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Faculty of Computers & Artificial Intelligence

جامعة حلوان
Helwan University

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Faculty of Computers and Artificial Intelligence
Information Systems Department

Psychotherapist

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Submitted in partial fulfilment of the requirements for the degree of Bachelor of Science in Computers & Artificial Intelligence, at the Computer Science Department, the Faculty of Computers & Artificial Intelligence, Helwan University

Supervised by:

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Abstract:

This program works to solve a big problem in society, which is the problem of mental disorders, which destroys society with false thought. Through the program, we will be able to solve many societal problems caused by mental disorders and lack of awareness of psychiatry in our eastern society. And we can use it to help school psychologists and behavior correction cases.

And We hope that the program will have an effective role and a positive impact on society soon

INTRODUCTION

1.1 Project Overview

It is an application that treats mental disorders in a simple and fast way, and anyone can use it, which works to save a large amount of time and learn more about psychological disorders and their treatment.

1.2 Project Objectives

- The user enters some symptoms.
- System will search for disorders that have the same symptoms.
- User will enter to test.
- Based on the test results, the system will identify the disorder and treat it or if he does not actually suffer from the disorder.
- Nominate a doctor if the user requests it.

1.3 Purpose

The application works to solve the problem of mental disorders, raise awareness of mental disorders, and quickly solve these problems that negatively affect the individual, which will lead to a negative impact on all of the community members, and therefore this application will positively affect the community.

1.4 Scope

The approximate work involved to finish the project is divided into these phases:−

1. **Planning and project setup:**

   • Define the task and scope out requirements.

   • Determine project feasibility.

   • Determine general model tradeoffs.

   • Set up project codebase.

2. **Searching and determining the scientific method:**

• Determine the studying field.

• Search for the best ways to organize and divide the tasks.

• Create reports periodically and follow developments.

• Research on the latest scientific papers published in the field of psychological disorders and their treatment.

• Building on specific molds and walking on a specific path in building the model.

• Choosing the best methodology of work.

3. **Data collection and labeling:**

• Determine the suitable dataset for the project.

• Validate quality of data.

• Labeling the data to help the system

• Revisit Step 1 and ensure data is sufficient for the task.

4. **Data cleaning and pre-processing:**

   • Working to find the keywords.

   • Select how to show the questions.

   • Convert the disorder to yes or no questions.

   • Remove duplicates.

   • Highlight disorders.

5. **Model Exploration:**

   • Establish baselines for model performance.

   • Start with a simple model using initial data.

   • Over-fit simple model to training data.

• Find SOTA model for your problem domain (if available) and reproduce results, then apply to your dataset.

• Repeat Step 1 and ensure feasibility of model.

• Repeat Step 2 and ensure that data quality is sufficient.

6. Testing and Evaluation:

• Evaluate model on test distribution, understand differences between train and test set distributions (how is "data in the wild" different than what you trained on).

• Repeat model evaluation metric, ensure that this metric drives desirable downstream user behavior.

● Functional testing:
  ○ Unit testing

- Non−functional testing:

  o Performance testing

  o Security testing

8. Documentation:

The documentation should mainly include these main chapters:-

• Introduction: includes an overview of the project and limitations

• Project Planning: includes the tools, technologies and tasks

• Project Requirements: includes the functional and nonfunctional requirements

• Project Design

• Project Implementation: includes user application

• Project Testing: includes testing types

1.5 General constraints

- Learning new technologies may take much time.

- Time management.

- Underestimating the objectives that may not lead to realistic or achievable function.

- Searching and discovering the right path may take much time.

- Lack of resources and resources because the model needed great capabilities in order to produce better and higher accuracy.

- The hardness to find the best bath to follow at the start of the project.

PROJECT PLANNING & ANALYSIS

2.1 Project Planning

2.1.1 Feasibility Study

A Feasibility study is used to determine if that project is achievable, so for determining the achievability of our project we'll go deeper in the following points:–

1. Realistic analysis

a. Our project is not available with our features in anywhere.

b. It helps users to analyze and verify their ideas, main ideas and consolidate the important details that support them.

c. It provide the user from going to hospitals or private clinics.

d. Saves a lot of effort and money.

e. Online data to help better discover relevant information and related information consumption faster.

2.1.2 Estimated Cost

A cost estimate is approximation of the cost of a program, project or operation .the cost estimate is the product of the cost estimating process and our estimated cost for this project comes as following:-

In our project we had a financial issue like:

- Meeting once a week in a public workspace: (100 LE) (from August to July including vacations and holidays = 1500 LE).

● Cost to purchase Dataset which related to our project to facilitate our work to achieve our progress to reach our goal.

- Efforts to study a lot of sciences about Machine learning and deep learning which related to Text processing.

- Estimated Power of team leader's pc for training models to get the best accuracy balanced with the loss from the original dataset.

- We spent a lot of time and effort to get the best services and functions to be included in our app.

2.2 Analysis and limitations of existing system

1–APTA

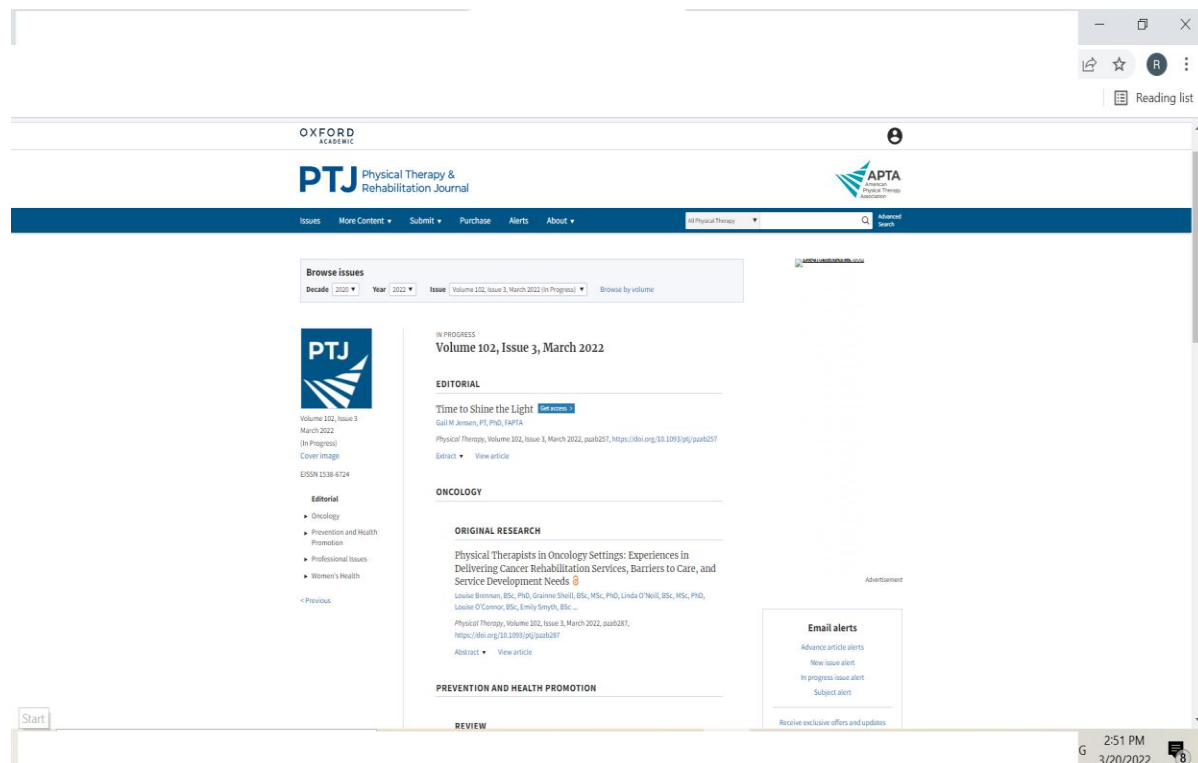**Link: https://www.apta.org/**
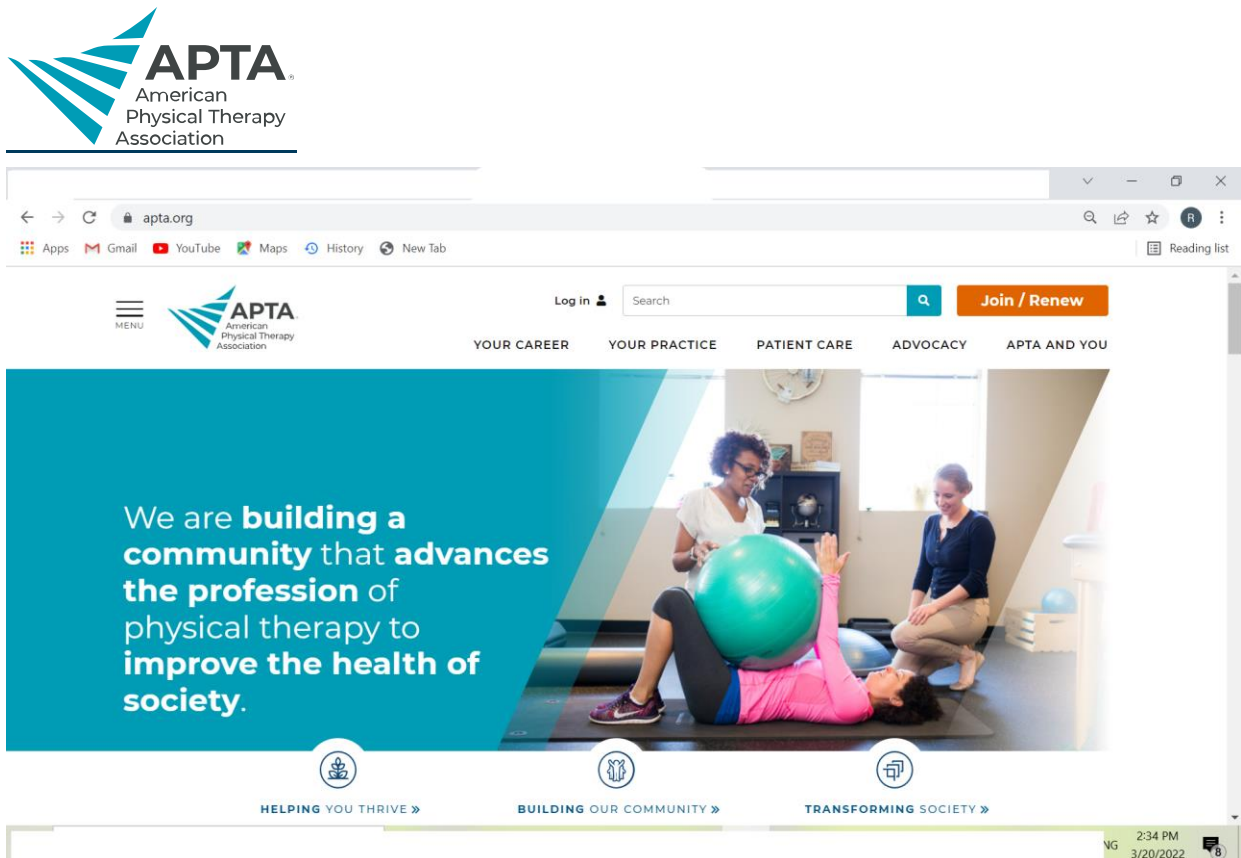
BENEFITS INCLUDE:

