HASHTAG CSE MOBILE APPLICATION

BY

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

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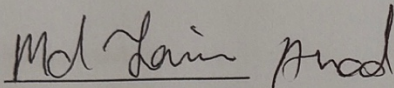Daffodil International University

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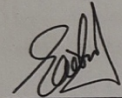**DHAKA, BANGLADESH**

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APPROVAL

This Project titled "**Hashtag CSE**", submitted by Shakh Istiak Hossain Jibon, ID: 191-15-12640 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 10/01/2024.
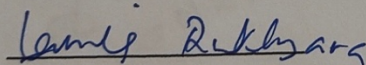
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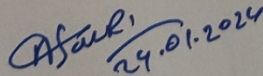Daffodil International University

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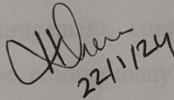
DECLARATION

I hereby declare that, this project has been done by me under the supervision of **Most. Hasna Hena, Assistant Professor Department of CSE Daffodil International University.** I also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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Finally, I must acknowledge with due respect the constant support and patients of our parents.

ABSTRACT

In the dynamic realm of Computer Science and Engineering (CSE) education at DIU, I identified a common challenge faced by students a lack of readily available answers to the myriad questions that arise in our daily academic lives. To address this, I conceptualized and developed an innovative Android app using the versatile Flutter framework, coupled with the robust Django backend. The app is designed to serve as a comprehensive DUI CSE helping community, facilitating seamless communication and collaboration among students. As CSE students, we often encounter diverse questions that may pertain to our courses or simply be queries about the intricacies of our field. In many instances, finding the right person to provide answers can be challenging. The goal of this project is to bridge this gap and create a supportive ecosystem where the community, comprising fellow CSE students, becomes the invaluable resource for answers. The app will have three major sections, The DIU news feed section, The Course section, and the Add Question Section. In the Feed Section, there will be the. The course section will have all the courses and we can ask any course-related questions. Flutter and Django were just the perfect framework to use in my application. By using Flutter I've developed the application for both Android and iOS. This application will let the students work as a community and help each other and that was my goal to create this project. In essence, this project is a manifestation of my vision to empower CSE students to collaborate, share knowledge, and support one another. By harnessing technology and fostering a sense of community, the app endeavors to transform the solitary nature of questioning into a collective journey of learning and growth.

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CHAPTER 1
INTRODUCTION

1.1 Introduction

The project is about an online DUI CSE helping community. In our daily life as a CSE student, we get several types of questions in our minds. Sometimes we don't find the perfect person to ask the question. The questions can be about our Course, our daily basis questions about CSE like "What should I learn to be a mobile app developer" or I need a senior CSE student to teach me how to build a website or teach me web development. I'll develop an Android app just for these Questions. There will be a large community and the community will be us, The students of the CSE department of DIU. We will answer those questions for free. And the person who will have the perfect answer will be rewarded with some type of points for helping others. After having some points students will get a title for answering those questions correctly. After those titles, their answers will be more valid and people will know this person got the title for giving the correct answer to those questions. The app will have three major sections, The DIU news feed section, The Course section, and the Help Section. In every section, there will be a process to ask questions and answer asked questions. This app is pretty simple but very useful for our students.

1.2 Motivation

Once when I was new to the campus, I had some questions about the classroom and Study but I had no idea who to ask those questions. After 2 years I was trying to learn Java programming language. After facing some questions, I asked those questions on google. Then I saw a website called "Stackoverflow". This was the biggest programmer community I've ever seen. Then I realized DIU has a lot of CSE students but they do not work as a community. The students need a way to be a community. So, I thought about this App. This app will help the student's life by answering their unasked questions. This App will answer questions about courses and other CSE-related questions. This app will make us a community.

1.3 Objectives

The following describes our project's objectives:

- Building a Mobile Application with a good user interface, a solid back-end, and a manageable database.
- The system's connection to Dui students.
- Regularly updated courses.
- Create a user-friendly Application.
- Works on every version of Android and IOS mobile.

However, the main objective of my project is to make an application that works properly and has a good UI. The app has unique functionalities and a nice design that can help all DIU students. Planning and overall process, investigating, and requirement analysis are also part of the objectives of my project.

1.4 Expected Outcomes

"Hashtag CSE" will be the first application that is mainly built for the students of CSE of DIU. Daffodil has a large amount of CSE student but still this large number doesn't work together. This app will make the students a community so that the students work as a team and help each other. With this app the students will not only help each other but also solve major issues together. My project will be the first app that will make the students a community.

1.5 Project Management and Finance

Project Phases:

Initiation:

- Detailed project briefing and goal clarification.
- Selection of project manager and team members.
- Obtain necessary permissions from DIU authorities.

Planning:

- Develop a comprehensive project plan, including timelines, milestones, and resource allocation.
- Define roles and responsibilities for admin panel members.
- Create a financial plan outlining the budget requirements for deployment.

Execution:

- Begin the development of the Communication Application.
- Establish the admin panel and assign roles.
- The project manager oversees the initial management of the project.

Monitoring and Control:

- Regularly review project progress against milestones.
- Address any issues or risks promptly.
- Prepare for the transition of management to DIU.

Transition:

- When DIU authorities grant permission, hand over project management to DIU.
- Ensure a smooth transition of responsibilities and documentation.

Closure:

- Evaluate the project's success and areas for improvement.
- Finalize all documentation and handover materials.
- Conduct a project review meeting.

Team Structure:

Project Manager:

- Responsible for overall project direction and management.
- Coordinates with team members and DIU authorities.

Admin Panel:

- Administrators and assistants manage user accounts and support.
- The moderator ensures content moderation and adherence to guidelines.
- An accountant handles financial transactions and budget tracking.
- The manager oversees general project operations.

Finance Plan:

Budget Overview:

- Funding is primarily required for the deployment phase.
- Costs associated with hosting the Communication Application.

Budget Breakdown:

- Hosting Expenses: Allocate funds for server space, maintenance, and any associated costs.
- Development Tools and Licenses: Budget for necessary software licenses and development tools.

Financial Management:

- Regularly track and report financial transactions.
- Coordinate with the accountant to ensure accurate budget utilization.

Funding Source:

- Identify potential sources for funding, such as DIU or external sponsors.

Cost Control:

- Minimize unnecessary expenses.
- Regularly review the budget and adjust as needed.

