



Computing Group Project

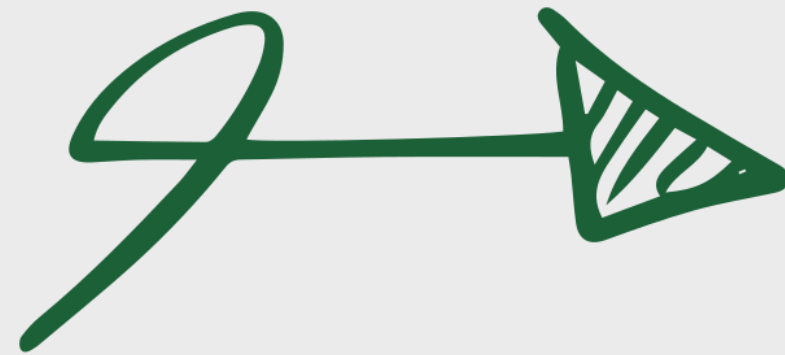


NFCampus

Member:

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2. Ng Kean Chun
3. Teoh Yi Shan
4. Yong Ken





Scope of the Project



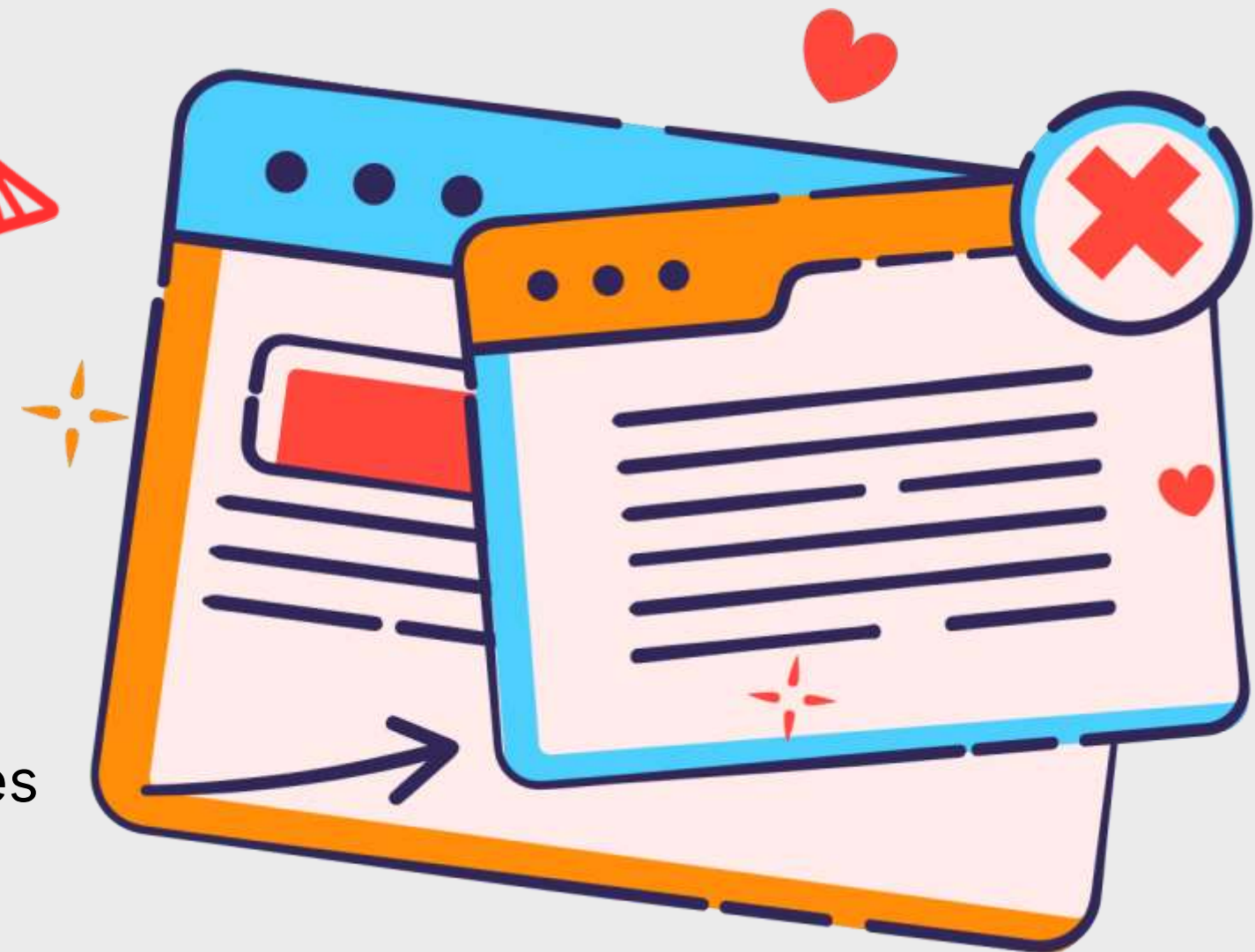
In-Scope

- Development of an Android Mobile Application for Student Users (e.g. OCR, NFC Card Binding, MFA)
- Backend System and Database (e.g. NFC UID Validation)
- Proof-of-Concept Access Simulation



Out-of-Scope

- iOS Application Development
- Advanced OCR Data Parsing
- Admin Dashboard or Guard Interface
- Automatic Card Deactivation
- Real-time Communication with University Databases
- Fully Functional Reader System for Buildings



LITERATURE REVIEW - ANALYZING THE RELATED WORKS



**Traditional Physical
Access Cards**



**Proprietary Wallet
Passes**



**National Digital
Initiatives (MYJPJ)**

PHYSICAL ACCESS CARDS



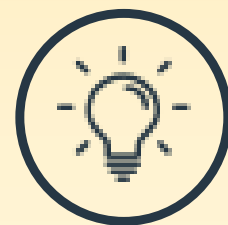
Strengths

- Simple
- low-cost
- Universally understood.



Weakness

- High Risk of Loss or Theft
- No Inherent Authentication
- Lack of Convenience
- Limited Functionality



How NFCampus is different?

- Moves the credential to a device students always carry.
- Protects access with the phone's own security (PIN, biometrics).

PROPRIETARY WALLET PASSES

(GOOGLE WALLET, APPLE WALLET)



Strengths

- Great Convenience (lock screen access).
- Great OS integration
- Has built-in security.