- Unlimited access to our expert content

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- Opportunities to expand your network with chapters and sections.

2- PTJ
Link: **https://academic.oup.com/ptj**

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<u>Precision Rehabilitation</u>

In a new special section, PTJ is showcasing research on
Precision Rehabilitation. Articles include editorials, perspectives,
and original research on the connections between lifelong
behaviors, rehabilitation, and epigenetics. Guest edited
by Richard Shields, PT, PhD, FAPTA.

2.3 Need for the New System

This program is a new idea and doesn't have an old system. We are the ones who started working on the idea from A to Z. This program solves psychological problems in all societies, especially the age of childhood and adolescence, so we found that society is in dire need of this app.

2.4 Analysis of the new system

2.4.1 User Requirements:

****

Desirable requirements:

The user can use the app with him at any place and any time so our app should be available in any place and any time.

2.4.2 System Requirements:

Mobile Device:

Also the App can works on any mobile device at any time.

Internet connection:

This app uses a cloud server so you need to be connected to the internet to use it.

2.4.3 Domain Requirements:

- Multiple users must be able to use the application simultaneously without corrupting.
- The application must have update capabilities for future models and accessories.

2.4.4 Functional Requirements:

1- Sign up:

Actor: client.

Pre: open the application, client should enter a valid data in order

to create an account such email, password.

Description: user can create an account to be a part of the

application, and login to the application for the second time he

open the application without the need of sign up again.

Post: the user should have an account to enter the app.

2- Login:

Actor: client.

Pre: open the application, enter login Button, and enter a valid email and password.

Description: user should enter his email and his password for

authorizing that he has an account.

Post: enter to the App then he can summarize with more than

one way.

3-Forget Password:

Actor: client.

Pre: open the application, user should have an account, click on forget password button.

Description: help the user to change password when he forget it, the user should click on forget password and then enter his e-mail to make sure, that he is the correct user and sent the change password form to his mail.

Post: this password should be saved in the Data tables to use it when you make login before.

2.4.5 Non-functional Requirements:

Availability:

Our application can be used in any time and it always "uptime" is the amount of time that it is operational and available for use. This is specified because some systems are designed with expected downtime for activities like database upgrades and backups.

Efficiency:

Our application utilizes scarce resources: CPU cycles, memory,

bandwidth, etc.

Flexibility:

If the team intends to increase or extend the functionality of the software after it is

deployed, that should be planned from the beginning; it influences choices made

during the design, development, testing, and deployment of the system.

Performance:

Our application has high performance and more speed and interact with it.

Reliability:

Our application is capable of the software to maintain its performance over time.

Unreliable software fails frequently, and certain tasks are more sensitive to failure.

Robustness:

Our application is able to handle error conditions gracefully, without failure. This

includes a tolerance of invalid data, software defects, and unexpected operating

conditions.

Scalability:

Our application is scalable has the ability to handle a wide variety of

system configuration sizes. The nonfunctional requirements should

specify the ways in which the system may be expected to scale up (by

increasing hardware capacity, adding machines, etc.).

Usability:

Our application is Ease to use requirements address the factors that

constitute the capacity of the software to be understood, learned, and

used by its intended users.

2.5 Advantages of the system

- The application allows the diagnosis of psychiatric disturbances.
- The presence of therapy through medicine, music, physical and mental sports.
- Allows you to save the details of the case and treatment provided in a file.pdf.
- Indirectly reducing the crime rate in society.

2.6 Risk and Risk Management

Risk management process:

1. **Risk identification :**

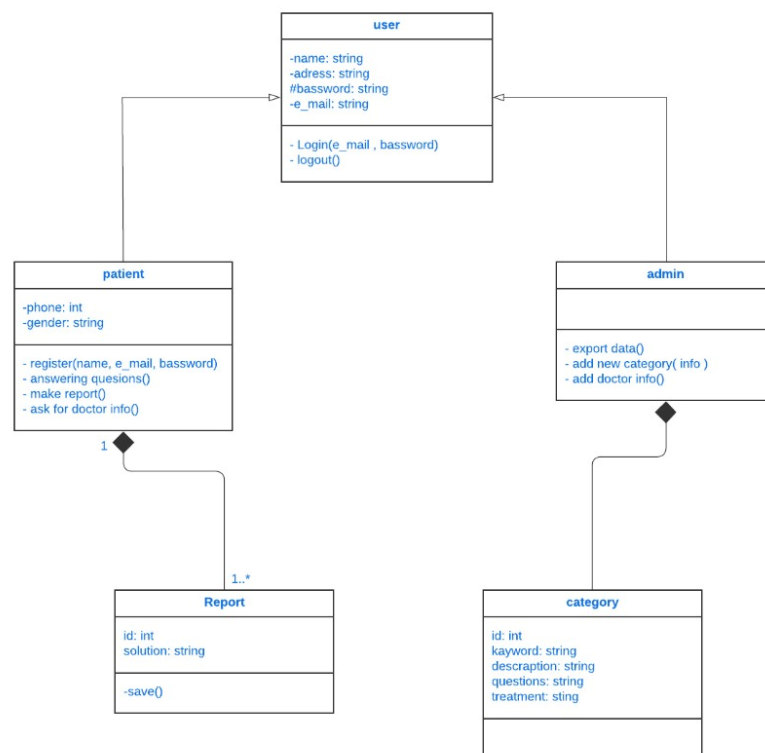| RISK TYPE	Possible risks
Technology	The database used in the system cannot process as many transactions per second as expected. Software components that should be reused contain defects that limit their functionality.
People	It is impossible to recruit staff with the skills required. Key staff are ill and unavailable at critical times. Required training for staff is not available
Organizational	The organization is restructured so that different management are responsible for the project. Organizational financial problems force reductions in the project budget.
Requirement	Changes to requirements that require major design rework are proposed. Customers fail to understand the impact of requirements changes.
Estimation	The time required to develop the software is underestimated. The rate of defect repair is underestimated. The size of the software is underestimated

