

Clinical Management System

SECOND SEMESTER PROJECT

TEAM 4

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Deadline: 8/06/2018

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**Abstract**

The purpose of this report is to inform the reader on what methods and techniques where used to complete the given tasks for this project. For this case, the given tasks corresponded with the ones received from Vipassana which have been struggling with their business activities due to lack of technology being implemented accordingly resulting in slow and inefficient outcome.

Because of this several methods have been used to result in a satisfactory product for the costumer in hand.

This paper will provide all the steps, methods and techniques used in a detailed manner so that reader can get a good understanding on what took place.

A summary of the costumer will be provided at the beginning of this report since it is crucial for the first step to get a better understanding of the struggles faced in the enterprise.

Furthermore, a list of requirements will be provided in the beginning since they play an important role in understanding the client and what they want out of this project.

These will play a crucial role for the development and implementation for this document and will add functionality for the created system.

# 1 Introduction

Dan-Med is a clinic institute which resides in Denmark Århus and its focus is to provide healthcare to their patients and offer high quality services. The clinic does not specialize in multiple medical fields rather in general medicine. The staff has been concerned lately with the booking system that they are currently using since it is inefficient and unreliable in organizing and planning their daily activities.

The appointments are organized and stored using pen and paper and this makes it difficult for some staff members to keep track of each individual task. Also, the secretary must be able to send medicine renewal requests to the doctor from patients that requested this. Because of this miscommunication sometimes happen between the secretary and the doctor since most of the time this must be orally communicated and often the doctor is busy with meetings and the information is forgotten since it is not stored anywhere.

This is a bad practice and often results in conflict between the patients and the institute. Besides that, medical records of patients and prescribed medicine are also made using pen and paper and are stored on files inside drawers. Retrieval of certain patient’s records becomes a daunting task and a significant amount of time is wasted while searching through these records.

Because of these negative factors, the business is struggling these days to stay on the market.

As such the clinic wants to improve their activity flow and would like to receive an IT solution to solve their problems. The customer would like a system that could improve their daily activities such as storing records of patients, medicine and so on and the system should be able to make retrieval of this data fast and reliable.

Storing for the records must be made using a digital solution instead of paper and functionality must be kept always

As a result, this paper will provide the reader with all the necessary information needed to get a better understanding on what methods, techniques, resources where used to complete this project and what challenges arose and how they were solved.

Considering the delimitation chapter from the problem description, this paper will only focus on what has been established there and will not add anything new.

In the following chapter, the business case will be presented and requirements from it will be established and segmentation will be made based on importance level.

# 2 Requirements

In this chapter the purpose will be to establish the requirements based on the user stories from the customer. Based on the user stories requirements can be made and separated into two groups: functional and non-functional requirements.

This is done so that a better understanding of the customer’s needs can be made. All the requirements in this chapter are base on the business case from the clinic.

To categorize the requirements into grades of importance, the SMART model will be used since it provides all the necessary tools to accomplish this.

SMART stands for Specific, Measurable, Achievable, Relevant and Time bound. This chapter will proceed in examining the five types of goals by means of the following questions.

**Specific**

The goal must be specific and clear enough to not create confusion in the team and everyone know exactly what to do.

1. ***What must be accomplished?***

As mentioned earlier, the client has made a business case where requirements where subtracted from. The clinic wants to increase productivity and diminish time loss and stress as much as possible.

Thus 13 functional requirements have been made based on the mentioned above which must be accomplished before the deadline.

1. ***Why is this important?***

The client desires functionality above anything else and even though the requirements have been grouped into two categories, the functional ones remain as first priority.

1. **Who is involved?**

The customer has given the task to a team of engineers who are responsible for the projects execution, however both parties are involved in the process since good communication must be kept always or whenever changes need to be made due to different factors.

**Measurable**

This goal main characteristic is to keep track of the projects evolution and all the different tasks present in it. This is important to the team working on the project, so deadlines are met, and motivation kept high.

In consequence the following questions come into place:

1. ***How much?***

How much time is allocated for the given requirements, and howl long will it take to accomplish each individual task before reaching a certain milestone.

1. ***How many?***

What must be accomplished for this project and how many tasks does it have that need done.

1. ***When will the project be finished?***

The project will be considered complete, once every requirement has been met and delivery must be made before the given deadline.

**Achievable**

The given assignment must be able to challenge the team working on it but at the same time the given tasks must be realistic and doable in the given time.

1. ***How can the tasks be realized?***

The given tasks must be realistic so that they can be finished in the given time stamp. Also, all the necessary resources must be at the workings team disposal.

1. ***Are the goals realistic?***

The given tasks must be executable and not exaggerated in terms of difficulty level and resources must be allocated towards the team to help in achieving their purpose.

**Relevant**

This topic poses the question whether the given tasks are relevant or not.

1. ***Are the given tasks worth it?***

The given tasks must be relevant and logical to make sense for the team so that every member knows what must be done.

1. ***Is it the right time?***

Now a day’s technology has evolved significantly and has influenced the entire world, and as such everyone on the marked tries to be as competitive as possible. Thus, every enterprise is looking for ways of improving their productivity to stay ahead of the competition.

**Time-bound**

In this section of the SMART model, time as a resource and as an entity will be debated since each process has a start and an end. Thus, this prevents other daily activities to take priority over others since in this period the project takes higher importance.

Because of this the following questions appear.

1. ***When?***

When must the project be finished and what is the given time limit for it.

1. ***What can be executed in the given period?***

Time must be treated as a resource and must be used with caution. Tasks must be prioritized, and proper time must be allocated according to grade of importance, so time is not lost on less important aspects of the project.

