

# Design Document

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**Project Name:** Take Me There

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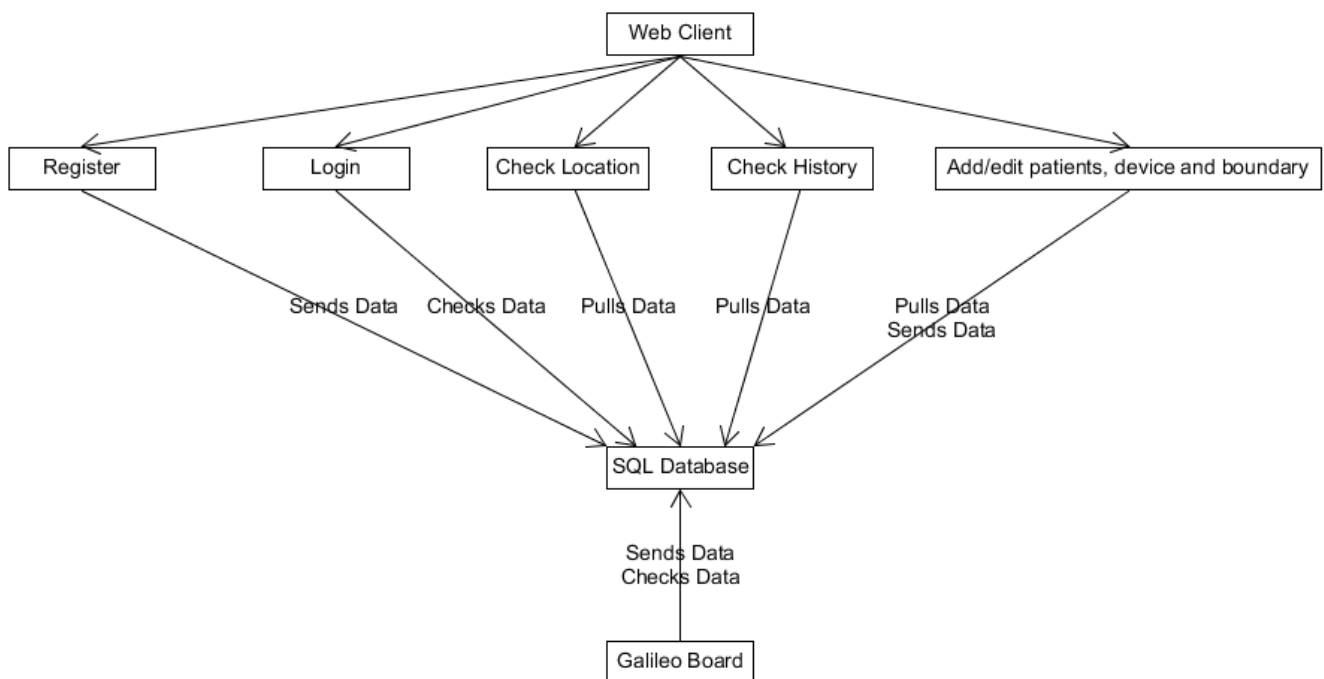
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## Introduction

The purpose of this document is to provide a detailed document for Software Developers and a guide on the architectural structure of the Take me there project. The goal of this project is to develop a wearable device (based on Galileo) that will lead the wearer to a particular location. When activated the device will lead the wearer along the correct path to their destination by signaling when to turn left or right. It will do this by getting directions from google maps (or similar). It will also upload the wearers current position and route to the cloud. Another feature of this device is letting the carer know if the wearer has left the boundary after curfew by sending a text message to the carer. Also if the wearer falls it will alert the carer to let them know that the wearer has fallen via text message.

## High Level Architectural Diagram



## Interface Design

### Home Screen

This is the first place that you are brought when you go to the website. Here it gives you a description of the website and what it is for. You have the option to either login or register to use the website.

**Welcome to the Take Me There home page!**

Login here [Login](#)  
Register here [Register](#)

The purpose of this website is to monitor a patient that is using the take me there device. Once registered you can monitor their location, check their history of where they have been and if they have fallen, also you can setup or edit the patients details like change their name, change the device sim number, setup a boundary and a curfew time.

## Login Screen

When you select the login option from the home screen you are brought to the login page where you will be asked for your email address and password. The system then takes the username and password and checks to see if the username and password exist in the database. If you are not registered or the login details are incorrect you are brought back to the login screen to try again. If the login was successful you are brought to the user home screen. On the login screen you also have the option to go back to the home screen.



**Welcome to the Login Page!**

Please enter in your login details.

E-mail

Password

## Register Screen

When you select the register button from the home screen it brings you to the registration screen. In this screen you are asked to for your name, email address, confirm email address, create a password, to confirm the password, and your phone number. Once you have entered in the details a thank you for registering screen appears and after five seconds it brings you to the login screen. The data that you entered is taken and placed into the right table. On the register screen you also have the option to go back to the home screen.

**Welcome to the Registration Page!**

Please enter in your details to register.

First Name

Last Name

Email

Confirm Email

Password

Confirm Password

Phone Number

## User Home Screen

Once you are logged in you are brought to the user home page. Here you can check the patients location, the patients history and edit the patients details, the device sim number, and the boundary details. On the user home screen you also have the option to go logout which brings you back to the home screen.

**Welcome to Your Home Page!**

Find wearers location [location](#)  
Wearers history [History](#)  
Register/edit the wearer and device [Edit](#)

Logout



## Location Screen

When you select the location option then system goes to the database and selects the patients location details by the device id. The system loads the location screen and the location of the patient is displayed on the map. On this page is an option to go back to the user home page or to logout which brings you back to the home page.



## History Screen

When the history option is selected the system gets the location, the fall impact, the date and time of the patient. The system then displays the data in a table on the history screen. On this page is an option to go back to the user home page or to logout which brings you back to the home page.

