DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

PROJECT REPORT ON

COVID APPLICATION FOR PLASMA DONATION

Course Name - UROP

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CONTENTS

1.ABSTRACT

This project is aimed to developing an online Plasma Donation Information. The entire project has been developed keeping in view of the distributed client server computing technology, in mind. The plasma Donation Agent is to create an e-Information about the person who wants to donate his/her plasma voluntarily or needs someone else's that are related to donating the plasma. Through this application any person who is interested in donating the plasma can register himself in the same way if any organization wants to register itself with this site that can also register. Moreover, if any general consumer wants to make request plasma online so he can also take the help of this application. This Plasma Donation System project is programmed in order to help the humans or patients who are seeking plasma at a particular location. The Plasma Donation System does not store plasma but it stores the information about the plasma or more precisely we can say it store the information or database of the plasma available in the particular location. Because there was a time when some needs plasma in urgent, then this software proved to be his best friend and help the person finding the place nearby him to quick. Admin is the main authority who can do addition, deletion, and modification if required.

The application for the storage of the data has been planned. Using the constructs of MS-SQL Server and all the user interfaces have been designed using the Android Studios technologies. The database connectivity is planned using the "SQL Connection" methodology. The standards of security and data protective mechanism have been given a big choice for proper usage. The application takes care of different modules and their associated reports, which are produced as per the applicable strategies and standards that are put forwarded by the administrative staff.

The entire project has been developed keeping in view of the distributed client server computing technology, in mind. The user interfaces are browser specific to give distributed accessibility for the overall system. The basic constructs of table spaces, clusters and indexes have been exploited to provide higher consistency and reliability for the data storage.

The total front end was dominated using the Android Studios technologies. At all proper levels high care was taken to check that the system manages the data consistency with proper business rules or validations. The database connectivity was planned using the latest "SQL Connection" technology provided by Microsoft Corporation. The authentication and authorization were crosschecked at all the relevant stages.

2.Introduction

Convalescent plasma (CP), which refers to plasma collected from individuals recovered from an illness and developed antibodies against the pathogen, is also being proposed as a therapeutic option for COVID-19 treatment in severe cases to achieve short-term immunity against the virus.

After red blood cells, white blood cells, platelets, and other cellular elements have been separated, plasma is the transparent, straw-colored liquid part of blood that remains. It makes up approximately 55 percent of human blood and contains water, salts, hormones, antibodies, and other proteins.

Plasma donation requires a time commitment as well as a commitment to donate on a regular basis. Donating source plasma usually takes one to three hours, and plasma can be donated twice in a seven-day span. Donating whole blood takes less time—under 30 minutes—and donors donate less frequently—once every eight weeks at most. The services may work into a donor's life in different ways at different times, but they are all similarly effective in helping to meet a critical medical need.

The coronavirus disease (COVID-19) pandemic, which originated from the city of Wuhan, China, has quickly spread to various countries including India. India with the population of more than 1.34 billion - the second largest population in the world is having several difficulties in controlling the transmission and recovering the patients. In this tuff situation providing patients with plasma at the critical time is an important task, since people are practicing social distancing and moving out is dangerous, it is the time to find online mediums to function various procedures.

The project's aim is to develop an application system to minimize the manual work for plasma Bank, Donor, plasma Group management. It monitors all of the plasma Group information, plasma cells, plasma supply and Donor list. The project is mainly centered towards the people of society who are willing to donate plasma to the patients that are in need so as to help them recover from Corona virus. Through this system it will be easier to find a donor for the exact plasma type and it's easy to build the connection between donor and the patient. The main intention behind this system is to formalize the procedure of plasma donation and motivate other donors in order to play their role in the welfare of the society. At the situations when the Covid infected patient needs the plasma then it's important to aid the patient in no time. Searching for plasma in plasma banks and other centers is a tedious task. As we all know our country is facing very challenges at present due to covid-19 and thus it's a need of the hour to think about all the possible ways to help the society.

2.1 Overview

Plasma donation application is an online based project. Today you can easily connect with anything through internet services, so online platform is the best choice of our project. Plasma Donation application aims serving for human welfare. We have all the information you will ever need. Many people are here for you to help you, willing to donate plasma for you anytime. We have done all the job by providing an application wherein the user who is willing to donate and the people who need the Plasma for their recovery are connected through a digital medium. By registering through this application, the users will get the benefit to search and find the plasma with ease and in less time, thus reducing the pressure of manually searching for a particular plasma via different plasma Banks.

The user will need to provide all the important information required for authentication like entering the contact number and verifying through OTP generation and therefore login into the application. By giving all the relevant information's like your plasma type, name, address, city the donors can easily help the patients in need.

The system helps the needy to search for various donors available and request them to help by contacting them. Through this digital medium it is easy to connect different donors which lead to saving time and ultimately may save the the lives of people. At this time social distancing and other precautions are taken seriously, therefore while staying indoors it's not easy to seek help. To find the specific plasma type, availability of the donor at a nearby place to the patient is the motive of this application.

2.2Motivation

Plasma transfusion is an essential component of every country's health care system and patients needing plasma transfusion. There is a severe shortage in our country between plasma requirements and plasma reserves, and as a result, many patients die or suffer unnecessarily because they have no access to plasma in this COVID-19 pandemic. There are problems with the donor records management with the manual system. The donor records may not be securely held and donor records that fail as a result of human errors or disasters. In fact, mistakes can occur if more than one staff document for the

same donor is kept. No centralized voluntary donor database is open. Therefore, if a person is in an emergency, it's really difficult to find plasma. The only way to do this is through checking and matching donors manually and by calling each donor. No centralized database for keeping donor information is available too. If a donor makes a donation in different hospitals, no previous records can be traced unless the donor carries the certificate of donation. In fact, the actual amount of each plasma type can be tracked in a plasma bank and the donor list without an automatic management system. In order to resolve this problem, we have created the project Plasma Donation System. This is a android application project online. You can now easily connect to anything via the Internet service. The online platform is therefore the best choice for our project. The goal of the plasma Bank and Supplier Program is for human well-being to be achieved. We have all the plasma information and supplier that you will always need. Many people are here to support you, always ready to give you plasma. Look for your plasma group. You can support us by registering on our website if you are prepared to donate your plasma if you are recovered from the COVID-19 virus. As a proud member of this community and as a responsible human. If you are recovered Covid patient then You can help a person in need. So, donate plasma.

3.Related Work

[1] Omrani, Ali S., et al has been explained that convalescent plasma was associated with increased viral clearance and lower mortality in patients with serious influenza. Convalescent plasma was not linked to a better respiratory support condition within 28 days, all-cause mortality, or viral clearance in this retrospective cohort analysis of patients with extreme COVID19.

[2] Tushar Pandit, Satish Niloor, A.S. Shinde has released a new framework that will upgrade the current system and enable it to transition from a desktop to a mobile system. E-blood bank is a fully automated blood bank system. The key goal of the E-blood bank is to use computation technologies to link all of the state's blood banks into a common network, validate, store, and circulate various live data and knowledge.

[3] Vikas Kulshreshtha Research Scholar, Dr. Sharad Maheshwari has explained the main characteristics, benefits, and drawbacks of the current Web-Based Information System for Blood Banks. Blood is widely acknowledged as the most valuable component of survival. It saves countless

lives in a wide variety of circumstances all over the world. A blood bank is a facility dedicated to the preservation of blood and blood components.

