REPUBLIC OF ALBANIA

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1. Executive Summary

1.1 Project Overview

Our project consists of a Web-based application for a Management System for Hospitals with its main points being leaving appointments online, keeping medical records for each patient in a digital form instead of on paper, how they are now, keeping records of hospitalizations and emergencies and also showing timetables for medical personnel.

The implementation of the idea will work closely with polyclinics by having access at their databases for patients they forward to our system. Polyclinic's doctors, which will have their own account in our system, will be the ones to leave appointments for their patients depending on the hospital doctor's timetable and also share the medical records of the patient with that doctor.

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. In addition the specialist doctor can send requests to the receptionist to reserve a bed to hospitalize a patient, if he sees it necessary after an appointment.

Also, in our system we will keep track of each doctor's timetable and display how the shifts are going to be. Besides doctors, higher ups in administrate will have their own accounts, where they can make changes in timetables, shifts and in personnel such as adding/removing doctors.

Receptionists will also have accounts but mostly of an observing nature, they won't be able to make any changes but only check timetables, inform patients on them but also add new entries for people who come for an emergency and choose beds for patients who will be hospitalized.

Nurses will have their own accounts, where they submit reports on the progress of the hospitalized patients.

In addition, the project will consist of a separate part for the emergency section of the hospital to hold records of when the patient comes, his basic personal information, what was his problem and which doctor attended to his needs. This information as we said will be added by the receptionists.

The project is intended towards public hospitals.

1.2 Purpose and Scope of this Specification

The purpose of our project is to facilitate the way the hospitals in our country work. The idea came while thinking about the numerous problems the health department faces such as people waiting in long lines and medical records getting lost and not being kept in order. Our Management System aims to remove such long lines by people leaving appointments at a specific time when the doctor is available and holding all records of patient activity in the hospital in digitalized form. Such activity includes not only appointments but also emergency entries, hospitalizations, shifts. Thus records will be less likely to get lost or get mixed up.

In scope:

- Modification of the way patient records are being kept in a hospital
- Modification of the way appointments at the doctor's office are reserved
- Modification of the way hospitalized patients' progress are kept
- Modification of the way the shifts are displayed
- Modification of the way emergency entries are kept

Out of scope:

- Modifications of the administrative part of the Hospital

2. Product/Service Description

2.1 Product Context

This project is about a Medical Management System available for hospitals. It is not an independent system because it has a accessible database with polyclinics, so it is depended on the polyclinic.

2.2 User Characteristics

In this project there are five types of users:

- Administrator
- Family Doctor
- Specialist Doctor
- Receptionist
- Nurses

a. Administrator

The administrator of our software will be created initially by the programmers. Afterwards, the account will be given to one of the top members of hospital hierarchy whom can be The Dean of the hospital or hospital Administrators. He/she will be in charge of scheduling of timetables. Also, another task of admin is adding or removing staff members such as : doctors ,receptionists and nurses.

b. Family Doctor

In this project the family doctor is not a member of the hospital. He/she is only needed to set appointments to the specialist doctor and along with it exports also the patients' medical history.

c. Specialist Doctor

The specialist doctor is the one that receives the appointments from family doctor. After checking the patient he/she can: fill a digital prescription, set the patient for further testing ,immediately send the patient to the emergency and also hospitalizing the patient. In addition, for every change in patients' medical history the specialist doctor will make the necessary updates and then send it to the family doctor.
In cases where the patient comes to emergency without being sent from family doctor, the specialist doctor in charge will create a new entry in that hospital, by completing the medical parts of his/her charts.
Finally, specialist doctor has the option to cancel any of his/hers appointment.

