Homework

Android-based Software Development

Semester: 2021 Spring

BME Lost & Found

Tamás Szepessy

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MŰEGYETEM 1782

Specification

Introduction

I'm sure many people at the BME have lost something and then searched through several buildings from CH to I. To solve this problem, I have developed a lost and found application that helps to return the lost item to its owner.

Main Functions

The application can manage users with Firebase Authentication, set a profile picture for new registrations, and optionally provide a phone number.

Once logged in, you can see the posts stored on the server in two separate databases, at the lost and found item level. You can attach a picture to the item, but it is not required, you need to add a title and description to the post, as well as the location of the lost item by building.

Clicking on a post in the list will display it in large size, with the details of the object and the creator of the post.

In the details view, tapping on the author of the post will bring up a business card from which you can initiate an email, direct call or SMS. You can even save the business card offline to your phone.

Contacts saved offline are displayed in a list and can be accessed without logging in, in case you need to call someone without internet access to get your notebook, for example.

Technologies Used

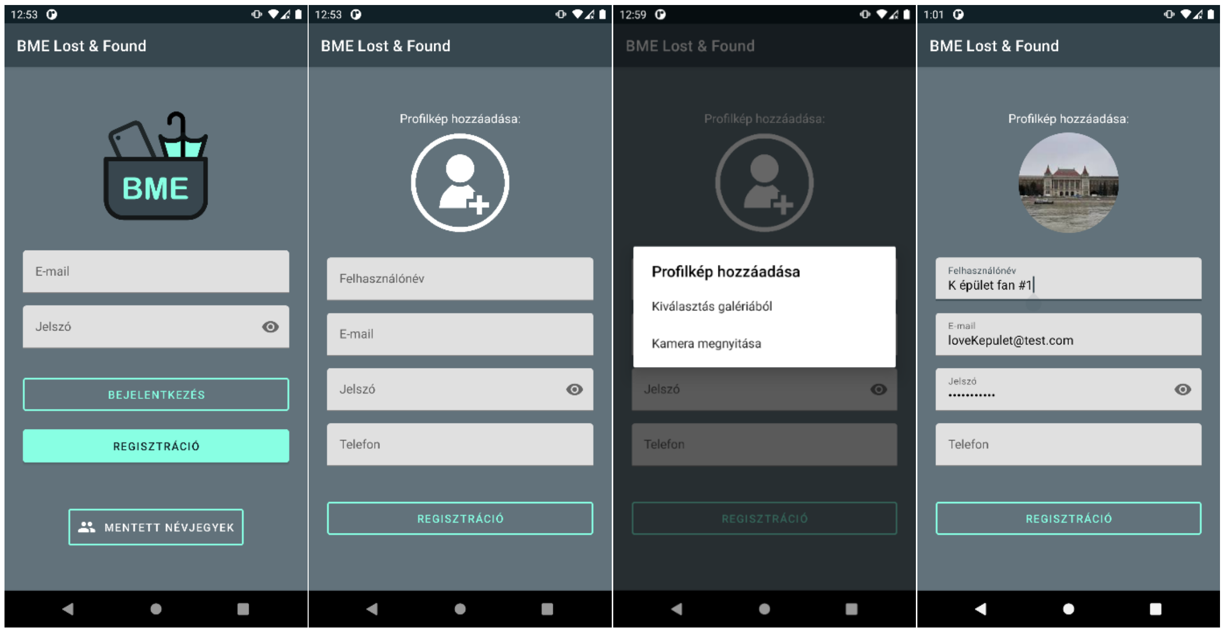
(1) UI: User interface of the application: activities, fragments, intentions to launch activities
(2) RecyclerView: the application uses RecyclerView to display a list of lost objects and contacts.
(3) Firebase: the application loads posts from Firestore collections, stores user data in Firestore and images in Cloud Storage.
(4) Database management: the user can save user contacts that are important to them, which the app stores persistently on the device so they can be accessed offline.
(5) Runtime permissions: proper management of dangerous permissions, e.g. a direct call can be made from contact details to another user.

Documentation

Since I was developing a Firebase-based application, my first task was to create a registry and login Activity. By default the LoginActivity is loaded, this is where you can log in to the app, however Firebase on android devices can keep the logged in user details, so if the `FirebaseAuth.currentUser` parameter is not null, the app's *MainActivity is* automatically loaded with the posts.

Clicking on the "Register" button will load the *RegisterActivity*, where you must enter your username, email address and password. Optionally, you can set your phone number and profile picture. The profile picture can be added by selecting it from a gallery or directly from the camera. No permissions are needed for these, as the phone does not get access to the storage or the camera, it opens the default applications with implicit intent and waits for the selected or created picture in an `onActivityResult()`. Clicking the "Register" button creates the new user account, the image is uploaded to Firebase Storage, and the data is stored in a Firestore `"users"` collection by `uid`.

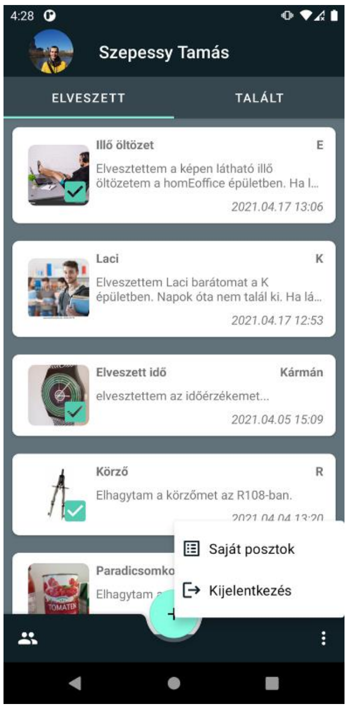
At the bottom of *LoginActivity*, there is also a "Saved contacts" button, which contains contacts saved to a database for offline use during the application. This allows you to look up an in-app contact on your phone without an internet connection.



