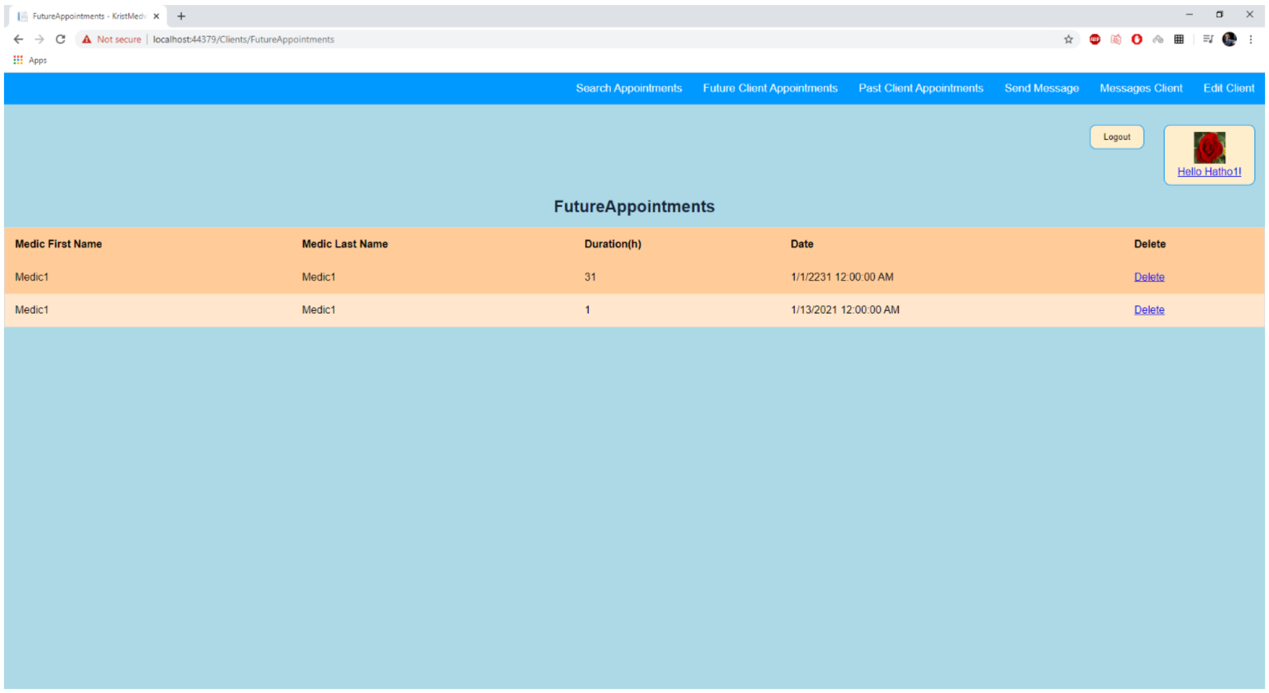


The Client Home Page has the menu with the pages that are available for the client.



Medic Last Name	Medic First Name	Date	Duration	Make Appointment
Werstef1	Efrem1	3/12/2031 12:00:00 AM	3	Make Appointment

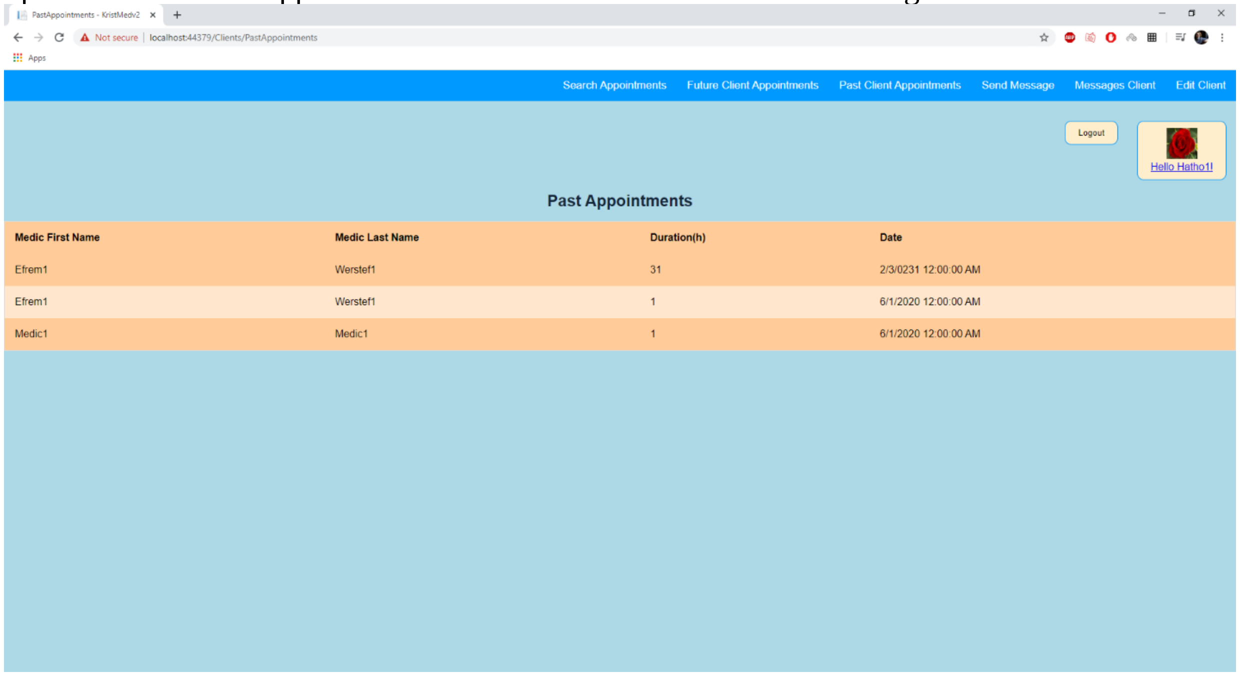
The “Search Appointments” page implements the search functionality, it allows us to search for all available appointments or just the ones of certain medic by writing his Last Name and choosing the corresponding filter. On the right of every available appointment we can press the “Make Appointment” button to make an appointment with that Medic at the specified Date.