[4] P. Priya, V. Saranya, S. Shabana, Kavitha Subramani has proposed an expanded online framework to keep information about donors, acceptors, and patients up to date in real time, with the administrator having access to all information about blood bank management systems. The web-based Android framework is flexible, powerful, and adaptable to address the diverse needs of blood banks, which are important facilitators in the healthcare industry.

[5] Malani, Anurag N., John P. Sherbeck, has Plasma is obtained from donors that have healed from COVID-19 by a procedure known as apheresis, which involves a special system to divide the blood into various parts, as seen in their paper. The plasma is removed and the remaining blood cells are returned to the donor.

[6] Collado-Borrell, Roberto, et al has conducted a report to classify and assess mobile applications aimed at combating the COVID-19 pandemic. The apps' most popular uses are to provide details on the number of sick, recovered, and dead patients, as well as to monitor symptoms and track down contacts. We learned the basic features to incorporate in this project about the pandemic situation from this paper.

[7] Hamlin, M. A., & Mayan, J. A. has conducted market research to identify the various generations that make up the blood donor demographic. A huge proportion of this society is made up of digital natives who carry their smartphones with them at all times.

[8] Wen, H., Zhao, Q., Lin, Z. completed A cross-platform analysis of privacy problems in official touch tracing applications around the world is being conducted. They gathered 41 applications that had been published and examined both metadata and binary code. Even if they are built for the same reason, certain applications have inconsistent data collection habits across various mobile platforms.

4.Software Requirement Analysis

A software design document (SDD) is a written description of a software product, that a software designer writes in order to give a software development team overall guidance to the architecture of the software project. An SDD usually accompanies an architecture diagram with pointers to detailed feature specifications of smaller pieces of the design. Practically, a design document is required to coordinate a large team under a single vision. A design document needs to be a stable reference, outlining all parts of the software and how they will work. The document is commanded to give a fairly complete description, while maintaining a high-level view of the software.

There are two kinds of design documents called HLDD (high-level design document) and LLDD (low-level design document).

4.1Feasibility Study:

Feasibility study is the process of determination of whether or not a project is worth doing. Feasibility studies are undertaken within tight time constraints and normally culminate in a written and oral feasibility report. I have taken a fixed time in feasibility study. The contents and recommendations of this feasibility study helped me as a sound basis for deciding how to precede the project. It helped in taking decisions such as which software to use, hardware combinations, etc.

4.2 System Requirement:

4.2.1 Software Requirement Specification:

The System Requirements Specification (SRS), the requirements specification for a software system, is a complete description of the functionality of the system to be implemented and may include a collection of use cases describing the experiences that users will have with the software.

4.2.2 Hardware Interfaces:

Processor: Intel core i5 or above.
RAM: 4 gigabyte or above
Hard Disk: 500gb or above
Input Devices: Keyboard, Mouse
Output Devices: Monitor; -14" VGA
Smart Phone: Android OS based device.

4.3Software Interfaces:

4.3.1 For Designing:

1. Photoshop.
2. Adobe XD and Some online resources.

4.3.2 For Development:

OPERATING SYSTEM: Windows 10 64bit.
IDE: Android Studio.

Programming Language: Java.
Design language: XML.
Backend Support: My SQL, SDK.
Database: No-SQL database.

4.4 Operations:

Required an Android OS based device to test run the application. And performing the debug operations.

4.5 Technology Stack:

This project is mainly based on Java Programming language and Android SDK which will make the application to run on the all-android supported devices.

SDKs are used to perform all the backend tasks like **Retrieve, Update, Delete** the data in android app.

5.Implementation and User Interface

Methodology:

Part-1: -

Identifying the Technologies Required in managing, making and accomplishing the goals of this Project.

Android Studio is used as an Integrated Development Environment to develop the android application for the project.
Java and XML language is used for making the application functionable and implementing the design of the android application.
Google Cloud Platform is used to provide the backend support to this application.
Firebase SDK is integrated in the application to provide the following Backend services:

1. Firebase Authentication
2. Firebase Realtime Database.
3. Firebase Storage.

Part-2: -

Designing the User Interface plays an important role in shaping the final project.
It defines the presentation and functionality of the application.
Photoshop and Adobe XD is used in designing the User Interface of the application.

Part-3: -

After Design it's time to setup the development environment to implement the designed layout and to develop the logic of the app in the development environment.
XML scripting language forms the whole user interface part and Java helps in developing the functionality of the app.

Part-4: -

After setting up the development environment we will integrate the Firebase SDK in the application.
Firebase Authentication is used to integrate the login module of the app.
When a user register on the app it becomes the part of the database which forms up the whole User database of the application on the Firebase console.
A network of the users/donors is created to connect them on an online platform to have ease of finding the required plasma type.

Part-5: -

All the database is managed on the Firebase console and fetched on the application to display the relevant data about the apps activities.

Data in the app is fetched in the JSON format which then is arranged and decoded to display in the app by the Firebase SDK in the application itself.

Firebase Storage service contains all the required media which will be used in the app to make it more user friendly. Media like icons, images, svg files.

Part-6: -

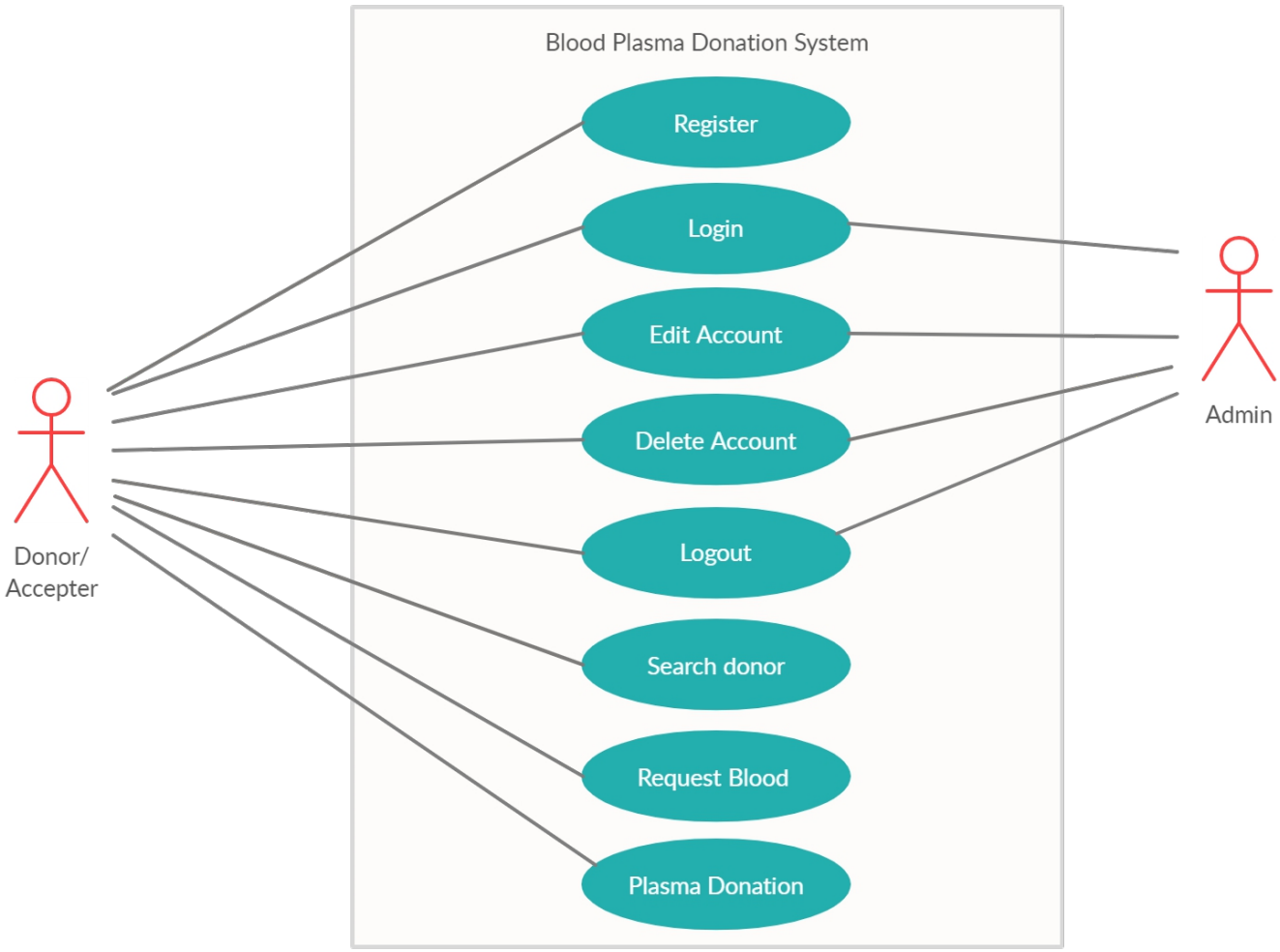
Managing the Database to collect the data of the users, Covid-19 database and Request of the specific plasma type.

