Faculty of Computer Science and Engineering -Skopje
Mobile information systems

TECHNICAL DOCUMENTAION

Product name: Mental health app

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1.Purpose and Scope

1.1 Purpose

The main purpose of this Technical Documentation document is to define and describe the functions and specifications of the “Help me” mobile mental health application. The document is intended to be used as documentation and reference in the future development of this application. In further sections, in clear terms and vocabulary are described the requirements, implementation and the use of the application.

The intended audience for this document is all the stakeholders including the developers and future users.

1.2 Scope

The name of the software product is “Help me” and it is going to be implemented into a mental health application for people that have problems with coping with stress, low mood, depression, and anxiety. The application is implemented using Flutter framework, which allows it to be used by both Android and iOS users.

2.Software Requirements

Priority Level	*Description*
Priority 1	Essential functionality
Priority 2	Desirable functionality
Priority 3	Extra features

Table 1.1

2.1 Functional Requirements

fr1. The System shall be designed for a single type of user: Users who will use this app to help them cope with stress, low mood, depression, and anxiety. (Priority 1)

fr2. The application shall allow each user to enter the email of their psychotherapist and phone number of their emergency contact person. (Priority 1)

fr3. The System shall provide a current location of the user embedded into the emergency message

content. (Priority 1)

fr4. The system shall be able to present information about the mood information entered by the user on

daily basis. (Priority 1)

fr4. The system shall be able to present generated recommended activities based on user's current mood.

(Priority 1)

fr5. The system shall allow users to choose which activity to take from the proposed activities. (Priority 1)

fr6. The system shall be able to present more details about the chosen activity.

(Priority 3)

fr7. The system shall allow users to choose from available mental health categories. (Priority 1)

fr8. The system shall be able to present generated motivation quotes. (Priority 1)

fr9. The system shall allow the users to listen to the articles. (Priority 1)

fr10. The system shall be able to present mood history record to users. (Priority 2)

2.2 Non-Functional Requirements

nr1. The system shall provide all features to mobile devices. (Priority 1)

nr2. The system shall support users who have at least 0.5 Mbits/sec upload speed. (Priority 1)

nr3. The system shall operate with a preference for dark and standard mode.

nr4. The system's interface shall be responsive and adapt to screen resolutions ranging from 480x800px to 1920x1080px.

nr5. The system shall respond in less than a half of a second. (Priority 1)

nr6. The system shall be readily used by all groups of users, even those with little training in information technology, after a short introduction of 5 minutes. (Priority 1)

nr7. The system shall not be unavailable for more than 1 hour per 1000 hours of functioning. (Priority 1)

nr8. The system shall recover in under 15 seconds after a failure 95% of the time. (Priority 1)

3.Product overview

This mental health app, helps their users learn new and better ways of coping with stress, low mood, depression, and anxiety.

It offers 4 main parts (Activities, Motivation, Tests and Articles) for improving mental health of users.

Based on how the user is feeling currently, recommends him a list of activities that can help him boosting his mood. The aim of every recommended activity is to help user in decreasing its stress level, helping him to remain calm and postive. Completing activities user earns rewards in the app, motivating him to take steps towards becoming healthier, happier, and more confident.

The Motivation section offers the user various useful quotes and tips that help the user increase his self-confidence, helps you stay focused on the way of achieving your goals and lift you up at the moment when you feel down and reluctant.

The tests section offers the users quick and easy way to determine whether a user is experiencing symptoms of a mental health condition, such as depression or anxiety. Based on the test results, the user will be provided with information, resources and tools to help him understand and improve his mental health.

The Articles section offers the user a wealth of mental health articles that can help user learn more about various mental health conditions, symptoms, as well as mental well-being techniques.

The user can also take a look at their list of all activities that the user has accomplished, so that user can track its progress over time. Also users can track their mood with "Mood history" section, that provides a report of feelings and emotions that user has experienced in the past month.

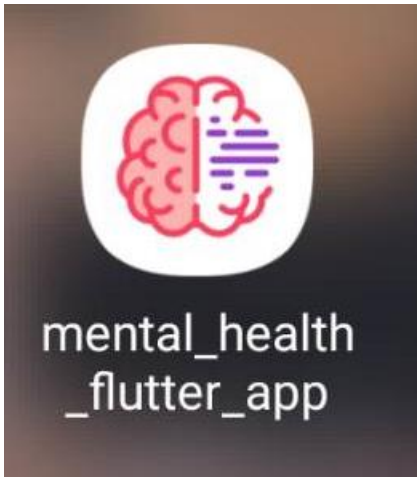
The user that will access the application will be able to enter their record for their daily mood.
There is no limit to how many mood records can be entered. This is left to the user to enter a record any time they need it. The history of entered mood records is available to user at anytime.

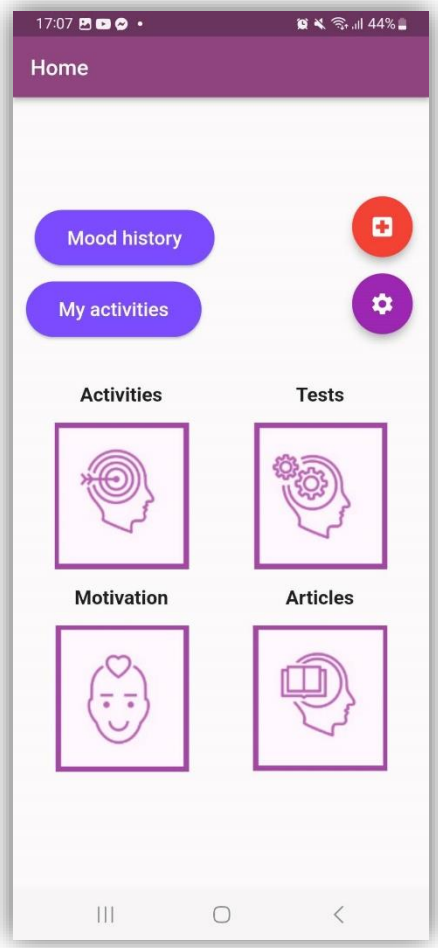
Also there is an option to send the mood history records by mail to their psychotherapist. This is especially usefull for those users who regularly attend psychotherapy sessions.
Using this mood history records, the psychotherapist can take a look at and draw appropriate conclusions about the psychological state of the user.
In order to use this feature, the user is required to enter email address of their psychotherapist.