FutureAppointments

Medic First Name	Medic Last Name	Duration(h)	Date	Delete
Medic1	Medic1	31	1/1/2231 12:00:00 AM	Delete
Medic1	Medic1	1	1/13/2021 12:00:00 AM	Delete

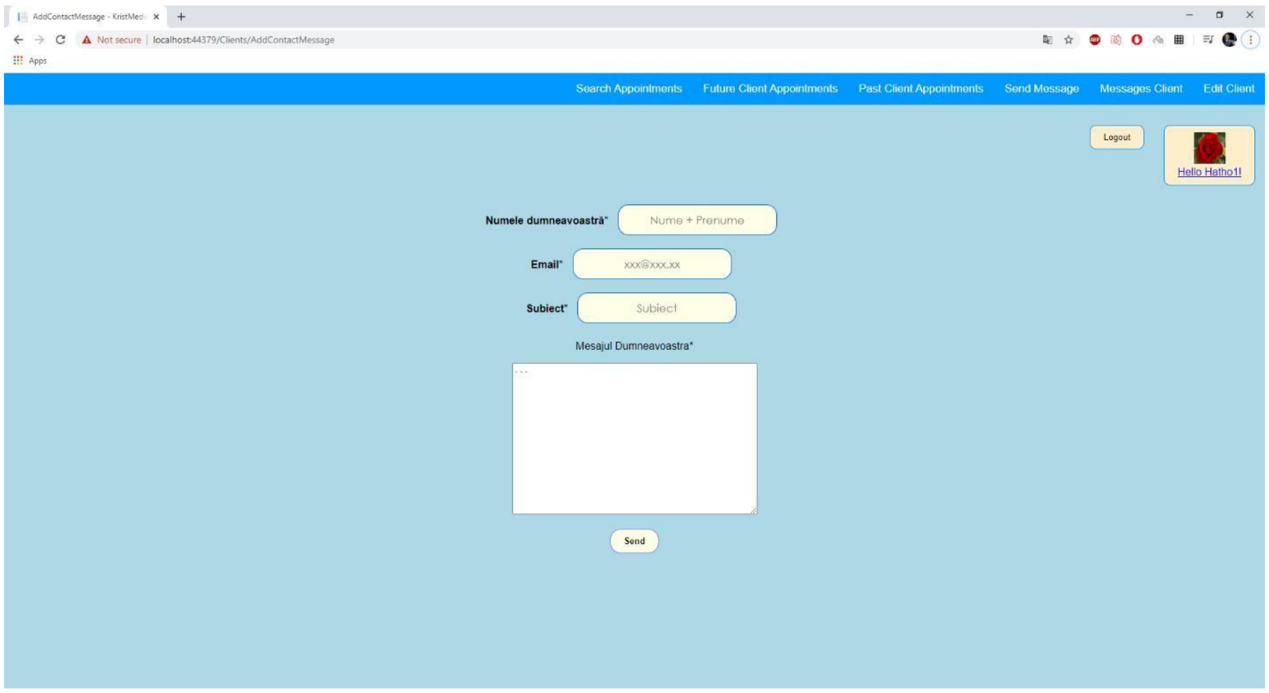
On the “Future Appointments” page we can see the client’s future appointments and an option to delete this appointment in case we want to cancel our meeting with the medic.



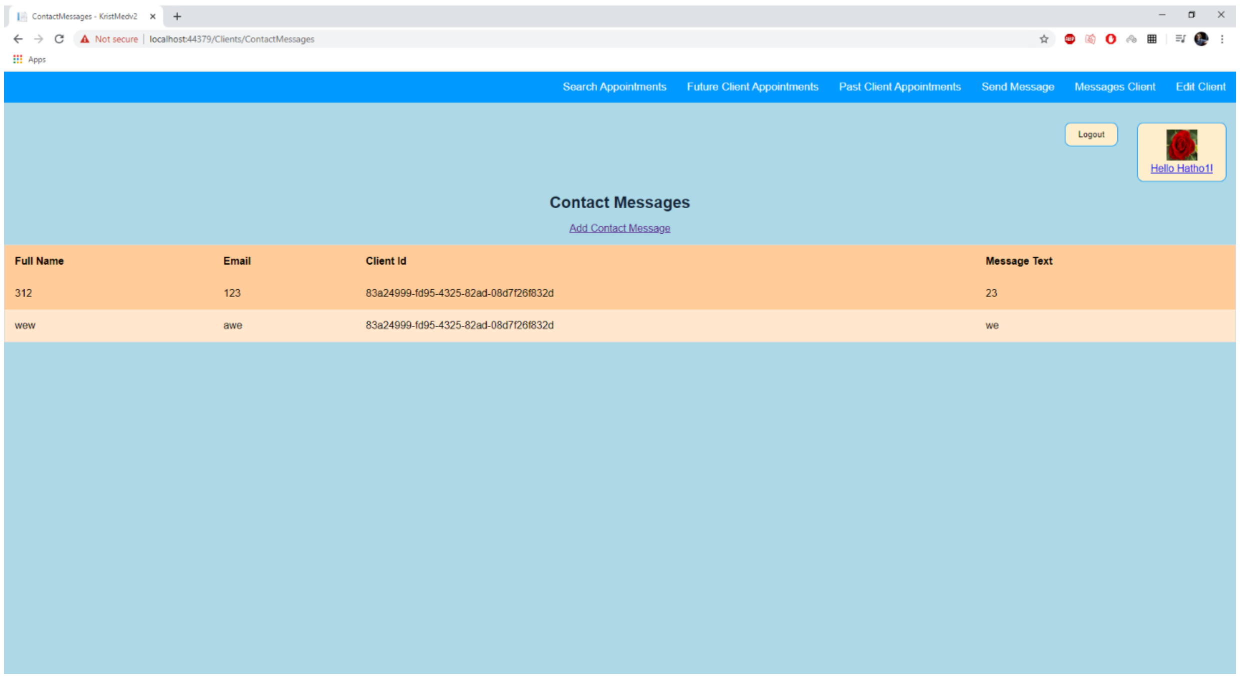
Past Appointments

Medic First Name	Medic Last Name	Duration(h)	Date
Efrem1	Werstef1	31	2/3/0231 12:00:00 AM
Efrem1	Werstef1	1	6/1/2020 12:00:00 AM
Medic1	Medic1	1	6/1/2020 12:00:00 AM

In the “Past Appointments” page we can see the past appointments of the client and the Duration of every appointment.



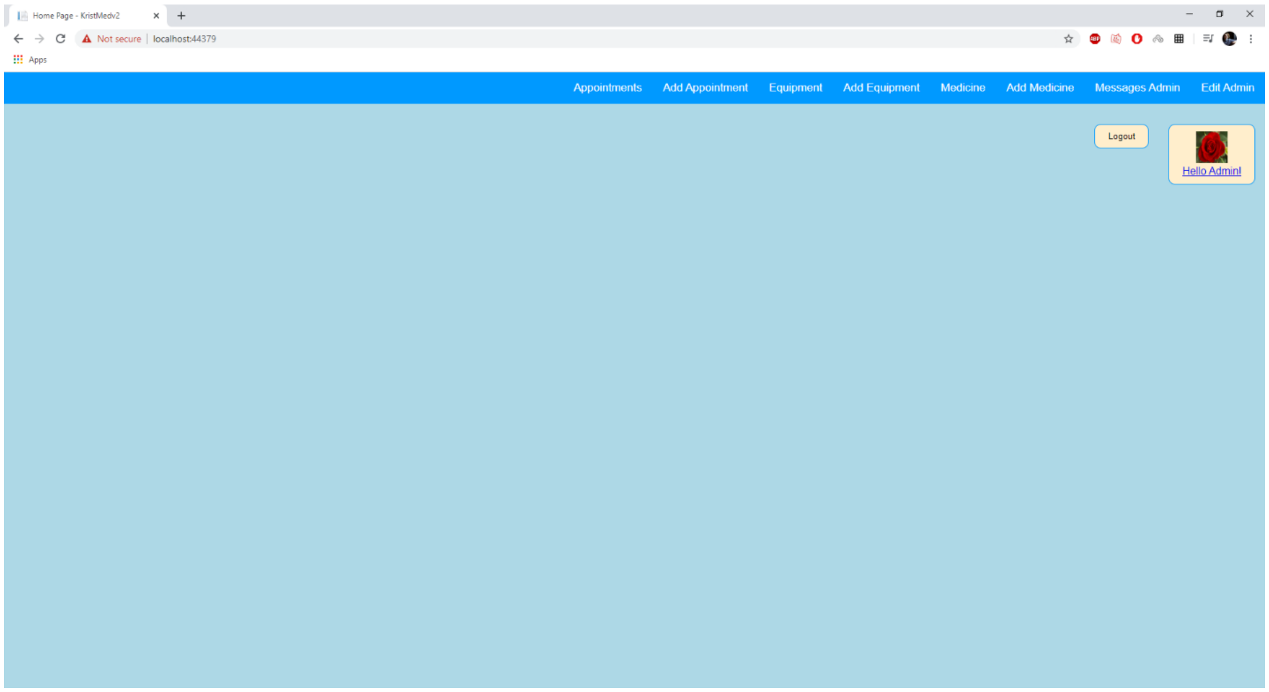
On the “Send Message” page we can send a message to the clinic, this is done in case we want some additional information about treatment or we want to ask some questions. The clinic should respond relatively fast.



