OBJECT-ORIENTED ANALYSIS AND DESIGN

Directed Emergency System

Requirements Analysis Document

2 December 2022

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1 Introduction

As our strength in our project we would like to state that we have made improvements to solve the problem of communication gap between hospitals in emergency situations.

While devoloping our project we have determined some important points that we base on. Identified important points:

With the project we will do, patients will be transferred to the most suitable hospital as soon as possible.

We will ensure giving interactive answers.

Keeping the system up to date with the feedback we receive from the users. We aim to prevent communication breakdown due to turmail in emergency situations.

2 Current System

With the help of cloud computing, doctors and hospitals now we have the power increase patient engagement and give them anywhere anytime access to their medical data test result, and even doctor's notes. Using this system, we ensure that the necessary person is reached quickly and transferred to the right hospital as much as possible in emergencies.

3 Proposed System

3.1 Functional Requirements

Finds the location of the hospitals from the GPS satellite and records the feedback of the hospitals instantly. Ambulance also makes feedback. The system shows the feedback of the patients up-to-date. While it takes a long time to find a place and give a notification with GPS, our application quickly notifies two at the same time.

3.2 Nonfunctional Requirements

Usability : It must be usable for everyone even with someone who never used an application before.

Relaibility : There should not be any errors for updates will always occur.

Performance : The incident must be reported in 3 minutes.

Response time : Most of the incidents from anywhere in , anytime can be reported.

Supportability : All kinds of emergency situations can be reported and dealt with.

Quality : Usage of navigation must be without error.

3.3 System Models

3.3.1 Scenarios

Scenario name: SolvedProblemWithDES

Participating actors instances; Emine: Witness , Dilara: Dispatcher, Oguz: Ambulance Driver, Duygu: Hospital Worker

Flow of Events:

1 - An earthquake happens and Emine who happens to be there at that time sees it and reports the emergency to Dilara by calling her. Emine reports the address of where she is, a brief description of its location, and an emergency level.

2 - Dilara receives the call and the information and creates an *Incident* in the database by invoking the *OpenIncident* use case. The Dispatcher selects a response and acknowledges the emergency report. Dilara logins to DES.

3 – DES navigation system finds the nearest hospitals using the information of Dilara's inputs.

4 – Dilara sends patient information to Duygu with *OpenIncident* usecase, Duygu accesses the incident and patient form *Incident* site and Dilara asks if the first hospital have enough capacity to except the patient.

5- Duygu logins to DES.

6 – First, Duygu checks the occupancy of the hospital and after seeing that there is enough space, the patient is admitted and sends the acceptance information to Dilara.

7 – Dilara sends the location of nearest hospital to Oguz.

8 – Oguz recieves the location and informs to Dilara that he is on his way to deliver the patient/patients to the nearest hospital.

9 – Oguz brings the patient/patients to the hospital and informs his deliverance to Dilara.

10- Dilara closes the file of that patient and exits the system.

EXCEPTIONAL EVENT SCENARIO

Scenario name: SolvedProblemWithDES

Participating actors instances; Emine: Witness , Dilara: Dispatcher, Oguz: Ambulance Driver, Duygu and Kadriye: Hospital Workers

Flow of Events:

1 - An earthquake happens and Emine who happens to be there at that time sees it and reports the emergency to Dilara by calling her. Emine reports the address of where she is, a brief description of its location, and an emergency level.

2 - Dilara receives the call and the information and creates an *Incident* in the database by invoking the *OpenIncident* use case. The Dispatcher selects a response and acknowledges the emergency report. Dilara logins to DES.

3 – DES navigation system finds the nearest hospitals using the information of Dilara's inputs.

4 – Dilara sends patient information to Duygu with *OpenIncident* usecase, Duygu accesses the incident and patient form *Incident* site and Dilara asks if the first hospital have enough capacity to except the patient.

5- Duygu logins to DES.

6 – First, Duygu checks the occupancy of the hospital and after seeing that there is not enough space, the patient is not admitted and sends the rejection information to Dilara.

7- Dilara receives the rejection and selects the second nearest hospital DES listed. Dilara asks Kadriye if the second hospital have enough capacity to except the patient.

8- Kadriye logins to DES, checks the occupancy of the hospital and after seeing that there is enough space, the patient is admitted and sends the acceptance information to Dilara.

9 – Dilara sends the location of the second nearest hospital to Oguz.

10 – Oguz recieves the location and informs to Dilara that he is on his way to deliver the patient/patients to the nearest hospital.

11 – Oguz brings the patient/patients to the hospital and informs his deliverance to Dilara.

12- Dilara closes the file of that patient and exits the system.

SECOND SCENARIO

Scenario name: FireProblemSolvedWithDES

Participating actors instances; Emine: Witness , Dilara: Dispatcher, Oguz: Ambulance Driver, Duygu and Kadriye: Hospital Workers

Flow of Events:

1 - Emine who happens to be there at that time sees the flames and the smoke coming from the incident place and calls Dilara.

2 - Dilara receives the call and the information.

3 – Dilara logins the DES.

4 – DES navigation system finds the nearest hospitals using the information Dilara's inputs.

5 – Dilara sends patient info to Duygu and asks if the first hospital have enough capacity to except the patient.

6- Duygu enters DES.

7 - According to the data Duygu has, she excepts the patient then gives feedback to Dilara.