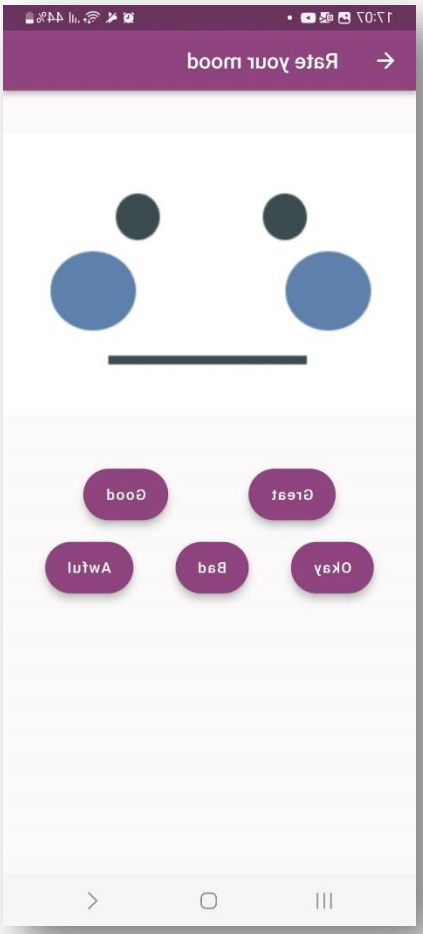
The user has the option for emergency button. This feature is used in situation when the user needs help from the emergency contact person
to help them cope with their current mental health breakdown. The feature allows user to send direct message to their emergency contact person.

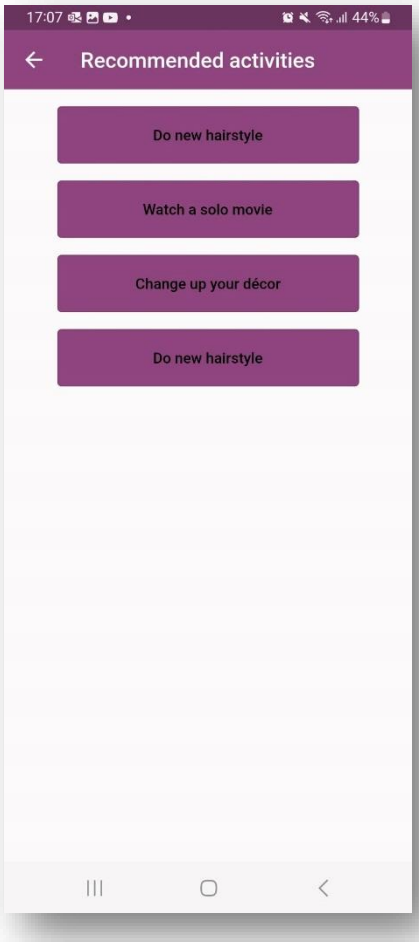
So that they can be alert that the concerned person has need of their emergency support. As part of the content of the message to be sent, is also the current location of the concerned user. Providing their emergency support person to give them instant information about the location of the person in need. In order to use this feature, the user is required to enter phone number of their emergency contact person.