2. Risk analysis:

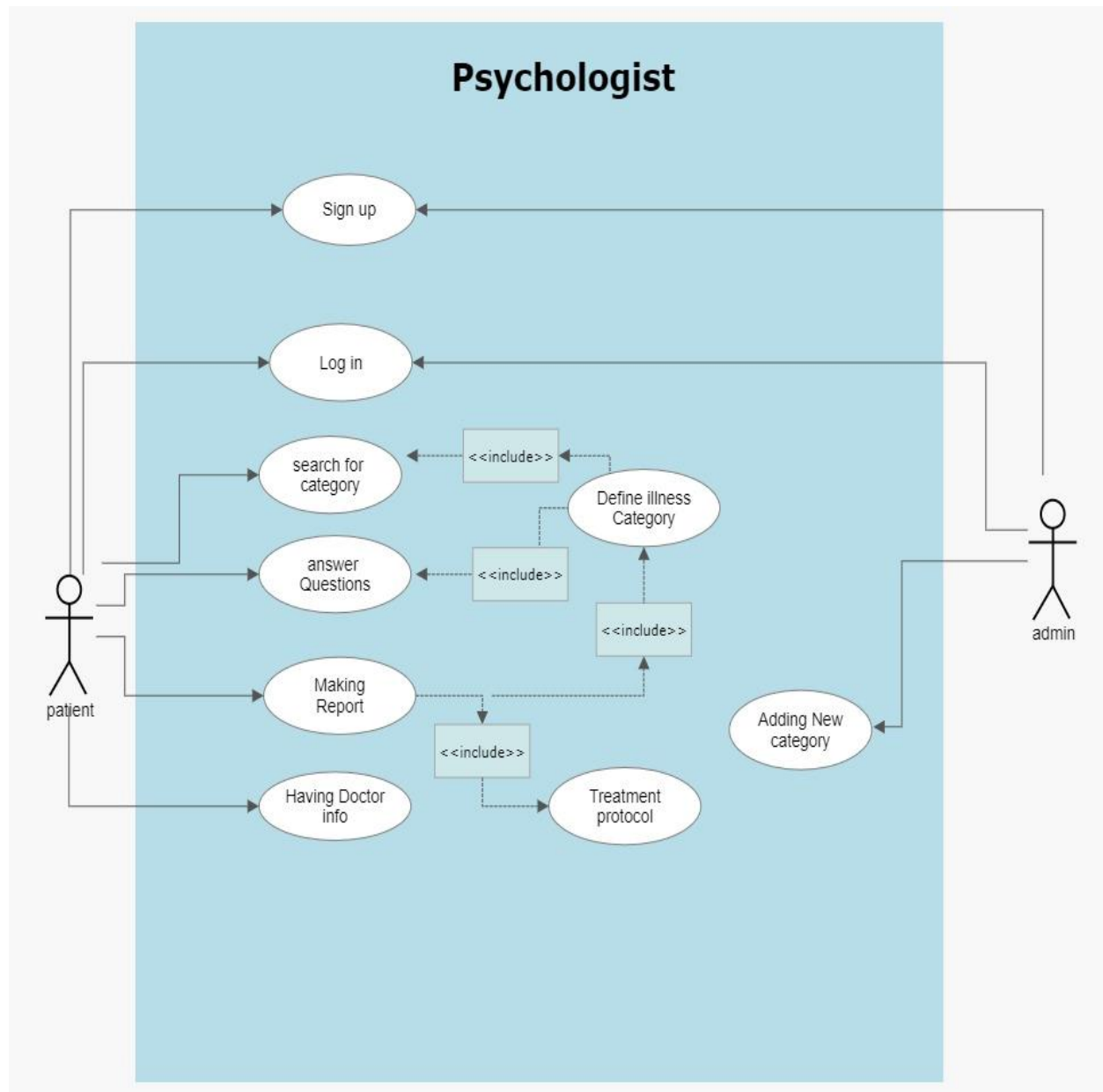| RISK	Probability	Effects
Organizational financial problems force reductions in the project budget.	Low	Catastrophic
It is impossible to recruit staff with the skills required for the project.	high	Catastrophic
Key staff are ill at critical times in the project.	Moderate	Serious
Software components that should be reused contain defects which limit their functionality.	Moderate	Serious
Changes to requirements that require major design rework is proposed.	Moderate	Serious
The organization is restructured so that different management are responsible for the project.	High	Serious
The database used in the system cannot process as many transactions per second as expected.	Moderate	Serious
The time required to develop the software is underestimated.	High	Serious
Customers fail to understand the impact of requirements changes.	Moderate	Tolerable
Required training for staff is not available.	Moderate	Tolerable
The rate of defect repair is underestimated.	Moderate	Tolerable
The size of the software is underestimated.	High	Tolerable

3. Risk planning:

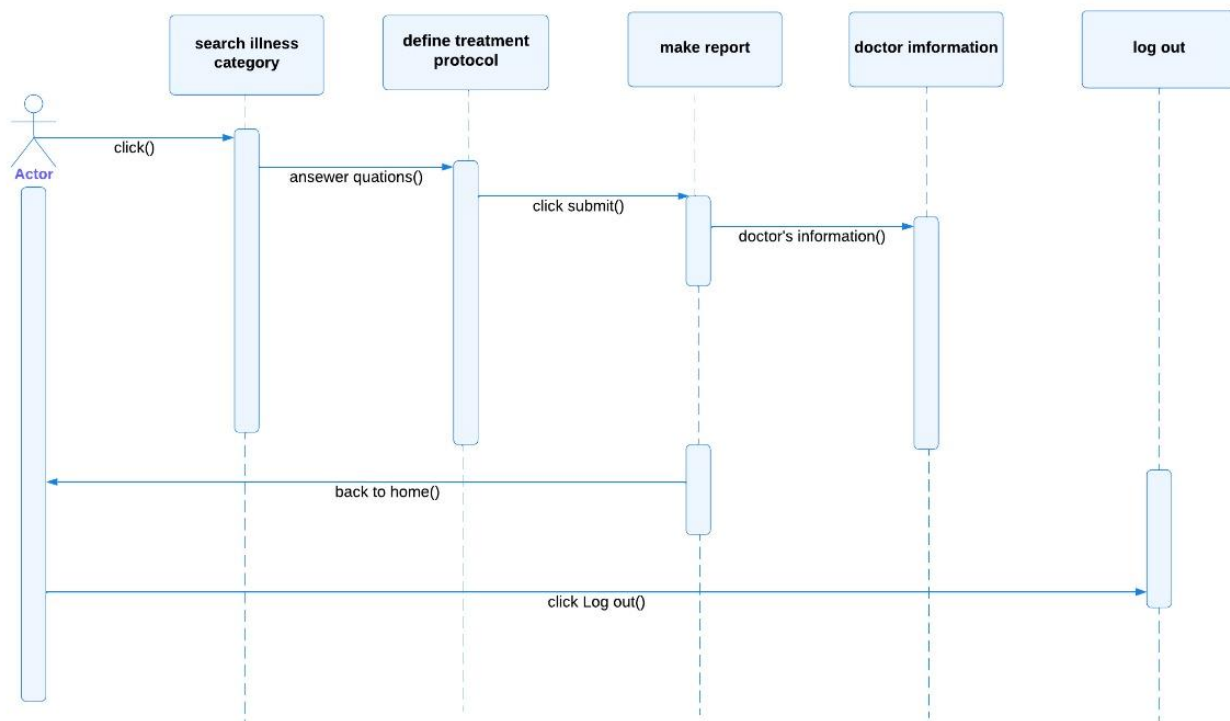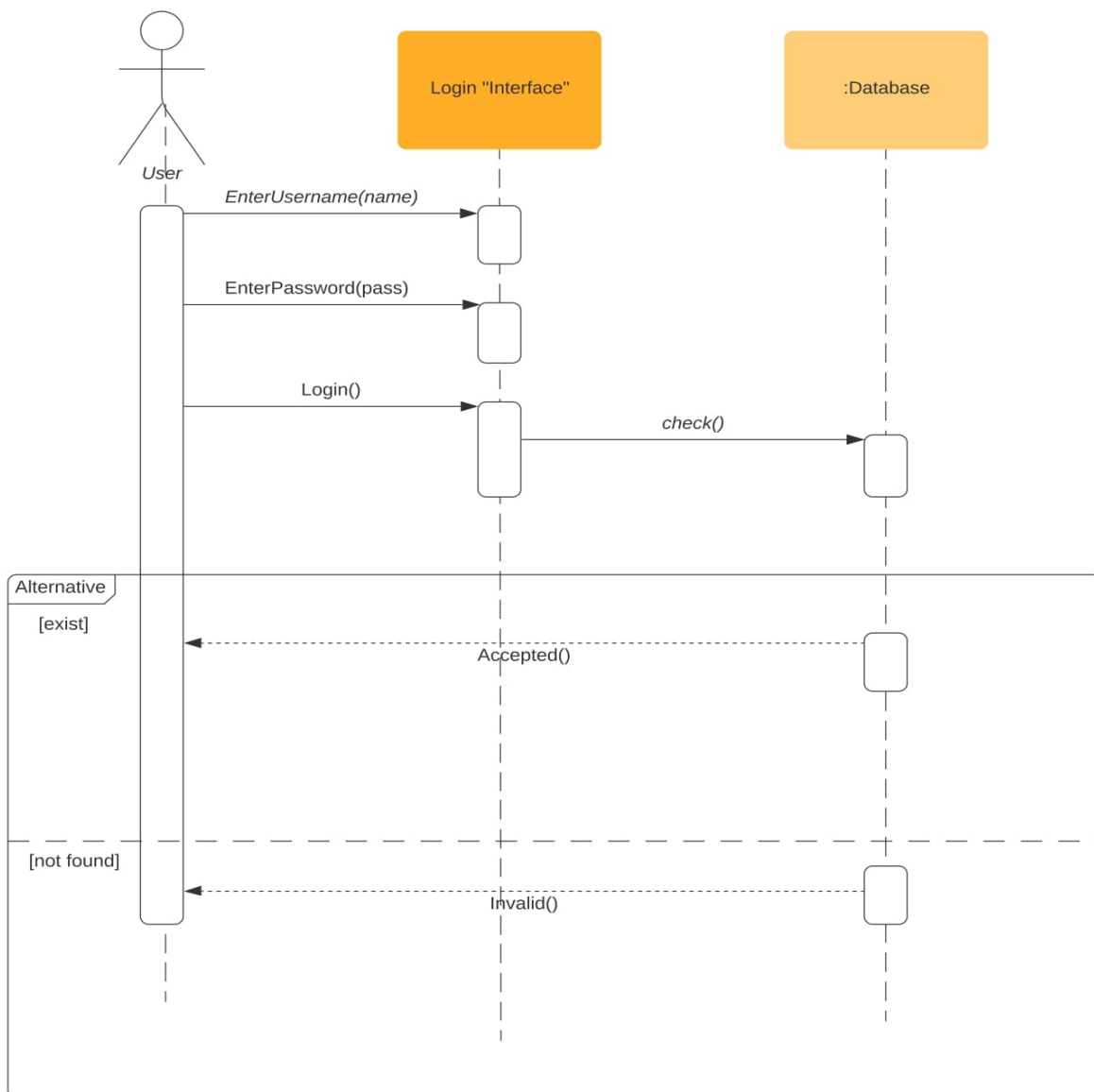| Risk	Strategy
Organizational financial problems	Prepare a briefing document for senior management showing how the project is making a very important contribution to the goals of the business
Recruitment problems	Alert customer of potential difficulties and the possibility of delays.
Staff illness	The organization is restructured so that different management are responsible for the project. Organizational financial problems force reductions in the project budget.
Requirement	Reorganize team so that there are more overlap of work and people therefore understand each other's jobs.
Defective components	Replace potentially defective components with bought in components of known reliability
Requirements changes	Derive traceability information to assess requirements change impact, maximize information hiding in the design.
Organizational restructuring	Prepare a briefing document for senior management showing how the project is making a very important contribution to the goals of the business.
Database performance	Investigate the possibility of buying a higher performance database. Underestimated.

