Requirements Specification

Task 02 - Team Green

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Contents

1 Preface

This document is for system engineers, end-users, system administrator and managers which are involved in the project.

1.1 History

Table 1: History

Version	Author	Changelog	Date
0.1	All	Document created	2019-03-27
0.2	Severin Kaderli	Add glossary and testing	2019-04-03
0.3	Fabio Caggiano	Add system model & evolution	2019-04-04
0.4	C. Kocher	Added Introduction	2019-04-05
0.5	C. Kocher	Added System Architecture	2019-04-05
0.6	C. Kocher	Added System Requirements	2019-04-05
0.7	MS	Added Use-Cases	2019-04-07

2 Introduction

This document describes the requirements for software that supports patients with depression in therapy as well as doctors in their day-to-day work with their patients.

Our goal is to develop an application which allows for doctors and patients with depression to work closely together. The software is to provide assistance to the patient where needed and allow the doctors to grant access to information and help where appropriate. Individuals suffering from depression should be able to have a source of information and help at their fingertips when they require it.

The application's functions will be on a "permission" basis determined by the patient's doctor. This means that the doctor will be able to decide which functions are most helpful to his patients and which are not suited to certain cases.

The doctor will be able to track a patient's progress through the system and monitor any changes.

The idea is to allow for a cooperative process between doctor and patient. It is not intended to replace any systems already in place but to support them, especially from the point of view of the patient.

The application should help to support a patient by allowing them to write mood diaries, keep track of medication intake and prescriptions, contact their doctor for help and advice and provide information and emergency contacts. These are all things which, according to our interviewees, can help a person suffering from depression in their day-to-day lives.

Table 2: Roles

Initial	Name	Role
CK	Christian Kocher	Student / Developer
FC	Fabio Caggiano	Student / Developer
MH	Marc Häsler	Student / Developer
MS	Marius Schär	Student / Developer
SK	Severin Kaderli	Student / Developer
JV	Jürgen Vogel	Lecturer / Stakeholder

Initial	Name	Role
UK	Urs Künzler	Lecturer / Stakeholder

3 User requirements definition

In this section we flesh out the use cases that we got especially good feedback on during the interviews.

3.1 Use-Cases

3.1.1 001 - Medication Reminders

Table 3: Use-Case 001: Medication Reminders

No.:	001
Name:	Medication Reminders
Short Description:	The patient takes their medication when reminded by the system at the time that the therapist specified and ticks it off when taken.
Scenario A:	Bob's Therapist prescribed him Fluoxetine to take daily before noon. The therapist entered these data into the PMS. Everyday at 11:30 Bob's devices buzz to remind him to take his medication. After he takes it, Bob checks off on his device that he has taken the medication.
Variant A.1:	Today Bob cannot take his medication when his device reminds him because he is driving. The system automatically defers his reminder by 30 minutes for today and reminds him again then.
Involved Actors:	Patient, Therapist, System
Pre-Condition:	Patient has medication assigned by therapist.
Result:	Patient is reminded about medication and takes it.
Post-Condition:	Patient has taken medication, the system knows about it.
Side-Effects:	-

Steps

No.	Involved	Description
1	Therapist, Patient	The therapist prescribes medication to the patient and when to take it.
2	Patient, System	The system reminds the patient to take their prescribed medication at the correct time.
3.A	Patient, System	The patient takes the medication and checks it off in the system.
3.B	Patient, System	The patient notices the system, but cannot take the medication right now. He tells the system to defer the reminder until later.
3.C	Patient, System	The patient doesn't notice the system, or can't interact with it for another reason. The system automatically defers the reminder.

