Sri Lanka Institute of Information Technology

SE4041 – Mobile Application Design and Development

Assignment – 02

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Table of Contents

PART A - iOS APP

1. Introduction

- App name

Cine Learn is a comprehensive iOS learning application developed using SwiftUI. It is designed for individuals interested in photography and videography who want to learn concepts such as ISO, shutter speed, aperture, lenses, cameras, and lighting.

- Problem being solved

Many beginners struggle to understand camera concepts because learning resources are scattered across websites and videos. There is no single, structured, interactive environment to learn photography fundamentals, test knowledge, stay updated, and manage notes.

- Why is the app needed

Photography is becoming a key skill for social media creators, content producers, journalism students, and hobbyists. Traditional learning resources lack: Interactivity, Notes and summarization, Quizzes for practice, Real-time news updates, Equipment purchase guidance.

CineLearn addresses all these areas on one platform.

- Target audience

Photography beginners, Content creators, Students learning multimedia, Hobbyists, Professionals wanting a refresher.

- How the app benefits users

Structured learning path, Topic-based quizzes to test understanding, Auto-sliding photography news, Note-taking + AI summarization, “Buy Equipment” map to locate shops, Clean, modern, user-friendly interface.

2. Purpose & Target Audience

- Purpose statement

The purpose of Cine Learn is to deliver an intuitive, educational, and interactive platform for users interested in learning photography. The app provides learning modules, quizzes, news updates, and equipment guidance, enabling users to grow from beginner to intermediate level.

- Justification of the need

Users typically search YouTube, blogs, or courses separately. Cine Learn brings: Knowledge, Practice, Tools, Updates
into a single mobile app, improving learning efficiency.

- Audience Characteristics

The target audience: Uses mobile devices regularly, prefers visually rich applications, needs bite-sized, well-structured content, Benefits from quizzes to check learning

- Design match with user needs

Clean, card-based layout supports readability, Dark mode for comfortable night learning, ScrollViews and dynamic slides improve interaction and Topic-wise categorization reduces cognitive load.

3. System Overview

- High level description

Cine Learn consists of: Learning modules, Quizzes, News carousel, notes with summarization, Map-based equipment finding and Login & signup system.

- Three screens overview

Home Screen -
Shows dynamic news slider + navigation to Notes, Learn, Exams, Buy Equipment.

Learn Modules -
Structured lessons with visuals and explanations.

Exam Modules -
Topic-wise multiple-choice quizzes with scoring.

- Feature summary

Topic learning, Auto-rotating news, Side navigation, Notes creation + summarization, Quiz system, MapKit store locator, Dark/Light mode and Login/Signup screens

- Simple architecture Diagram

Splash → Login/Signup → Home

├── Notes

├── News

├── Learn Menu → Learn Modules

├── Exam Menu → Exam Modules → Results

└── Buy Equipment (MapKit)

4. UI/UX Design (Advanced UI Elements)

- UI Design Explanation
  - Color palette

Primary: White/Black (theme dependent)

Accent: Photography-inspired colors (yellow/orange highlights)

Background: Adaptive depending on mode

  - Typography

SwiftUI default text styles with weight adjustments and Dynamic resizing based on device settings.

  - Layout choices

ScrollView for scrollable content, VStack/HStack for structured alignment and ZStack for layered UI (slider + text overlays)

- Advanced UI requirements
  - Custom animations

Auto-sliding news using withAnimation

  - Gesture recognizers

Scroll gestures for horizontal news slider

  - Adaptive layouts (landscape + portrait support)

Works on iPhone SE → iPhone 15 Pro Max

  - Dark Mode support

Toggle automatically changes UI theme

5. SwiftUI Components & Customization

- Cpre SwiftUI components used

NavigationStack, NavigationLink, ScrollView, ZStack, VStack, HStack, List, Toggle, Map,TextField and Alert

- Custom components

NewsCardView, Category Buttons, Card Containers and Map marker items

- Custom modifiers

Rounded corner cards, Shadow modifiers and Custom background overlays

- Themes and Dynamic Type

Adapts to user's system font size and adapts fully to Dark/Light mode.

6. Navigation & Architecture

- NavigationStack structure

Used for all screen transitions.

```
NavigationStack {
   NavigationLink("Learn", destination: LearnMenuView())
}
```

- State management

@State → button interactions

@Binding → card updates

@StateObject (recommended) → view models

- Architecture pattern (MVVM)

The app's structure aligns with MVVM principles:

Model - Notes, Questions, NewsItem

View - SwiftUI UI screens

ViewModel - Business logic + state handling

- Navigation flow diagram

Home → Learn Menu → Module

Home → Exam Menu → Exam → Results

Home → News → News Details

Home → Notes → Add/Edit Note

Home → Buy Equipment → Map View

- ViewModel explanation

7. Data Persistence & Networking

- Chosen persistence method
  - What is stored

Dark mode toggle

Saved notes

Quiz scores (optional)

  - Why user defaults

Small dataset, Fast, Does not require complex models and No authentication needed for these features

- APIs
  - Networking architecture

The app currently does not fetch online news, but the code structure supports future integration.

8. Integration of Emerging Technology

Pick one (CoreML / ARKit / Maps / HealthKit / Games / etc.)

- Used Technology

MapKit - Implemented in the “Buy Equipment” feature.

- Why MapKit adds value

Help users locate nearby camera shops, enhance real-world usability and provide interactive maps with zoom/pan.