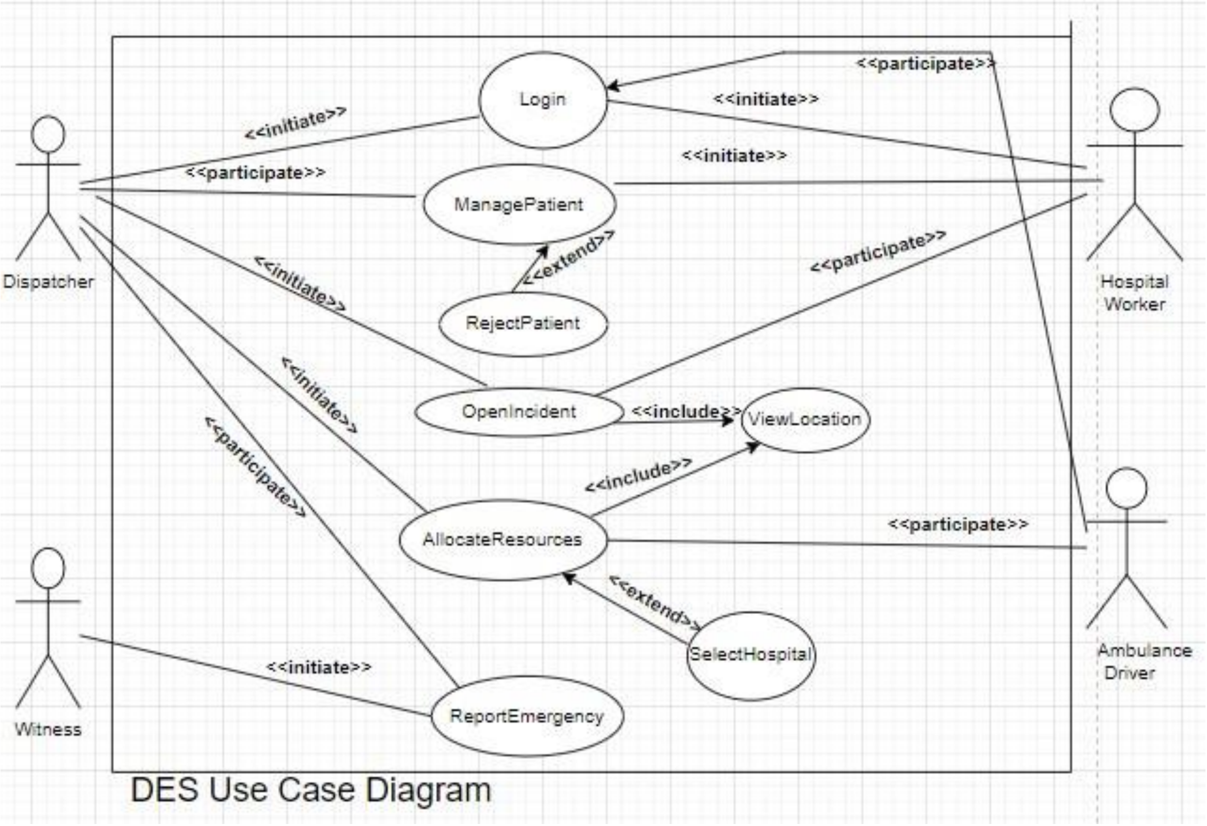
8 – Dilara sends the location of nearest hospital to Oguz.

9 – Oguz confirms the feedback and gives feedback of his driving to the hospital to Dilara

10 – Oguz gives feedback to Dilara about his deliverance.

11- Dilara exits the system.

3.3.2 Use Case Model



3.3.3 Object Model

Use Cases

Name: AllocateResources
Participating Actors: Dispatcher, Ambulance Driver
Entry Condition: Providing emergency information to dispatcher, dispatcher entering the patient's location information into the system.
Exit Condition: The ambulance driver notifies that the patient has reached the hospital.

Flow of Events:

1. The dispatcher enters the patient location into the system.
    2. The system directs the ambulance driver to the patient's location.
3. The dispatcher enters the information of the hospital that accepts the patient into the system.
    4. The system directs the ambulance driver to the hospital.
5. The ambulance driver notifies that the patient has reached the hospital.

AllocateResources(extend relationship)

1. …
2. …
3. The hospital where the patient wants to be taken is entered into the system by the ambulance driver and the patient is taken to the hospital of his choice.
4. …
5. …

AllocateResources(include relationship)

1. …
2. The system displays the patient's location on the screen on the map and directs the ambulance driver to the location.
3. …
4. …

Name: OpenIncident
Participating Actors: Dispatcher, Hospital Worker
Entry Condition: Providing emergency information to dispatcher, dispatcher entering the patient's location information into the system.
Exit Condition: Sending a incident report to the hospital

Flow of Events:

1. The dispatcher enters the patient location into the system.
2. According to the information he received from the witness, he determines the urgency and writes them to the incident report.
    3. The system prints the nearest hospitals on the screen sequentially according to the incident report.
4. According to the results, it sends the incident report to the nearest 3 hospitals.

OpenIncident(include relationship)

1. …
2. …
3. The system finds the nearest hospital list using the map system with navigation.
4. …

Name: ManagePatient
Participating Actors: Dispatcher, Hospital Worker.
Entry Condition: The incident report reaches the hospital worker.

Exit Condition: The notification of the hospital worker reaches the dispatcher.