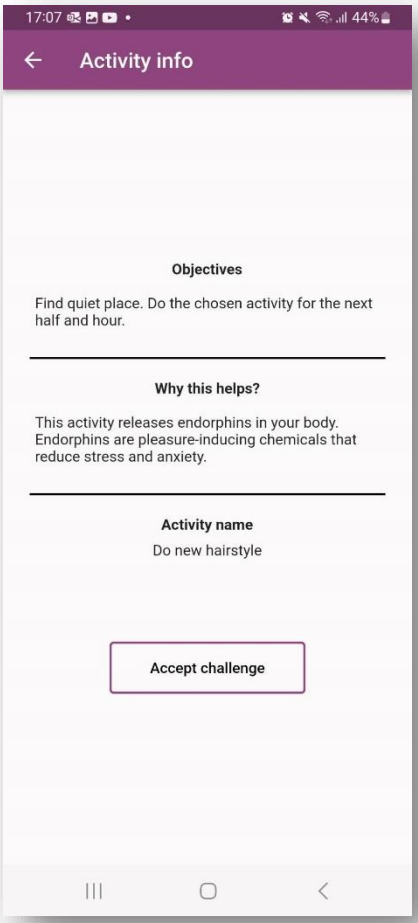
4. Mockups

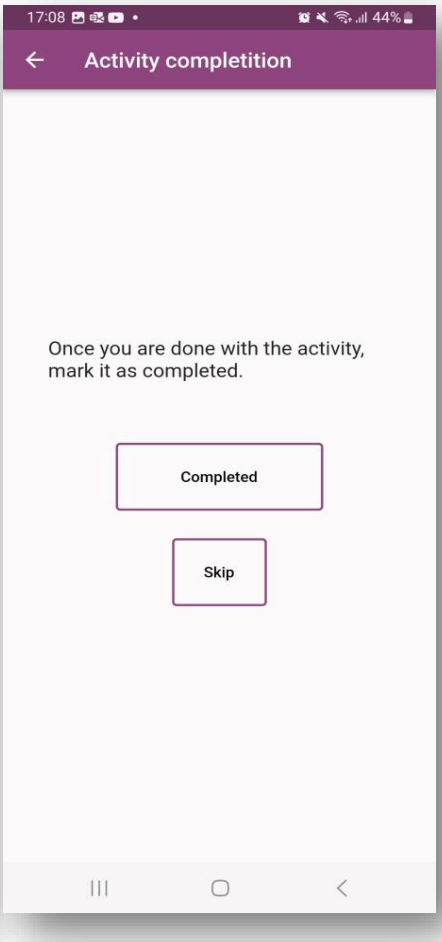


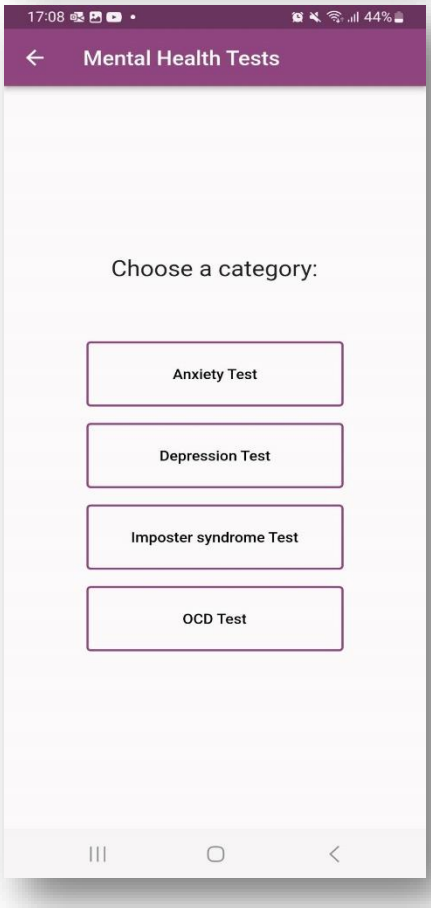


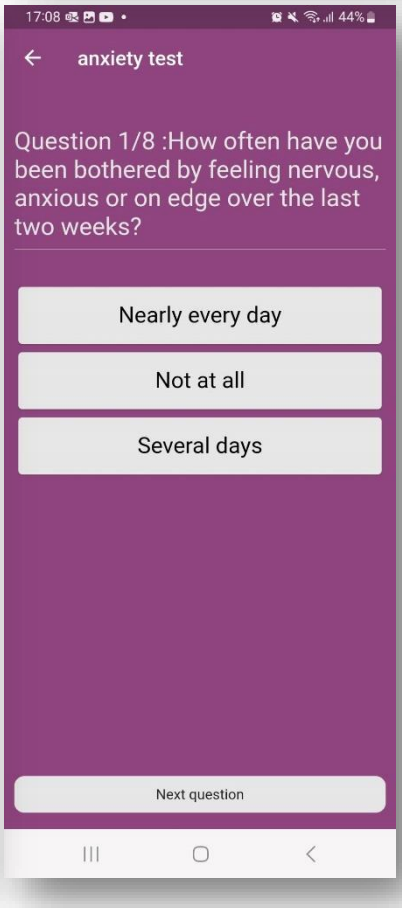


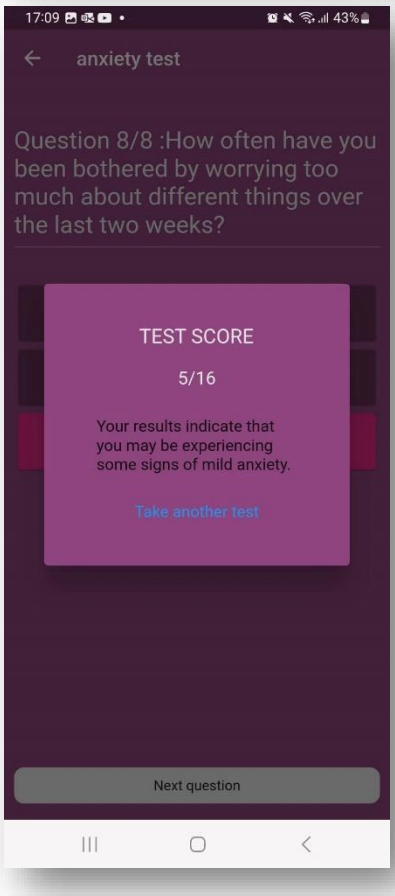

17:07 44%
Recommended activities
Do new hairstyle
Watch a solo movie
Change up your décor
Do new hairstyle

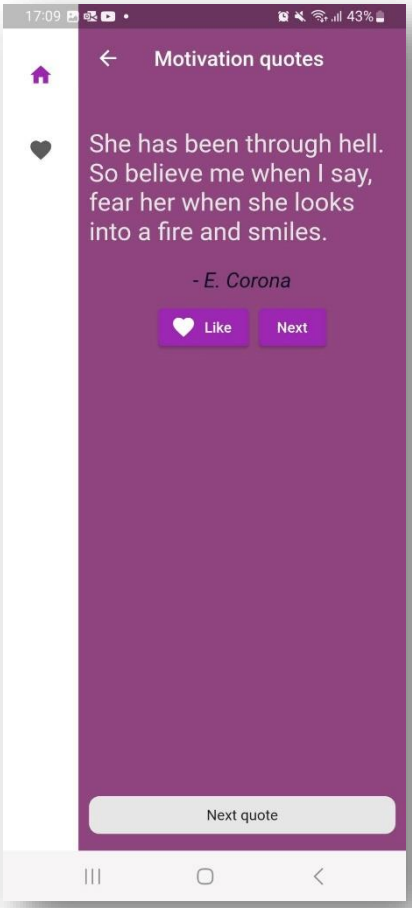

17:07 44%
Activity info
Objectives
Find quiet place. Do the chosen activity for the next half and hour.
Why this helps?
This activity releases endorphins in your body. Endorphins are pleasure-inducing chemicals that reduce stress and anxiety.
Activity name
Do new hairstyle
Accept challenge

