



# Computing Group Project

NFCampus



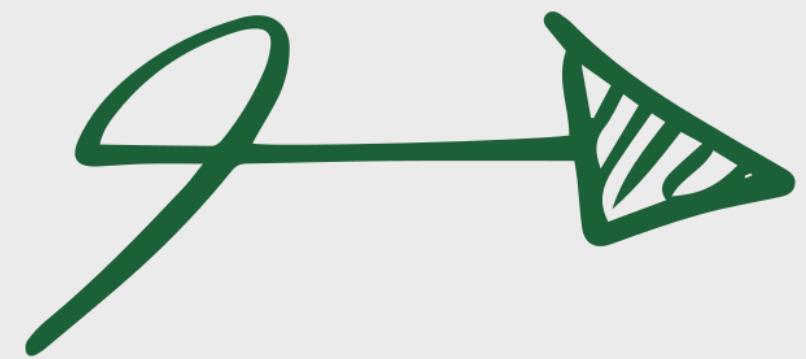
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# Scope of the Project



# 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

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## ANALYZING THE RELATED WORKS



Traditional Physical  
Access Cards

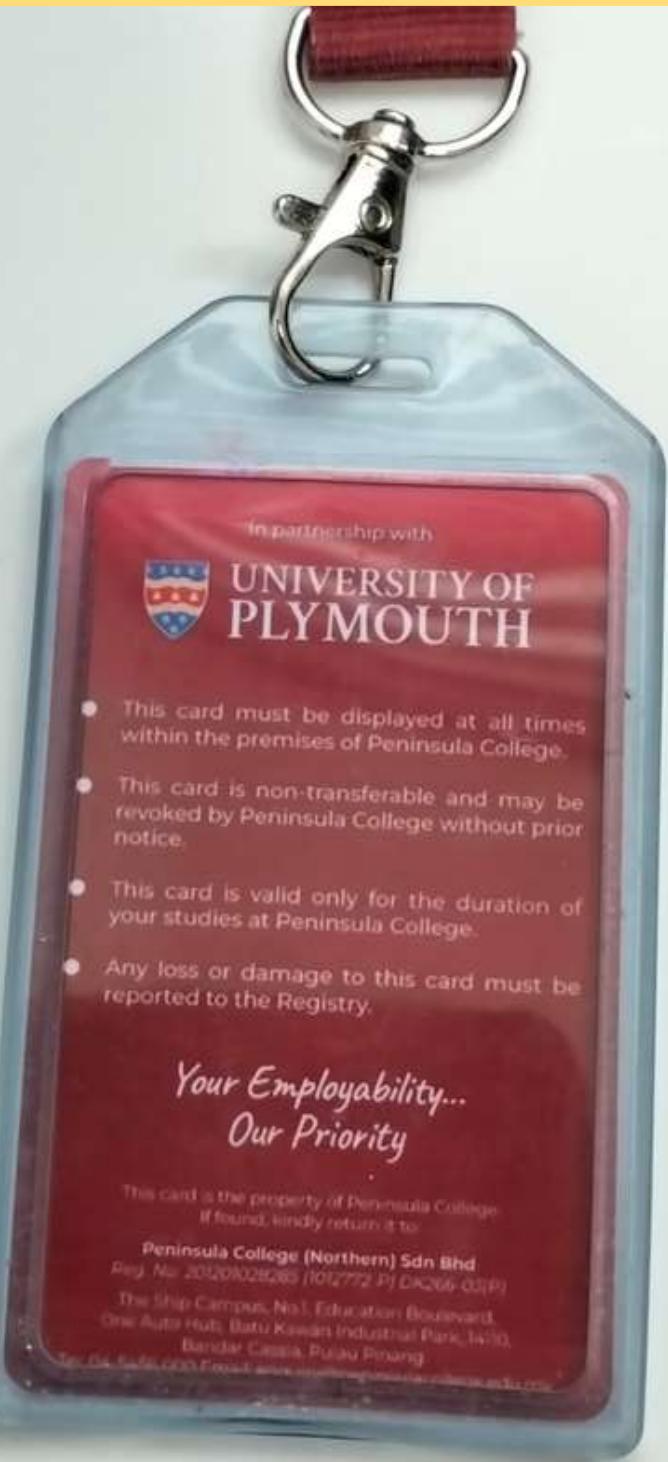


Proprietary Wallet  
Passes



National Digital  
Initiatives (MYJPJ)

