

Shavit Luzon  
**Give And Take**  
Software Design Document

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# **1. INTRODUCTION**

## **1.1 Purpose**

This software design document describes the architecture and system design of Give and Take Android application.

## **1.2 Scope**

This project's goal is to provide a platform for students to ask for help and offer it, based on location, to see who they can help close by, visualized with a map, so that they can help each other conveniently. The app provides 3 main services: 1. Map service to watch existing requests based on location. 2. Create request service that adds it to map with a marker and stores it in databases. 3. Joining existing requests so request's creator will see, to offer help/join event.

## **1.3 Overview**

This project is done as part of my final project, pursuing Computer Science and Mathematics Bachelor's degree at Ariel University.

## 2. SYSTEM OVERVIEW

For Ariel university students and staff that are smartphone users, who want to ask for help or give help to their peers: the Give and Take Android application is a sharing social application that allows users to open and maintain requests, watch open requests of others, and to communicate to offer their help, with an option of filtering based on location, visualization and placing requests on a map, to see for instance who's nearby. Unlike traditional social/map apps sites such as WhatsApp or Google Maps, our product allows users to manage the requests on a targeted system to Ariel students only, enabling wide distribution and location filtering by combining requests management and a map.

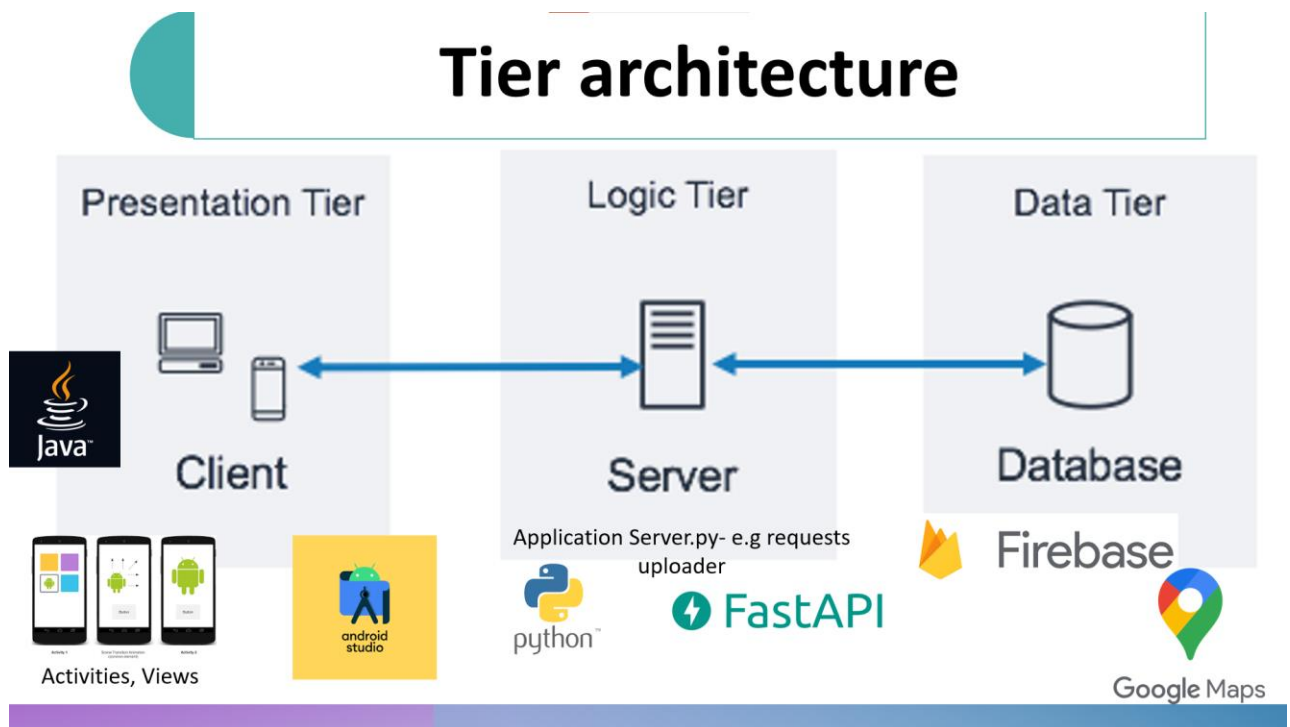
## 3. SYSTEM ARCHITECTURE

### 3.1 Architectural Design

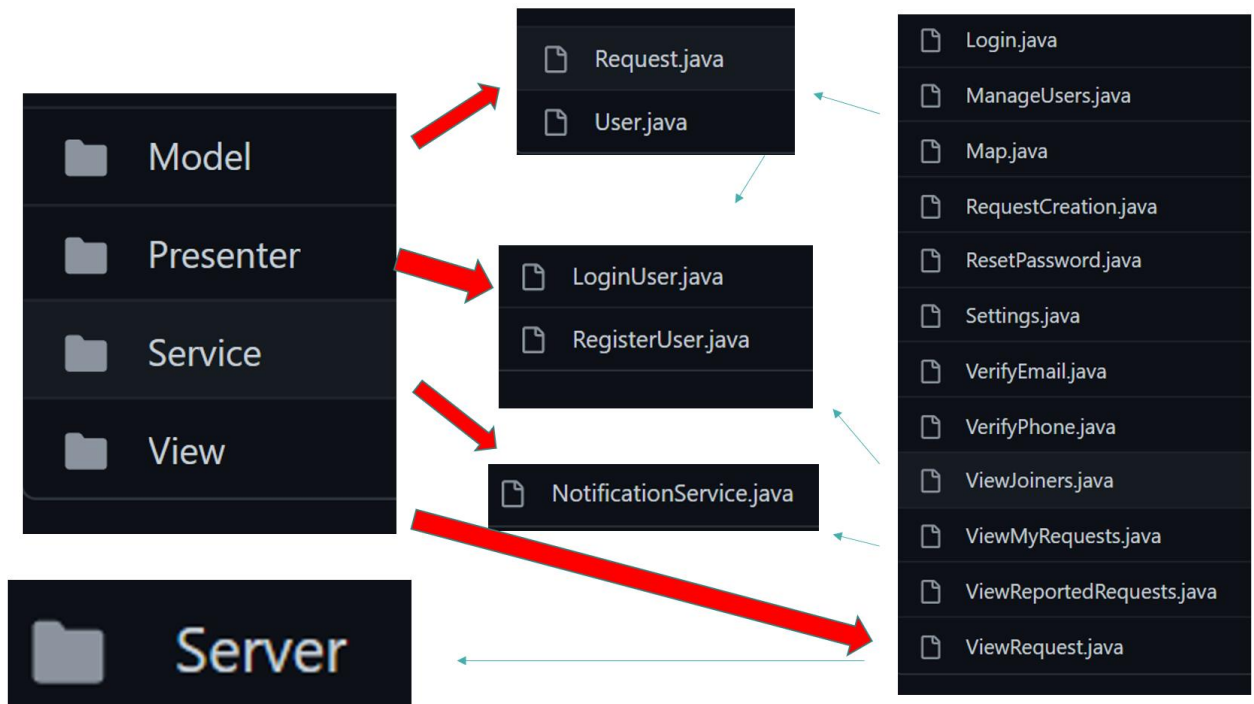
The Presentation Tier holds activities that use as views for the users to view the map and requests data, and to manage it through the interface the activities offer. To do so, the activities (Presentation Tier) connect to a logic app data server -“Logic Tier”- that performs various actions that the user chooses, while sending requests to the data server- “Data Tier”.

The Logic Tier fetches/send data from/to the Data Tier per request from the Presentation Tier.