Felhasználónév: K épület fan #1
E-mail: loveKepulet@test.com
Jelszó: ••••••••••

LoginActivity **RegisterActivity in different states**

After successful registration, you can log in to the application by filling *MainActivity* with posts. Using a TabLayout and ViewPager adapter, I solved the two separate lists of lost and found items. At the top, the username and picture of the logged in user is displayed, and clicking on it displays their profile. At the bottom I have placed the application toolbar, pressing the floating action button creates a new post, the contacts icon loads the contacts saved offline, and pressing the options button displays a submenu with "My Posts" and "Logout Options". Lost and found item posts are displayed in two separate fragments on either side of the ViewPager, each with a RecyclerView.



Illő öltözet E
Elvesztettem a képen látható illő öltözetem a homEoffice épületben. Ha l...
2021.04.17 13:06

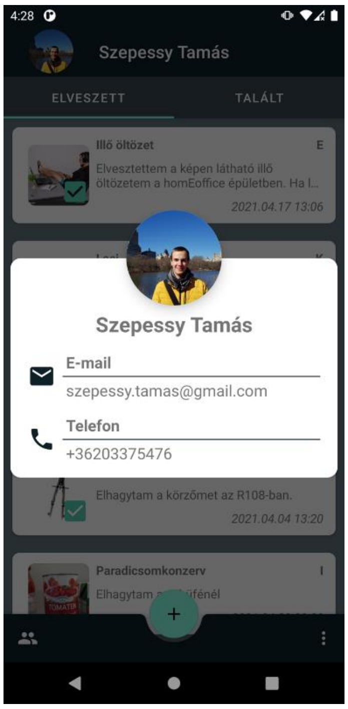
Laci K
Elveszettem Laci barátomat a K épületben. Napok óta nem talál ki. Ha lá...
2021.04.17 12:53

Elveszett idő Kármán
elvesztettem az időérzékemet...
2021.04.05 15:09

Körző R
Elhagytam a körzőmet az R108-ban.
2021.04.04 13:20

Paradicsomko...
Elhagytam a...

MainActivity with options menu



Szepessy Tamás
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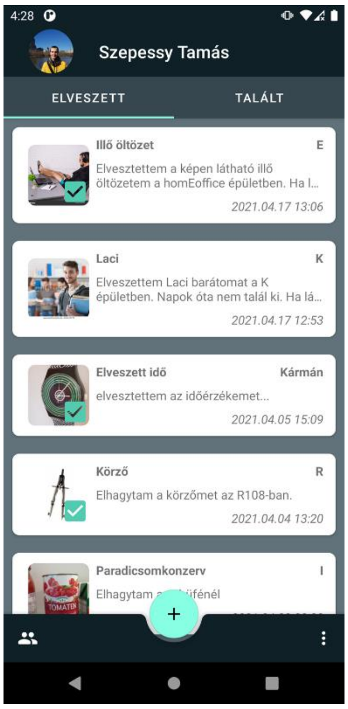
+36203375476

User data sheet

I used the SnapshotListeners provided by the Firestore collection library to load and update the lists, handling all three instances of the `documentChanges` event in the PostsAdapter: *ADDED* -> load new post, *MODIFIED* -> modify post content, *REMOVED* -> delete post from the list on the phone. In the `onCreateView()` function of the two fragments, I call the `initPostsListener()` function that initializes the listener to the `"lost"` or `"found"` collection depending on whether we are currently on the *LostFragment* or the *FoundFragment*.



Illő öltözet E
Elvesztettem a képen látható illő öltözetem a homEoffice épületben. Ha l...
2021.04.17 13:06

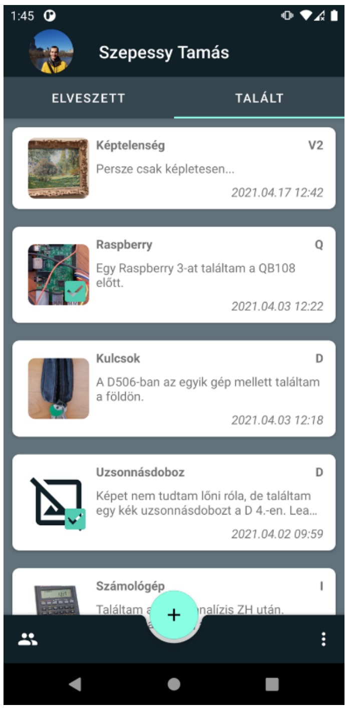
Laci K
Elveszettem Laci barátomat a K épületben. Napok óta nem talál ki. Ha lá...
2021.04.17 12:53