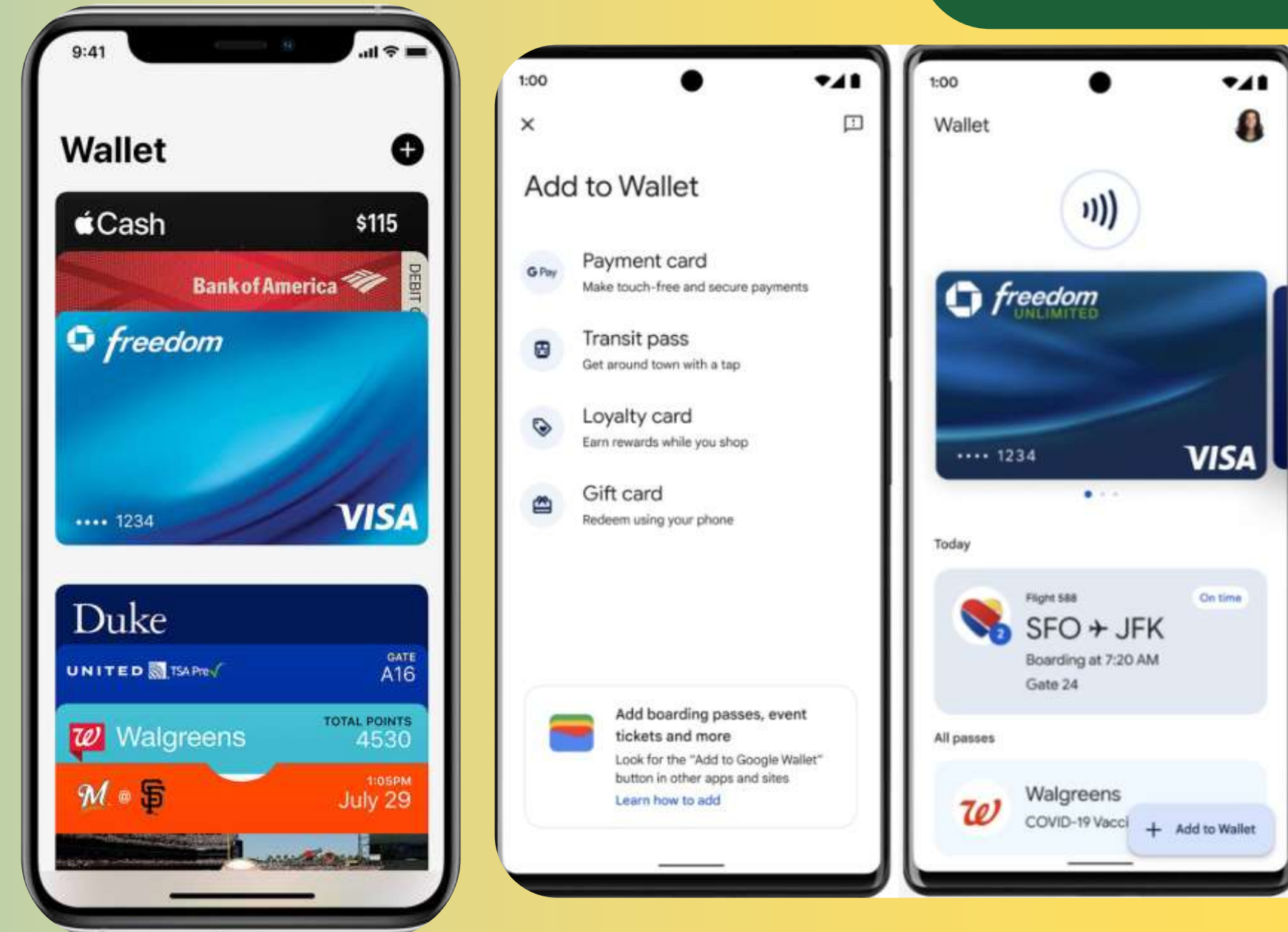
Weakness

- Difficult to implement custom security logic or backend integration
- Limited Customization & Control



How NFCampus is different?

- Does not rely on the feature sets or policies of third-party wallets.
- Has more flexible control over data, security, UI, and future features.



NATIONAL DIGITALIZATION INITIATIVES (MYJPJ)



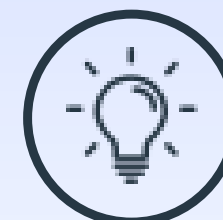
Strengths

- Convenient (Replaces physical documents.).
- User-Centric Model



Weakness

- Security Relies on Device Security System
- Manual and Slower Process
- No-Machine Readable Data Tap

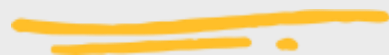


How NFCampus is different?

