Course: COSC2659|COSC2813

COSC2659 iOS Development

Assignment 3 - Group Project Report

“F2Learn App”

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YouTube link:	https://www.youtube.com/@minhtrah3007/videos

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I. Application name

F2Learn: A Personalized Learning App for Educators in Vietnam

II. Purpose

F2Learn is a comprehensive newsfeed app designed to revolutionize the learning experience in Vietnam. It is an educational platform designed to bridge the education gap between urban and rural areas in Vietnam. It provides a safe and supportive environment for sharing learning resources, study tips, and peer support, catering especially to underprivileged communities. By leveraging technology, F2Learn seeks to bring pioneers' experience, enhance learning outcomes, and empower students in Vietnam to achieve their full potential. The app enables access to educational content, facilitates connections with scholarship opportunities, and promotes community engagement.

III. Inspiration and Relevance to Social Impacts in Vietnam

Vietnam faces significant disparities in education accessibility and quality between urban and rural regions. Many students in rural areas lack access to quality educational resources, experienced teachers, and supportive learning environments. Limited access to technologies and educational institutes further hinders these students' ability to obtain necessary educational materials. The inspiration for F2Learn stems from the growing recognition of the importance of quality education in Vietnam's development. By offering a personalized and interactive learning platform, F2Learn aims to provide a more effective and enjoyable educational experience.

F2Learn addresses these pressing issues by offering a community-driven platform that promotes inclusive education. By leveraging technology, F2Learn seeks to make quality education more accessible, fostering a culture of shared knowledge and collaboration among Vietnamese students nationwide. This purpose aligns with the urgent educational challenges in Vietnam, particularly in rural areas where access to quality education remains a significant issue. By addressing these challenges, F2Learn contributes to narrowing the educational divide and promoting equitable learning opportunities for all Vietnamese students.

F2Learn is highly relevant to the Vietnamese context due to several factors:

- **Digital Divide:** The increasing penetration of smartphones and internet connectivity in Vietnam presents a unique opportunity to leverage technology for education.
- **Educational Disparities:** F2Learn can help address the disparities in educational access and quality across different regions of Vietnam.

- **Cultural Relevance:** The app can incorporate culturally relevant content and teaching methods to enhance student engagement and understanding.
- **Language Support:** F2Learn can be designed to support both Vietnamese and English languages, catering to the diverse linguistic needs of Vietnamese learners.

IV. Originality and Innovation

F2Learn stands out through its community-driven approach to learning. Unlike typical educational platforms that are teacher-centric, F2Learn encourages students to contribute their own learning experiences, study tips, and resources. Competitors include existing educational apps like Wishcare and AMA Vietnam, but F2Learn's "killer feature" is its integration of user-generated content, scholarship information, and offline functionality. These features make F2Learn not just a learning platform but also a support system for underprivileged communities.

Furthermore, F2Learn addresses the pressing social issue of educational inequality in Vietnam. By providing free and accessible educational resources, the app can help level the playing field and ensure that all students have equal opportunities to succeed.

V. Competitors and Standout Features

While there are several educational apps available in Vietnam withing the same category such as AMA and Wishcare, F2Learn is the new one allow users to post learning experience and its unique selling points include:

- **Personalized Learning Paths:** F2Learn's ability to tailor content and assessments to each student's individual needs sets it apart from generic educational apps.
- **Gamification and Interactive Learning:** The app incorporates gamification elements and interactive activities to make learning more engaging and enjoyable.
- **Integration with Vietnamese Curriculum:** The app aligns with the Vietnamese national curriculum, making it a valuable tool for users as learners.

VI. Main Features and Advanced Features

1. Main Features:

F2Learn provides a user-friendly platform with essential views, including registration, login, discovery, user insights and additional views to add, edit, display Show sensational content and showcase favorite posts.

- **Authentication:** The app simplifies both user login and registration processes but still ensures secure authentication methods.

- **Data Synchronization:** Ensures that user data (posts, saved items, profile information) is consistent across devices.
- **Personalized Learning Paths:** Adaptive algorithms create customized learning plans based on student performance and preferences.
- **Interactive Content:** Engaging multimedia content, including videos, animations, and interactive exercises, enhances learning.
- **Scalability:** The app can handle large number of users and data without compromising its performance.
- **Social Features:** Collaborative learning features, such as group discussions and peer-to-peer tutoring, foster a supportive learning environment.
- **Multi-language Support**: We want to provide a multilingual platform that can later be expanded to other countries. Currently the app only supports two languages: Vietnamese and English

We use **Firebase** for real-time data handling and synchronization across devices. Firebase's robust database allows for efficient CRUD operations, ensuring that user-generated content (posts, saved items, etc.) and settings (profile, notifications, language preferences) are stored and updated consistently across sessions. Firebase also facilitates user authentication, enabling seamless login, signup, and profile management.