# PHYSICAL ACCESS CARDS



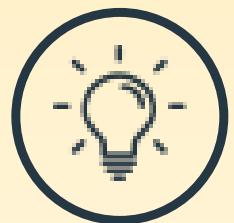
## Strengths

- 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

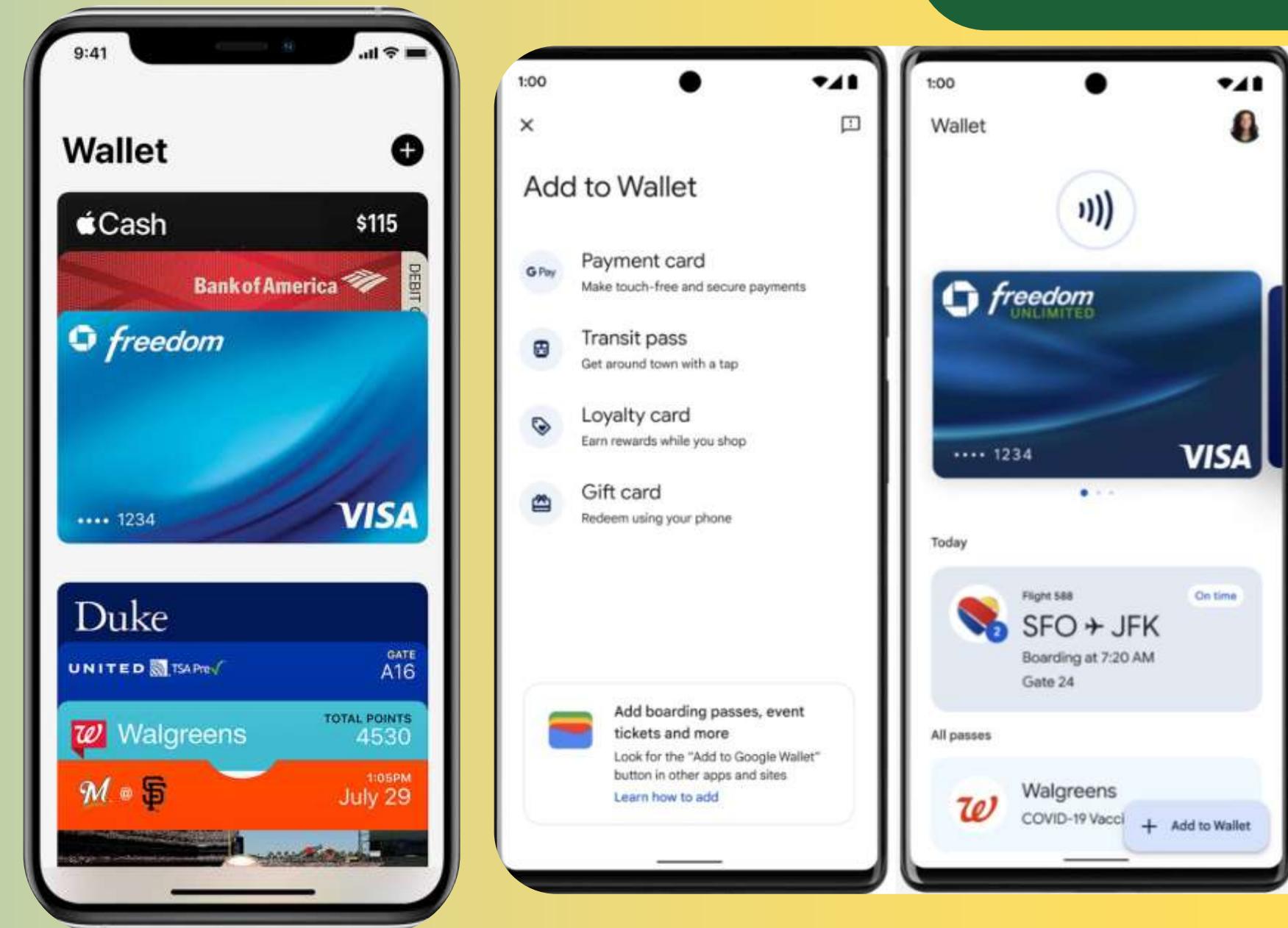
- Great Convenience (lock screen access).
- Great OS integration
- Has built-in security.