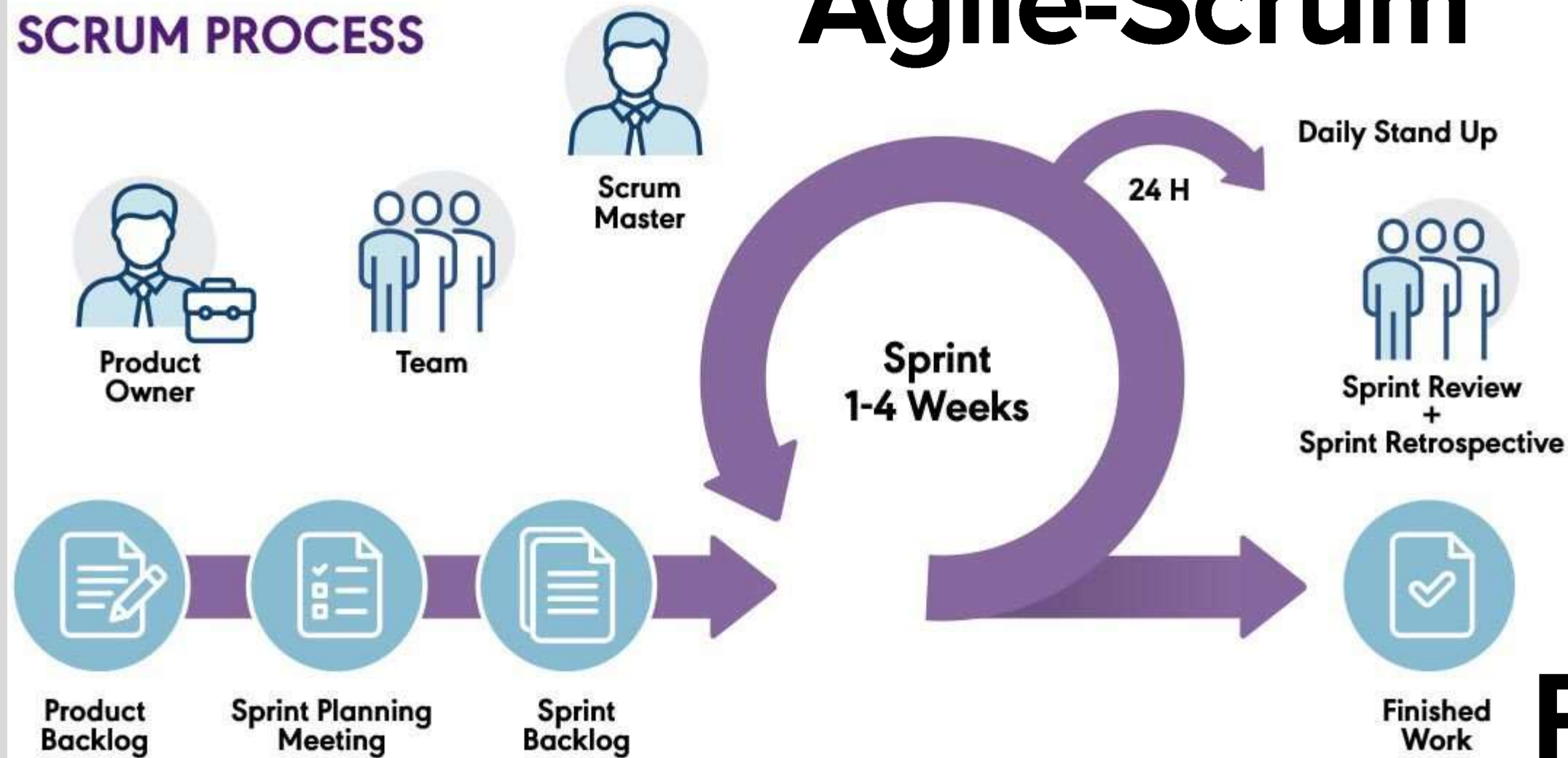
- Uses Active NFC Communication instead of Passive Display
- Enables automated, secure, and instant data exchange