2. Advanced Features:

- **Integration with Educational Institutions:** The app can be integrated with schools and universities to streamline administrative tasks and improve student outcomes.
- **Dark Mode**: A dark theme for reducing eye strain, especially when using the app at night.
- **Push Notifications**: user can receive a notification whenever admin post new feeds
- **Reset Password**: User can reset password in case they forgot their password.

3. Screenshots and Technical Implementation:

SplashVIew:

Upon launching the application, this view greets the users with a splash view featuring the
application's logo.

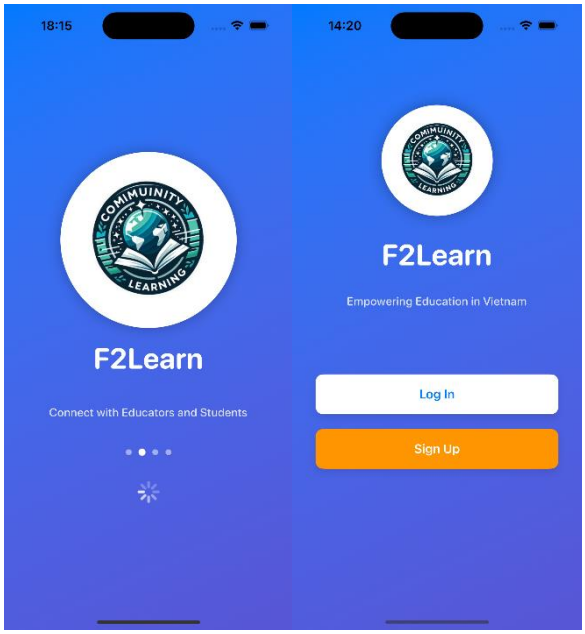

Figure 1: The screenshot of the application's Splash View

RegistrationView:

Proceedingly, the users are presented with the option to register for a new account or login
to an existing account. During registration, they are required to provide an email id and a password.
Upon successful registration, their account is created, granting them access to the application.

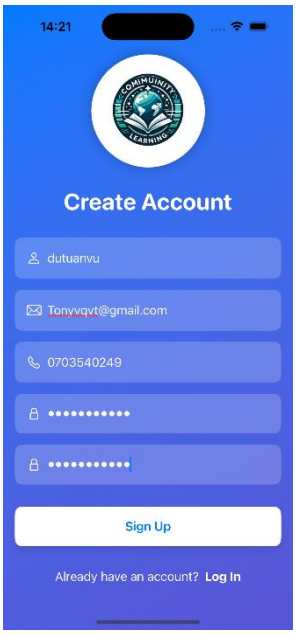

Figure 2: The screenshot of the application's SignUp views

LoginView:

This view allows existing users to log in to their accounts using their email and password

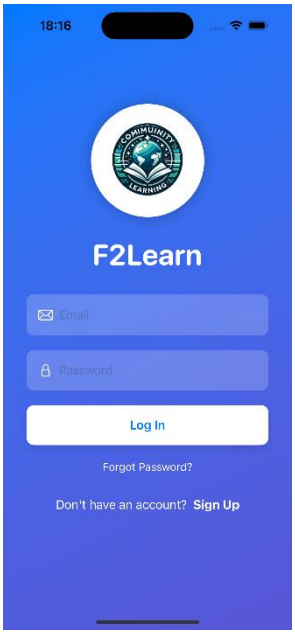

Figure 3: The screenshot of the application's Login view

Admin Post View:

The View that fetches all posts from admin or moderator.

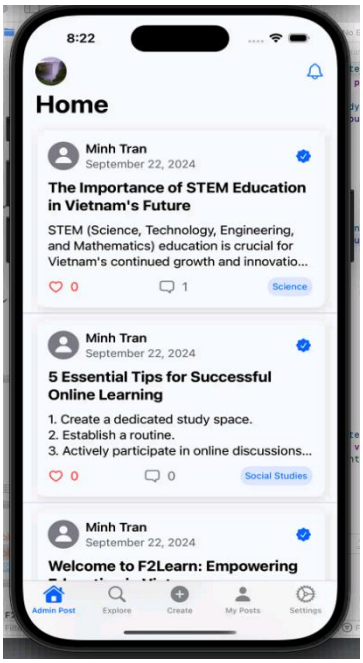

Figure 14: Admin Post View

• ExploreView*:*

The view elegantly showcases all the post of the day. F2Learn empowers users with the ability to search for their favorite topic by name or hashtag. And they can also filter or click in each post to see all details and comments.