**Welcome to the History Page!**

History

FirstName	LastName	Date	Time	Latitude	Longitude	Fall Impact
john	shampoo	2015-03-31	20:14:58	53.783	-8.9164	0
john	shampoo	2015-03-31	22:16:29	53.7833	-8.9167	50
john	shampoo	2015-03-31	23:11:41	53.7835	-8.9168	100

Home

Logout

## Add/Edit Patients, Device and Boundary Details

When you select this option the system pulls the patients name, the device sim number, and the boundary details and displays them in a form. To change any of the data you must click the amend details button to unlock the text boxes to change the data. Once you click the update button then new data entered replaces the original data in the database. Also on this screen is an option to go back to the user home page or to logout which brings you back to the home page.

**Add/edit patient, device and boundary**

Please add or edit patients, device, or boundary details.

Patients First Name

Patients Last Name

Device Sim Number

Device Issue Date

Boundary Latitude

Boundary Longitude

Boundary Radius

Curfew Time

## Data Description

### register data

When the user goes to register they enter in their data and clicks the registration button. Next all the information that the user has entered is sent to the database and is given its own unique index key which in this case is the userID in the database and it is used as a primary key. The information that the user has entered is then split up in the database into their own specific fields for example the users first name would go into firstName position in the table of the database.

### Login data

The user goes to the login screen and enters their username and password. The system then goes and checks the users table in the database to check if the username and password exists in the table. If the login information is right the user is brought to their home screen. If the login information is incorrect the system returns them back to the login page and displays an error to the user to let them know if the username or if the password is incorrect.

### Location data

Once the user is logged in they are able to see the location of the wearer. The device that the wearer has on them updates the database with the wearers latitude and longitude every minute. On the client side when the user is in the locate wearer screen the webpage pulls the wearers latitude and longitude from the location database and displays it on a map showing where the user was before the next update.

### Boundary data

The carer of the wearer sets up a boundary and a curfew time so if the wearer leaves the boundary after curfew a text message will be sent to the carer to let them know that they have left the area. The device that is on the wearer checks the boundary table regularly to check and see if the wearer has left the boundary after curfew. If they have left the boundary the device sends the text message to the carer.

### Fall data

If the wearer falls the accelerometer in the device will measure the impact of the fall and send the impact data to the database to kept on record. Then the device will send out a text message to the carer to let them know that the wearer has fallen over.

## SQL Statements

### Register SQL

```
INSERT INTO users (firstname, lastname, email, password, phone) VALUES(%s, %s, %s, %s, %s)
```

Adds the new user to the database.

```
INSERT INTO location(DeviceID, latitude, longitude, Date, Time) VALUES(%s, 0, 0, null, null)
```

Adds a start location to the database which is empty.

```
INSERT INTO patients(firstName, lastName) VALUES("", "")
```

Adds a new patient to the database which is blank.

```
INSERT INTO device(UserID, PatientID, issueDate, sim) VALUES(%s, %s, %s, 0)
```

Adds the new device to the database which can be edited.

```
INSERT INTO fall(LocationID, impact) VALUES(%s, 0)
```

Adds the a blank fall into the database.

```
INSERT INTO boundary(DeviceID, boundaryLat, boundaryLong, radius, curfewTime) VALUES(%s, 0, 0, 0, null)
```

Adds a blank boundary data to the database.

### Login SQL

```
SELECT email, password FROM users
```

This statement pulls all the emails and passwords from the users table to be used to compare with the entered email and password.

### Location SQL

```
SELECT latitude, longitude from location WHERE DeviceID = %s
```

This statements selects all the latitude and longitude from the location table where the the deviceID is equal to the person who is logged in.

### Edit Patients SQL

```
SELECT firstName, lastName, sim, issueDate, boundaryLat, boundaryLong, radius, curfewTime
```

```
FROM device
```

```
INNER JOIN patients on device.PatientID = patients.PatientID
```

```
INNER JOIN boundary on device.DeviceID = boundary.DeviceID
```

```
WHERE device.DeviceID = %s
```

Gets the patients first and last name, the device sim number and issue date, the boundary latitude, longitude and radius and the curfew time. Once the data is pulled from the database it is placed into a form where it can be edited.

```
UPDATE patients SET firstName = %s , lastName = %s WHERE PatientID = %s
```

```
UPDATE device SET issueDate = %s, sim = %s WHERE DeviceID = %s
```

```
UPDATE boundary SET boundaryLat = %s, boundaryLong = %s, radius = %s, curfewTime = %s WHERE BoundaryID = %s
```

These statements are used to update the the database with new data.

## Get History SQL

```
SELECT firstName, lastName, Date, Time, latitude, longitude, impact FROM device  
INNER JOIN location on location.DeviceID = device.DeviceID  
INNER JOIN patients on patients.PatientID =device.PatientID  
INNER JOIN fall on fall.LocationID = location.LocationID  
WHERE device.DeviceID = %s
```

This statement gets all of the patients history, their location the date and time and if they have fallen. Then the data is put into a table and displayed to the carer.

## Database Tables

### Users Table

#	Name	Datatype	Length/Set	Unsigned	Allow NULL	Zerofill	Default
1	<b>UserID</b>	<b>INT</b>	<b>11</b>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<b>AUTO_INCREMENT</b>
2	firstname	VARCHAR	50	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NULL
3	lastname	VARCHAR	50	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NULL
4	email	VARCHAR	100	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NULL
5	password	VARCHAR	50	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NULL
6	phone	VARCHAR	12	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0

### Patients Table

#	Name	Datatype	Length/Set	Unsigned	Allow NULL	Zerofill	Default
1	<b>PatientID</b>	<b>INT</b>	<b>11</b>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<b>AUTO_INCREMENT</b>
2	firstName	VARCHAR	50	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NULL
3	lastName	VARCHAR	50	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NULL