SOFTWARE DESIGNS

3.1 Class Diagram:

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3.2 Use case Diagram:

3.3 Sequence Diagram

3.3.1 User

3.3.2 Login

3.3.3 Sign-up
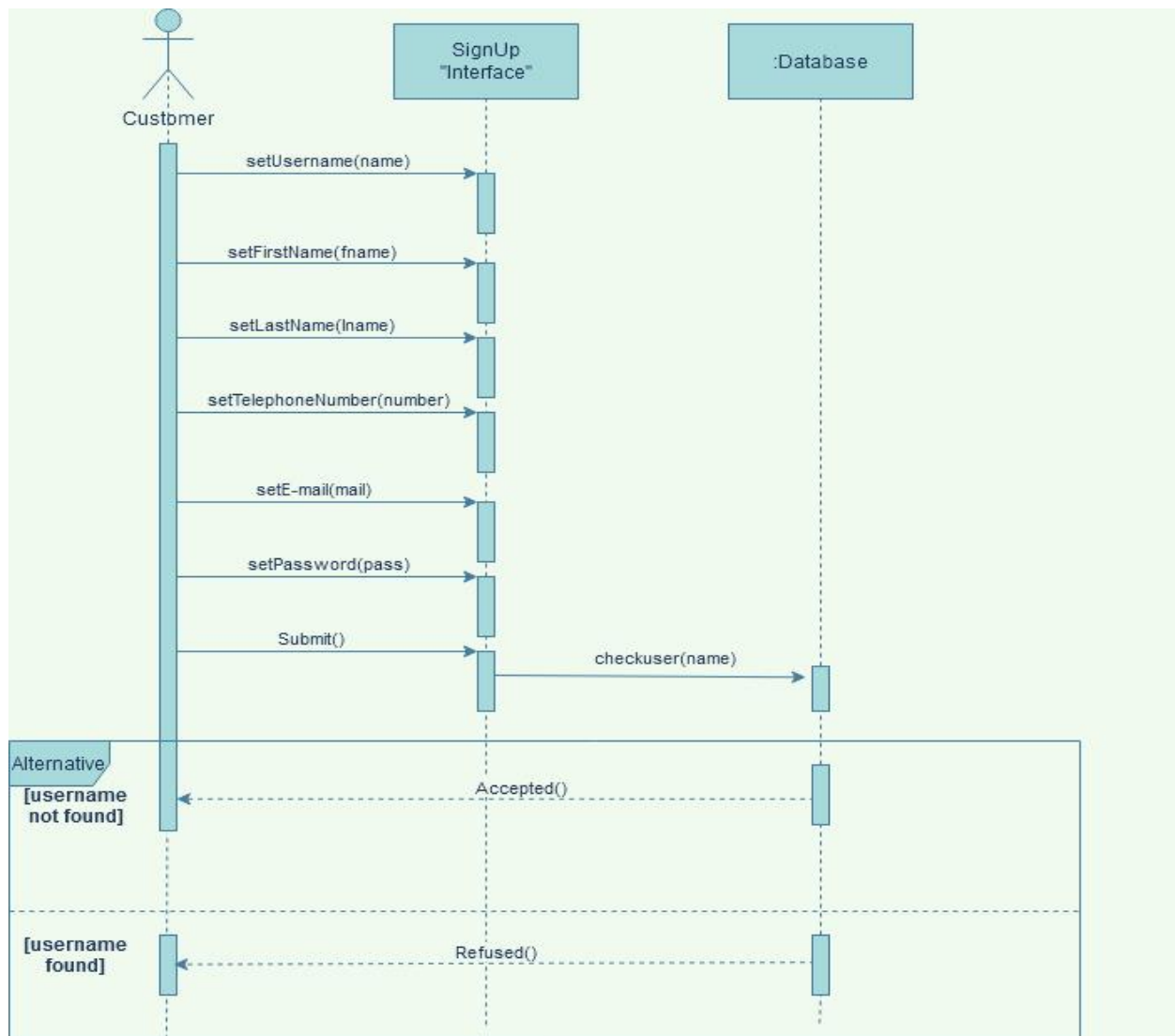
3.4Activity Diagram:
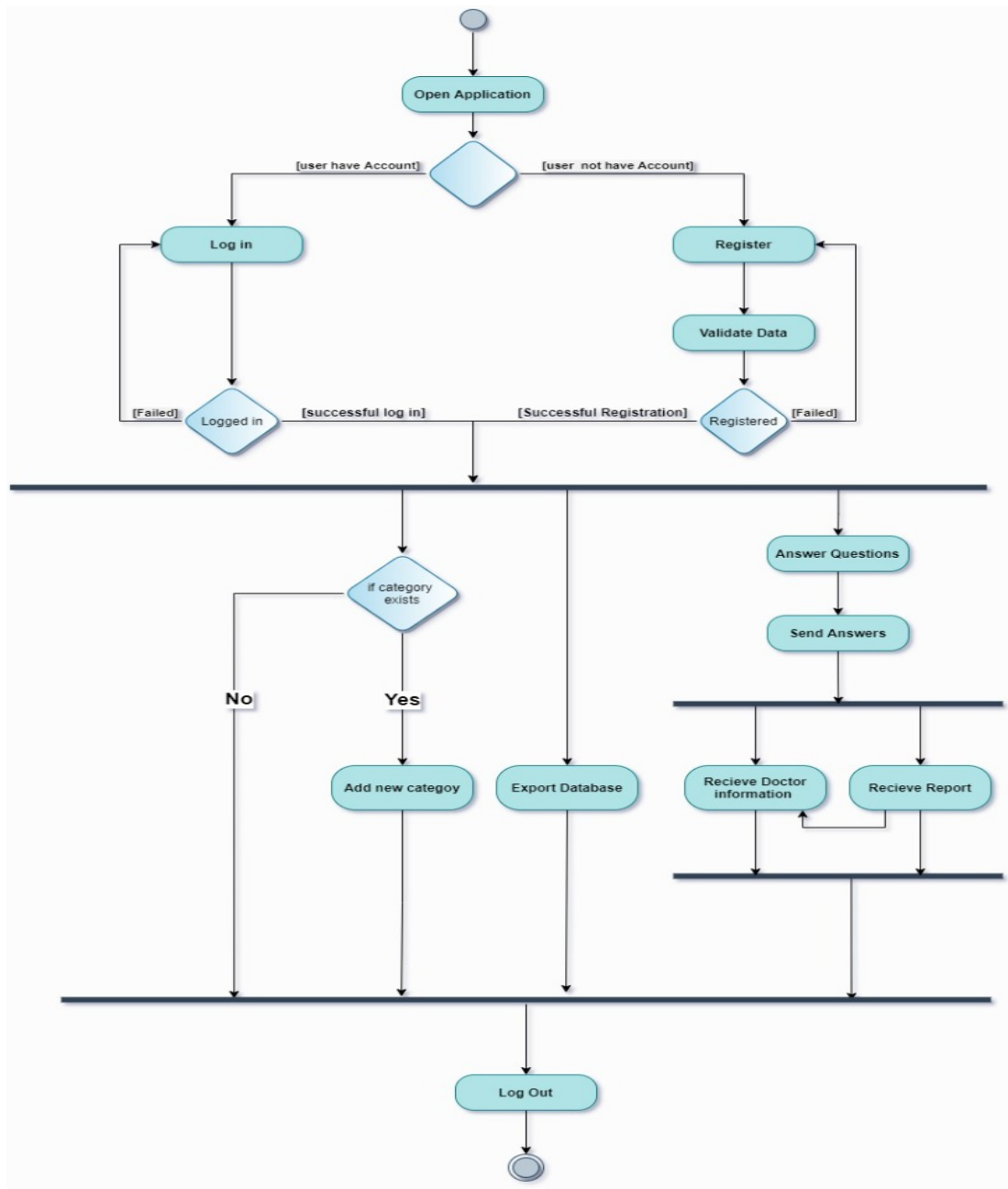
3.5 Data set

ID	Name	Desc	Treat	
			Drug treatment	Psychiatric treatment
1	Unexplained hypersomnia (فرط النوم مجهول السبب)	A neurological disorder that is rarely diagnosed at an early stage,The disease is usually chronic and debilitating	Modiodal (once every 12 hours) Or Strattera(once every 12 h).Or Xyrem (once a day).	Set an alarm that rings every 8 hours.
2	The Hypnolepsy (النوم القهري)	A chronic neurological disease about the loss of the brain's ability to naturally regulate sleep-wake cycles , Narcolepsy sufferers often suffer from severe daytime sleepiness that occurs	1.Adderall (Once in the morning) 2.Xyrem (Once in the morning) 3.Efexor XR (Once with food)	
3	sleep paralysis (jathoom) شلل النوم ("الجاثوم")	1. A condition that occurs while awake or asleep 2. Temporary paralysis of the body after waking up from sleep 3. The person is conscious but unable		1.Regulating sleep schedules , 2.Away from stress, 3.Doing a sporting activity
4	Insomnia (الارق)	It is a sleep disorder or a piece, and negatively affects the patient's mental and physical health., Complaining about difficulty initiating or maintaining sleep	Klonopin (once at day) , Clobazam (once at day) , Xanax (once at night)	Going to bed at a fixed time., Refrain from drinking stimulants., Doing exercise. , do not stay up too much. , Stay away from smoking. ,Do not eat dinner late . Stay away from alcoholic
5	sleep walking (السرنمه)	It is a sleep disorder, and this disorder represents a mixed state of sleep and wakefulness, where the person with the disorder performs functions or works that usually require a full state	1.Klonopin (once at the day)	1- Avoid stress and problems. 2- Avoid alcohol or drugs. 3- Doing exercise. 4- Don't sleep too much.
6	Claustrophobia(رهاب الاحتجاز)	It is the fear resulting from the presence of a person in a confined or closed place, and it is considered one of the diseases caused by anxiety and usually causes panic attacks		1- Go to a cognitive behavioral therapist 2-hypnosis 3-Breathe slowly and deeply while counting to three with each breath 4-Imagine a quiet place in you brain and focus on it
7	Misophonia (الميسوفونيا)	Misophonia, or selective voice sensitivity syndrome, is a neurological disorder characterized by an emotional and passive reaction to hearing certain whispered or hidden		Tinnitus training treatment TRT , Go to a cognitive behavioral specialist , White noise therapy , wear earplugs
8	Agoraphobia( )	Agoraphobia, or agoraphobia, is a type of stress. It is a fear of panic	1. Prozac (once at morning)	Identify negative thoughts and beliefs and try to overcome them , Quiet and slow breathing when

IMPLEMENTATION

In this chapter we're going to discuss and go deeper in our application's implementation, and present its main two functions (Search, Test) and the algorithms used to build it.