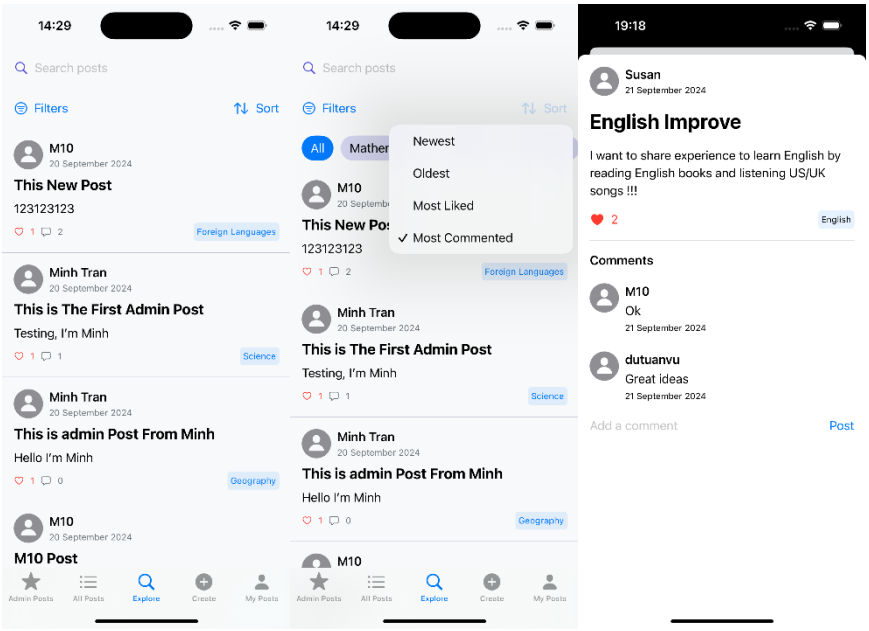

Figure 4: The screenshot of the Home view, Explore view and search filtering

CreatePostView:

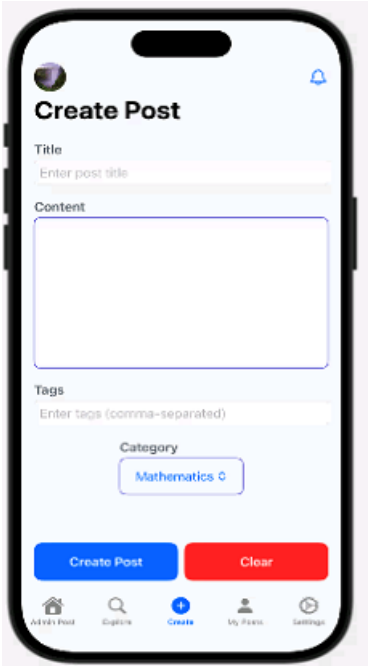

Figure 5: The screenshot of the application's Create Post

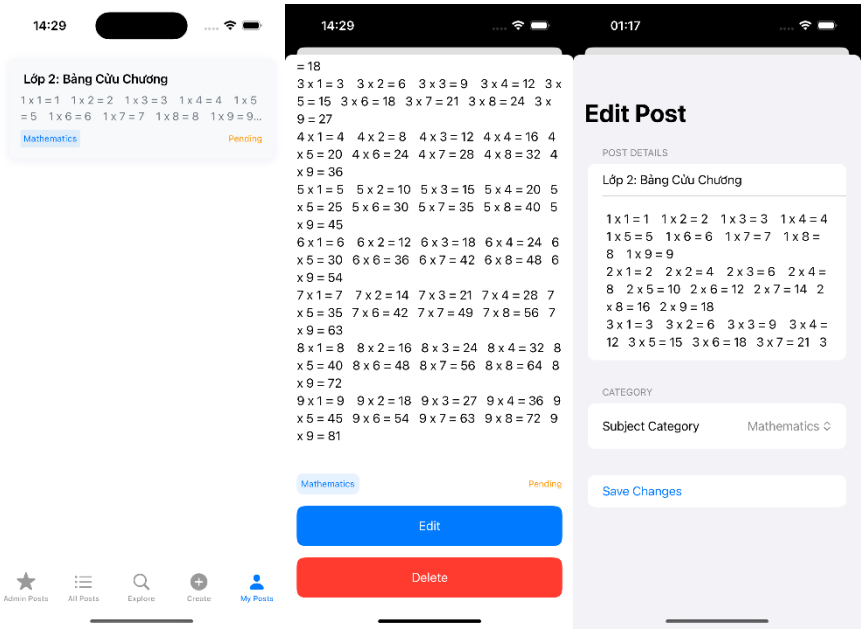

Figure 6: The screenshot of the application's Edit Post View

EditProfileView:

This view assists users in editing their profile and avatar. However, they can't change their phone due to security concerns.