### Location Table

#	Name	Datatype	Length/Set	Unsigned	Allow NULL	Zerofill	Default
1	<b>LocationID</b>	<b>INT</b>	<b>255</b>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<b>AUTO_INCREMENT</b>
2	DeviceID	INT	255	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
3	latitude	FLOAT		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0
4	longitude	FLOAT		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0
5	Date	DATE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NULL
6	Time	TIME		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NULL



### Fall Table

#	Name	Datatype	Length/Set	Unsigned	Allow NULL	Zerofill	Default
1	<b>FallID</b>	<b>INT</b>	<b>11</b>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<b>AUTO_INCREMENT</b>
2	LocationID	INT	11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
3	impact	INT	11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0

## Device Table

#	Name	Datatype	Length/Set	Unsigned	Allow NULL	Zerofill	Default
 1	DeviceID	INT	11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	AUTO_INCREMENT
 2	UserID	INT	11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0
 3	PatientID	INT	11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0
4	issueDate	DATE		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NULL
5	sim	INT	11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0

## Boundary Table

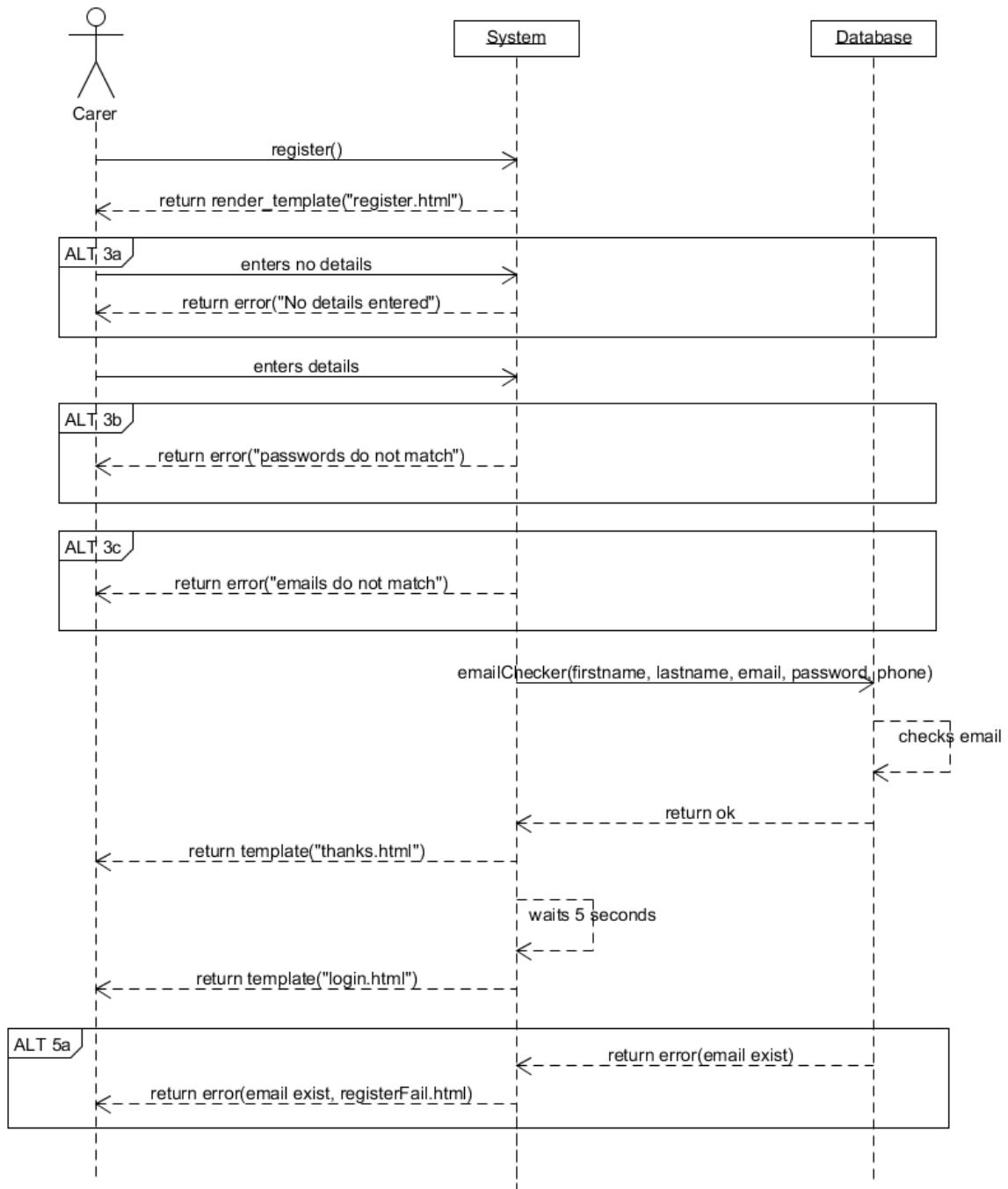
#	Name	Datatype	Length/Set	Unsigned	Allow NULL	Zerofill	Default
 1	BoundaryID	INT	11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	AUTO_INCREMENT
 2	DeviceID	INT	11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
3	boundaryLat	FLOAT		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
4	boundaryLong	FLOAT		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
5	radius	FLOAT		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
6	curfewTime	TIME		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NULL