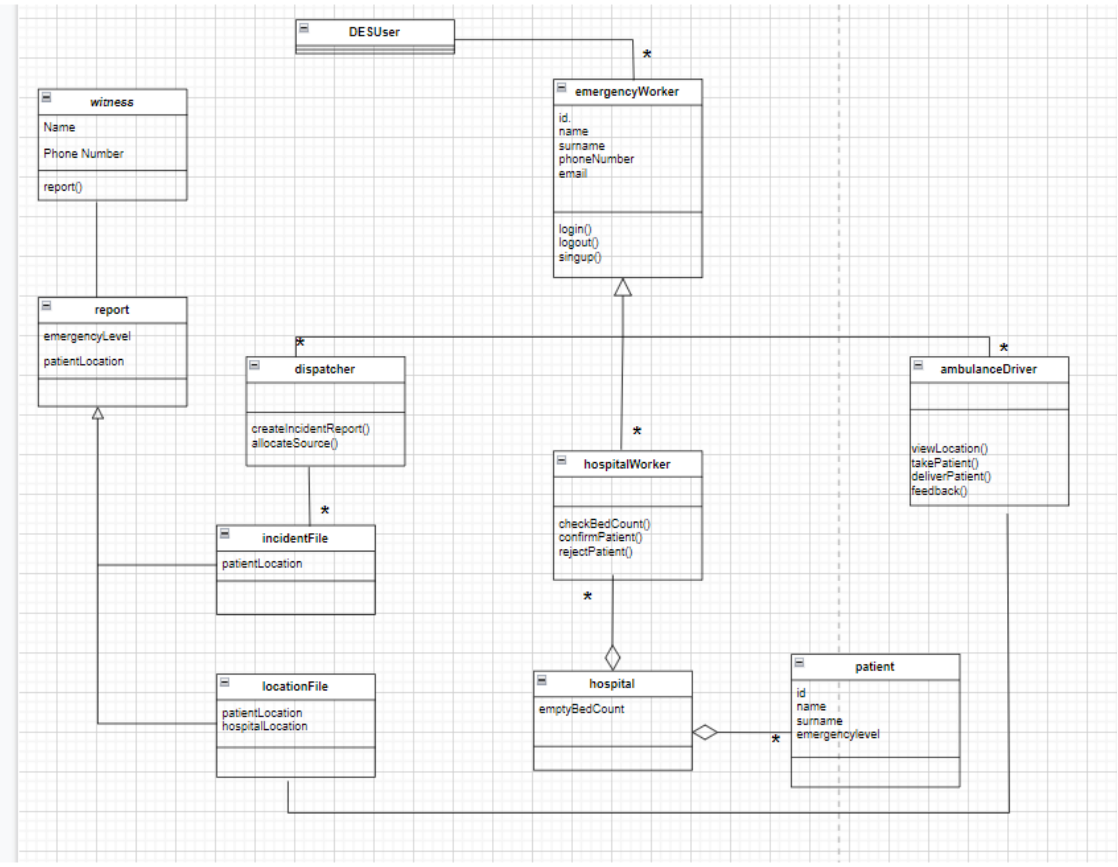
Flow of Events:

1. The incident report reaches the hospital worker.
2. The hospital worker checks the capacity and qualification information of the hospital.
3. The hospital worker decides whether he can receive the patient according to the hospital capacity and competence.
4. When he accepts the patient, he sends the information about this to the dispatcher.
5. Dispatcher receives notification sent by hospital worker.

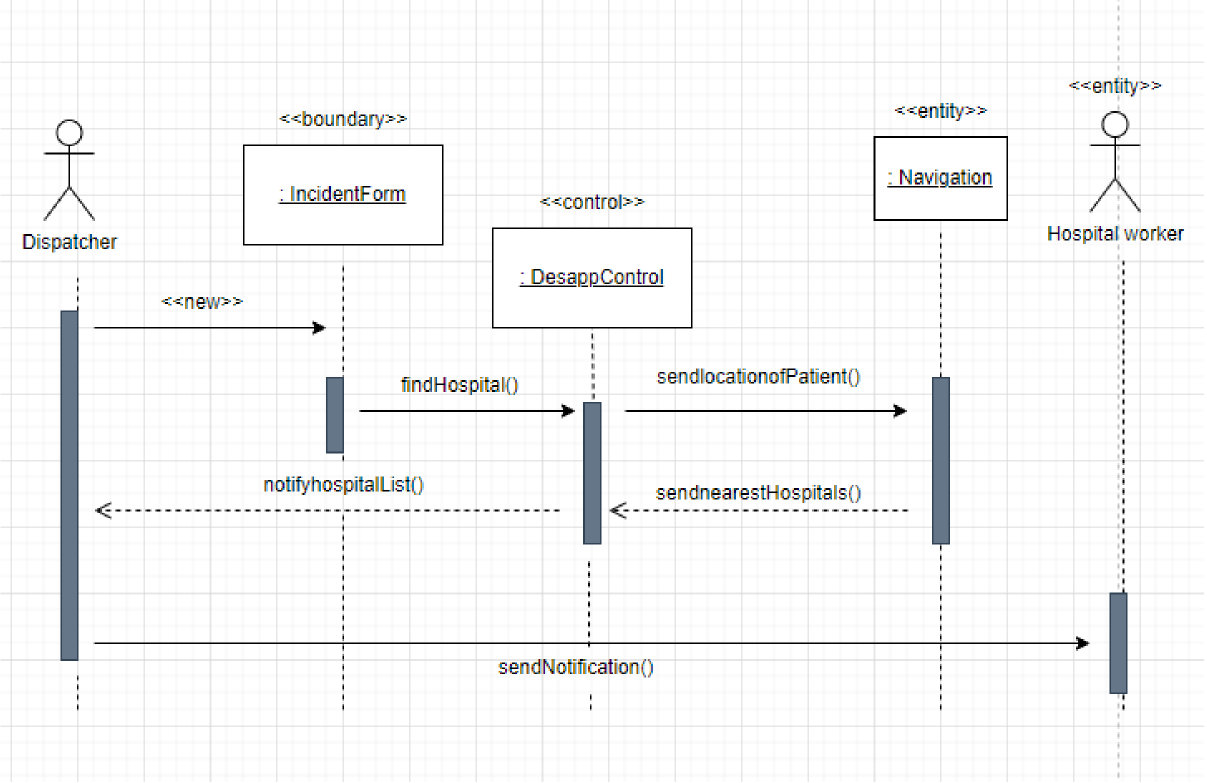
ManagePatient(extend relationship)

1. …
2. …
3. …
4. The hospital worker enters the notification that he cannot accept the patient into the system.
5. …