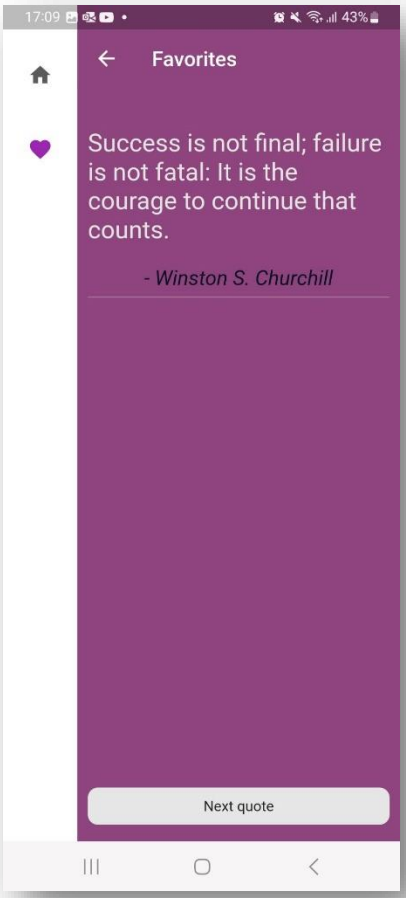

17:08 44%
Activity completition
Once you are done with the activity, mark it as completed.
Completed
Skip

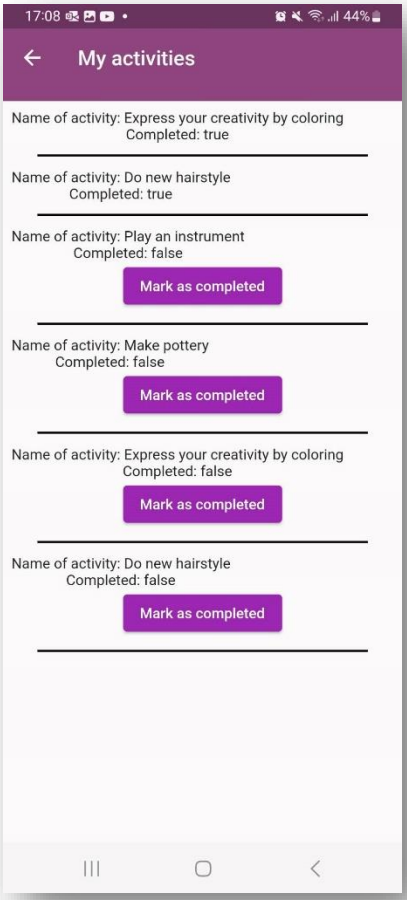

17:08 44%
Mental Health Tests
Choose a category:
Anxiety Test
Depression Test
Imposter syndrome Test
OCD Test

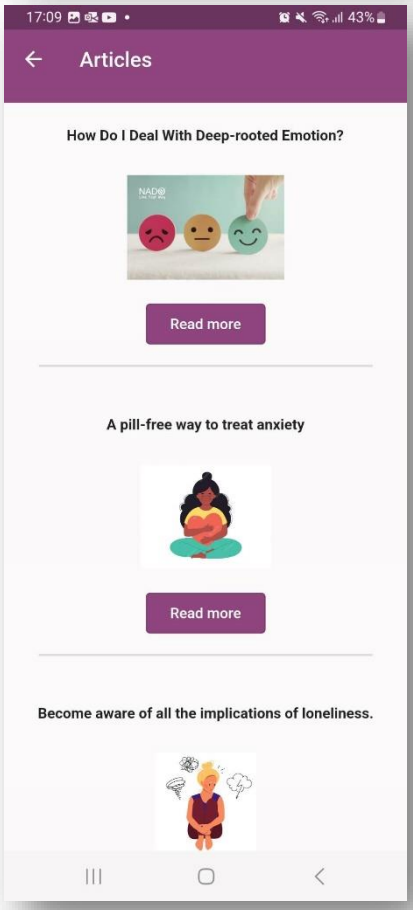

17:08 44%
anxiety test
Question 1/8 :How often have you been bothered by feeling nervous, anxious or on edge over the last two weeks?
Nearly every day
Not at all
Several days
Next question

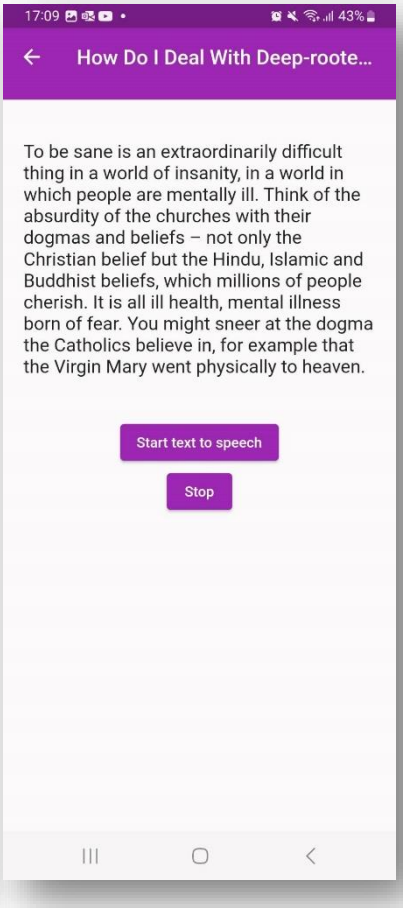

17:09 43%
anxiety test
Question 8/8 :How often have you been bothered by worrying too much about different things over the last two weeks?
TEST SCORE
5/16
Your results indicate that you may be experiencing some signs of mild anxiety.
Take another test
Next question