Methodology



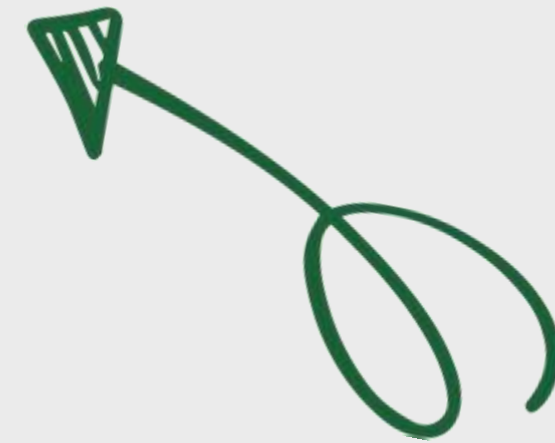
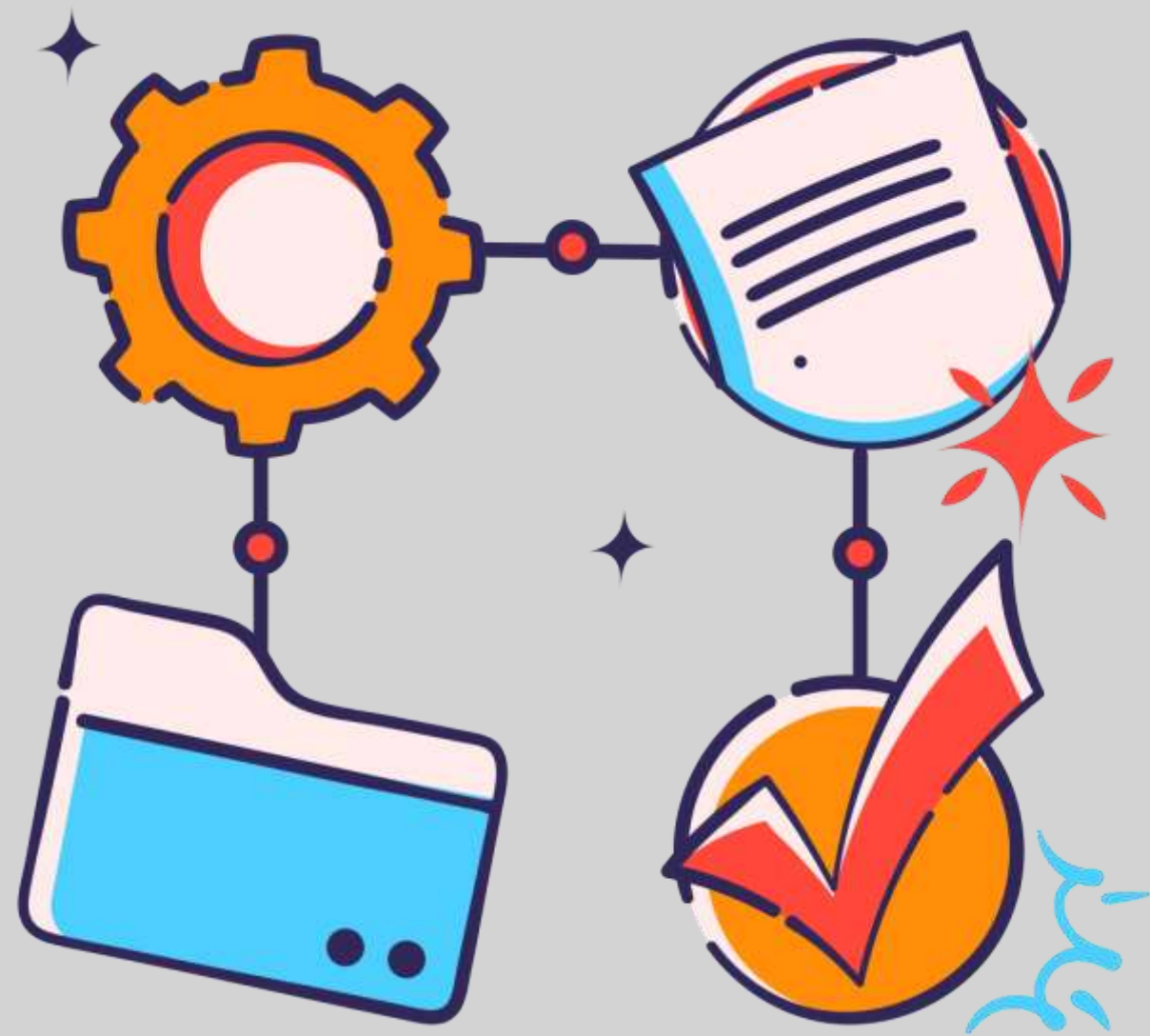
SCRUM PROCESS



Agile-Scrum

Project Approach / Framework

- **Sprints:** The project schedule will be divided into two week sprints.
- **Sprint Planning:** At the beginning of each sprint, our team will select a set of tasks from the product backlog to complete.
- **Daily Stand-ups:** Brief daily meetings will be held to synchronize activities and identify blockers.
- **Sprint Review & Retrospective:** At the end of each sprint, we will demonstrate the completed functionality and reflect on the process to improve the next sprint. This allows for regular feedback and continuous refinement of the product.



Tools & Technologies

- Android Studio
- Firebase / Firestore
- Figma
- Kotlin
- GitHub

Implementation Plan

Module 1

- Develop backend server, database, and basic API endpoints.
- Build UI Figma fpr the Android app.

Module 2

- Implement OCR Registration System & NFC UID capture
- Develop Basic Security Features (password, NFC MFA login flow, one-card-per-account system)

Module 3

- Implement and Integrate HCE Service into the Application

Module 4

- Perform end-to-end testing.
- Further improve the application.



Testing & Evaluation



1. Unit Testing

Test each part of the system separately, make sure every feature works correctly on its own.

2. Integration Testing

Combine all modules and test them together, ensure the app, server, and NFC reader communicate properly.

3. System Testing

Test the whole system in real situations, try real scenarios: valid/invalid users, lost device, no internet, etc.