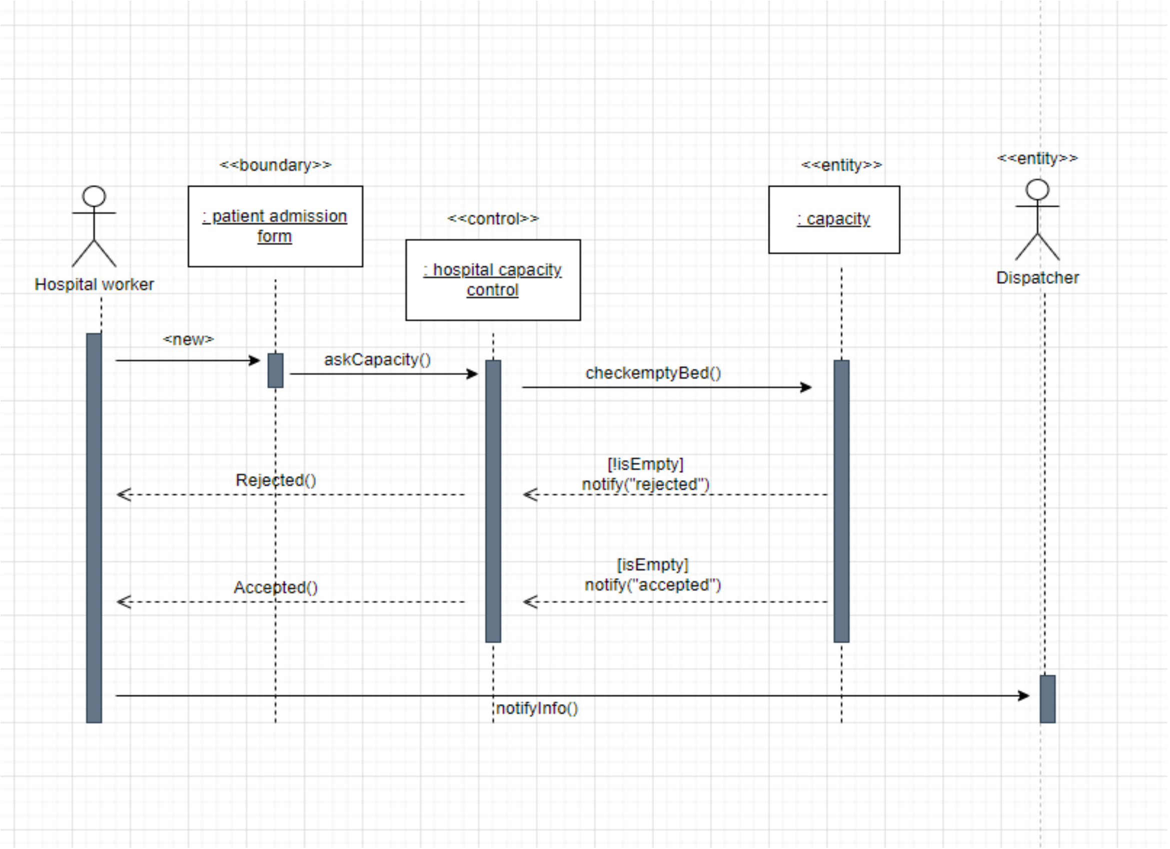
Class Diagram



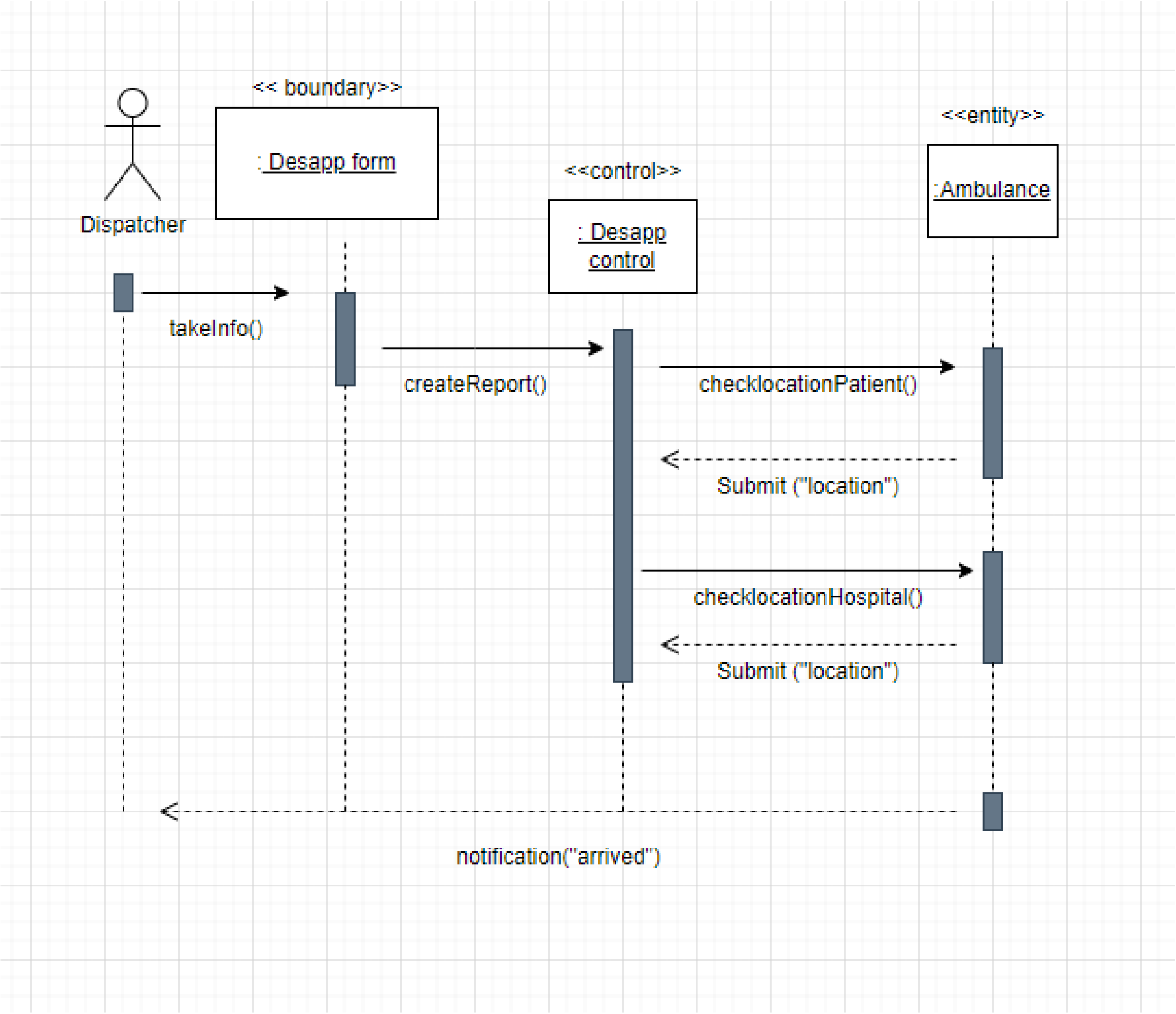
3.3.3 Dynamic Models



Open Incident Sequence Diagram.