Elveszett idő Kármán
elvesztettem az időérzékemet...
2021.04.05 15:09

Körző R
Elhagytam a körzőmet az R108-ban.
2021.04.04 13:20

Paradicsomkonzerv I
Elhagytam a ...iféné́l

LostFragment



Képtelenség V2
Persze csak képletesen...
2021.04.17 12:42

Raspberry Q
Egy Raspberry 3-at találtam a QB108 előtt.
2021.04.03 12:22

Kulcsok D
A D506-ban az egyik gép mellett találtam a földön.
2021.04.03 12:18

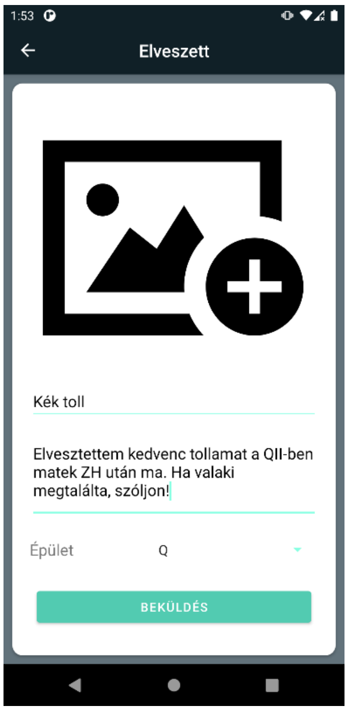
Uzsonnásdoboz D
Képet nem tudtam lőni róla, de találtam egy kék uzsonnásdobozt a D 4.-en. Lea...
2021.04.02 09:59

Számológép I
Találtam a ...nalízis ZH után.

FoundFragment

The layout of the posts is a CardView, where I display the image of the post, if there is one, the title and description are required, date is saved at post creation, and the letter of the building is displayed at the top right. A green tick next to each post image indicates that you have applied for that item.

Pressing the + button at the bottom will load *CreatePostActivity*, depending on which list you are on, you can add a lost or found item. It's mandatory to add a title and description to a post, you can select the letter of the building where the item was lost/found on the spinner, and optionally you can add a picture to your post. You can also add a picture from the gallery or camera as already described in the registration. The post data is uploaded to the appropriate collection and the image to storage.

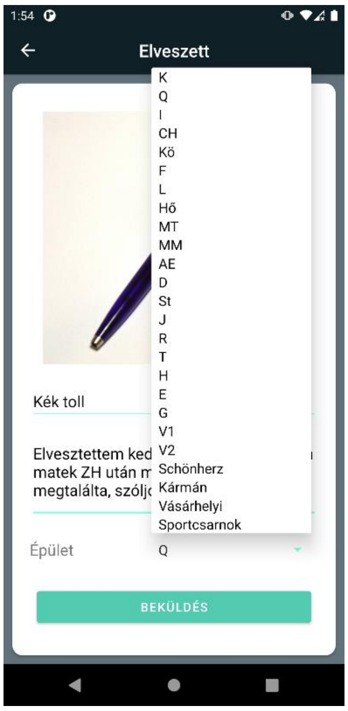


Kék toll

Elvesztettem kedvenc tollamat a QII-ben matek ZH után ma. Ha valaki megtalálta, szóljon!

Épület Q

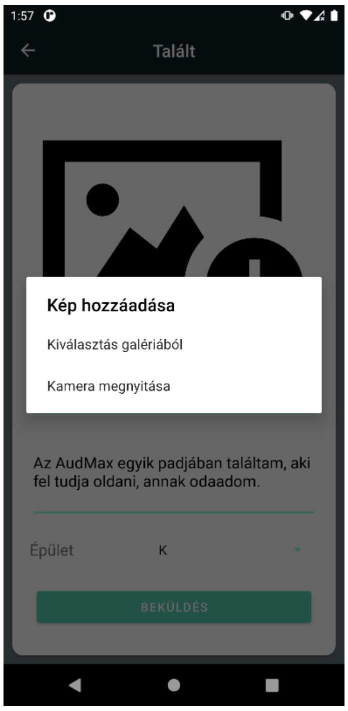
Create a “lost” post



Kék toll

Elvesztettem ked matek ZH után m megtalálta, szólj

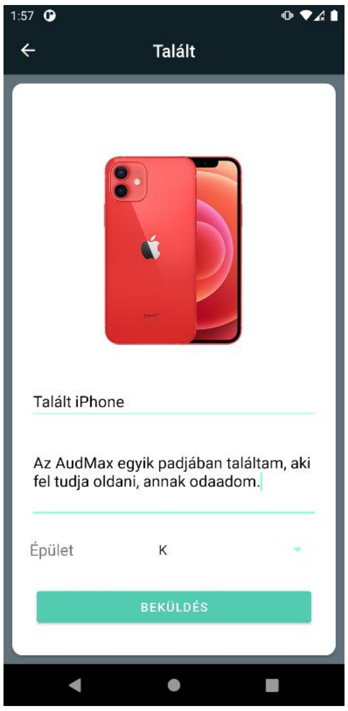
Spinner open with buildings’ list



Az AudMax egyik padjában találtam, aki fel tudja oldani, annak odaadom.

Épület K

Add a picture to a “found” post



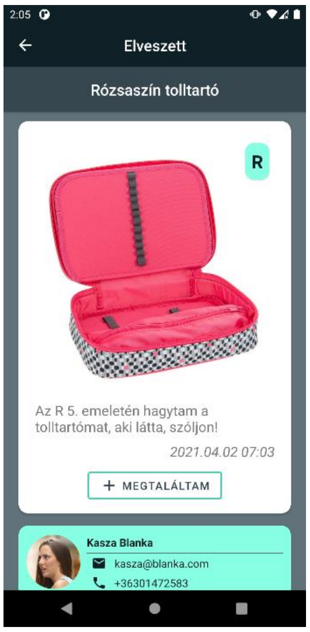
Talált iPhone

Az AudMax egyik padjában találtam, aki fel tudja oldani, annak odaadom.

