SOFTWARE REQUIREMENTS SPECIFICATION

for

MediApp

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1. Introduction

1.1 Purpose

The purpose of this document, a Software Requirements Specification, is to present a detailed description and all relevant information about the functionalities of the MediApp system. This document will explain the intended purpose and features of the system, what the system will do, the constraints under which the system must operate, as well as offer an introduction to the suggested user interface. This document is intended to be used as a proposed solution to the client and as a reference for developing the prototype system for the development team or any future developers.

1.2 Scope

The MediApp system will be an Android based mobile application, which users can install onto their mobile device, designed to keep digital medical records and provide additional functionality concerning the data and interactions between users. This application should be available to download and free to share through mobile device application stores.

The idea is that the system will be accessed by at least four groups of users: admins, doctors, nurses and patients. The software system shall protect all data via encryption and will facilitate information in such a manner that only authorized users have access to certain information. Furthermore, the application shall provide additional functionality for each associated user, such as a doctor being able to create a patient chart or an admin being able to create a new patient.

1.3 Definitions, Acronyms and Abbreviations

Term	Definition
User	A person who interacts with the mobile phone application
Admin/Administrator	A system administrator who is given permission to manage and control the system
Encrypt/Encrypted	Alter information using a key to protect information from unauthorized viewers

Decrypt/Decrypted	Make encrypted information understandable by all viewers
Algorithm	A set of steps that are followed in order to solve a mathematical problem or to complete a computer process [1]
BMI	Body Mass Index
CAT Scan	Computer Axial Tomography Scan
MRI	Magnetic Resonance Imaging
QR Code	Quick Response Code
CHA	Canadian Health Act

1.4 References

[1] "algorithm". *Merriam-Webster.com*. 2013. http://www.merriam-webster.com (6 October 2013)

1.5 Overview

The remainder of this document includes three more chapters:

The second chapter of the document provides a complete overview of the system explaining how the system will interact with other systems and its basic functionality.

The third chapter of the document contains all of the specific software requirements relating to functionality. Every requirement is specified so that different stakeholders are able to understand.

The fourth chapter of the document contains all of the non-software related requirements such as aesthetics.

The combined sections of the Software Requirements Specification describe the project in its entirety using different languages for different audiences.

2. Overall Description

2.1 Product Perspective

· The app will serve as a tool for doctors, nurses, and patients for use in medical centres
· It will conveniently store electronic copies of medical records, forms, patient notes, CAT scans etc.
· It will run on the user's android phone and is totally self contained

2.2 Product Functions

· The software will provide an authentication screen from which the doctor, nurse, administrator, or patient can log in.
· A doctor will have the ability to:
   o View the medical records of patients, including their BMI plot
   o Edit the patients' medical records
   o Search the patients' records
   o Filter the patients' records according to criteria such as last visit, upcoming appointments, or illness
   o View information on other doctors and nurses in the medical center
   o View his/her schedule and upcoming appointments
   o Receive push notification on appointments and reminders
· A nurse will have the ability to:
   o View medical records of patients, including their BMI plot
   o Edit the patients' medical records
   o Search the patients' records
   o Filter the patients' records according to criteria such as last visit, upcoming appointments, or illness
   o View information on other doctors and nurses in the medical center
   o Receive push notification on appointments and reminders
· An administrator will have the ability to:
   o Create medical records for patients on their first appointment
   o View and edit records of patients to a limited extent (they can only view name, date of birth, insurance card number, and appointment history)
   o Delete the medical record of a patient
   o Search and filter medical records of patients
   o Schedule an appointment for the patient
   o View, edit, add, and delete doctors and nurses and their appointments/schedule

- A patient has the ability to:
    - View their medical record including their BMI plot
    - View their upcoming appointments
    - View their reminders
    - Receive push notification on appointments and reminders
- A pharmacist has the ability to:
    - Scan QR Codes of a patient

2.3 User Characteristics

- There are three distinctive users: doctors, nurses, and patients
    - Doctors have a PhD with varying levels of workplace experience and average technical expertise
    - Nurses have an education including a degree in nursing, varying levels of experience and average technical expertise
    - Patients may or may not have any level of education, any experience, and any level of technical expertise
- An admin is required that has no specific characteristics, other than basic level of education to operate and manage administrative activities
- A pharmacist may be added to the database if the QR code feature is used.
- A minimal level of technical expertise is required to operate the application