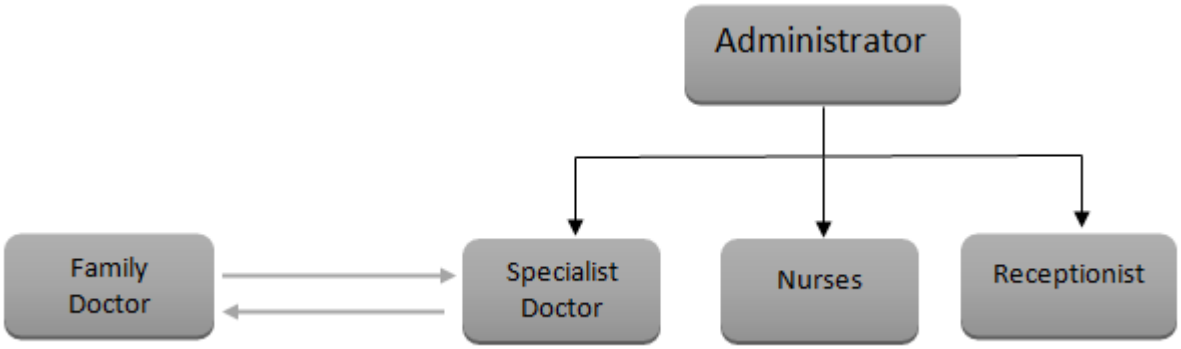
d. Receptionist

Receptionists' job is to access the doctors' timetables and to create a new entry in emergency room by fulfilling on the patient credentials.

e. Nurses

The nurses are divided in different departments. They are in specialist doctors' supervision and can also fulfill the patient records for some conditional cases. Their responsibilities are set by the specialist doctor in charge and can only complete the given tasks such as: taking tests from a patient, making sure the medicine is given at the right time and amount etc.

Here is a diagram on how these users are connected with each-other:



2.3 Assumptions

- It is assumed that everything is done according the law.
- It is assumed that the doctors insert properly the patients' diagnoses and prescription.
- It is assumed that the timetables of hospitals' staff are set properly.
- It is assumed that doctors are coordinated in schedules for emergency.
- It is assumed that a patient knows the time of the appointment.

2.4 Constraints

- A management system should be implemented at polyclinics too

- Access to polyclinics' databases is a must (will be done using XML)
- Patients should have medical records at the corresponding polyclinic
- Patients should go to polyclinic first and then forwarded to us if necessary
- Only the doctor and nurse attending to a patient can have access to that patient's records
- Only higher ups in the hospital can make changes such as add/remove staff, change timetables and shift schedules
- Receptionists can only see timetables but cannot make any changes
- Each doctor should have a PC in his/her office
- Internet connection should be stable and available at all times

3. Requirements

3.1 Functional Requirements

The requirement numbering has a scheme - FR_## (FR for Functional Requirement).

Req#	Requirement	Comments	Priority	Date Rvwd	SME Reviewed / Approved
FR_01	The web application has different views for each type of user, each one of them having different functionalities accordingly.	- A view for family doctors - A view for specialist doctors - A view for the receptionist - A view for nurses - A view for the administrator			
FR_02	All the accounts for each type of user are secured with a password.	The password is stored in the database by firstly hashing it, so that only the user knows it.			
FR_03	Each user will be uniquely identifiable by his/her own id.	It guarantees that each user is uniquely identifiable (no two users have the same id, thus no ambiguity).			
FR_04	Admin can add, remove or edit doctors, receptionists and nurses, as well set the timetable for each one of them.	Admin is the only user responsible for updating or editing users such as: doctor, receptionist and nurse.			

Req#	Requirement	Comments	Priority	Date Rvwd	SME Reviewed / Approved
FR_05	Admin has restricted access to all patients' records.	Admin has no right to have sensitive information about any of the patients.			
FR_06	All the patients' profiles that are added by the doctor or the receptionist have to obey the validation rules determined by the system itself.	Every attribute that is inserted into the database must strictly stick to the rules previously set.			
FR_07	Only the family doctor is able to set appointments for patients.	The family doctor is the only user that has the right to set appointments.			
FR_08	Each specialist doctor has the right to cancel his/her appointment.	If the doctor can't reach the time set for an appointment for different reasons, he is able to cancel it.			
FR_09	Once the specialist doctor cancels a patient's appointment, the patient is notified about this fact by email.	An email is sent automatically when the appointment has been cancelled.			
FR_10	The family doctor must export the anamnesis of the patient whom he/she is making an appointment for.	This is a must, because otherwise there won't be any information about the patient in the system.			
FR_11	After updating the anamnesis of a patient, the specialist doctor has to export the generated format of the anamnesis back to the family doctor.	For every change in the anamnesis of a patient, the specialist doctor has to inform the family doctor.			
FR_12	Receptionist can only add personal information when creating a new entry for a patient that comes to the emergency department.	Receptionist fills in the formalities for each new patient that comes in the emergency.			

