Caduceus System

Hospital Management System

Requirements Specification

April 6, 2016

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# Executive Summary

* 1. ***Project overview***

We are all humans; we will need for sure that one day to visit the hospital so all as can tell that hospitals in our lives play a very essential part. They provide medical treatments to people suffering from various diseases which come from different conditions such as wounds, climatic conditions, different trauma, stress or many others. The hospital has various stocks of pharmaceutical drugs and medical equipments used for treating their patients. The hospital is government-funded. Patients are considered those who are admitted to the hospital and hospitalized until their complete recovery, but also those who just go for a visit and receive a simple prescription.

The hospital is separated into different wards that are specialized to treat the respective afflictions, such as heart problems, neural complications, skin diseases and many others. To record and keep track of all these records is unreliable; it also isn’t economically efficient to maintain these records on paper. In Albania, the government-funded hospital also suffer from a severe lack of automation and proper archiving of these patients’ records of their stay or experience in the hospital. Therefore this system is designed to rectify this problem and simplify the archiving of medical examinations and admissions in these hospitals.

* 1. ***Purpose and scope of this specification***

The purpose of this specification is to outline the complete and detailed list of requirements concerning the development of the Caduceus System, a hospital management software. These requirements were elicited by the group EvoSoft. The specification provides detailed accounts of the functional and non-functional requirements in accordance with the conditions placed upon by the client, a staff member of QSUT

In Scope:

* Complete management of room assignment of patients and doctors.
* Hospital employees management by the Human Relations manager.
* Tracking of hospital inventory drugs and equipment.

Out of scope:

* Interfaces and functionalities for other staff members, such as hygiene staff, guards or hardware maintenance staff.
* Inter-hospital communication and coordination. This system can only be applied on one hospital at a time and does not support a network of hospitals.

# Product Description

In most private hospitals procedures are more ordered and patient handling or medical staff assignments are conducted more efficiently but the opposite is true in public hospitals. Many patients come every day and in any second the place can be full of people waiting without proper care, not knowing where to go. Doctors rarely keep very precise records since they deal with many patients in row and it is hard for them to remember all of them and keep records for each of them in written form. It even happens that these records might be lost in the huge stack of physical records. The service we intend to offer will help doctors keep track of their patients and ease their job. Patients will be lead to their specific doctor, according to their illness, in an instant. Patients, from their lack of possibility to go to the same hospital, can enter to the system in its own page and download his/her medical report and show to the new doctor. With this service, things will happen faster and in a very smooth way. Later on, the whole requirements will be explained.

## Product Context

## It will be a whole system on its own, dependent on its own database. The patient will come and if he/she is new than an ID will be given and the registration will take place. Then the receptionist will lead the patient to the available doctor in that moment. If the patient is not new then the receptionist will make the changes to the existing database.

## User Characteristics

## -        Nurses

## Nurses are an important support in the hospital and they have a great responsibility in their shoulders. They will take care about the patients and always be on alert. In their page, they will have the description of each medication that will be given to the patients given to her. Then after she finishes and the precise medications are given to the patients, she will mark them as done so even the doctor can keep in track will the progress of the patient. They will use the computer only to see the medications needed for the precise patient and to mark as done when they are finished.

## -        Patients

## They will have a space where they can sign in with their name, surname and a specific ID. There they can find their medical report in case they change hospital or doctor. They will be able to print this document in case it is needed. They will use this page only in case of need, not that often.

## -        Receptionist

## The will be using the service more than anyone else. They will constantly be using this service. It is their duty to register the patients, lead them to the specific doctor, provide them with the information needed etc. The computer will be their inseparable asset since they have the most taxing and most important job of organizing the patients.

## -        Human Relations Manager

## They will have their own space here in order to keep track of the staff and maintain the efficiency of their work. They are responsible for all the staff and when an employee is hired or fired, and are responsible for arranging the shifts of the staff.

## -        Medicine Stock Manager

## They are in charge of the medicines that the hospital has and offers to the patients. They will be constantly updating the database since there will be medicines finishing and new ones coming. They will all need to be registered and keep an inventory to be more efficient and correct. They will use the computer often and ready to register the changes.