4.1 Software architecture.
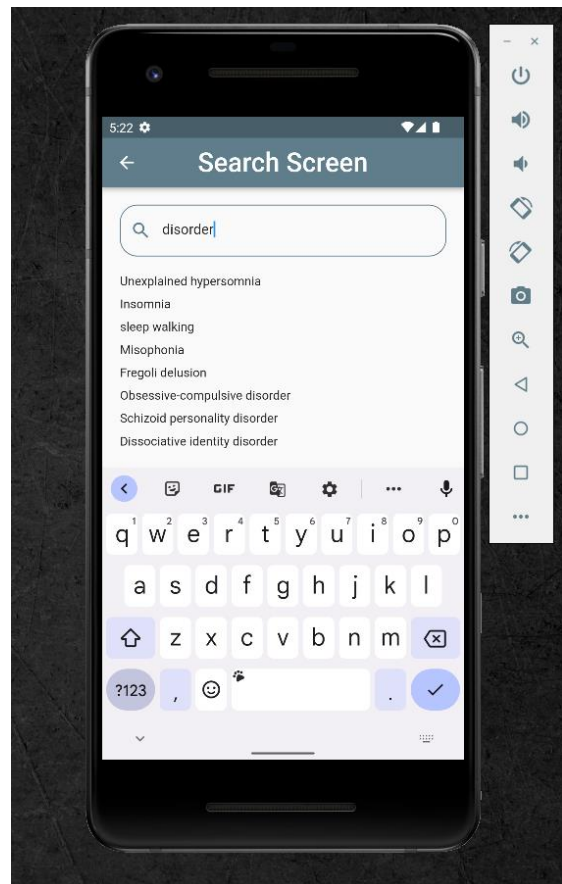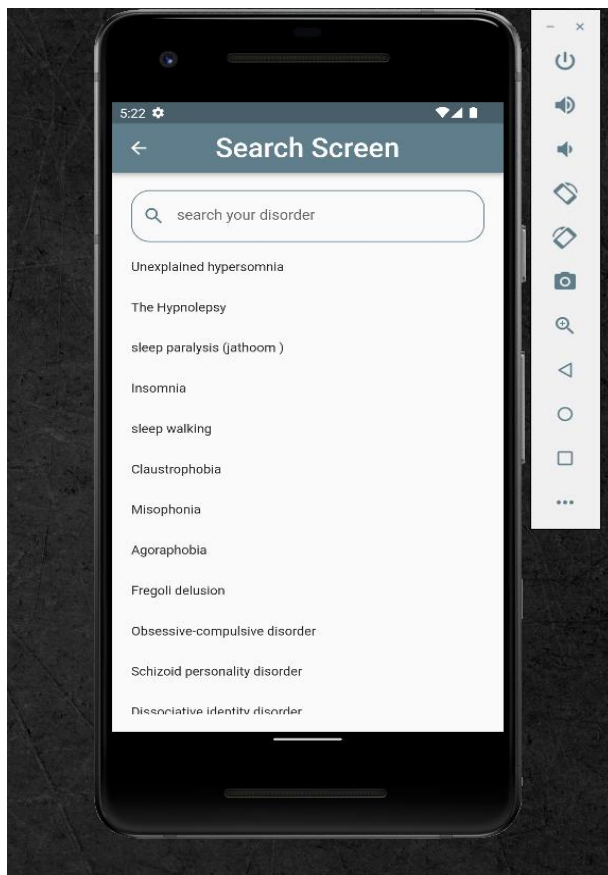
4.1.1 Search Function

This function is the first one which help users to search for their disorder by simple symptoms or the main name of his disorder and this is completely shown in this function by it's screenshot
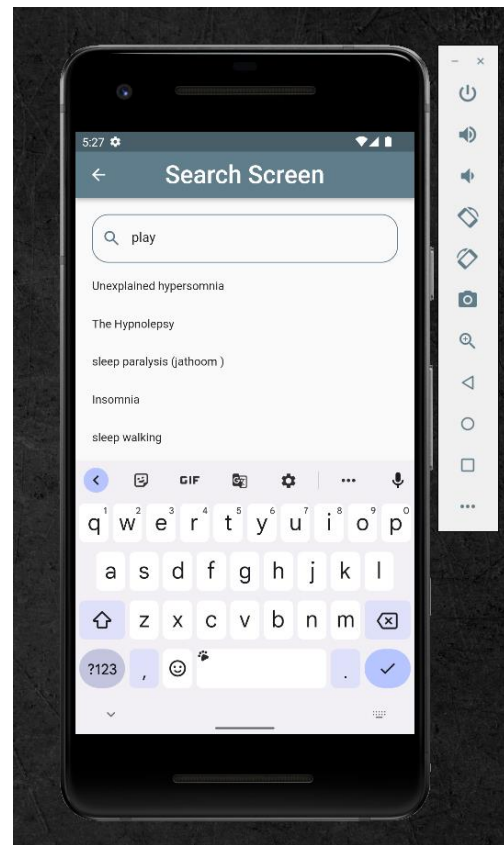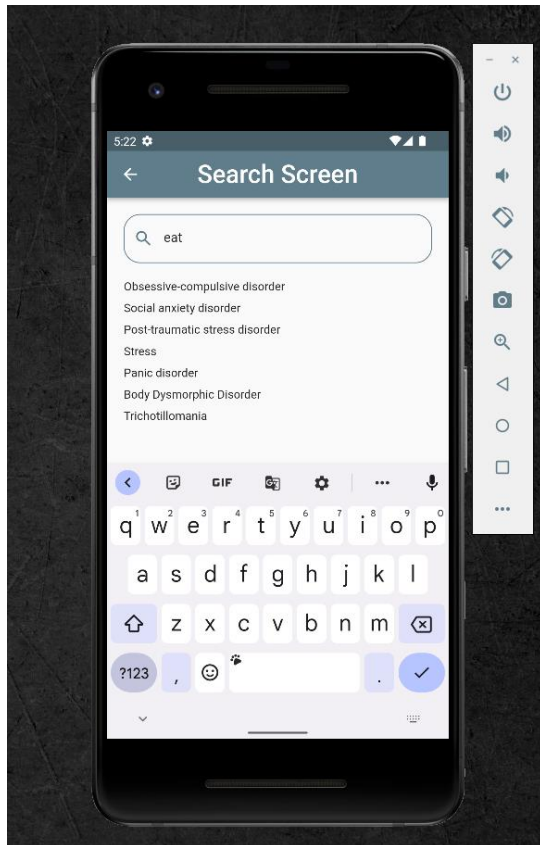
```
}
void search(String query){
  final suggestion = catList.where((element) {
    final nametitle = element.name.toString().toLowerCase();
    final desctitle = element.desc.toString().toLowerCase();
    String input = query.toLowerCase();
    return nametitle.contains(input) || desctitle.contains(input);
  }).toList();
  setState(() {
    searchItem = suggestion;
    print(searchItem);
  });

}
```

And we have used a model to set it easily to get it y easy way

```
class Cat {
  int? id;
  String? name;
  String? desc;
  String? treat;

  Cat({this.id, this.name, this.desc, this.treat});

  Cat.fromJson(Map<String, dynamic> json) {
    id = json['id'];
    name = json['name'];
    desc = json['desc'];
    treat = json['treat'];
  }
}
```

And there are some screens during the operation

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4.1.2 Test Function

This function is the second one which help users to check if they have this disorder or not by some questions of his disorder and this is completely shown in this function by it's screenshot

```
), // AppBar
body: Padding(
  padding: const EdgeInsets.all(20.0),
  child: ListView.separated(itemBuilder: (context,index)=>Column(
    children: [
      Text(test[index].questions.toString()),
      const SizedBox(height: 20,),
      Row(
        children: [
          MaterialButton(...), //yes button  // MaterialButton
          const SizedBox(width: 30,),
          MaterialButton(...), //no button  // MaterialButton
        ],
      ), // Row
```

