AN-NAJAH NATIONAL UNIVERSITY

FACULTY OF ENGINEERING AND INFORMATION TECHNOLOGY

Presented in partial fulfillment of the requirements for Bachelor degree in Computer Engineering

Software Graduation Project

Projects Hub

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1 Acknowledgments

" First and foremost, We'd like to express our gratitude and thanks to Dr.Alladdin Al-Masri who aided us in completing our Graduation project. He didn't hesitate for a moment to support us to complete our project. Furthermore, We'd also to express our appreciation to our families and friends for their great support. Not forgetting everyone who assisted and emboldened us for working on our project. We wouldn't be able to finish this project without you."

2 Disclaimer

This report was written by students at the Computer Engineering Department, Faculty of Engineering, An-Najah National University. It has not been altered or corrected, other than editorial corrections, as a result of the assessment and it may contain language as well as content errors. The views expressed in it together with any outcomes and recommendations are solely those of the students. An-Najah National University accepts no responsibility or liability for the consequences of this report being used for a purpose other than the purpose for which it was commissioned.

3 Abstract

Many people working on their project or research and facing a lack of resources, ideas, or answers to the problem or reaching out to people who may have the answers. There are many websites that do partial functionality such as Research Gate, IEEE Explore and Springer contain millions of precious papers. And many communities like Stack Overflow, Arduino hub and many others are there to answer and help provide solutions for problems workers have while building projects. In this research the process of Scientific research and how this will be affecting students in AN-Najah National university and a solution was formed to serve this purpose. This is a prototype software trying to solve or partially solve some of the problems facing researchers and students trying to work on their graduation projects. The next chapter will be demonstrating more about the problem and the motives behind this work.

4 Introduction

The massive development of technology has led to an increase in the need to the research and development. Better the technology more research to improve. usually researchers are having a rough time trying to get new ideas and got burned out and stressed in the process.

Research is seeking new knowledge through discovery.Scientific research entailed thorough investigation and methodical phenomenon observation. The majority of scientific research efforts require experimentation, which frequently calls for determining how outcomes are affected by varying variables. It is imperative that specified observational circumstances are strictly monitored and that records are kept up to date.This makes it possible to replicate observations and results. Fundamental or applied scientific research are two different types. What is the difference? The National Science Foundation uses the following definitions in its resource surveys:

1. Basic research
   Basic research doesn't have any particular applications in mind; instead, its goal is to learn more about a subject in depth. Research that enhances scientific understanding but does not specifically have direct commercial purposes, although it may be in domains of current or potential economic relevance, is referred to as fundamental research in the business world.

2. Applied research
   The goal of applied research is to gather knowledge or insight in order to ascertain the best way to address a particular, identified need. In the business world, applied research refers to studies focused on acquiring new scientific information that have particular commercial goals in relation to goods, processes, or services. [8]

As a part of the university system, the student have to participate in a scientific research to shape a new product or get some valuable results about on of the topics depending on the specialization or the department. Almost every student have to go through this to graduate as part of the program plan. Being part of the students the researchers struggled finding new ideas to be applies since there are so many students who are trying to do the same with limited ideas depending on the affordable resources and time. One of the most sufferable aspect is the novelty of the idea since everyone is looking to be special and leave a good impression. To be creative, the researchers decided to take a step back and take a look at the problems faced then decided to focus on 'Why Ideas Should Be This Hard To Get?'. So, jumping into that, how can research and ideas become easier ? how to get help from older students who faced similar problems ? and how to make the maximum use of the community and create a place where everyone can express their ideas about science and research ?

The next chapter will be diving into these ideas hoping this will make it more clear to get the motives and what problems this research is trying help with.

5 Constraints Limitations and Earlier Coursework

5.1 Constraints And Limitations

5.1.1 Language And Programming Skills

The knowledge of the team is one of the most conclusive points considered when trying to fix any problem. The known programming languages was limited due to the past experience the team members had. So, Flutter-Dart framework and C ASP.Net were chosen to implement the application. Both of those options were not without downsides. Asp.Net had null safety and flutter was a beta version in web that waas a big problem causing many turn-arounds to do some basic functionality that turned about to be unsupported in the web version.

5.1.2 network bottleneck and Internet stability

Being in a third world country, the internet is slow or not stable and using a cloud Database will be throttled by the internet speed.

5.1.3

Mobile version The available mobile Android version that have been used during development is considered old which is Android 8, so uploading the APK version on the mobile wasted alot of time.

5.1.4

Quality Eventhough this might seem not considerable in a prototype but the website was build in a neat well-organized architecture. In the front-end a bloc system (Event driven system) used to respond to the interface meanwhile the back-end was handled with clean architecture (AKA onion architecture).

5.1.5 Scalability

The project considered scalable so it was implemented to be developed and deployed into a cloud database to be as easy as possible to be scaled into multiple replicas or even sharding.

5.2 Earlier Coursework

The experience of the participants in mobile development is at least 3 years and less than a year in the back-end development. A set of skills we gained from the Computer Engineering Department from the courses such as Software-Engineering, data structure, and other programming courses that helped to build the work in a clean and nice looking design.

6 Literature Review

Since the beginning of history, Human race found it's way by trial and error. early cavemen with simple minds and very very limited knowledge started trying things and see how it affects their lives. Humans started eating animals and whatever plants and see if it was a real food or not. Like imagine how humans started eating shrooms! "Oh this one killed Bob", "That one made Mike see heaven for a week!", "Oh this one tastes like beef" ... see? trial and error!

The human evolved and started realising that this is not always the best way to gain knowledge so they started making theories like "If I do X then Y will be happening" and started experimenting to proof how right or wrong is this theory. This way research has evolved to more of a systematic way instead of the randomness before.

Scientific research is the objective, systematic, well-thought-out, multi-step procedure that leverages already-known facts to advance previously unrecognized knowledge. In terms of data collection methods, it can be categorized as observational or experimental, descriptive or analytical in terms of causation, and prospective, retrospective, or cross-sectional in terms of time. [1]

Usually research is about the 5Ws [3]. Those are :

1. WHY did you choose the topic? What interests you about it? Do you have an opinion about the issues involved?
2. WHO are the information providers on this topic? Who might publish information about it? Who is affected by the topic? Do you know of organizations or institutions affiliated with the topic?
3. WHAT are the major questions for this topic? Is there a debate about the topic? Are there a range of issues and viewpoints to consider?
4. WHERE is your topic important: at the local, national or international level? Are there specific places affected by the topic?
5. WHEN is/was your topic important? Is it a current event or an historical issue? Do you want to compare your topic by time periods?

After Getting the Idea, It is not the end of the way where the sun rises and shines everywhere. There are many challenges faces researchers to start, proceed, finish or publish their work. starting from the last stage which is **publishing the paper**, many problems can emerge like *Poor Written Papers* which will cause rejection from the publishers to publish any poor written papers because this will affect their rank among their competitors and even this will be bad for the researchers whom will be mocked or not taken seriously even if the work was fabulous and remarkable. Another reason is *Political or Racial reasons* especially among ethnical minorities or conflict situations. The earlier stage is **finishing the paper** where many of researchers get to *Dead-End* right before they reach the solution they are looking for. Some are surrounded with *Frustration and Burning out* due to the lack of motivation and pressure to reach any results. Earlier stage is **proceeding the research** where problems like *Poor Time Management* and *Lack of Focus and Misdirection* because once researcher get deep into a topic many other aspect forms and leads to a vary endings and they have to choose to follow one of those paths to actually get something done instead of wasting effort following a mirage in a hot desert. One of the most important problems is *Funding* which can be a problem in all stages but this is where it is the most important because in the end it is just a small price for salvation and before this there are nothing really done but in this stage where alot is on the line where months of even years can be just gone for no return. Finally, The **starting** where it is all about *Finding a Novel Idea* and *Gathering a Team* and *Finding The Suitable Mentor*.

With more research the harder to find something to start researching about because there are so many researchers looking or the same things with less novelty. This is mostly due to the enormous numbers of researchers working on limited hot topics and putting their best to get the most of it. but this is also for the lack of bouncing ideas between them! Almost the only way of communication

is conferences and published articles though researchers lack time to do both when it is about new ideas. They do these things in term of getting knowledge in a specific narrow field they are working on. Mainly to summarise where researchers tend to get their ideas about their next research into the following :

1. Papers. Researchers tend to read a lot about a specific field so they become more expert and mature in this particular field and the more they read about it the more they get ideas.
2. Specialization. Well, school is one of the top motives on "what to research about". Master and PHD students are dedicated to a small scope to be researching about that is relevant to their study.
3. Peers. Bouncing ideas and talk with peers have a huge effect on the level of creativity and how much further it can go up.
4. Need. As the old saying "Need is the mother of invention". So, the need of a solution for a very occurrence problem will motivate people to make some effort to ease this problem.
5. Social media. Social media is a place where people post their thoughts, express themselves and talk about relevant topics. Some of those websites has communities can hold many "nerdy conversations".
6. FUN! this is not what you expected right? as a matter of fact many inventions and gadgets started because of a 'mad scientist' who felt poor and decided to do something "fun" and it turned out to be very useful.

In the next section, more about the problem and the methodology will be demonstrated in details.

7 Methodology

7.1 Components Of The System

7.1.1 Flutter - Dart

Google built and unveiled Flutter, a free and open-source mobile UI framework, in May 2017. Simply said, it enables the development of a native mobile application using just one codebase. This implies that two distinct apps can be constructed using a single programming language and codebase (for iOS and Android).Further more, Desktop applications and web are supported as well.

Flutter is made up of two crucial components:

A group of tools called an SDK (Software Development Kit) will assist in creating the applications. Tools for converting code to native machine code are also included (code for iOS and Android).

An architecture (UI library based on widgets): a set of reusable user interface (UI) components to customize for the developer own purposes, such as buttons, text inputs, sliders, and other elements.

Flutter considered an easy to use cross platform with a large growing community. Flutter has a really good documentation as well. It also support maximum productivity with the real time hot reload meaning that any changes can be sensed in time with one click. And in terms of business, flutter is a good method to create prototypes to get funds and rush into the market with a competitive idea and it has a really high demand in freelance world.[5]

Figure 1: Flutter Framework

7.1.2 ASP Dotnet

An open-source web platform called ASP.NET is used to create online applications using the.NET (dotNET) framework. It was developed by Microsoft, and version 1.0 was made available in 2002 so that programmers could create dynamic online applications, services, and websites. All web applications use the standard HTTP protocol, hence the framework is designed to function with it.

The Active Server Pages (ASP) technology was replaced by ASP.NET, which represented a

considerable improvement in terms of flexibility and capability. It is a.NET platform extension that includes extra tools and libraries made expressly for creating things for the online, such as websites and web applications.

The cross-platform version of ASP.NET, which was initially referred to as ASP.NET Core, was made available in 2016. Microsoft shortened the name and dropped "Core" from it in November 2020. This implies that future versions will simply be referred to as.NET and then a version number. Every year, a new version is issued in November; consequently,.NET 5 was launched in 2020,.NET 6 in 2021, and so on.
DotNet consists of :

1. Language. *VB.NET (Visual Basic) or C* is the programming language used for the ASP.NET platform.
2. Library. The ASP.NET offers libraries for standard web patterns in addition to the .NET framework's fundamental libraries. *Model View Controller (MVC)* is one such package that enables you to leverage the MVC design pattern while creating online apps and websites. A web application can be created using the MVC paradigm by combining three different roles: business layer, display layer, and input control.
3. Runtime for Common Language. *.NET* apps run on a platform called the *Common Language Runtime (CLR)*.It is used to carry out crucial tasks like activating objects, carrying out security checks, arranging them in memory, running programs, and managing garbage collection. [6]

ASP Dotnet is simple, secure and have a rich support and solves many issues that developer suffers from like memory issues, security and exceptional handling. It was lunched from *Micosoft* meaning that it will have a long term support. It is also built on the windows packages meaning that it does not require many steps to be installed. DotNet is fast! comparing ASP that is implemented with C, F or even VB, it still a compiled languages where some languages usen in back-end like PHP or JS(Node) are not. Those need extra interpretation to be run on the machine which mean they will be slower.[4]

Figure 2: Dotnet

7.1.3 Clean Architecture

In his book "Clean Architecture: A Craftsman's Guide to Software Structure and Design," Robert C. Martin (MARTIN, 2017) defined the term "Clean Architecture". Systems in this architecture can be broken down into two basic categories: policies and details. The details are the things required to carry out the policies, whereas the policies are the organizational rules and procedures.2017 (MARTIN) This phase is when Clean Architecture starts to set itself apart from other architectural styles. The system must be able to identify the policies as the primary components of the architecture and the details as unimportant to the policies. As these are details that do not conflict with the policies and can thus be altered over time, it is not required to select the database or framework at the start of development when using a clean architecture. [7]