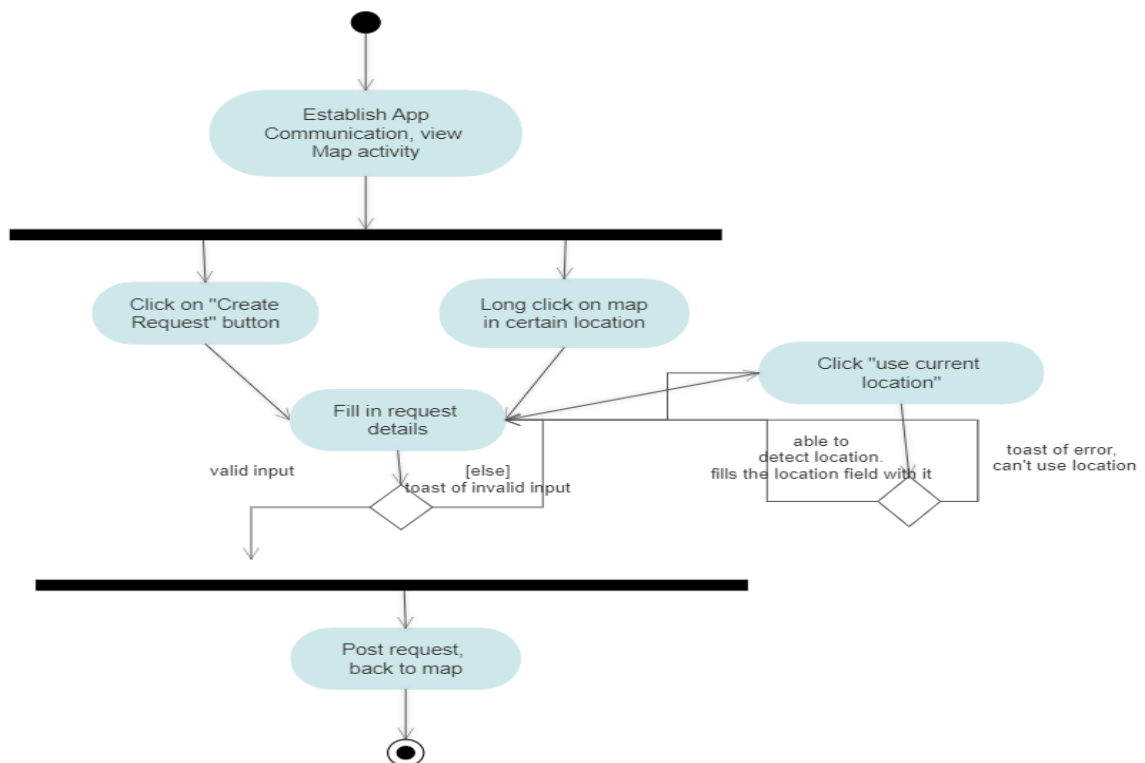
As shown in the diagram below;

