CMS Requirements Specifications

CEN 302-Software Engineering
Department of Computer Engineering
Faculty of Architecture and Engineering
Epoka University

Ardit Gega
Gerald Jovani
Keti Hysi
Pironada Nako
Xhensila Lakti

02/04/2019

CMS Requirements Specifications
Version 1.0
April 2,2019

Table of Contents

1.1 Project Overview

Technology nowadays is developing really fast and it is being implemented in almost all the areas of our lives. One of the main fields that is trying to incorporate technology, is the health field. For each patient is needed to store its personal information. When analyzed this detailed handwritten information it is a very difficult and slow to process.
Our project is a Web application for Clinic Management System. Its main functionalities include: request appointments online and keeping medical records for each patient in a digital form instead of on paper, which is the nowadays examination form, especially in our country.
The implementation of the idea will work closely with clinics by having access at their databases for patients they forward to us. Patients will require an appointments and the doctor will accept or decline based on his agenda.
Each doctor will have his/her own account where he/she can add patients, leave appointments (this is done by polyclinic's doctors), cancel them, write prescriptions, check the medical records of a patient and alter them if needed.
Also, in our system we will keep track of each doctor's timetable. Besides doctors, receptionists will have their profile, in order to manage the patients and doctors profiles.
Receptionists will inform patients and doctors for any change in the schedule for example.
The project is intended for private clinics.

1.2 Purpose and Scope of this Specification

The purpose of our project is to facilitate the way clinics work in our country. Patients will not have to save their examination documents year by year but they will have their personal information stored in their own online profile.
Also our management system aims to reduce the time of waiting by leaving an appointment online for each patient.
The patient will also be able to go to the pharmacy and get the medicines without a hand receipe.

In scope:

- Modifying the appointment reservations.
- Modifying the way patients' records are kept.

Out of scope:

- Modifying the administrative procedures of the clinic.

2. Product/Service Description

2.1 Product Context

Our software is related with an ordinary clinic and a group of pharmacies that will be available for the patients of that clinic.It will be an independent system that will be available to 4 levels of users: Patient,Doctor, Receptionist and Pharmacist.These 4 levels will be directly connected to each other.

2.2 User Characteristics

There are 4 types of users that will interact within our systems:

1. Patient
    - Can log in his account
    - Can read its personal data
    - Can contact his doctor
    - Can contact the receptionist
    - Can check for the nearest pharmacy and the medicines that each of them offers
    - Can look at all his/her visits and check ups
    - Can log out

2. Doctor
    - Can log in his account
    - Can read its CV
    - Can contact patients
    - Can contact receptionist
    - Can fill the form of examinations
    - Can log out hic account

3. Receptionist
    - Can log in his account
    - Can add new patient
    - Can delete an existing patient
    - Can contact with patient
    - Can contact with doctor
    - Can change personal data of patient
    - Can add new doctor
    - Can delete an existing doctor
    - Can log out of his/her account

4. Pharmacy
    - Can log in its account
    - Can update their medicinal list
    - Can log out

2.3 Assumptions

It is assumed that most part of the actions taken are legally allowed.

It is assumed that information added about doctors and users is already verified.

It is assumed that the profile of the receptionist is already created by an administrator.

It is assumed that when writing the examination form of the patient the only person responsible for that is the doctor.

2.4 Constraints

Our project is constrained only by the Internet connection since we have decided for it to be a Web Application.
The Internet is needed for the connection with the database and also for the Map.

2.5 Dependencies

Our system is independent.
This means there is no dependency between the users in our Web application.

3. Requirements

3.1 Functional Requirements

The requirement numbering has a scheme –BR_##(BR for Business Requirement).
The following table is a format for requirements.

Req#	Requirement	Comments	Priority	Date	SME Reviewed/Approved
BR_01	The software should have different views and different functionalities for different user login ins.	Patient,Doctor, Clinic and Pharmacist should be different.	Doctor		
BR_02	A reCaptcha should be used to detect abusive traffic on our web application without any user friction. It returns a score based on the interactions with our website and provides the user more flexibility to take appropriate actions.	To verify that a user is not a robot,he should fill the reCaptcha.	Valid User		
BR_03	Every user should have different usernames ,passwords and valid passwords as well.	This can be achieved by hashing passwords before saving them in a database.	Password		
BR_04	The user can have the chance to edit the password .	This can be done by updating credentials in database and he can update only the password because its username is changed only by doctor.	Update		
BR_05	The clinic manages the doctors, and also the available rooms,while the doctor manages the pharmacist and	The clinic and doctors are responsible for Create,Read,Update and Write	Database Interaction		