- Implementation

```
Map(coordinateRegion: $region, annotationItems: stores) { store in

  MapMarker(coordinate: store.location)

}
```

9. Testing, Debugging & Performance Optimization

- Testing Types
  - Unit tests

Quiz scoring, note summarization logic

  - UI tests

Navigation between Learn → Exam → Results

  - User acceptance testing

Verified with multiple device sizes

- Debugging Techniques

Print statements, SwiftUI Preview debugging and Xcode Memory Graph debugging

- Performance Optimization

Reduced unnecessary state updates, Limited memory usage in news images and MapKit optimized with minimal markers.

10. Security & Privacy Considerations

- Permission

Location permission for MapKit and Only used within context (equipment locator)

- Secure data storage

No sensitive user data stored, and only non-critical local preferences saved

- iOS privacy compliance

Follows Apple's "Ask Permission Before Use" and does not track or share user data.

11. Challenges Faced & Solutions

Auto-sliding news was choppy - Used Timer.publish with animation easing

Dark mode inconsistencies - Switched to adaptive colors

Map not loading smoothly - Reduced annotation frequency

Complex navigation - Switched to NavigationStack

12. Conclusion

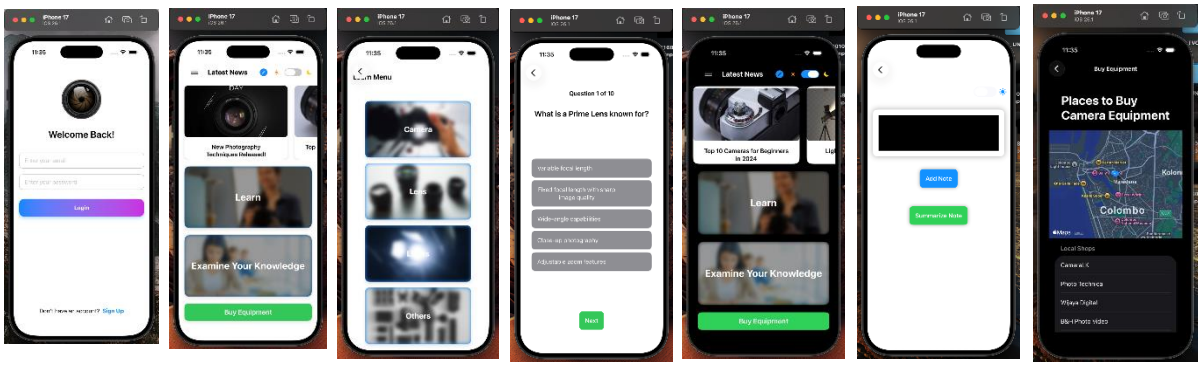
Cine Learn successfully delivers an interactive platform for photography learners. The app includes learning modules, quizzes, dynamic news, note management, and equipment purchasing guidance. Through applying SwiftUI, MapKit, and modern mobile UI concepts, the project demonstrates strong mobile development skills and practical application of course concepts.

13. Appendix

- GitHub Repo URL

https://github.com/Hasara-410/IOS-App1.git

- Screenshots



PART B - tvOS

1. Introduction

- Chosen platform (tvOS)

Artefy is a virtual art gallery experience offering dynamic backgrounds, categorized art collections, virtual tours, and art uploads. The app transforms the TV screen into an immersive art space.

- Why tvOS is suitable

Large-screen immersive experience, Ideal for art viewing, works well with static and animated backgrounds and Great for showcasing high-resolution artworks.

2. Concept Innovation

Artefy stands out because it - Refreshes background art every 15 seconds, allows users to upload personal artwork, Provides categorized exploration, includes virtual art tours, lets users' favorite artworks and provides an educational "Learn About Art" section.

This blends art appreciation, creativity, education, and interactivity in one system.

3. Competitor / Similar Apps Review

Google Arts & Culture - Offers guided tours & art viewing, Uses Museum collections

Difference: Artefy allows user uploads + dynamic backgrounds

Artivive - AR-focused art experiences

Difference: Artefy focuses on gallery-style TV viewing

DeviantArt TV - Displays user artworks

Difference**:** Artefy adds categories, learning, and virtual tours.

4. Prototype Design

- User Interactions

Large, clickable buttons for TV remote, Grid layout navigation and High-contrast UI for distance viewing.

- Platform-Specific Features

Dynamic background with smooth transitions, Large-card UI optimized for TV screens and Button focus highlighting.

- UI/UX Design Elements

Minimalist UI to focus on art, Bold typography and Color-coded category buttons.

5. Technical Implementation

- Architecture

View Layer: SwiftUI Views

Logic Layer: State variables + timers

Data Layer: Local arrays for categories and backgrounds

- Core functions built

Background rotation using Timer, Category grid navigation, Favorites management and Simple upload placeholder.

- Tools Used

SwiftUI, AVKit (optional for future video tours) and Combine Timer for background

- Sample Code

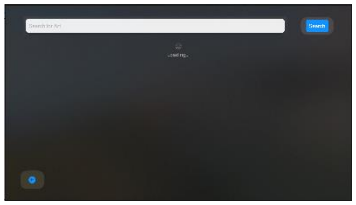
```
timer = Timer.scheduledTimer(withTimeInterval: 15, repeats: true) { _ in
    withAnimation(.easeInOut(duration: 3)) {
        currentImageIndex = (currentImageIndex + 1) % images.count
    }
}
```

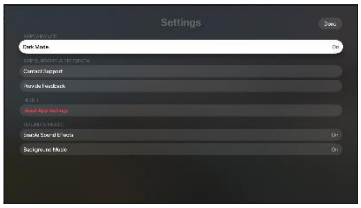
6. Appendix

- GitHub Repo URL

https://github.com/Hasara-410/TVOS1.git

- Screenshots



7. Conclusion

Artefy demonstrates the potential of digital art environments by combining interactive UI, dynamic displays, categorized learning, and community-driven content. With future enhancements in AR/VR, it can become a major platform for digital art discovery and appreciation.