Épület K

“Found” post with image before submission

Clicking on a post in the list will load the *PostDetailActivity* with the post's details, indicating in the address bar above that a lost or found item has been opened. Since the description could be a short story about the lost item, I'm displaying the post in a ScrollView here, with the author below it. By clicking on the "I found" or "I lost it" button below the post card, the author of the post will be notified of the report when the application is opened (more on this later). The report can also be deleted if it is accidentally clicked, by clicking on the button again, the object can be logged out.

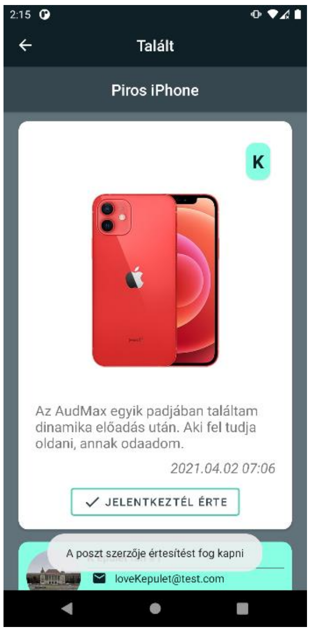


Az R 5. emeletén hagytam a tolltartómat, aki látta, szóljon!

2021.04.02 07:03

kasza@blanka.com

+36301472583



Az AudMax egyik padjában találtam dinamika előadás után. Aki fel tudja oldani, annak odaadom.

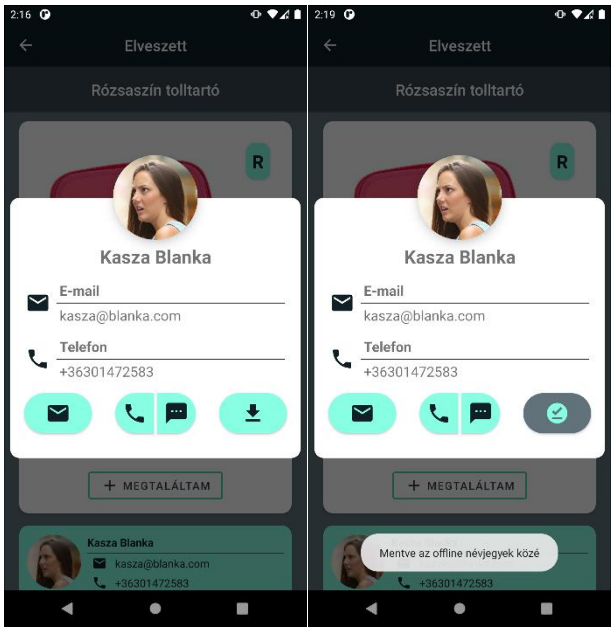
2021.04.02 07:06

A poszt szerzője értesítést fog kapni

loveKepulet@test.com

PostDetailActivity for lost object **Successful application for the found object**

Pressing on the post author's card will display their profile in a dialog (*ContactFragment*). If you have a profile picture set up, it will also be shown in large size. Buttons on the business card are, in order from left to right: send email, call phone number directly (requires permission), send SMS to the number and save to offline contacts. For users without a phone number, the two buttons in the middle do not appear, and for contacts that have already been saved, the save button is also inactive and a tick indicates that the contact has already been saved.



Kasza Blanka

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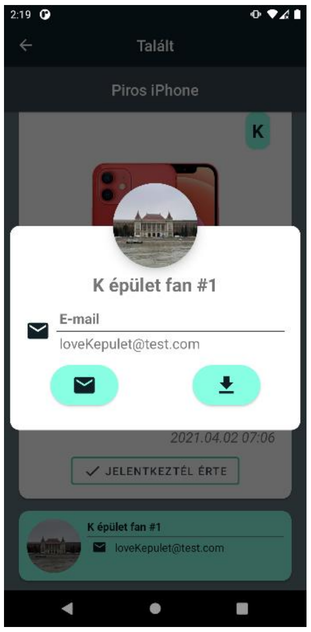
Mentve az offline névjegyek közé



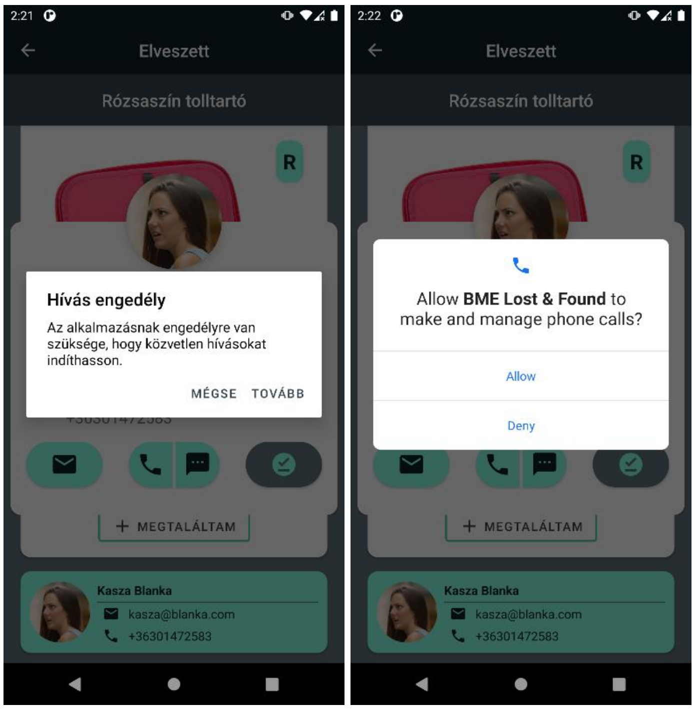
K épület fan #1

E-mail: loveKepulet@test.com

2021.04.02 07:06

ContactFragment before and after saving a name tag **User without phone number**

For the direct phone call, I needed runtime permission and solved this using the PermissionDispatcher library. After giving the application the permission to make the call, it can immediately dial the phone number entered by the user by pressing the phone button.