1.6 Report Layout

Detailed information about every project chapter is referred to as the "report layout." Since my project is a development project, I'll outline it in seven chapters. The seven chapters that make up this report book are Background Study, Requirement Specification, Design Specification, Implementation and Testing, Importance, Possibilities and Challenges, Conclusion, and Future Work.

In the first chapter, we studied Introduction, Motivation, Objectives, Expected Outcomes, and Report Layout were just a few of the project-related topics.

The second chapter provides background information about our project's topic by building a mobile application and referencing earlier works, comparative studies, ideas, and background research.

The third chapter describes some of the specifications and features of our project. The use case modeling, ER diagram, and business process model all provide specific instructions on how to carry out e-commerce for the university. The criteria for requirement gathering and design also included descriptions of the many sorts of data needed for this project.

In Chapter Four, the requirements for front-end, back-end, interaction, and user experience (UX) design are all covered in the design specification. When every functionality is working properly, then the project will be perfect and good.

In Chapter Five, the implementation and testing process starts when the front-end and back-end designs are finished. The use of a database and user interaction with the system are both covered in this document. This section also includes the report and test results.

Chapter Six, on to the section on Importance, Possibilities, and Challenges. The explanation of these sections gives readers the opportunity to see the advantages of this Application

Chapter Seven, It is the final section of the project, and it is divided into three sections: Conclusion, Recommendations, and Implications for Future Work. These three are last but not least. Here the future scope is more important so that we can improve in the future.

CHAPTER 2

BACKGROUND

2.1 Preliminaries / Terminologies

Hashtag CSE is a collective term for applications that focus on communication, community-based input, interaction, content-sharing, information, and collaboration. Students will use this app to stay in touch and interact with friends, seniors, juniors, teachers, and various activities. Some will use this application to market and promote their club and courses and others will try to make their way easier by collecting various information and help. That's the practice of using this application and this social networking to gather knowledge, goods, services, or help. Though this app is not for business purposes someone can share their in-campus business or services. This application will make all the students work as a community and help as a family.[1]

For my project, I used Python and Dart as programming languages. The used terminologies are –

- Flutter
- Dart
- Ngrok
- Django
- Python

2.2 Related works

Though Hashtag CSE is a unique application I used concepts from "stackoverflow.com" to construct this project. I studied 3 different projects and found their features and limitations as well. I needed a unique App. So I had to compare these projects to give the best to this project. These Projects are:

- Stack Overflow (Can Post Question and give answers)[8]
- Quora (Can Post Question and give answers)[7]
- Facebook Group (Can Post Question and comment answers)[6]

They have various limitations to their own functionalities. Some do not have that many user-friendly interfaces. Their functionalities are not working properly. Some features are very confusing. So, I cover those limitations and add extra features.

2.3 Comparative Analysis

With the help of this comparison sheet for websites, my project is able to assess the most important aspects and determine the best method for developing the app.

Table 2.1: Compared Systems

SL NO.	NAME OF THE SYSTEM	FEATURES	LIMITATIONS	POSSIBLE TO OVERCOME THE LIMITATIONS?
1	Stack Overflow	Mainly based on programming related questions	Can't get help about DIU questions	Yes
2	Quora	Based on regular life questions and less academic related questions	Less academic questions are available.	Yes
3	Facebook Group	Questions are asked and posted various types of content	Only questions are related to campus or courses	Yes

Here, I compared three different websites and applications that are already in a good position all over the world. These projects are not exactly the same as ours. But, as this App is also a bit similar, so I compared those to mine.

2.4 Scope of the Problem

I have many scopes to develop and several challenges to overcome. As I have a fixed student group here, I have many options to work with. If I get permission from DIU, another big opportunity will open for my project. Then I'll have some more access to DIU functionalities to work with for my project. Such as unnecessary questions and wrong answers. These can be a great scope to improve my project. Implementing AI will lead this project to a different level. So, I placed this scope as a future goal for my project.

2.5 Challenges

This project will help the new CSE students and also the current students. Due to this, all the students will get several types of help through this app. The main challenge of this app is the traffic and the server. A lot of students can log in at the same time and create a lot of traffic and servers can be shut down anytime. I need a strong server for this mobile app. Also maintaining all the questions and updating all the courses is also a major challenge. Daffodil updates the courses time after time then the previous courses will be useless and the new courses will be necessary. So, updating the courses with the app is a major but minor challenge if DIU gives me enough information.Multiple account and spam questions should be maintained. If I use AI to handle this problem then there won't be much problem.

CHAPTER 3

Requirement Specification

3.1 Business Process Modeling

Hashtag CSE isn't mainly a business application. This is a non-profit application and has no connection to the business and profit. But this application can be used for advertisement for programming courses and others.

3.2 Requirement Collection and Analysis

Functional Requirements:

1. User Authentication:

- Users (students) can register and log in using their name and password.

2. Question Posting:

- Students can post questions by entering a title, description, and id.

3. Answering Questions:

- Students can provide answers to existing questions.

Software Requirements:

- **Operating System:** Windows 10 is a widely used operating system globally, known for its acceptance and easy to use. In educational platforms, computers running Windows are popular due to their compatibility with existing hardware and software.[2]
- **Visual Studio Code:** Microsoft created VScode, an open-source text editor that is free of charge. Programming languages supported by it include but are not limited to C, C++, C#, Dart, JavaScript, Flutter, Django, and so on. Its extensive feature set includes editing, debugging, testing, and code development. When it comes to the

development and improvement of the project, I mostly used Flutter, Dart, Python, and Django.[3]

Hardware Requirements:

