Requirement Specification Document For A Hospital Appointment System.

A. INTRODUCTION:

The rising demands for health care services and medical consultation have increased the number of visitations to hospitals, consequently increasing hospital queues, patients waiting time and patient dissatisfaction. It is now pertinent that hospital administration is enhanced through the adoption of technological solutions for better management of health processes and operations to guarantee quality health care service delivery and operational efficiency.

a.a. Purpose:

The purpose of this section is to enumerate the description of the Health Management solution by detailing information about the context and interface constraints as well as solution functionality. The document also states the goal to be achieved and the product scope as well as the functional and non-functional requirements.
This document is the basis for the development of the product as it explains the solutions designer's expectations about the user and other infrastructure of that is required by the solutions. The assumptions and dependencies section highlight any assumptions or dependencies the application has about the hardware, software, environment and user interactions associated with it.

a.b. Scope:

The scope of the Health Appointment System includes administrative functions performed within a medical facility. The aim of the system is to automate the daily operation of a medical facility. In many institutions, all patient appointments are made by telephone or directly at the reception desk of the institution. Patient data is stored in analog files. This system is designed for the administration and processing of patient files and information, appointments and medical history. This system enables doctors to make appointments online, and the practice can manage the appointments. In addition, information about patients' medical data, medical history and medical advice. This will allow physicians to spend less time writing, updating and maintaining records. The scope of the system requirement is that the stakeholders involved will understand and have an idea of how and what will happen in the system.

a.c. Acronyms & Definitions:

This section provides an overview over useful terms and defines them for better understanding.

Terms	**Definition**
Software intensive system	System where software plays a pivotal role in the development, production and deployment of the system.
Hospital Appointment System	The framework by which the entire the Hospital appointment operations are done.
Medical facility	Facility using the software.
Patient	All people coming to the medical facility for examination.
Receptionist	Person that helps organize the medical facility as well as patients contact.
Doctor	Person examining the patient; they deal with the patient's data.
Database	All the data the software uses is stored in the database
GUI	Graphical User Interface
Web Based Solution	Software reachable from the internet

Uptime	Time in that the software is reachable
Downtime	Time in that the software is not reachable
Server	Hardware the system runs on.
Request	Signal from the software to the database
Web interface	The web interface provides the possibility for the patient to get access to the data.
Permission form	A form the patient needs to fill out that his data is allowed to be used.
Prescription	A paper that the patient forwards to the pharmacy to get his medicaments.
Personal Data	Personal information of patient
Password	A combination of strings numeric, alphabet or a combination of both.
Credentials	Unique user name and password
Data backup	A security feature, the data is always stored twice.
Account	A digital record of personal information of patient detailing bio data and general medical information.
Appointment	A confirmed and scheduled consultation with the doctor.
Non-functional requirement	A requirement

a.d. Reference:

https://courses.cs.ut.ee/MTAT.03.306/2018_fall/uploads/Main/team3.pdf

https://www.slideshare.net/sanofimohin/use-case-of-hospital-managment-system

B. DESCRIPTIONS:

The purpose of this section is to provide essential information about the product's perspective, giving information about the context and interface.

The product functions section outlines major functionality the solution will perform. The user characteristics section describes the users and explains the expectations the solution has about the users. The constraints section contains detailed descriptions of constraints and safety attributes relating to the solution. The assumptions and dependencies section summarizes the assumptions and dependencies that have been considered about hardware, software, environment and user interactions associated with the solution.

b.a. Product Functions:

The solution upon completion will perform four core functions for the medical facility. The solution through the web interface allows the patient to create personal account which enables them to access the patient module with their unique login details for appointment reservation, appointment rescheduling and cancellation. Through the reception module, the front desk operative or receptionist manages patients' appointment request, confirms the appointment request, register new patient, assign patients call for vital sign's examinations and doctors' consultation during visit

to the hospital with the solution. Thereby, enabling the receptionist to perform the key Out Patient Department duties and consultation management task.
In addition to the above, the solution provides the medical facility the capacity to create and manage medical record upon the visit of patients to the hospital. The process for creating patient record commences with the receptionist when a patient visits the hospital, both for existing and new patients, using the receptionist module. When a new patient visits the hospital, the receptionist log into the system running the solution and registers the data of the patient. This automatically creates the medical file of the patient upon completion and stores the data on the server where doctors and nurses can subsequently access the record during examination of the patient. The doctor module of the solution avails the general medical practitioners and specialist practitioners access to the medical file of the patient, see investigation result, give drug prescriptions to patient and add observe results to medical record of patient.

b.b. User Classes and Characteristics

For the software three main user classes exist:

1. **Patient**: Patients are all people that must see the doctor.
   - A patient can have different backgrounds:
     - People who are familiar with internet applications.
     - People with less experiments with internet applications or web pages or without the possibility to use an online application.
2. **Receptionist**: The receptionist is the person who is organizing the appointments and talks first to the patients when they arrive at the hospital.
   - Have small technical knowledge.
   - They are used to working with software in the field of medical practices.
3. **Doctor/ Nurse**: They must be able to deal with the patient's data.
   - Are used to work with software organizing the patient's data
   - A patient can have different backgrounds.

The three user groups have different interests while working with the system:

1.1. Patient:

- Wants to organize his/her appointments (make/reschedule/delete an appointment)
- Wants to see and change his/her personal data.