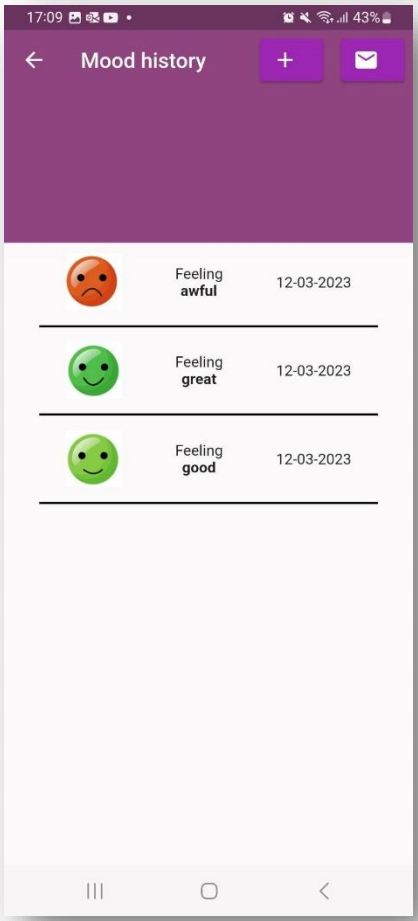

Motivation quotes
She has been through hell. So believe me when I say, fear her when she looks into a fire and smiles.
- E. Corona
Like
Next
Next quote

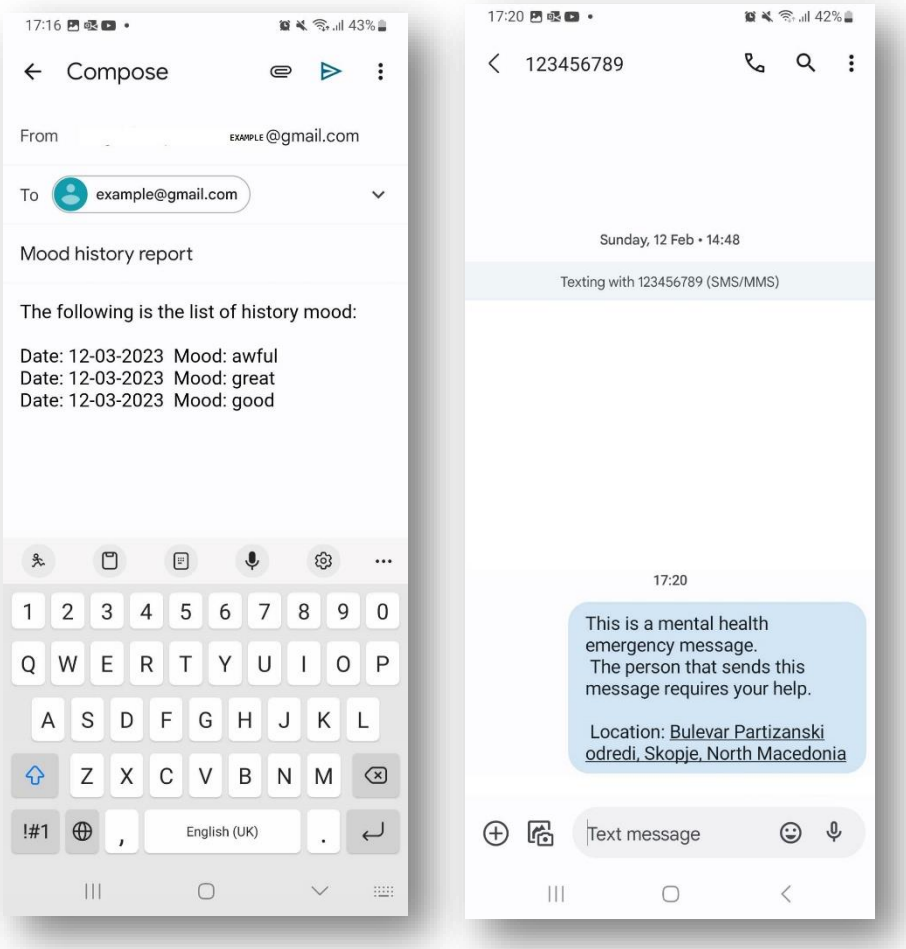

Favorites
Success is not final; failure is not fatal: It is the courage to continue that counts.
- Winston S. Churchill
Next quote


My activities
Name of activity: Express your creativity by coloring
Completed: true
Name of activity: Do new hairstyle
Completed: true
Name of activity: Play an instrument
Completed: false
Mark as completed
Name of activity: Make pottery
Completed: false
Mark as completed
Name of activity: Express your creativity by coloring
Completed: false
Mark as completed
Name of activity: Do new hairstyle
Completed: false
Mark as completed


Articles
How Do I Deal With Deep-rooted Emotion?
Read more
A pill-free way to treat anxiety
Read more
Become aware of all the implications of loneliness.


How Do I Deal With Deep-roote...
To be sane is an extraordinarily difficult thing in a world of insanity, in a world in which people are mentally ill. Think of the absurdity of the churches with their dogmas and beliefs – not only the Christian belief but the Hindu, Islamic and Buddhist beliefs, which millions of people cherish. It is all ill health, mental illness born of fear. You might sneer at the dogma the Catholics believe in, for example that the Virgin Mary went physically to heaven.
Start text to speech
Stop


Mood history
Feeling awful
12-03-2023
Feeling great
12-03-2023
Feeling good
12-03-2023



5. System implementation

5.1 Database connection

For storing the data, I use Firebase Realtime Database.

mental_health_flutter_app/lib/db_connection/db_connect.dart → This is the location where all http methods are decalred and consequently used to retreive/update/insert data in the database.