Req#	Requirement	Comments	Priority	Date Rvwd	SME Reviewed / Approved
FR_13	The specialist doctor at the emergency department adds a new patient after examining him/her.	The specialist doctor has the right to add a new patient, when in emergency department.			
FR_14	Receptionist has restricted access to all patients' records.	Receptionist has no right to have sensitive information about any of the patients.			
FR_15	The system generates automatically reports for statistical purposes.	Reports, such as for number of patients in a special department in a month, types of most faced medical diagnosis, etc. are generated in PDF format.			
FR_16	Admin is the only one who can access the automatically generated reports for statistical purposes.	All others users don't have any access to the reports.			
FR_17	Admin can search doctors, nurses and receptionists without any limitation, but not patients.	Getting information for doctors, nurses and receptionists, but not for patients (ethical issues).			
FR_18	Admin can search the timetables for the doctors that stay in the emergency department.	Search for the doctors who have the shift at the emergency department.			
FR_19	When doctors are logged in, they can search only their patients.	Ethical reasons because of the confidentiality of the information for all other patients that this doctor has no relation to.			
FR_20	The receptionist can search the timetables and get information for the availability of a specialist doctor and also for the doctors at the emergency department as well.	Search the doctor's appointments and the doctors who are at the emergency department.			

Req#	Requirement	Comments	Priority	Date Rvwd	SME Reviewed / Approved
FR_21	The specialist doctor has a dedicated page where they can view the hospitalized patients.	This page will contain the ID, name, surname, room and also information on the patient's records and his/her progress written by the nurse.			
FR_22	The receptionist assigns the room and bed to the patient waiting to be hospitalized.	When the specialist doctor makes a room request the receptionist views the rooms' availability for that specific department and assigns one to that patient.			
FR_23	The receptionist can search for a hospitalized patient in order to find his/her room during the visiting hours.	Using name/surname/ID of a patient the receptionist can easily find in which room the patient is.			
FR_24	The nurse can search for a patient that is assigned to her (that is in her department).	Using name/surname/ID of a patient the nurse can easily find that patient.			
FR_25	The specialist doctor sends a request for hospitalization whenever he/she considers it necessary for the patient's case.	The specialist doctor makes the request for hospitalization and the nurse proceeds later with assigning the room.			
FR_26	Nurses have restricted access to the patients' records that are not in their department.	Nurses have no right to obtain sensitive information about any of the patients that don't belong to their department.			

3.2 Non-Functional Requirements

3.2.1 Product Requirements

3.2.1.1 Usability Requirements

- The software is very user-friendly which makes it very easy to work with.
- On the first log in each user will have small tips on how the system works and what it provides.
- Admin will be the only person that can register staff members. The system has the right instructions to make this step easier.
- After registration, admin has no more clearance to access any of doctors or receptionists credentials.
- After changing the given password, nurses, receptionists and doctors are the only ones with access to their accounts.
- The system is conceptualized to be easy to learn and to use.

3.2.1.2 User Interface Requirements

The user interface of the web-based application will be executable to browsers like Chrome and Mozilla. Before entering the system each of our users: admin,nurse, receptionist or doctors, will face each a login interface where he/she must provide the medical ID and password. After this step each user, will be sent to his/hers own appropriate view.

- Admin will have a view of a table of all medical specialties in the hospital with corresponding doctors and two buttons to Add/Remove doctors.
- Receptionist will have an interface where he/she can view the doctors timetable.
- Doctors will have a view of his/hers timetable, the hospitalized patients and an interface where he/she can complete a prescription for each patient.
- Nurse will have a view of all hospitalized patients and a module of all tasks(medications / tests) given by the specialist doctor for each patient.