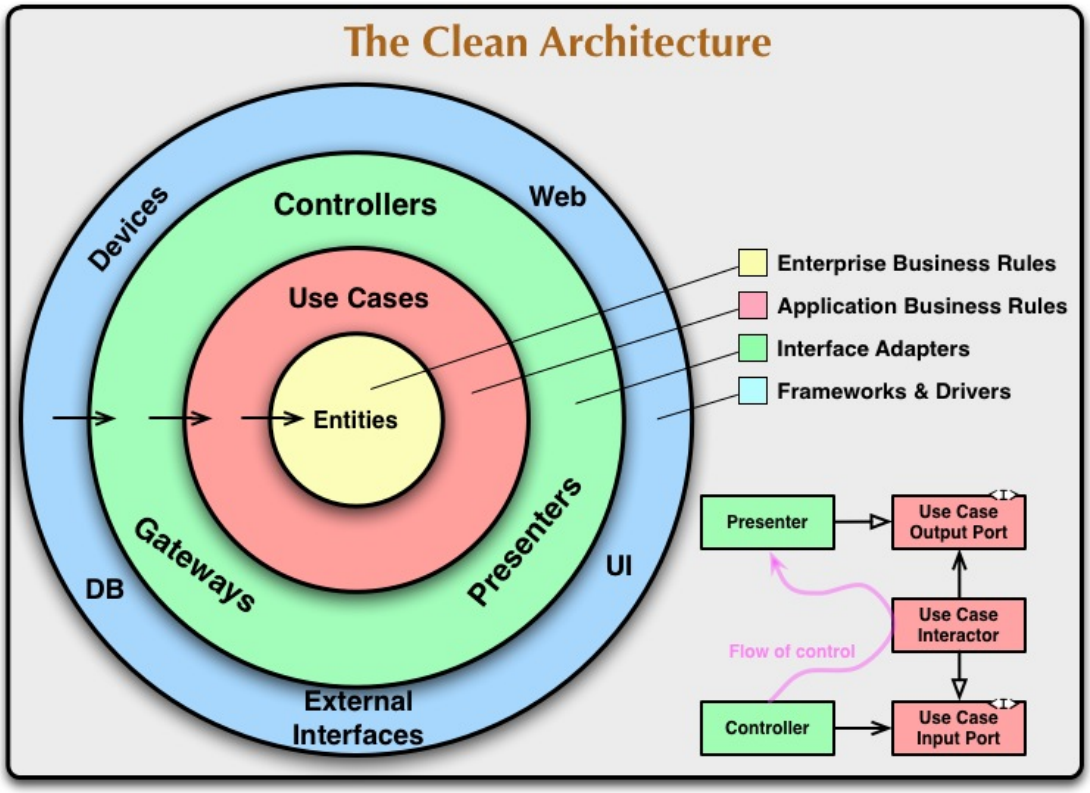

Figure 3: Clean Architecture

7.1.4 MongoDB

One of the most well-liked DBs worldwide. a component of the well-known MEAN stack, which stands for MongoDB, ExpressJS, Angular, and NodeJS as well as additional JavaScript-based stacks like MERN and MEVN (which substitute React and Vue for Angular, respectively). A NoSQL document storing system. The data is stored in big documents where each contains BSON formatted data. It is also schema-less, which means that no true schema or columns exist. By creating sharded clusters, you can provide horizontal scalability and make it very simple for data to be spread across different servers.

MongoDb is a very popular DB that has been used from millions across the world. It is user friendly and schema-less which is very helpful in software need flexibility in storing data. Scalability is one of the benefits of choosing MongoDB due to the ease of scale.

Figure 4: MongoDb

7.1.5 Microsoft Azure

At its core, Azure is a platform for public cloud computing that offers Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) solutions. These solutions can be used for a variety of services, including analytics, virtual computing, storage, networking, and much more. On-premise servers can be supplemented or replaced with it.

There are many reason why anyone should be using Microsoft Azure. Where Azure enhance and implement backup and disaster recovery. And provide a Hosting service where apps can be hosted on it providing auto path management and auto scaling. Azure can integrate with the Active Directory to supplement identity and access capabilities which gives the DNS a global reach, centralized management, and robust security.

Figure 5: Microsoft Azure

7.1.6 Firebase

A backend-as-a-service is Firebase (Baas). It offers a range of tools and services to developers so they can create high-quality apps, expand their user base, and make money. It is built using Google's technical framework.

A NoSQL database application, Firebase stores data in documents that resemble JSON. There are many features provided by Firebase such as *Authentication*. It supports authentication using passwords, phone numbers, Google, Facebook, Twitter, and more. The Firebase Authentication (SDK) can be employed to manually add a sign-in option or even several to an app. *Realtime database*, Data is instantly synced across all clients and is still accessible even when an app is not running. *Hosting*, Firebase Hosting provides fast hosting for a web app; content is cached into content delivery networks worldwide. *Test lab*, The application is tested on virtual and physical devices located in Google's data centers. and one of the most used features is *Notifications*. Notifications can be sent with firebase with no additional coding.[2]

Figure 6: Firebase

8 Discussion

The main purpose of the project initially is to help AN-Najah National University students who work on their graduation project to be aware of the projects have been done and get more ideas about what they can do as well as a place to discuss their ideas, get help for problems they face and share their own ideas. Providing a website and a mobile application providing such functionality will help with creating a more helpful society and a place where projects and researches matter. Also, providing a platform where the companies can find brilliant students who are trying to work on their reams to recruit and maybe support or adapt their ideas.

The application is great but still has some downsides, especially in loading data! User experience is a little bit slow but many things can be done to improve the relevant speed and performance of the application. Also, Loading of the application APK takes a lot of time to be rendered on Android 8, A suggestion is a better mobile device with a version of Android 10 or higher to be more compatible with the flutter version used. Some features not working on the web because some packages are not stable for web (flutter web still in beta version) or not even supported like PDF viewer and drawer section, so must build the web section part using different technologies that give better user experience.

9 Conclusion

"There are no perfect system!" as technology improves systems are improved. It is just a big circle that aims to provide the best way with the available technologies.

Improvement is a journey that never ends. and here are some points this system can be passing through to be mature enough.

1. Support different languages (not only English).
2. A group chat system.
3. A recommendation system. where the current is based on following users it can be improved to provide similar interests and some machine learning to classify users to provide related work.
4. An advanced notification system.
5. Voice recognition for searching.
6. A desktop application which may seem a bad idea but still relevant since users may have faster reach and faster and more responsive experience while using apps.
7. Implement some sort of security matters like hiding following and follower, hiding files in projects and control who can see posts and projects a user uploads.

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A GUI for the Android application and Web application