Activity Diagram

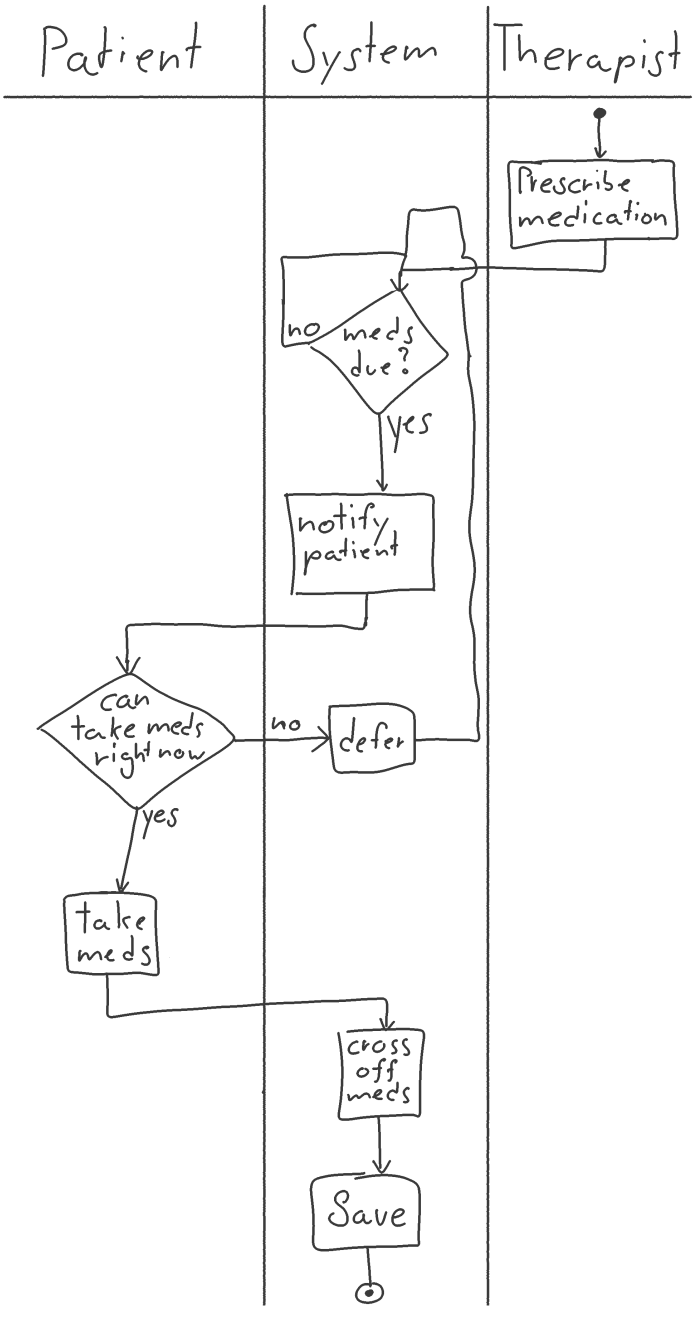


Figure 1: Activity Diagram describing Use-Case 001

Exception UC.001.E.1

As described in *UC.001.A.1* the patient may not be able to take their medication when the system reminds them to.
In this case, the patient can tell the system to “defer” the reminder. The system will then remind the patient at a later date.

Exception UC.001.E.2

Similar to *UC.001.E.1*, but the patient may not be able to interact with the system, for example if they were driving.
If the patient does not interact with the system for 10 minutes after it reminded them, the system will automatically defer the reminder for some time. The patient will be reminded again after that time has passed. The time for which to defer a reminder should be set by the therapist, because some medication may be time-sensitive.

Prototype UC.001.P.1

This prototype is more detailed than the one in the last phase. It shows the defer-mechanism, as well as a more structured UI.