User can post the Request for the plasma group on the app and the same data and activity will be uploaded on the firebase database.

6.Software Design

6.1 Use Case Diagram:

A **use case diagram** at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved. A use case diagram can identify the different types of users of a system and the different use cases and will often be accompanied by other types of diagrams as well. The use cases are represented by either circles or ellipses.



Fig; 6.1/Use Case Diagram

6.2 Data Flow Diagrams:

A data-flow diagram is a way of representing a flow of data through a process or a system (usually an information system).

The DFD also provides information about the outputs and inputs of each entity and the process itself.

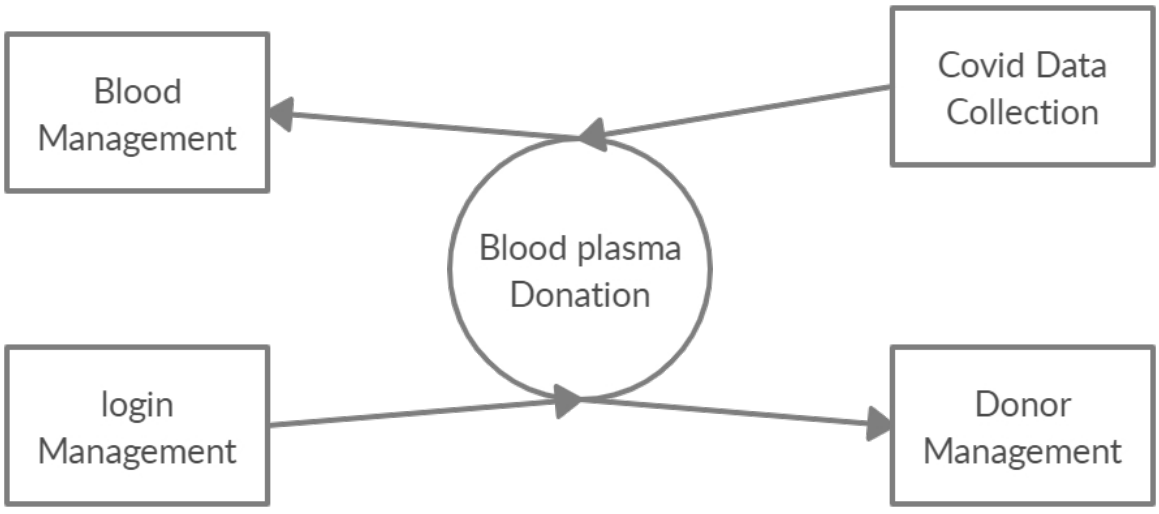
A data-flow diagram has no control flow, there are no decision rules and no loops.

Specific operations based on the data can be represented by a flowchart.

The Purpose of use case diagram is to capture the dynamic aspect of a system.

However, this definition is too generic to describe the purpose, as other four diagrams (activity, sequence, collaboration, and State chart) also have the same purpose. We will look into some specific purpose, which will distinguish it from other four diagrams.