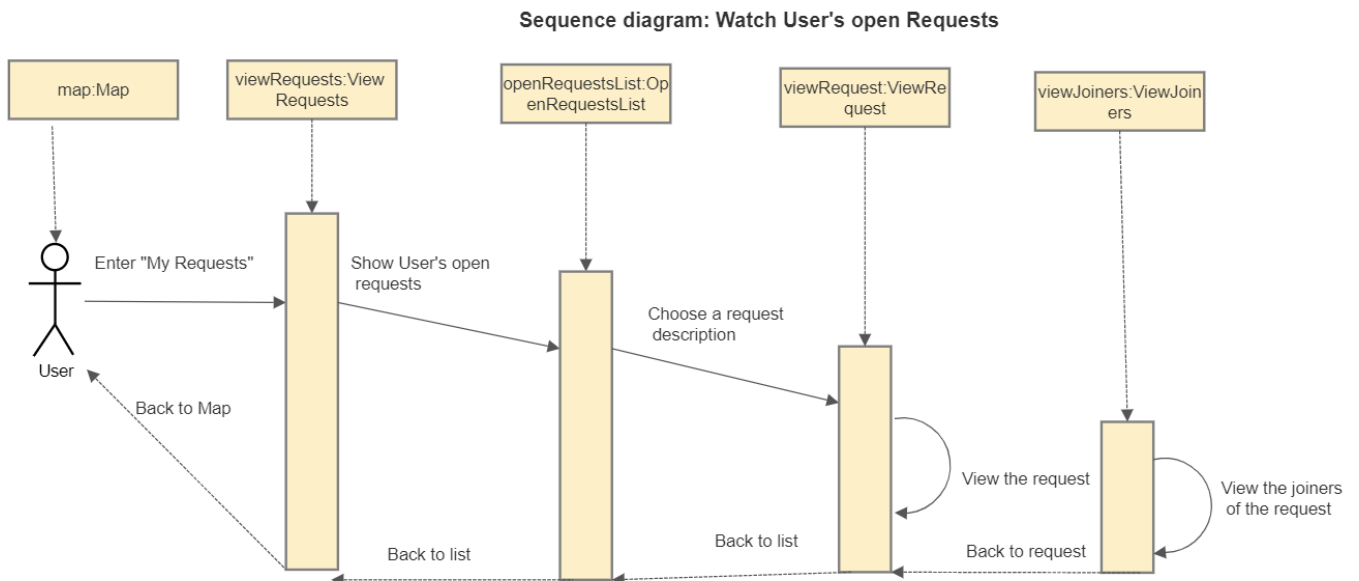
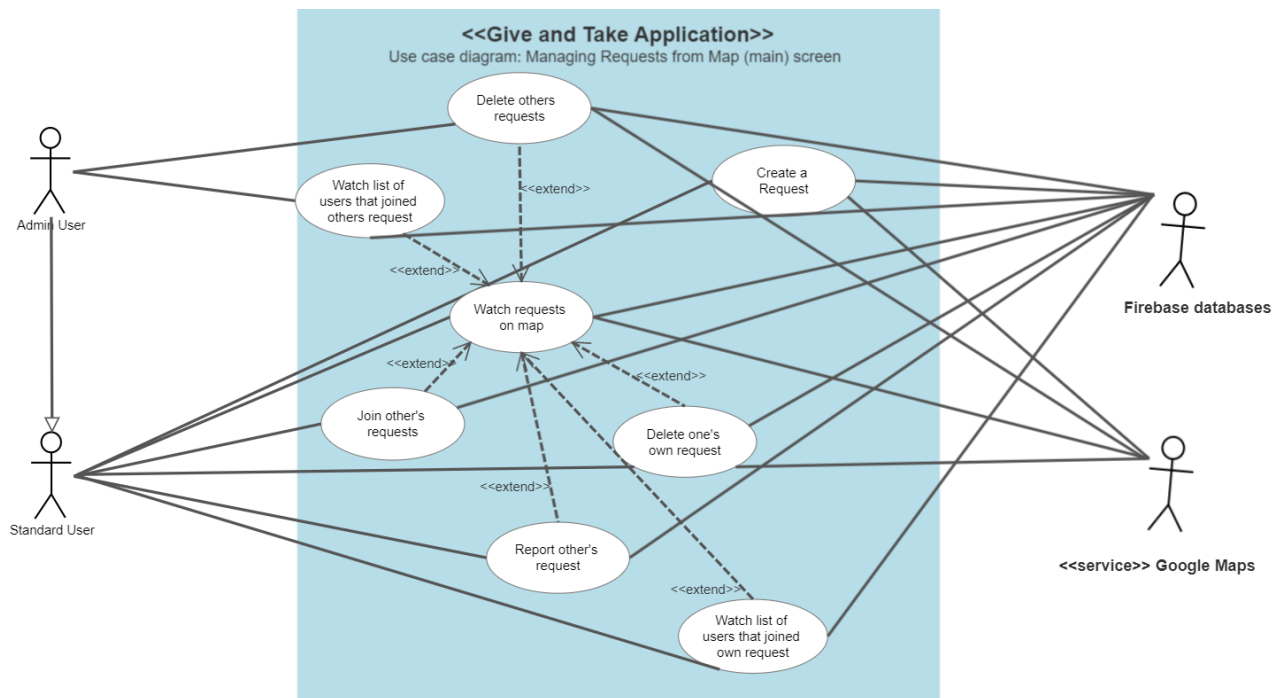


### 3.2 Decomposition Description



UML Activity Diagram: Create a Request





### 3.3 Design Rationale

Three-tier architecture is a well-established software application architecture that organizes applications into three logical and physical computing tiers: the presentation tier, or user interface; the application tier, where data is processed; and the data tier, where the data associated with the application is stored and managed.

The chief benefit of three-tier architecture is that because each tier runs on its own infrastructure, each tier can be developed simultaneously by a separate development team,

and can be updated or scaled as needed without impacting the other tiers.

The chief vulnerability of this architecture that I found is this separation and using an external server requires a server to run so that users can interact with it, and doing so on a local PC might be causing problems if you don't have a dedicated PC for it. I found a solution for it, running the app server on a cloud server.

Reference:

<https://www.ibm.com/topics/three-tier-architecture>

## 4. DATA DESIGN

### 4.1 Data Description

Firestore- stores the markers data (to be drawn on the map): location, request id, user id, icon

FireBase RealTime Database- stores the users data including their requests.