- **RAM:** It is essential to have at least 4GB of RAM for the best possible PC performance to run this project and emulator.
- **Hard Disk:** For storage, a minimum requirement of 300GB of hard disk capacity is required. This is necessary to run the emulator and keep the project too.
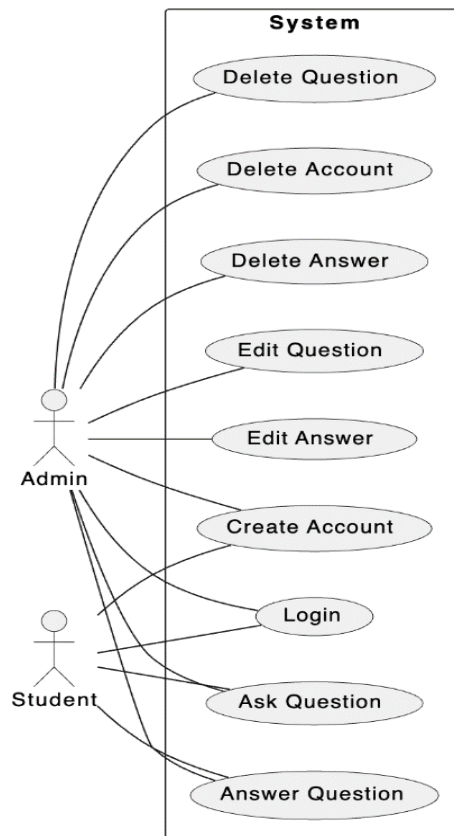
3.3 Use Case Modeling and Description

Fig 3.1: Use Case Diagram

Use Case Description

Table 3.1: Use Case Registration Description

Use Case ID	UC1
Use Case	Registration
Pre-Requisite	N/A
Description	In this use case, the username and password are encoded during the registration process. This is an essential component of the system.
Actor	Admin, User.

Table 3.2: Use Case Login Description

Use Case ID	UC2
Use Case	Login
Pre-Requisite	Must have to register first
Description	In this use case, the username and password are encoded during the login process. This is an essential component of the system.
Actor	Admin, User.

Table 3.3: Use Case Add Question Description

Use Case ID	UC3
Use Case	Add Question
Pre-Requisite	Must have to register and login first and have User Id to post a question.
Description	In this use case, the user id, question title and question details are required during the login process. This is an essential component of the system.
Actor	Admin, User.

Table 3.4: Use Case Answer Description

Use Case ID	UC4
Use Case	Add Answer
Pre-Requisite	Must have to register and login first and have a question to answer.
Description	In this use case, the user id and answers are required during the login process. This is an essential component of the system.
Actor	Admin, User.

3.4 Logical Data Model

In the logical structure of the app's data model, users play a central role by registering with unique IDs and engaging in activities such as posing questions or providing answers. Each question is identified by a distinct ID, containing specific text, categories, and posting dates, associated with the respective user. Answers, bearing unique IDs, consist of text, posting dates, and connections to particular questions and the user responding. Administrators, holding their distinct IDs, oversee platform operations and manage reported content flagged for review. Reported content, encompassing IDs, descriptions, and references to questions or answers, originates from users, triggering actions by administrators. These entities collaboratively function to create a robust knowledge-sharing environment, emphasizing content reliability and active user involvement.

Admin
Admin Name
Admin Id (PK)
Password
Account Created Time

Student
Student Name
Student Id (PK)
Password
Account Created Time

Question
Question Id (PK)
Question Description
Question Title
Question Time

Answer
Answer Id (PK)
Answer Description
Answer Title
Answer Time
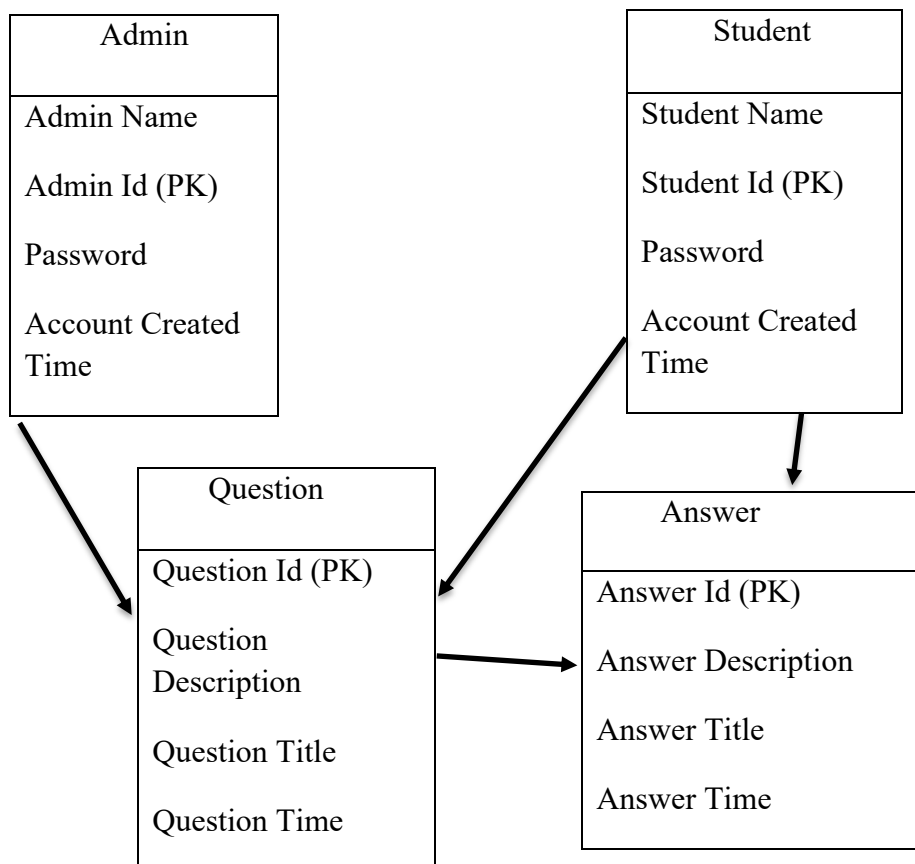
Fig 3.2: Logical Data Model Demonstration

Entities:

1. **Admin:**

   Attributes: Admin ID, Question Title, Full question, Answer, Time.

2. **Student:**

   Attributes: Student name, Question Title, Full question, Answer, Time.

3. **Questions:**

   Attributes: Question title, Time, Full Question, User Name.

4. **Answers:**

   Attributes: Time, Answer, User Name.