6.2.1 Level 0 DFD:



Fig; 6.2.1

6.2.2 Level 1 DFD:

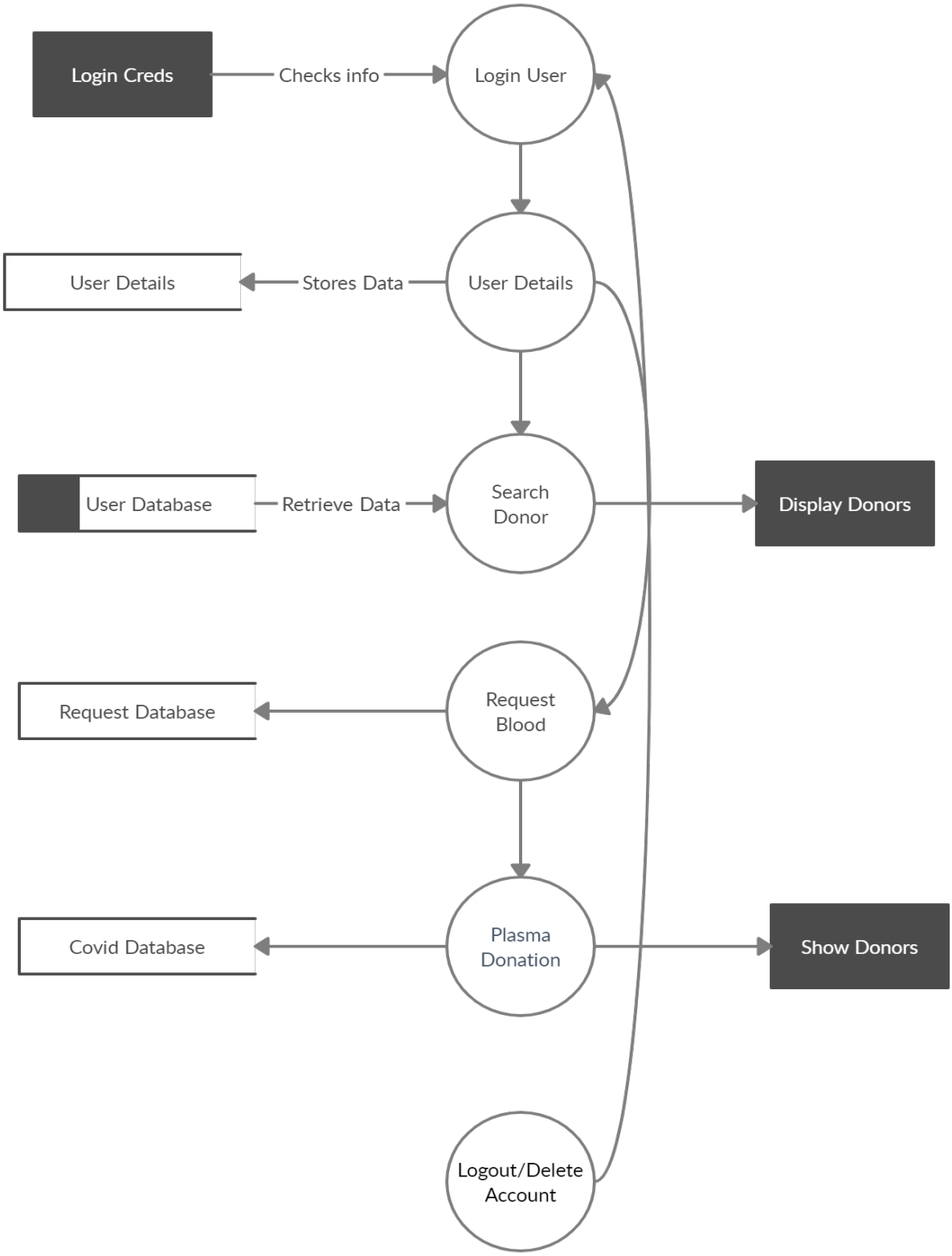


Fig:6.2.2

6.3 Design and Output:

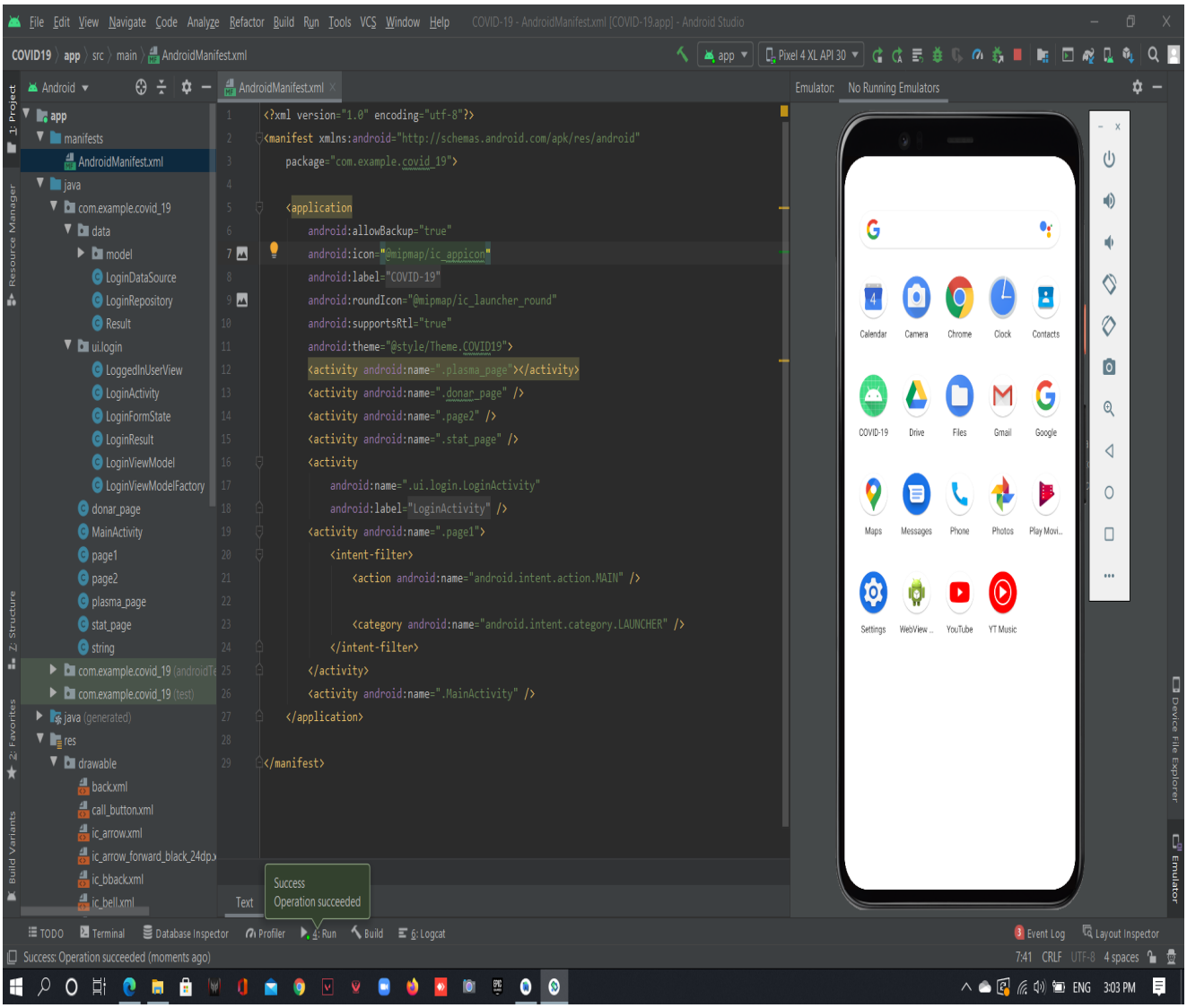


Fig:6.3.*1* ***App*** view in the ***emulator***.

This picture shows the view of our android app in the android emulator based mobile and also it looks same as this in the original android phone among all the other apps.