3.2.1.3 Efficiency Requirements

3.2.1.3.1 Performance Requirements

- The software will be based on web and has to be run from a web server.
- The software shall support all the workers in the hospital who must have access in the system at any time.
- The software will take initial load time depending on internet connection strength which also depends on the media from which the product is run.
- The performance will depend upon hardware components of each user.
- Registration of data for each entity shall be processed in a few milliseconds

3.2.1.3.1.1 Capacity

This project with require constantly export and import of patients data between different databases. This process will most probably increase the time of execution and maybe will make a queue of requests and responds from the database.

3.2.1.3.1.2 Availability

- The software will be active and utilized 24 hours on every day of the week.
- Since the project is built up on a specific hospital, the geographic coverage area of the software will be only inside the hospital.
- The system is made to decrease the lines of wait in hospitals so each patient must have scheduled an appointment in correct procedures. The unscheduled patients can only be accepted in emergency department.
- The system is not available on patients.
- The system will be reliable because the failures would cause unwanted queues.

3.2.1.3.1.3 Latency

The project is based on internet connection so the most common problem that would cause delays will be the internet latency.

3.2.1.4 Manageability/Maintainability Requirements

3.2.1.4.1 Monitoring

The best will be done by our team to have a reliable and robust system, but there can be unexpected cases when the application malfunctions (due to bugs; attacks; etc). To make sure that these cases will not happen we will be in continuous discussion with our supervisor and tester.

3.2.1.4.2 Maintenance

MySQL is used for maintaining the database and the Apache server takes care of the site. In case of a failure, a re-initialization of the program is recommended. If it is not the case, that means that the server may be down, so the user needs to wait for the system administrator to start the server.

For emergent cases of breakdown, we will provide the software with the backup of the web application and the database. The application shall be easy to extend. The code shall be written in a way that it favors implementation of new functions and additions of new lines of code. Also, modularity in the organization provides for a better maintenance.

3.2.1.4.3 Operations

Some normal and special operations required by each user are:

- Admin
  - Register of doctors and receptionists and log in
  - Add/Remove doctors
  - Add/Remove receptionists
  - Update his own profile
  - Set timetable for all staff
  - Access automatically-generated reports

- Receptionist
  - Log in
  - Update his/her own profile
  - Add new entry in emergency
  - Views the timetables

- Family doctor
  - Log in
  - Export current patient anamnesis to the specialist doctor
  - Import his patient anamnesis from the specialist doctor
  - Update his/her own profile
  - Set appointments

- Specialist doctor
  - Log in
  - Import anamnesis of a patient from family doctor
  - Export anamnesis of that patient to the family doctor
  - Update the patient anamnesis
  - Complete the register of that day
  - Update his/her own profile
  - Add patient in case of emergency
  - Search a patient
  - Cancel an appointment

- Nurse
  - Log in
  - Change him/her credentials
  - Search a patient
  - Add data to a patient condition
  - Complete the required medication for each patient

3.2.1.5 Dependability Requirements

- "Ministry of Health and Social Protection" should implement a completely functional management system in polyclinics first, before implementing our system in hospitals
- We need continuous access to polyclinics' databases. We can't treat a patient without importing his medical records first from polyclinics. This is done by the corresponding clinic's doctor forwarding it to us when leaving an appointment for a patient at our hospital

3.2.2 Organizational Requirements

3.2.2.1 Environmental Requirements

By the administrative point of view, every document such as: patient's personal info, prescriptions, anamnesis, etc. must be imported and obtained by the family doctor from the

polyclinic's system into our system, because otherwise it can't be proceeded with other phases of medication by the doctors of other specialties. Of course the polyclinic's system must take into consideration that all other legal and ethical issues concerning confidentiality for patient's sensitive information aren't exploited.

3.2.2.2 Data Management Requirements

- The data that this application will deal with varies from personal information of the patient, to specific and detailed medical records.
- Rules are set to access and maintain this data. Depending in the user's level of accessibility, the range of access will vary from basic data, like appointments timetable, to full and specific medical data.
- To maximize data management performance, data entities and their relationships will be well defined.
- Since this application will deal with large set of data, the frequency of data usage with be of high levels, so this system will guarantee firm stability.

3.2.3 External Requirements

3.2.3.1 Security Requirements

Knowing that this application will deal with sensitive data, is of primary obligation to assure the safety and inviolability of the datasets.