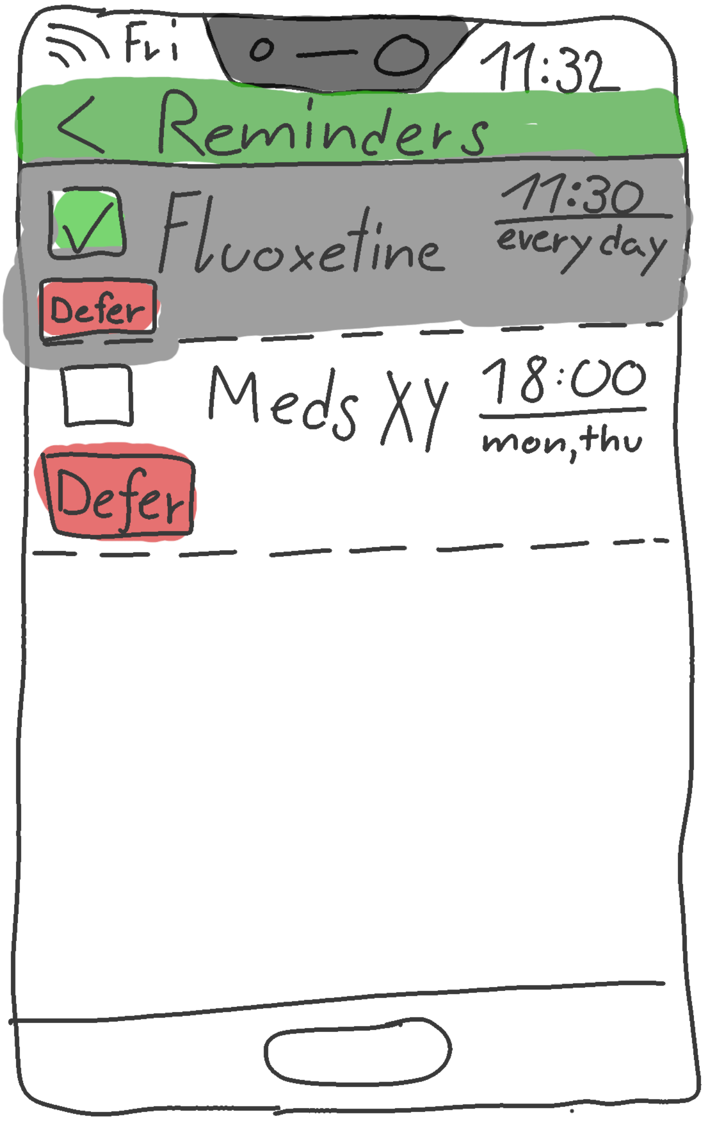


Figure 2: Prototype UC.001.P.1

3.1.2 002 - Patient-Therapist Communication

Table 5: Use-Case 002: Patient-Therapist Communication

No.:	002
Name:	Patient-Therapist Communication
Short Description:	The patient wants to talk to their therapist and can do this quickly and asynchronously.
Scenario:	Mallorie wants to talk to her therapist about some symptoms she's been experiencing. Through a text interface they can communicate quickly and asynchronously to discuss if and what further steps should be taken in order to mitigate Mallorie's symptoms. The therapist asks Mallorie to keep an eye on her mood in the coming days and report it to him.
Involved Actors:	Patient, Therapist
Pre-Condition:	Patient wants to talk to their therapist. OR Therapist wants to talk to their patient.
Result:	The patient and therapist communicated.
Post-Condition:	-
Side-Effects:	-

3.1.3 003 - Mood Diary

Table 6: Use-Case 003: Mood Diary

No.:	003
Name:	Mood Diary
Short Description:	The patient can record their mood, activity, sleep, and food for any given date and share this information with their therapist.
Scenario:	Her therapist has asked Mallorie to record her mood for two weeks in order to better gauge the success of a new medication. Every evening, Mallorie rates how she felt today, writes down what she did, what she ate, how she slept and any other significant occurences. Her therapist sees this information and can adjust her dosage relatively quickly.
Involved Actors:	Patient
Pre-Condition:	Therapist asks patient to track their mood.
Result:	Therapist and patient see the progress of the patient.
Post-Condition:	-
Side-Effects:	It may be detrimental for some patients to have to write down how they feel. Thus the therapist should have to enable the feature for the patient.

Steps

No.	Involved	Description
1	Patient	Patient opens the mood diary UI.
2	Patient	Patient rates their overall mood on a quick scale (See Prototype UC.003.P.1)
3.A	Patient	If the patient rates their mood positively on the quick scale, all further inputs are optional
3.B	Patient	The patient is asked how much they slept last night.
4	Patient	The patient is asked how much water they drank today.
5	Patient	The patient is asked what medication they took today. This is pre-filled from the medication that the system knows about.
6	Patient	The patient is asked what they ate today.
7	Patient	The patient is asked about any significant mood changes during the day.
8	Patient	The patient is asked about any activities or exercise they did today.
9	Patient	The patient can enter any general notes that they want the therapist to know, but didn't fit any of the previous categories.

Exception UC.003.E.1

It's detrimental to the patient to spell out how they feel, or to see that they're not making the desired progress in their therapy.