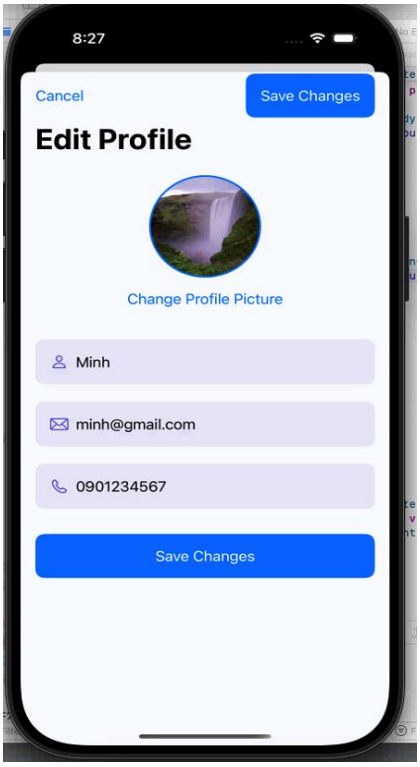

Figure 6: The screenshot of the application's Edit Profile view

Profile View:

This view assists users in viewing their information and the number of post the posted.

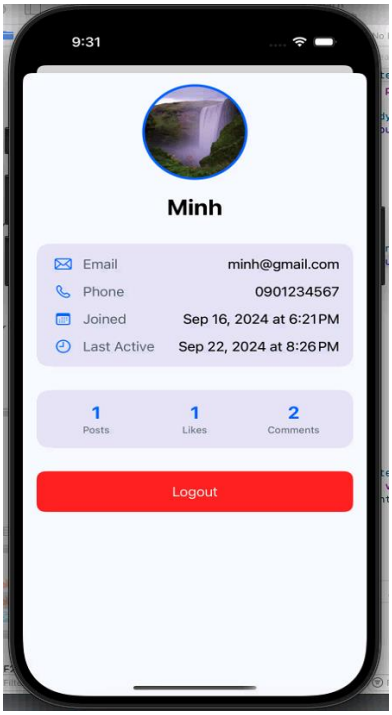

Figure7:Profile View

Setting View:

Users can change their view based on their own need.

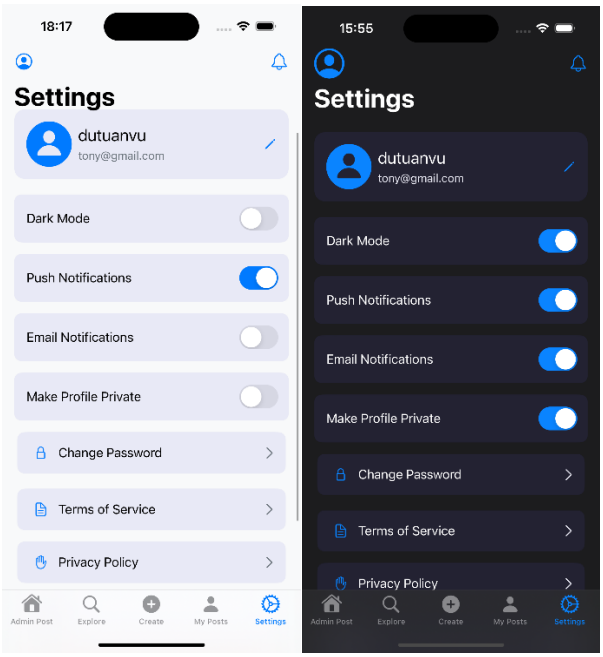

Figure 8: The screenshot of the application's Setting view

Change Password and Reset Password View:

To increase the security of the application, we allow customers to change their password. Moreover, users can reset their password if they forgot their password, the reset password link will be sent to their email address.