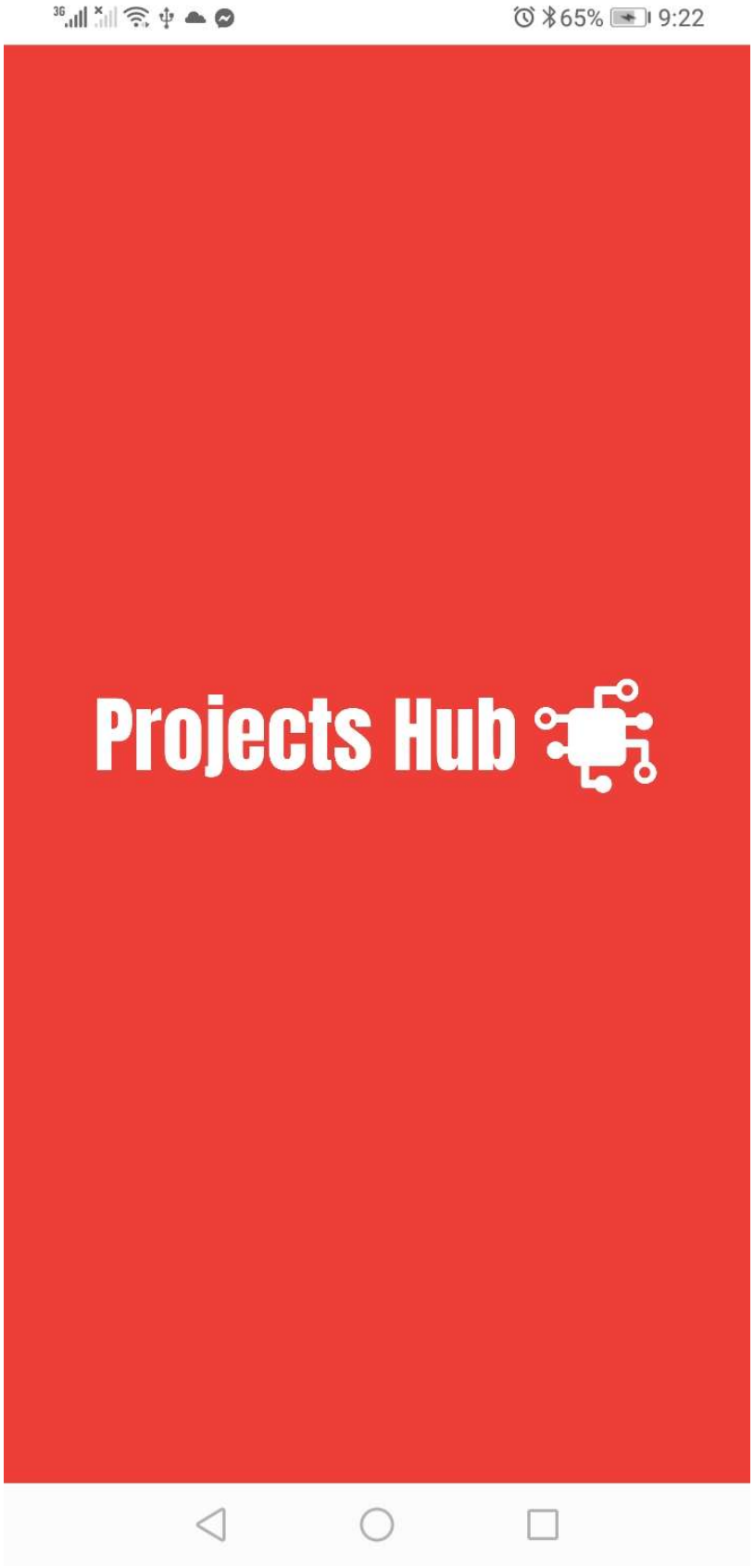


Figure 7: Splash screen when starting running application for the first time

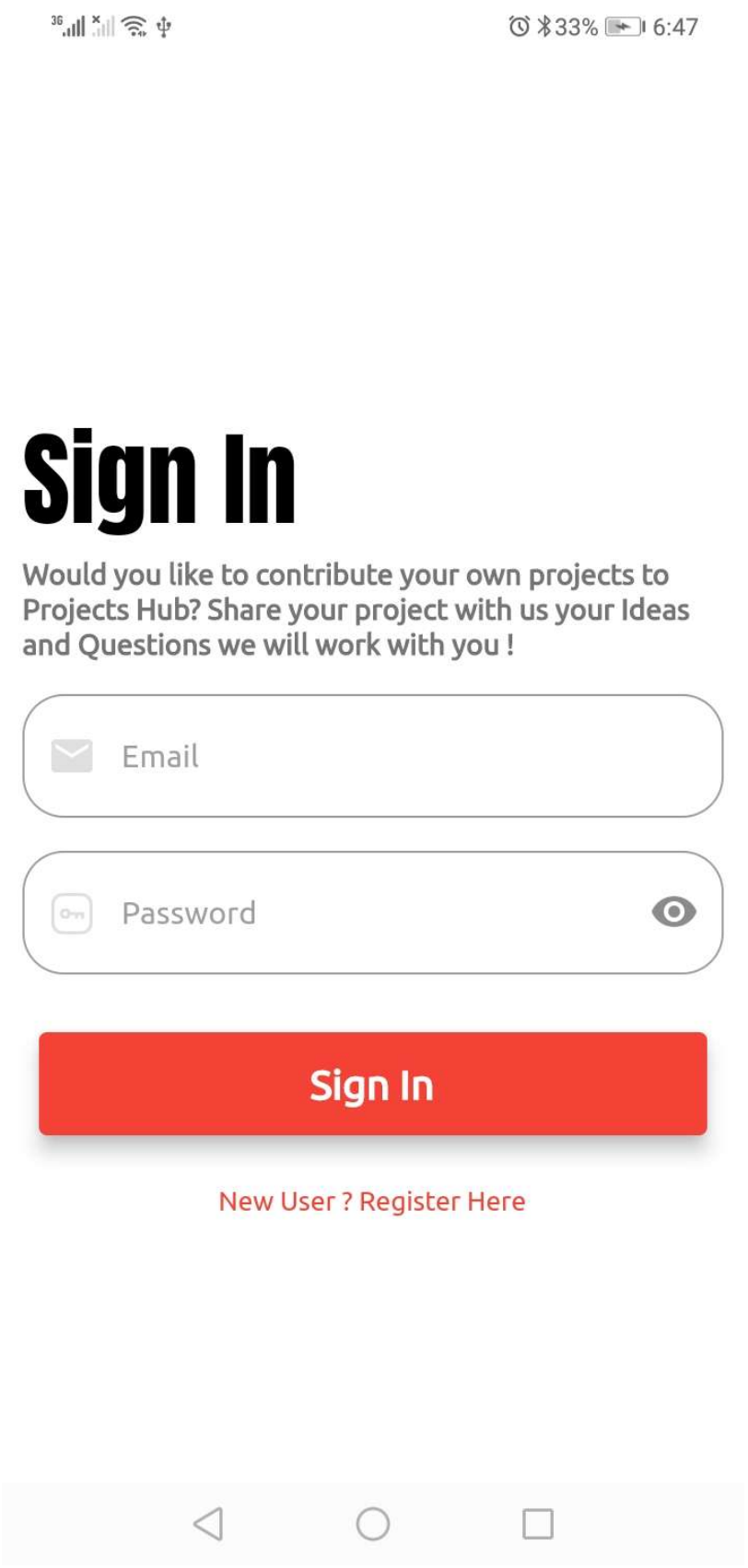
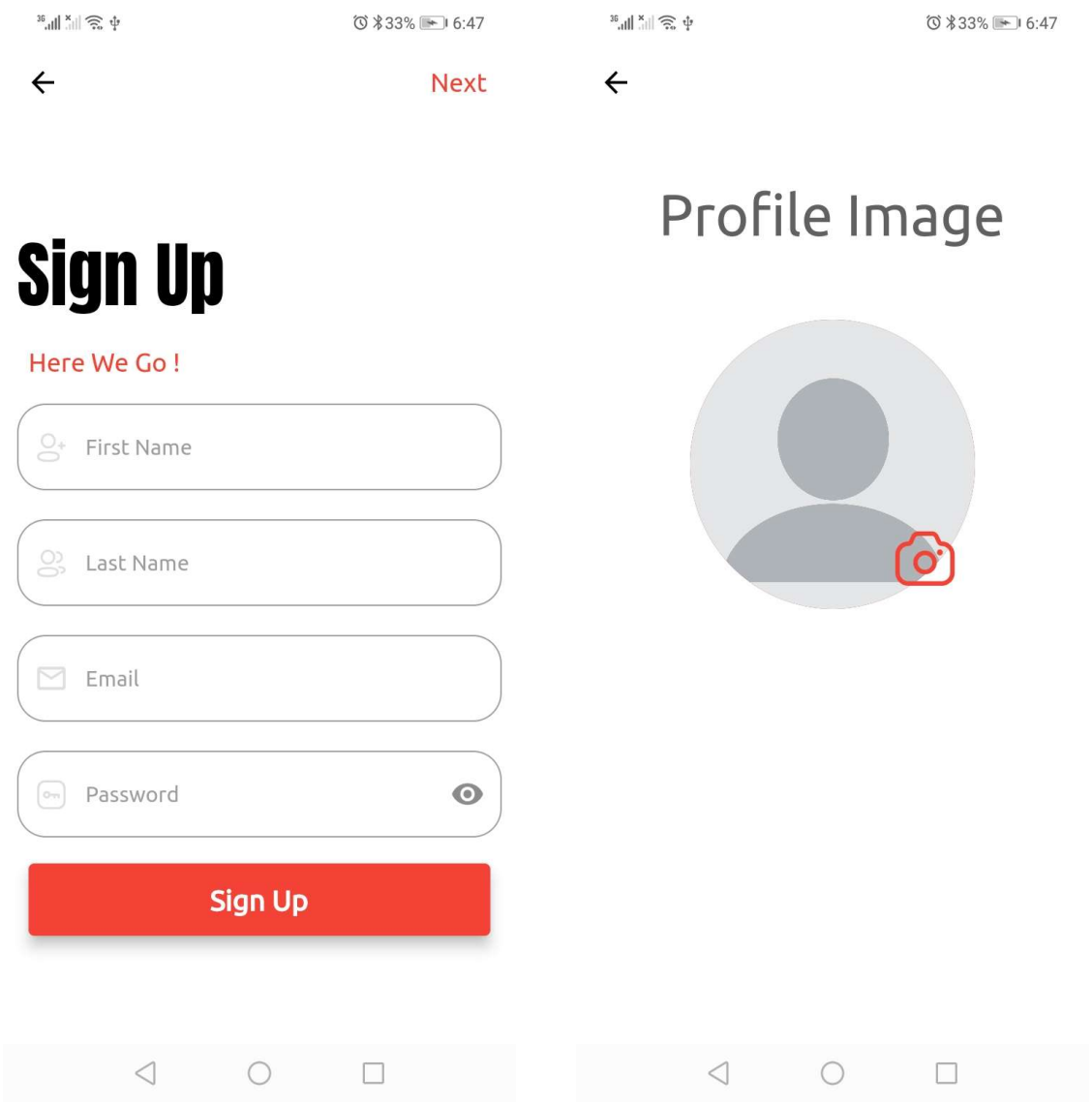