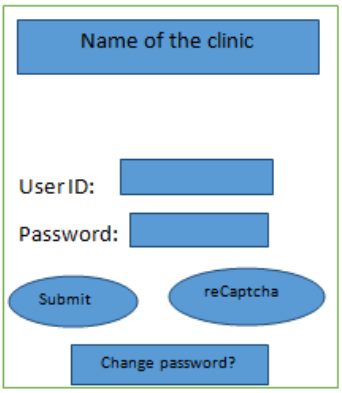
	the client.	functionalities .			
BR_06	The information entered by the doctor and the clinic for a specific user should be first validated.	It is important that all the information entered is accurate.	Information		
BR_07	The software should be able to generate an XML file which will contain all the records for a specific patient.	The records of a patient are written on a medical cartel.	Patient records ,XML file		
BR_08	The clinic checks which patient belongs to which doctor.Doctor checks which pharmacist is connected with him.	The doctor has the permission to create a medical visit record and make it visible for its patient as well.	Visit record		
BR_09	A patient can not edit its records .	The profile of a patient is on a read view.	Patient's profile		
BR_10	A patient can have a chat conversation with the doctor.	The patient can be able to contact the doctor and ask him for information without going to the clinic .	Communicatio n with doctor		
BR_11	A patient belongs to only one doctor ,he is not able to choose another doctor.	A patient has only to do with his family's doctor.	Doctor-Patient		
BR_12	The doctor can see all the records of a current patient .	He may need to analyze his previous examinations.	Medical cartel visible to doctor		
BR_13	The doctor can see the records of each client.	If the system is not working he may be able to edit the medical visit later.			

3.2 Non-Functional requirements

3.2.1 User Interface Requirements

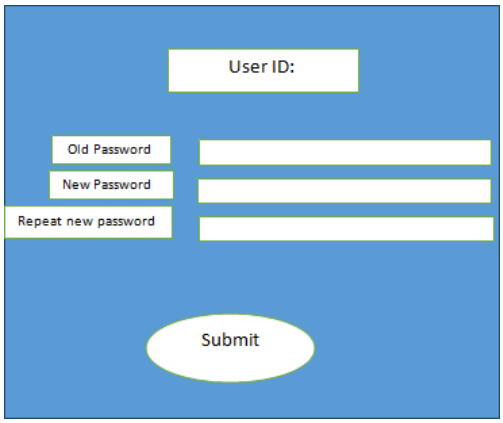
The user interface should be grouped in 5 main interfaces .

- Log In interface
    1. Enter your Mainframe User Id in the field labeled 'User'.
    2. Enter your Mainframe Password in the field labeled 'Password'.
    3. If you want to change your password, you should click inside the radio button located below these fields.
    4. Click the Submit Button or the reCaptcha to protect the user.



If your password has expired you will not be able to continue. The Change Password page appears automatically and you are given the opportunity to enter a new password. The message below appears on the Change Password page when your password has expired:
Steps to Change your password:

1. Enter your current Mainframe Password in the field labeled 'Old Password'.
2. Enter your New Mainframe Password in the field labeled 'New Password'.
3. Re-enter Your New Mainframe Password in the field labeled 'Repeat New Password'.
4. If the 'User ID' field appears, be sure to enter your mainframe user id. The 'User ID' field will appear if you have selected to change your password, but will not appear if you are changing an expired password.
5. Click the Submit Button.



- **Patient's interface**
    1. The header bar containing CMS logo,"Patient <Name><Surname> and a Menu Icon ☰ ,which when pressed shows all available menus.
    2. The menu Icon showing all the menus the user can access after logging in as a patient: Profile,Records,Contact Doctor ,Log Out.
    3. The "**Profile**"Menu will allow the user to see all his personal information saved in database.
    4. The "**Records**"Menu will show to the user medical visits and medical cartel created by the doctor.
    5. The "**Contact Doctor**"Menu will all allow the user to chat with the doctor.
    6. The "**Log Out**"will return the user to home page.

- **Doctor Interface**
    1. The header bar containing CMS logo,"Doctor<Name> <Surname>" and a Menu Icon ☰,which when pressed shows all available menus.
    2. The Menu Icon showing all the menus the user can access after logging in as a doctor: Profile,Examinations, Doctor's List,Add a Doctor,Search a Doctor,Log Out,Agenda.
    3. The "**Profile**"Menu will allow the user to see all his personal information saved in database.
    4. The "**Contact Doctor**"Menu will all allow the user to chat with the doctor.
    5. The "Examinations "Menu will show a list of the examinations of the current patient.This will be in a tabular form and when the examination is over the doctor presses the button'End of Examination'.The doctor can edit the patient information.
    6. The"**Patient's List**"Menu where the clinic could see a full list of the patients with their medical visit.
    7. The "**Add a Patient**"Menu allows the clinic to create a new user ,type patient.
    8. The "**Search a Patient**"allows the clinic to search for a specific patient.
    9. The "**Log Out**"will return the user to home page.
    10. The"**Agenda"**will contain the calendar of a doctor.