- Login authentication is the first step that protects the system from unauthorized access. Every user will have his/her own username and password, stored in a secure database. Depending in the user's category, the access in system's data, modalities and functions are restricted. This means that a user cannot use this system outside of his/her work scope.
- The data that will be stored in this system are of most sensitive, including individual and medical records for each and every patient. Under the privacy policy, the dataset will be encrypted, safe from unauthorized usage and stored for unlimited period of time.

The methods that will be used to insert and store data in the database, will assure stability, check data integrity and prevent injections from inside or outside of the system.

4. Software Design/Diagrams

4.1 User Scenarios (General)

Nr.	User Story Name	Description
1.	Admin logs in	Using ID and password to access the system, admin logs in.
2.	Views Doctors, Nurses, Receptionists and Emergency Staff	Admin can view doctors and nurses according to specific departments, receptionists and their shift and emergency staff as well.
3.	Edits each type of user	Admin can edit and update personal information about doctors, nurses and receptionists.
4.	Removes/Deletes each type of user	Admin can remove each type of user from the system/database.
5.	Adds new user	Admin is the only user that can add a new user (doctor, nurse, receptionist).
6.	Sets the timetable	Admin is the only user that sets the timetable for doctors, nurses and receptionists.
7.	Views monthly reports	Admin is the only user that can view monthly reports.
8.	Searches doctors, nurses and receptionists	Admin can search by ID, name, surname or department each doctor or nurse and by ID, name or surname the receptionists.
9.	Admin signs out	Admin signs out from the system
10.	Specialist doctor signs in	User provides ID and password and signs in.
11.	Specialist doctor adds new appointment	User leaves an appointment for the patient at a specific time
12.	Specialist doctor finishes appointment	User fills a form on how the visit went and this is added to the patient's medical records

13.	Specialist doctor cancels appointment	User has an emergency and cancels the appointment
14.	Specialist doctor checks patient records	User sees all the patients records including all his visits, analysis, prescriptions etc.
15.	Specialist doctor checks patient progress	User sees all the patients' progress since he was hospitalized based on what the nurse has written
16.	Specialist doctor sends request for hospitalization	User sends request for bed to the receptionist
17.	Specialist doctor edits patient information and medical records	User changes the medical records of a patient based on the visit or analyses the patient did at the hospital
18.	Specialist doctor deletes a patient	User deleted a patient from the database
19.	Specialist doctor searches for a patient	User searched by ID, name or surname a patient
20.	Specialist doctor edits his own profile	User edits his basic information on his profile page
21.	Specialist doctor adds new patient	User adds new patient in case of emergency
22.	Specialist doctor signs out	User signs out of the system
23.	Family doctor signs in	User inserts credentials to access the system
24.	Family doctor creates appointments	User inserts patient's general and medical data and sets date and time for the appointment.
25.	Family doctor imports/exports Data	User imports or exports data from hospital's database and clinic's database.
26.	Family doctor signs out	Family doctor signs out of the system
27.		
28.		

4.2 User Scenarios (Detailed)

Scenario 1_10_23_27_# → User signs in

- User enters ID
- User enters password
- If ID and password match, user is signed in
- Else user must re-enter them

Scenario 2 → Admin views Doctors, Nurses, Receptionists and Emergency Staff

- Provided that the admin is signed in
- Views information about which nurse and doctor is assigned to which department
- Views information about the receptionists and their shifts
- Views information about the staff that is part of the emergency department
- Admin signs out

Scenario 3 → Admin edits each type of user

- Provided that the admin is signed in
- Clicks on the button “Edit”
- Edits and changes profile information of the users
- Clicks “Save” button
- If data is entered according to validation rules then changes are saved
- Else changes have to be performed correctly from the beginning
- Admin signs out

Scenario 4 → Admin deletes each type of user

- Provided that the admin is signed in
- Clicks on “Remove” or “Delete” button located beside each type of user
- Is asked whether being sure about the deletion of that user
- If clicks “Yes” that user is deleted from the database
- Else (if “No” is clicked) no changes are performed (user isn’t removed)
- Admin signs out