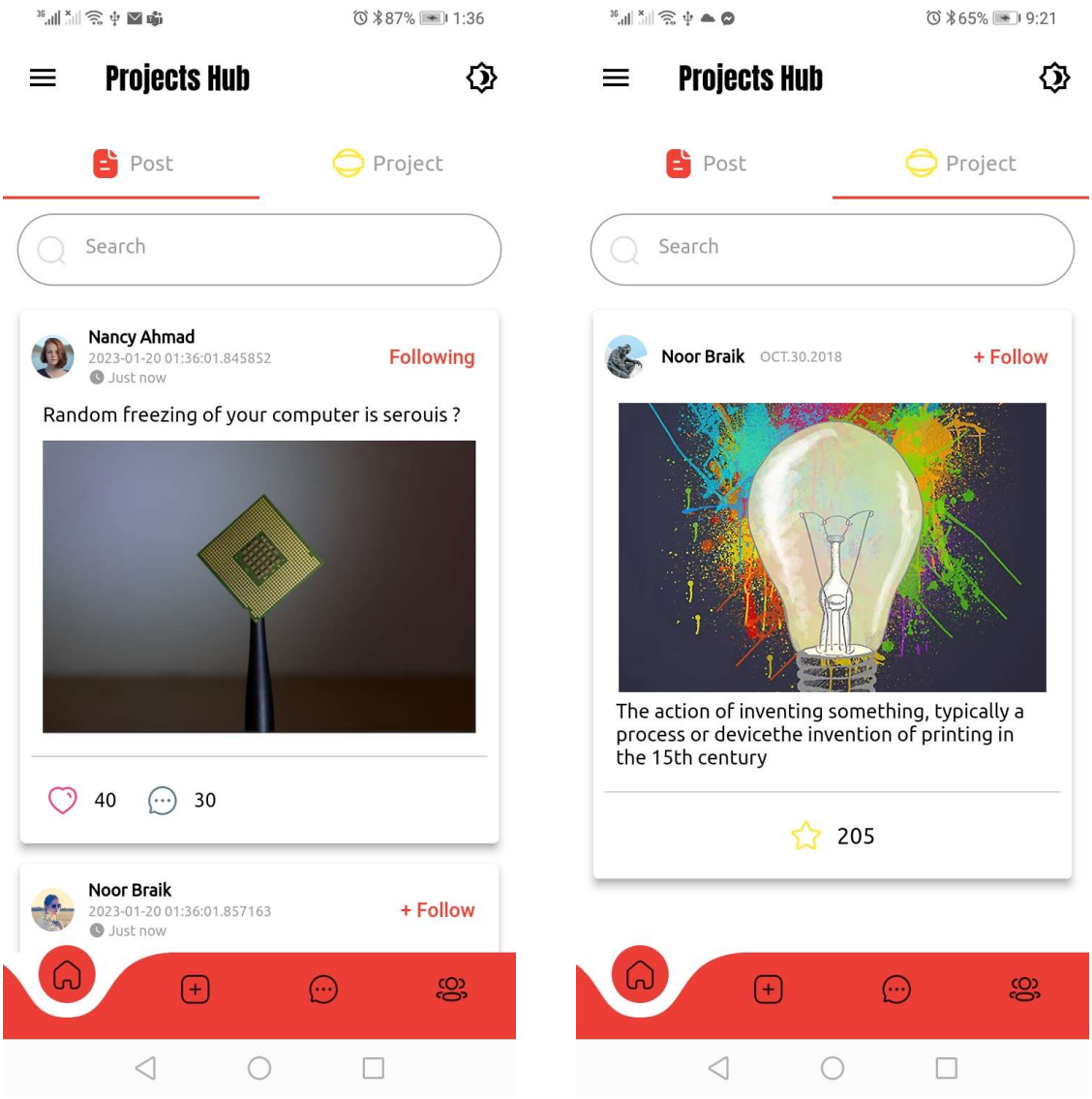
Figure 8: Sign In page



(a) Input your information and Sign Up

(b) Change profile Image

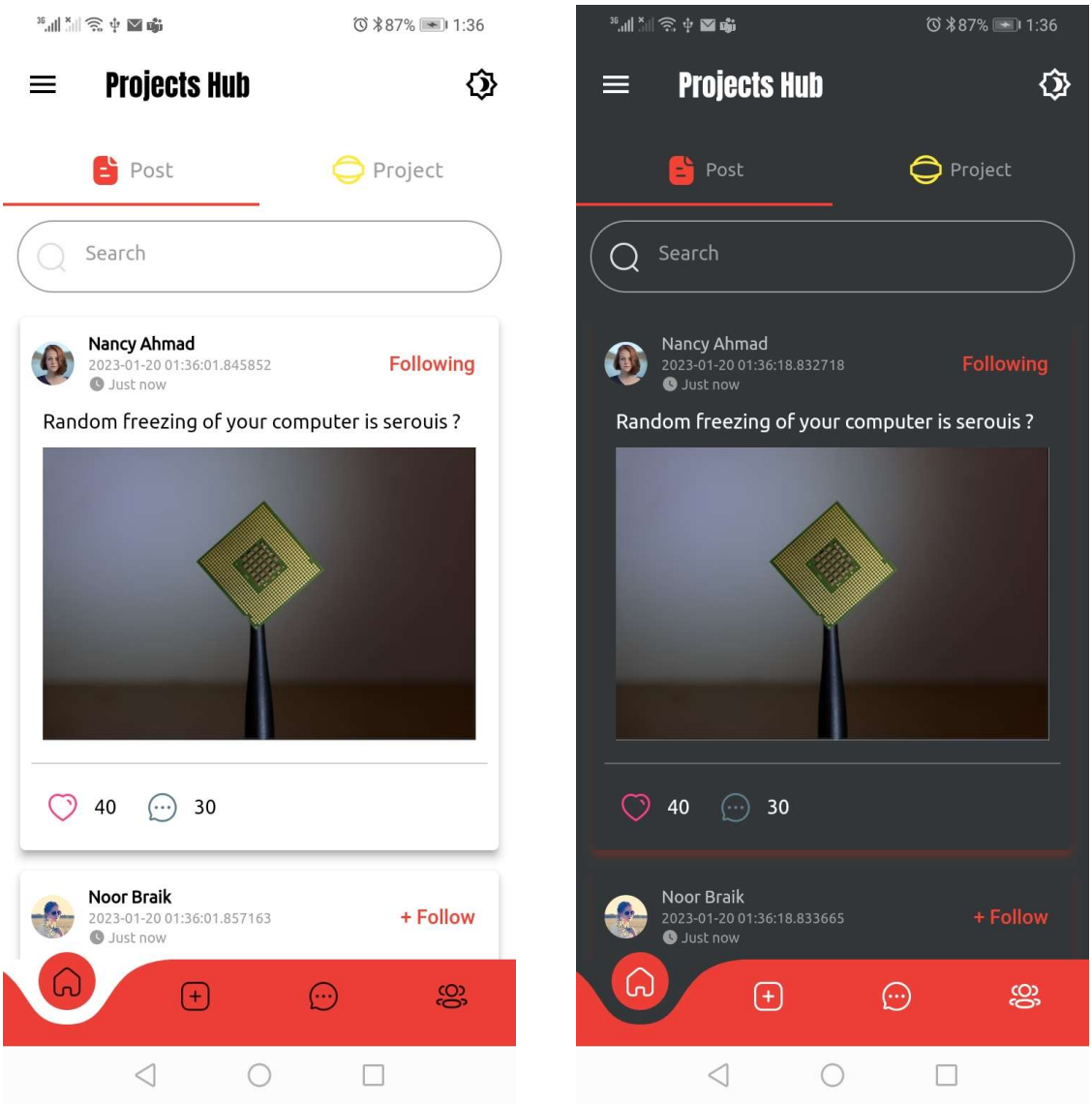
Figure 9: Sign up Page



(a) post page

(b) project section

Figure 10: Home page



(a) Light Theme

(b) Dark Theme

Figure 11: Themes

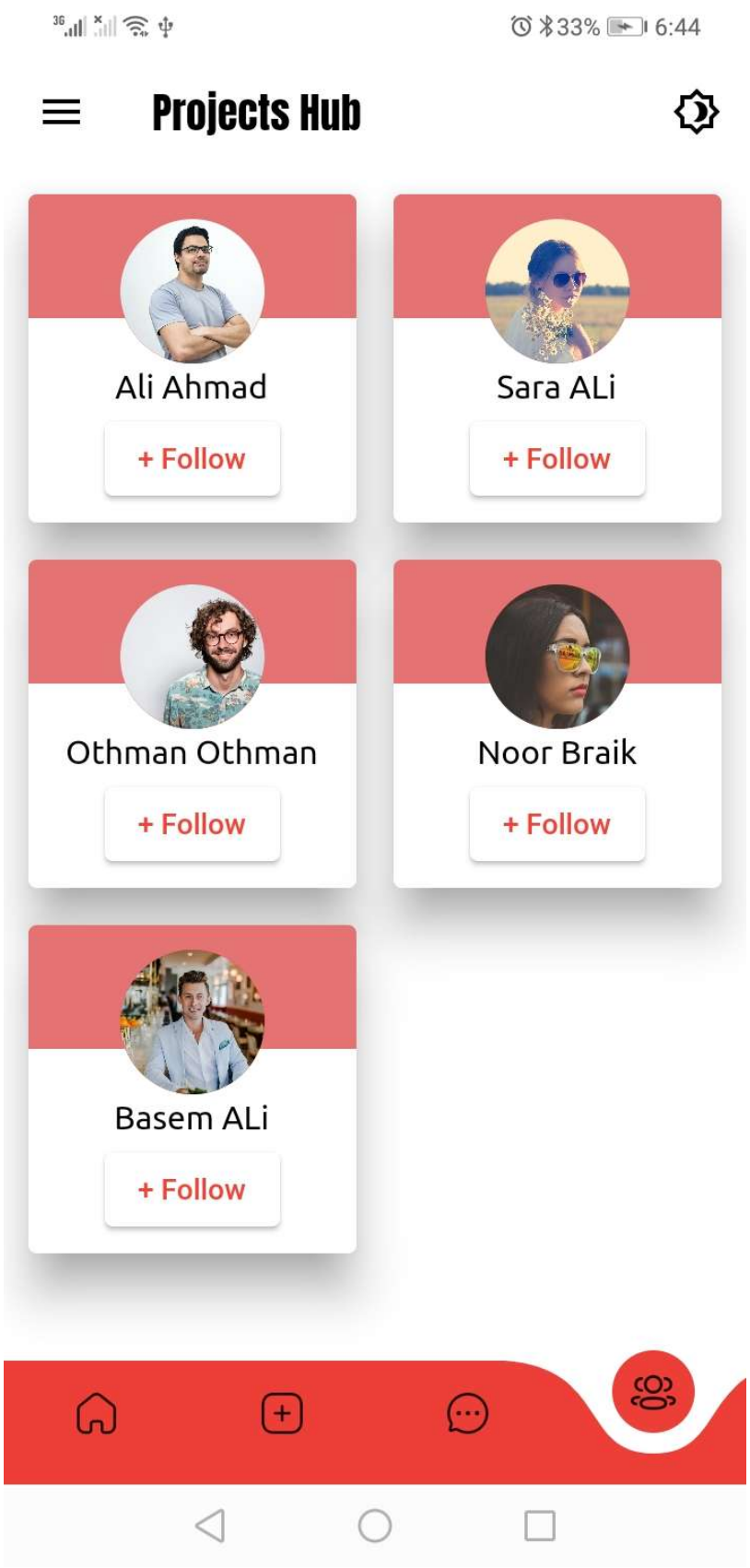
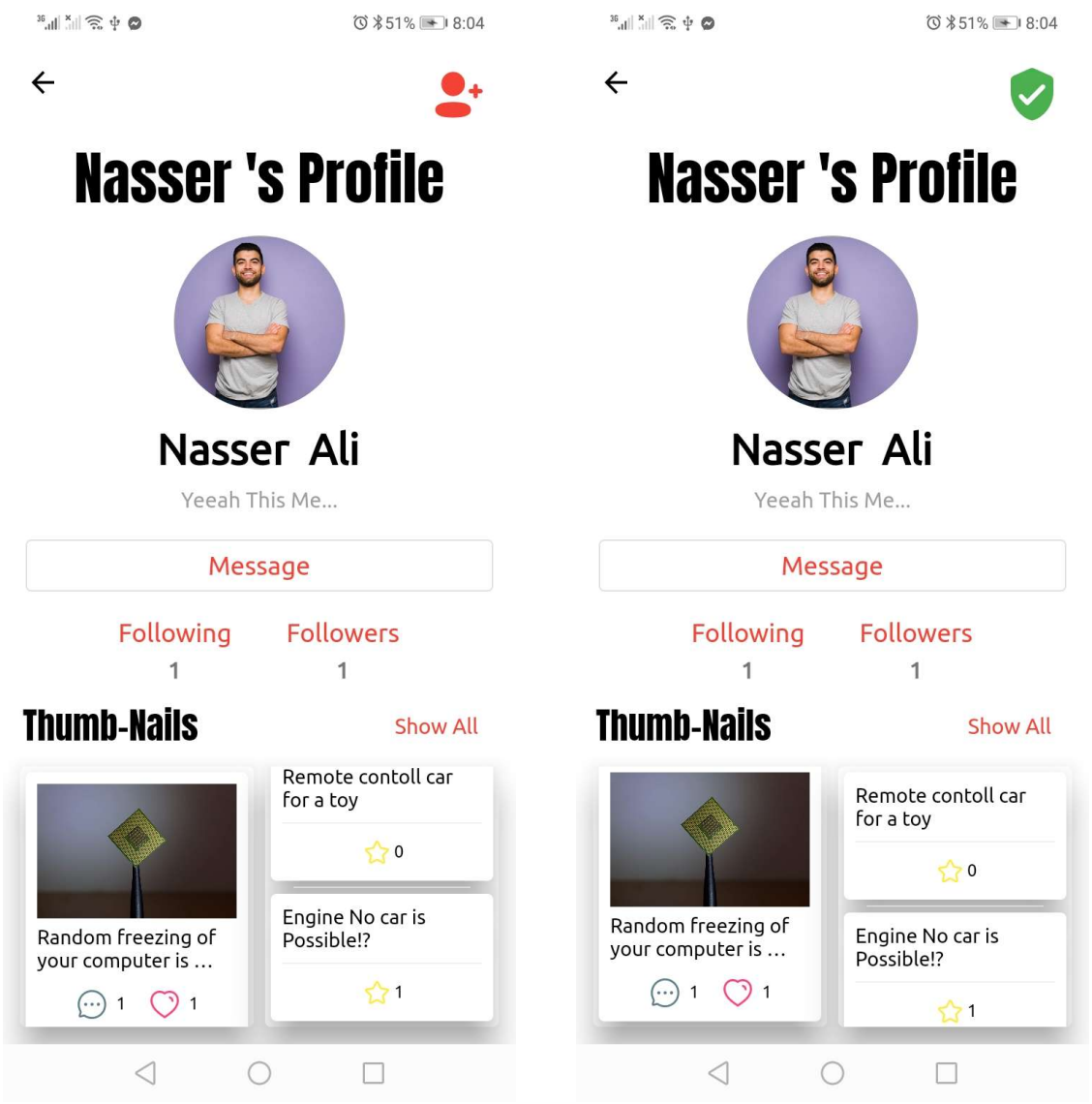


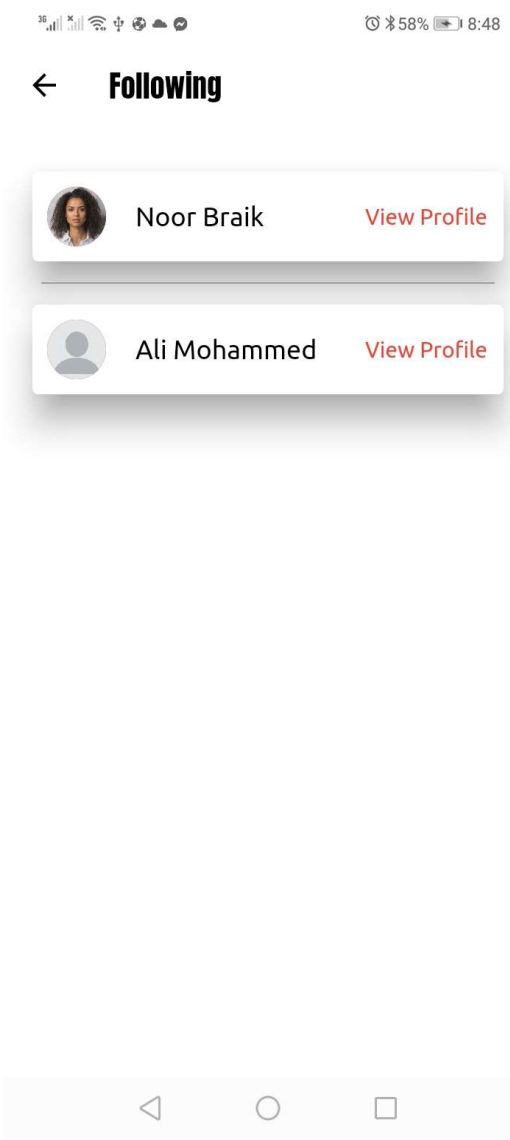
Figure 12: Network Section includes suggested people to follow



(a) shows the user not followed

(b) shows the user followed

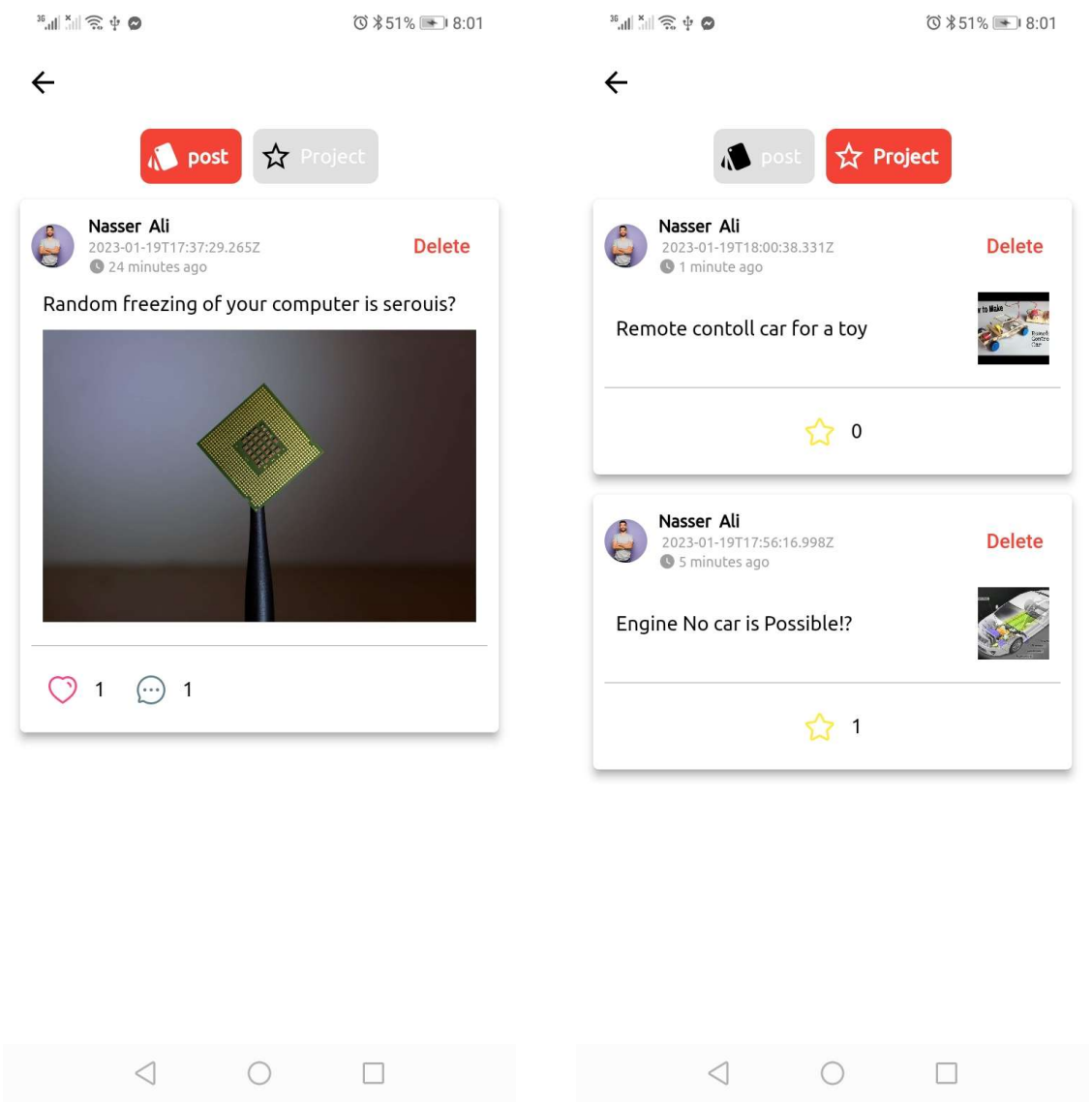
Figure 13: User Profile



(a) Following

(b) Followers

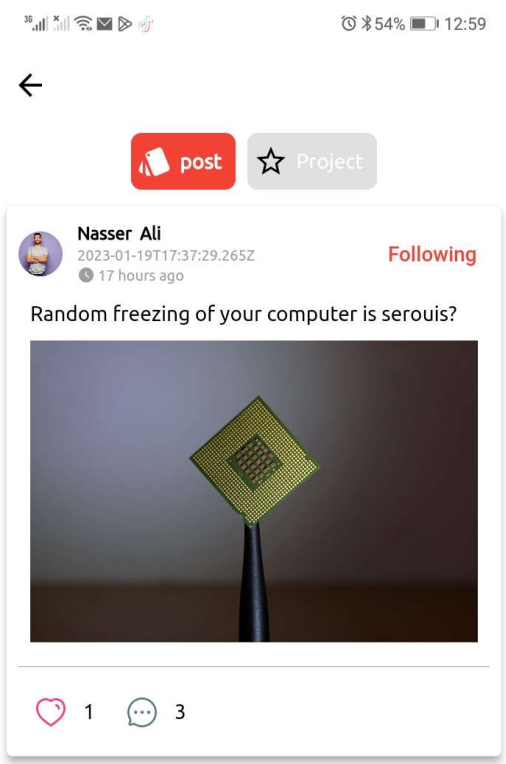
Figure 14: Followers and following Sections