Users/user Id/ user details: full name, e-mail, requests user joined , notification settings, requests

Notification settings: on/off, use specific location, use current location

Requests: subject, body, contact details, location

### 4.2 Data Dictionary

Firebase firestore

Firebase Real Time database

Request object: subject, body, contact details. GeoLocation location. methods: getters and setters, post request (create request)

String list: requests user joined (list of String request Ids) . method: fetch from database

String list: notification settings (list of String request Ids). method: fetch from database

User object: String full name, e-mail... methods: getters and setters, post user (register)

## 5. COMPONENT DESIGN

All request related methods (post, delete, report, join) from activity connects to the server and sends it the request data, then server connects to Firebase databases and uploads it there.

So does the post user method when registering.

The login activity uses Firebase authentication methods through the server to perform the action.

## **6. HUMAN INTERFACE DESIGN**

### **6.1 Overview of User Interface**

Describe the functionality of the system from the user's perspective. Explain how the user will be able to use your system to complete all the expected features and the feedback information that will be displayed for the user.

The system displays a map, by interacting with a map service

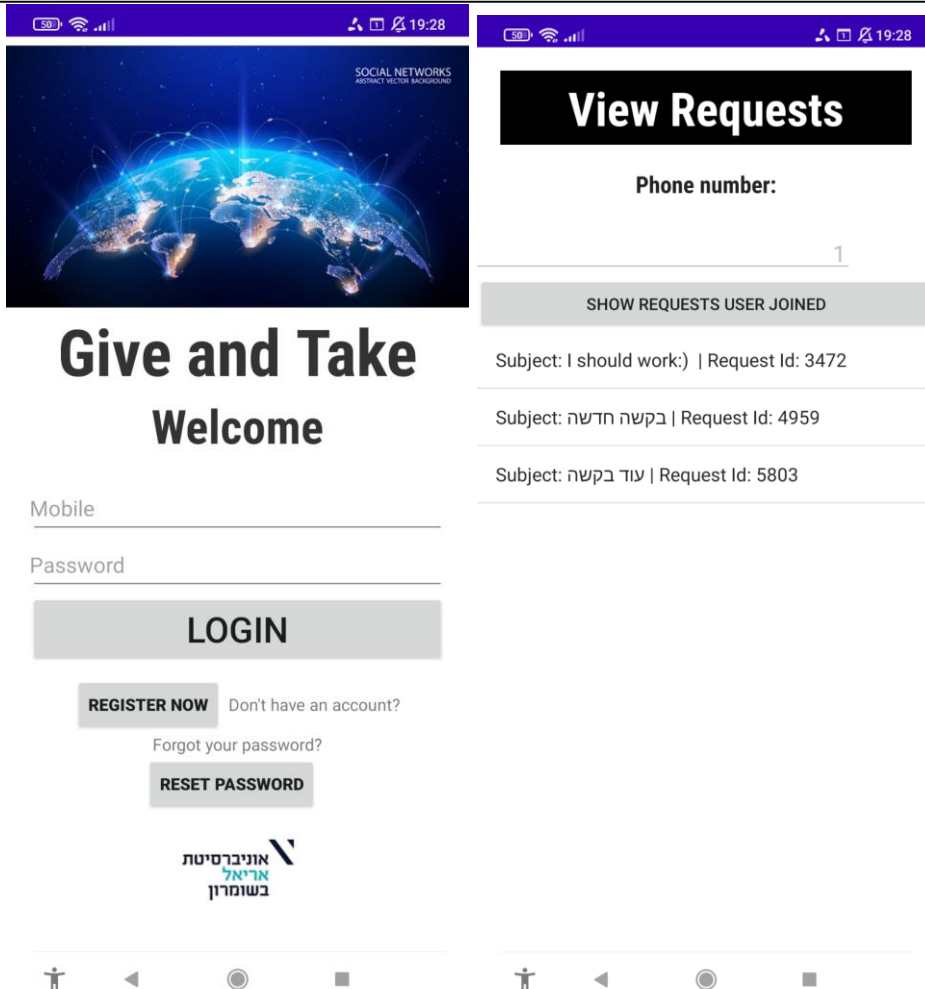
2. The application allows saving information of requests and events in the database
3. The system allows users to create requests
- 3.1 The system will display error message when can't upload requests to the server
4. The application displays real convenient and clear to the user. It will be easy to distinguish the different actions
5. The app enables communication between the users of the application so that they can answer requests
6. The system allows user registration and login according to verified details, which will be saved in the system
7. Managing the requests and viewing them on the map is reliable, all users at the same time will see the same map
8. The requests appears in the form of dedicated icons on the map that are visible to all users.