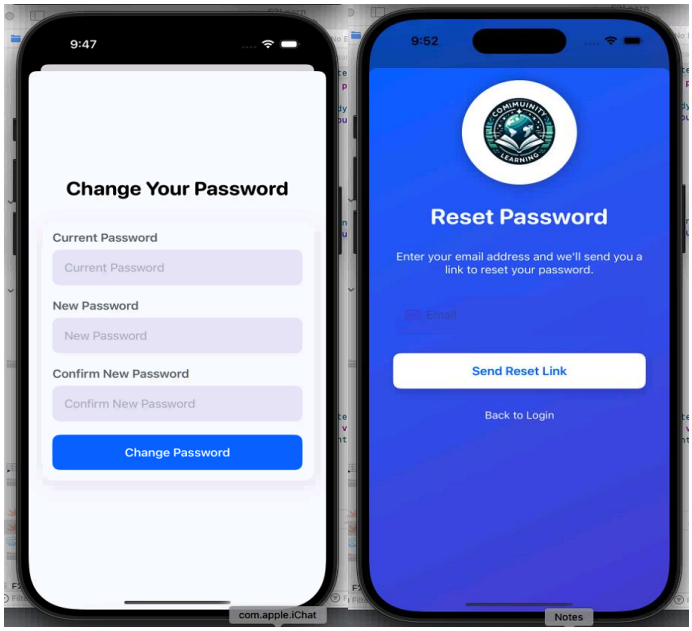

Figure 2: Change Password and Reset Password

Notification

Notification view will display all the newest notification whenever admin post a new post.

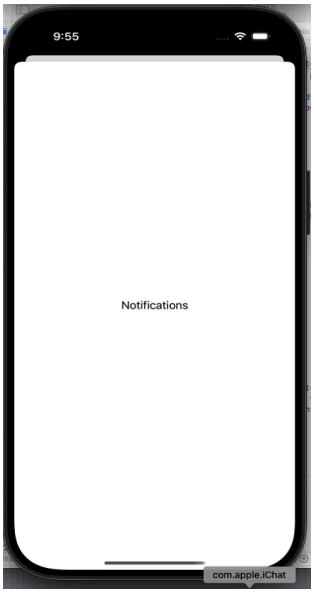

Figure 3:Notification View

Platform Accessibility:

Discovery Application is compatible with a range of platforms, including iPhone 15,

iPhone 15 Pro, iPhone 15 ProMax, iPad 11, and iPad 12.9.

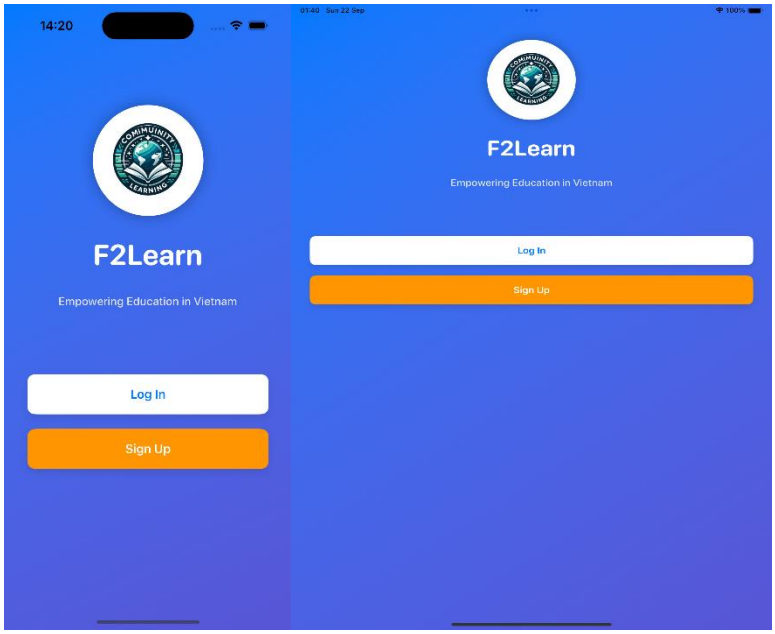

Figure 9: The screenshot of the application's on iPhone 15 ProMax and iPad 11

Insert screenshots of different views of the app, including the home screen, learning paths, interactive content, progress tracking, and social features)

VII. Data Persistence:

1. Justify your decision of using one or multiple of these types of data persistence for your app

For this application we decide to use Cloud Firestore, Firebase Storage, Firebase Authentication, Local State, and AppStorage.