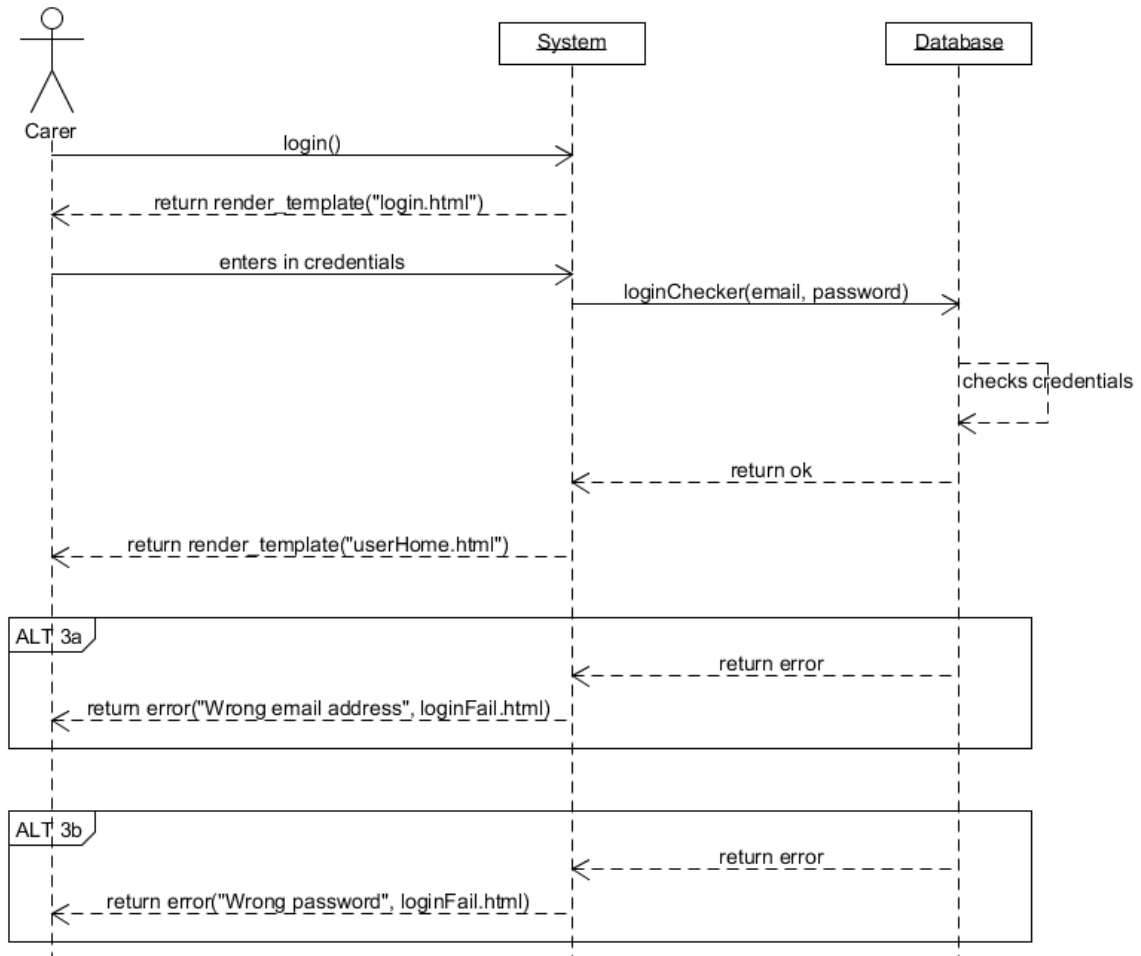
# Architecture Design

## System Sequence Diagrams

### register System Sequence Diagram



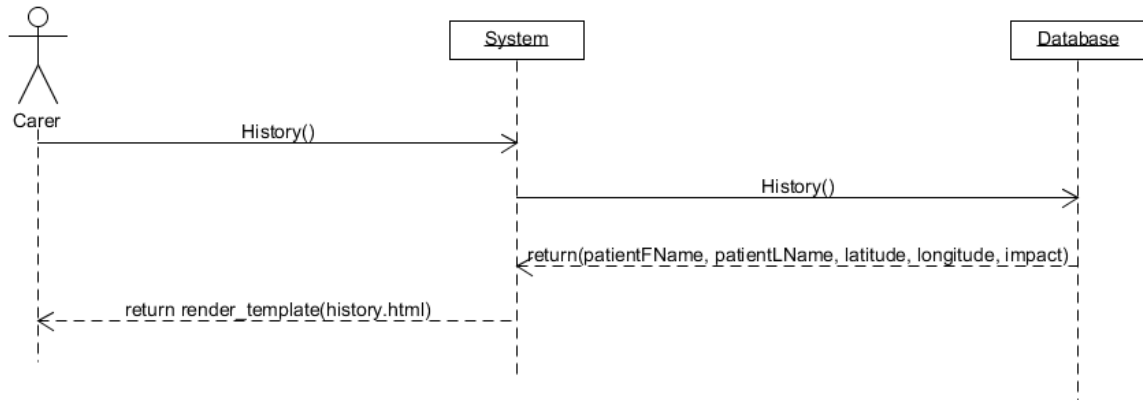
## login System Sequence Diagram



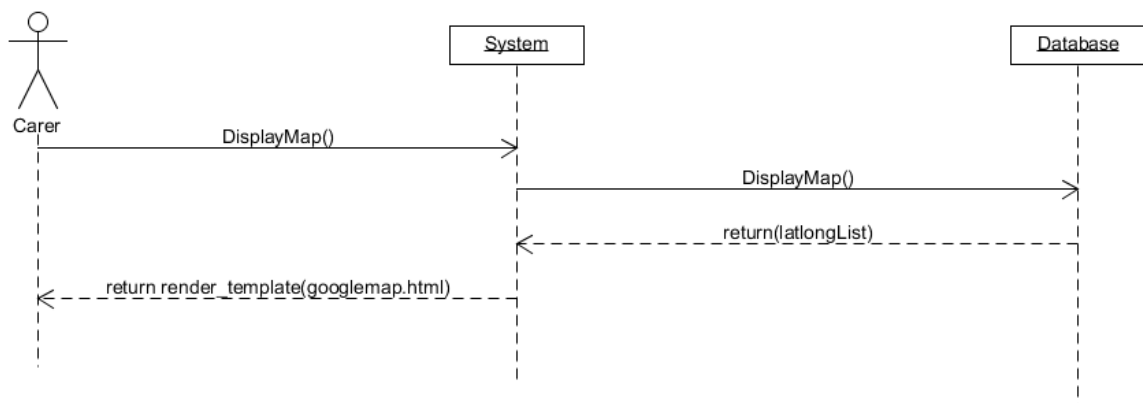
## Add/edit patients, device and boundary details System Sequence Diagram