Desirable:

9. The app allows an admin user to block users
10. The administrator is given the option to add an event with a special icon
11. A user is able to delete his request from the map
12. The app enables users to report other users
13. The system requires a university email to register users
14. Admins are able to remove user posts
15. The application displays a notification on the phone about a new request or event (according to the user's preferences).

### **6.2 Screen Images**







## Join Us

2 Way authentication: first university E-mail. DONE. now, enter your name and phone below. if you already have an account, this will create a new user for you after you verify.

**GENERATE OTP**

**VERIFY OTP**



## Join us

2 Way authentication: first university E-mail. Please enter your email and verify it. after, enter and verify your phone when you log in.

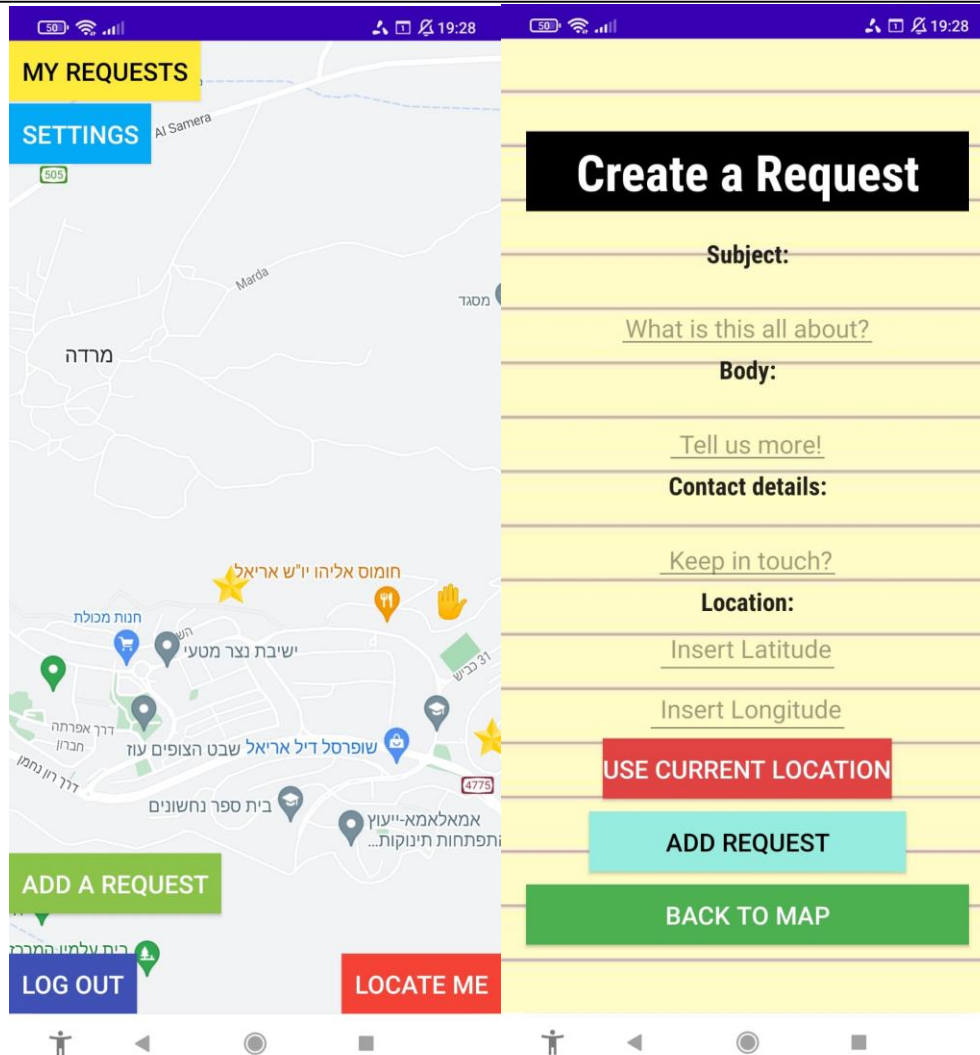
**REGISTER**

**LOGIN NOW**

Already have an account?