3.5 Er Diagram and Description
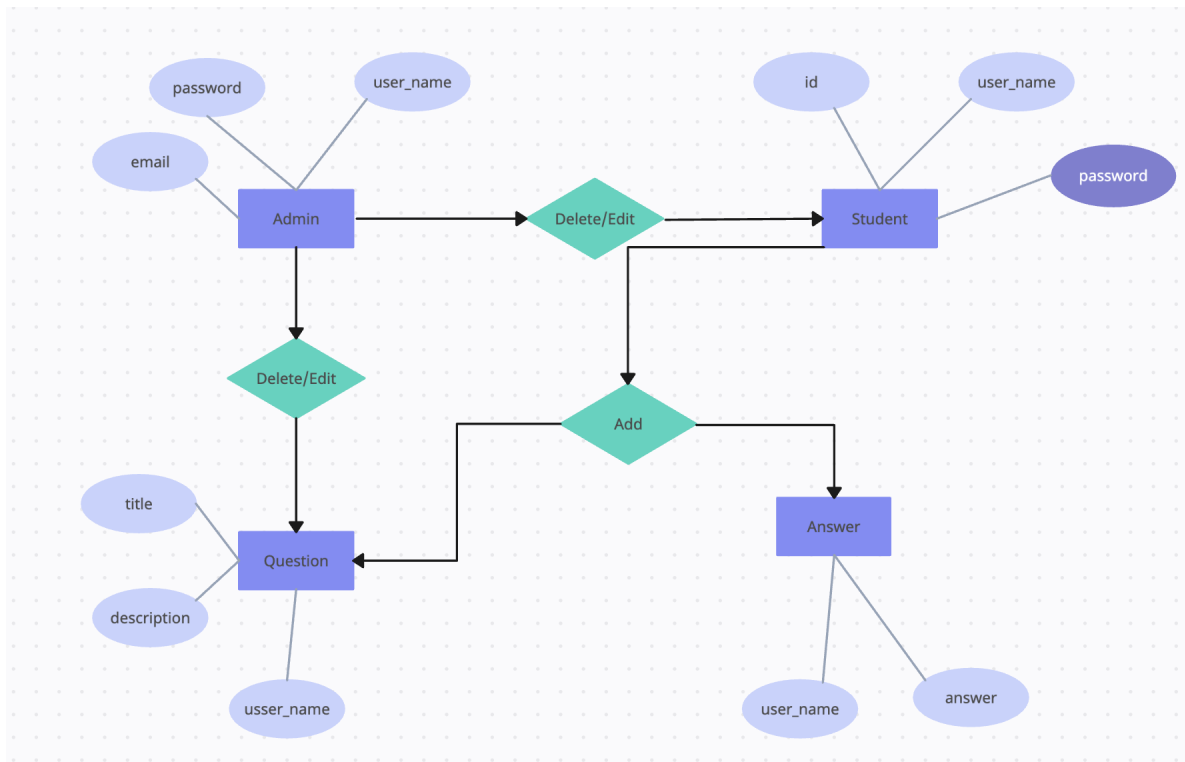
Fig 3.3: Er Diagram

In this database schema, the interaction between students, admins, questions, and answers is streamlined for a dynamic platform. Students and admins are identified by unique IDs, and questions are linked to them through foreign keys. Each question and answer is tagged with IDs and additional details like content and posting date. Students and admins can post multiple questions and answers, fostering engagement. Admins, with the authority to delete questions and answers, contribute to content moderation. This structured approach ensures an efficient and coherent database design for the platform's interactive environment.

3.6 Design Requirement

The design requirements for this mobile application are really straightforward and practical. It encourages users to use it. Therefore, I need to be skilled in mobile application design with Figma in order to finish the design.[10] I need to understand several computer programming languages, database design, authentication, and other things to be able to do this. I carefully considered how to create the database so that it functions properly and without difficulty. Some basic design requirements we follow for my project:

- Responsive Application
- Themes with Lots of Customization
- Question Feed
- Question Slot
- Course Name Slot
- Online Students
- Support and Interface with students

CHAPTER 4
Design Specification

4.1 Front-end Design

The front end is used by the user. This component allowed us to create a user-friendly design. Everyone can easily use this application. An app that the user interacts with directly is referred to as a front-end app. To enable easy viewing and interaction by the user, front-end conversion of the data to a graphical interface is necessary. On the front end is where the user's audience may be found. An example of this project is an internet application. There are three elements to this application. The front end is the first, followed by the database and the back end. Some language is used in the front end. I used Flutter and Dart for the front end. For the application's structure, Widget, Bloc, and GetX are employed. When the front-end portion is finished, the user can interact with the App by clicking a button and entering information like a name or email address. Front-end design is very important because, if the front end looks beautiful, then the overall project will look good and give a flawless impression. Front-end design needs to be more smooth and more flexible. The user must be very comfortable while using this Application.

4.2 Back-end Design

My project's back end is a key component. All aspects of our system cannot be handled by a single front end. The backend server is used to maintain the essential elements. Firebase and Django are used as the backend, and MongoDB is used as the database. The database contains all of the data. The data is stored in MongoDB in a reliable sequential order. The database has a variety of collections, including admin, student, questions, dui feed, and so on. Back-end design is so managed and easy to functionalize. Back-end data security is very necessary for the user's personal security. If a project is all over good, its front-end is good, and its back-end good but there is no security in data so, the project will be a big fail. Every user definitely asks for data security of their own.

4.3 Interaction Design and User Experience (UX)

Interaction design is the key to having a better User Experience. The easier the application is to use with full functionality the better the user experience will be. I tried my best to achieve a great User experience for my App. I used the material design guidelines by Google to make our application more beautiful and interactive and also User-Friendly which lead to a better User Experience.

4.4 Implementation Requirements

To implement my design into life, a specific environment is required. As my application depends on the data from a remote server a hosting service and database are required to communicate from our app to the server. Our backend REST API is built upon Django framework so the server must support the environment from running Django applications. Flutter has some great packages and widgets to achieve my goal.
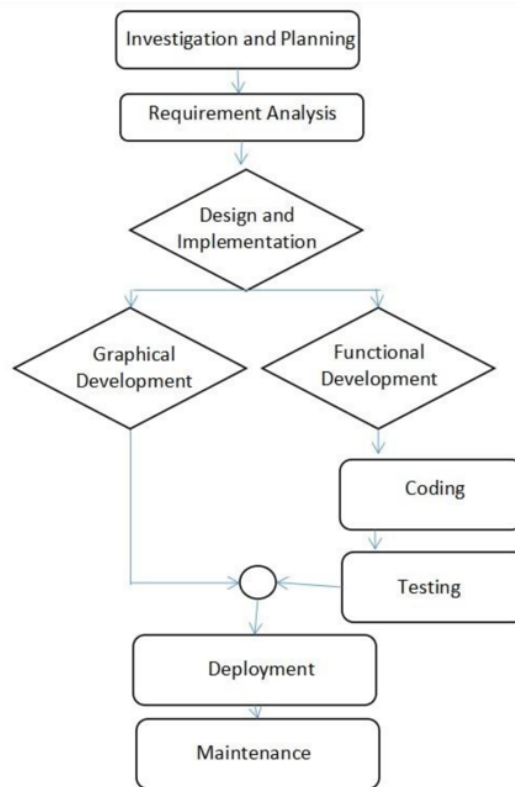
Fig 4.1: Methodology

