

SOFTWARE ENGINEERING

MEDICAL CLINIC

Software System to Support a Doctor

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Table of Contents

1. Project description	2
1.1 Area and subject of modeling	2
1.1.1 Problem domain	2
1.2 Modeling area	2
1.2.1 Description of organization structure	2
1.2.2 Activity Areas	3
1.3 Activity areas' description	4
1.3.1 Posts description	4
1.3.2 Business procedures description	4
1.4 Verified system's responsibilities	5
1.5 Short problems	5
1.6 Goals:	5
1.6.1 Product's aims	5
1.6.2 Design aims	5
2. Requirements description	6
2.1 List of functions from the users' viewpoint	6
2.2 Data to be stored in the system	6
2.3 Input and output documents	8
2.4 Required special requirements and limitations	8
2.5 Functional requirements' analysis	9
2.5.1 Patients Module	9
2.5.1.1 Patients Scenario with Cockburn's Pattern	10
2.5.2 Doctors Module	11
2.5.2.1 Doctors Use Case Scenario with Cockburn's Pattern	11
2.5.3 Administrative Module	13
2.5.3.1 Administrators Use Case Scenario with Cockburn's Pattern	13
2.6 Functional requirements for additional system functions	15
2.7 Non-functional requirements	15

1. Project description

1.1 Area and subject of modeling

1.1.1 Problem domain

The company is a medical organization composed of many different employees and created to reach every person that needs medical assistance, so that is the kind of people that are going to be interested on the project.

The software is going to be used in a medical clinic, helping both employees and clients, so for example the patients will be able to ask for a meeting with the doctor when they need medical assistance and doctors will send messages and prescriptions back to the patients.

1.2 Modeling area

1.2.1 Description of organization structure

Thanks to our modelling project, the organization of any medical clinic will be extremely easy to administrate. In these systems are going to take part not only the doctors and nurses but also the patients and providers of each office. The

The employees will be able to modified things such important like medical records of theirs patients or diagnostics from the appointments, as well as others less vital stuffs like, for example, holidays and vacations. In addition to that, patients will have the choice to make online appointments in a really simple way.