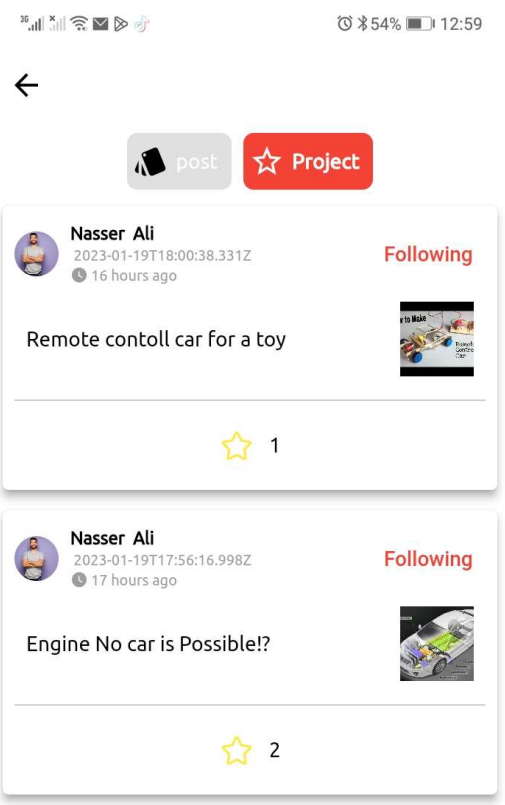
(a) Post section

(b) project section

Figure 15: Show All users' posts and projects for Signed In User



(a) Post section



(b) project section

Figure 16: Show All users' posts and projects for subscribers

(a) Post content

(b) project content

Figure 17: Content of posts and projects

(a) Post Liked

(b) project Voted

Figure 18: Liked post and voted project

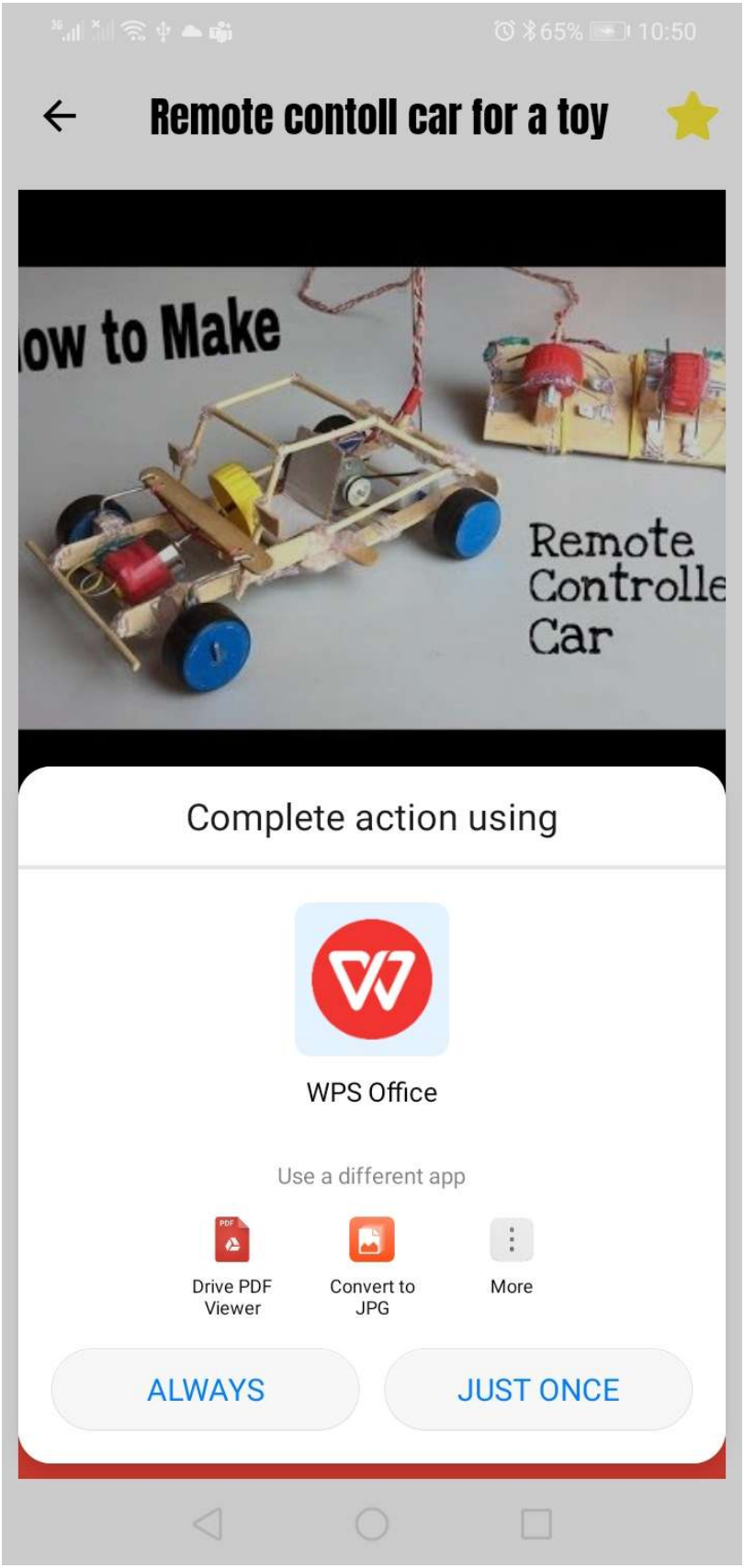
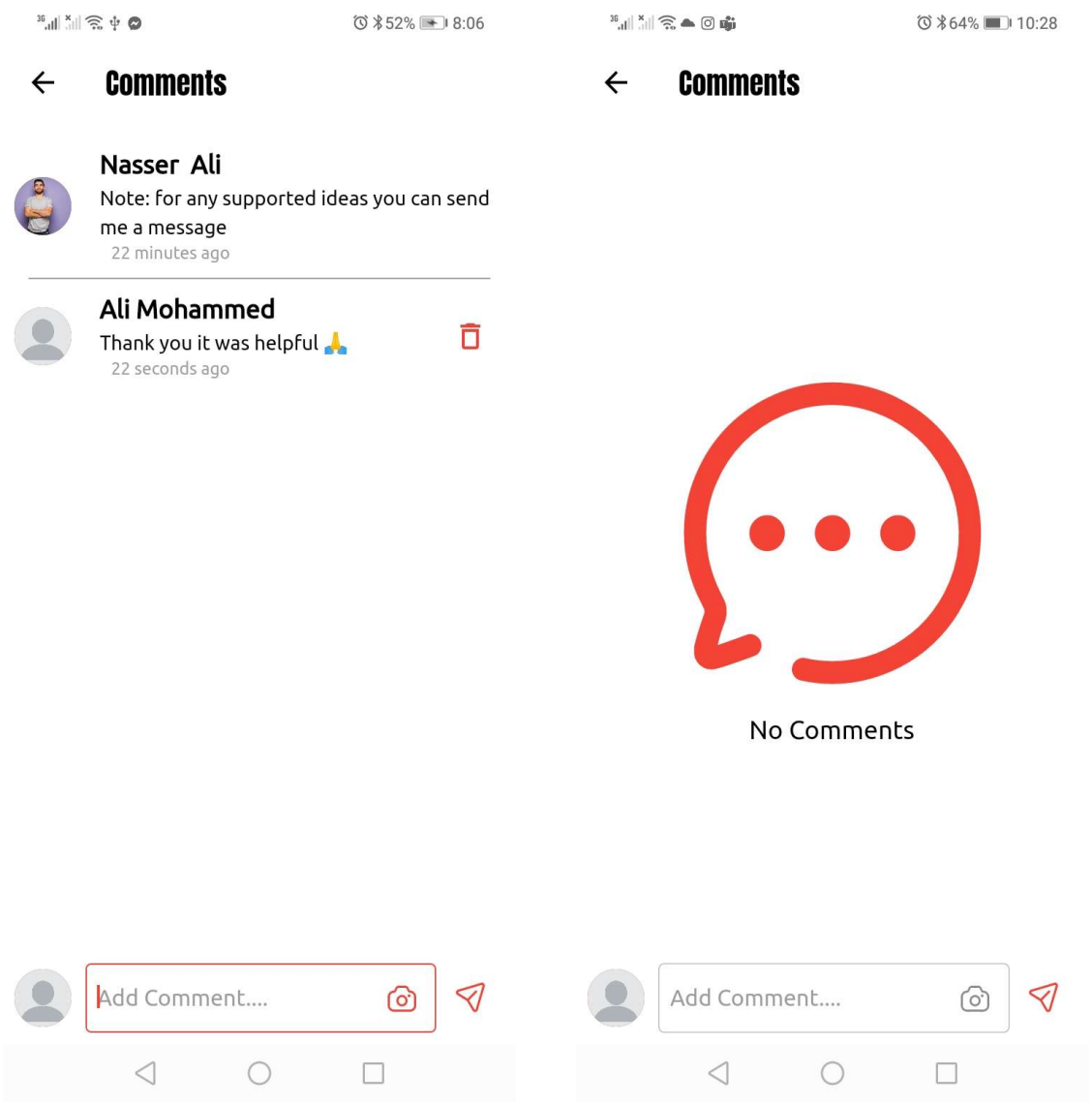