### 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)



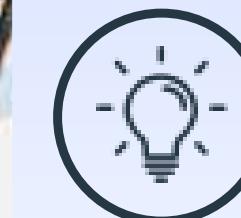
## Strengths

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



## Weakness

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



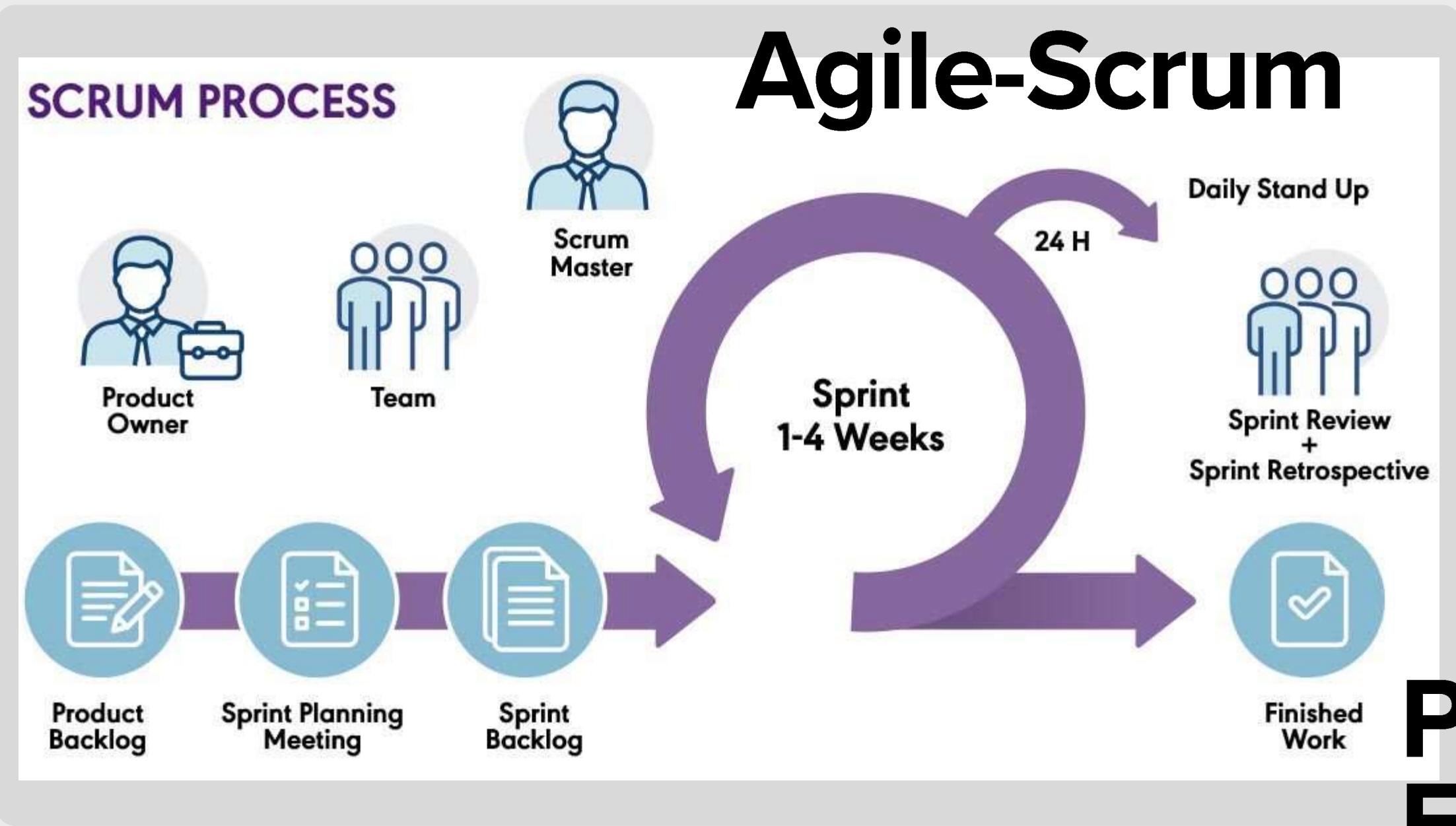
## How NFCampus is different?