Welcome message

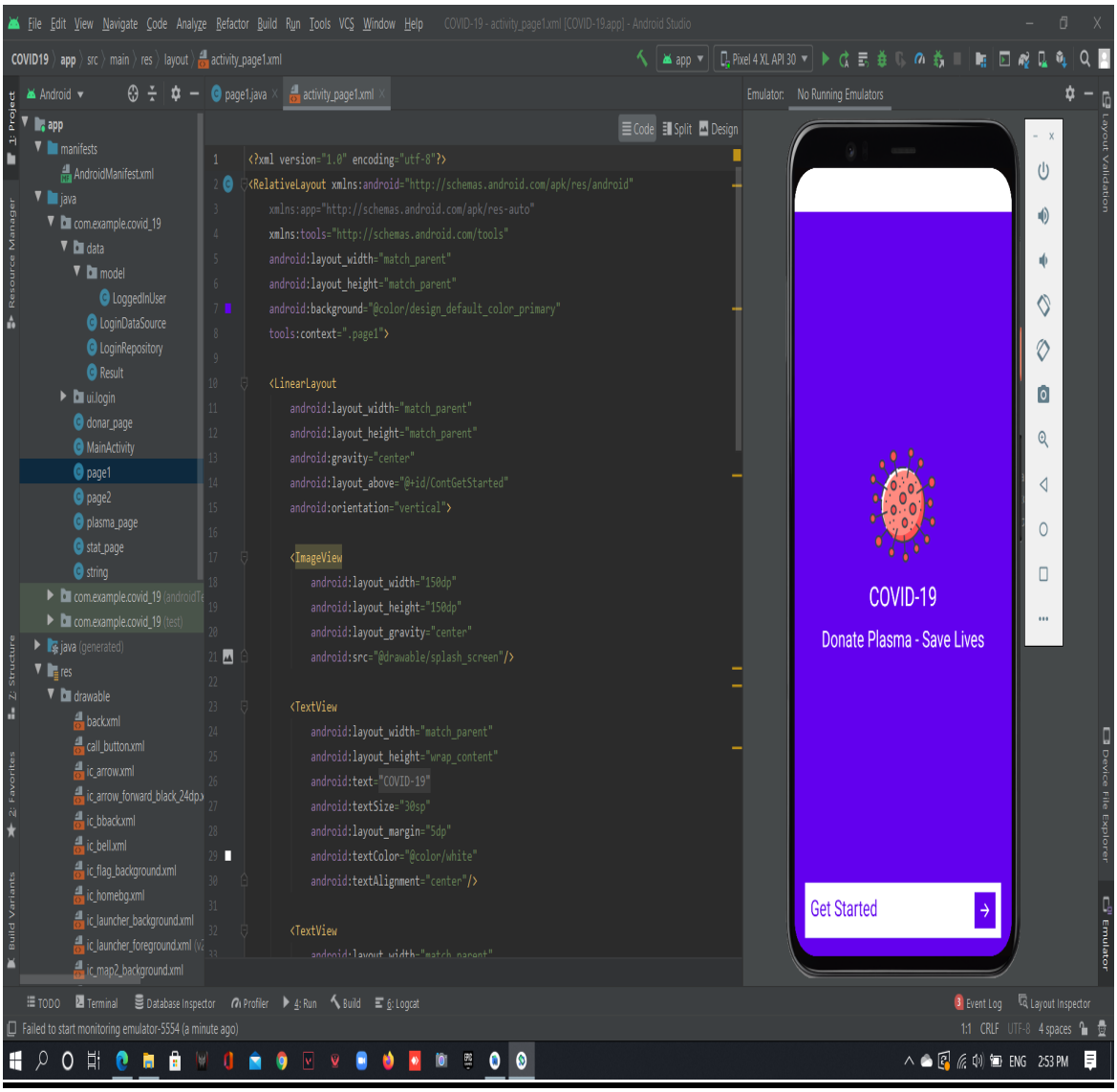


Fig:6.3.2: - A welcome message to motivate user to donate plasma.

The idea back of this page is to encourage all the people to donate plasma and save lives.

Login Menu

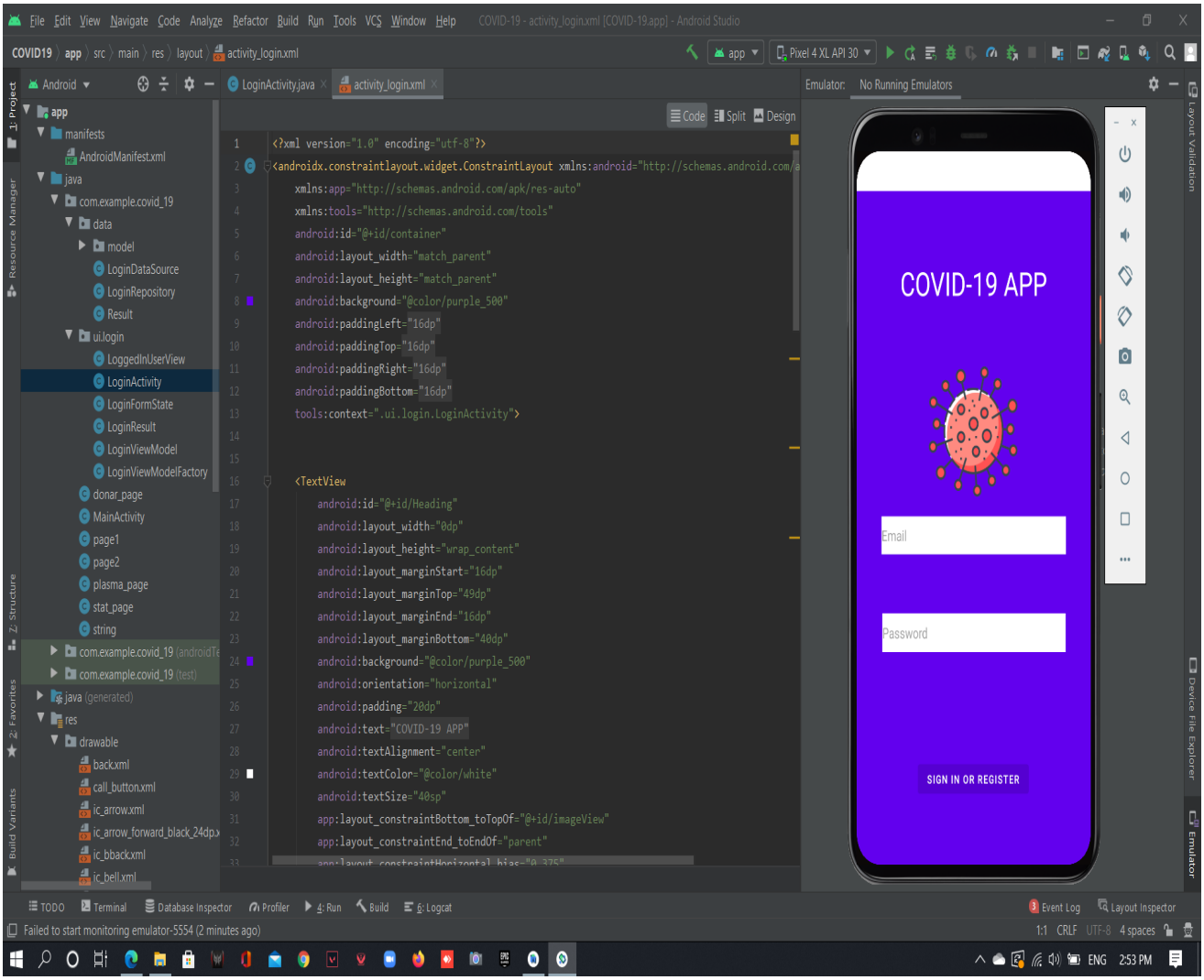


Fig:6.3.3 User tends to login to the app or can register.

This Login Activity is to make sure that, the people who had registered with our app only can login to our app and not all people can just see the information provided by this donor.