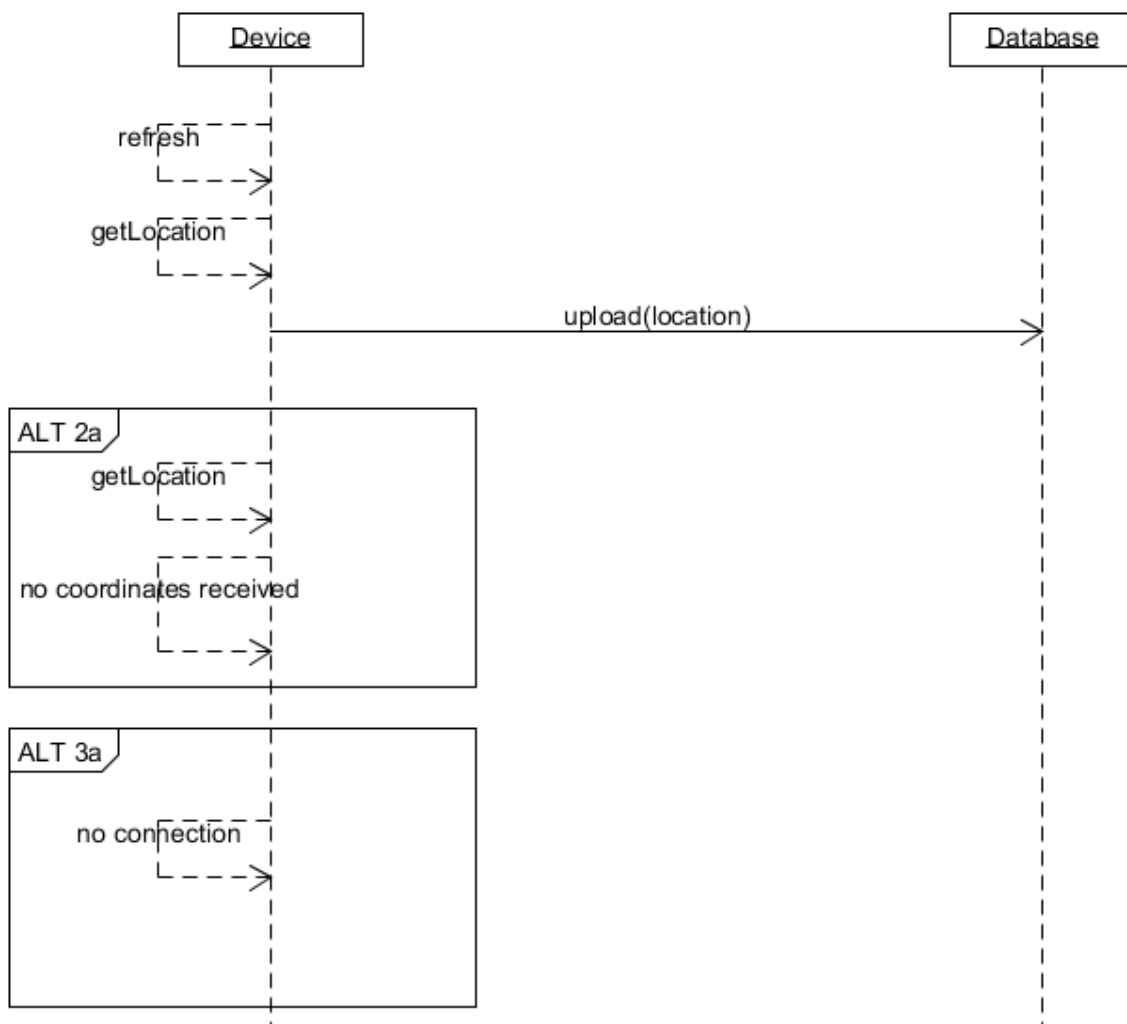
### Check History System Sequence Diagram



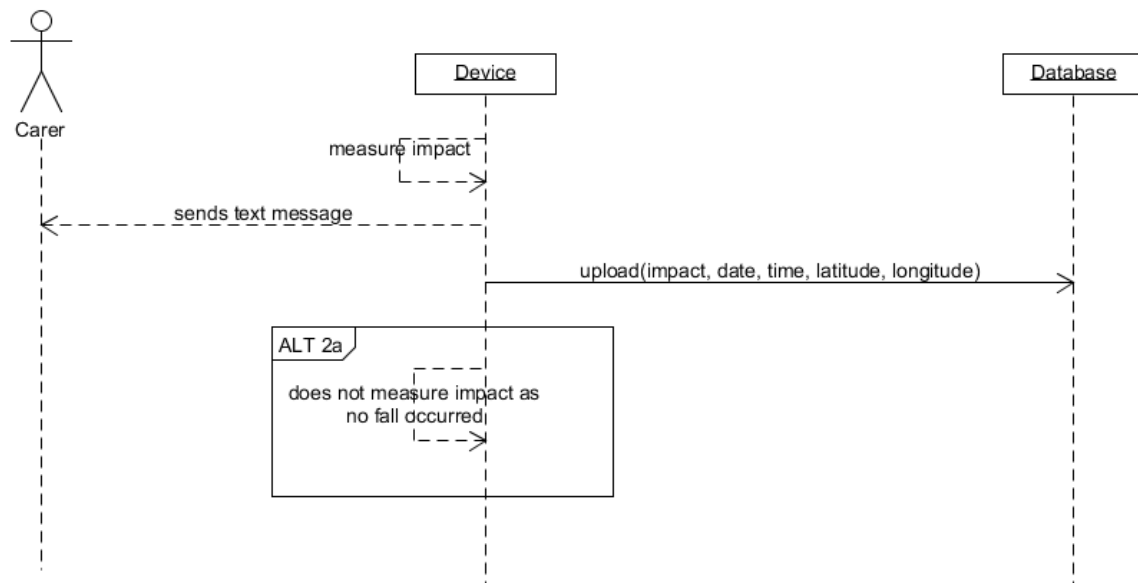
### Check Position System Sequence Diagram