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



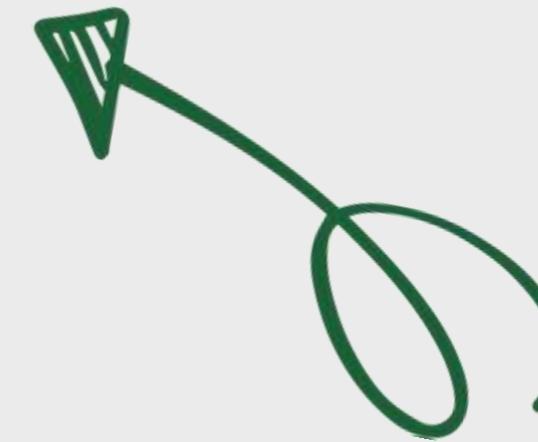
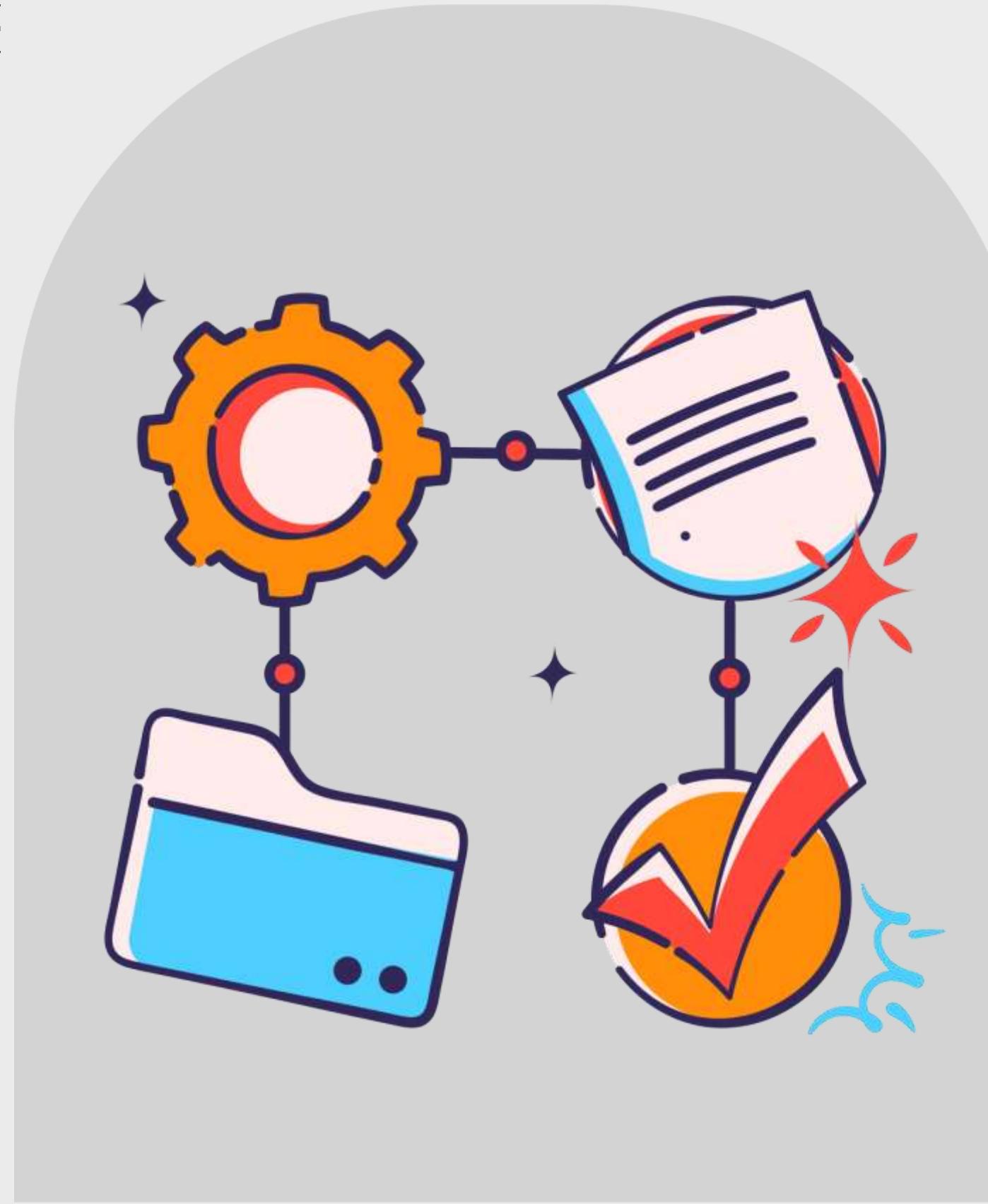
# Methodology





## 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 4

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

## Module 3

- Implement and Integrate HCE Service into 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

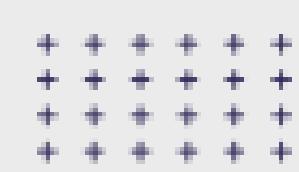
Let students and staff use the app and give feedback, measure ease of use, speed, and satisfaction.