- **Clinic Interface**
    1. The header bar containing CMS logo,"Clinic<Name> and a Menu Icon ☰,which when pressed shows all available menus.
    2. The Menu Icon showing all the menus the user can access after logging in as a doctor: Profile,Doctor's List,Add a Doctor,Search a Doctor,Create a Visit,Log Out.
    3. The "**Profile**"Menu will allow the user to see all his personal information saved in database.
    4. The"**Doctor's List**"Menu where the clinic could see a full list of the doctors with their CV included.
    5. The "**Add a Doctor**"Menu allows the clinic to create a new user ,type Doctor.
    6. The "**Search a Doctor**"allows the clinic to search for a specific doctor.
    7. The "**Create a Visit**"Menu will see the doctor's agenda and will reserve an appointment.
    8. The "**Log Out**"will return the user to home page.

- **Pharmacist Interface**
    1. The header bar containing CMS logo,"Clinic<Name> and a Menu Icon ☰,which when pressed shows all available menus.
    2. The Menu Icon showing all the menus the user can access after logging in as a doctor: Profile,The Drug Recipe,Log Out.
    3. The "**Profile**"Menu will allow the user to see all his personal information saved in database.
    4. The "**Drug Recipe**"Menu will allow the pharmacist to see the recipe of the current patient uploaded by the doctor.
    5. The "**Log Out**"will return the user to home page.

3.2.2 Usability

Learnability

- Doctors and Clinic should be able to know how to use all the functions the software offers .
- Patients will have it easy to use because it resembles other web applications (log in),which is known world wide how to be used.

Efficiency

- Each operation will be executed in a real time.

Memorability

- The system is intuitive hence, it is not a problem if you 'vaguely remember' how to use it.
- If the user returns the application after some time. He able to understand on that page where he left or he may start again.

Errors

- How many errors user can face and how easily the server gets recover that errors that also impact on the users to the application.

Satisfaction

- How much user satisfied with using our application.

3.2.3 Performance

3.2.3.1 Capacity

A straightforward count of the number of requests from doctor, patient and the clinic at the same time ,that the application can process within a defined time interval. How quickly the system acknowledges a request as opposed to processing it. A database that is sufficiently robust to handle the application. Typically, a good application's database requires hardware three to four times more powerful than the application server hardware. It is good practice to use a separate machine for your database server.

3.2.3.2 Availability

The application will be available 24 hours per day ,every day.
The drug recipes should be available on the system when the patient is at pharmacy.
The medical visits should be visible at the time when the patient reserves an appointment to the doctor .

3.2.3.3 Latency

No latency.

3.2.4 Manageability/Maintainability

3.2.4.1 Monitoring

The system will be secured and reliable.
All the users can access the system 24/7 ,by monitoring the login form interactions for availability and performance. The system will have it easer to detect the problem .

3.2.4.2 Maintenance

The database will be build using MySQL and the server to execute it is APACHE.

If any problem occurs, the system should use a backup data in order not to allow any information to be lost .This is done by logs and text files .

3.2.4.3 Operations

- The application will be available to the user 24/7.
- The busiest time frames are 7 AM to 9 AM and from 4 PM to 8 PM ,even though these time frames may change according to different days.
- The information entered to the system shall be accessed only by the people who are previously registered to the system.
- Create ,Read,Update and Delete users.
- Create ,Read,Update and Delete examinations .
- Create periodic reports .
- Create drug recipe.
- Create periodic medical visit.
- Update periodic agenda .

3.2.6 Security

3.2.6.1 Protection

To protect the system from malicious or accidental access, modification, disclosure ,destruction, or misuse we will take the following precautions.

- Encrypt the most sensitive information such as passwords using hashing method to protect privacy .
- We will keep tract of the activity of each user, such that in case of error the user will be held responsible .
- The clinic is responsible for the personal data authenticity of the doctor he/she enters, hence the system is not responsible.
- The system will validate passwords, and each data for special characters and other specific conditions before inserting in the database.
- Each patient will see only the information related to him/her ..
- Each doctor will only see the data of every patient.

3.2.6.2 Authorization and Authentication factors:

- The Authorization and Authentication factors .
- The user authentication will be using username password and reCaptcha.
- Authorization will be based on the user type Each user will access only their information
- Using sessions for the currently logged user
- Using Cookies and PubCookie tool.