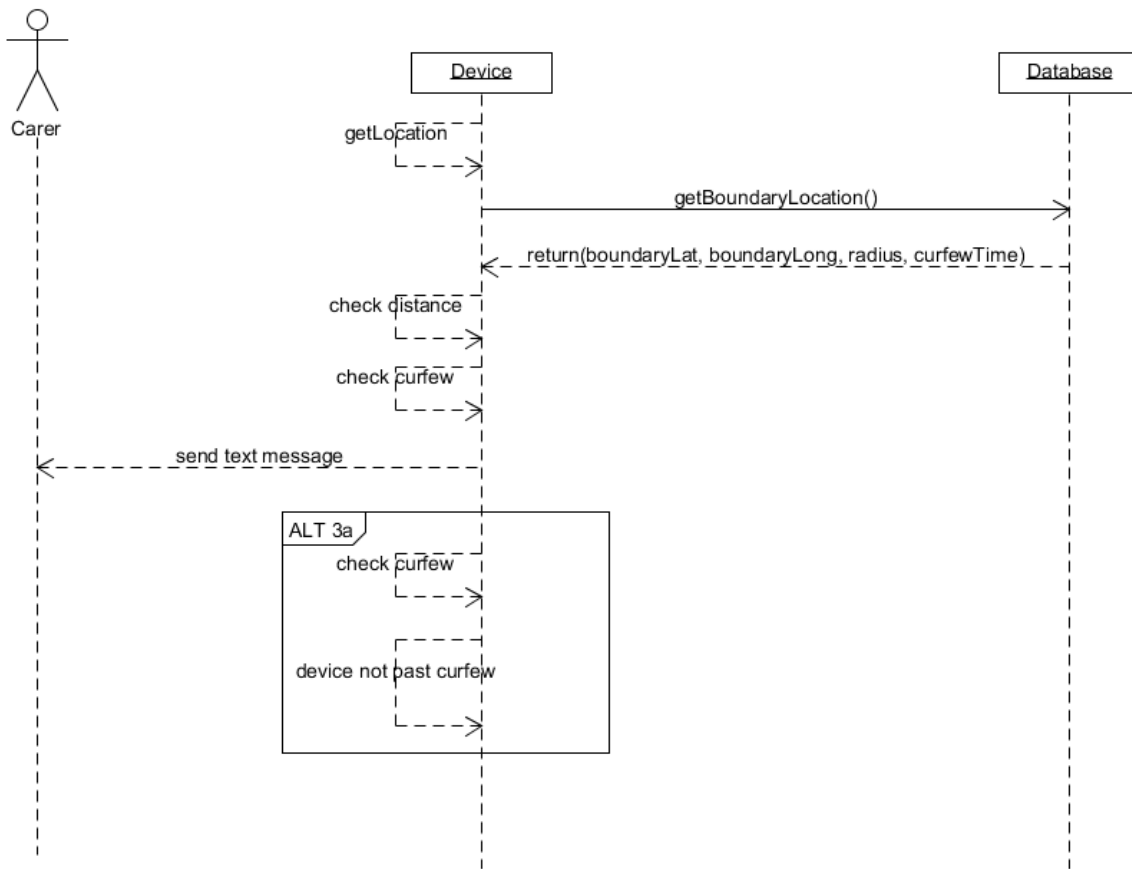
## Update position System Sequence Diagram