In order to make http call requests, we use the flutter ‘http’ library.

```
'https://flutter-mental-health-app-default-rtdb.firebaseio.com';
```

This is the default db uri used to access the data.

Below you can find some example methods of how to retreive, insert or update data using the connection that we have with the realtime firebase database.

```dart
  Future<List<CompletedActivity>> fetchCompltedActivities() async {
    final url = Uri.parse(
        'https://flutter-mental-health-app-default-
rtdb.firebaseio.com/completed_activities.json');

    return http.get(url).then((response) {
      var data = json.decode(response.body) as Map<String, dynamic>;
      List<CompletedActivity> newCompltedActivities = [];

      data.forEach((key, value) {
        var newCompltedActivity = CompletedActivity(
          id: key,
          title: value['title'],
          isCompleted: value['isCompleted'],
        );

        newCompltedActivities.add(newCompltedActivity);
      });
      return newCompltedActivities;
    });
  }
```

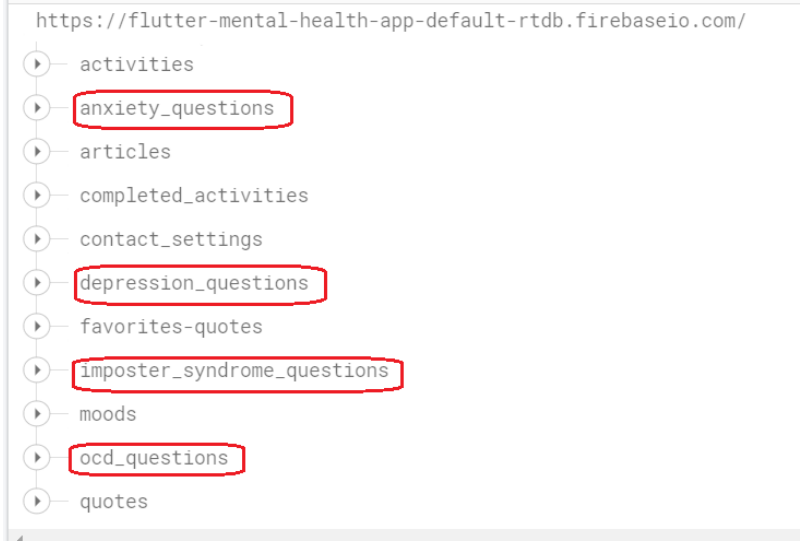
```dart
  Future<void> addActivity(Activity activty) async {
    final url = Uri.parse(
        'https://flutter-mental-health-app-default-
rtdb.firebaseio.com/activities.json');
    http.post(url,
        body: json.encode({
          'title': activty.title,
          'moodCategory': activty.moodCategory,
        }));
  }
```

```dart
  Future<void> updateMood(String moodId, Mood mood) async {
    final url = Uri.parse(
        'https://flutter-mental-health-app-default-
rtdb.firebaseio.com/moods/$moodId.json');
    http.put(
      url,
      body: json.encode({
        'mood': mood.mood,
        'datetime': mood.datetime,
      }),
```

```
    );
  }
```

5.2 ‘Measuring user mental health condition based on questions’ feature functionality

For every test category we keep the questions separetely in different db tables.



The model structure used for every question is the following:

```dart
class Question{
  final String id;
  final String title;
  final Map<String,int> options;

  Question({
    required this.id,
    required this.title,
    required this.options,
  });

  @override
  String toString() {
    return 'Question(id: $id, title: $title, options: $options)';
  }

}
```

As you can see it from the above screenhost, the title property is where we keep the actual question and in options property we store the possible anwsers for that particulat question.

Here the main logic relay on user choosing the answers to the questions. As he goes from question to question, in the background we have a ‘result’ variable where we update the result based on the points of the chosen question. Every question has 3 options: ‘Nearly every day’, ‘Several days’, ‘Not at all’. And each of these brings 0,1,2 points accordingly. It is intended to measure the degree of the user's mental state.

5.3 ‘Random motivation quote generator’ feature functionality

For this feature to be implemented, first we need to import some data - motivation quotes in the database. Then when the user click on ‘Next quote’ button, a random quote is generated. For this purpose we use the flutter math library ('dart:math') so that we can create an object from ‘Random’ class which is used to generate a random number. Then this random number is used to choose which record (‘motivation quote’) will be fetched from the database.

Below you can find the function that is used for this purpose:

```
Future<List<Activity>> fetchActivities(int mood) async {
  final url = Uri.parse(
      'https://flutter-mental-health-app-default-rtdb.firebaseio.com/activities.json');

  return http.get(url).then((response) {
    var data = json.decode(response.body) as Map<String, dynamic>;
    List<Activity> newActivities = [];

    data.forEach((key, value) {
      if (mood == value['moodCategory']) {
        var newActivity = Activity(
          id: key,
          title: value['title'],
          moodCategory: value['moodCategory'],
        );

        newActivities.add(newActivity);
      }
    });
    List<Activity> recommendedActivities = [];
    Random random = Random();
    int randomNumber = 0;
    for (int i = 0; i <= 3; i++) {
      randomNumber = random.nextInt(newActivities.length);
      recommendedActivities.add(newActivities[randomNumber]);
    }

    return recommendedActivities;
  });
}
```

5.4 ‘Read article’ feature functionality

For this feature the most important part is that is provices you automatic reader od the shown text. In order to implement this, we use the library: ‘flutter_tts’ which is a text to speech plugin.

```dart
final FlutterTts flutterTts = FlutterTts();

void stopSpeaking() async {
  await flutterTts.stop();
}

void onPressed() async {
  await flutterTts.setLanguage("en-US");
  await flutterTts.setPitch(1);
  await flutterTts.speak(content);
}
```