3.2.8 Standards Compliance

This project aims, after an overview of the health care system and welfare Albanian to examine, based on the current organizational structure of the same, what can be the possible improvements could be implemented in this area of fundamental importance to the national health department such as medical records being on paper and people waiting in long lines, we came up with the idea of creating a Web-based Application to digitalize the way the public hospitals in our country work.

Our project will be based on these main points:

• Leaving appointments online

• Keeping medical records of each patient in digital form

• Keeping records of emergency entries and hospitalizations

• Showing medical personnel timetables

• Agenda of each Doctor

• Drug Recipe

3.2.9 Portability

- The system will be web-based ;it will operate the same regardless of the operating system.
- The system will be programmed by using HTML,JavaScript ,CSS and PHP.

4. User Scenarios/Use Cases

Provide a summary of the major functions that the product will perform. Organize the functions to be understandable to the customer or a first time reader. Include use cases and business scenarios, or provide a link to a separate document (or documents). A business scenario:

- Describes a significant business need
- Identifies, documents, and ranks the problem that is driving the scenario
- Describes the business and technical environment that will resolve the problem
- States the desired objectives
- Shows the "Actors" and where they fit in the business model
- Is specific, and measurable, and uses clear metrics for success

Scenario 1: Patient login

1. Patient goes to the clinic
2. Receives his/her first treatment
3. Receptionist creates account
4. Provides patient with log-in information
5. The patient logs-in
6. Open his/her profile page

Scenario 2: Patient request

1. Patient logs-in
2. Clicks on home tab
3. Clicks on request an appointment
4. Selects day, treatment type and sends
5. Admin receives request
6. Manages request
7. Patient receives confirmation

Scenario 3: Patient views his profile

1. Client logs-in

2. Clicks on home tab
3. Checks his/her medical file

Scenario 4: Patient edits profile

1. Client logs-in
2. Goes to their profile page
3. Clicks edit
4. Clicks field to edit
5. Fills form
6. Submits

Scenario 5: Doctor registration

1. Doctor starts job at clinic
2. Provides admin with personal information
3. Admin creates account
4. Provides doctor with log-in information
5. The doctor logs-in
6. Checks his/her profile page

Scenario 6: Doctor edit

1. Doctor logs-in
2. Goes to their profile page
3. Clicks edit
4. Clicks field to edit
5. Fills form
6. Submits

Scenario 7: Doctor views his profile and agenda

1. Client logs-in
2. Clicks on home tab
3. Checks his/her agenda and profile

Scenario 8: Doctor can add/ edit patients' form of examinations

1. Doctor clicks on patients profile
2. Clicks on edit form
3. Submits

Scenario 9: Receptionist can create/delete/edit patient profile

1. Goes to user management tab
2. Clicks add/remove/edit patient
3. Fills form with obtained information
4. Submits

Scenario 10: Receptionist

1. Admin receives appointment request from client
2. Checks doctors which handle treatment type requested
3. Checks agenda of these doctors for available hours
4. Creates appointment

5. Notifies the patient

Scenario 11: Receptionist

1. Admin goes under user management tab
2. Selects/searches user
3. Opens his/her profile
4. Selects field to update
5. Fills form
6. Submits