Homepage

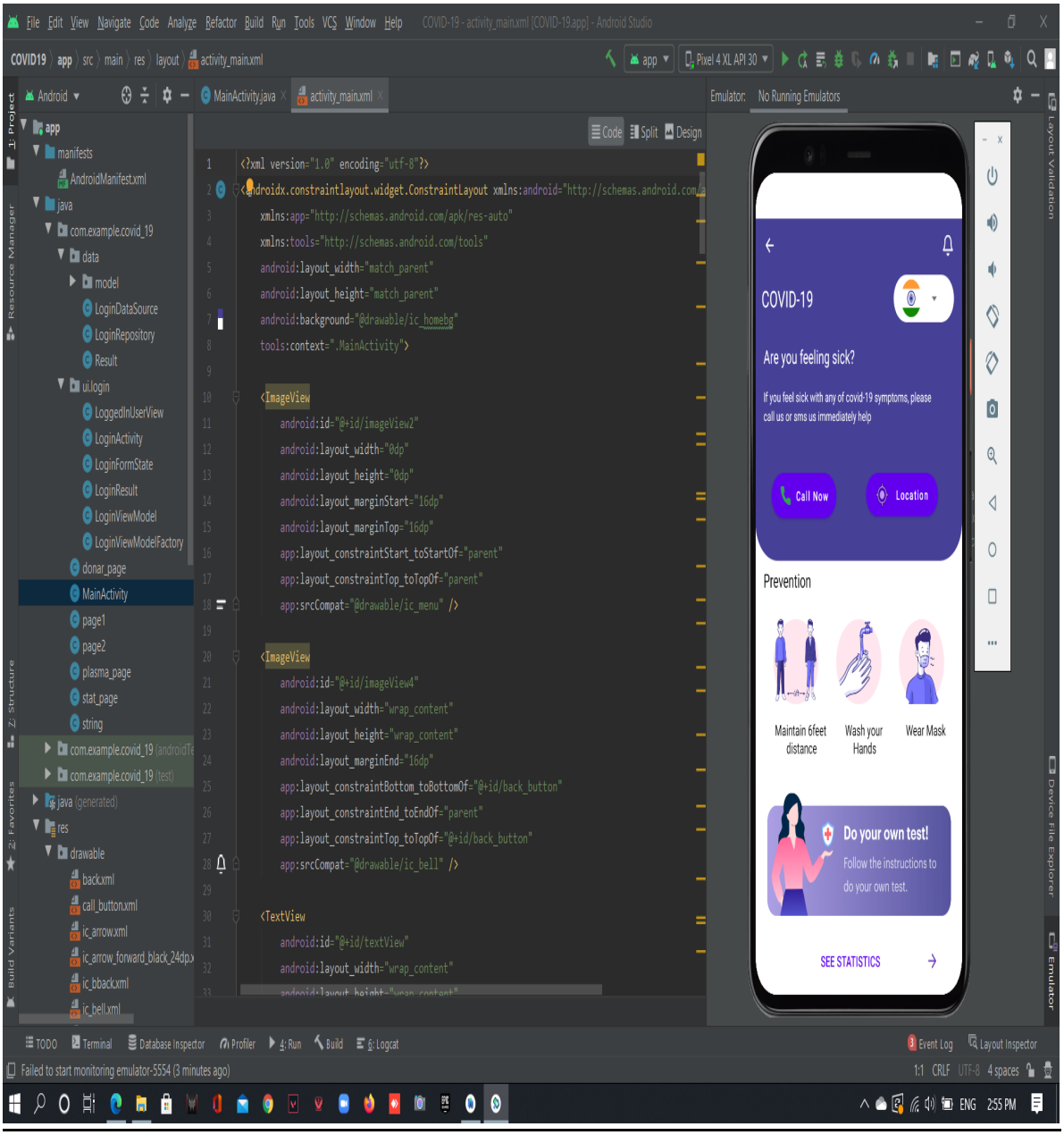


Fig:6.3.4: - App Home page allows user to contact prescribed authorities if the user feels any illness.

The idea behind this was to bring the user-friendly home page and also very interactive so that if the user was feeling illness, immediately he can call to the covid helpline authorities through just clicking on call icon. And also, he can view the nearby Hospitals through the location button.

Statistic Page

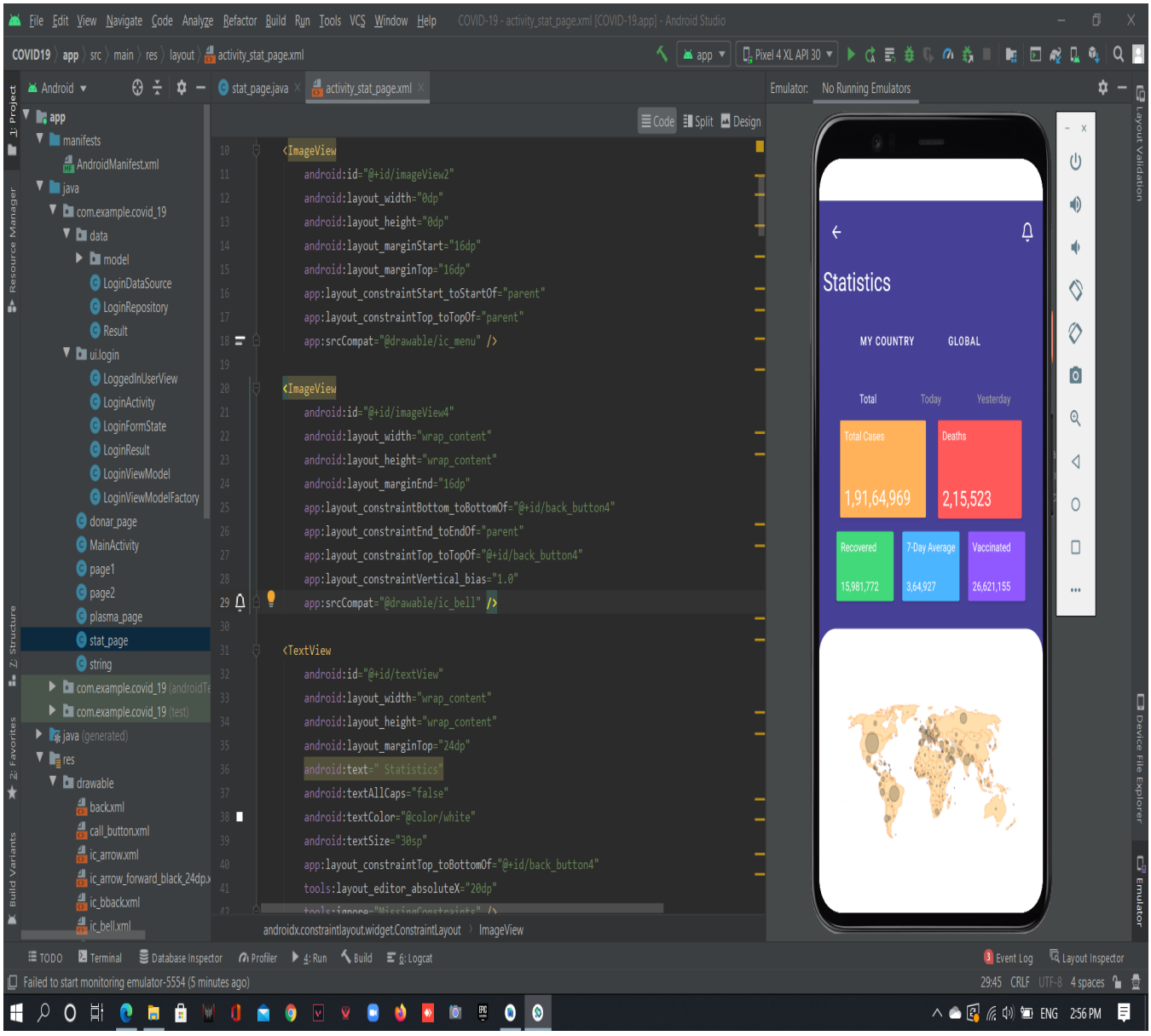


Fig:6.3.5 Statistics pages gives detailed information current situation about Covid-19.

This page was included to bring the awareness of this pandemic situation. It's really important to know the knowledge of what's going on out there. So, we included Covid cases, recovered people, Vaccinated people and all that information.