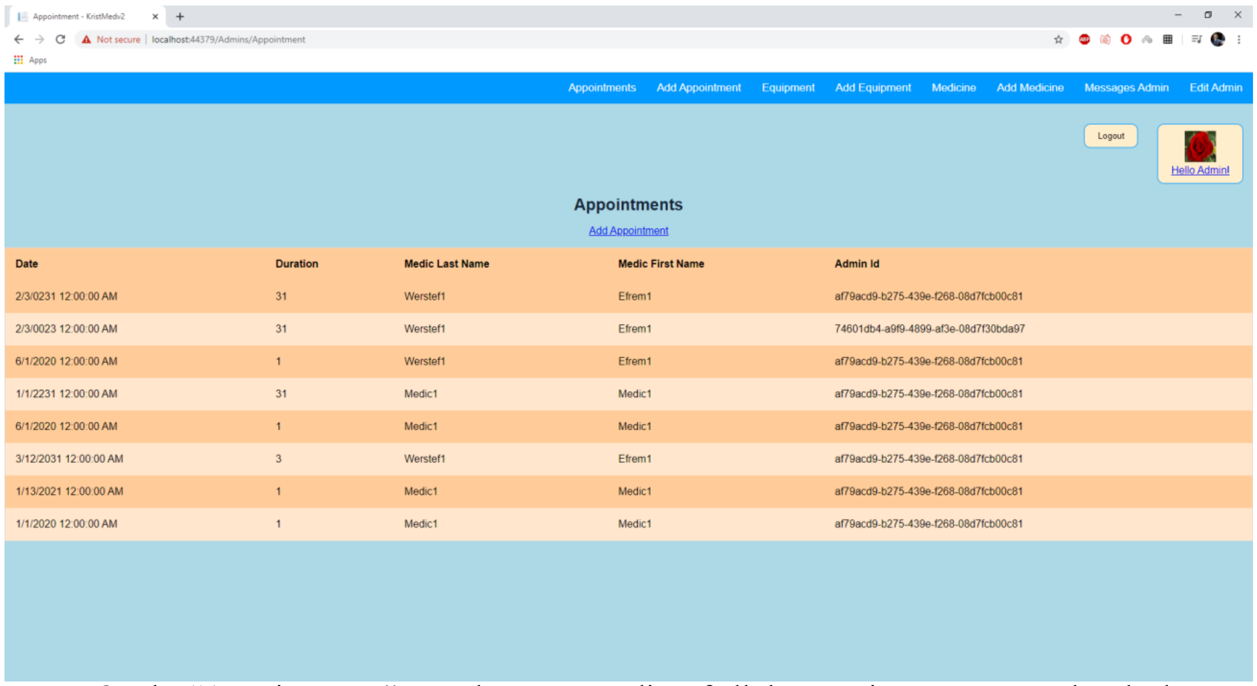
Full Name	Email	Client Id	Message Text
312	123	83a24999-fd95-4325-82ad-08d7f26f832d	23
wew	awe	83a24999-fd95-4325-82ad-08d7f26f832d	we

On the “Message Client” page we can see the client’s messages that have already been sent to the clinic.

4.3 Admin functionalities



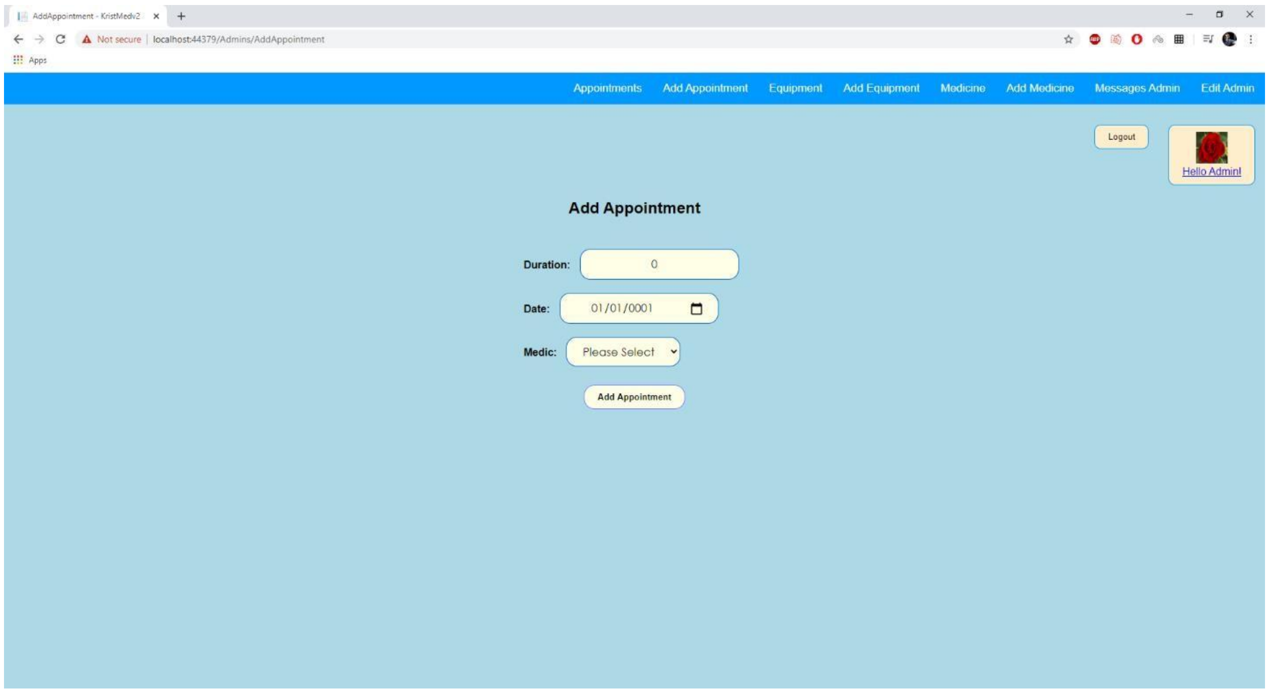
The Admin Home Page has the menu with the pages that are available for the admin.