2.4 Constraints

- All aspects of the app shall be delivered by December 4th 2013
- All aspects of the app shall be created and maintained free of cost
- The app shall run on the android platform
- The app shall only use data from the app's corresponding database
- The app shall be available 99.99% of any 24-hour period

2.5 Assumptions and Dependencies

- A username and password login scheme is to be used for authentication
- The information will be encrypted on the mobile device and sent to the database
- The unique feature will be a QR code generator and scanner in which the doctor can generate a prescription QR code that the patient will receive on his/her device. The pharmacy can then scan the QR code, which is then removed from the database to avoid further duplications in purchasing the prescriptions.
- A BMI of each patient will be plotted
- Notifications will be checked for associated every 30 minutes

2.6 Apportioning of Requirements

- · Patients, doctors, and nurses will receive profile pictures to their profiles
- · Efficient sorting and searching algorithms
- · Attach patient results as pictures (i.e.: CAT scans, X-Rays, MRIs)

3. Functional Requirements

VP1. Admin Login
BE1.1 Login
  i. The username and password entered are encrypted.
  ii. The collected information is sent for comparison with the existing pairs in the database.
  iii. If the pair exists and has a priority of "1" the user can view the admin page, else error message is shown
BE1.2 Create Medical Record
  i. A new entry is created in the patient records.
  ii. The user is prompted to fill the corresponding patient form.
  iii. The form is encrypted.
  iv. The encrypted form is sent to the database.
  v. The database is updated.
BE1.3 Create Employee(Doctor/Nurse)
  i. A new entry is created in the employee records.
  ii. The user is prompted to fill the corresponding new employee form.
  iii. The form is encrypted.
  iv. The encrypted form is sent to the database.
  v. The database is updated.
BE1.4 View Medical Record (Limited)
  i. The patient records of the requested patient are imported from the database.
  ii. The contents are decrypted.
  iii. The contents are limited for security purposes and the user can only view limited information.
BE1.5 Edit Medical Record (Limited)
  i. The patient records of the requested patient are imported from the database.
  ii. The contents are decrypted.
  iii. The contents are limited for security purposes and the user can only view limited information.
  iv. Once edits are made, the form is encrypted.
  v. Encrypted form is sent to the patient records in the database.
  vi. The database is updated.

BE1.6 Edit Employee Record (Doctor/Nurse)
   i. The employee records of the requested doctor/nurse are
      imported from the database.
   ii. The contents are decrypted.
   iii. The contents are limited for security purposes and the user can
      only view limited information.
   iv. Once edits are made, the form is encrypted.
   v. Encrypted form is sent to the employee records in the database.
   vi. The database is updated.
BE1.7 Delete Medical Record
   i. All existing patients list is imported from the database.
   ii. The patient names are decrypted.
   iii. The names are shown in alphabetical order to the user.
   iv. The user is prompted to select which patient to delete.
   v. The selected patient name is then encrypted.
   vi. All the records associated with that name are deleted
      from the database.
   vii. The database is updated.
BE1.8 Delete Employee Record (Doctor/Nurse)
   i. The employee records of the requested doctor/nurse are
      imported from the database.
   ii. The contents are decrypted.
   iii. The names are shown in alphabetical order to the user.
   iv. The user is prompted to select which employee to delete.
   v. The selected patient name is then encrypted.
   vi. All the records associated with that name are deleted
      from the database.
   vii. The database is updated.
BE1.9 Search Medical Records
   i. A name, health card # etc. is searched in search bar.
   ii. The searched term(s) are encrypted.
   iii. A search is conducted in the database to find entries in patient
      records that match the search criteria/term(s).
   iv. The matching results are imported.
   v. The results are decrypted.
   vi. The results are limited for security purposes and shown to user.
   vii. The user is able to click on the appropriate result and view limited
      patient information.

BE1.10 Filter Medical Records
    i. User chooses to filter patients by name, appointment date, birthday etc.
    ii. The chosen method is encrypted.
    iii. A search is conducted in the database to import patient entries.
    iv. Patient entries are sorted by the chosen method.
    v. Entries are then decrypted and limited for security purposes.
    vi. User is shown the filtered entries.

BE1.11 View Employees
    i. Database is searched for the employee entries.
    ii. All the employee names are obtained.
    iii. The employee names are decrypted.
    iv. The employee names are shown to the user.