In order to register, the user goes through two-factor authentication methods, one by university E-mail, and after verifying it, he verifies his phone number. His phone number will be used as his user ID.



**View Request**

Phone number: 1

Subject: עוד בקשה

Body: של שבית

Contact details: ליד חומוס

Location: 32.106993416036254  
35.20070157945156

Creation Time: 2022-12-26T19:06:07.313

**DELETE REQUEST**

Body: 1

Contact details: 0

Location: 32.10646631421179  
35.20829189568757

Creation Time: 2022-12-26T19:23:14.520

**DELETE REQUEST**

**BACK TO MAP**

**VIEW JOINERS**

**UNJOIN REQUEST** **JOIN REQUEST**

**UNREPORT REQUEST** **REPORT REQUEST**

### 6.3 Screen Objects and Actions

A discussion of screen objects and actions associated with those objects.



**View Request**

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DELETE REQUEST

BACK TO MAP

VIEW JOINERS

UNJOIN REQUEST JOIN REQUEST

UNREPORT REQUEST REPORT REQUEST

Viewing all requests data that was posted by the request creator.

If the user is a manger she can delete other users requests.

Else, only the creator can delete her own request.

Only non creator of a request can join it/ report it.

The creator of a request can watch the list of those who joined it.

A manager can watch a list of joiners to any request, and a list of reported request, with id of reporter.

A user can watch a list of requests created, and another list of those he joined.

## 7. REQUIREMENTS MATRIX

ID No.	description	Satisfying component	system	commentary
1	The system will display a map and allow users to move in it from one place to another, will integrate with a map service	Map activity. Presentation Tier		
2	The application will store information of requests and events in a database	Data Tier, Firebase database		
3	The system will allow users to create requests	Map, create request activities that connect to Data Tier through Server. all system tiers together		
4	The app will present a convenient and clear User Interface. The different actions that can be performed will be easily noticeable.	All Presentation Tier		
5	An admin will be given the option to block users in the app	Presentation Tier by Map and Manage users, View Request activities that connect to Data Tier through Server Tier. all system tiers together		In order to prevent spam, harassers
6	An admin will be able to add an event with a special symbol	Presentation Tier by Create Request activity that connects to Data Tier through Server Tier. all system tiers together		To mark an event as special, such as an Aguda /university official event
7	The app will display a notification on users phone, about a new request or event based on user preferences	Presentation Tier activates Notification Service according to settings activity that connects to Data Tier through Server Tier. all system tiers together		
8	The app will allow users to report other users	Presentation Tier by View Request activity that connects to Data Tier through Server Tier. all system tiers together		In order to prevent spam, harassers

document

9	The system will require a university email for user registration	Presentation Tier by Register User activity that connects to Data Tier through Server Tier. all system tiers together	In order to verify that the user is indeed from the target audience of the application (a member of the university)
10	An admin will be able to remove other users posts	Presentation Tier by View Request activity that connects to Data Tier through Server Tier. all system tiers together	In order to prevent spam, harassers
11	The app will enable communication between users so they can respond to requests	Presentation Tier by View Request activity that connects to Data Tier through Server Tier. all system tiers together	
12	The system will allow registration and login, according to users details that will be verified and stored in the system's database	Presentation Tier by Register User activity that connects to Data Tier through Server Tier. all system tiers together	
13	A user can delete her/his request from the map	Presentation Tier by View Request activity that connects to Data Tier through Server Tier. all system tiers together	
14	Managing requests and viewing them on the map will be reliable- users at the same time will see the same map	Presentation Tier by Map activity that connects to Data Tier through Server Tier. all system tiers together	
15	The requests will appear in the form of designated icons on the map that will be visible to all users	Presentation Tier by Map activity that connects to Data Tier through Server Tier. all system tiers together	



16	A user will be able to view a list of her/his open requests	Presentation Tier by Map activity, Watch Requests that connects to Data Tier through Server Tier. all system tiers together	
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