Appointments

Date	Duration	Medic Last Name	Medic First Name	Admin Id
2/3/0231 12:00:00 AM	31	Werstef1	Efrem1	af79acd9-b275-439e-f268-08d7fcb00c81
2/3/0023 12:00:00 AM	31	Werstef1	Efrem1	74601db4-a9f9-4899-af3e-08d7f30bda97
6/1/2020 12:00:00 AM	1	Werstef1	Efrem1	af79acd9-b275-439e-f268-08d7fcb00c81
1/1/2231 12:00:00 AM	31	Medic1	Medic1	af79acd9-b275-439e-f268-08d7fcb00c81
6/1/2020 12:00:00 AM	1	Medic1	Medic1	af79acd9-b275-439e-f268-08d7fcb00c81
3/12/2031 12:00:00 AM	3	Werstef1	Efrem1	af79acd9-b275-439e-f268-08d7fcb00c81
1/13/2021 12:00:00 AM	1	Medic1	Medic1	af79acd9-b275-439e-f268-08d7fcb00c81
1/1/2020 12:00:00 AM	1	Medic1	Medic1	af79acd9-b275-439e-f268-08d7fcb00c81

On the “Appointments” page he can see a list of all the appointments created and a button which sends him to a page where he can add more appointments.



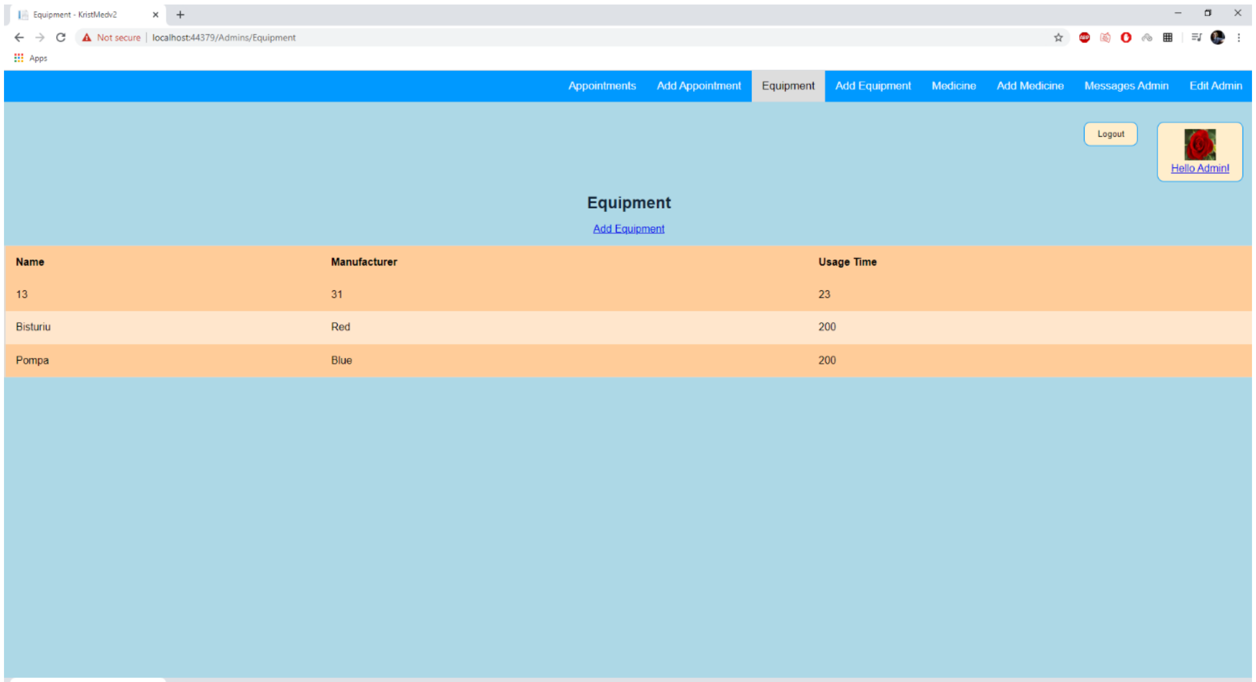
Add Appointment

Duration: 0

Date: 01/01/0001

Medic: Please Select

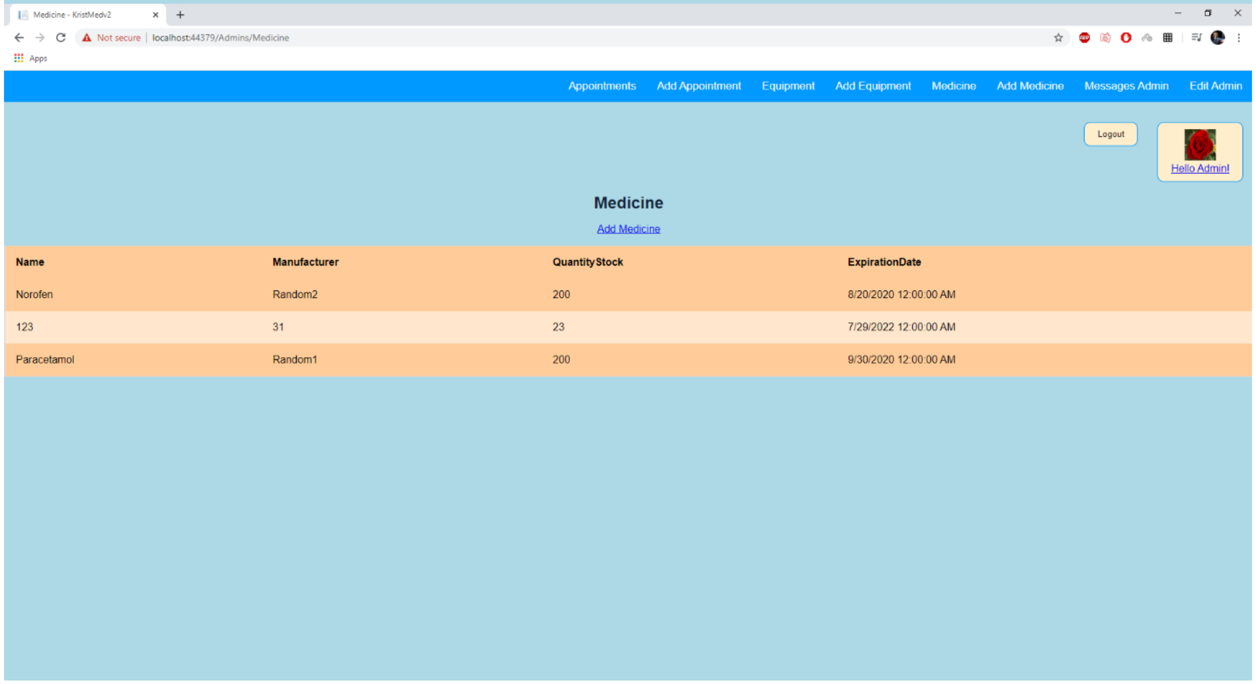
On the “Add appointment” page, the admin can add an appointment at a certain date, for a certain duration and with a certain medic which will be chosen from a select list with all the medics available.