4. Security Testing

Check data protection and prevent unauthorized access, test for NFC cloning, replay attacks, and data encryption.

5. Usability Testing

Let students and staff use the app and give feedback, measure ease of use, speed, and satisfaction.

6. Performance Evaluation

Evaluate how the system performs under heavy use, example measure speed, response time, and reliability.



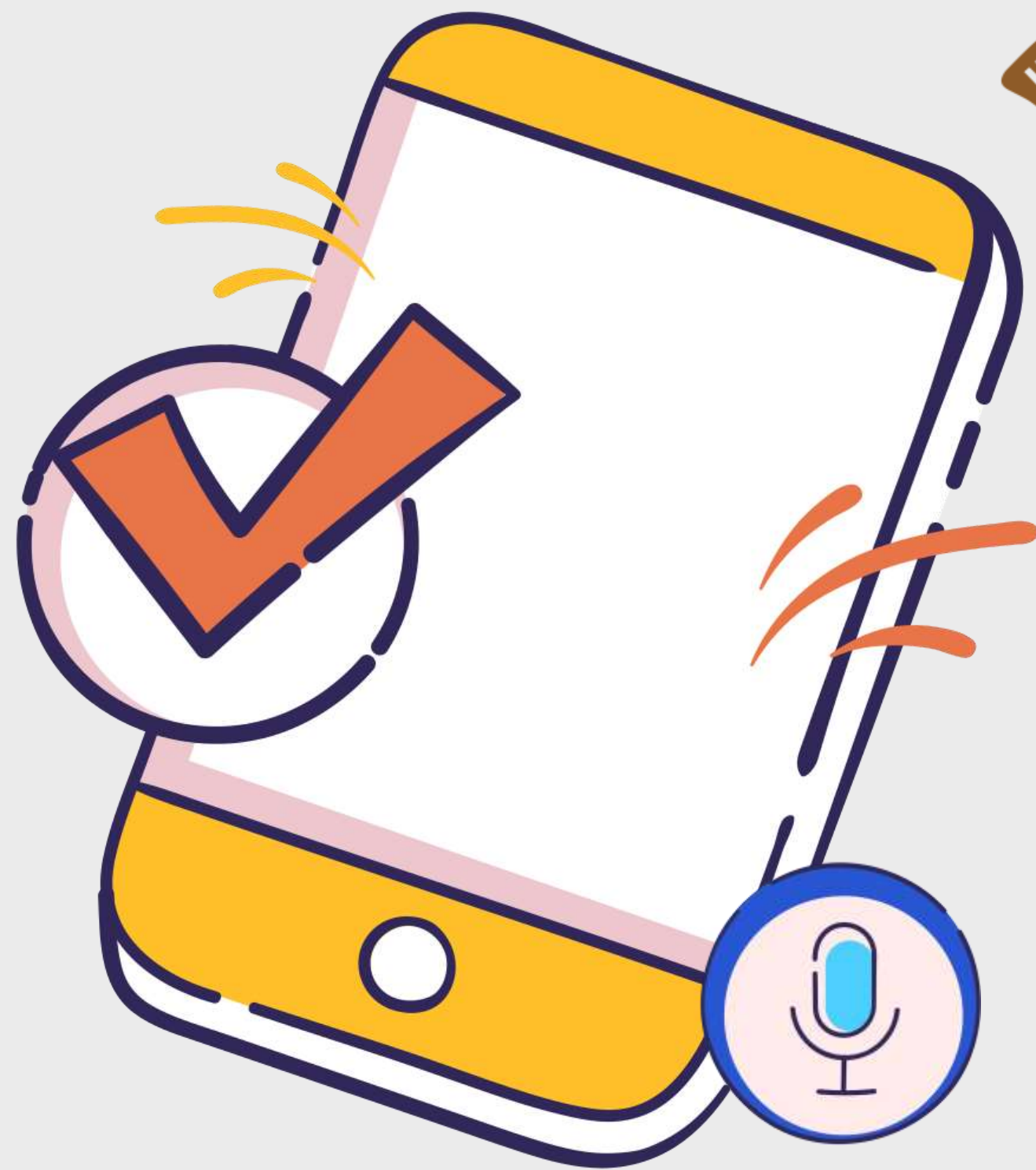
PROJECT TIMELINE





Project Timeline (2026)

[illegible]




Ui Framework (Figma)



Login

12:30



NFCampus

[Forgot Password?](#)

Login

Don't have an account? Register here

Home Page

12:30

NFCampus

Welcome Back!