App Menu

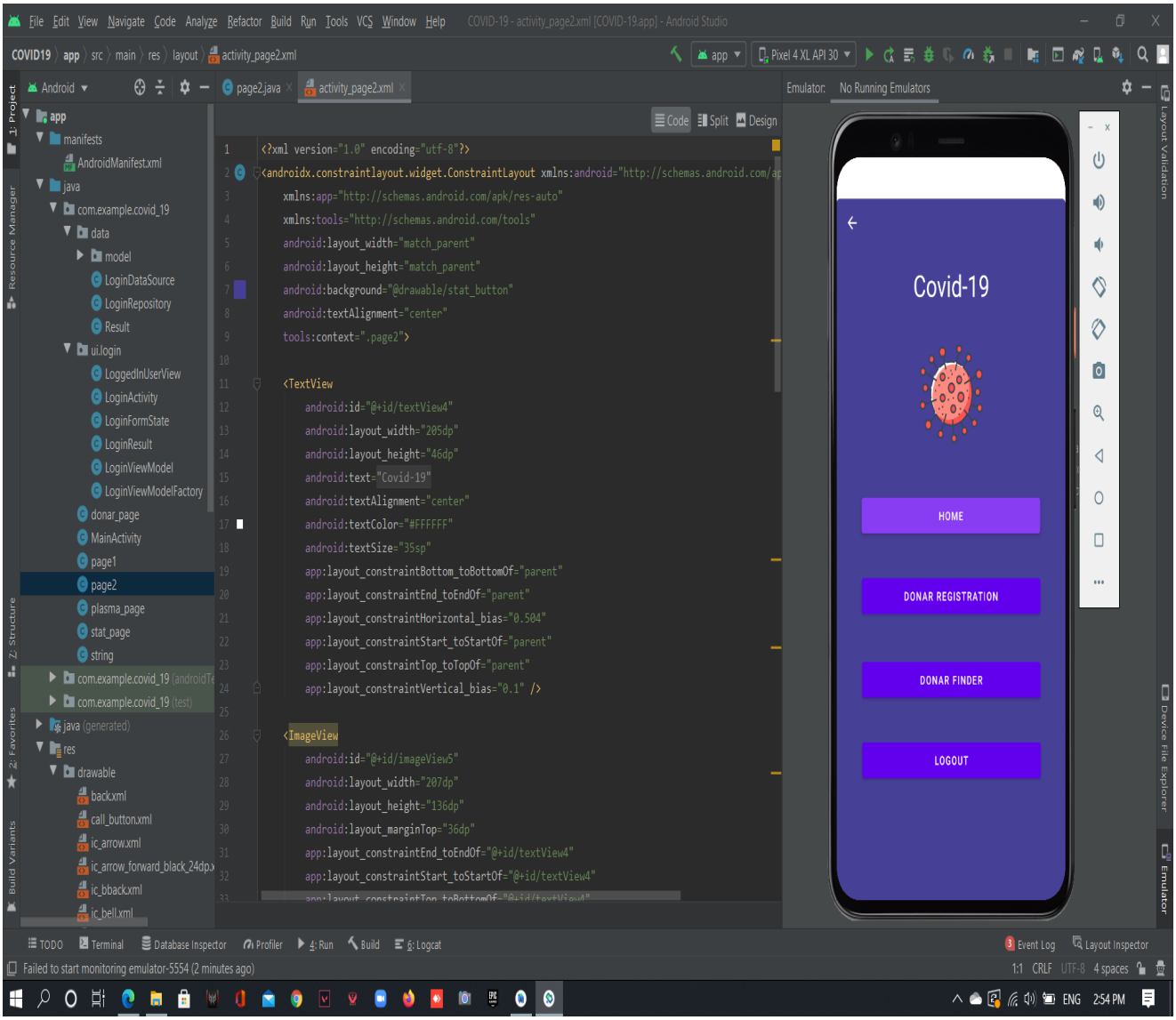


Fig:6.3.6 Main Screen app menu.

From this page user can enter to home page or either he can enter to registration page if he wants to donate plasma and if the user wants to find a donor, he can go to donor finder page to get helped and can logout.

Registration form

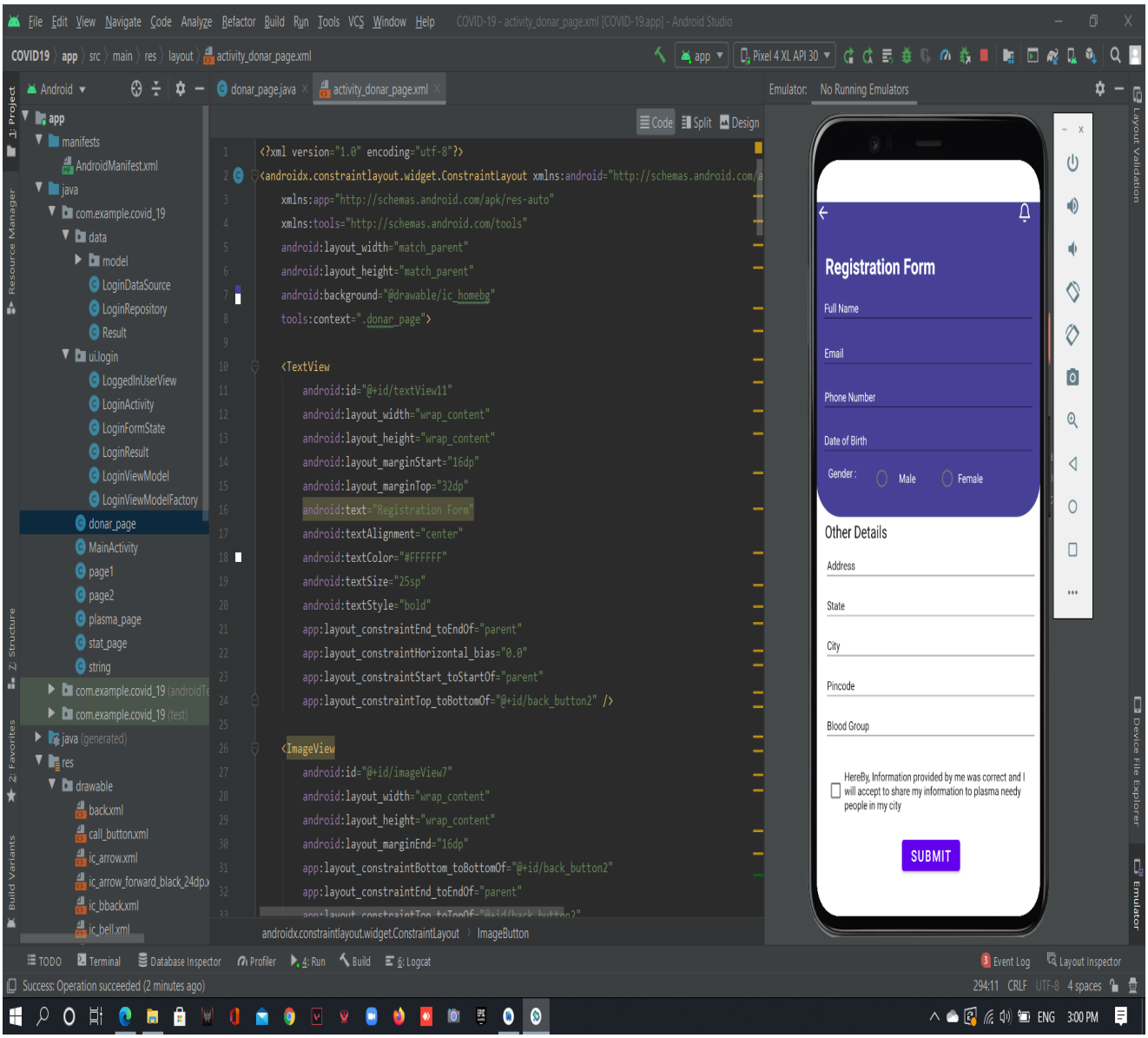


Fig 6.3.7: - Registration form for donor who tends to donate plasma.