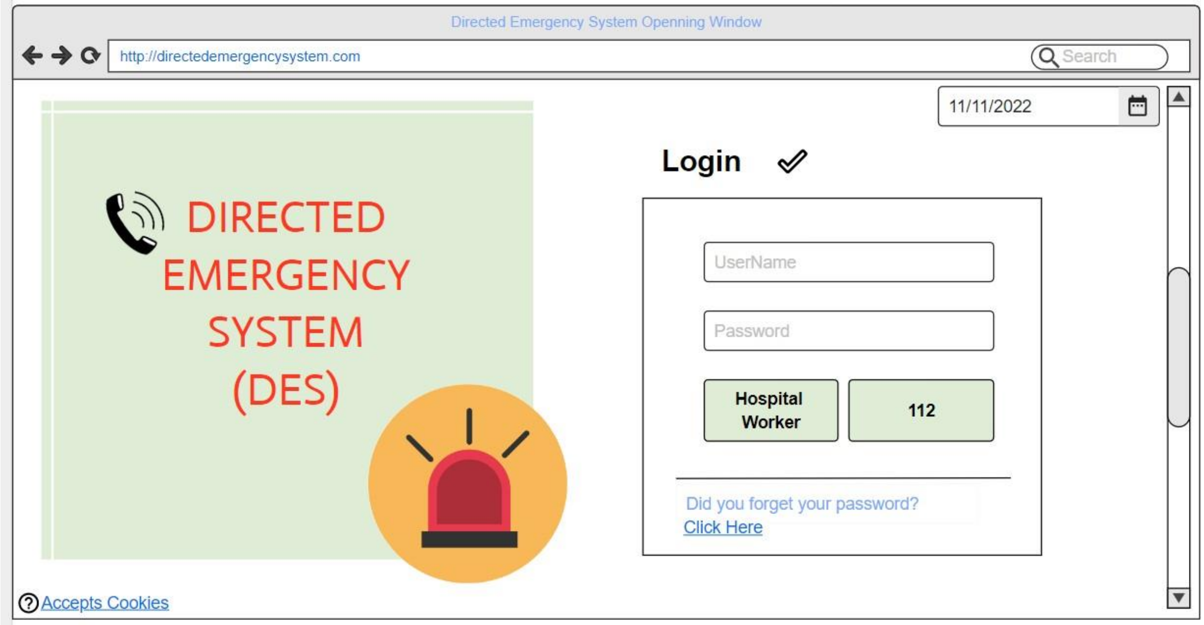


Manage Patient Sequence Diagram

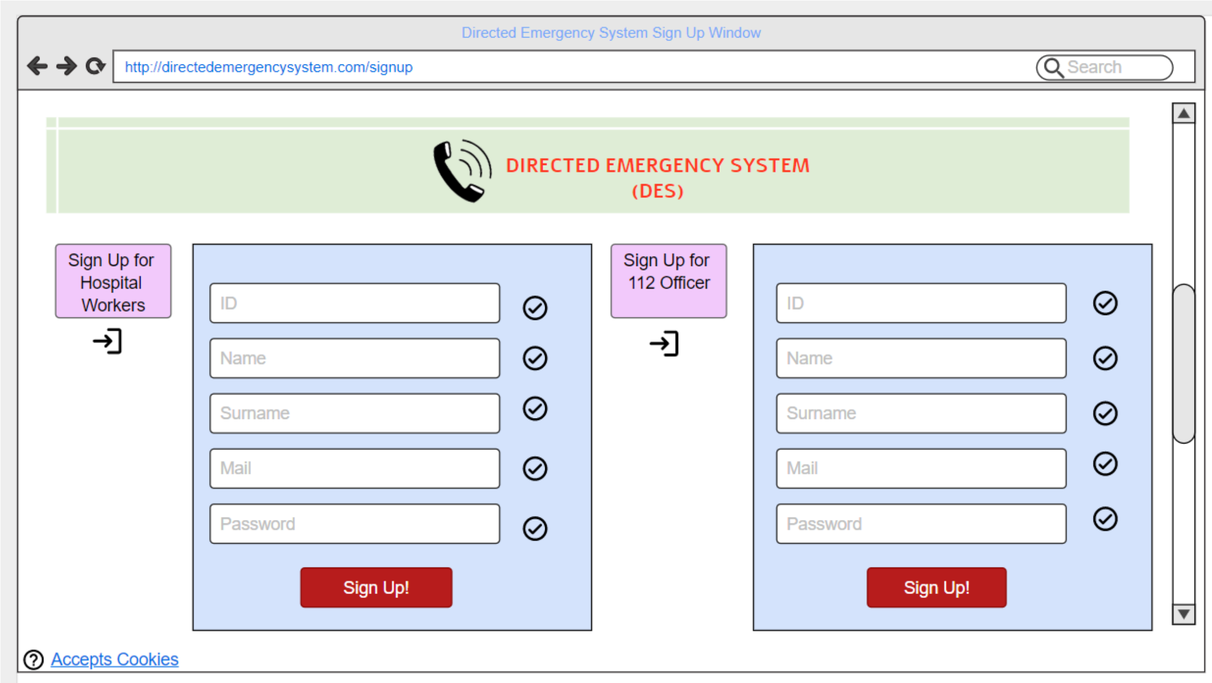


Allocate Resources Sequence Diagram

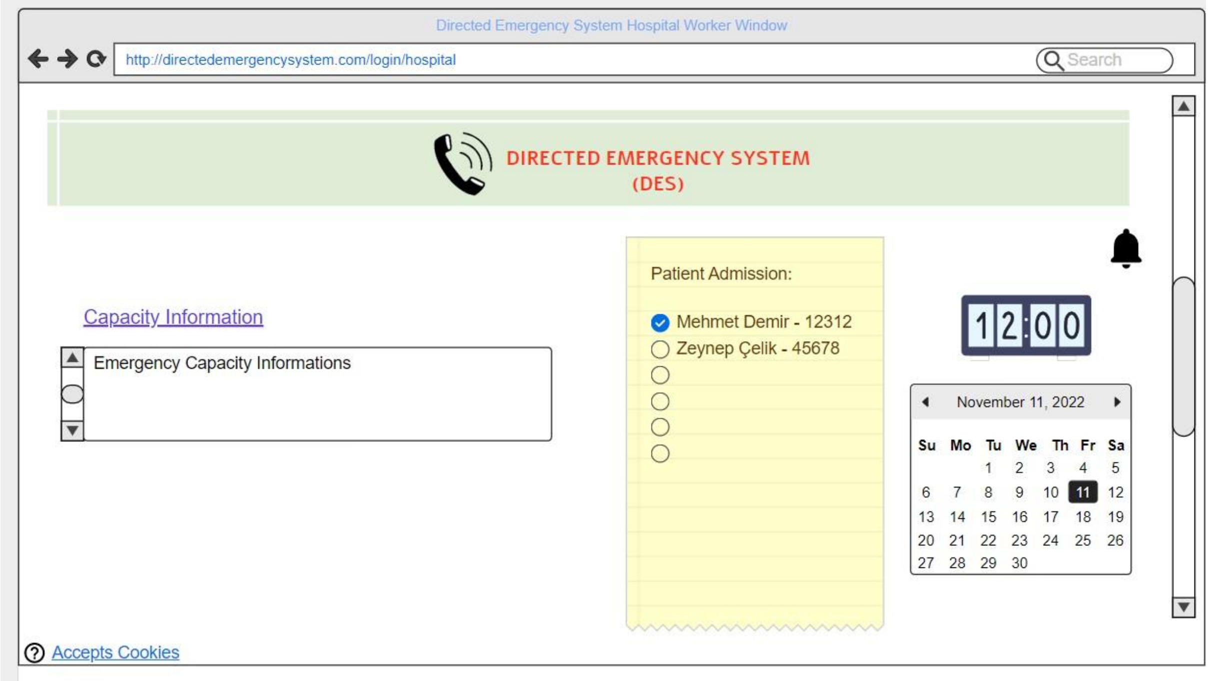
3.3.4 User Interface Mock-ups


Directed Emergency System Openning Window
http://directedemergencysystem.com
Search
11/11/2022
DIRECTED EMERGENCY SYSTEM (DES)
Login ✓
UserName
Password
Hospital Worker
112
Did you forget your password?
Click Here
Accepts Cookies

Directed Emergency System Opening Window


Directed Emergency System Sign Up Window
http://directedemergencysystem.com/signup
Search
DIRECTED EMERGENCY SYSTEM (DES)
Sign Up for Hospital Workers
ID
Name
Surname
Mail