5.5 ‘Send emergency SMS’ feature functionality

This was done using the ‘flutter_sms’ library for sending the SMS, and ‘geolocator’ and ‘geocoding’ libraries which were used to get the current user location.

```dart
Future<void> getAddressFromLatLong(Position position) async {
  List<Placemark> placemarks =
      await placemarkFromCoordinates(position.latitude, position.longitude);
  print(placemarks);
  Placemark place = placemarks[0];
  address =
      '${place.street}, ${place.subLocality}, ${place.locality}, ${place.postalCode}, ${place.country}';
  setState(() {});
}

void sending_SMS(String msg, List<String> list_receipents) async {
  String send_result =
      await sendSMS(message: msg, recipients: list_receipents)
          .catchError((err) {
    print(err);
  });
  print(send_result);
}

void generateMessage() async {
  Position position = await _getGeoLocationPosition();
  location = 'Lat: ${position.latitude} , Long: ${position.longitude}';
  await getAddressFromLatLong(position).then((result) {
    sending_SMS(
        'This is a mental health emergency message.\n The person that sends this message requires your
        [
          emergencyPhone,
        ]);
  });
}
```

These 3 methods are the most important. In the ‘getAddressFromLatLong’ method, we encode the current location of the user, actually we get the current longtitude and latitude of the user’s location and then we translate it in an address. Which information is then encoded within the message content which is then send to the user’s emergency contact person.

5.6 ‘Send email for mood hisitory reprot’ feature functionality

In order to implement this functionality we use the flutter library ‘flutter_email_sender’.

```dart
generateEmailBodyContent() {}

void sendEmail() async {
  final Email send_email = Email(
    body: emailBodyContent,
    subject: 'Mood history report',
    recipients: [emailAddress],
    isHTML: false,
  );

  await FlutterEmailSender.send(send_email);
}
```

```dart
Future<List<Mood>> fetchMoods() async {
  final url = Uri.parse(
      'https://flutter-mental-health-app-default-rtdb.firebaseio.com/moods.json');

  return http.get(url).then((response) {
    var data = json.decode(response.body) as Map<String, dynamic>;
    List<Mood> newMoods = [];

    data.forEach((key, value) {
      var newMood = Mood(
        id: key,
        mood: value['mood'],
        datetime: value['datetime'],
      );

      newMoods.add(newMood);
    });
    return newMoods;
  });
}
```

These are the most important methods used for this functionality. We use ‘fetchMoods’ method in order to fetch the ‘mood’ record and then encode these data into the email body that is then send to the user’s psychotherapist.

6. User manual

6.1 How to test the app

Here we will list the steps required to start using the application:

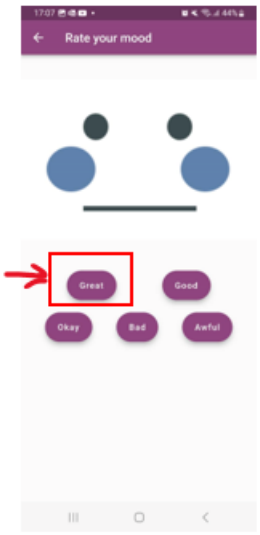
1. Download code from the github repository: https://github.com/magdalenapetrushevska/mental_health_flutter_app
2. Next open the code in the Visual studio editor or other code editor of your choice
3. Connect your mobile device with your PC using the USB cable
4. Run the app (F5)
5. Well done. Now you have installed the app on your phone. Go ahead and start using it.

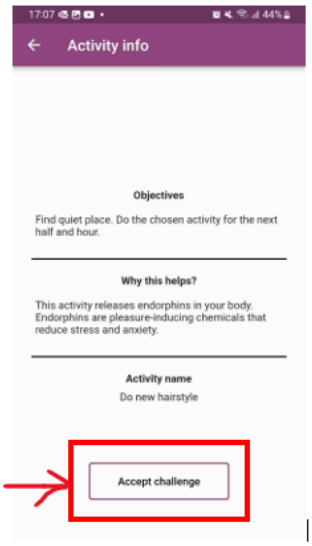
There are few features that you can use with this app. In the following we will give you some short intro of how to get started with each of them.

6.2 Activites section – How to use?

Based on how the user is feeling currently, recommends him a list of activities that can help him boosting his mood. The aim of every recommended activity is to help user in decreasing its stress level, helping him to remain calm and postive. Once the user has done the activity it can mark it as complted. The user also has the possibility to take a look at the list od his activities that he has chosen to do so far.

First of all, in order to use this functionality, one must click on the activities icon presented on the main screen. Then you will need to enter your current mood. The available options are ‘awful’, ‘bad’, ‘okay’, ‘good’, ‘great’. This will be used as input for generating recommended activities by the system. Next user has to choose which activites suits his mood the best and accept it as challenge. Once the user has done the activity, he needs to set the status od activity as ‘Completed’. Next the user is shown all the activities that he has chosen so far.