1. Cloud Firestore: The app primarily uses Cloud Firestore for storing and retrieving data:
    a. Real-time updates: Firestore provides real-time synchronization, so the app can update posts, comments, and user activities
    b. Scalability: Firestore can handle large amounts making it suitable for a growing educational community platform.
    c. Security: Firebase rule gives the user can only edit their own documentation. Moreover, firebase rules only allow users to interact with data which they are allowed to interact with.
2. Firebase Authentication:
    a. Simple and Security: It provides secure user authentication without coding API from scratch.
    b. Multiple sign-in method: It supports many login solutions such as Google, Facebook and Phone.
3. Firebase Storage:

a. The app uses Fire Storage to store user images
b. It works well with Fire Store, storing image URLs in Firestore, which point to the actual images stored in FireStorage, ensures that the user's images cannot be mistaken.

4. Local Storage: The app uses the SwiftUI's state management for handling local, temporary data:
5. AppStorage: The app use Storage to store user preferences like Dark Mode:
    a. It is using simple key value storage
    b. It allows saving data that should persist between app sessions.

VIII. Application Flow Diagram:

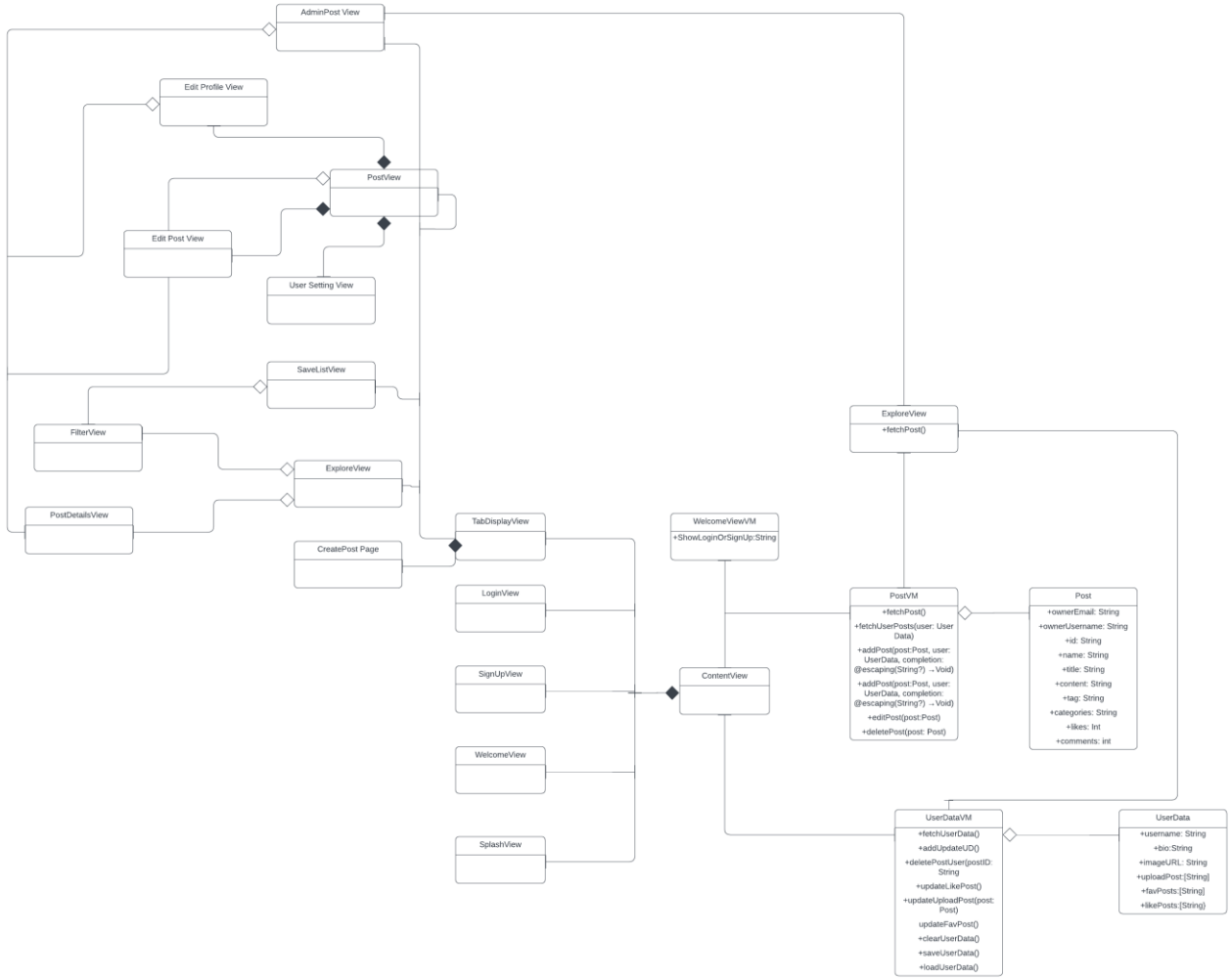

Figure 1: The screenshot of the application flow diagram

Link for the Flow Diagram: https://lucid.app/lucidchart/2a96681d-8938-4a16-89dc-68fc97ecfff1/edit?viewport_loc=-1049%2C-1128%2C1832%2C2651%2C0_0&invitationId=inv_6f74cf54-1611-4657-b048-7c9dcf06e58d