Password
Sign Up!
Sign Up for 112 Officer
ID
Name
Surname
Mail
Password
Sign Up!
Accepts Cookies

Directed Emergency System Sign Up Window



Directed Emergency System Hospital Worker Window

http://directedemergencysystem.com/login/hospital

DIRECTED EMERGENCY SYSTEM
(DES)

Patient Admission:

- ● Mehmet Demir - 12312
- ○ Zeynep Çelik - 45678
- ○
- ○
- ○
- ○

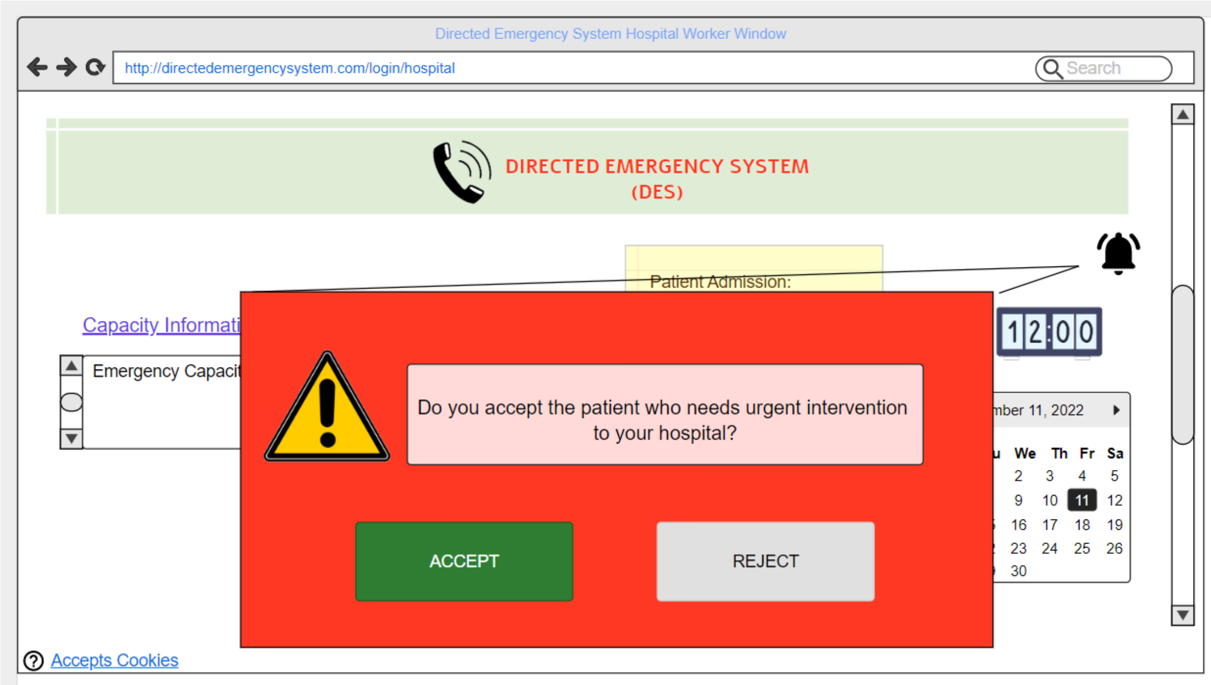
Capacity Information

Emergency Capacity Informations

12:00

November 11, 2022

Directed Emergency System Hospital Worker Window



Directed Emergency System Hospital Worker Window

http://directedemergencysystem.com/login/hospital

DIRECTED EMERGENCY SYSTEM
(DES)