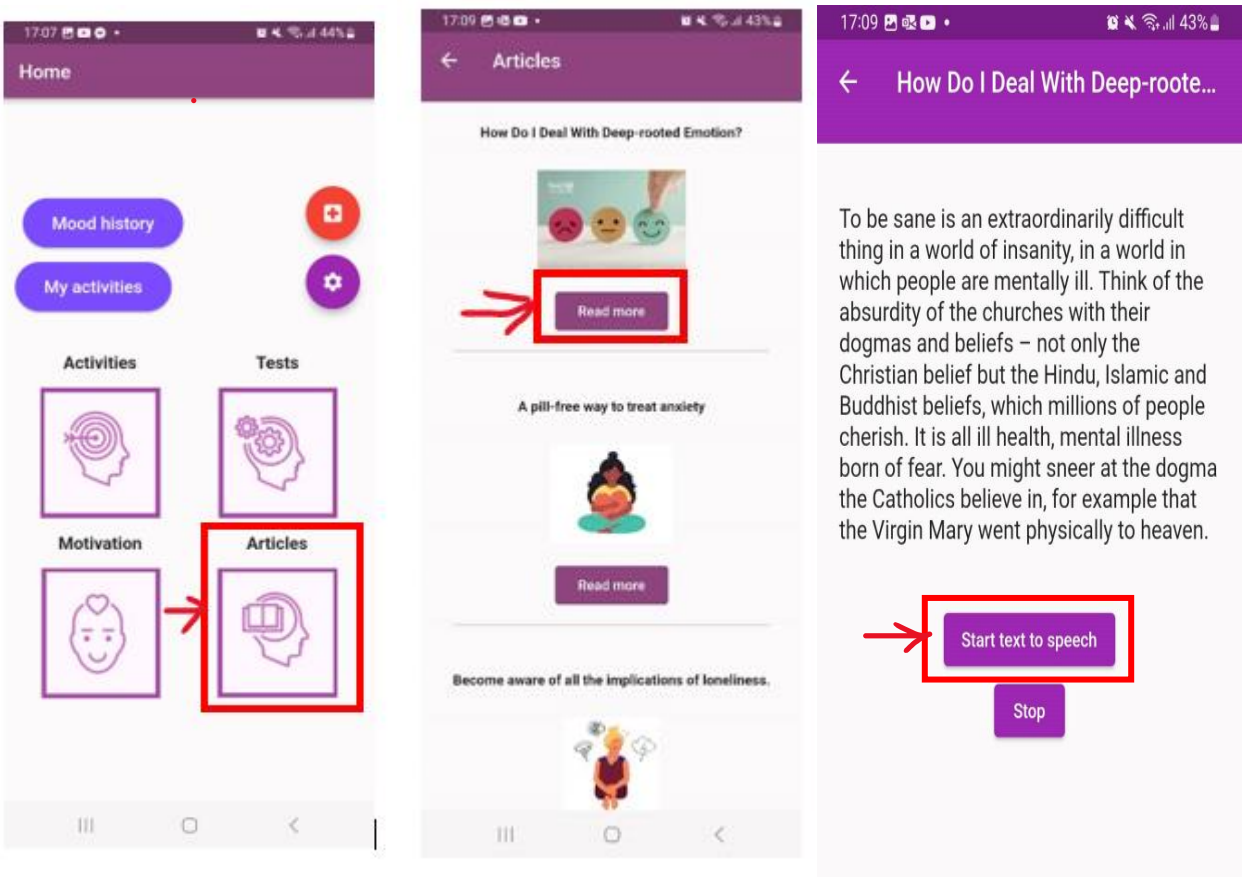




6.3 Articles section – How to use?

The Articles section offers the user a wealth of mental health articles that can help user learn more about various mental health conditions, symptoms, as well as mental well-being techniques.

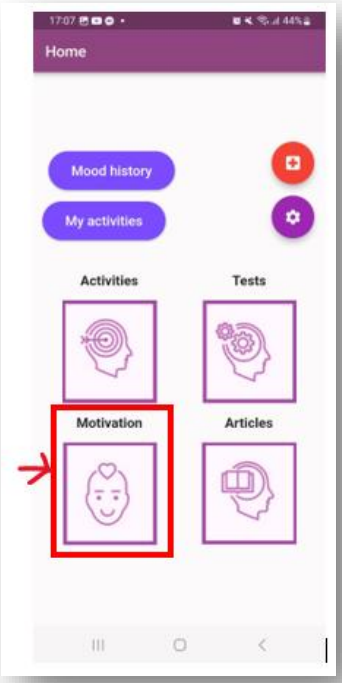
First of all, in order to use this functionality, one must click on the articles icon presented on the home screen. This will open a list of articles that the user can read. Next the user has to chosen an article of interest. This will generate a new screen where the user can read the artcle or he can click on ‘read’ button’ if he wants to listen to the automatic reader. This action can be stopped at any time.

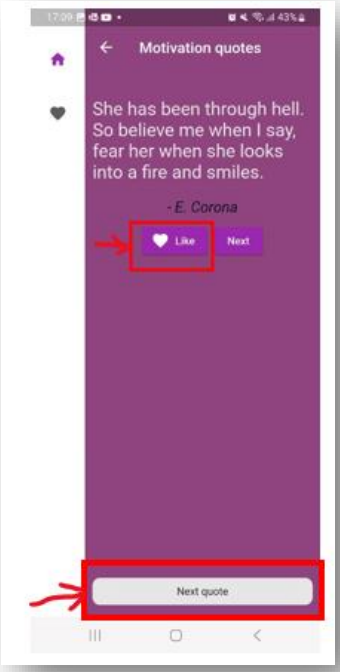


6.4 Motivation section – How to use?

The Motivation section offers the user various useful quotes and tips that help the user increase his self-confidence, helps you stay focused on the way of achieving your goals and lift you up at the moment when you feel down and reluctant.

First of all, in order to use this functionality, one must click on the motivation icon presented on the home screen. This will generate random motivation quote. The user has the possibility to add that quote to its favorites quotes section. Consequently to that, there is a section for favorites quotes.





6.5 Tests section – How to use?

The tests section offers the users quick and easy way to determine whether a user is experiencing symptoms of a mental health condition, such as depression or anxiety. Based on the test results, the user will be provided with information, resources and tools to help him understand and improve his mental health.

First of all, in order to use this functionality, one must click on the tests icon presented on the home screen. This will open a screen where the user can choose from the available mental health test categories: ‘anxiety’, ‘depression’, ‘OCD’, ‘imposter syndrome’. Based on the chosen test category, the user will be presented with total of 8 questions to anwser related to how does he feels over the last two weeks. Then

based on his answers, the result is presented and show the user whether he has mild or severe anxiety/depression/OCD/imposter syndrome.