## -        Hygiene Staff

## The hygiene staff will not use the computer. They will just be informed of the schedule of their shifts constantly. The system will help to prevent any schedule clash to happen. They also have to make known their presence.

## -       Hospital Grounds Guard

## Hospital ground guard will not use the system also. There is no need for it since will be informed of the schedule of their shifts. All they have to do is be there on time and make known their presence.

## Assumptions

The operating system used in the hospital is Windows 7, so the service will be created according to that. Databases will be created according to the hospital staff and restrictions.

## Constraints

Being a public hospital, there is a lack of funds and not many investments are done. No one pays attention to computer infrastructure and this leads to some constraints that we might encounter. Some of these constraints are:

* Low number of computer terminals
* The computers found there are not all of them up to date and not so fast
* There might also be limits of disk space
* Since most of reports are in written form, there is a lack of a well formed database

## Dependencies

* The receptionists and doctors will need a constant Internet connection to perform the operations.
* The report form will need an update for every time the patient makes a check up
* The registration will be needed to be done before the patient goes to the doctor
* Only after the registration a database entry can be created for the new patient
* An update of the doctors’ occupancy is needed in order to decide for the new incoming patients
* An update of rooms is needed constantly so no conflicts arise.

# Requirements

3.1  *Functional Requirements*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Req# | Requirement | Comments | Priority | Date Reviewed | SME Approved/ Reviewed |
| BR\_01 | The system should have a database of two major types of users , staff and client | Organization and Management of Users” | 1 | 27/03/2016 | QSUT IT Manager |
| BR\_02 | For every staff user, the system must give information  for a daily job they must do. | If a doctor or a nurse is previously booked on an operation it should give this information. | 1 | 27/03/2016 | QSUT IT Manager |
| BR\_03 | The system should have detailed information on busy or free beds and possibility for the receptionist to fill the bed. | This sort of information will be available to the receptionist, so in case of a necessary patient entrance she can now where to direct them too. | 1 | 27/03/2016 | QSUT IT Manager |
| BR\_04 | Permanent patient medical history and records, and easy access to it in tabular form. | This data should only be available to the patient or his personal doctor. Updated with every new checkup. | 1 | 27/03/2016 | QSUT IT Manager |
| BR\_05 | The system should have an instant alarm, started by a patient and received by the receptionist and his personal doctor. | In case of a medical emergency the patient can send an emergency S.O.S which gives small details for the situation so that the receptionist and its medic can do the preparations necessary (until the patient arrives) | 3 | 27/03/2016 | QSUT IT Manager |
| BR\_06 | The patient module of the system should allow for a complaint towards a doctor, which goes directly to the chief of the pavilion. | If the patient has some problems with the service he has the right to complain for it. | 3 | 27/03/2016 | QSUT IT Manager |
| BR\_07 | Admission and ward allocation and de-allocation.  . | A way to admit the patient to a free bed in any ward, remove it when necessary, and update the system accordingly. | 1 | 27/03/2016 | QSUT IT Manager |
| BR\_08 | Financial Accounting. | For the economical part of the staff it should do some accounting related mostly to the medical supplies. | 2 | 27/03/2016 | QSUT IT Manager |
| BR\_09 | System Security | An almost fool proof system that will make every data private, any attempt to access them will create a procedural log to react to it. | 1 | 27/03/2016 | QSUT IT Manager |
| BR\_10 | Symptom Checker | For every patient, also depending on their medical history, to give a possible reason for the symptom inputted. | 3 | 27/03/2016 | QSUT IT Manager |
| BR\_11 | Timetable Scheduling | For the medical staff, create a dynamic timetable, which shows their availability. | 3 | 27/03/2016 | QSUT IT Manager |
| BR\_12 | Statistical analyses and reports. | At the end of significant timeline (month, season. Year) produce some charts related to admission causes. | 3 | 27/03/2016 | QSUT IT Manager |

**3.2 Non-Functional Requirements**

## 3.2.1 User Interface Requirements

The frontend of the entire software will be built upon the Bootstrap framework. The logging in and registering webpages will consist of comprehensive and easy-to-fill out online forms. The administrative sites of the head nurse will have a visually simple layout that will not overwhelm the user. The patient websites will display their relevant medical data with detailed records of their visits and simple account of their diagnoses.