Equipment

Add Equipment

Name	Manufacturer	Usage Time
13	31	23
Bisturiu	Red	200
Pompa	Blue	200

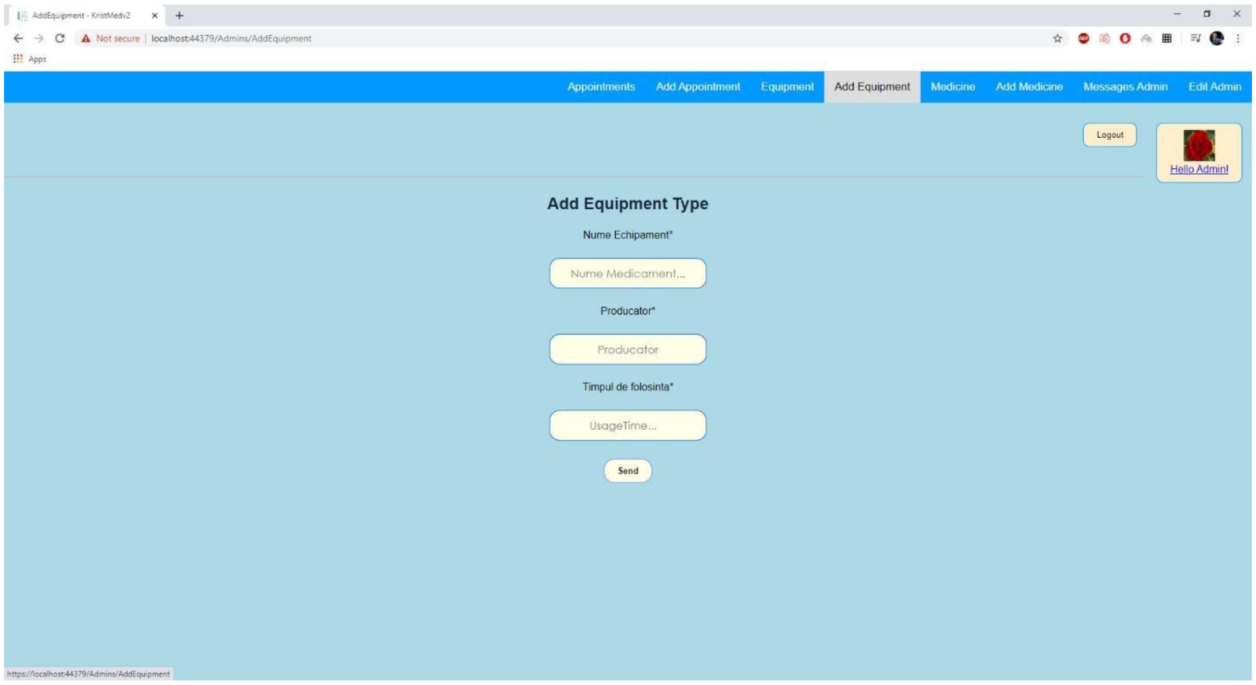


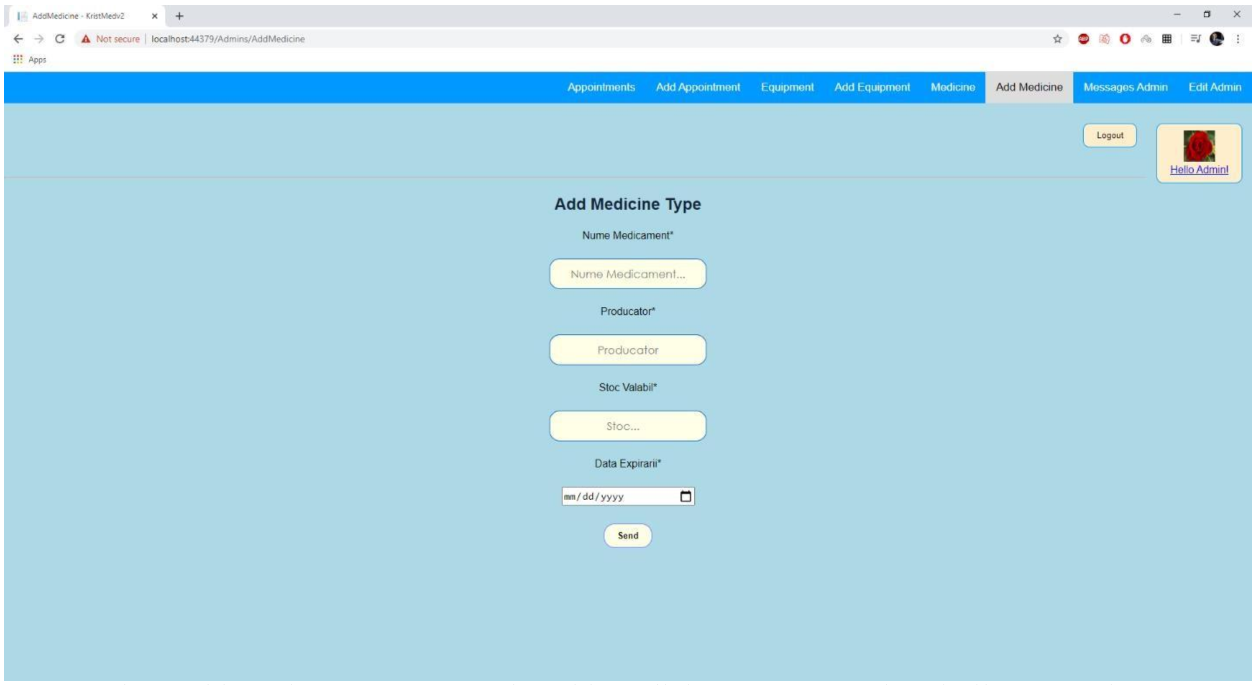
Medicine

Add Medicine

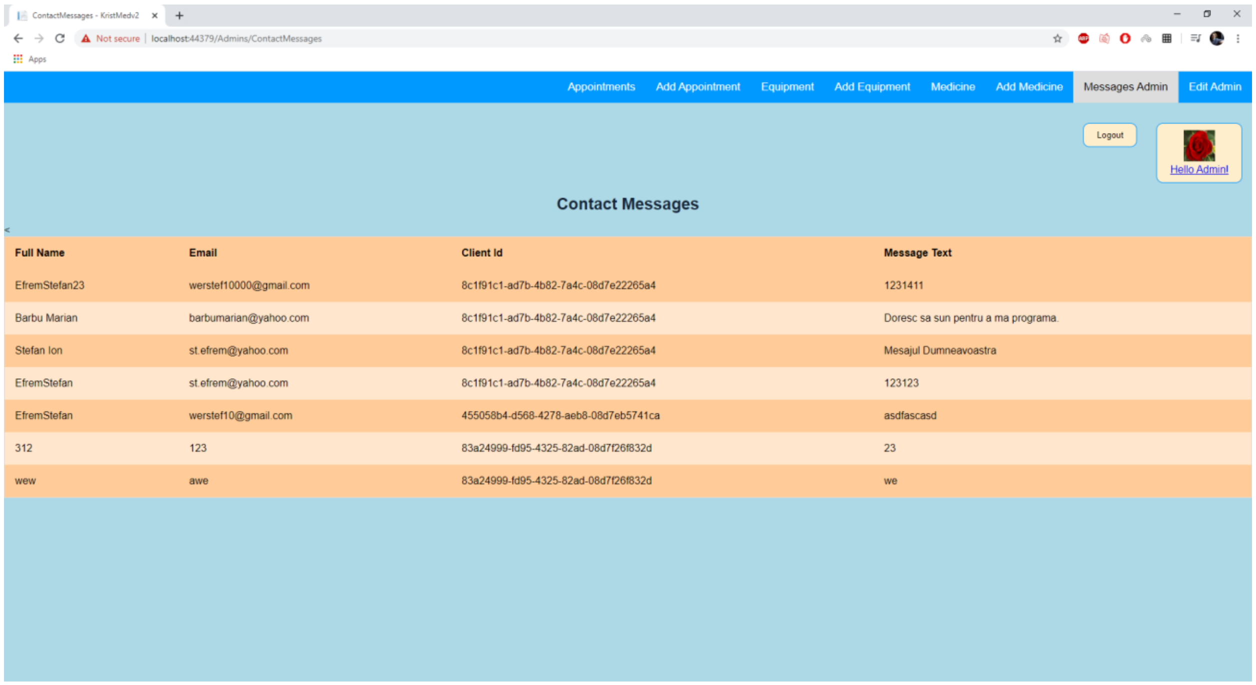
Name	Manufacturer	QuantityStock	ExpirationDate
Norofen	Random2	200	8/20/2020 12:00:00 AM
123	31	23	7/29/2022 12:00:00 AM
Paracetamol	Random1	200	9/30/2020 12:00:00 AM

The “Equipment” and “Medicine” pages are similar and they show a list of available equipment and medicine for the treatment of patients by the medic.





The “Add Equipment Type” and “Add Medicine Type” are also similar as on these pages the admin will add new equipment or medications on the clinics software after they arrive at the clinic.