## 6. Performance Evaluation

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

# PROJECT TIMELINE





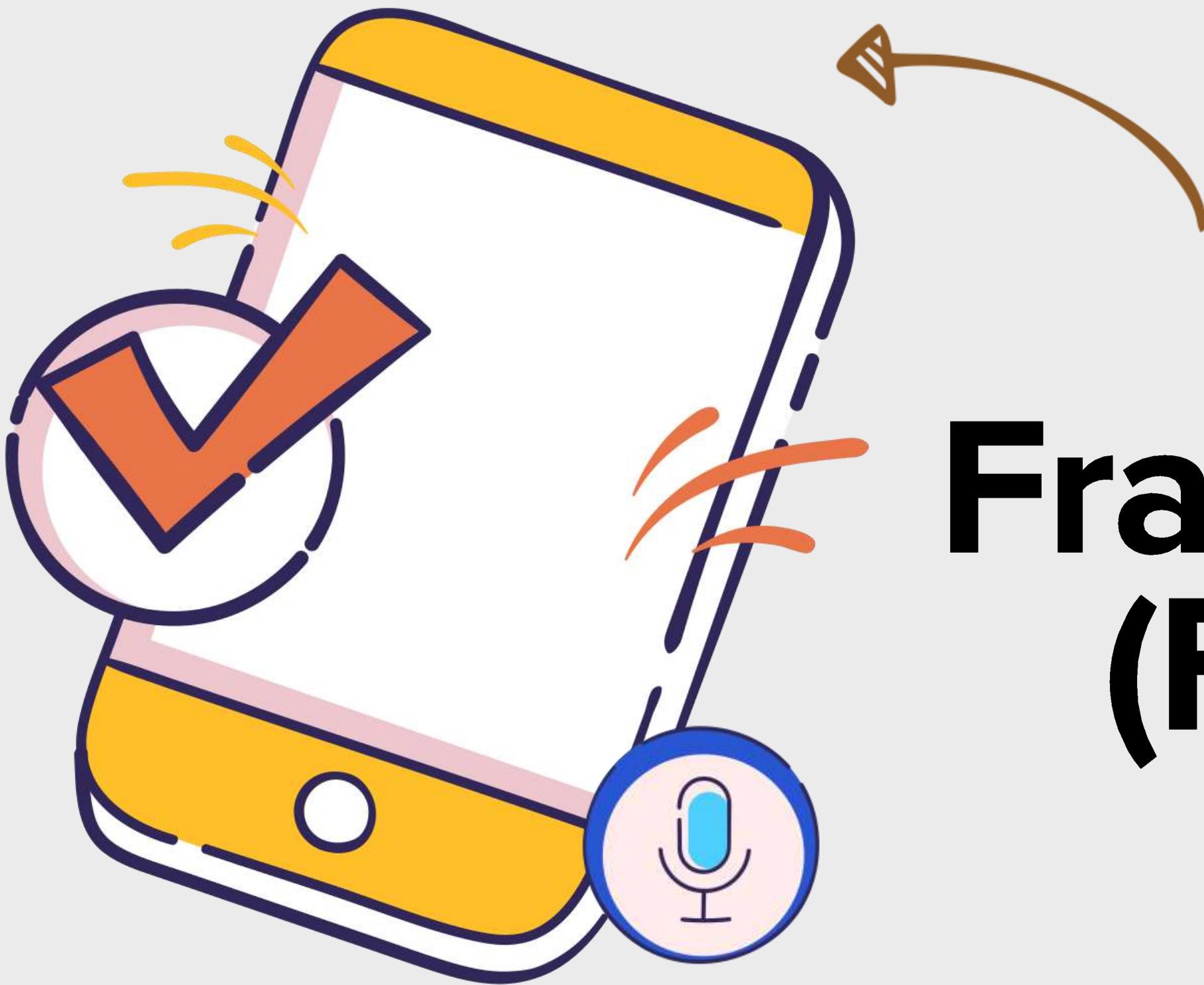
# Project Timeline (2025)

2025		Sept			Oct			Nov			Dec		
Task	Description	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
Early Development (POC)	Set up Android Studio, repo, read NFC UID on test phone / reader.												
Requirement Analysis	Identify problems, gather requirements, stakeholder interviews.												
Literature Review & Background Study	Survey related works, summarize strengths / weaknesses.												
Define Scope, Objectives & Methodology	Finalize scope, SMART objectives, select framework (e.g., Agile-Scrum).												
System Design & Planning	High-level architecture, database schema, and interface planning.												
Frontend (Android) - UI/OCR	Login / Registration UI; Integrate OCR for card text.												
Multi-Factor Authentication	Password and email link												
Proposal Writing & Interim Submission	Draft, review with supervisor, finalize and submit proposal.												