2.2. Receptionist:

- Wants to manage patient appointments (make/reschedule/delete an appointment, list all appointments).
- Wants to manage patient's data (add/change).
- Wants to manage patient's payments.

3.3 Doctor:

- Wants to work with the patient data.
- Wants to get detailed information about the patient's medical history.

b.c. Constraints:

The solution requires fully functional internet network connection and 24-hour server uptime for optimal functionality. The occurrence of loss of internet connection or server downtime during an active session of the any of the user, will result to the display of an error message like "*temporarily lost network connection*" or "*Server not found*" depending on the occurrence. Users will need to perform task again when any of these occurrences is experienced upon resumption of internet network connectivity and server.

b.d. Assumptions and Dependencies

During the development of the software we assume that the medical facility using the software uses computer hardware with a windows operating system. The medical facility must have two servers for the data, with the capability to store all the data. One of these severs should be used for the data backup. The medical facility must have a domain that can be used for the web interface of the patient module. This web interface must have the rights to access the database of the medical facility. For the web interface used by patient has a work station with internet connection.

C. SPECIFIC REQUIREMENTS

This section provides an overview of the requirements. The requirements are ordered by the different actors.

c.a. Functional Requirements

Our main source for the functional requirements of the software is a presentation of the domain:

Requirement ID	Description
P1	The patient must be able to create an online account.
P2	The patient must be able to log in to his account.
P3	The patient must be able to see the appointment information online.
P4	The patient must be able to make an appointment.
P5	The patient must be able to cancel an appointment.
P6	The patient must be able to reschedule an appointment.
P7	The patient must be able to confirm an appointment online.
P8	The patient must be able to add doctor to appointment.
P9	The patient must be able to change his personal data.
P10	The patient must be able to see his personal information.
P11	The patient must be able to delete values in his personal data.
P12	The patient must be able to register for a new account.
P13	The patient must be able to log out from the account.
P14	The patient must be able to delete his account.
P15	The patient must be able to change the password of the account.
P16	The patient must be able to pay for the doctor visits.
P17	The patient must be able to create a new entry in the personal data.

P18	The patient must be able to delete his/her entry of the personal data.
R1	The receptionist must be able to log in to the system.
R10	The receptionist must be able to see the data of a patient.
R11	The receptionist must be able to confirm the payment of a patient.
R12	The receptionist must be able to create an invoice for the patient's payment.
R13	The receptionist must be able to confirm, that the patient signed the permission form.
R14	Front-Desk/Receptionist must be able to manage the payment made by the patient and the pending bills.
R15	Front-desk/Receptionist must be able to add Doctor ID to an appointment.
R16	Front-desk/Receptionist must be able to confirm a new patient.
R17	Front-desk/Receptionist must be able to confirm the payment for an appointment.
D1	Doctor must be able to see the medical data of the patient. The medical data includes previous examinations and prescriptions.
D2	Doctor must be able to add medical data to the patient's entry.
D3	Doctor must be able to create the prescription for a patient.
D4	Doctor must be able to print the prescription for a patient.

c.b. Non-Functional Requirements

REQUIREMENT ID	**Description**
NFR1	• The system at the Front desk/receptionist should give responses in 2 seconds after checking the patient's information. • The system must handle 100 payment transactions per second in peak load. • The Information System must support 1000 people at the same time. • Time taken should be minimal for simple report preparation in most of the cases. • Navigation through one page up or down in a 100-page document shall take at most 1second. Searching the page for a specific keyword shall take at most 5 seconds.
NFR2	• Login the system: Patient using the system must have an email and password. In case of forgotten password/email, a security question and reference email option will be provided during Registering in the system. • Unauthorized entry in information system will be blocked by Firewall and secured with encryption. An email and mobile notification will be sent when the user logs in the system except when the user is an administrator.
NFR3	• The downtime of the information system must be less than 10 hours in a week.

	• The information system needs to be available >90 percentage during peak hours.
NFR4	• All the data in the database of the information system must be backed in cloud to avoid loss of patients' data during any major crash to the system.
NFR5	• Software Framework of the Information System shall be robust, bug free satisfying all the requisite requirements and provide good overall user experience. • The accuracy of the system shall be high. • Probability of unavailability shall be less than 0.5 • Probability of failure shall be less than 0.5 • Mean-time-to-failure shall be high
NFR6	• The Information System must keep log of all the errors occurred and can be easily maintained by the Engineer. • The cost of maintaining the system shall be low. • Development of the system shall use regression testing allowing full re-testing in 12 hours
NFR8	• Training time for using the system shall be minimal. It needs to be less than 1 month. • Help frames shall be provided for the ease of the user to operate the system. • New Users can easily perform tasks in the system in a shorter time span. • Experienced User can perform tasks in the system in < 2minutes .
NFR9	• Time to restart after failure shall be less than 2 hours. • Percentage of events causing failure shall be less than 50 %
NFR11	• Percentage of target-dependent statements shall be > 50 • Number of target systems shall be high.
NFR12	• Information flow between modules shall be fast • Count procedure calls shall be minimal.
NFR13	• The system shall be easily tested during maintenance by Engineer. • The system shall be easily tested in case of a failure.
NFR14	• Time taken by a new user to understand the system shall be less than 1 week.

D.USE CASE DIAGRAM

Use Case Diagram (Hospital Reception)