By using this function to get the question from the model

```
class QuestionItem extends StatelessWidget {
  Questions questions;
  QuestionItem({Key? key,required this.questions}) : super(key: key);
  @override
  Widget build(BuildContext context) {
    return Container(
      child: Row(
        children: [
          Text(questions.questions.toString()),

        ],
      ), // Row
```
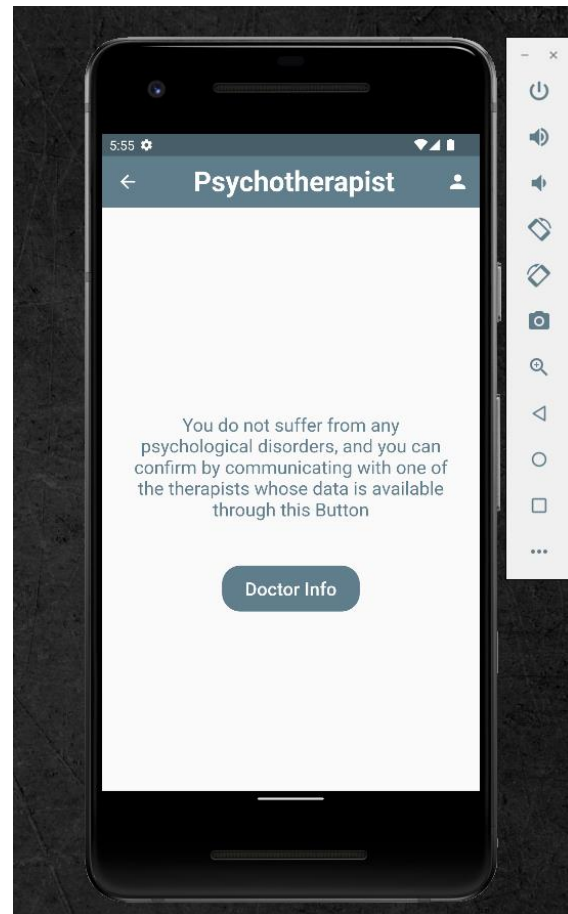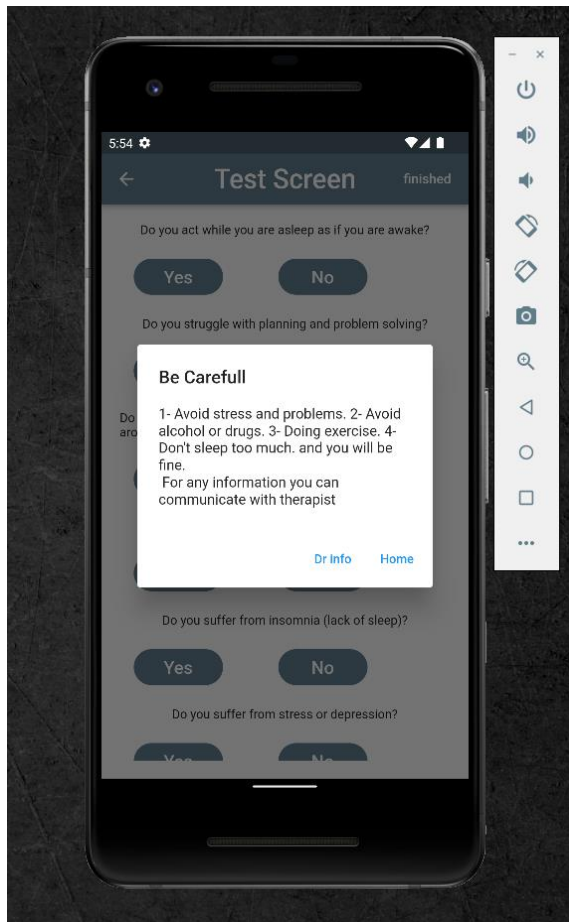
And this is the model of the questions

```
class Questions{
    int ?id;
    String ?questions;
    int ? idFk;
    Questions({required this.questions,required this.idFk, required this.id });
}
```

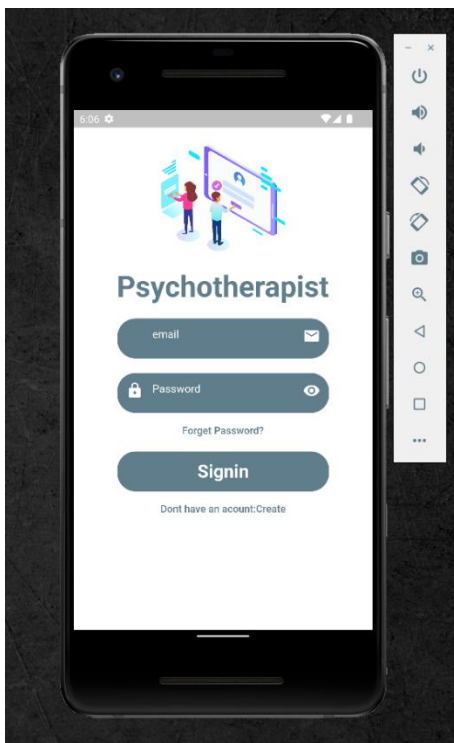And there are some screens during the operation
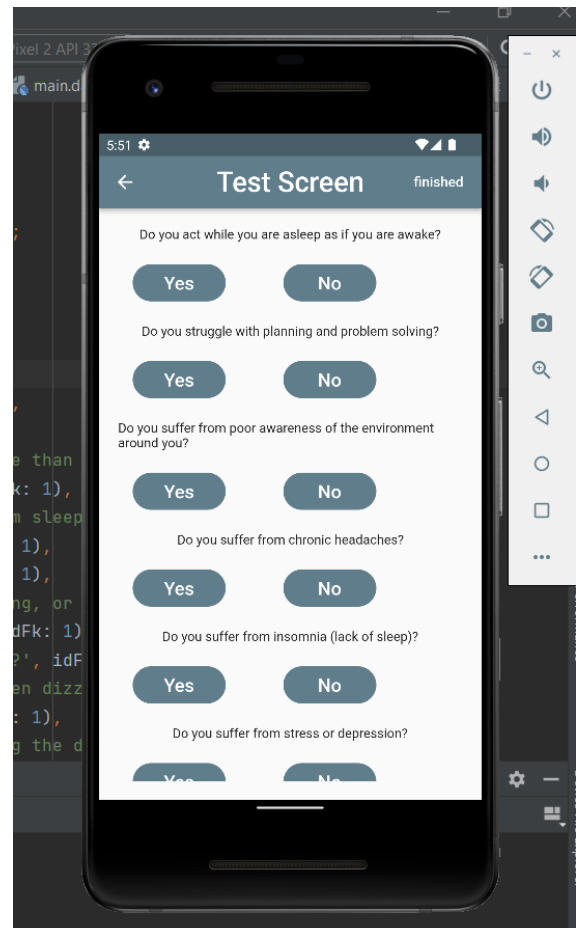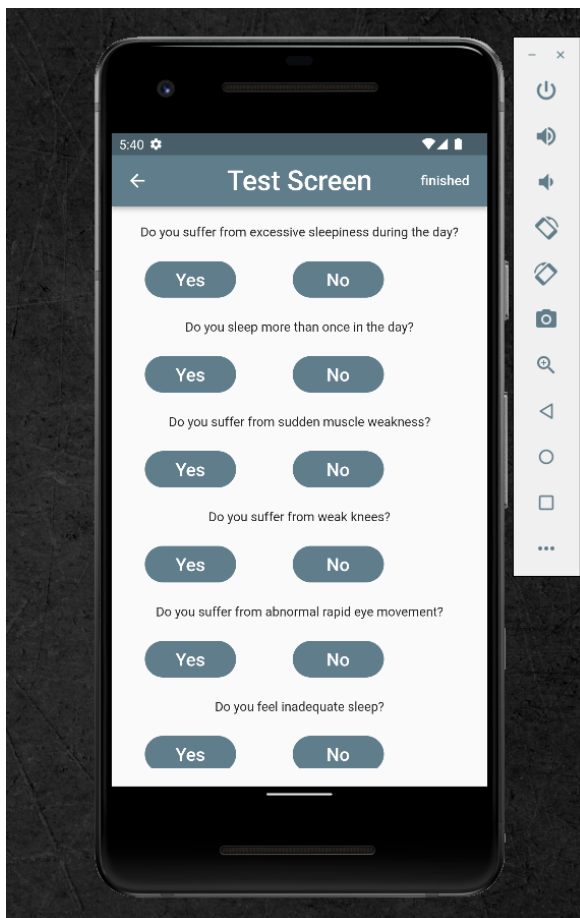
And this is the positive and negative report of disorder test

4.1.2 Side Functions

And there many side function was handled as log in, register, add category there are will be added here