CHAPTER 5

Implementation and Testing

5.1 Implementation of Database

The database has two major purposes in my app. The first one is to save the user's data and the second one is to save the question and answers. All the questions and answers added will be saved here and also remove any answer or question the user wants to remove. To store a heavy amount of data/questions database is a must.[5]
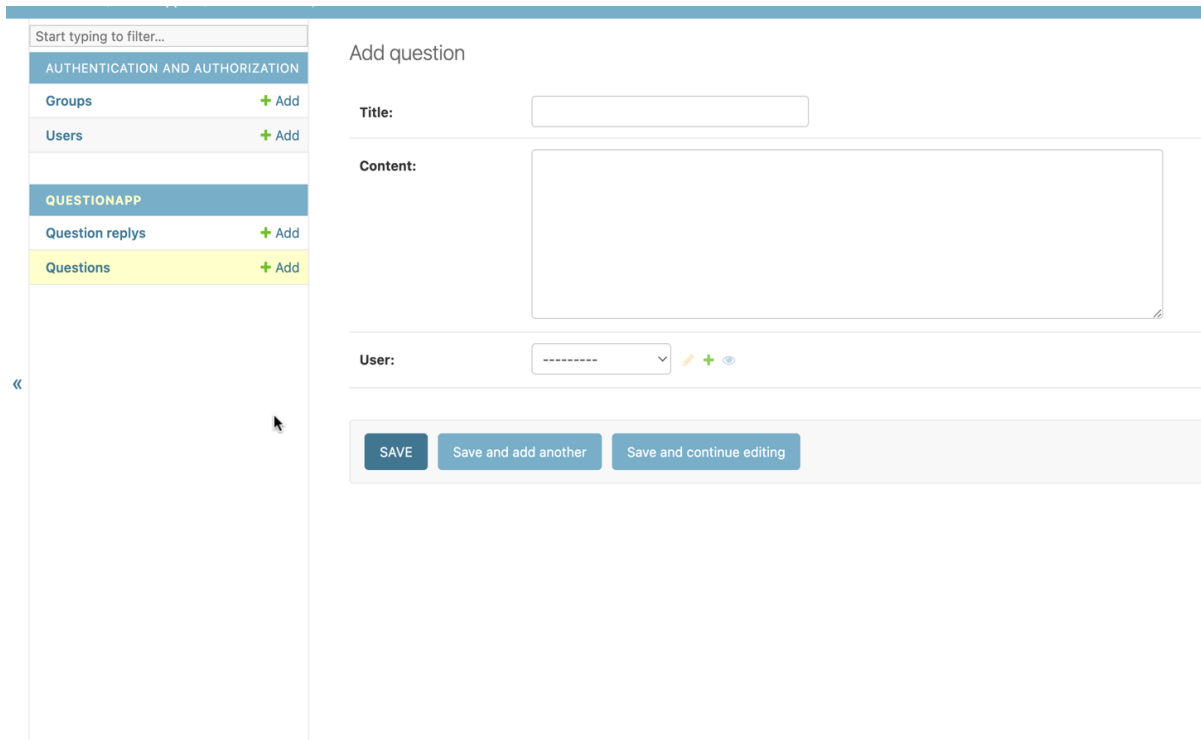
Fig 5.1: Django database setup

5.2 Implementation of Front-end Design

Splash Screen: At the start of the application for 2 seconds a splash screen will pop. Then the screen will push automatically to the Login Screen.
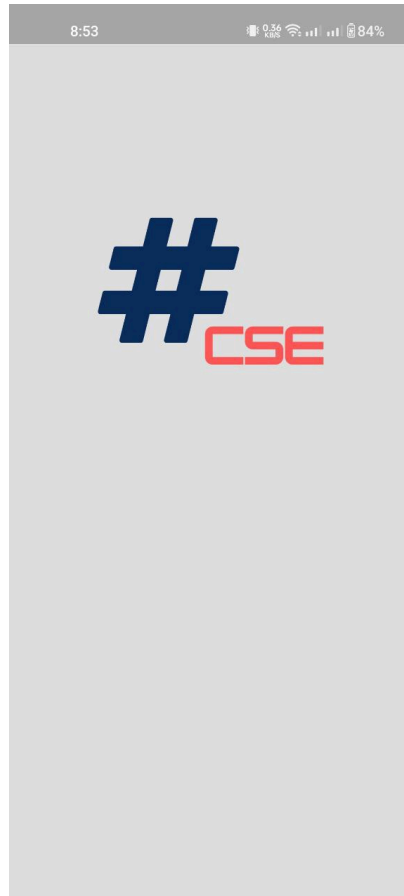
Fig 5.2: Splash Screen

Login Page: There are two types of login options: User, and Guest. User login is for the students of Diu who can log in by just signing up first. This login system is only for students and they can post questions and message others. The Guest login system is for someone who wants to check the questions but they can't post questions and can't even comment on any of the questions.
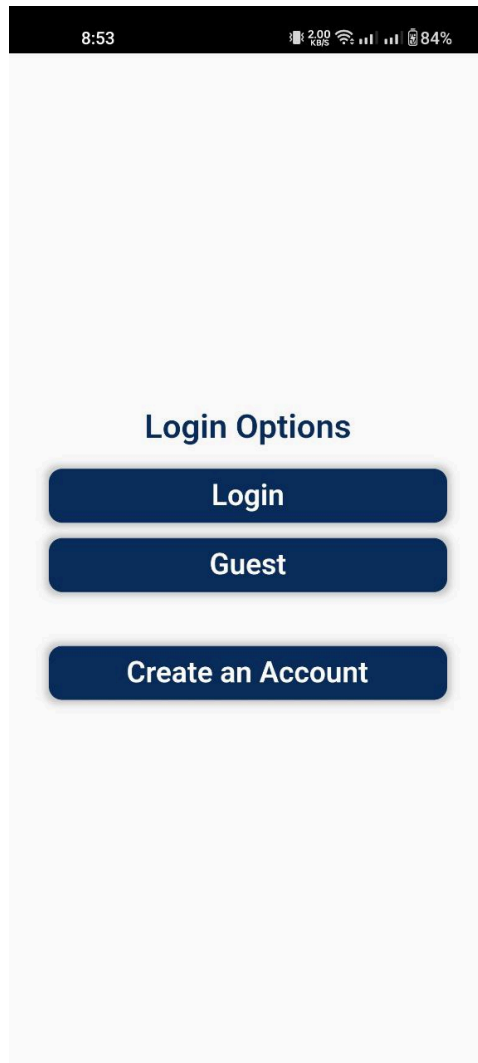
Fig 5.3: Login Option Page