## Fall indicator System Sequence Diagram

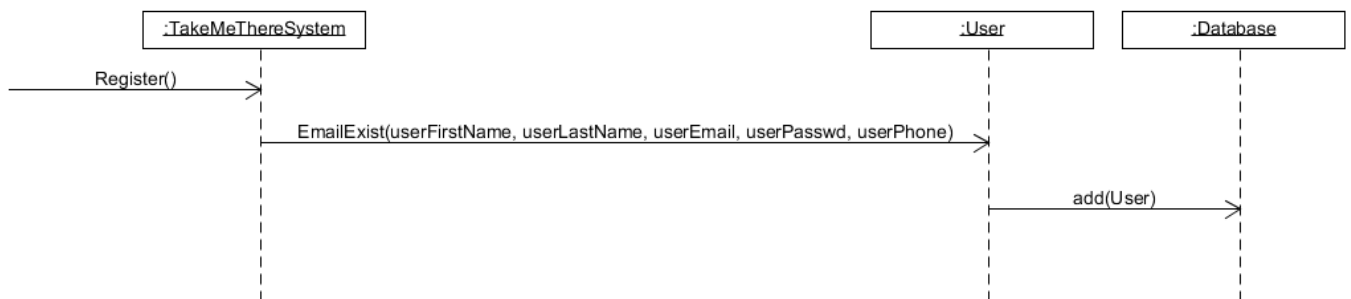


## Out of the boundary System Sequence Diagram

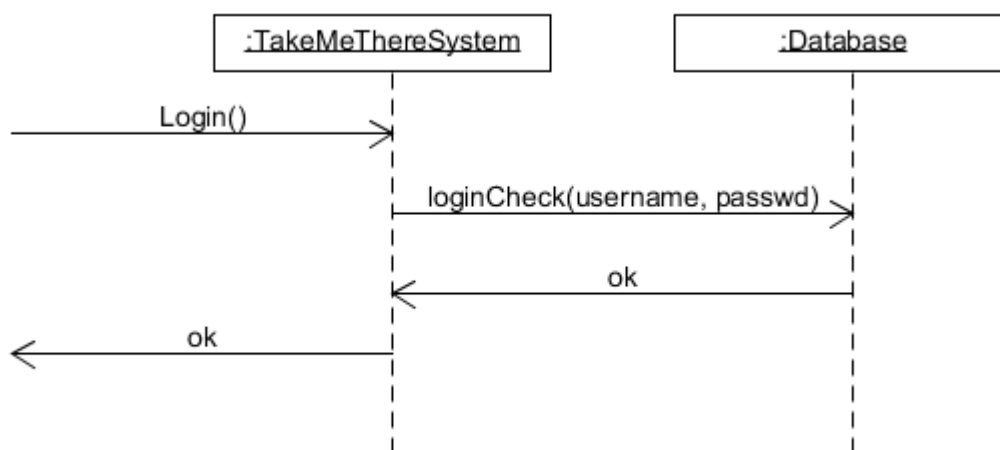


## Sequence Diagrams

### Register Sequence Diagram

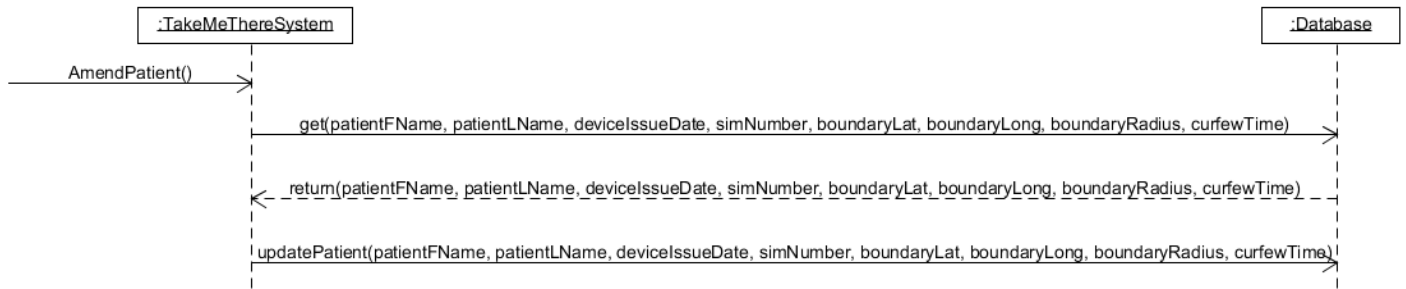


### Login Sequence Diagram

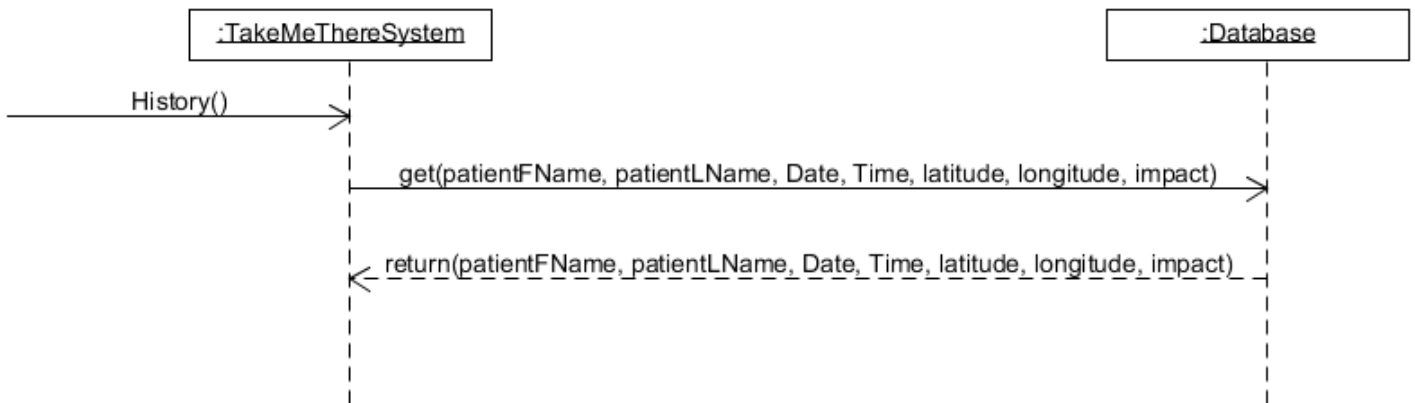




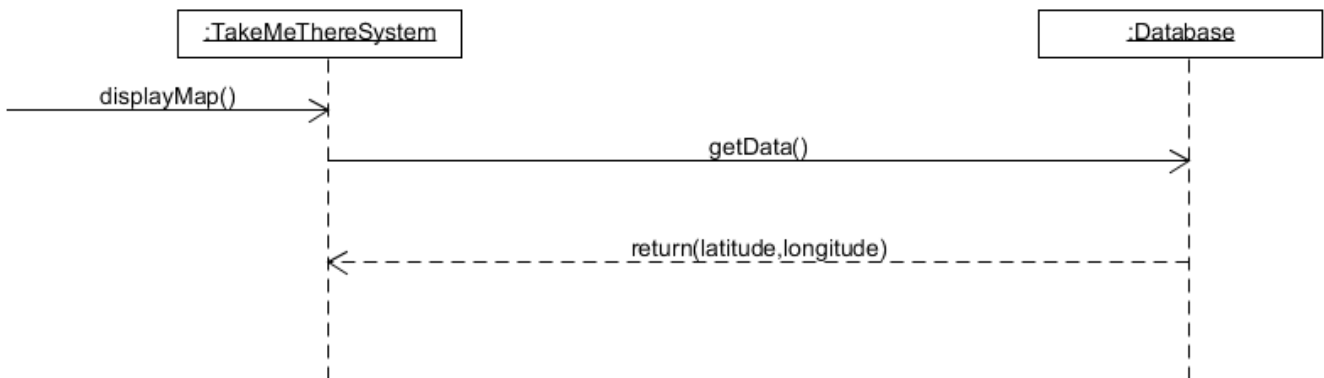
## Add/edit patients, device and boundary details Sequence Diagram