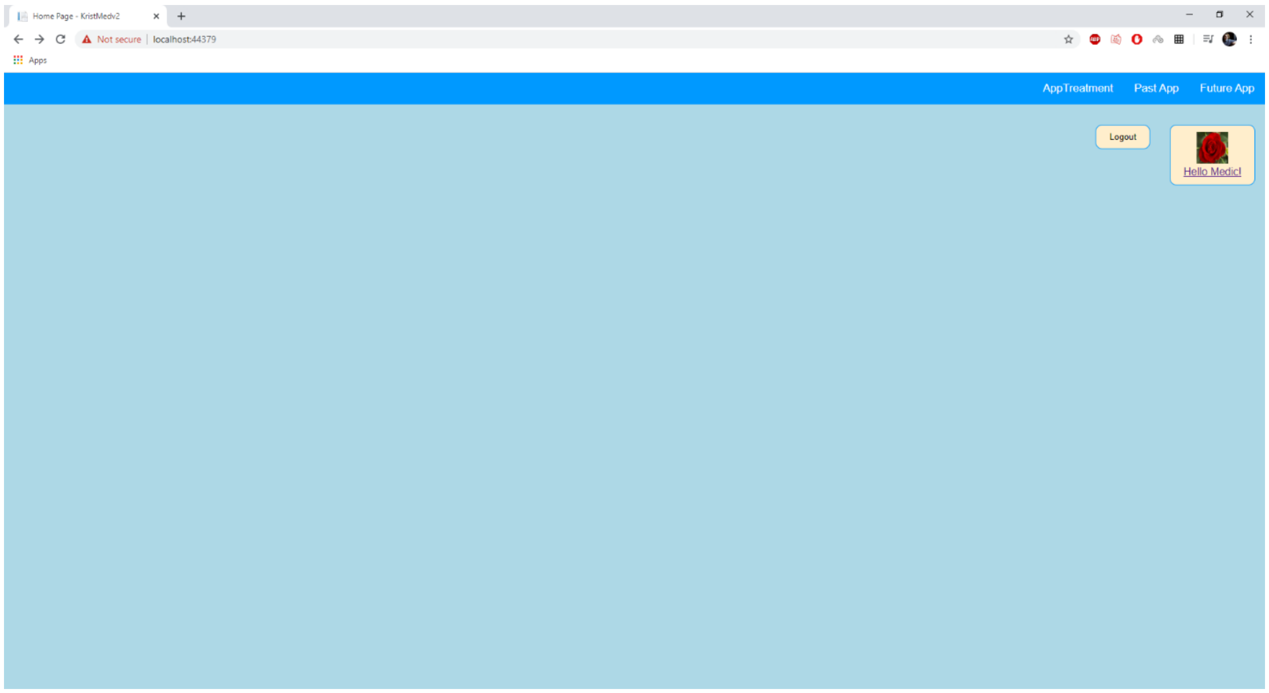


Contact Messages

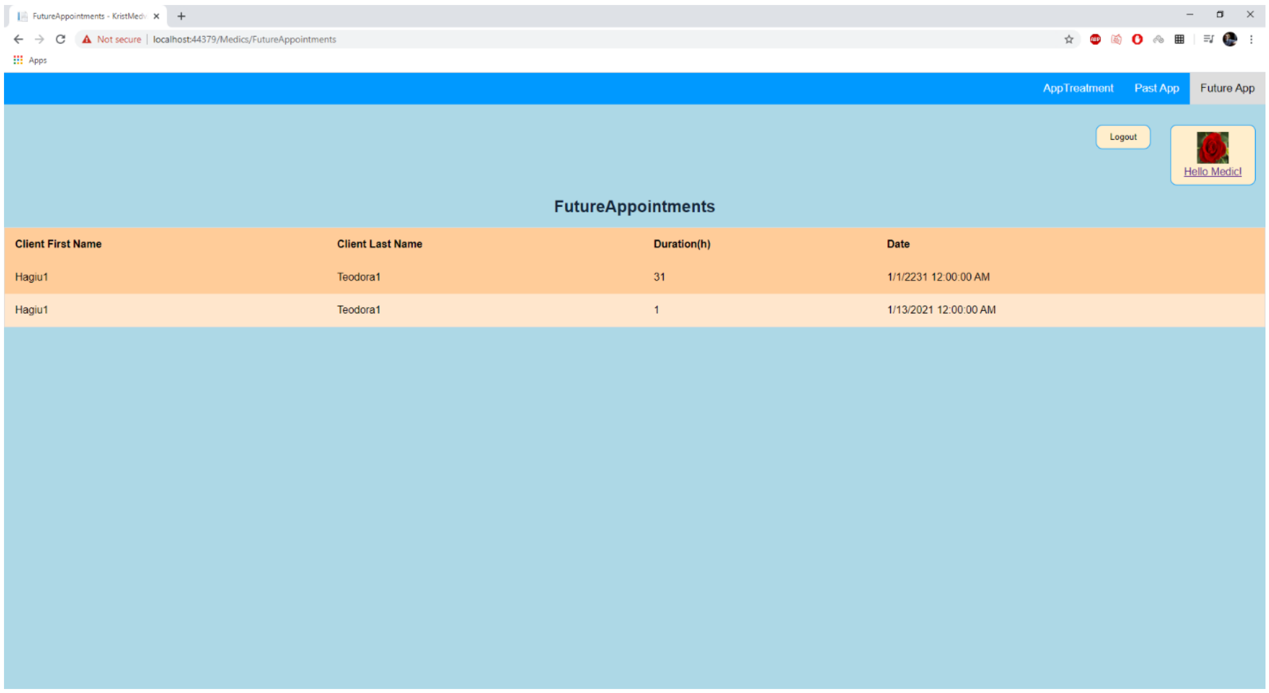
Full Name	Email	Client Id	Message Text
EfremStefan23	werstef10000@gmail.com	8c1f91c1-ad7b-4b82-7a4c-08d7e22265a4	1231411
Barbu Marian	barbumarian@yahoo.com	8c1f91c1-ad7b-4b82-7a4c-08d7e22265a4	Doresc sa sun pentru a ma programa.
Stefan Ion	st.efrem@yahoo.com	8c1f91c1-ad7b-4b82-7a4c-08d7e22265a4	Mesajul Dumneavoastra
EfremStefan	st.efrem@yahoo.com	8c1f91c1-ad7b-4b82-7a4c-08d7e22265a4	123123
EfremStefan	werstef10@gmail.com	455058b4-d568-4278-aeb8-08d7eb5741ca	asdfascasd
312	123	83a24999-fd95-4325-82ad-08d7f26f832d	23
wew	awe	83a24999-fd95-4325-82ad-08d7f26f832d	we