Log in


```
return BlocProvider(
    create: (BuildContext context) =>LoginCubit(),
    child: BlocConsumer<LoginCubit,LoginStates>(
        listener: (context,state){
            if(state is  LoginSuccessfulState){
                navigatto(context, HomePage());
            }
            else if(state is LoginErrorState){
                showtoast(text: "email is not correct",state: ToastState.ERROR);
```

```
Container(
    padding: const EdgeInsets.fromLTRB(20, 10, 20,10 ),
    margin: const EdgeInsets.fromLTRB(20, 10, 20, 10),// This will be the login form
    child: Column(
        children: [
            Lottie.asset("assets/Images/login.json",height: 200),
            const Text(
                'Psychotherapist',
                style: TextStyle(fontSize: 40, fontWeight: FontWeight.bold,color: firstColor),
            ),  // Text
            const SizedBox(height: 20.0),
            Form(
                key: formKey,
                child: Column(
                    children: [
                        textformfeild(
```
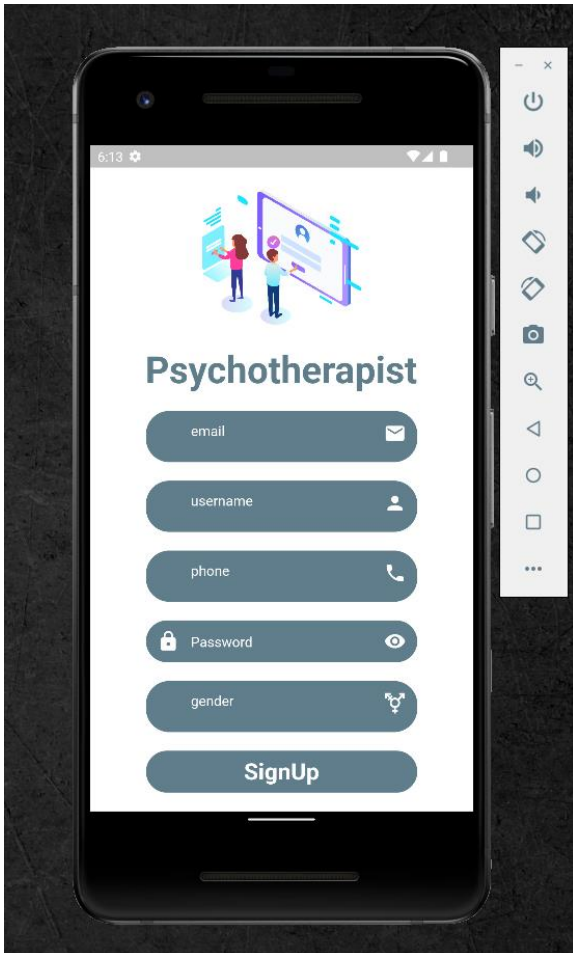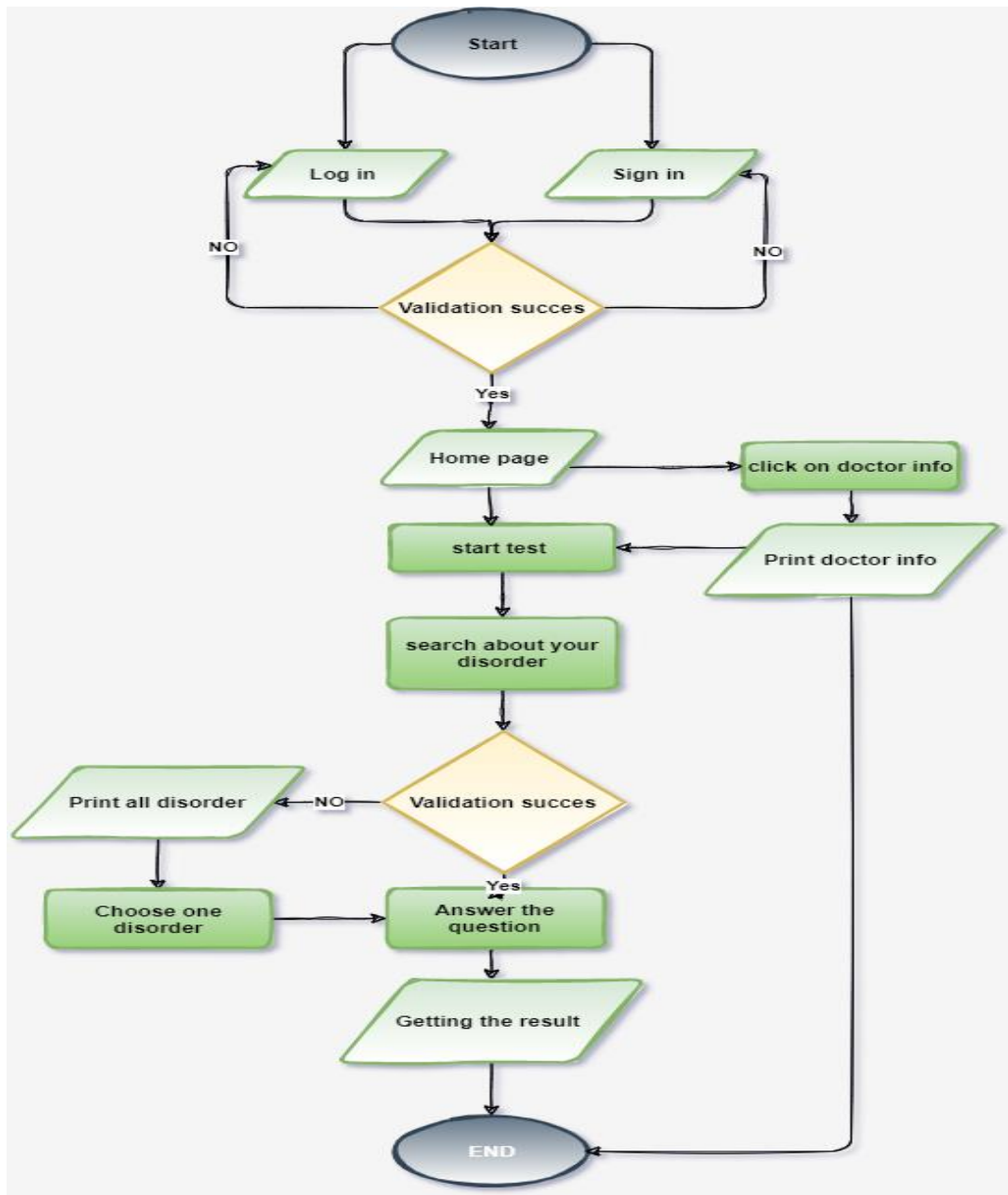
Register


```
child: TextFormField(
    controller: passwordcontrollerre,
    obscureText: CubitRegister.get(context).ispassword,
    decoration:  InputDecoration(
        hintText: 'Password',
        border: InputBorder.none,
        prefixIcon:const Icon(
            Icons.lock,
            color: Colors.white,
        ) , // Icon
        suffixIcon: IconButton(onPressed: (){
            CubitRegister.get(context).changeiconspasswordre();
        },icon:  Icon(CubitRegister.get(context).suffix,color: Colors.white,),),  // IconBut
        hintStyle: const TextStyle(
            fontSize: 15,
            color: Colors.white,
```

```
    create: (context)=>CubitRegister(),
    child: BlocConsumer<CubitRegister,Register>(
        listener: (context,state){
            if(state is CreateSuccessfulState){
                navigatto(context, HomePage());
            }
            else if(state is RegisterErrorState ){
                showtoast(text: "email already exist",state: ToastState.ERROR);
```

4.2 Flowchart

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TESTING

In this chapter we're going to discuss and go deeper in Safe zone application's testing and present the types of testing to be used and test cases we examined our application through

5.1 Functional Testing:

5.1.1 Unit testing:

Testing of individual items (e.g., modules, programs, objects, classes, etc.) Usually as part of the coding phase, in isolation from other development item sand the system.

5.1.2 Integration testing:

Testing the interfaces between major (e.g., systems level application modules) and minor (e.g. individual programs or components) items with in an application which must interact with each other

5.1.3 System testing:

Testing a system behavior as a whole when development is finished and the system can be tested as complete entity.

5.2 Non-Functional Testing:

5.2.1 Performance testing:

Accomplished a designated function regarding processing time and through put rate.

5.2.2 Load testing:

Measuring the behavior of within creasing load which can be handled by the component or system.

5.2.3 Security testing:

Testing how well the system protects against unauthorized internal or external access.
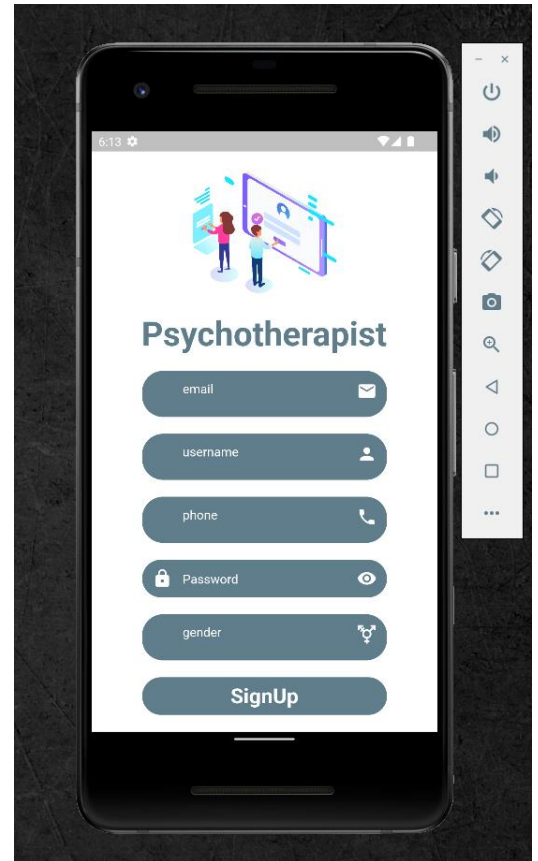
5.3 Additional testing

Project Name: Psychotherapist

Module Name:

safe zone Register

Test case id:

Register_1

Test case scenario: try to registration with valid andinvalid data

Test case	Test steps	Test data	Result
Register with complete and valid data	1-press sign up 2-enter data 3-press sign up	Personal data(name ,phone number, e-mail, password)	1-Account created successfully -logged in