Login: The students just need their username and password to enter this app. Giving the wrong password or username will show a warning.
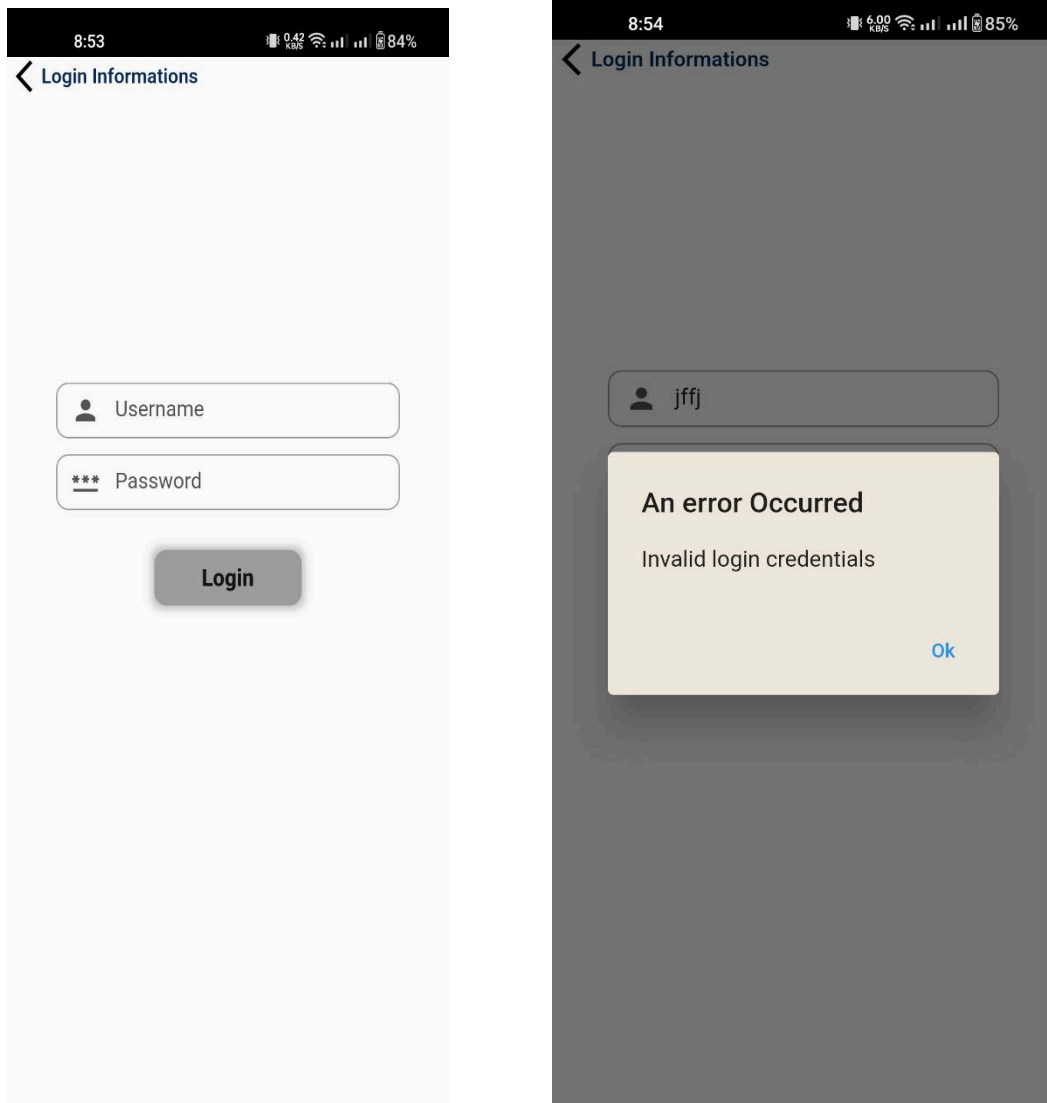
Fig 5.4: Login Page

Sign-up Page: Students who want to use this app must sign up first. The exceptions are they just need a unique username and a hard-to-guess password to sign up. If these requirements aren't met then the app will show an error message and users have to choose a unique username and id to register.
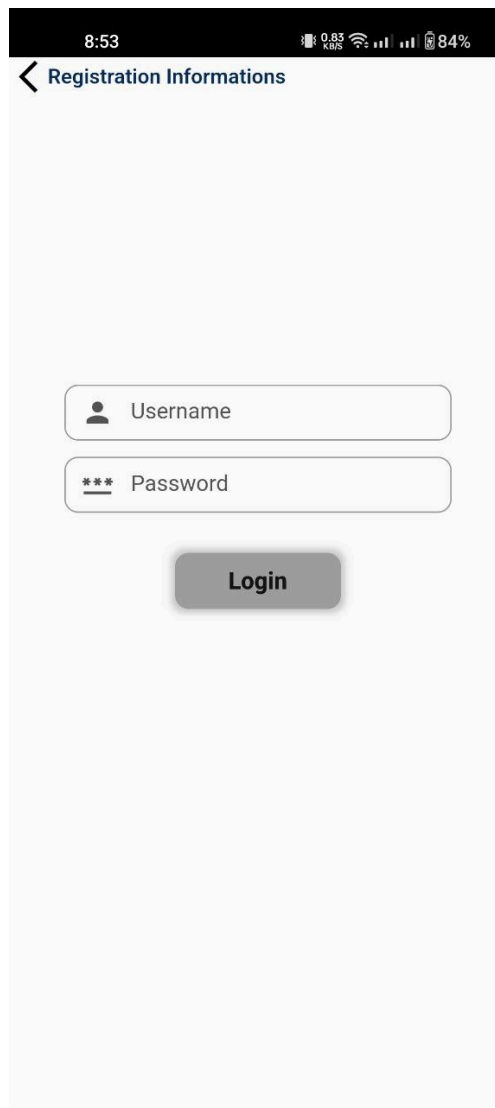
Fig 5.5: Signup Page