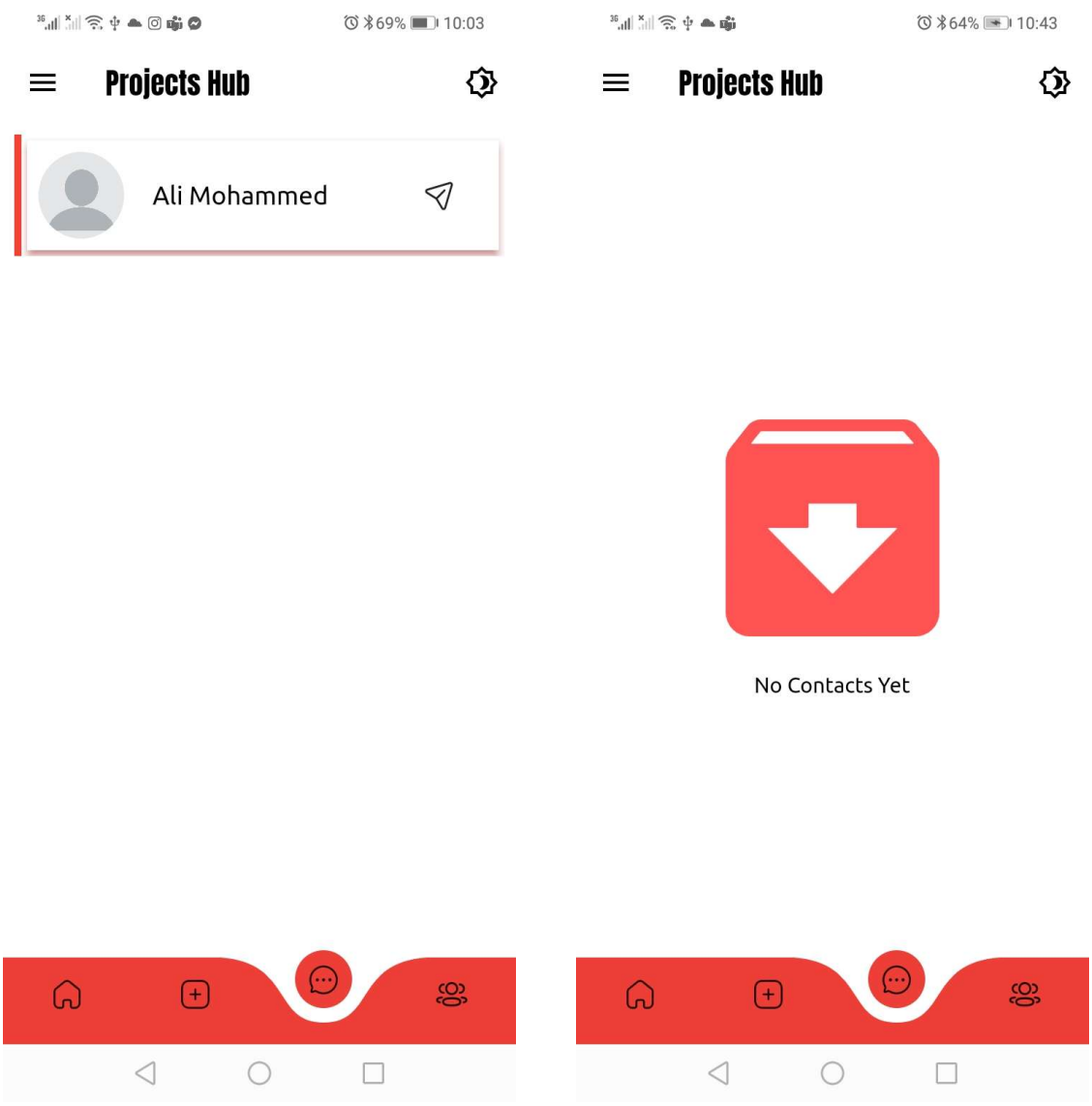
Figure 19: View the file work



(a) Some Comments

(b) No comments

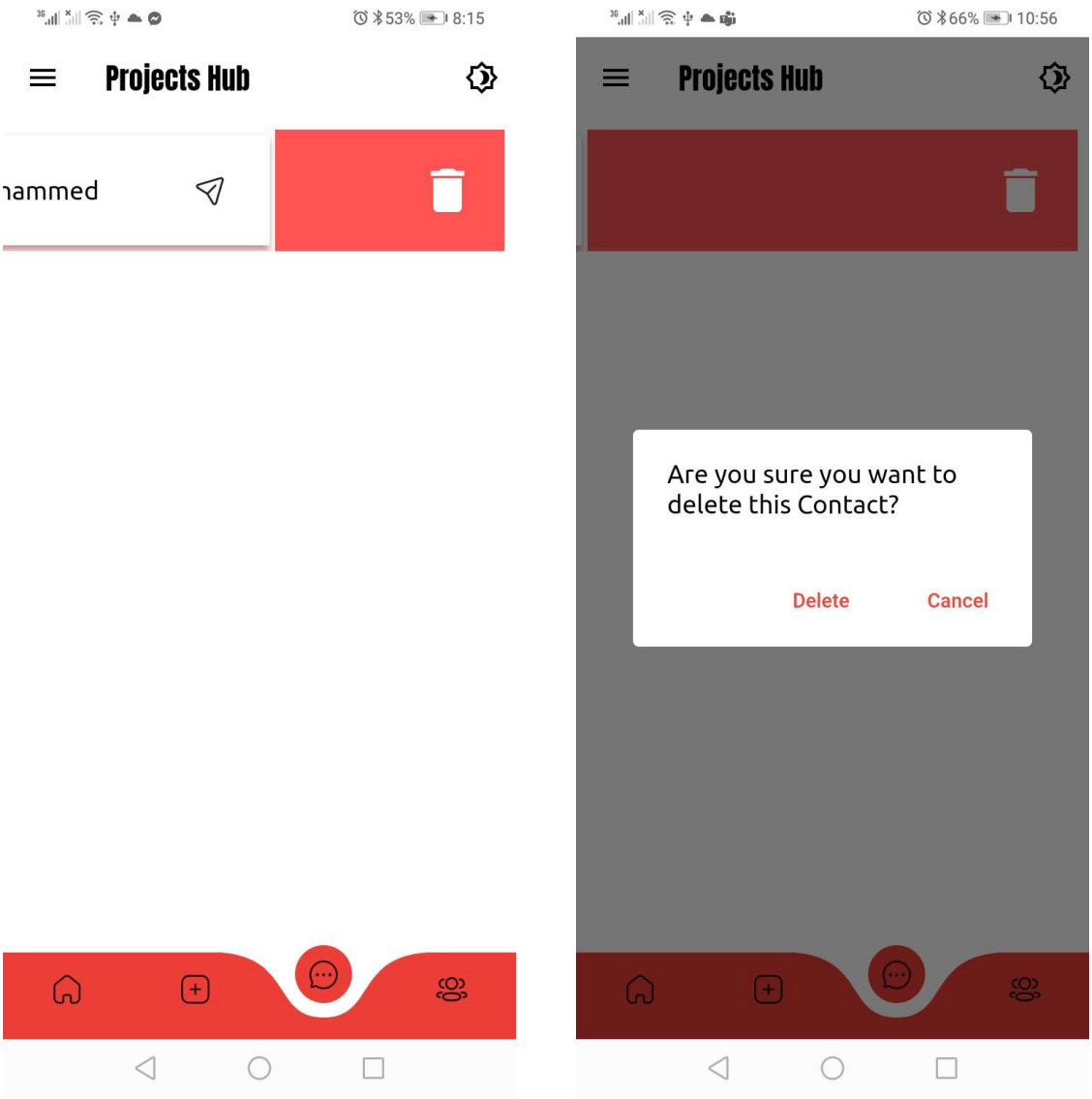
Figure 20: Comment section in the post



(a) Includes Contact

(b) No Contacts

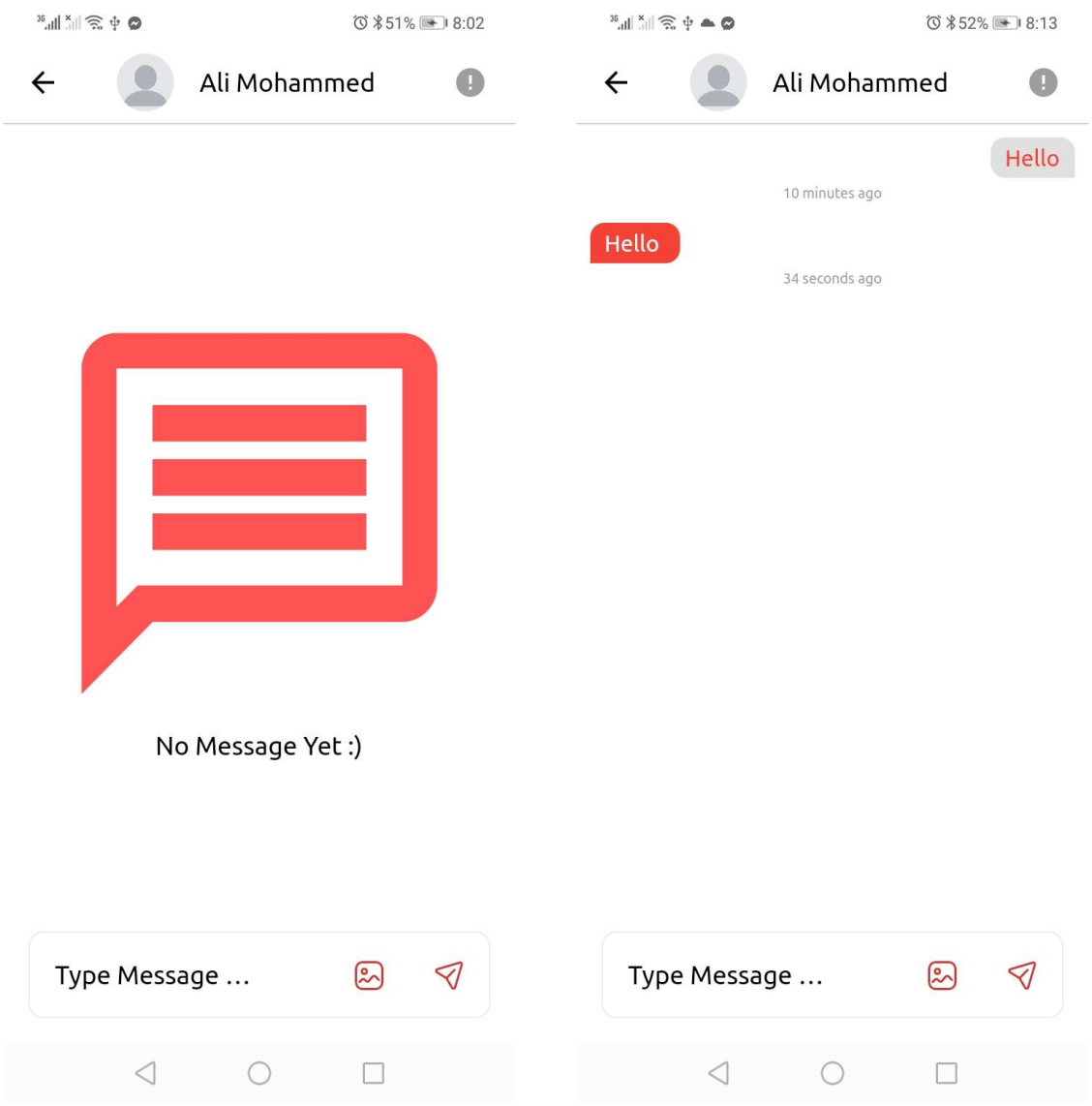
Figure 21: Contact Section



(a) Delete Option

(b) pop up window to insure the deletion