Patient Admission:

Capacity Informati

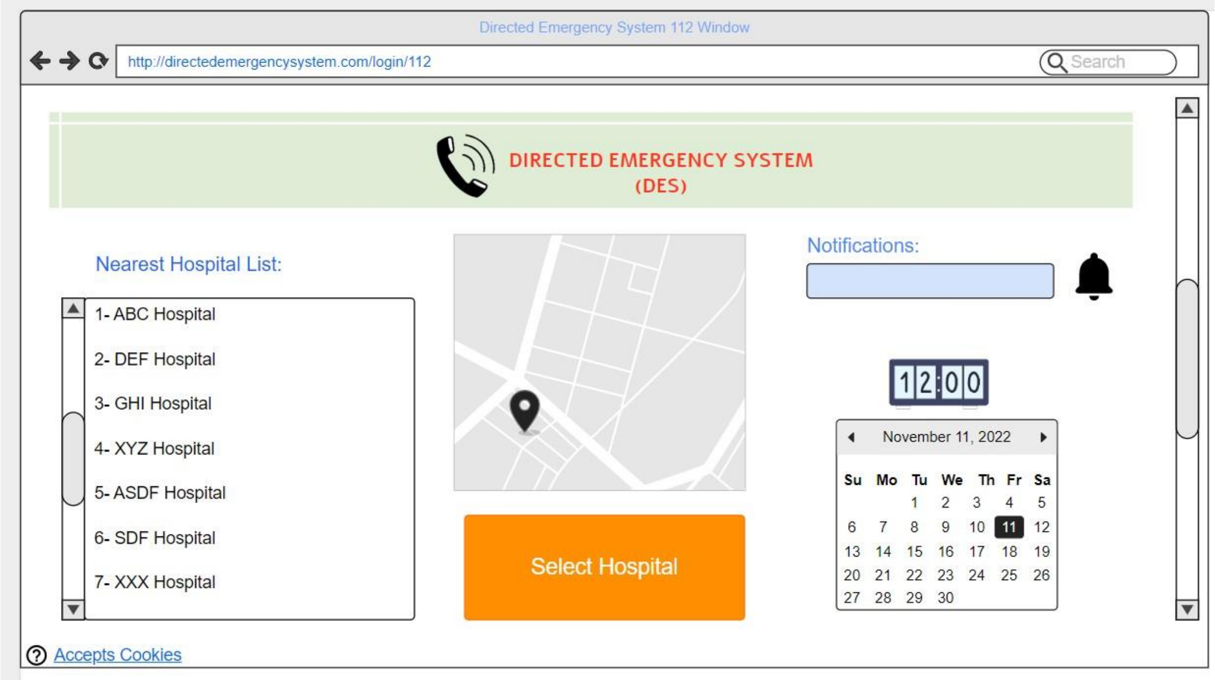
Emergency Capacit

Do you accept the patient who needs urgent intervention to your hospital?

12:00

mber 11, 2022

Directed Emergency System Hospital Worker Window



Directed Emergency System 112 Window
http://directedemergencysystem.com/login/112
Search
DIRECTED EMERGENCY SYSTEM
(DES)
Select Hospital
12:00
Accepts Cookies

Nearest Hospital List:

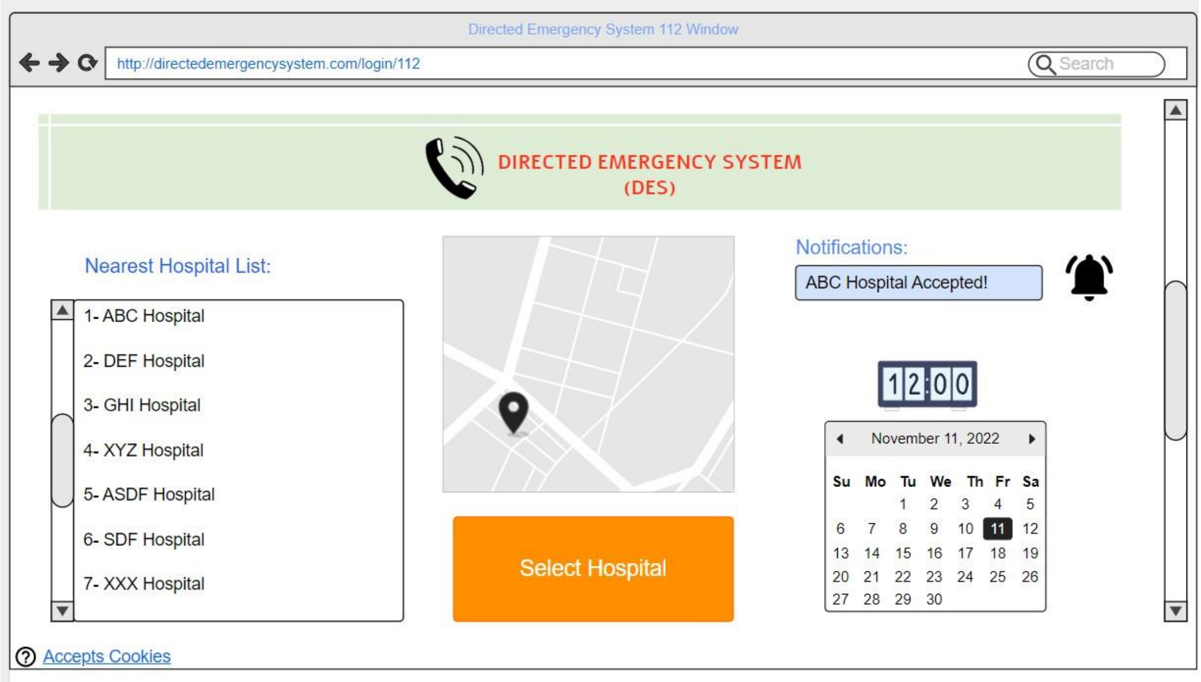
1- ABC Hospital
2- DEF Hospital
3- GHI Hospital
4- XYZ Hospital
5- ASDF Hospital
6- SDF Hospital
7- XXX Hospital