Home Page: This is the question feed for the students. Here they can add questions and also answer others' questions. This feed is generated my time and the latest questions will be on the top and it can be refreshed by just a slide from the top. Students' name and their topics about the question are given and it can be marked as valid or important questions. From time to time the questions will be refreshed and new questions will appear on top. If the questions aren't valid someone with admin access can delete the questions.
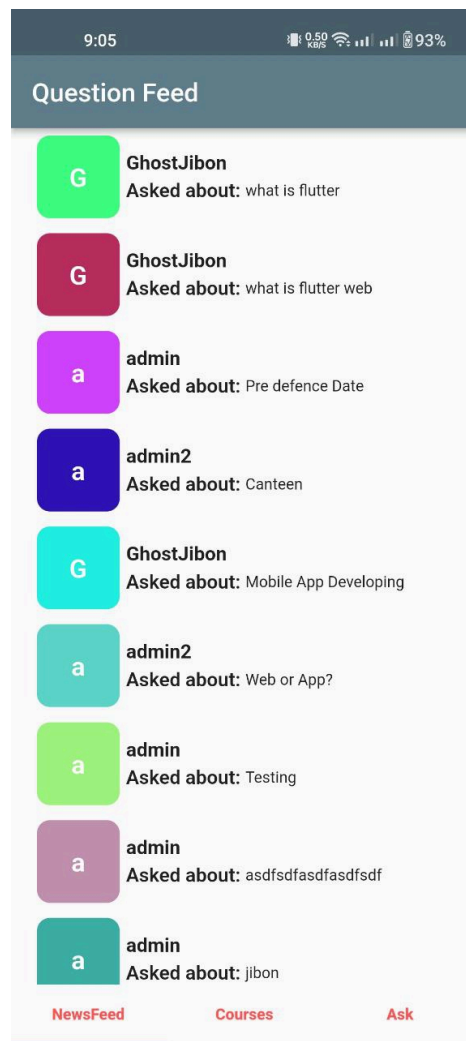
Fig 5.6: Diu Question Feed Page

Answer Page: After tapping any question the answer page will appear. Students can answer the question by writing an answer and clicking post.
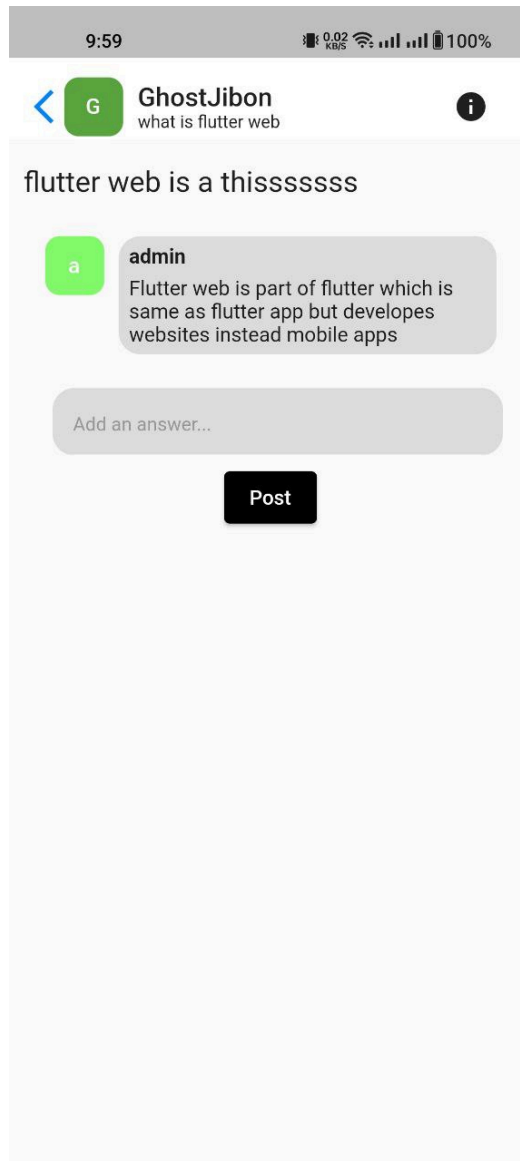
Fig 5.7: Answer Page

DIU Course names: On this page All the courses of DUI CSE will be shown so that students can easily choose titles for their course-related questions.
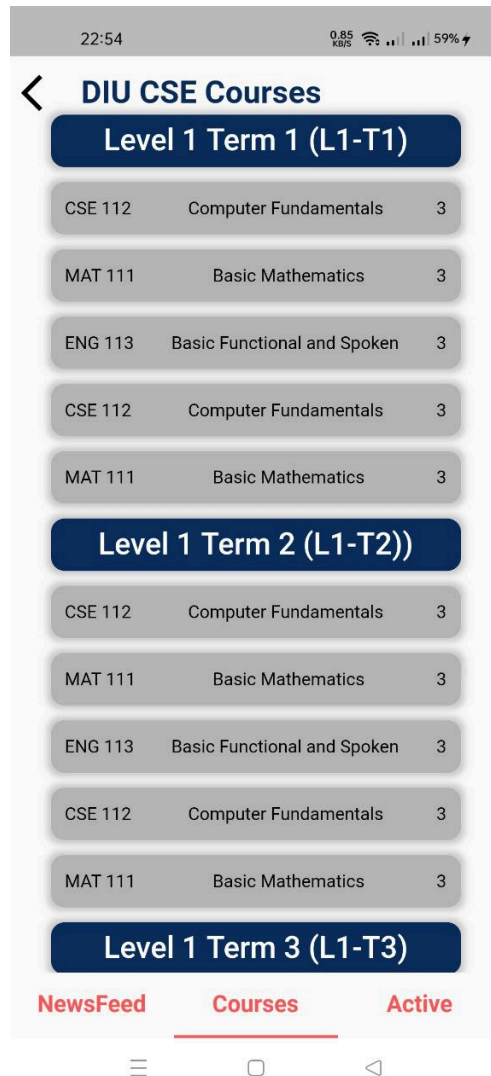
Fig 5.8: Course Name Page

Add Question Page: On this page, users will be able to add questions to the field. To add a question, they need 3 major things. None of them can be empty. The first one is the user id. For every username, there will be a unique ID which will be given only to the user and its secret ID. Then the next thing that will be needed is the question title. This can be a course name if it is course-related questions or it can be a short form of question topic. Then the major part is the full question. Here the fully explained question will be shown.