Figure 22: Delete Contact



(a) No Messages

(b) Some Messages sent

Figure 23: Message Section

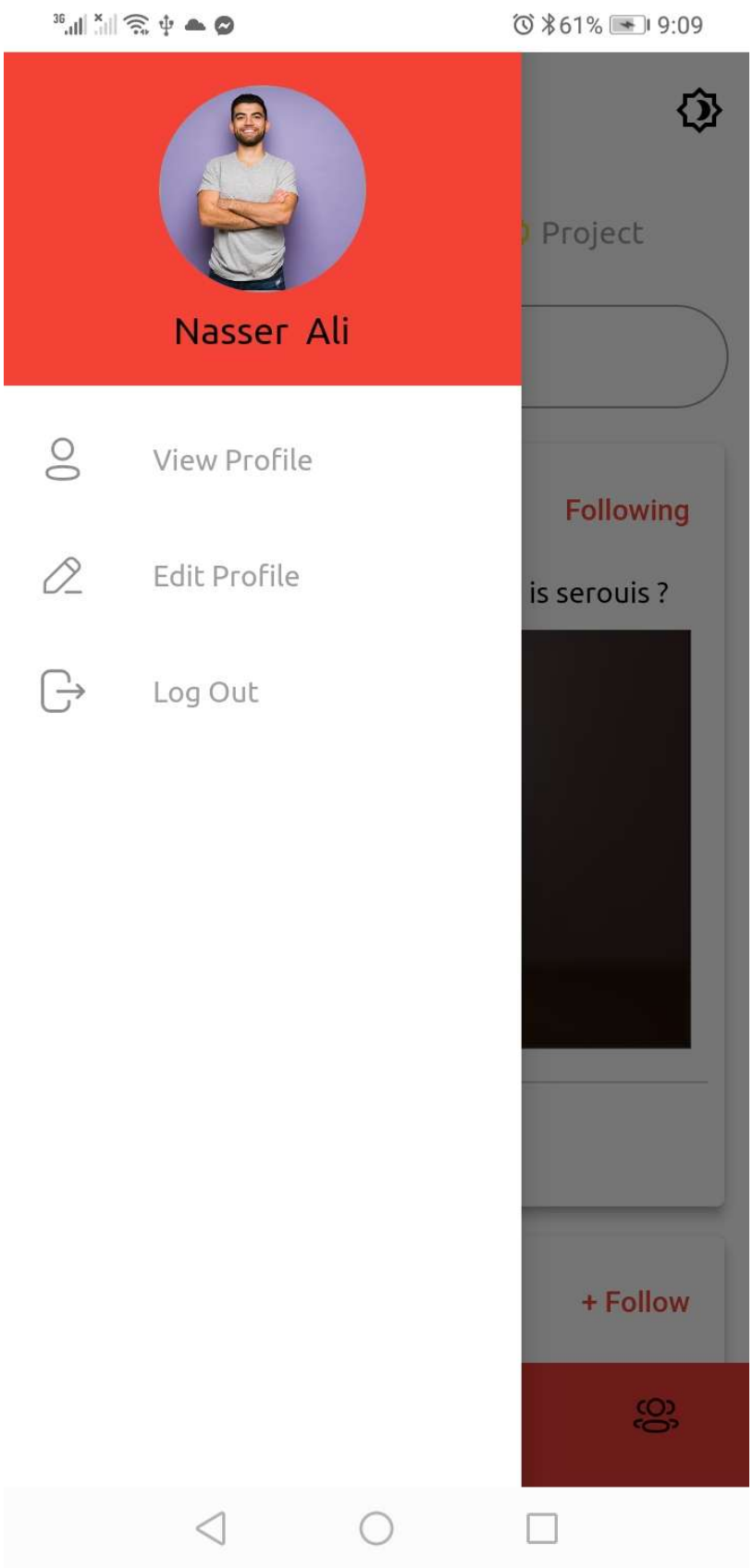


Figure 24: Drawer section

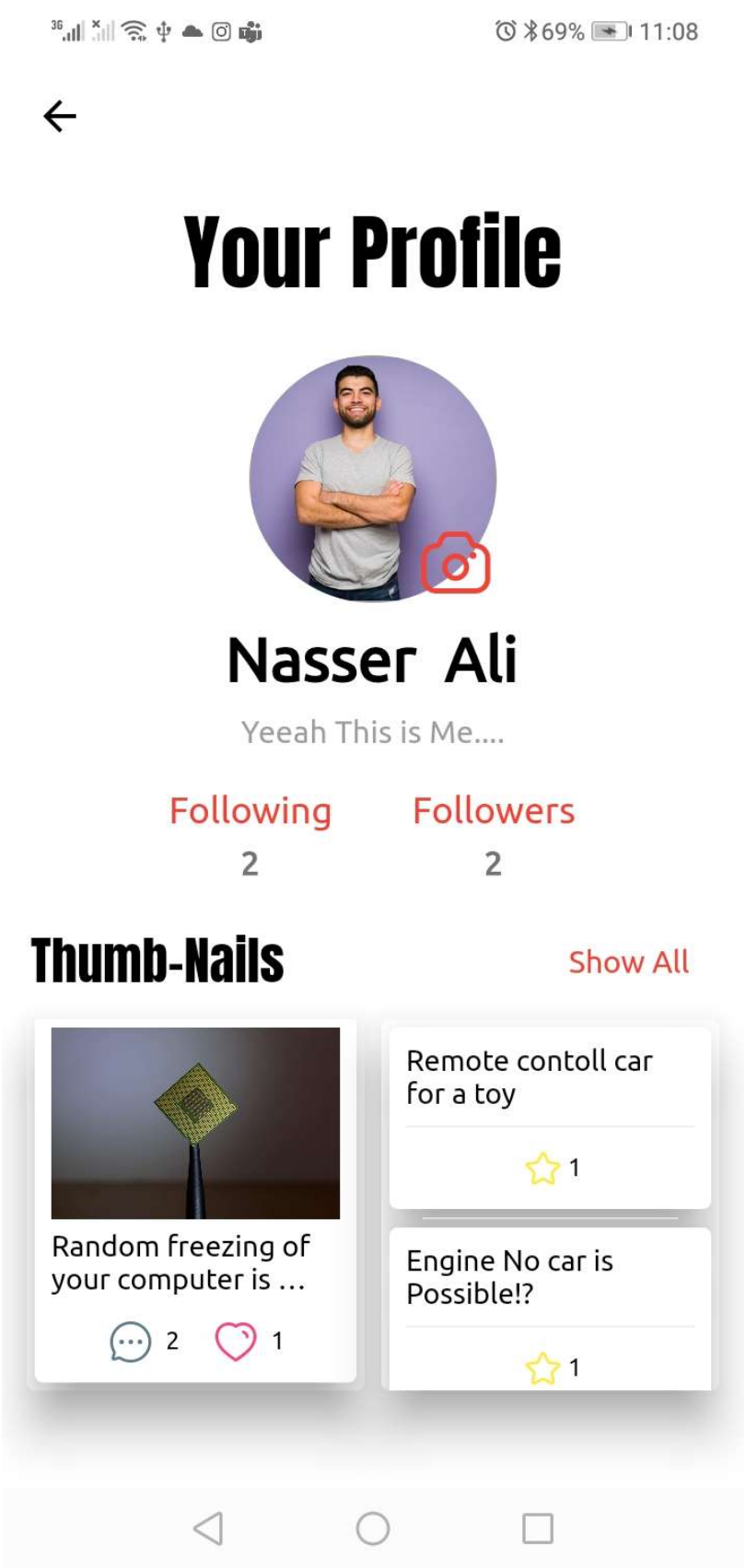


Figure 25: Logged In profile section

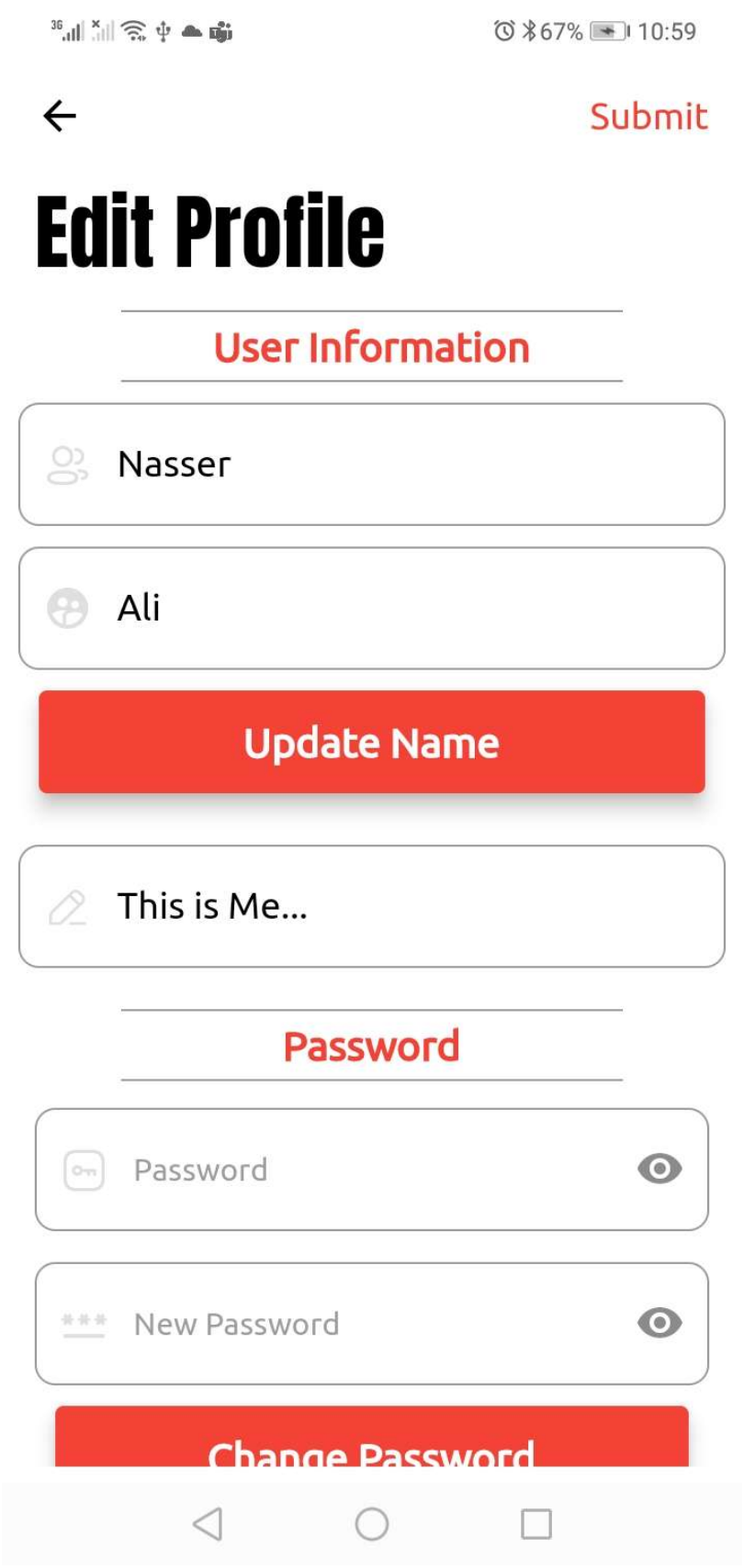
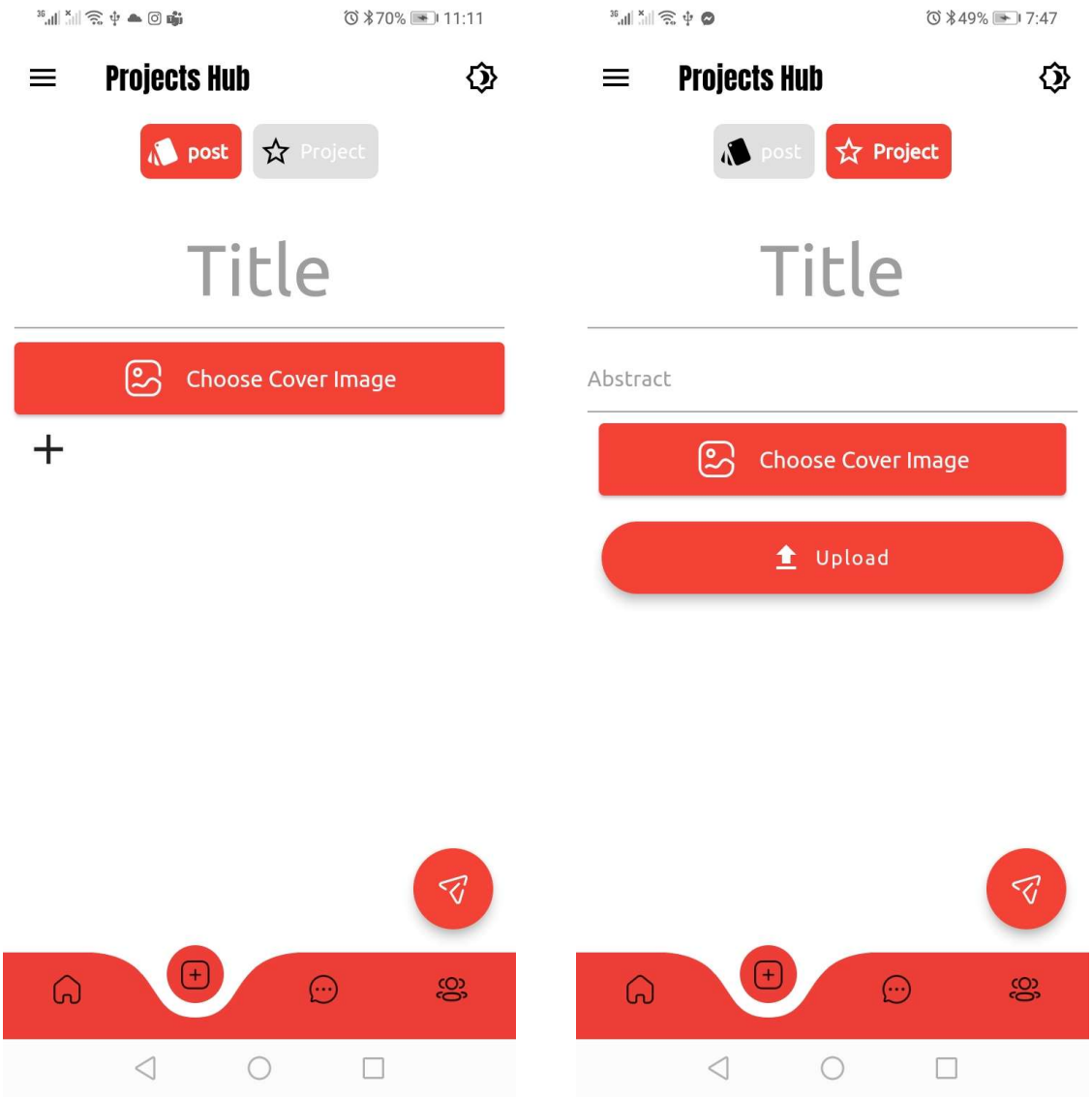