Hívás engedély

Az alkalmazásnak engedélyre van szüksége, hogy közvetlen hívásokat indíthasson.

MÉGSE TOVÁBB

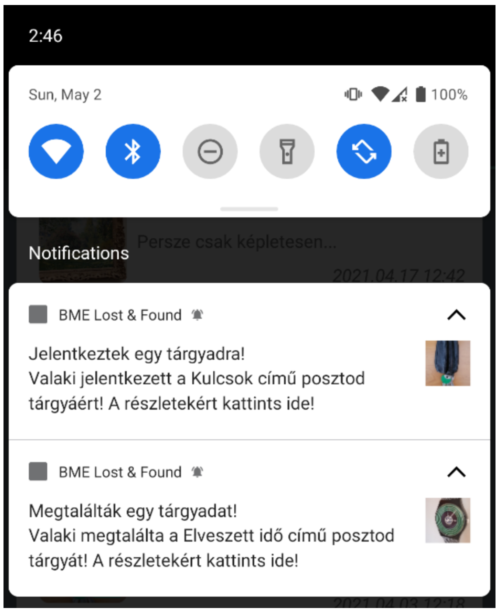
Allow **BME Lost & Found** to make and manage phone calls?

Allow

Deny

Grant call permission to the application

I monitor applications for the post *in MainActivity* with a SnapshotListener. In both Firestore collections, I filter on the where query for the current user's own posts. As soon as the `"applied"` parameter of a custom post is changed from null, the application throws a notification using the Notification library. Only in-app notifications are sent when the user is logged into their Firebase account. The text of the notification will differ depending on whether it is a lost or found item, and if so, the image of the post will be displayed in the `LargeIcon` parameter of the notification. Clicking on the notification will load the Detail view of the referenced post.

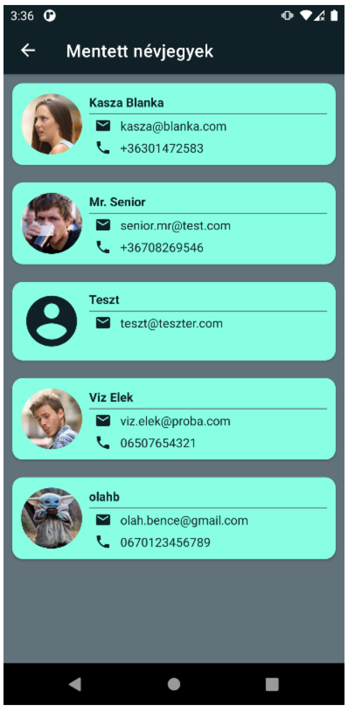


Jelentkeztek egy tárgyadra!
Valaki jelentkezett a Kulcsok című posztod tárgyáért! A részletekért kattints ide!

Megtalálták egy tárgyadat!
Valaki megtalálta a Elveszett idő című posztod tárgyát! A részletekért kattints ide!

Notifications of applications for posts in two different categories

The previously saved contacts are persistently stored in a Room database. Since this is offline, you can open the *ContactsActivity* displaying the list of contacts without logging in *from LoginActivity* or even *from MainActivity*. Clicking on a contact loads the data sheet already presented *in PostDetailActivity.* And if you press and hold, you can delete the contact in a pop-up menu. The images are stored in the app's internal storage, and deleting the contact deletes the image file from the phone. The *ContactsAdapter* is connected to the Room database and loads the saved contacts from the database into RecyclerView. To display the *ContactFragment to* indicate the saved contacts, I created an extension for the `LiveData` type. `LiveData.observeOnce()` only calls the ViewModel `check(userData)` function once, which checks if the contact is in the database.


3:36

Mentett névjegyek

Kasza Blanka
kasza@blanka.com
+36301472583

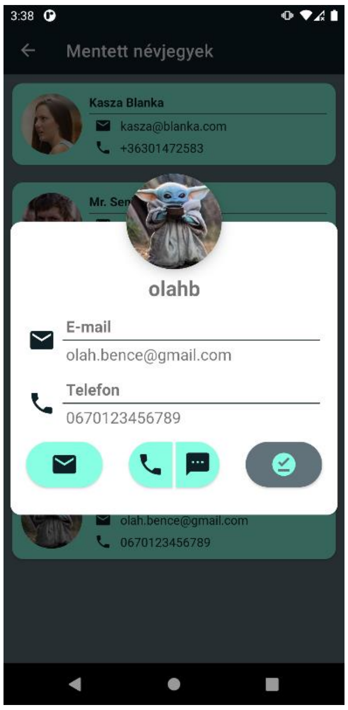
Mr. Senior
senior.mr@test.com
+36708269546