Notifications:

November 11, 2022

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

Directed Emergency System 112 Window



Directed Emergency System 112 Window
http://directedemergencysystem.com/login/112
Search
DIRECTED EMERGENCY SYSTEM
(DES)
Select Hospital
12:00
Accepts Cookies

Nearest Hospital List:

1- ABC Hospital
2- DEF Hospital
3- GHI Hospital
4- XYZ Hospital
5- ASDF Hospital
6- SDF Hospital
7- XXX Hospital

Notifications:

ABC Hospital Accepted!

November 11, 2022

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

Directed Emergency System 112 Window

4 Glossary

Dispatcher	The person who receives patient information, enters it into the system and directs the ambulance.
Witness	The person who notifies the dispatcher of the emergency.
Ambulance Driver	The person who learns the hospital to go to and carries the patient there by using the system.
Hospital Worker	The person who accepting and rejecting the patient using the system.
Login	The part where users log in to the system after registering to the system.
Manage Patient	The process of whether to admit the patient to the hospital according to patient information.
Reject Patient	Failure to admit the patient to the hospital due to full capacity.
Open Incident	Dispatcher's process of finding the nearest hospitals using the system.
View Location	Indicating the targeted location on the map.
Allocate Resources	Dispatcher's process of directing the ambulance driver according to the notification from the hospital.
Select Hospital	The patient specifies the hospital he wants to go to privately in the ambulance.
Report Emergency	The witness who witnessed the incident informed the dispatcher about the injured person.
Directed Emergency System Opening Window	It is the login screen of DES system users.
Directed Emergency System Sign Up Window	The screen where system users are members of the system.
Directed Emergency System Hospital Worker Window	The screen where the hospital employee receives notifications and manages patient admission.

Directed Emergency System 112 Window	112, the interface that the dispatcher uses.
DESUser	An object that contains the general properties and operations of DES users.
emergencyWorker	The class with general information of emergency workers.
ambulanceDriver	The ambulance driver class includes the characteristics and operations of the workers who take the patient from the accident site to the hospital.
hospitalWorker	The class containing operations of hospital employees.
incidentFile	It is the class of files that carry patient and accident information.
locationFile	The class that contains operations that show the location of the hospital and injured people.
patient	The class that carries the attributes and operations of injured people
hospital	The class containing operations of the number of empty beds.
report	The parent class, which contains the general characteristics of the patient status, incident file and location classes.
witness	The class that contains the witness's attributes and operations.
Name	The attribute that holds the names of the people in the classes.
Phone Number	One of the attributes of system users.
report	The function in which the person who witnessed the accident reports the accident.
emergencylevel	Feature indicating the damage status of the injured person.
patientlocation	The attribute that carries the information of the patient's location.
id	One of the attributes of system users.

surname	The attribute bearing the surname of the people in the system.
email	One of the attributes of system users.
logout	An operation of the emergency worker class that users in the system use to exit the system.
signup	Operation to register in the system.
Create incident report	An operation of the dispatcher class that is used to generate a patient report.
Check bed count	Operation that controls the number of beds.
Confirm patient	It is an operation of the hospital worker class used to accept patients.
Reject patient	Operation that does not accept the patient.
Empty bed count	It is an operation of the hospital class that keeps the number of empty beds in the hospital.
View location	The operation in which the ambulance driver obtains location information.
Take patient	It is an operation of the ambulance driver class, which refers to the removal of the patient from the accident site.
Deliver patient	Operation related to the transport of the patient to the hospital.
Feedback	It is an operation of the ambulance driver class that transmits to the dispatcher that the patient has reached the hospital.
Des App Form	The boundary object for allocate resources.
Take info	Function that receives information from dispatcher.
Create report	Report generation function.
Des app control	Control object for allocate resources.

Check Location(patient)	Function that sends the location of the patient to the ambulance.
Submit (“location”)	Function indicating that the patient position is taken.
Check Location(hospital)	Function that sends the location of the hospital to the ambulance.
Notification (“arrived”)	The function that carries the information that the hospital has been reached.
Ambulance	Entity object for check and submit location
New	The function that creates the incident form.
Incident form	Boundary object of manage incident usecase.
Find hospital	The function that tells the control object to find a hospital.
Notify hospital list	Function that sends the location of the nearest hospital list to the dispatcher.
Des app control	Open incident usecase’s control object.
Send location of patient	Function that sends the location of the patient to the navigation.
Navigation	Open incident usecase’s entity object.
Send nearest hospitals	Function that sends the location of the nearest hospital to the app.
Send notification	Function of notification of the decision made by the hospital employee to the dispatcher.
New	The function that creates the patient admission form.
Patient admission form	Boundary object of manage patient usecase.
Hospital capacity control	Control object for capacity.

Capacity	Entity object of manage patient usecase.
Ask capacity	Function to learn the capacity.
Check empty bed	Function to control the empty bed
Rejected	Function of the hospital employee's notification that he has rejected the patient.
Accepted	Function of the hospital employee's notification that he has accepted the patient.
[!is empty] notify (“rejected”)	There is not an empty bed and the function that tells the patient to write the reject notification
[is empty] notify (“accepted”)	There is an empty bed and the function that tells the patient to write the accept notification
Notify info	Function to sending information to dispatcher.