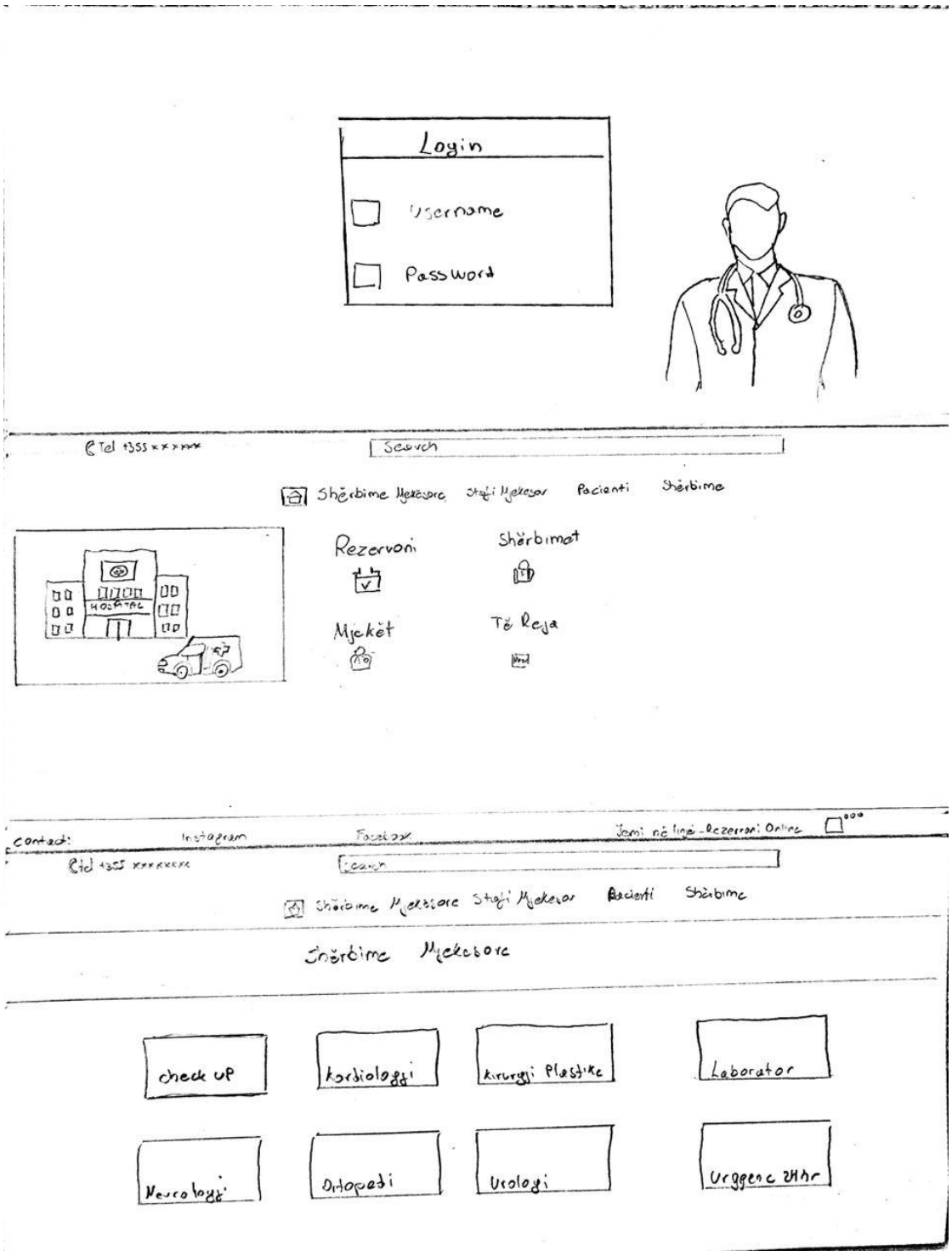
Scenario 12: Pharmacy log in

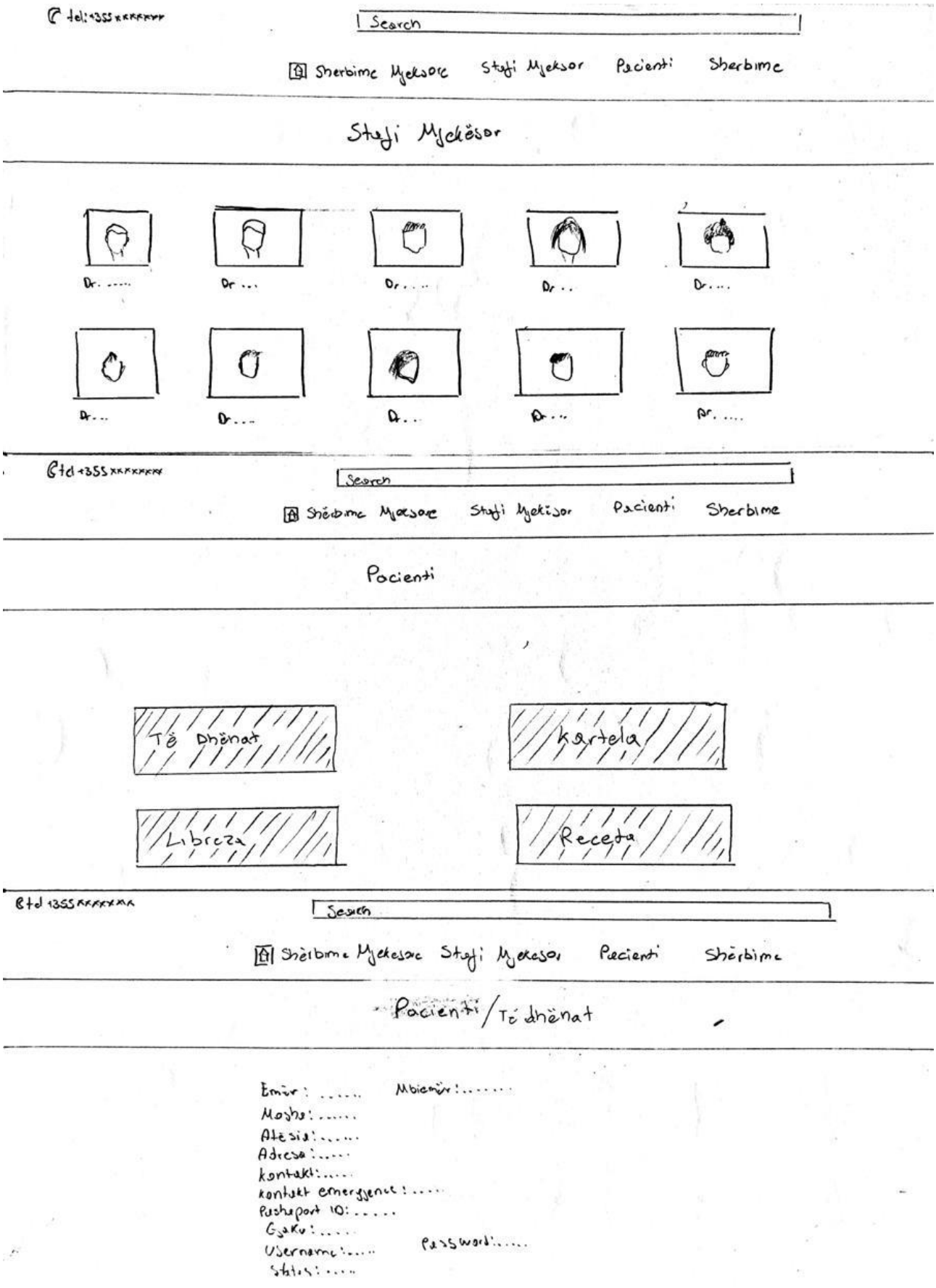
1. Pharmacy user logs in its profile
2. Pharmacy can add/remove/edit medicines in their list
3. Pharmacy can log out of its profile