Teszt
teszt@teszter.com

Viz Elek
viz.elek@proba.com
06507654321

olahb
olah.bence@gmail.com
0670123456789

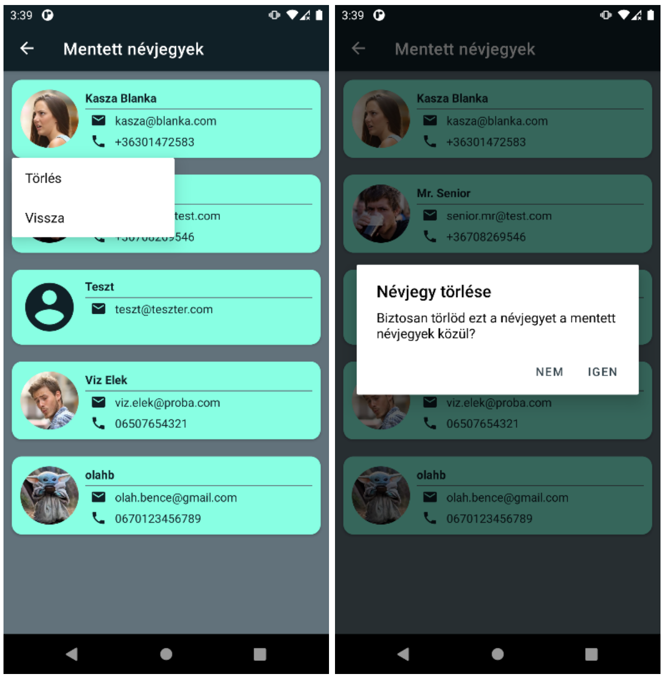
ContactsActivity


3:38

Mentett névjegyek

olahb
E-mail
olah.bence@gmail.com
Telefon
0670123456789

Offline saved contact details


3:39

Mentett névjegyek

Kasza Blanka
kasza@blanka.com
+36301472583

Törlés
Vissza

Teszt
teszt@teszter.com

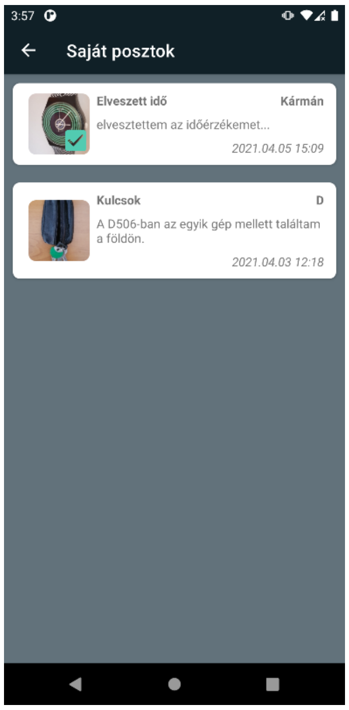
Viz Elek
viz.elek@proba.com
06507654321

olahb
olah.bence@gmail.com
0670123456789

Névjegy törlése
Biztosan törlöd ezt a névjegyet a mentett névjegyek közül?
NEM IGEN

Pop-up menu and dialogue window warning you to delete your contact

Opening *MyPostsActivity* from the *MainActivity* menu, which displays the user's own posts from both Firestore collections, and gives the possibility to view their details, as well as fragments from *MainActivity. A* long press on the own post brings up the context menu where you can delete the post, at which point the Firestore entry is deleted from the corresponding collection, before of course deleting the image of the post from the server if there is one. If someone has applied for one of our items, there will also be a "Restore" option in the local menu, then we can delete the user who applied for the post from our post.