Figure 1 - Structure of Actors

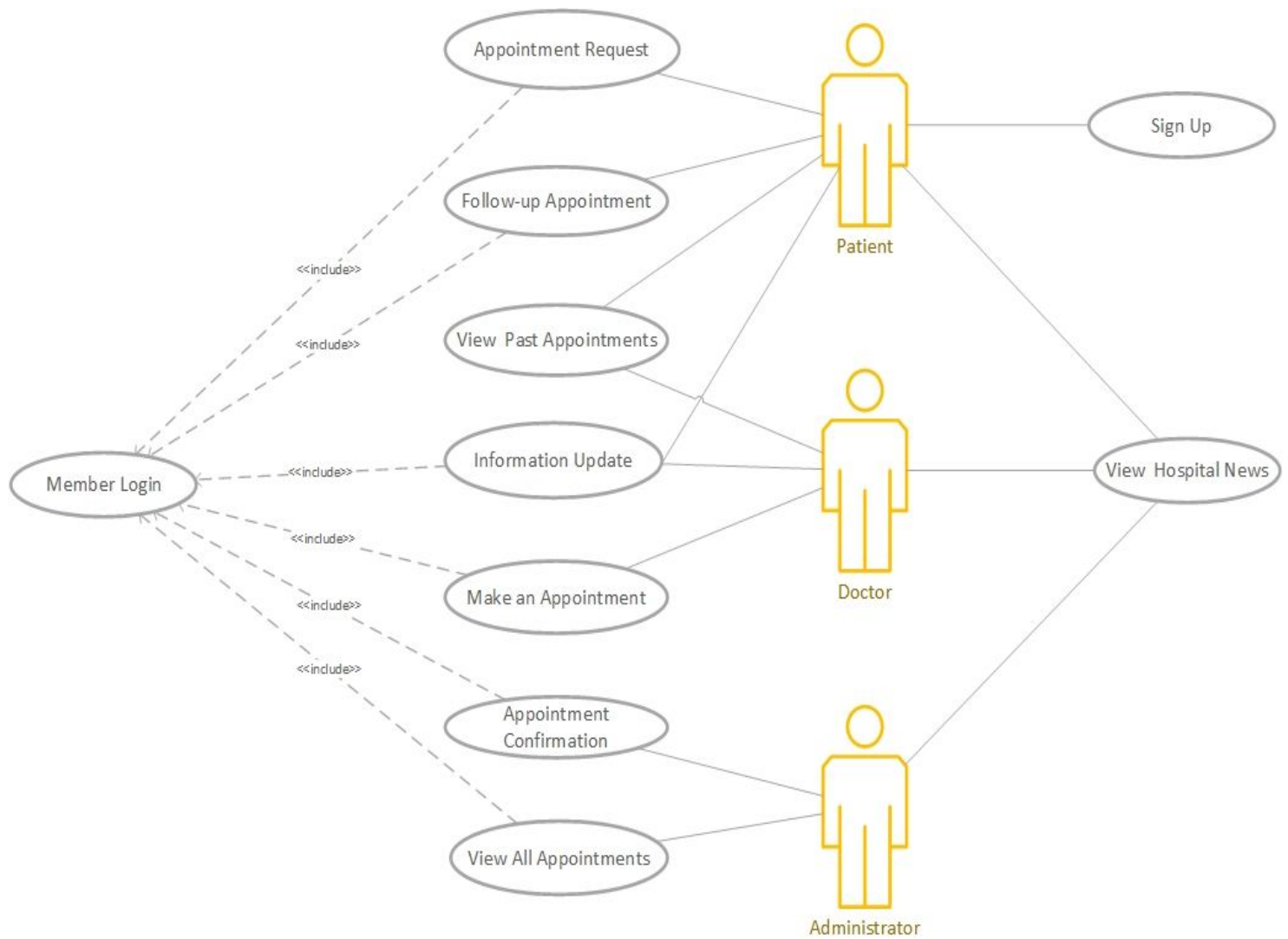


Figure 2 - Global Vision Use Case

1.2.2 Activity Areas

Each clinic will content the following areas separately:

- Administrative area
- Medical area
- Ordering area
- Human resources

1.3 Activity areas' description

1.3.1 Posts description

- Administrative area:
This area concerns everything what has to do with calendars, payments and identities or information about every individual interact with the clinic. Legal documentations and signed contracts from each person who has work or gain from those services.
- Medical area
The medical records and analyzes belongs to this area, as well as treatments followed by the patients and doctors. This information is quite sensitive due to its delicacy, so it will be specially good protected.
- Ordering area
Here we will include purchases and sales of different products which are necessary for the company. They are going to be mainly medicines and hygiene items for the maintenance of the office and services.
- Human resources
This area will be dedicated to manage the environment between the employees, additionally, they handle all new employees and other kind of internal problems.

1.3.2 Business procedures description

- Administrative area:
The employees in this area participate in a lot of business deals, they have to manage and store every contract done with a client, management of documents and information of the doctors.
- Medical area
There have to be a very good and special business deal on this area with the security of data enterprises, cause here is where the medical data is managed.
- Ordering area
This area is working directly with the providers, making deals and orders every week to have the necessary materials and medicaments for the clinic. Once they have closed a deal they must send the pertinent documents to the administrative area.
- Human resources
Human resources negotiate with the employees their contracts and new salaries, and also are the ones in charge of the new hires and layoffs.

1.4 Verified system's responsibilities

The system must guarantee a fast and good communication between the company and the clients, because patients must need a medical response quickly in case they have a serious health problem.

Also, it must store the medical data of the employees and of the registered clients, but with a very good security system to protect the people personal and medical information and prevent legal problems.

1.5 Short problems

One of the biggest problems the system will have to handle with is the unpredictable success of itself, so we will have to work and improve the system in case we have a lot of demand. For example, if we have a lot of registered clients we must store a huge amount of data and also have a better security system.