The “Contact Message” page holds a list of all the contact messages sent by the clients.

4.4 Medic functionalities



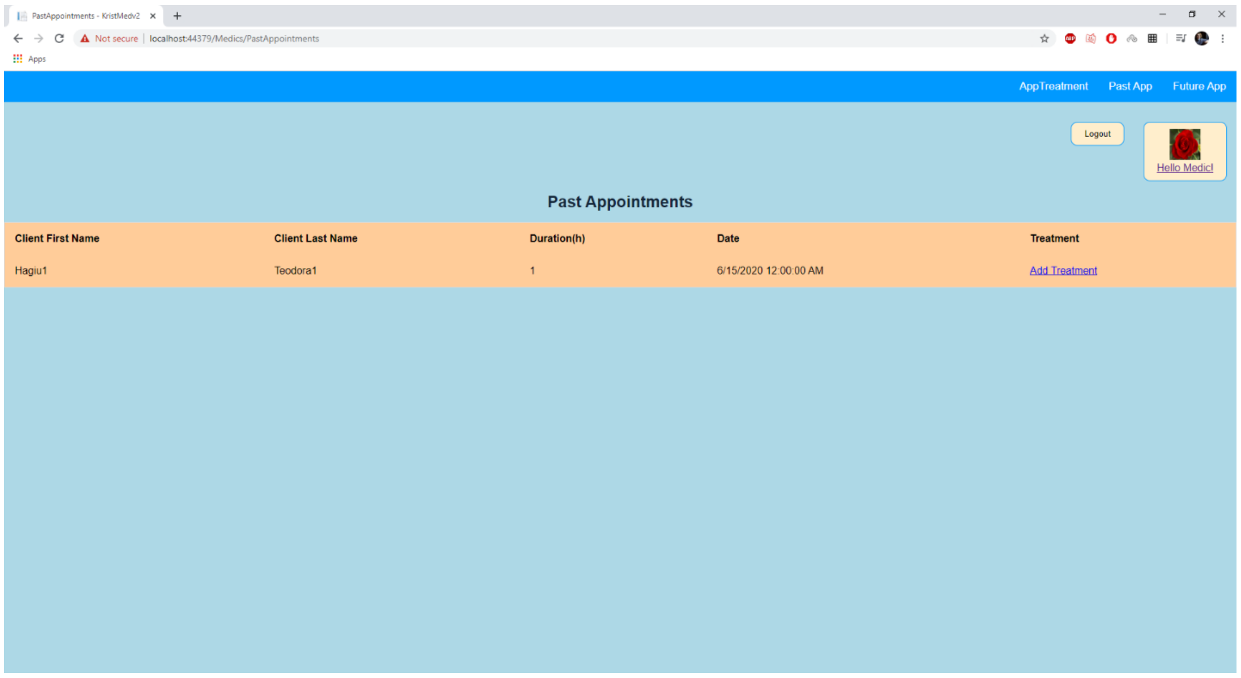
The Medic Home Page has the menu with the pages that are available for the medic.


FutureAppointments - KristMedv
Not secure
localhost:44379/Medics/FutureAppointments
Apps
AppTreatment
Past App
Future App
Logout
Hello Medic!

FutureAppointments

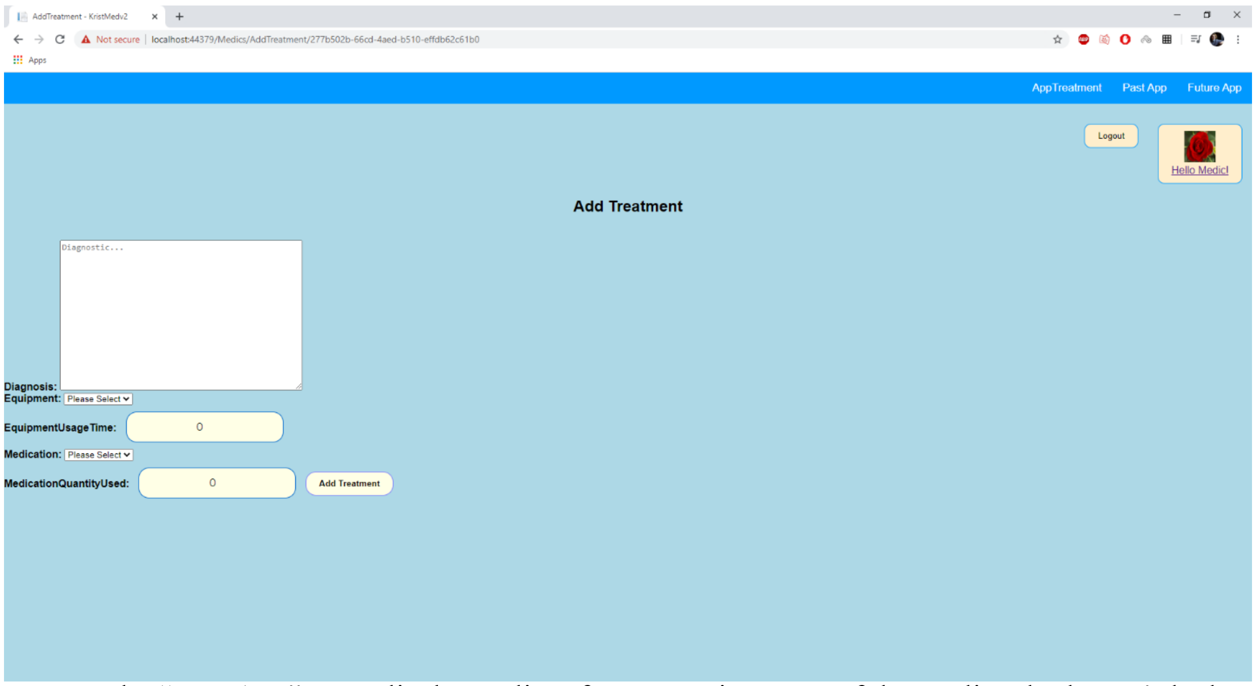
Client First Name	Client Last Name	Duration(h)	Date
Hagiu1	Teodora1	31	1/1/2231 12:00:00 AM
Hagiu1	Teodora1	1	1/13/2021 12:00:00 AM

The "Future Appointments" page has a list of all the future appointments with clients of the medic. There are also so called "Fresh Appointments" created by admins which have no client yet and those will not be displayed here.