IX. Technologies

Swift Components	1. Codable protocol 2. Identifiable protocol 3. ObservableObject protocol 4. Enum 5. Struct 6. Extension 7. Closure 8. Optional 9. Result type 10. Date and DateFormatter 11. UUID
SwiftUI components	1. View 2. NavigationView 3. ScrollView 4. VStack, HStack, ZStack 5. Text, TextField, SecureField 6. Button 7. Image, AsyncImage 8. List, ForEach 9. NavigationLink 10. TabView 11. Alert 12. Sheet 13. ProgressView 14. Picker 15. Toggle 16. GeometryReader 17. @State, @Binding, @ObservedObject, @StateObject, @EnvironmentObject 18. @AppStorage 19. Environment
UIKit (for ImagePicker)	1. UIImagePickerController 2. UIViewControllerRepresentable

Third-party Libraries	1. Firebase
	  ○ FirebaseApp
	  ○ Auth
	  ○ Firestore
	  ○ Storage
	2. FirebaseFirestore
	3. FirebaseStorage
	4. FirebaseAuth

X. Design Elements and User Experience

The design of F2Learn prioritizes visual appeal, intuitive navigation, and consistency. A clean and modern interface, combined with vibrant colors and engaging visuals, creates a welcoming and enjoyable learning environment. The app's layout is designed to be intuitive, with clear navigation and easy access to key features.

1. Visual Appeal:

- **Color Schemes:** A consistent color scheme and design elements across both light and dark modes.
    - customPrimary: The primary app color.
    - customSecondary: A complementary color used for secondary elements.
    - customBackground: The main background color.
    - customTextPrimary: The primary text color, ensuring readability in both modes.
    - customTextSecondary: A secondary text color for less important text.
- **Fonts:** The app uses system font for all the pages to maintain the cohesion and consistency.
- **Layout:** A well-organized layout with consistent spacing and alignment enhances user experience.
- **Design:** The app uses a modern, clean design with rounded corners, shadows, and gradients.

2. Intuitive User Interface:

- **Simple and Clear Navigation:** A clear and intuitive navigation structure helps users easily find the content they need.
- **Clear Labels and Instructions:** Descriptive labels and clear instructions guide users through the app.
- **Consistent Design Elements:** Consistent use of colors, fonts, and spacing creates a cohesive and familiar experience.
- **Accessibility First:** Features designed to accommodate users with disab

3. User-Centered Design:

- **Accessibility:** The app supports dynamic type and contrast color for readability.
- **Personalization:** The app remembers user preferences and login credentials.
- **Feedback and confirmation:** The app gives alerts and confirmation dialogs for important actions.
- **Regular Updates:** The app is continuously updated to address user needs and incorporate new features.
- **Error handling**: The app show error messages and validation issues occur.
- **Responsive design:** The app supports a different screen size

XI. Known Bugs/Problems

1. The current version of F2Learn is implemented using a free version of the Firebase service which is limited by how many read and write operations we can perform in Firebase Cloud Storage.
2. Using the Free Version of firebase leads to slow loading in detail post view.
3. The detail post only appears when the user like the post.

XII. Future Improvements

- **Enhanced Accessibility Features:**
  - Implementing voice command and improved navigation for visually impaired users.
  - Adding support for more assistive technologies, e.g. stylus, touchpad, mouse and keyboard.
- **Integration with AR and VR:** Explore opportunities to incorporate AR and VR for immersive learning experiences.
- **Gamification:** Add gamification elements such as badges, rewards, leaderboards to further motivate and engage students.
- **Social Networking Features:** Enhance social features to foster collaboration and community among learners.
- **Expanded Offline Functionality:** Allowing user to gain full access to saved posts and resources without internet connectivity.
- **Partnerships:** Collaborating with local educational and institutions to host real-time collaboration and enrich content quality and relevance.
- **Advanced Filtering:** Adding filters based on location, age, topic, or class level to personalize content.