***3.2.2*** ***[Usability](#Usability)***

The system will be easy to learn and easy to use in a short span of time.

The major features and functions will be well documented and described in a simple manner via a help section.

***3.2.3 Performance***

**3.2.3.1 Capacity**

The managing module of the system will support up to 50 simultaneous users, whilst the patient information will be able to support up to 200 concurrent users. The system will require a minimum of 512 MB of RAM for each user (or higher, depending on the Internet Browser) to not cause delay in the page loading times.

**3.2.3.2 *Availability***

The system will available 24 hours a day of the time. The downtime interval for the managing side is expected to be no more than 20 seconds during emergencies only to process the large amount of incoming requests.

***3.2.4 Maintainability***

An administrator will be able to fix minor defects in the system in less than 2 hours.

Backup of patient data is to be conducted every week.

***3.2.5 System Integ******ration***

A web server will be needed, which will also serve as a data server to hold all patient data. Apache 2.4 will be used as the web server software that will connect to the MySQL 5.5 database. PHP 5 will be used as the server script.

***3.2.6 Security***

All password data, immediately after registering will be encrypted using SHA1 encryption. Every activity of each user will be logged and stored in the database.

***3.2.7 Data Management***

The following data will be stored in the database:

1. Patient information
2. Doctor information
3. Nurse information
4. Room information
5. Checkup admission data
6. Inventory information
7. Employee information.
8. Common Diseases (for the symptom tester function)

***3.2.8 Standards Compliance***

The system must log and record every activity performed by staff members in accordance with QSUT hospital policies.

All patient information is private and is protected under the Patient Private Information Protection Act of QSUT.

All patient information must be disclosed to the user as per the Privilege to Information Law no.119, Constitution of Albania.

# 3.3 Domain Requirements

The data in the domain requirements are adapted to the hospital chosen for the system. The database will be created according to the hospital records. We interviewed one of the hospital employee about a general idea of how the hospital works. For each department there are minimum seven to eight specialized doctors but there are departments where there can be ten or more depending on the workload of the department. The receptionist decides for the patients where to go and to which doctor in order that all the doctors have almost exact amount of work and so that none of them remain without patient. Even though remaining without patient is hard since there are minimum a hundred sick people that come every day and needs attention. Since the service will include the medical report for each patient and also the personal patient history report, we obtained information on the contents of these reports, and these are the format rules that we must abide to when creating the respective pages to fill out.

1. **Patient Medical Report**

The doctor will save this report online so these are the questions that it will include and the way it will work:

Name\_\_\_\_\_\_\_\_ Father’s Name\_\_\_\_\_\_\_\_ Surname\_\_\_\_\_\_\_

Today’s Date\_\_\_\_\_\_\_\_ D.O.B \_\_\_\_\_\_\_\_\_\_\_

Male Female

Statement of present health

Excellent Good

Fair Poor

Blood type (if known)\_\_\_\_\_\_\_\_\_\_\_

\*Diagnosis: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Medications: All prescription, non-prescription, vitamins, home remedies etc.

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Dose (ex: mg) | How often? | Date medication started |
|  |  |  |  |
|  |  |  |  |

\*Family Health status

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Member | Current Disease | Health Status good, fair, poor | Date of Birth | Deceased | Cause of Death |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

The ones with the star will be connected to each other. In the diagnosis part there will be two buttons that will indicate whether the disease is inheritable or not. If it is then the family health status will appear otherwise it won’t be needed.

1. **Personal patient medical history**

The registered patients will have their own space in the system where they can log in and check a brief summary of their medical reports so far. Only they have the right to see their reports. Here are what the report will include

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
Surname: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
Date of Birth: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Phone no: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Email: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |
| --- | --- | --- | --- |
| Chronic Conditions | Risk Factors | Allergies | Other |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Medication Records | | | | |
| Date | Medication | Appearance | Quantity | Start Date |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Doctor Visits | | | | |
| Date | Diagnosis | Medication | Duration of Medication | Results |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

In the moment of registration, the receptionist will only take these data:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. of patient | Name | Father Name | Surname | Today’s Date | Reason of visit |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Then it will also take the phone number of the patient, email and an emergency.