Another problem could be the fact that older people are less used to using new technologies, so we should implement in a way that everyone find it easy. Also, we could make it more international offering a few options for the language of the system and the communication with the employees.

1.6 Goals:

1.6.1 Product's aims

This product aims are to improve communication between hospital and patients, it will help to direct referrals to other hospital. On the other hand, the product is going to be beneficial for the shipment of medicines and materials.

1.6.2 Design aims

This application is calculated specially to help older people, the design includes a small messaging application so these people will be able to communicate immediately without the needed of going to the hospital.

2. Requirements description

2.1 List of functions from the users' viewpoint

- Patients
 - Make an appointment with the doctor
 - View their medical records
- Employees
 - Manage their contract
 - Manage holidays/free days
 - Order products
- Doctors
 - View medical records from their patients
 - Make a diagnosis
 - Add treatments to a patient
- Secretary
 - Add appointments
 - Manage medical records
- Nurse
 - Add treatments (limited)
 - Keep medical records (limited)
- Providers
 - Check their orders

2.2 Data to be stored in the system

In the system we will have information about all the people who is related to our clinic, as appointments, diagnosis, but also payments and salaries. To be more concrete:

- Employees
 - Name
 - ID
 - Address
 - Phone number
 - Email address
 - Bank account
 - Status of payment
- Doctors
 - Department number
 - Calendar
 - List of activities

- Nurse
 - Department number
 - List of activities

- Secretary
 - List of activities

- Providers
 - Name
 - ID
 - Address
 - Phone number
 - Email address
 - Department number
 - Type of product
 - List of activities
 - Bank account

- Registered patients
 - Name
 - ID
 - Address
 - Phone number
 - Email address
 - List of activities
 - Status of subscription payment
 - Dates of appointment

- Not registered patients
 - Name
 - Address
 - Phone number
 - Email address
 - Dates of appointment

2.3 Input and output documents

- Registration file

Registration will be an input information. When a new patient wants to subscribe to our medical clinic he has to fill a profile document about himself and his personal information such as full name, home address, phone number, bank account, etc. in order to the secretary can add all this information to the system.

- Doctor's diagnostics

Doctor's diagnostics are output documents, these documents include some informations about the patient's situation. All this diagnostics will be input information for patient's treatments

- Patient's treatments

Treatments will be output information as well as input because it would be the doctor's conclusion about the treatment to be followed by a patient, but also would be the document which the respective patient has to check to be able to follow it.

- Calendar

Here we have both type of documents as well. First of all the patient has to be able to see when the doctor is free to get an appointment, this would be output information. But then the patient has to fill a form about the appointment date, reasons and so on, this would be an input document.

2.4 Required special requirements and limitations

The most important thing to consider in our system is to have knowledge about how sensitive are the documents we deal with, in fact, we are talking about completely secret information about people.

That means we need a really secure system which doesn't let anybody go in without permission. The connections will be especially secure when they talk about diagnostics or reports from the doctors, and the login will be totally controlled, modifying passwords every three months or adding second steps as security improvement.

2.5 Functional requirements' analysis

The system consists of 3 modules: Patients Module, Doctors Module, Administrative Module. Each module has its own use case diagram and scenarios