BE1.12 View Doctor
    i. All doctor entries are imported from database.
    ii. Names are decrypted.
    iii. User is prompted to select desired doctor's name.
    iv. The information of the doctor is decrypted.
    v. The information is shown to the user.

BE1.13 View Nurse
    i. All nurse entries are imported from database.
    ii. Names are decrypted.
    iii. User is prompted to select desired nurse's name.
    iv. The information of the nurse is decrypted.
    v. The information is shown to the user.

BE1.14 Schedule Appointment
    i. All doctor's schedules are imported from database.
    ii. Doctor's names are decrypted.
    iii. User is prompted to select a doctor to book an appointment with.
    iv. The schedule of the selected doctor is decrypted.
    v. User can select date and time to book appointment.
    vi. Updated schedule is encrypted.
    vii. Database is updated.

BE1.15 View Schedule
    i. All doctor's schedules are imported from database.
    ii. Doctor's names are decrypted.
    iii. User is prompted to select a doctor.
    iv. The schedule of the selected doctor is decrypted.
    v. The schedule is shown to user.

BE1.16 BMI Checker
    i. User is prompted to enter height, age, weight, activity level.
    ii. BMI index is calculated.
    iii. BMI is plotted in graph and analysis shown to user.

BE1.17 Logout
    i. User is logged out from admin page.
    ii. User is redirected to login page.

VP2. Doctor Login
BE2.1 Login
    i. The username and password entered are encrypted.
    ii. The collected information is sent for comparison with the existing pairs in the database.
    iii. If the pair exists and has a priority of "2" the user can view the doctor page, else error message is shown.

BE2.2 View Medical Record
    i. The patient records of the requested patient are imported from the database.
    ii. The contents are decrypted.
    iii. The contents are shown to the user.

BE2.3 Edit Medical Record
    i. The patient records of the requested patient are imported from the database.
    ii. The contents are decrypted.
    iii. The contents are shown to the user.
    iv. Once edits are made, the form is encrypted.
    v. Encrypted form is sent to the patient records in the database.
    vi. The database is updated.

BE2.4 Search Medical Records
    i. A name, health card # etc. is searched in search bar.
    ii. The searched term(s) are encrypted.
    iii. A search is conducted on the database is to find entries in patient records that match the search criteria/term(s).
    iv. The matching results are imported.
    v. The results are decrypted.
    vi. The results are shown to user.
    vii. The user is able to view selected patient's information.

BE2.5 Filter Medical Records
    i. User chooses to filter patients by name, appointment date, birthday etc.
    ii. The chosen method is encrypted.
    iii. A search is conducted in the database to import patient entries.
    iv. Patient entries are sorted by the chosen method.
    v. Entries are then decrypted.
    vi. User is shown the filtered entries.

BE2.6 View Doctors
  i. All doctor entries are imported from database.
  ii. Names are decrypted.
  iii. User is prompted to select desired doctor's name.
  iv. The information of the doctor is decrypted.
  v. The information is shown to the user.

BE2.7 View Nurses
  i. All nurse entries are imported from database.
  ii. Names are decrypted.
  iii. User is prompted to select desired nurse's name.
  iv. The information of the nurse is decrypted.
  v. The information is shown to the user.

BE2.8 View Schedule
  i. User's schedule (Doctor) is imported from database.
  ii. Schedule is decrypted.
  iii. The schedule is shown to user.

BE2.9 View Plot
  i. Database is searched for the requested patient's information.
  ii. Weight and past visit information are decrypted.
  iii. The information is used to create a graph.

BE2.10 Alert
  i. User's schedule is imported from database.
  ii. Schedule is decrypted.
  iii. Schedule is analyzed for approaching appointments.
  iv. Next appointment notification is prompted to the user.

BE2.11 BMI Checker
  i. User is prompted to enter height, age, weight, activity level.
  ii. BMI index is calculated.
  iii. BMI is plotted in graph and analysis shown to user.

BE2.12 Generate QR Code
  i. User is prompted to enter patient name, medication name, dosage, quantity.
  ii. Unique QR code is generated.
  iii. Code and medication information is encrypted.
  iv. Code and medication information are stored in database.
  v. Database is updated

BE2.13 Logout
  i. User is logged out from doctor page.
  ii. User is redirected to login page.