Scenario 5.1 → Admin adds new user (Receptionist or Family Doctor)

- Provided that the admin is signed in
- Clicks on “Add new user” button
- Clicks on the combo box “Staff”
- Selects the “Receptionist” or “Family Doctor” option
- A form that contains: ID, Name, Surname, Password, Email, Phone Number is shown.
- Admin enters the data
- If data is entered accordingly and correctly then when “Add” button is clicked the user is created in the system and added to the database as well
- Else data must be re-entered once again from the beginning
- If “Cancel” button is clicked then the fields that were entered are reset automatically and nothing is saved
- Admin signs out

Scenario 5.2 → Admin adds new user (Specialist Doctor)

- Provided that the admin is signed in
- Clicks on “Add new user” button
- Clicks on the combo box “Staff”
- Selects the “Specialist Doctor” option
- A form that contains: ID, Name, Surname, Password, Specialty, Email, Phone Number and Office Number is shown.
- Admin enters the data
- If data is entered accordingly and correctly then when “Add” button is clicked the user is created in the system and added to the database as well
- Else data must be re-entered once again from the beginning
- If “Cancel” button is clicked then the fields that were entered are reset automatically and nothing is saved
- Admin signs out

Scenario 5.3 → Admin adds new user (Nurse)

- Provided that the admin is signed in
- Clicks on “Add new user” button
- Clicks on the combo box “Staff”
- Selects the “Nurse” option
- A form that contains: ID, Name, Surname, Password, Department, Email, Phone Number is shown.
- Admin enters the data

- If data is entered accordingly and correctly then when “Add” button is clicked the user is created in the system and added to the database as well
- Else data must be re-entered once again from the beginning
- If “Cancel” button is clicked then the fields that were entered are reset automatically and nothing is saved
- Admin signs out

Scenario 6.1 → Admin sets the timetable (Nurse or Receptionist)

- Provided that the admin is signed in
- Clicks on the “Set the timetable” button
- Selects the “Nurse” or “Receptionist” option
- Then on the combo box “Nurse” or “Receptionist” selects one of the names available
- A two-column table is shown: the first column contains the days of the week, while the second one contains combo boxes where the shift number must be selected
- After selecting the shift for all the days of that week then the “Save” button is clicked and the data is saved to the database
- Else if “Cancel” button is clicked then the options that were selected are reset automatically and nothing is saved
- Admin signs out

Scenario 6.2 → Admin sets the timetable (Specialist Doctor)

- Provided that the admin is signed in
- Clicks on the “Set the timetable” button
- Selects the “Specialist Doctor” option
- Then on the combo box “Specialist Doctor” selects one of the names available
- A two-column table is shown: the first column contains the days of the week, while the second one contains two check boxes describing the working hours: one dedicated to Visits and the other dedicated to the Duty Call when in the Emergency Department
- When selecting Visits two options are shown to be checked: either the first shift (08:00-14:00) or the second shift (14:00-20:00)
- After selecting Duty Call or Visits or both of them then the “Save” button is clicked and the data is saved to the database
- Else if “Cancel” button is clicked then the options that were selected are reset automatically and nothing is saved
- Admin signs out

Scenario 7 → Admin views monthly reports

- Provided that the admin is signed in
- Clicks on “View Monthly Reports” button
- A table shows the number of hospitalizations, visits and emergency cases of specific departments for that month
- Clicks on “Download as PDF” button
- A PDF file containing the same information as in the table is downloaded
- Admin signs out

Scenario 8 → Admin searches Doctors, Nurses and Receptionists

- Provided that the admin is signed in
- Enters ID, name, surname or department at the search field
- Clicks on “Search” button
- Information related to that ID, name, surname, or department is shown, provided that the entered word exists anywhere in the database except for the patient’s data
- Else “No information found” message is shown
- Admin signs out

Scenario 11 → Specialist doctor adds new appointment

- User clicks on the button “New” in the page Home
- User completes the form that is shown after clicking
- User clicks “Add”
- If form fields are not completed correctly, user must recomplete it
- If form fields are completed correctly, new appointment is created