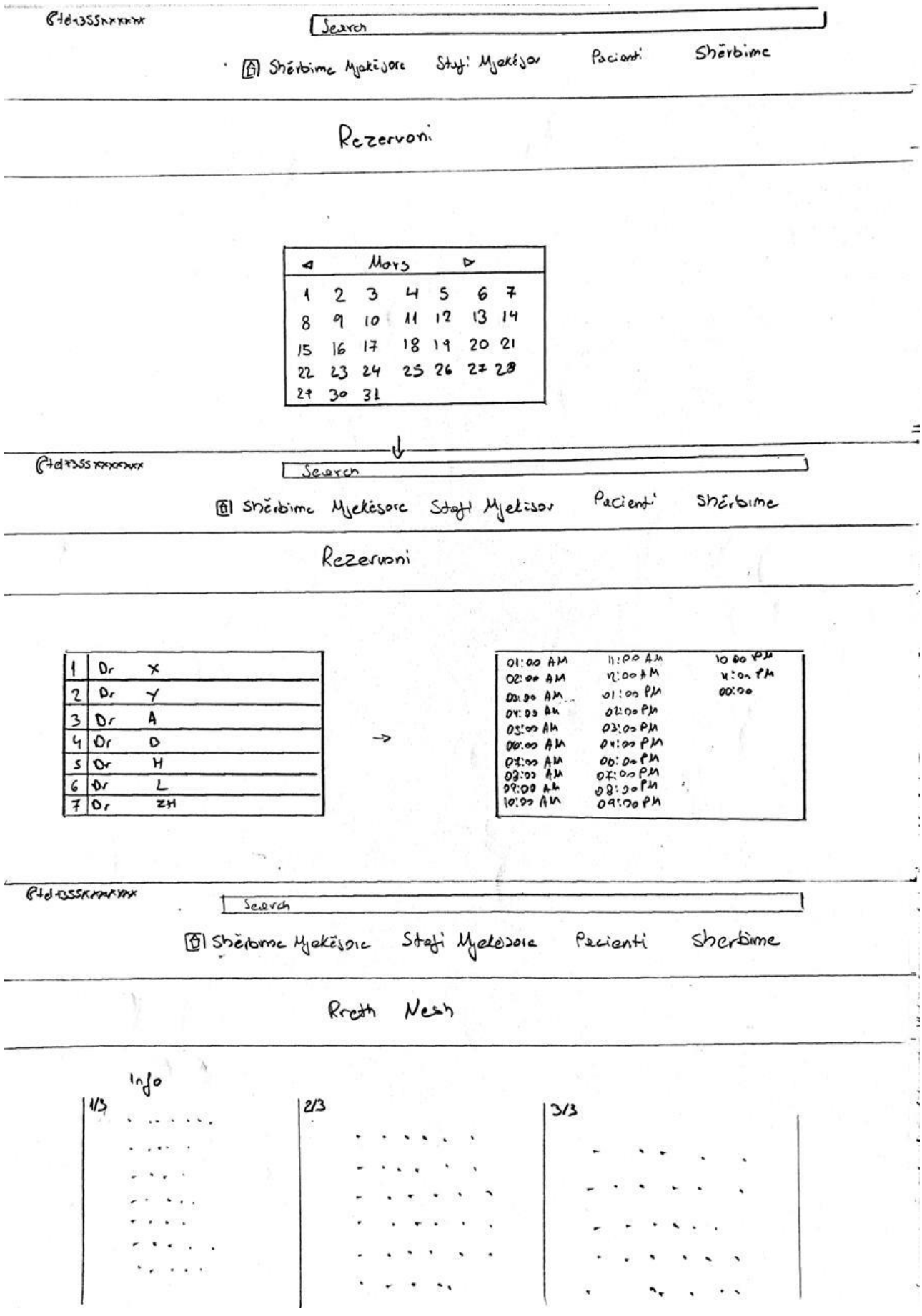
Use Case No.	1	2	3
Use Case name	Log-In	Request an appointment	Register a new user
Overview	Users have the rights to access the system and its functionality.	Patients are able to request an appointment	Admin can create accounts for doctors and users
Actors	Doctors,patients	Patient, Receptionist	Admin
Pre-conditions	Doctors/patients must have a valid username and a profile created before by the receptionist.	Patients should be registered and logged in.	Admin need to have some information about client/doctor
Scenario flow	1. Log-in form 2. User enters his username and password 3. System checks if username/password are valid 4. System displays users profile	1. Patients logs-in 2. Goes under Home view 3. Clicks request an appointment 4. Decides day and hour 5. Receptionist receives request and manages it	1. Admin goes under user management tab 2. Clicks add user 3. Fills form with information 4. Submits
Errors	->Invalid data -> Denied Access	->no available hours ->denied appointment ->postponed for another day	->already registered ->Failed registration
Post conditions	After Log-in has been made the user has access to the system.	After appointment is accepted and managed the client is notified	After registering a new user he/she is able to access their accounts