2.5.1 Patients Module

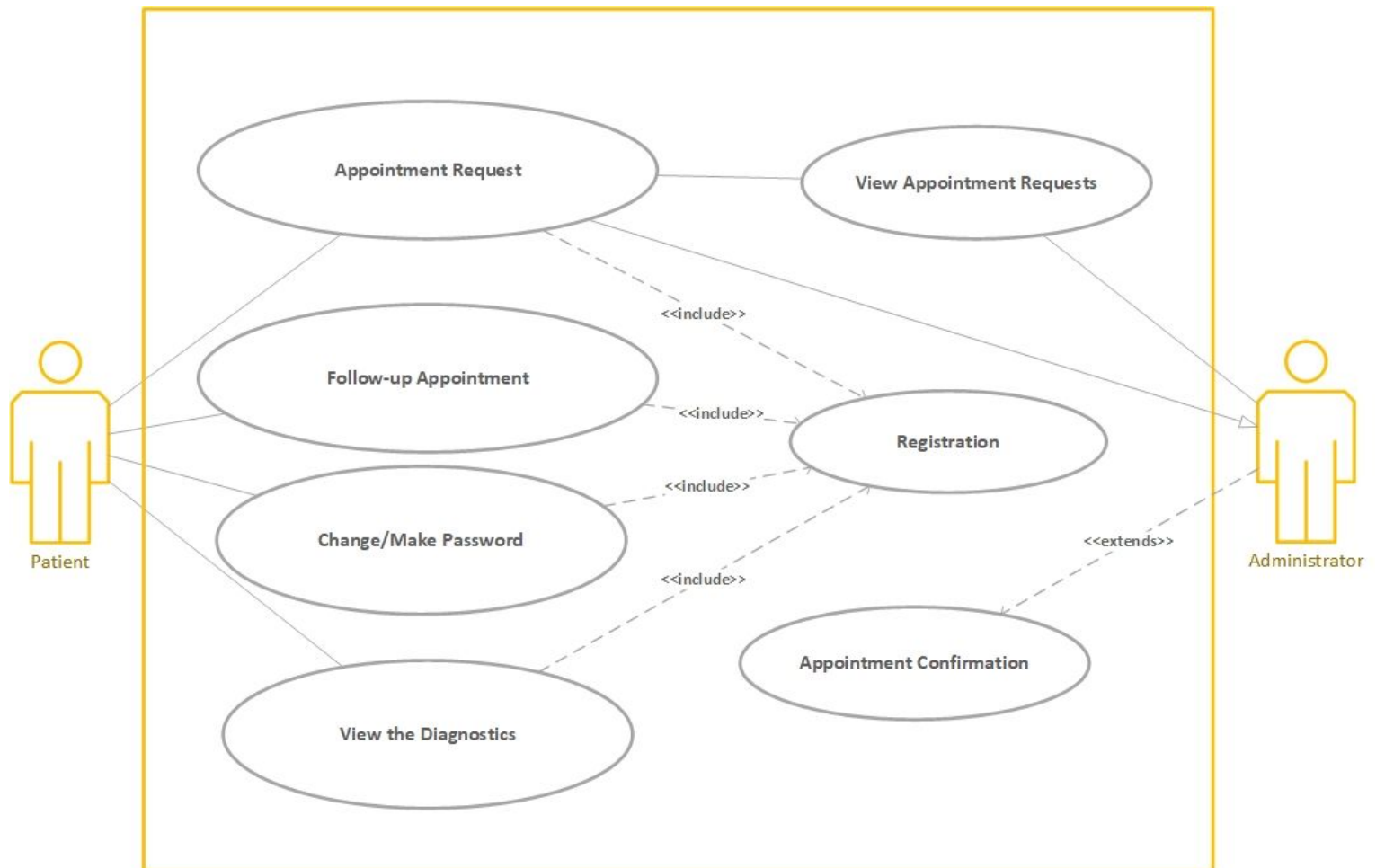


Figure 3 - Patients Movements Diagram

2.5.1.1 Patients Scenario with Cockburn's Pattern

Number (id) and the name of the Use Case: UC-01.- Patient Use Case

Author: Iñaki and Sefa

Objective of the Use Case: Understand and have a better compression of our system functionality, in this concretely case, how patients work.

Context (business goal of the Use Case): A patient would like to know something about his treatments or reports, or want to use the medical clinic services.

Range (project range, ie. which system is a „black box”):

Level: (business level, function, subfunction with implementation details): function like request for an appointment

Main Actor: Patient

Participants (other Actors): Administrator

Trigger (Initiating event – what starts the Use Case): First step is the intention to do an appointment to go to see the doctor.

Initial condition (what state of the world we expect at the beginning): Patient is not registered, then he or she will have to register herselfes or provide some specific information.