Fig 5.9: Add Questions Page

5.3 Testing Implementation

Testing the Implementation is a must for this application. The detection and correction lead to a clean app. Used try catch method to catch the errors of the API. If any API isn't working properly, I'll be notified immediately. If this app is produced without testing the app may crash or the info may be lost forever. Data are saved on the database but the user's personal data could be stolen easily if I would leave the app without testing and security. The testing phase is mainly for looking for bugs or any problematic documents. The testing I used:

- Functional Testing
- Security Testing
- Performance Testing
- Usability Testing
- Testing the API.
- Testing the Database

Here are some test cases for this Application:

- **Test case 1:**

    Precondition: The user must create an account first.

    Assumption: The user has opened the application and is on the login page.

    Input: After giving username and password the user pressed the "Login" button.

    Result: The user is logged in to the system.

- **Test case 2:**

    Precondition: The device must be connected to the internet.

    Assumption: The user is logged in and at the "Dui Feed" page.

    Input: The user clicked a question.

    Result: The user went to the answer page.

- **Test case 3:**

  Precondition: The device must log in.

  Assumption: The user is on the "Dui Feed" page.

  Input: The user clicked the course section.

  Result: Courses are shown to the user.

- **Test case 4:**

  Precondition: The device must be connected to the internet.

  Assumption: The user is logged in and at the "Answer Question" page.

  Input: The user answered a question and pressed post.

  Result: The answer was added to that question.

Testing is a must for every Application because without testing there will be a chance to have bugs or errors or failure in this application.

5.4 Test Results and Reports

Following a comprehensive testing phase that yielded a 100% success rate, the application showcased smooth functionality. However, beneath this success lie subtle issues—minor bugs that often elude detection during testing phases. To ensure the application's continued relevance and alignment with evolving developments, an imminent update is imperative. This forthcoming update aims not only to enhance existing features but also to meticulously address these minor bugs, ensuring a seamless user experience. This iterative process, inherent to app development, underscores the need for continual refinement to maintain the application's reliability. By proactively adapting to technological advancements, this approach guarantees a consistently smooth and error-free application, prioritizing user satisfaction in a dynamic tech landscape.

CHAPTER 6

IMPACT ON SOCIETY, ENVIRONMENT AND

SUSTAINABILITY

6.1 Impact on Society

The significance of this application, particularly within the DIU society, cannot be overstated. It serves as a catalyst for communication and connection, fostering a sense of community among Computer Science and Engineering (CSE) students. This platform transcends mere communication; it becomes a hub for collaboration and support. Students, united by their shared academic pursuits, find within this application not just a means to converse but a space where they can offer and receive invaluable assistance. Discussions can span diverse topics—be it related to career prospects, course insights, future planning, or job opportunities. The beauty lies in its exclusivity to CSE students, creating an environment where mutual aid thrives. The app acts as a conduit, allowing individuals to seek guidance from those with seasoned experience in the field of Computer Science and Engineering or navigating career trajectories. The implications are profound; this application stands as an evolutionary tool for our CSE department, empowering students to collaborate, learn, and pave their paths to success within a unified digital community unparalleled by any other platform.

6.2 Impact on the Environment

My software solution has been meticulously crafted with a strong emphasis on environmental sustainability, ensuring it operates without any detrimental effects on our ecosystem. Through conscientious design and purposeful integration of eco-friendly features, this application is committed to minimizing its ecological footprint. It embodies a conscientious approach to technology, aiming to align with the principles of responsible innovation. From its inception to execution, every facet of this application is geared

towards environmental stewardship, seeking to make a positive contribution to the well-being of our planet.[11]

6.3 Ethical Aspects

There is nothing to worry about anything unethical on my application. If someone tries to do something unethical admins are always there to ban them and a simple report will solve this problem. This application is open to everyone and this application only allows the user of DIU and their profiles are always open to everyone so there is less chance that someone will try to do something unethical or something that can hurt someone in this application.

6.4 Sustainability Plan

Mobile application technologies are updating regularly and adding new features and security measures also with faster build. I used Flutter in this project which is a framework of Google. This means this application will be updated for a long time but if any major update comes, which will lead this current existing project to down I'll update my application with the required changes. This application will receive time to time with new features and updates. So, this application is very versatile and can be used for a longer time as expected.[4]

CHAPTER 7

CONCLUSION AND FUTURE SCOPE

7.1 Discussion and Conclusion

This application is unique and has never been any application like this before. Students will be able to work as a community and help each other. This application is developed to make it easier for students to ask for help and solve their issues. I hope my " Hashtag CSE" app will be helpful to both freshers and old students. Before this application, students had no professional way to communicate with each other. I hope this app will fill the gap I imagined DIU CSE students have. This app is free and also add free so every CSE student will be able to use it with good experience. This app needs a lot of finishing work. So, I hope the students will send us a review to fix bugs or add new features to improve this Application.

7.2 Scope for Further Development

In upcoming developments, the app will undergo significant expansion aimed at enriching user interaction. A new feature will introduce an integrated online messaging system, fostering seamless communication among students within the platform. This addition is designed to cultivate an active community where students can engage in real-time conversations, exchange ideas, and seek academic support. Additionally, to facilitate connections between educators and potential opportunities, a dedicated job sector will be implemented. Here, teachers can post job openings, allowing students to explore relevant positions and directly apply through the app. These planned enhancements not only extend the app's functionality but also elevate its value by catering to the diverse needs of students and educators, creating a comprehensive environment for learning, communication, and professional advancement. This Application will be open source so if any student wants to

add any new feature, they will be welcomed also it is developed with new technology so new learners will be able to learn more about "Flutter" and "App Development."[1]

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