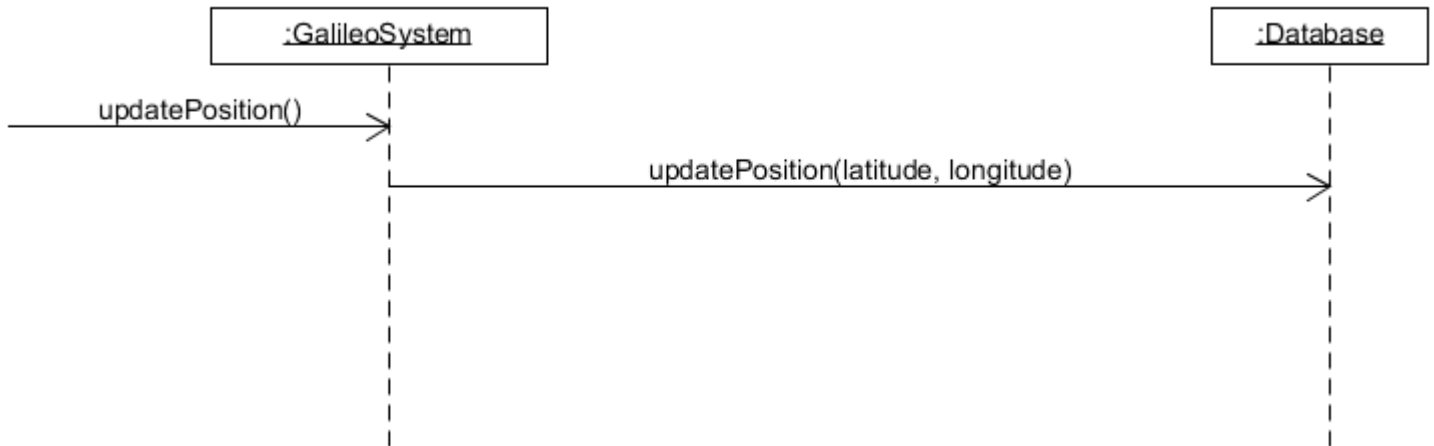
## Check History Sequence Diagram



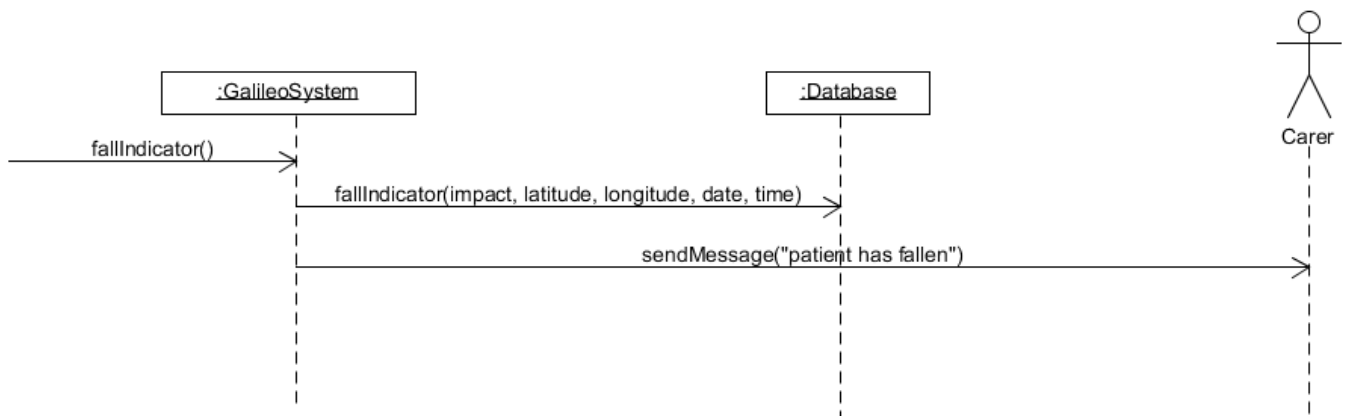
## Check Position Sequence Diagram



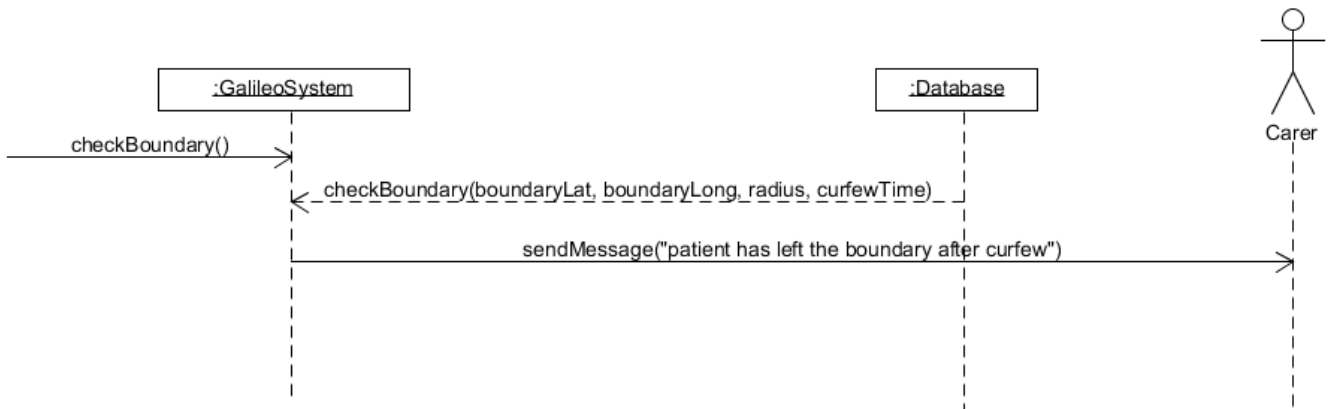
### Update position Sequence Diagram



### Fall indicator Sequence Diagram



## Out of the boundary Sequence Diagram



## Database Design