# User Scenarios

Scenario 1 - Receptionist Login:

* The shift receptionist will enter their username and password credentials in the system.
* If the data they entered is incorrect, they will be prompted to enter the data again.
* After a successful login, they will be redirected to the system’s main page for receptionists.

Scenario 2 - Receptionist’s Registering Patients Actions:

* A new patient will approach the reception, asking for a visit.
* The receptionist will confirm if this patient is already registered.
* If this patient is already registered, the receptionist will proceed with the verbal interrogation and the room assignment procedure.
* Otherwise the receptionist will register this patient, using their health card or other relevant identification document to fill out the patient form.

Scenario 3 - Receptionist’s Room Assignment Actions:

* After confirming the registration, the receptionist will conduct a verbal interrogation with the patient.
* After the interrogation, the receptionist will go to the room assignment page and look up the proper hospital room for this patient, based on the patient’s description of their condition.
* If there are any vacant rooms, the patient will be reserved that room.
* The receptionist will direct the patient to this room.
* Then the receptionist will look up the appropriate doctor and send a notification to this doctor, signaling them that a patient is awaiting their treatment.

Scenario 4 - Receptionist’s Patient Allocation:

* The receptionist will be notified of an allocation of a patient to a new room.
* Then the receptionist will press the reallocate button and will be shown the layout of the hospital.
* The receptionist will select the room the patient will be allocated to.

Scenario 5 - Doctor Login:

* The doctor will enter their username and password credentials in the system from their office computer.
* If the data they entered is incorrect, the doctor will be prompted to enter the data again.
* After a successful login, she will be redirected to the system’s main page for doctors.

Scenario 6 – Doctor’s Notifications Check:

* The doctor will check his notifications feed.
* The doctor will spot a notification about a patient waiting in the specific room for his treatment.
* The doctor will close this request, and he will head to the room to perform the consultation or checkup.

Scenario 7 – Doctor’s Diagnosis Update:

* After the checkup the doctor will go back on his computer and look up the patient he just treated.
* After he has found the patient he will update his medical history with the results of the checkup by reporting the diagnosis, documenting the prescription that might have been given and the visit data.

Scenario 8 – Doctor’s Symptoms Checker:

* The doctor will click on the symptoms checker button.
* They will provide any number of symptoms.
* A list of possible diseases that cause the symptoms will be shown on the screen.

Scenario 9 – Patient Login :

* The patient will enter their username and password credentials in the system.
* If the data they entered is incorrect, they will be prompted to enter the data again.
* After a successful login, she will be redirected to the system’s main page for patients.

Scenario 10 – Patient Actions:

* The patient can access their medical history.
* The patient can check their visit reports.
* The patient can check their previous prescriptions.

Scenario 11 – Medicine Stock Manager Login:

* The stock handler will enter their username and password credentials in the system.
* If the data they entered is incorrect, they will be prompted to enter the data again.
* After a successful login, the manager will be redirected to the system’s main page for patients.

Scenario 12 – Medicine Stock Manager Actions:

* The manager of the stock can lookup all the medicine and supplies in the stock.
* If a nurse or doctor has requested and taken an item, they will remove this item from the stock.
* If supplies have arrived, the manager can add these supplies to the stock.

Scenario 11 – HR Manager Login:

* The HR manager will enter their username and password credentials in the system.
* If the data they entered is incorrect, they will be prompted to enter the data again.
* After a successful login, the manager will be redirected to the system’s main page for patients.

Scenario 12 – HR Manager Employee Edit:

* The HR manager will lookup the hired medical and supplementary staff.
* The HR manager will edit the employee data from the table.

Scenario 13 – HR Manager Shift Organizing:

* The HR manager will bring up the various staff schedules.
* The HR manager will select an employee and rearrange their schedules

Scenario 14 – HR Manager New Employee:

* The HR manager will click the Add Employee button.
* The manager will fill out the Employee form, mainly specifying the type of Employee.
* Then the manager will be redirected to the timetable page to arrange this employee into the proper schedule.

Scenario 15 – HR Manager Leaving Employee:

* The HR manager will click the Remove Employee button.
* Then the employee

**Appendix**