Attention

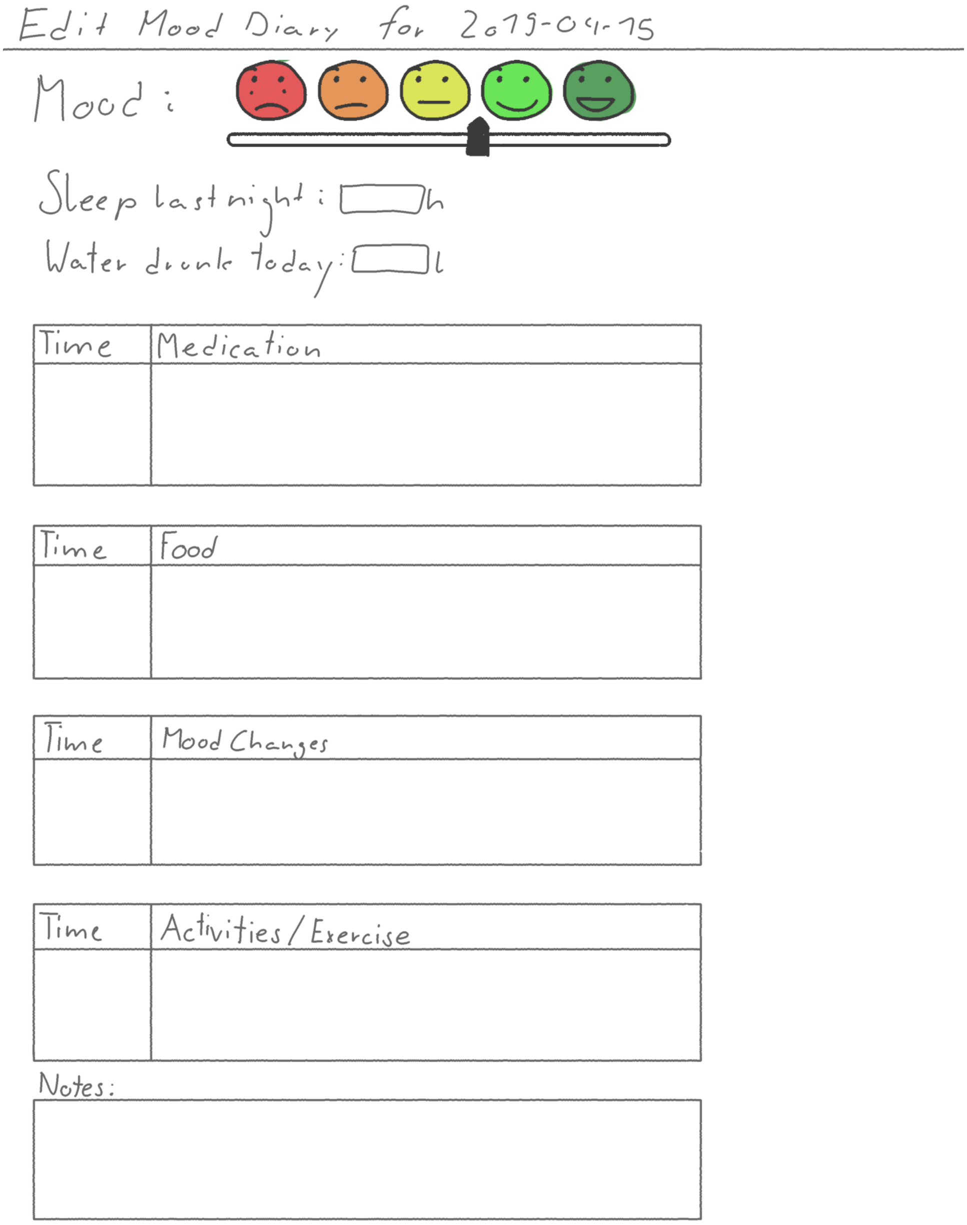
The desired solution to this problem has to be decided.

Exception UC.003.E.2

The patient forgets aspects of their day and fills them out inaccurately. This generates false data and may hinder the therapist in their decision making process

Prototype UC.003.P.1

This is an updated prototype for "Mood Diary Part 2", the most significant change is the inclusion of a quick rating system at the top.



Edit Mood Diary for 2019-04-15

Mood:

Sleep last night: □h

Water drunk today: □l

Time	Medication

Time	Food

Time	Mood Changes

Time	Activities / Exercise

Notes:

Figure 3: Mood Diary Part 2

3.1.4 004 - Emergency Contacts

Table 8: Use-Case 004: Emergency Contacts

No.:	004
Name:	Emergency Contacts
Short Description:	The patient has quick access to a number of emergency contacts, such as: A suicide hotline, their therapist, some close family members. It should be **obvious** how to reach the emergency contacts from any point in the application
Scenario:	Bob is experiencing a particularly heavy episode of depression. He wants to talk to his therapist immediately. He selects his contact details in the PMS and his phone automatically opens the phone app to call the therapist.
Involved Actors:	Patient, Therapist/3rd Party
Pre-Condition:	Patient wants to urgently communicate with someone.
Result:	An appropriate communications channel is opened, and the patient can talk to the selected party.
Post-Condition:	-
Side-Effects:	-

Exception UC.004.E.1

The selected party is not reachable at this time, the PMS should suggest an alternative party to contact, such as a close family member.