In this page, user can get registered him self by just filling out his details to help the plasma needy people.

Donor finder

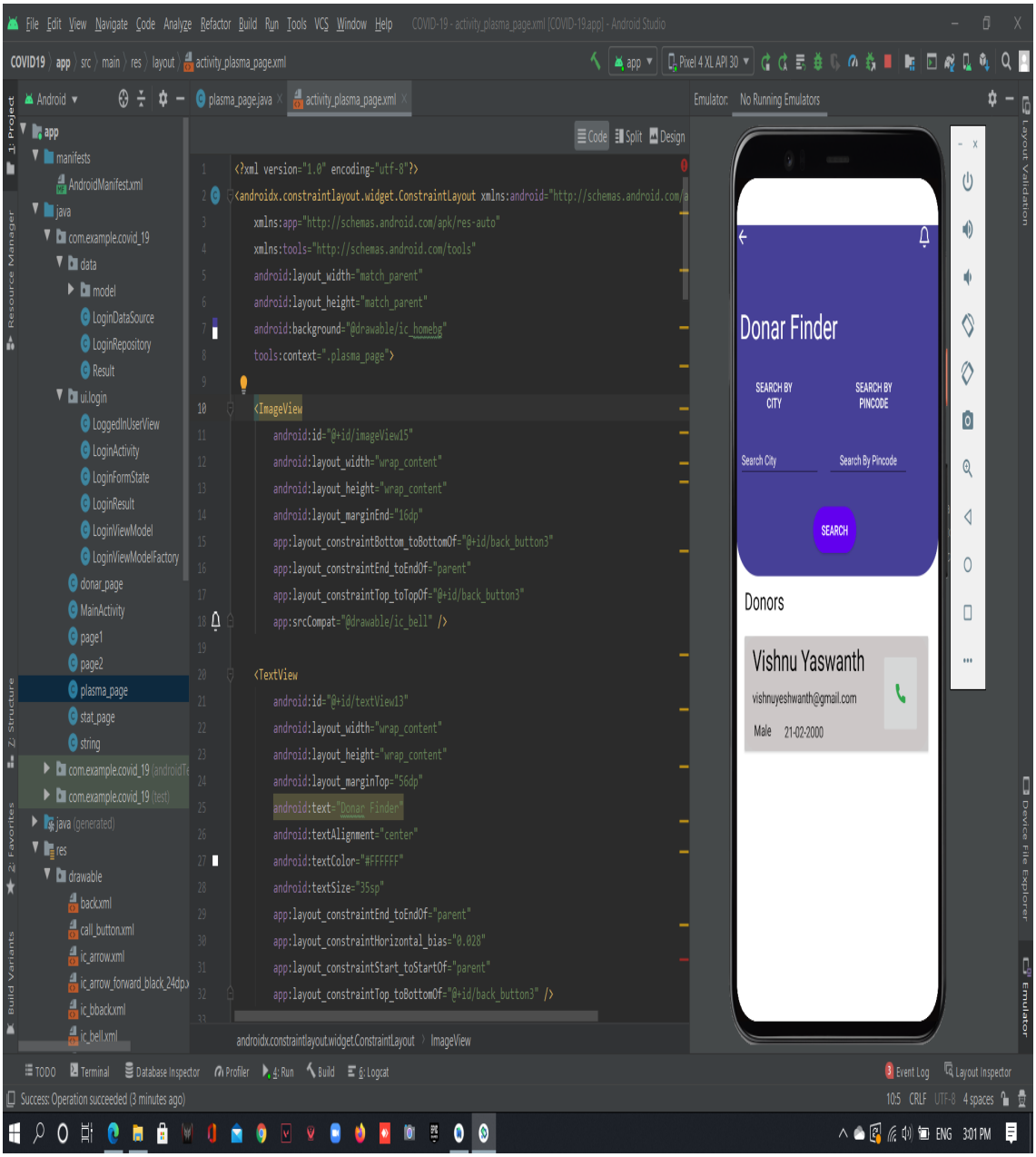


Fig: 6.3.8 User can find the donor availability at a specific location.

This page is for the people who are in need of plasma and are searching for donors around them. User can either search by his city or can search by pincode.

7. Software Testing

7.1 Testing:

Software testing is the process of executing a program with intension of finding errors in the code. It is a process of evolution of system or its parts by manual or automatic means to verify that it is satisfying specified or requirements or not.

Generally, no system is perfect due to communication problems between user and developer, time constraints, or conceptual mistakes by developer.

To purpose of system testing is to check and find out these errors or faults as early as possible so losses due to it can be saved.

Testing is the fundamental process of software success.

Testing is not a distinct phase in system development life cycle but should be applicable throughout all phases i.e. design development and maintenance phase.

Testing is used to show incorrectness and considered to success when an error is detected.

7.2 Objectives of Software Testing:

Software Quality Improvement:

The computer and the software are mainly used for complex and critical applications and a bug or fault in software causes severe losses. So a great consideration is required for checking for quality of software.

Verification and Validation:

- Verification means to test that we are building the product in right way. i.e., are we using the correct procedure for the development of software so that it can meet the user requirements.
- Validation means to check whether we are building the right product or not.

7.3 Principles of Software Testing:

- All tests should be traceable to end user requirements.
- Tests should be planned long before testing begins.
- Testing should begin on a small scale and progress towards testing in large.
- To be most effective testing should be conducted by an independent third party.

The primary objective for test case design is to derive a set of tests that has the highest livelihood for uncovering defects in software. To accomplish this objective two different categories of test case design techniques are used. They are:

- White box testing.
- Black box testing.

Software Testing is Important because:

If there are any bugs or errors in the software, it can be identified early and can be solved before delivery of the software product. Properly tested software product ensures reliability, security and high performance which further results in time saving.

8. Conclusion

As a conclusion, we can say that this project period was a great experience. Thanks to our amazing instructor Dr. Kshirasagar sahoo who motivated us to reach our goal. During the project, we acquired deeper knowledge concerning my technical skills but we also personally benefited. Indeed, we grew more independent in work and also in everyday life. We realized that we could do more things than we thought like learning new things by ourselves and also team co-ordination.

9.Future Work

There are huge opportunities available for the students who want to work in this field. Many private and public organizations hire android developers for their online work and application development. With the rapid advent of online industry, the demand of application development professionals is increasing and this has created a huge job opportunity for the aspirants in the upcoming days. Also, an experienced person in this field can also work as a freelancer; there are many online companies which provide online projects to the individuals. So we are looking forward to do many mor project works in this field.

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