VP3. Nurse Login

    BE3.1 Login

        i. The username and password entered are encoded.

        ii. The collected information is sent for comparison with the existing pairs in the database.

        iii. If the pair exists and has a priority of "3" the user can view the nurse page, else error message is shown.

    BE3.2 View Medical Record

        i. The patient records of the requested patient are imported from the database.

        ii. The contents are decrypted.

        iii. The contents are shown to the user.

    BE3.3 Edit Medical Record

        i. The patient records of the requested patient are imported from the database.

        ii. The contents are decrypted.

        iii. The contents are shown to the user.

        iv. Once edits are made, the form is encrypted.

        v. Encrypted form is sent to the patient records in the database.

        vi. The database is updated.

    BE3.4 Search Medical Records

        i. A name, health card # etc. is searched in search bar.

        ii. The searched term(s) are encrypted.

        iii. A search is conducted on the database is to find entries in patient records that match the search criteria/term(s).

        iv. The matching results are imported.

        v. The results are decrypted.

        vi. The results are shown to user.

        vii. The user is able to view selected patient's information.

    BE3.5 Filter Medical Records

        i. User chooses to filter patients by name, appointment date, birthday etc.

        ii. The chosen method is encrypted.

        iii. A search is conducted in the database to import patient entries.

        iv. Patient entries are sorted by the chosen method.

        v. Entries are then decrypted.

        vi. User is shown the filtered entries.

    BE3.6 View Doctors

        i. All doctor entries are imported from database.

        ii. Names are decrypted.

        iii. User is prompted to select desired doctor's name.

        iv. The information of the doctor is decrypted.

        v. The information is shown to the user.

BE3.7 View Nurses
    i. All nurse entries are imported from database.
    ii. Names are decrypted.
    iii. User is prompted to select desired nurse's name.
    iv. The information of the nurse is decrypted.
    v. The information is shown to the user.

BE3.8 View Plot
    i. Database is searched for the requested patient's information.
    ii. Weight and past visit information are decrypted.
    iii. The information is used to create a graph.

BE3.9 BMI Checker
    i. User is prompted to enter height, age, weight, activity level.
    ii. BMI index is calculated.
    iii. BMI is plotted in graph and analysis shown to user.

BE3.10 Logout
    i. User is logged out from nurse page.
    ii. User is redirected to login page.

VP4. Patient Login

BE4.1 Login
    i. The username and password entered are encrypted.
    ii. The collected information is sent for comparison with the existing pairs in the database.
    iii. If the pair exists and has a priority of "4" the user can view the patient page, else error message is shown

BE4.2 View Medical Record
    i. User's (Patient) medical record is imported from database.
    ii. The contents are decrypted.
    iii. The contents are shown to the user.

BE4.3 View Schedule
    i. User's schedule (Patient) is imported from database.
    ii. Schedule is decrypted.
    iii. The schedule is shown to user.

BE4.4 View Plot
    i. Database is searched for the user's (Patient) information.
    ii. Weight and past visit information are decrypted.
    iii. The information is used to create a graph.

BE4.5 Alert
    i. User's schedule is imported from database.
    ii. Schedule is decrypted.
    iii. Schedule is analyzed for approaching appointments.
    iv. Next appointment notification is prompted to the user.

BE4.6 BMI Checker
   i. User is prompted to enter height, age, weight, activity level.
   ii. BMI index is calculated.
   iii. BMI is plotted in graph and analysis shown to user.

BE4.7 View QR Code
   i. QR code entry is retrieved from database.
   ii. Entry is decrypted.
   iii. QR code and details are shown to user (medication name, dosage, quantity)

BE4.8 Logout
   i. User is logged out from patient page.
   ii. User is redirected to login page.

VP5. Pharmacist Login

BE5.1 Login
   i. The username and password entered are encoded.
   ii. The collected information is sent for comparison with the existing pairs in the database.
   iii. If the pair exists and has a priority of "5" the user can view the pharmacist page, else error message is shown.

BE5.2 View Doctors
   i. All doctor entries are imported from database.
   ii. Names are decrypted.
   iii. User is prompted to select desired doctor's name.
   iv. The information of the doctor is decrypted.
   v. The information is shown to the user.

BE5.3 View Nurses
   i. All nurse entries are imported from database.
   ii. Names are decrypted.
   iii. User is prompted to select desired nurse's name.
   iv. The information of the nurse is decrypted.
   v. The information is shown to the user.