4 System architecture

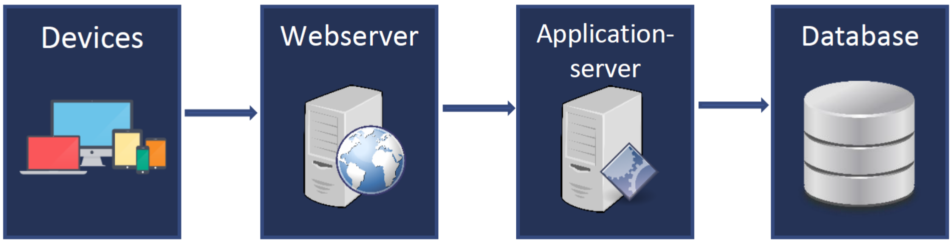


Figure 4: System Architecture

4.1 Client

A user of the system will access the application through a web-browser on their client device. All requests to the server will be made over an encrypted connection using HTTPS (SSL/TLS).

4.2 Web Server

The web server will handle requests to and from the client. This server will communicate directly with the application server allowing for data to be passed back and forth.

4.3 Application Server

The application server will handle all requests and data which do not involve the user interface. All business logic, authentication and database queries are executed here.

4.4 Database

User information, patient information and all other required data will be stored in the database. It is of utmost importance that the information stored and being sent to and from the database is extremely secure. The database will contain very sensitive patient information and all the users authentication information.

5 System requirements

5.1 Functional System Requirements

5.1.1 User Administration

The system should allow for user management through an admin login. Here the system administrator will be able to add, remove and edit existing users. The system administrator will also be able to edit any available settings from here.

5.1.2 Login and Dashboard

A user should be able to log into his/her account and have an overview of their profile. The user should be able to configure their profile wherever possible. This includes updating personal information and authentication details.

5.1.3 Patient Management

A doctor should be able to login and have an overview of his/her patients. A doctor should also be able to set certain permissions for patients.

5.1.4 Saving Data and Documents

The system should allow all users to save relevant information and documents to a database. The information stored should be secure and only visible to users with the correct permissions.

5.2 Non-Functional System Requirements

5.2.1 Usability

The application should be self-explanatory to use and it should be easy and clear to navigate. Important information and links should stand out on the individual pages. Emergency numbers should be displayed clearly on all pages.

5.2.2 Availability

The application should be accessible and usable at all times.

5.2.3 Security

All information sent to and from the server should be secure and encrypted. The data stored in the database should not be accessible by any third party.

5.2.4 Performance

The system should offer consistently high performance. This means pages and data should be loaded in less than 2 seconds.

5.2.5 Stability

The application should remain stable. A user should never be interrupted while on the site and data should never be lost due to faults in the application.

6 System models

To following screen-flow-diagram describes the interaction of different system components from the patient's perspective in the patient management system.