Scenario 12 → Specialist doctor finishes appointment

- User has appointment with patient
- User clicks on the button “Finished” allocated in the right side of the appointment entry in the table shown in the page Home
- User fills the form with the needed information
- User clicks “Save”
- If form fields are not completed correctly, user must recomplete it
- If form fields are completed correctly, the information for this visit is saved

Scenario 13 → Specialist doctor cancels appointment

- User clicks the button “Cancel” allocated in the right side of the appointment entry in the table shown in the page Home
- User asked if he/she is sure about the cancelation
- User clicks “Yes”
- Appointment is canceled

Scenario 14 → Specialist doctor checks patient records

- User goes to “Patient” page in the menu allocated on the top of every page
- User clicks the button “Records” allocated in the right side of the patient entry in the table with patient data

Scenario 15 → Specialist doctor checks patient progress

- User goes to “Hospitalized” page in the menu allocated on the top of every page
- User clicks the button “Progress” allocated in the right side of the patient entry in the table with patient data

Scenario 16 → Specialist doctor sends request for hospitalization

- User has appointment with patient
- User finishes appointment with patient
- User clicks on the “Finish” button allocated in the right side of the appointment entry in the table shown in the page Home
- User completes the form that will appear after clicking “Finish”
- User checks “Yes” at “Request for bed” at the end of the form
- User clicks “Save”

Scenario 17 → Specialist doctor edits patient information and medical records

- User clicks on the “Patients” button in the menu allocated on the top of every page
- User is redirected to a page containing a list of all patients
- User clicks on the button “Edit” allocated in the right side of the patient entry in the table shown in the page Patients
- User adds or edits the patient’s medical records
- User clicks “Save”

Scenario 18 → Specialist doctor deletes a patient

- User clicks on the “Patients” button in the menu allocated on the top of every page
- User is redirected to a page containing a list of all patients
- User clicks on the button “Delete” allocated in the right side of the patient entry in the table shown in the page Patients

- User asked if he/she is sure about the deletion
- User clicks “Yes”
- User is deleted

Scenario 19 → Specialist doctor searches for a patient

- User writes what he is searching for in the search input field allocated in every page
- User is shown a list of all entries that contain his search keyword
- If there is nothing found, user is shown a message telling him that

Scenario 20 → Specialist doctor edits his own profile

- User clicks on the “Profile” button in the menu allocated on the top of every page
- User is redirected to a page containing its profile
- User clicks “Edit”
- User changes his data
- User clicks “Save”
- If data in the forms is not edited correctly(not in accordance to the form conditions), user must recomplete it
- If data in the forms is edited correctly, user profile is updated

Scenario 21 → Specialist doctor adds new patient

- User clicks on the button “New” in the page Patients
- User completes the form that is shown after clicking
- User clicks “Add”
- If form fields are not completed correctly, user must recomplete it
- If form fields are completed correctly, new appointment is created

Scenario 24 → Family doctor creates Appointment

- User presses “Create Appointment” button
- Inserts general data of the patient
- Uploads digital medical prescription
- Saves the records by pressing “Save” button
- If some data is missing, the system will notify the user to re-enter missing data
- If save is successful, it redirects to “Select Ward” page
- User selects a ward from a list given by the combobox “Select Ward”
- After the selection is made, a timetable with available and non-available time schedule will appear
- User selects a free slot time schedule, as the patient indicates
- The label “Select date” will be updated with the selected date and time

- The user presses “Confirm Appointment” to confirm the appointment
- If successful, a pop up message will appear that notifies and redirects the user to homepage

Scenario 25 → Family doctor imports/exports Data

- Press the button “Import/Export Data” to redirect there
- User insert patient’s ID to search for patient data
- If unsuccessful, a message will appear: “No data found”
- If data found, a message will appear: “Patient found” and a table with patient’s data will appear
- By pressing “Import” or “Export” button, the user will upload or download the medical record of the patient

Scenario 9_22_26_#_# → User signs out

- Provided the user is signed in
- User clicks the button “Sign out” allocated at the top-right corner of every page
- User is signed out of the system