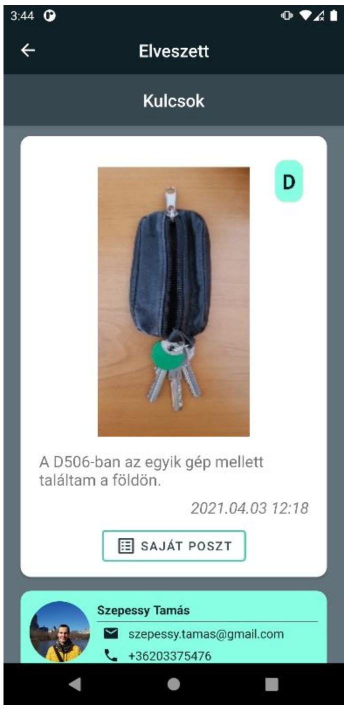

3:57

Saját posztok

Elveszett idő — Kármán
elvesztettem az időérzékemet...
2021.04.05 15:09

Kulcsok — D
A D506-ban az egyik gép mellett találtam a földön.
2021.04.03 12:18

MyPostsActivity


3:44

Elveszett

Kulcsok

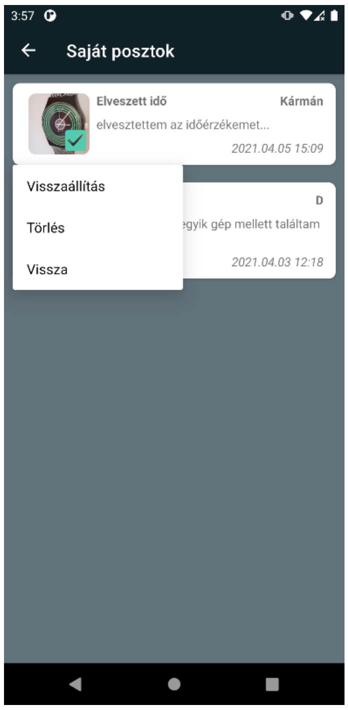
D

A D506-ban az egyik gép mellett találtam a földön.
2021.04.03 12:18

SAJÁT POSZT

Szepessy Tamás
szepessy.tamas@gmail.com
+36203375476

Own post's detail page


3:57

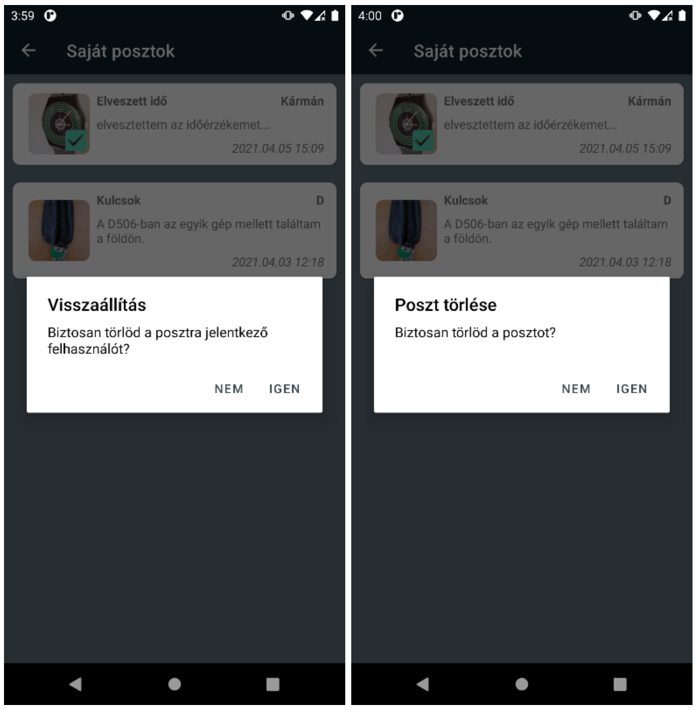
Saját posztok

Elveszett idő — Kármán
elvesztettem az időérzékemet...
2021.04.05 15:09

Visszaállítás
Törlés
Vissza

D
gyik gép mellett találtam
2021.04.03 12:18

Context menu


3:59

Saját posztok

Elveszett idő — Kármán
elvesztettem az időérzékemet...
2021.04.05 15:09

Kulcsok — D
A D506-ban az egyik gép mellett találtam a földön.
2021.04.03 12:18

Visszaállítás
Biztosan törlöd a posztra jelentkező felhasználót?
NEM IGEN

4:00

Saját posztok

Elveszett idő — Kármán
elvesztettem az időérzékemet...
2021.04.05 15:09

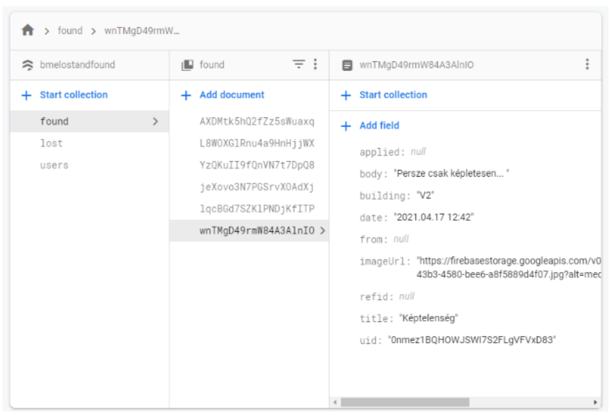
Kulcsok — D
A D506-ban az egyik gép mellett találtam a földön.
2021.04.03 12:18

Poszt törlése
Biztosan törlöd a posztot?
NEM IGEN

Confirm dialogs before deleting and resetting

Firebase

Collections stored in the Firebase Cloud Firestore:



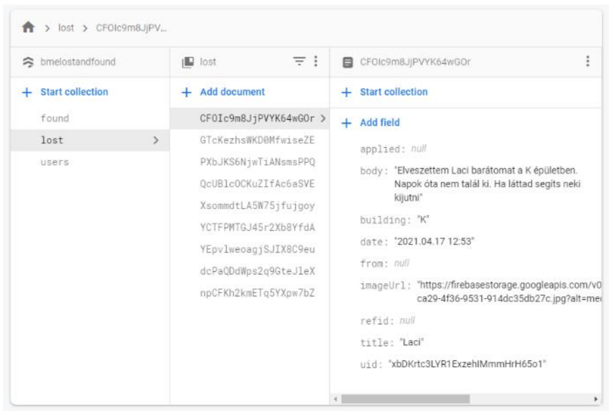
found > wnTMgD49rmW...

bmelostandfound | found | wnTMgD49rmW84A3AlnIO

Start collection: found, lost, users

Add document: AXDMtk5hQ2fZz5sWuaxq, L8WOXG1Rnu4a9HnHjjWX, YzQKuII9fQnVN7t7DpQ8, jeXovo3N7PGSrvX0AdXj, 1qcBGd7SZK1PNDjKfITP, wnTMgD49rmW84A3AlnIO

```
applied: null
body: "Persze csak képletesen... "
building: "V2"
date: "2021.04.17 12:42"
from: null
imageUrl: "https://firebasestorage.googleapis.com/v0
          43b3-4580-bee6-a8f5889d4f07.jpg?alt=med
refid: null
title: "Képtelenség"
uid: "0nmez1BQHOWJSWI7S2FLgVFVxD83"
```



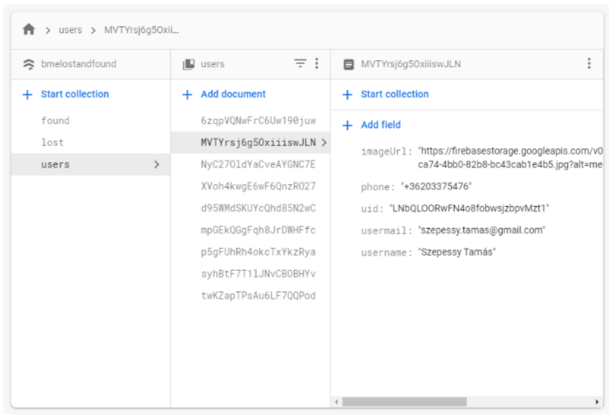
lost > CFOIc9m8JjPV...