Minimal guarantee (how interests are protected at any ending, even not successful): The patients is doing an appointment and the internet conexions fels down.

Main scenario of the success (3-7 points in the form: 1. Client adds the product to the basket; 2. System successfully verifies availability of the product, etc.):

- Make sure the patient is registered
- Patient make an appointment request
- System verify that the doctor is available
- Add appointment to the doctor's calendar

Extensions - Alternative scenarios - extensions to main scenario points: <<Extend>>: Cancel the appointment, the patient has to be able to cancel an appointment whenever he need it.

2.5.2 Doctors Module

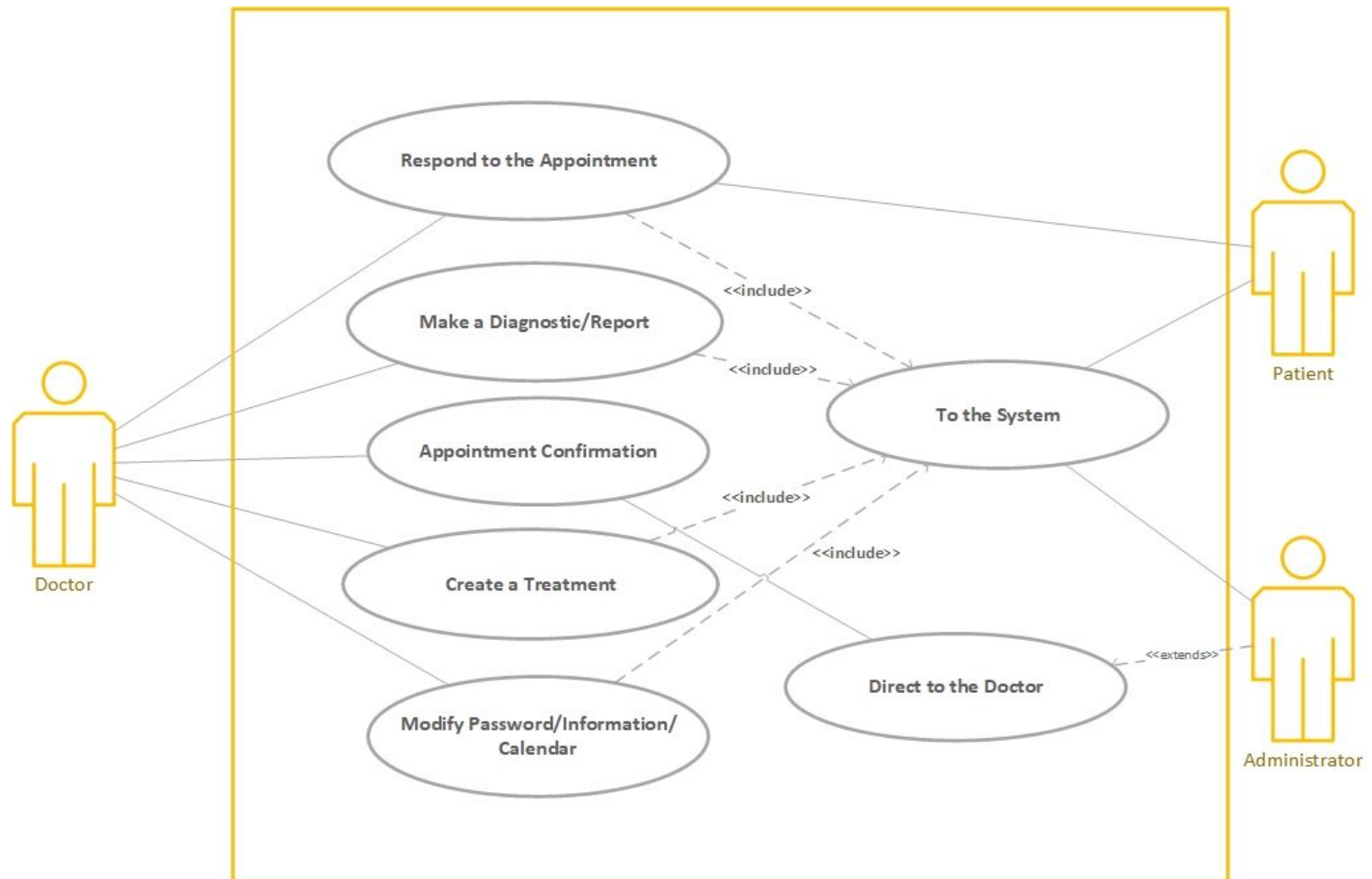


Figure 4 - Doctors Movements Diagram

2.5.2.1 Doctors Use Case Scenario with Cockburn's Pattern

Number (id) and the name of the Use Case: UC-02.- Patient Use Case

Author: Iñaki and Sefa

Objective of the Use Case: Understand and have a better compression of our system functionality, in this concretely case, how doctors work.

Context (business goal of the Use Case): During an appointment, the patient explains him all of his difficulties and problems, then the doctor has to redact an diagnosis and upload it to the medical record of the patient.

Range (project range, ie. which system is a „black box“):

Level: (business level, function, subfunction with implementation details): function, like make a report or design a treatment

Main Actor: Doctor

Participants (other Actors): Patient and Administrator

Trigger (Initiating event – what starts the Use Case): Redact conclusion of each visit and design a treatment for the patient.

Initial condition (what state of the world we expect at the beginning): To have an appointment with any patient.

Minimal guarantee (how interests are protected at any ending, even not successful):

Main scenario of the success (3-7 points in the form: 1. Client adds the product to the basket; 2. System successfully verifies availability of the product, etc.):

- After the patient's appointment is verified and added, this has to come to the doctor's clinic to explain which problem do he has.
- The doctor get conclusions and make a diagnosis of the appointment.
- Design a treatment and tells him.
- Add the diagnosis and the treatment to the patient's medical record.

Extensions - Alternative scenarios - extensions to main scenario points: <<Extend>>: Be able to see the medical record of any of his patients, so that he could have as much informations as he can to make a decision.