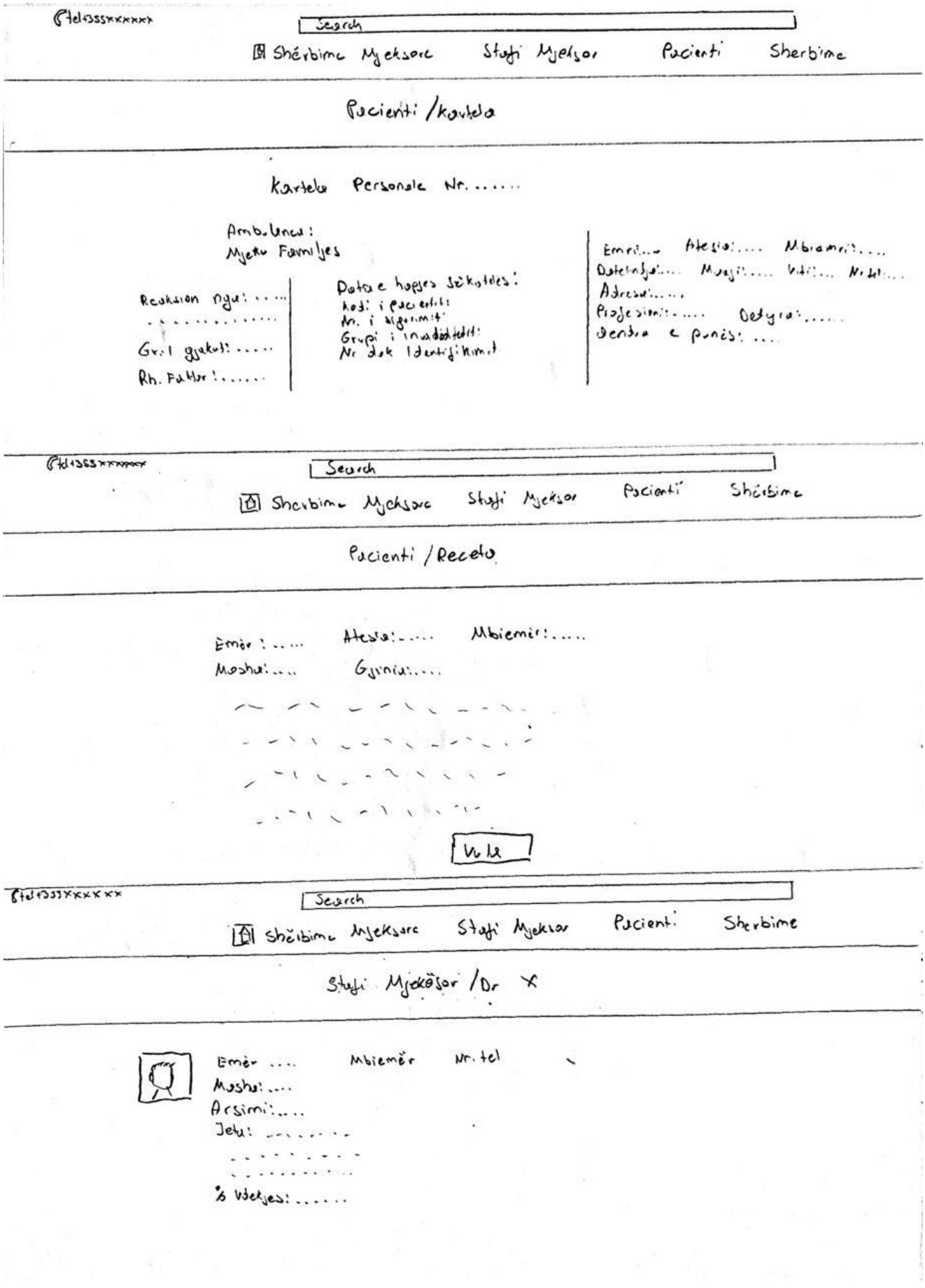
APPENDIX

Sketches




tel:+355 xxxxxxx
Search
Shërbime Mjekësor
Stafi Mjekësor
Pacienti
Shërbime
Stafi Mjekësor
Dr. .....
Dr ...
Dr. ...
Dr ..
Dr. ...
Dr...
Dr...
Dr...
Dr...
Dr. ....
tel +355 xxxxxxx
Search
Shërbime Mjekësor
Stafi Mjekësor
Pacienti
Shërbime
Pacienti
Të Dhënat
Kartela
Libreza
Receta
tel +355 xxxxxxx
Search
Shërbime Mjekësor
Stafi Mjekësor
Pacienti
Shërbime
Pacienti / Të dhënat
Emër: .....
Mbiemër: .....
Mosha: .....
Atësia: .....
Adresa: .....
kontakt: .....
kontakt emergjence: .....
Pashaport ID: .....
Gjaku: .....
Username: .....
Password: .....
Status: .....


Search
Shërbime Mjekësore
Stafi Mjekësor
Pacienti
Shërbime
Rezervoni
Mars
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
22 23 24 25 26 27 28
29 30 31
Search
Shërbime Mjekësore
Stafi Mjekësor
Pacienti
Shërbime
Rezervoni
1 Dr X
2 Dr Y
3 Dr A
4 Dr D
5 Dr H
6 Dr L
7 Dr ZH
01:00 AM
02:00 AM
03:00 AM
04:00 AM
05:00 AM
06:00 AM
07:00 AM
08:00 AM
09:00 AM
10:00 AM
11:00 AM
12:00 AM
01:00 PM
02:00 PM
03:00 PM
04:00 PM
05:00 PM
06:00 PM
07:00 PM
08:00 PM
09:00 PM
10:00 PM
11:00 PM
12:00
Search
Shërbime Mjekësore
Stafi Mjekësor
Pacienti
Shërbime
Rreth Nesh
Info
1/3
2/3
3/3


Tel+355xxxxxx
Search
Shërbime Mjeksore
Stafi Mjekësor
Pacienti
Sherbime
Pacienti / kartela
Kartela Personale Nr. .....
Ambulanca:
Mjeku Familjes
Emri:... Atesia:.... Mbiemri:....
Datelindja:.... Mosha:.... Gjinia:.... Nr.Tel:...
Adresa:.....
Profesioni:..... Qytet:.....
Qendra e punes: ....
Reaksion ngja: .....
Gr.i gjakut: .....
Rh. Faktor: .....
Data e hapjes sëkartelës:
kodi i pacientit:
Nr. i algorimit:
Grupi i invalidëtetit:
Nr dok Identifikimit
Tel+355xxxxxx
Search
Shërbime Mjeksore
Stafi Mjekësor
Pacienti
Shërbime
Pacienti / Receta
Emër: .....
Atesia: .....
Mbiemër: .....
Mosha: .....
Gjinia: .....
Vula
Tel+355xxxxxx
Search
Shërbime Mjeksore
Stafi Mjekësor
Pacienti
Sherbime
Stafi Mjekësor / Dr X
Emër ....
Mbiemër
Nr. tel
Mosha: ....
Arsimi: ....
Jeta: .....
% vdekjes: .....