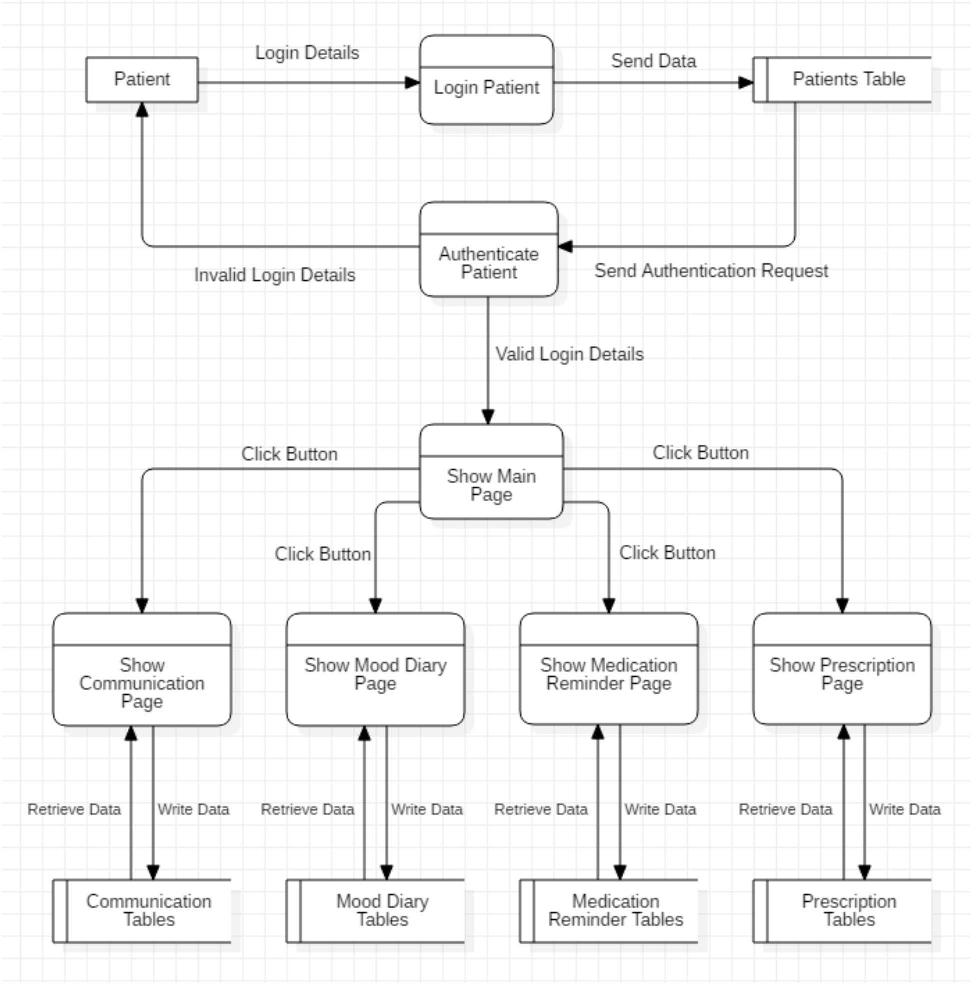


Figure 5: screen-flow-diagram

You can read the above diagram like this: The patient enters the login details, the application server queries the database (patient table) if the right login credentials have been provided and either informs the patient that the username or password were invalid or forwards the patient to the main page of the application. From the main page, the user has the possibility to open the communication, mood diary, medication reminder or prescription overview tab. Each one of these features retrieve and write data to their corresponding database table.

7 System evolution

After the development of this web application, patients should have all fundamental features to manage their data. For the time being there are no new features planned. However, new features requested by our customer could be integrated without any problems in the future because our development team preferably strives to write good structered generic code.

With growing patient data and workloads in the future, the hardware can be enhanced with load balancers for example to coordinate traffic and more servers to distribute the databases and link them together.

8 Testing

This application is meticulously tested using the following methods.

8.1 Component Tests

The code of the application is gonna be tested using numerous methods including unit tests by the individual developers and code reviews. This way a high software quality can be ensured.

8.2 Integration Tests

To ensure all components are behaving correctly together they are thoroughly tested before deploying a new version.

8.3 System Tests

After the aforementioned integration tests the result is compared agains the specification to ensure that the requirements and functionality are correctly implemented and working.

8.4 Validation Tests

At the end of the project the application is tested together with the customer. This way it can be ensured the software is behaving exactly like the customer wants and that the user experience is acceptable

9 Appendices

- System requirement
  - User:
    - Devices with internet connection (Computer, Tablet, Phone)
    - Browser for example Firefox, Safari, Chrome
  - Server:
    - Enough space for data
    - Enough performance (Ram Memory, Processor)
    - Reliable and fast internet connection

10 Glossary

Asynchronously Not simultaniously (Ex. A chat is asynchronous because not all parties must be present at the same time) .

Client An endpoint device which allows a user to interact with a system (ex. A cell phone with an internet browser) .

Database A storage system for electronic data .

Device Any appliance to view the PMS (Ex. Phone, Computer) .

Fluoxetine An antidepressant (Brandnames: Prozac, Sarafem, ...) .

UI Short for User-Interface .

Unit Test A test which (automatically) tests an isolated, small part of a computer program .

11 List of Figures

12 List of Tables