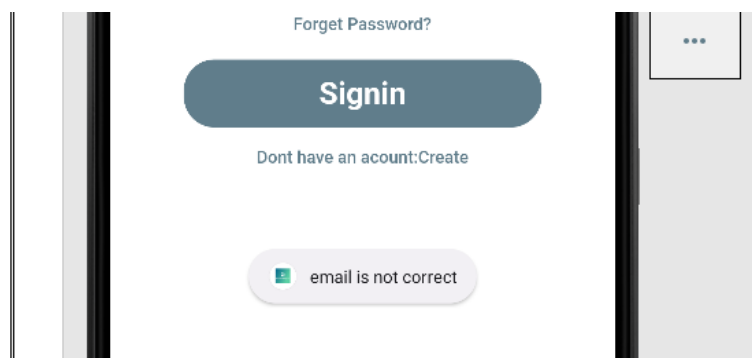| Test case	Test steps	Test data	Result
Register with incomplete and valid data	1-press sign up 2-enter data 3-press sign up	Personal data(,phone number, e-mail, password)	Display error message to co complete empty fields
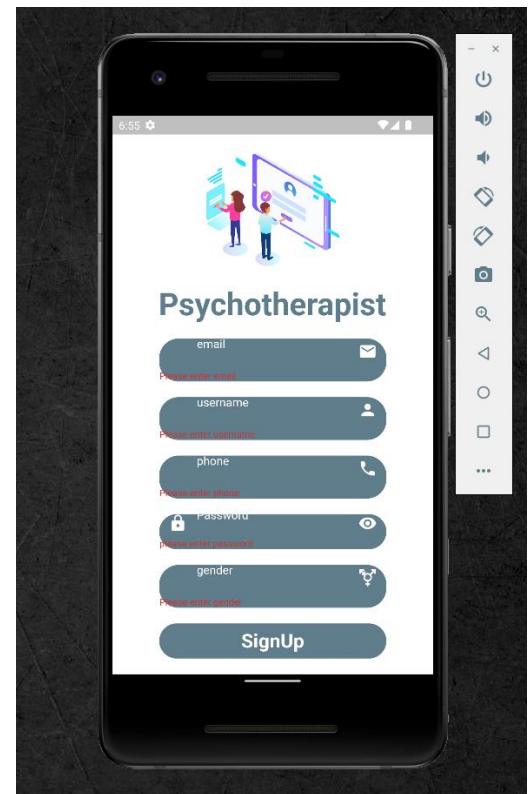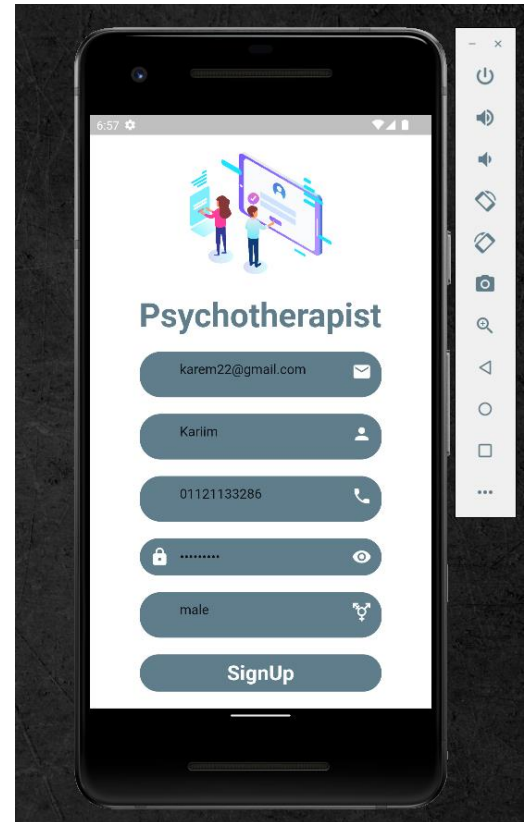
Module Name: safe zone login

Test case id: login_2

Test case scenario: try to login with valid and invalid email and password

Test case	Test steps	Test data	Result
login with valid email and valid password	1-enter email 2-enter password 3-press login	Valid Email Valid password	Logged successfully

Test case	Test steps	Test data	Result
login with invalid email and valid password	1-enter email 2-enter password 3-press login	Invalid email Valid password	Display message email doesn't exist

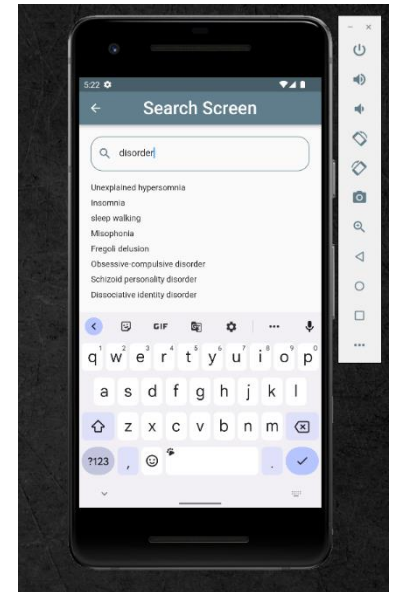| Test case	Test steps	Test data	Result
login with valid email and invalid password	1-enter email 2-enter password 3-press login	valid email invalid password	Display error message to enter valid password

Module Name: search disorders

Test case id: search

Test case scenario: search for his disorder by symptoms or name

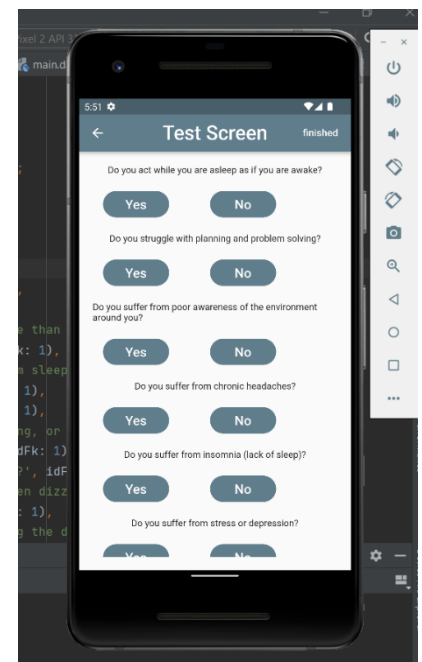| Test case	Test steps	Test data	Result
Search for disorder	Type a symptom	List of disorders	Go to specific disorder

Module Name: Test questions

Test case id: test

Test case scenario: answer for some question to have a report

Test case	Test steps	Test data	Result
Answer questions	Select answer	Questions and answers	Have a positive or negative report

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RESULTS

6.1 Result:

We have developed an efficient and effective application that allows users who need an initial diagnosis of their mental disorders. Those who can be helped to get the necessary treatment for the disorder, in this way there are some steps that each one of them must follow. First the user can register as a patient then he can log in into the system and start searching for psychological disorder that he suffers from or by searching for the symptoms that appear on the patient, and then it is possible to know the nearest doctor that the patient can visit.

6.1.1 Expected Results

First of all, we aim to help reduce the spread of crime In society due to the psychological disorders that large numbers of people suffer from due to the pressures of life. And help schools and hospitals to identify the type of disorder that the patient suffers from. so, we provide some tools and steps that make it easy for users to we offer some tools and steps that make it easy for users to know the

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psychological disorder they suffer from and help identify the appropriate treatment.

expected features and technology to make the application effective:

1-the user can sign up and log in with the (phone number - name- email and password).

2- The application can provide a search field; all you must do is enter the mental disorder or symptoms.

3- The application displays some questions for each psychological disorder through which it can be known whether the user suffers from this disorder or not.

4- The application displays a report in PDF format for the patient with everything related to the disorder he suffers from: symptoms, means of treatment, exercises to practice, and music to hear.

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5- The application displays information about the nearest psychiatrist who can be visited for help.

6.1.2 ACTUAL RESULTS

1- The user can register and login using (phone number - name - email and password).

2- The application can provide a search field. All you must do is enter the mental disorder or symptoms.

3- The application displays some questions for each psychological disorder, through which it is possible to know whether the user suffers from this disorder or not.

4- The application displays a report to the patient with everything related to the disorder he suffers from: methods of treatment, and exercises to be practiced.

5- The application displays information about a psychiatrist who can be visited for help.

6.2 Discussion:

Although we faced some difficulties such as:

1- Learning new powerful technologies and tools such as machine learning.
2- Studying a new technologies and techniques.
3- Fixing errors and learning how to avoid repeating that mistake.
4- Learning time management.
5- Set deadlines and committed them.
6- Get free resources.

We gained much experience like:

1- Self-study skills.
2- Time management.
3- Teamworking.
4- Searching about a certain topic or a certain tutorial.
5- Putting a plan.
6- Dividing the tasks into sprints.
7- How to apply a new technology.

CONCLUSION

Finally, we did our best in our application to get the perfect results and provide a lot of real and helpful resources and features. We also want to serve all people in our society. The patient should first sign up with the name and age and email address and a unique password. Then he can login and search for disorders that have the same symptoms he entered before and then enter to test. Our application aims to treat mental disorders in a simple and fast way, and anyone can use it. So, we hope to reduce the percentage of people that affected with mental disorders, and we hope that our psychological application will help hospitals and medical community.

Some important point:

1- Although we searched a lot, we did not find accurate or correct data to a large extent.

2- As students of the Faculty of Computer and Artificial Intelligence, it was difficult to obtain correct and accurate information in the field of psychiatry in a short period of time so we took more time in searching which then affects on writing the code in an optimal way and on the code implementation.

3- Finally, if we had much time and accurate data, we would have increased the efficiency and reliability of the project.

FUTURE WORK

- Make the application usable in all platforms such as: Android, the web, Desktop, and iOS.
- We are seeking for having a fund for our project by sending proposals to companies or joining competitions.
- So we won't miss any chance to keep working as a team on that project and enhancing it.
- Later, we will increase the information and psychological disturbances so that the program will be larger and in a more general way that actually includes all groups and all ages.
- We will be able to hold online sessions with the therapist and communicate with the patient with audio and video so that we can get better treatment.

- after graduation as we're looking forward to turning this application into a start-up. Our dream started with this idea months ago, and we'll insist on not letting go of it and not letting it just being a dream.

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Treat Yourself

Thanks

Psychotherapist team - Computer Science - Helwan University - Information systems department - Graduation Project 2022