BE5.4 BMI Checker
   i. User is prompted to enter height, age, weight, activity level.
   ii. BMI index is calculated.
   iii. BMI is plotted in graph and analysis shown to user.

BE5.5 View QR Code
   i. QR code entry is retrieved from database.
   ii. Entry is decrypted.
   iii. QR code and details are shown to user (medication name, dosage, quantity)
   iv. Once the user issues the medication to the identified patient, the QR code entry is deleted from the database.
   v. The database is updated.

BE5.6 Logout
      i. User is logged out from pharmacist page.
      ii. User is redirected to login page.

4. Non-Functional Requirements

4.1 Look and Feel Requirements
4.1.1 Appearance Requirements
LF 1.1 The app shall have the same colour scheme of the medical centre.
LF 1.2 The app shall have the medical centre's logo.
LF 1.3 The app shall have a simple layout that does not over complicate the display.
4.1.2 Style Requirements
N/A

4.2 Usability and Humanity Requirements
4.2.1 Ease of Use Requirements
UH 1.1 The app buttons shall be large enough to be touched by the average human fingertip easily and small enough to fit among other buttons into a 4-inch screen.
UH 1.2 The app shall be easy for 15-year-old children to use.
4.2.2 Personalization and Internationalization Requirements
UH1.3 The app shall be in the English language.
4.2.3 Learning Requirements
UH1.4 The app shall be easy to use on the first attempt by a member of the public without training.
UH 1.5 The user shall be familiar with basic android phone functionalities.
4.2.4 Understandability and Politeness Requirements
UH1.6 This app shall be used by a professional institution and a wide range of target audience.
4.2.5 Accessibility Requirements
N/A

4.3 Performance Requirements
4.3.1 Speed and Latency Requirements
PR1.1 Any interface between a user and app must have a maximum response time of two seconds.

4.3.2 Safety-Critical Requirements
> N/A

4.3.3 Precision or Accuracy Requirements
> N/A

4.3.4 Reliability and Availability Requirements
> <u>PR1.2</u> The app shall be available for use 24 hours per day, 365 days per year.

4.3.5 Robustness or Fault-Tolerance Requirements
> N/A

4.3.6 Capacity Requirements
> <u>PR1.3</u> The app shall store data for all medical centre patients and staff.

4.3.7 Scalability or Extensibility Requirements
> N/A

4.3.8 Longevity Requirements
> <u>PR1.4</u> The app shall run indefinitely.

4.4 Operational and Environmental Requirements

4.4.1 Expected Physical Environment
> N/A

4.4.2 Requirements for Interfacing with Adjacent Systems
> N/A

4.4.3 Productization Requirements
> <u>OE1.1</u> This app shall be free of charge via the android app store.

4.4.4 Release Requirements
> <u>OE1.2</u> The app shall be released December 4th, 2013 latest.

4.5 Maintainability and Support Requirements

4.5.1 Maintenance Requirements
> N/A

4.5.2 Supportability Requirements
> <u>MS1.1</u> The app shall be portable on android.

4.5.3 Adaptability Requirements
> N/A

4.6 Security Requirements

4.6.1 Access Requirements
> <u>SR1.1</u> Only doctors and nurses shall be able to view patient information
> <u>SR1.2</u> Only admin(s) shall be able to maintain staff/patient accounts
> <u>SR1.3</u> Only patients shall be able to view their personal medical records.

4.6.2 Integrity Requirements
N/A
4.6.3 Privacy Requirements
<u>SR1.4</u> The user information of individuals shall be protected and kept private from others.

<u>SR1.5</u> Personal information must be encrypted so as to comply with the Data Protection Act.
4.6.4 Audit Requirements
N/A

4.6.5 Immunity Requirements
N/A

4.7 Cultural and Political Requirements
4.7.1 Cultural Requirements
<u>CP1.1</u> The app shall not have any offensive symbols or words to any culture in the world.
4.7.2 Political Requirements
<u>CP1.2</u> The app shall not have any offensive symbols or words to any country in the world.

4.8 Legal Requirements
4.8.1 Compliance Requirements
<u>LR1.1</u> The app shall adhere to the conditions and criteria of the Canadian Health Act (CHA).
4.8.2 Standards Requirements
N/A