## 2.1 User stories

In this sub chapter the user stories from the customer will be presented since the requirements for this report will be made based on them.

1. As a manager I want to be able to add an employee to the system based on their specialty so that they can handle their tasks.
2. As a manager I want to search for employees so that I can keep track of them.
3. As a manager I want to be able to remove employees.
4. As a manager I want to be able to edit existing employees.
5. As a secretary I want to store patient personal information so that I can book a medical appointment for them.
6. As a secretary I want to be able to search for patient information so that I can obtain relevant information about a certain patient.
7. As a secretary I want to be able to manage an appointment so that I can organize patient meetings.
8. As a secretary I want to be able to view patient’s medical records so that their condition can be monitored.
9. As a secretary I want to view patients medicine so that I can send request for renew.
10. As a doctor I want to add a patient’s medical condition so that I can form a medical case.
11. As a doctor I want to prescribe medicine that can be stored in the patient’s personal record so that I can handle the data
12. As a doctor I want to renew medicine prescription that can be stored in the patient’s personal record so that I can satisfy his/her requests.
13. As a doctor I want to approve medicine prescription request that comes from the secretary so that patients can get what they requested.

## 2.2 Functional requirements

Based on the information above the following requirements have been created.

1. The system must allow the manager to be able to add new employees based on category.
2. The system must allow the manager to be able to remove employees.
3. The system must allow the manager to be able to edit existing employees.
4. The system must allow the manager to be able to search for certain employees.
5. The system must allow the secretary to be able to add new patient’s information.
6. The system must allow the secretary to be able to remove patient’s information.
7. The system must allow the secretary to be able to edit existing patient’s information.
8. The system must allow the secretary to be able to search for patient’s information.
9. The system must allow the secretary to be able to add an appointment.
10. The system must allow the secretary to be able to remove an appointment.
11. The system must allow the secretary to be able to edit an appointment.
12. The system must allow the secretary to be able to get a list of appointments.
13. The system must allow the secretary to be able to send a request to get the medicine renewed by the doctor.
14. The system must allow the doctor to be able to add a patient’s medical case.
15. The system must allow the doctor to be able to add a medical prescription to the patient’s medical record.
16. The system must allow the doctor to be able to renew medicine prescription for the patient.
17. The system must allow the doctor to be able to approve the requested medicine that comes from the secretary.
18. The system must allow the doctor to add medicine.
19. The system must allow the doctor to remove medicine.
20. The system must allow the doctor to be able to edit medicine.

## 2.3 Non-functional requirements

1. The system must be developed in java.
2. The usability of the system must be tested by end users.
3. The system must store information in a database.
4. The system must handle multiple requests at the same time.
5. The system must be up 24/7.

## 2.4 Scenarios

In this sub chapter the scenarios for the current software will be presented. Only one scenario will be shown as an example while the rest can be found in appendix….

1. **Add employee scenario**
2. Manager selects employee type.
3. Manager provides name and relevant information for an employee.
4. System validates employee data by confirming the saving of the entered information.

**Classes;**

* **System**
* **Manager**
* **Employee**
* **Type**

Methods:

* Select
* Validate
* Save
* Provide
* Confirming

# 3 Analysis

In this chapter, the focus will be on analyzing the user requirements stated above and modeling the software based on them trough the use of several methods and techniques.

To get a better understanding on how the user will interact with the new system, a use case diagram has been created.

***Figure 1 Use case diagram***

A close up of a map

Description generated with high confidence

For this case, there are 3 actors involved in the process and each of them have their own individual use cases as shown in ***Figure 1***. These use cases are the actions that each actor needs to perform as part of their daily activities.

Furthermore, use case descriptions have been made for each use case of the actors which participate in this flow. In this chapter only one, use case description will be shown as an example while the rest can be seen in Appendix …………...

***Figure 2 Add patient use case description***

A screenshot of a cell phone

Description generated with very high confidence

In this example, the actor performs an action using the system of adding a patient. This figure shows what steps the secretary takes for the system to successfully complete the requested action and what steps does the system make.

For more use case description examples, see Appendix……….

In the following figure, an example of an activity diagram will be made. The diagram is derived from one of the use case descriptions and graphically displays the steps taken by the actor to perform a certain action.

***Figure 3 Manager add employee Activity diagram***

A picture containing screenshot

Description generated with high confidence

The manager tries to add a new employee using the new system and is required to take certain steps before his request is completed as shown in ***Figure 3.***

For more examples of activity diagrams, see Appendix………

The next step in this chapter is to present a conceptual diagram for the new system. This is important since it provides a graphical representation on how the system will be created and how each component will interact with another to make it functional.

This is represented as a conceptual diagram as sown in ***Figure 4*** bellow.

***Figure 4 Conceptual diagram***

# 4 Design

In this section of the report, elements from previous chapters will be implemented to produce the final version of the requested system.

This chapter is relevant for the developers since it focuses on the technical aspects of this document while at the same time considering elements that are important for the stakeholders.

A class diagram for the system will be displayed and explained since it derives from the conceptual diagram model shown in the previous chapter. This is relevant since it provides a detailed view on how classes interact with each other for the newly created system.

This will also show the implemented methods in each class since they are needed to perform the required actions by the actors.

In the second part of this chapter an example of a sequence diagram will be displayed since this is necessary to show how the system will react and what steps it will take to perform the requested operation from the user.

The created GUI will also be shown and explained since it is an important tool for the user because of it provides a link between the actor’s requests and the rest of the system.

For the first step in this chapter, the class diagram will be presented and explained.

***Figure 5 Class diagram***