XIII. Conclusion:

F2Learn represents a significant step forward in educational technology in Vietnam. By providing personalized, engaging, and accessible learning experiences, the app has the potential to empower students, bridge educational gaps, and improve overall learning outcomes.

Moreover, developing F2Learn App helps us learn how to implement Firebase Library to a swift project. Using Firebase Authentication helps us a lot in developing a significant login and signup system which usually take a lot of time for this process.

XIV. References

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XV. Appendices

(Include additional screenshots, code snippets, or documentation as necessary)

1. Project Responsibilites:

Team Member	Accomplished Task	Workload
Tran Ngoc Minh	- Write Report - Implement Data Persistence & CRUD for user, post, admin - SignUp and Login	
Nguyen Duong Truong Thinh		
Dang Minh Triet		
Du Tuan Vu		

2. Terms and Conditions:

When users download and register for F2Learn, they are expected to read and agree to the terms and conditions outlined by the app. The team is taking steps to design the usage policy to inform the user that it is our responsibility to moderate the information circulating in our app, but they must also maintain a vigilance attitude towards the nature of user-generated content. The two sections that we want to highlight are:

- Scope of Responsibility: The focus of F2Learn is to deliver high quality educational contents and scholarship programs hosted by other goodwill parties to uplift the underserved communities. The app will have a dedicated team of moderators to ensure users' posted information is appropriate within the community guidelines, but it is not responsible for the complete information verification process of the contents. To be more specific, while the app will strive to acquire a team of experienced moderators, achieving total information accuracy information of all user posts is not a feasible task. Active users of our app are expected to be cautious with the contents on the app and to be responsible for their own actions and decisions resulting from the said information.
- Content Accuracy Verification Recommendation: For information posted on our app, users are encouraged to verify it with other sources. Cross reference with other trusted sites to ensure the veracity of information.

3. Examples of educational post:

The table below highlights examples of the content we hope to circulate and facilitate of F2Learn (of which will be presented in English or Vietnamese, depending on the user's preference):

Title	Description
Summer Camp: Summer Classes for Children in Mountainous Regions The 'Loving Classrooms' for Students in Mountainous Areas	• Soft skills class: Teach children how to approach difficult situations such as domestic violence, school bullying, or when someone is drowning. • Talent and Lifestyle class: Aerobic, Dancing, Swimming, Martial arts, Storytelling, Presentation skills, MC skills • Location: A Doi Commune, Huong Hoa District, Quang Tri Province • Attracting the participation of nearly 1,000 children and 21 dedicated volunteers from communes and towns
Night class: Class for Ethnic Minority Children	• Vietnamese, Math, English • Dancing and Singing • Location: Suoi Giang Commune, Van Chan District, Yen Bai Province.
Scholarships Supporting Human Resource Training for High School Students in 8 Northern Mountainous Provinces	For the academic year 2024 - 2024, the Vietnam National University of Agriculture is implementing a scholarship program to support training and develop high-quality human resources in 8 northern mountainous provinces (up to 115 slots per province). 12th-grade students from high schools located in the 8 northern mountainous provinces—namely Ha Giang, Cao Bang, Bac Kan, Son La, Tuyen Quang, Yen Bai, Lai Chau, and Dien Bien—if they apply and enroll at the Vietnam National University of Agriculture. • 5 full scholarships • 10 half scholarships • 50 startup scholarships • 50 soft skills scholarships Students with high school academic results achieving 'Good' or higher, conduct rated as 'Excellent'; who have the desire to return to their hometown to work and contribute after graduating from university (committed in writing) will be eligible to receive the scholarships.
“Because you love learning” Scholarship	Thirty scholarships for the academic year 2024-2024 have been awarded to poor, studious students in the border district of Loc Ninh (Binh Phuoc Province). Viettel allocates at least 26 billion Vietnamese Dong annually to award scholarships to students, especially ethnic minority students who overcome difficulties and excel academically. Most of the students are currently attending: • Loc Quang Secondary School • Loc Khanh Secondary School • Loc Phu Secondary School Previously, Viettel collaborated with Bình Phuoc Province to support 10,000 smartphones and 20,000 SIM cards (at half the usual price) to help ethnic minority students in remote areas access distance learning opportunities.

The Vietnam Foundation Supports Highland Children in Effective Education	Since 2021, The Vietnam Foundation has been working to bring the free online learning program on the Khan Academy platform to Vietnamese students across the country, especially recently implementing it in highland, remote, and isolated provinces such as Mu Cang Chai in Yen Bai, Than Uyen in Lai Chau, Son Duong in Tuyen Quang, etc.