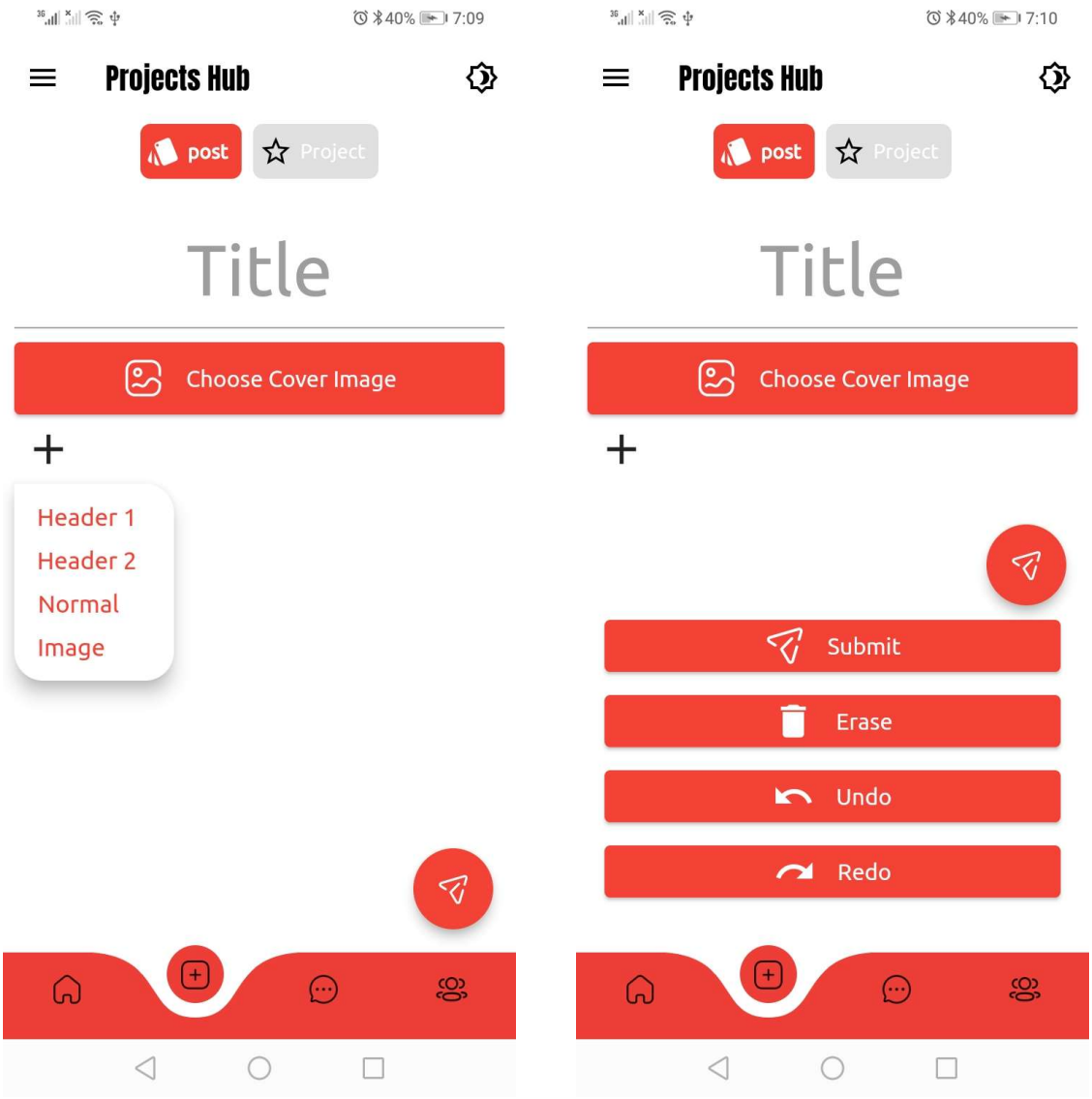
Figure 26: Updated information section



(a) Create post section

(b) Create project section

Figure 27: Create post and project sections



(a) post structure options

(b) post edit options

Figure 28: Post creation options

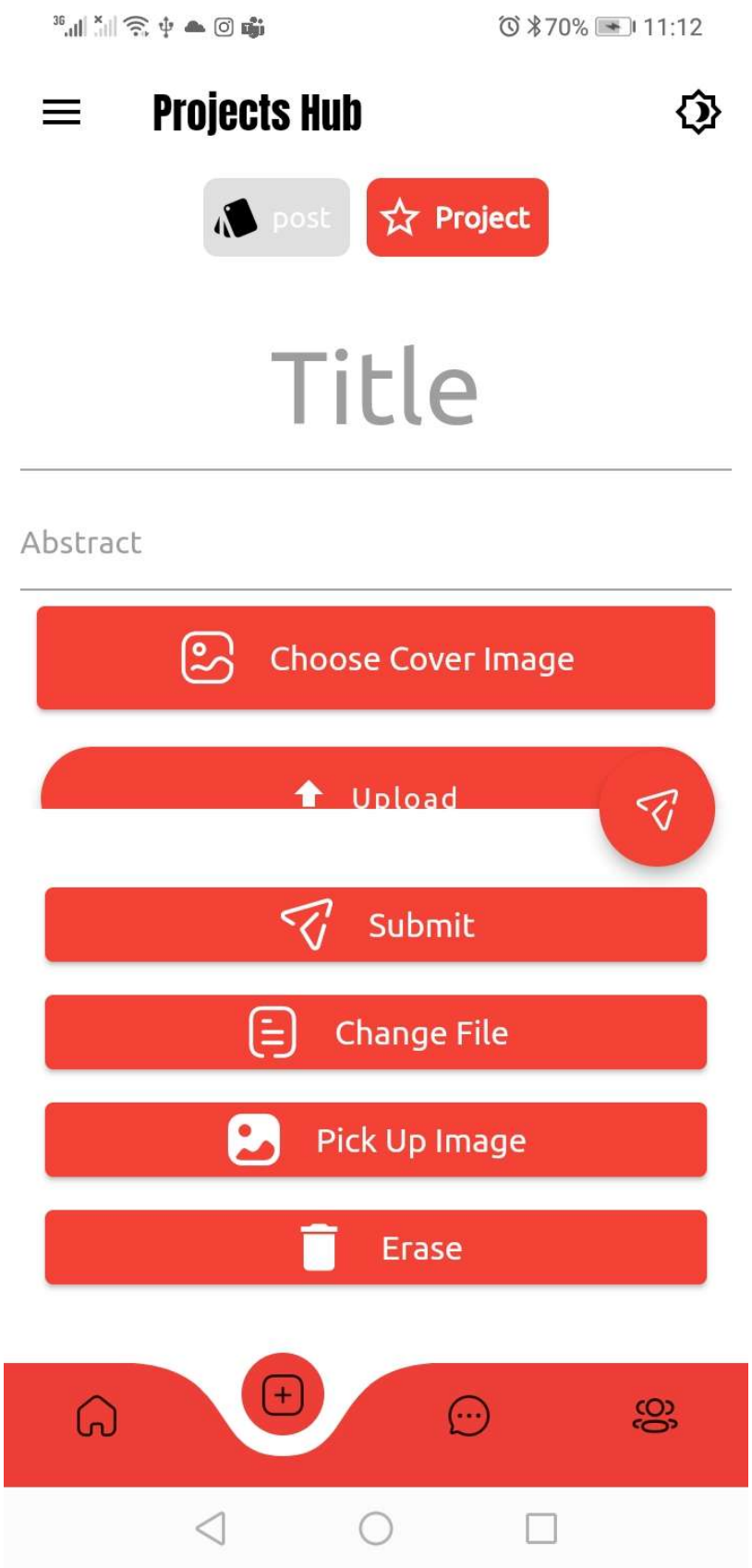


Figure 29: Project creation options

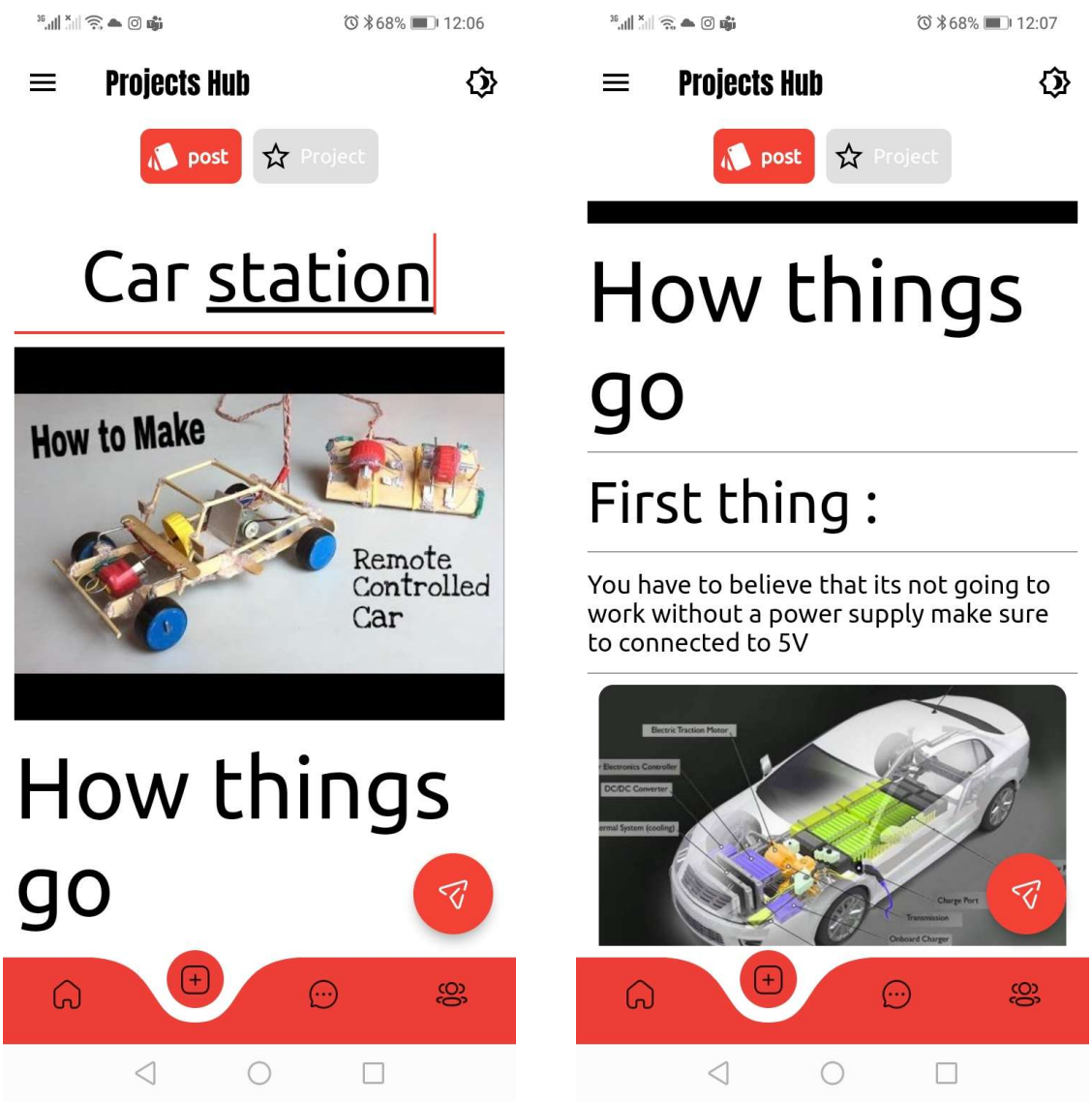


Figure 30: Post creation example

Figure 31: Project creation example

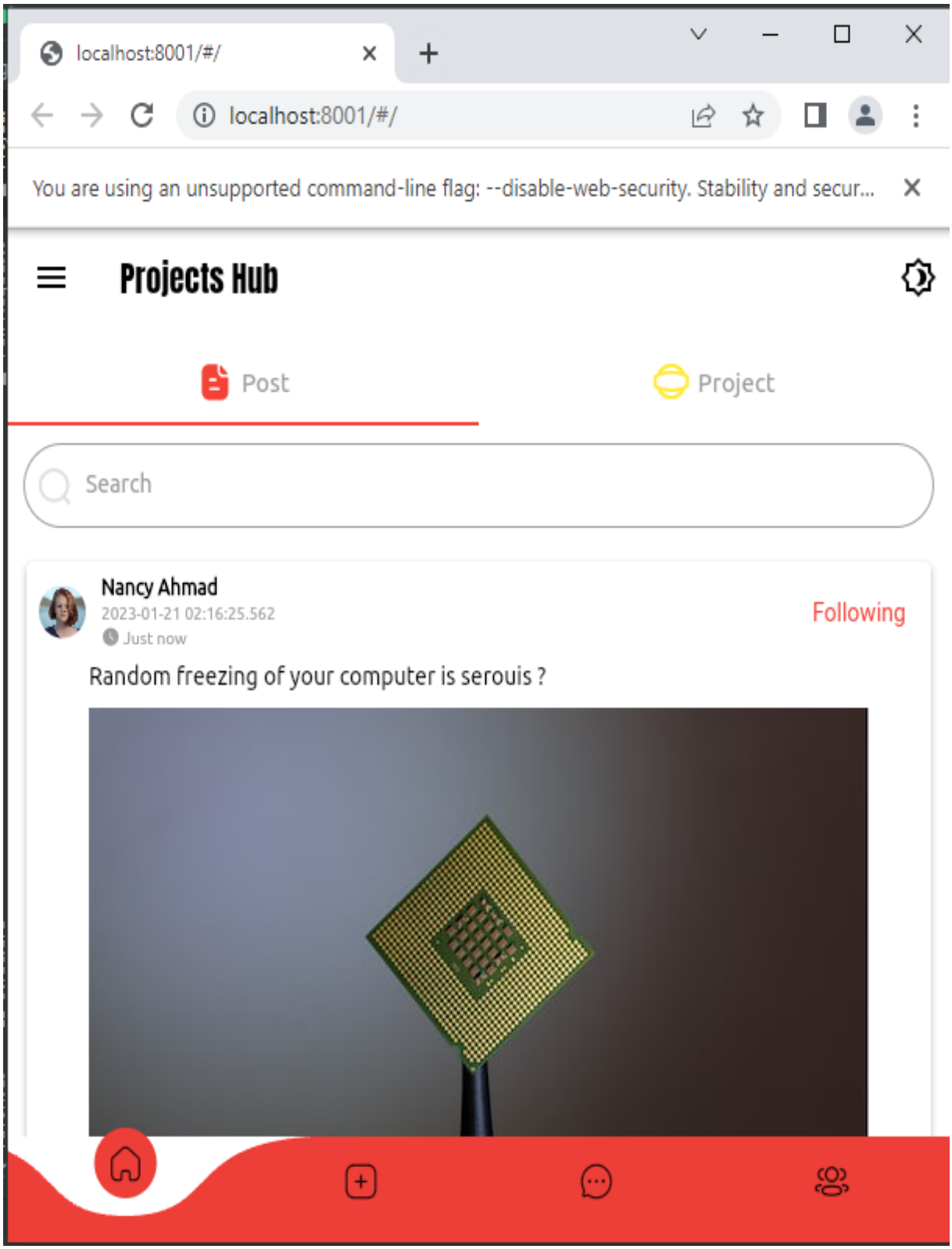


Figure 32: Web release Home page view