4.3 Use Cases

Use Case 1_10_23_27_#

Name	Sign in
Summary	User enters the system by providing genuine credentials
Actor	Admin, Family Doctor, Specialist Doctor, Nurse, Receptionist
Description	User provides ID and password
Precondition	User must have an existing account
Alternatives	The same user can sign in only once at a time
Post condition	User enters the system

Use Case 2

Name	View Staff
Summary	Admin views Doctors, Nurses, Receptionists and Emergency Staff
Actor	Admin
Description	Admin can view each doctor, nurse according to departments and also receptionists with their respective shifts as well as the staff attending to the emergency department
Precondition	Admin is signed in
Alternatives	Information on patients cannot be provided to the admin
Post condition	Staff information is displayed

Use Case 3

Name	Edit users
Summary	Admin edits each type of user
Actor	Admin
Description	Admin edits and changes profile information of the users and if data is entered according to validation rules then changes are saved
Precondition	Admin is signed in
Alternatives	
Post condition	Changes that have been made are updated in the database

Use Case 4

Name	Delete users
Summary	Admin deletes each type of user

Actor	Admin
Description	Admin clicks on “Delete” button located beside each type of user and after that is asked whether being sure about the deletion of that user; when clicking “Yes” that user is deleted from the database, else user isn’t removed
Precondition	Admin is signed in and that specific user exists
Alternatives	
Post condition	Deleted user doesn’t exist anymore

Use Case 5

Name	**Add new user**
Summary	Admin adds new user
Actor	Admin
Description	Admin after clicking on “Add new user” button selects a type of user and accordingly fills in the form of that specific user. If data is entered correctly then when “Add” button is clicked the user is created in the system and added to the database as well
Precondition	Admin is signed in and that user doesn’t exist
Alternatives	No two users with the same ID should exist
Post condition	New user is created

Use Case 6

Name	**Set the timetable**
Summary	Admin sets the timetable

Actor	Admin
Description	Admin selects a user: if nurse or receptionist admin assigns a shift number for each day of the week, if a specialist doctor admin selects visits and the shift and/or the duty call (emergency) option and saves the changes
Precondition	Admin is signed in
Alternatives	
Post condition	The timetable is set

Use Case 7

Name	**View monthly reports**
Summary	Admin views monthly reports
Actor	Admin
Description	Admin after clicking on “View Monthly Reports” button can view a table with the number of hospitalizations, visits and emergency cases of specific departments for that month. When clicking on “Download as PDF” button, a PDF file containing the same information as in the table is downloaded
Precondition	Admin is signed in
Alternatives	
Post condition	Information on different auto-generated reports is displayed

Use Case 8

Name	**Search Staff**
Summary	Admin searches Doctors, Nurses and Receptionists
Actor	Admin
Description	Admin enters ID/name/surname/department at the search field. When clicking on “Search” button information related to that

	ID, name, surname, or department is shown, provided that the entered word exists anywhere in the database except for the patient's data
Precondition	Admin is signed in
Alternatives	
Post condition	Information on the searched term/words is displayed

Use Case 24

Name	**Create Appointment**
Summary	User inserts patient's general and medical data and sets date and time for the appointment.
Actor	Family Doctor
Description	User inserts patient's general data, uploads medical prescriptions .Save those data and after selects Hospital Ward and sets date and time for the appointment.
Precondition	User must be logged in
Alternatives	
Post condition	Appointment is set and patient's data are stored in the system.

Use Case 25

Name	**Import/Export Data**
Summary	User imports or exports data from hospital's database and clinic's database.
Actor	Family Doctor

Description	User searches for patient's data in the system. After the data are found, user imports or export updated medical records of the patient from the clinic's database or the hospital's database.
Precondition	User must be logged in. Patient data must exist within the system.
Alternatives	
Post condition	Medical records of the patient are updated and exchanged between hospital and clinic.

Use Case 9_22_26_#_#

Name	**Sign out**
Summary	User clicks "Sign out" button and is signed out
Actor	Admin, Family Doctor, Specialist Doctor, Nurse, Receptionist
Description	User clicks button "Sign out" at the top-right corner of current page
Precondition	User must have been signed in
Alternatives	When the user closes the browser it is automatically signed out
Post condition	User is signed out of the system