2.5.3 Administrative Module

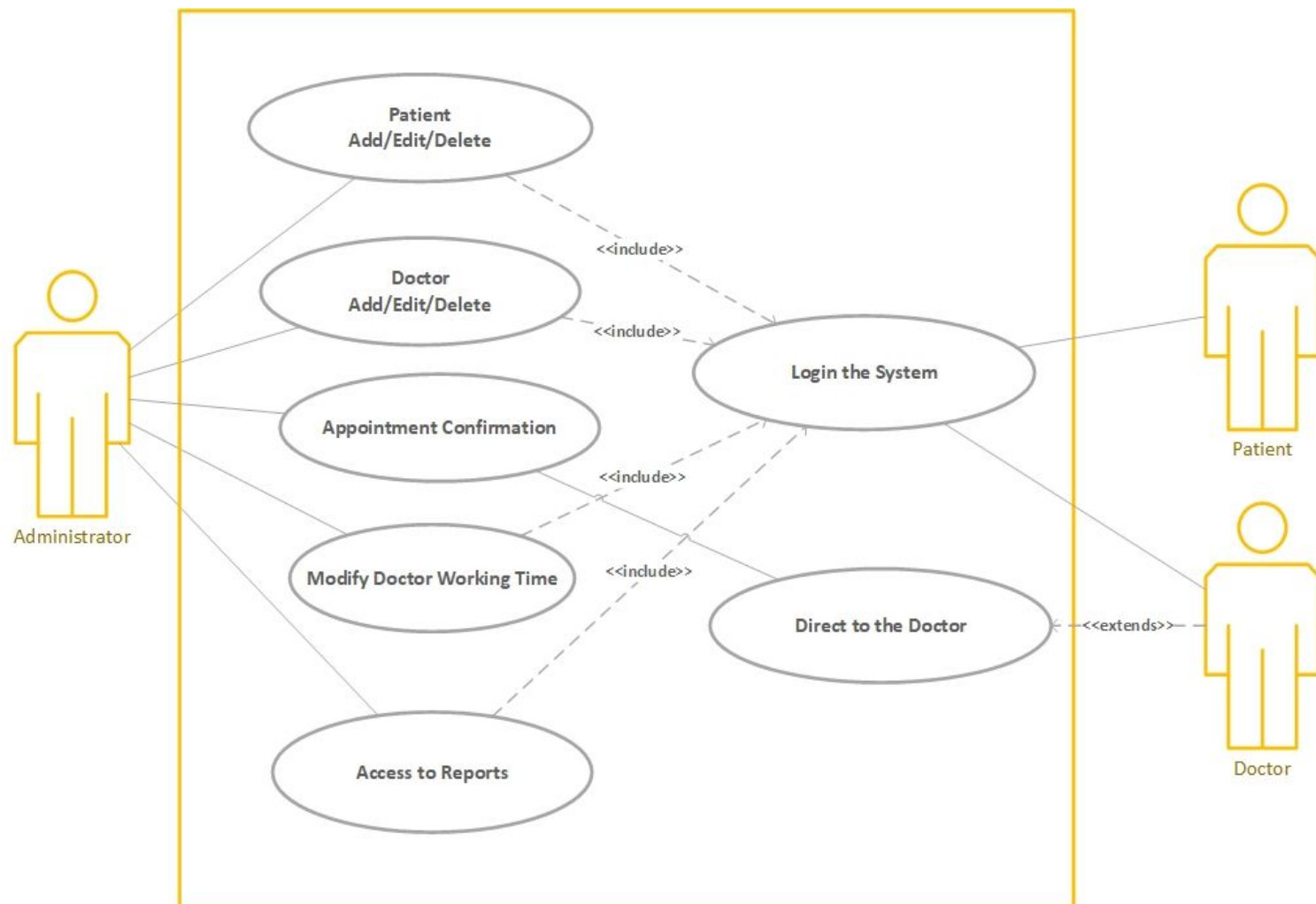


Figure 5 - Administrator Movements Diagram

2.5.3.1 Administrators Use Case Scenario with Cockburn's Pattern

Number (id) and the name of the Use Case: UC-3.- Administrator Use Case

Author: Iñaki and Sefa

Objective of the Use Case: Understand and have a better compression of our system functionality, in this concretely case, how administrator's work

Context (business goal of the Use Case): The patient's and doctor's schedule need to be modified and uploaded

Range (project range, ie. which system is a „black box“):

Level: (business level, function, subfunction with implementation details): function like add patients or access to reports.

Main Actor: Administrator

Participants (other Actors): Patient and doctor

Trigger (Initiating event – what starts the Use Case): Receive an application for an appointment from any patient, or for a modification from any doctor

Initial condition (what state of the world we expect at the beginning): Login and has access to the information of doctors and patients

Minimal guarantee (how interests are protected at any ending, even not successful):

Main scenario of the success (3-7 points in the form: 1. Client adds the product to the basket; 2. System successfully verifies availability of the product, etc.):

- Receive a request for an appointment
- Verify if the doctor is free in the schedule
- Add the appointment
- Inform the patient about the confirmation

Extensions - Alternative scenarios - extensions to main scenario points: <<Extend>>: Be able to see and modify the schedule of the patients and doctors, in addition to the salaries.

2.6 Functional requirements for additional system functions

We have only three input scenarios: Patients, Doctors and Administrations inputs:

- Patients input
 - Fill the profile form
 - Get an appointment
 - Update information about profile
 - Check the reports from the doctor
- Doctors input
 - Make a diagnostic/report
 - Create a treatment
- Administrative input
 - Add/Delete a new patient to the regist
 - Modify information about the patients
 - Modify the information about employees contracts

2.7 Non-functional requirements

The medical clinic will have next non-functional requirements:

- Update the information about the calendar of the doctors
- Control the amount of patients has each doctor per day
- Get statistics about the procedure and results of the clinic