bmelostandfound | lost | CFOIc9m8JjPVYK64wGOr

Start collection: found, lost, users

Add document: CFOIc9m8JjPVYK64wGOr, GTcKezhsWKD0MfwiseZE, PXbJKS6NjwTiANsmsPPQ, QcUBlcOCKuZIfAc6aSVE, XsommdtLA5W75jfujgoy, YCTFPMTGJ45r2Xb8YfdA, YEpvlweoagjSJIX8C9eu, dcPaQDdWps2q9GteJleX, npCFKh2kmETq5YXpw7bZ

```
applied: null
body: "Elveszettem Laci barátomat a K épületben.
       Napok óta nem talál ki. Ha láttad segíts neki
       kijutni"
building: "K"
date: "2021.04.17 12:53"
from: null
imageUrl: "https://firebasestorage.googleapis.com/v0
          ca29-4f36-9531-914dc35db27c.jpg?alt=med
refid: null
title: "Laci"
uid: "xbDKrtc3LYR1ExzehlMmmHrH65o1"
```



users > MVTYrsj6g5Oxii...

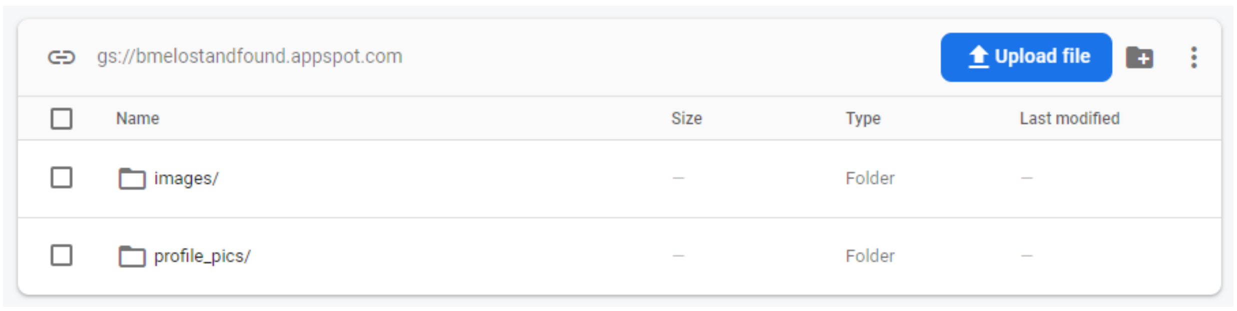
bmelostandfound | users | MVTYrsj6g5OxiiiswJLN

Start collection: found, lost, users

Add document: 6zqpVQNwFrC6Uw190juw, MVTYrsj6g5OxiiiswJLN, NyC27OldYaCveAYGNC7E, XVoh4kwgE6wF6QnzR027, d95WMdSKUYcQhd85N2wC, mpGEkQGgFqh8JrDWHFfc, p5gFUhRh4okcTxYkzRya, syhBtF7T1lJNvCBOBHYv, twKZapTPsAu6LF7QQPod

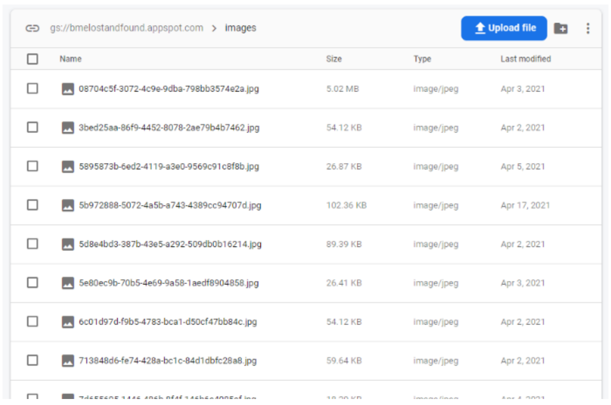
```
imageUrl: "https://firebasestorage.googleapis.com/v0
          ca74-4bb0-82b8-bc43cab1e4b5.jpg?alt=me
phone: "+36203375476"
uid: "LNbQLOORwFN4o8fobwsjzbpvMzt1"
usermail: "szepessy.tamas@gmail.com"
username: "Szepessy Tamás"
```

Files stored in Firebase Storage (`images` for post images, `profile_pics` for user profile data):



gs://bmelostandfound.appspot.com

Name	Size	Type	Last modified
images/	—	Folder	—
profile_pics/	—	Folder	—



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3bed25aa-86f9-4452-8078-2ae79b4b7462.jpg	54.12 KB	image/jpeg	Apr 2, 2021
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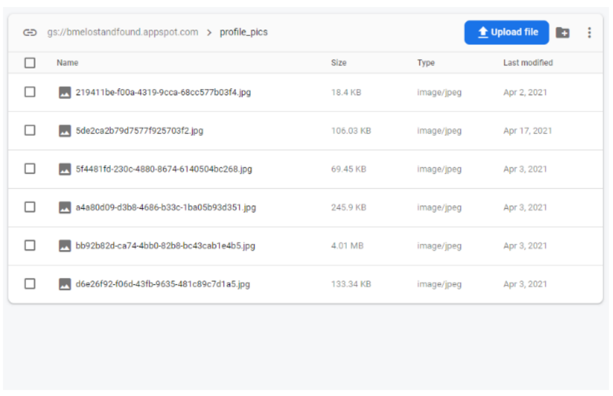

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d6e26f92-f06d-43fb-9635-481c89c7d1a5.jpg	133.34 KB	image/jpeg	Apr 3, 2021