PastAppointments - KristMedv2
Not secure
localhost:44379/Medics/PastAppointments
Apps
AppTreatment
Past App
Future App
Logout
Hello Medic!

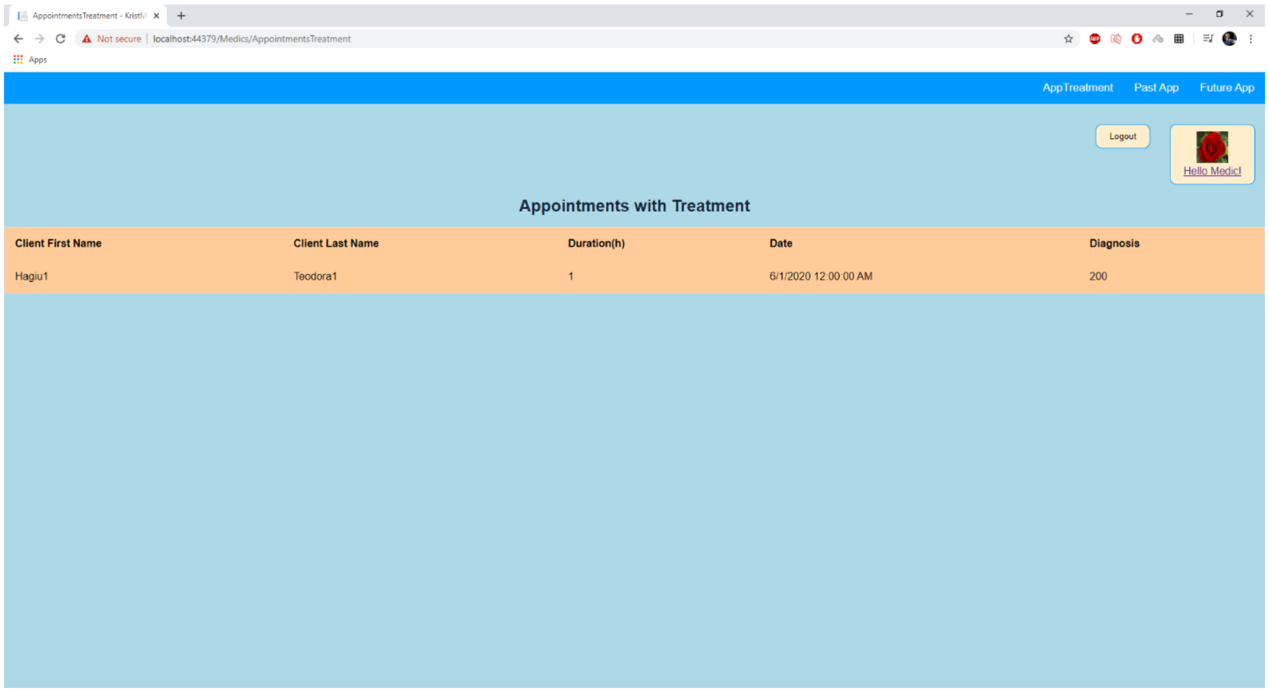
Past Appointments

Client First Name	Client Last Name	Duration(h)	Date	Treatment
Hagiu1	Teodora1	1	6/15/2020 12:00:00 AM	Add Treatment


AddTreatment - KristMedv2
localhost:44379/Medics/AddTreatment/277b502b-66cd-4aed-b510-effdb62c61b0
AppTreatment
Past App
Future App
Logout
Hello Medic!
Add Treatment

Diagnosis: Diagnostic...
Equipment: Please Select
EquipmentUsageTime: 0
Medication: Please Select
MedicationQuantityUsed: 0 Add Treatment

The “Past App” page displays a list of past appointments of the medic who haven’t had a treatment added to them as of now. There is a button next to every such an appointments that sends the medic to the “Add Treatment” Page where he will fill in the diagnosis of the patient.


AppointmentsTreatment - KristM
localhost:44379/Medics/AppointmentsTreatment
AppTreatment
Past App
Future App
Logout
Hello Medic!

Appointments with Treatment

Client First Name	Client Last Name	Duration(h)	Date	Diagnosis
Hagiu1	Teodora1	1	6/1/2020 12:00:00 AM	200

The “Appointments with Treatment” page shows a list of past appointments that have treatments created by the medic.

5. Plans to improve the Application

The next steps for the app will be implementing the Post Feature which will make possible chatting between the Medic and his/her patients. This is a necessary feature as many patients have certain problems that can be easily solved at the distance and they can receive advice from the medic in this format. The app will also store these messages for long term so the Medic can review the discussion he had with his patients before the appointment. This functionality will help the doctors tremendously in their quest to help patients. AngularJS should be used to make this functionality.

6. Interface Design and Tools Used

The interface has well positioned sparse elements that do not overcrowd the screen; this is done to help the users so that they will not be distracted by a lot moving element and they will be able to easily use the services of the app without prior experience with it.

In order to ease the usability of the application, some design guidelines were imposed in the making of the app:

- the response time of the application is less than 0.3 sec
- the pages are sparsely populated with elements that have a decent distance between them, 100-150 px
- an easy to understand top menu bar that will ease the access to all the important services of the app
- the choice of a bicolor interface: a calming cold color (light blue) and a relaxing warm color (pale orange) which gives the website a calming effect which should help ease the stress of using a web application of someone who might not have such a diverse experience with computers or the internet.

In addition, Bootstrap has been added to the frontend to make its accessibility from mobile devices and tablets a lot easier. This has make the app more appealing and easier to access for people that do not own a laptop or a personal computer. The project was made in Visual Studio, using .NET Core in the development of the web application. Sql Server was also used for the database through the Server Explorer feature of Visual Studio. Github has been used to keep track of updates and have a cloud storage feature for the source code of the application.

The internet is a staple of globalization and a symbol of its triumph over the world. Thus it is also one of the most accessible products in the world. Since our application is a web-based one, its accessibility is already on a high note, to that, design decisions such as some of the ones written above, showcase my desire to make the app accessible to older people which might have trouble with computers or the internet, but who are also an important part of the demographic targeted by this application.

Because it is accessible from the browser, that means that it can be used on a personal normal desktop computer or laptop, or using a browser on the phone. So, from the start, by implementing the application as a website, it is widely accessible thanks to the browsers that readily available nowadays.

All in all, the usability and accessibility of the application can be improved (but the decisions in its design have definitely put it on the right track and it achieves all its purposes in regards to its user friendliness.