Your Information

Name

LEE SONG JUN

Student ID

BSSE250601

Course

BSc (Hons) Computer Science
(Software Engineering)

Card UID

04:A3:B2:C1:89:45:80



Last generated: 27-Oct-2025

Home

Profile


Settings

Profile (Front)

12:30


NFCampus

Campus Card



PENINSULA
COLLEGE

Campus-in-Industry



LEE SONG JUN
The Ship Campus
XXXXXXXXXXXX
BSSE250601
BSc (Hons) Computer Science
(Software Engineering)
June 2025
Valid Thru: 08/27

Front

Home

Profile

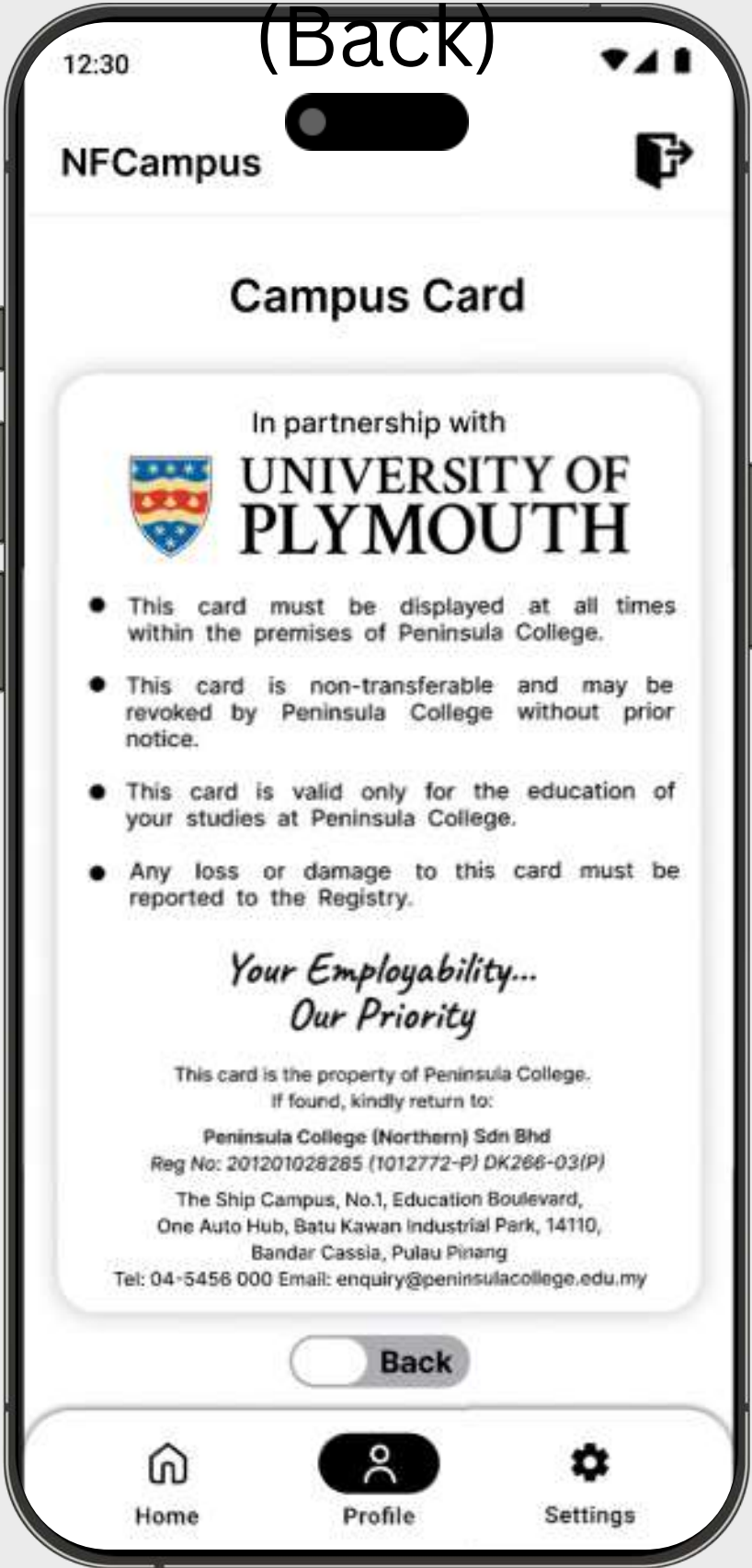
Settings



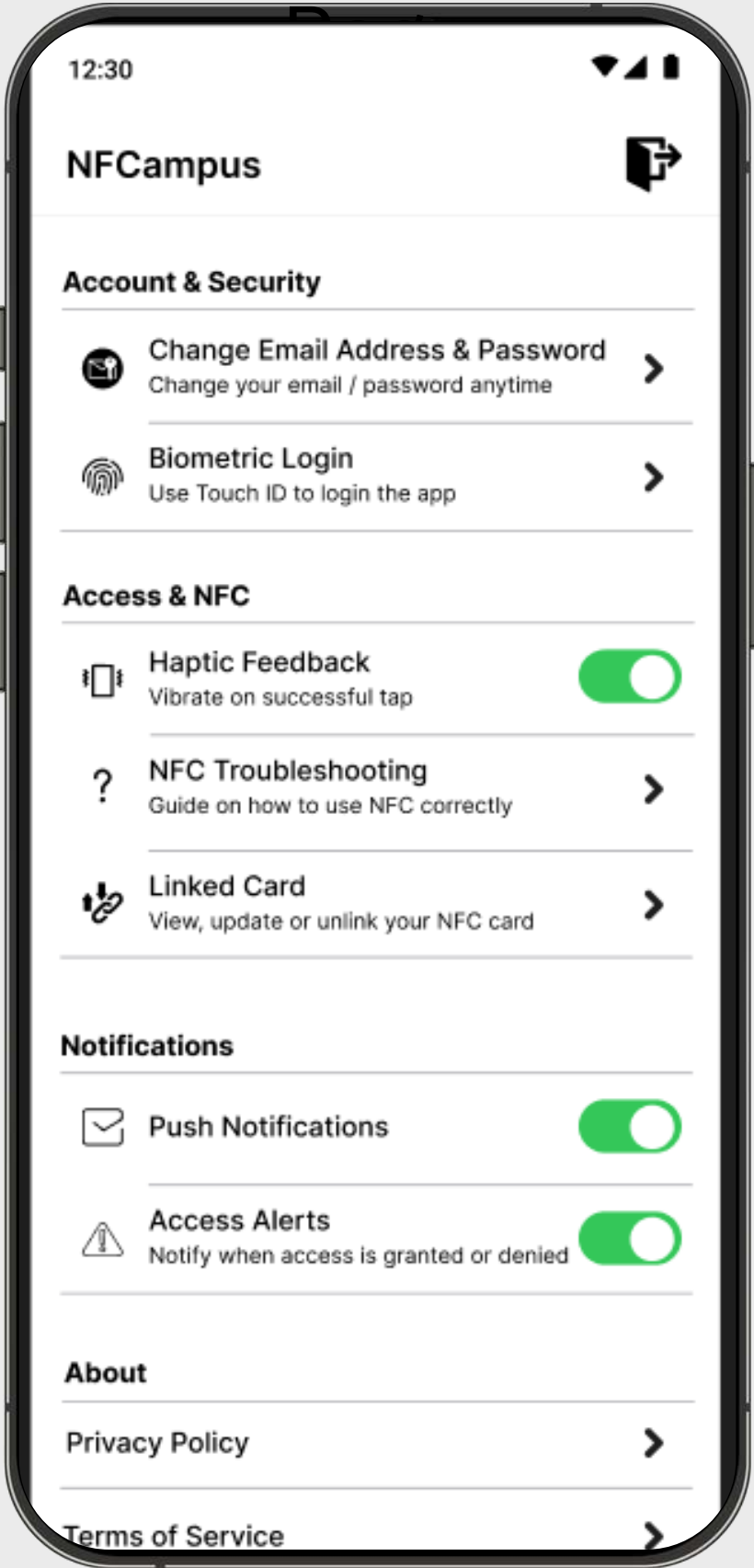


Profile

(Back)



Settings





THE
END