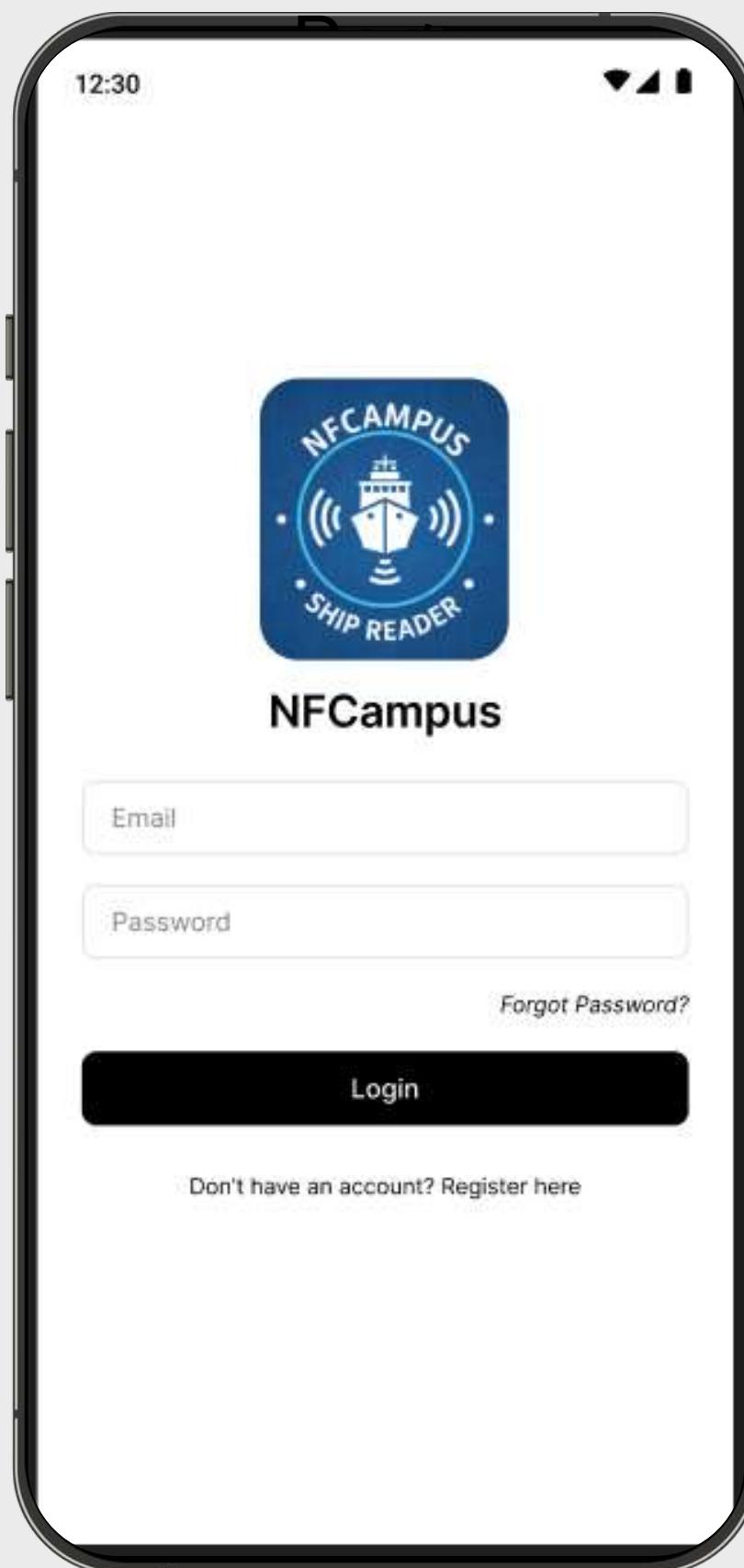
# Project Timeline (2026)

# Ui Framework (Figma)

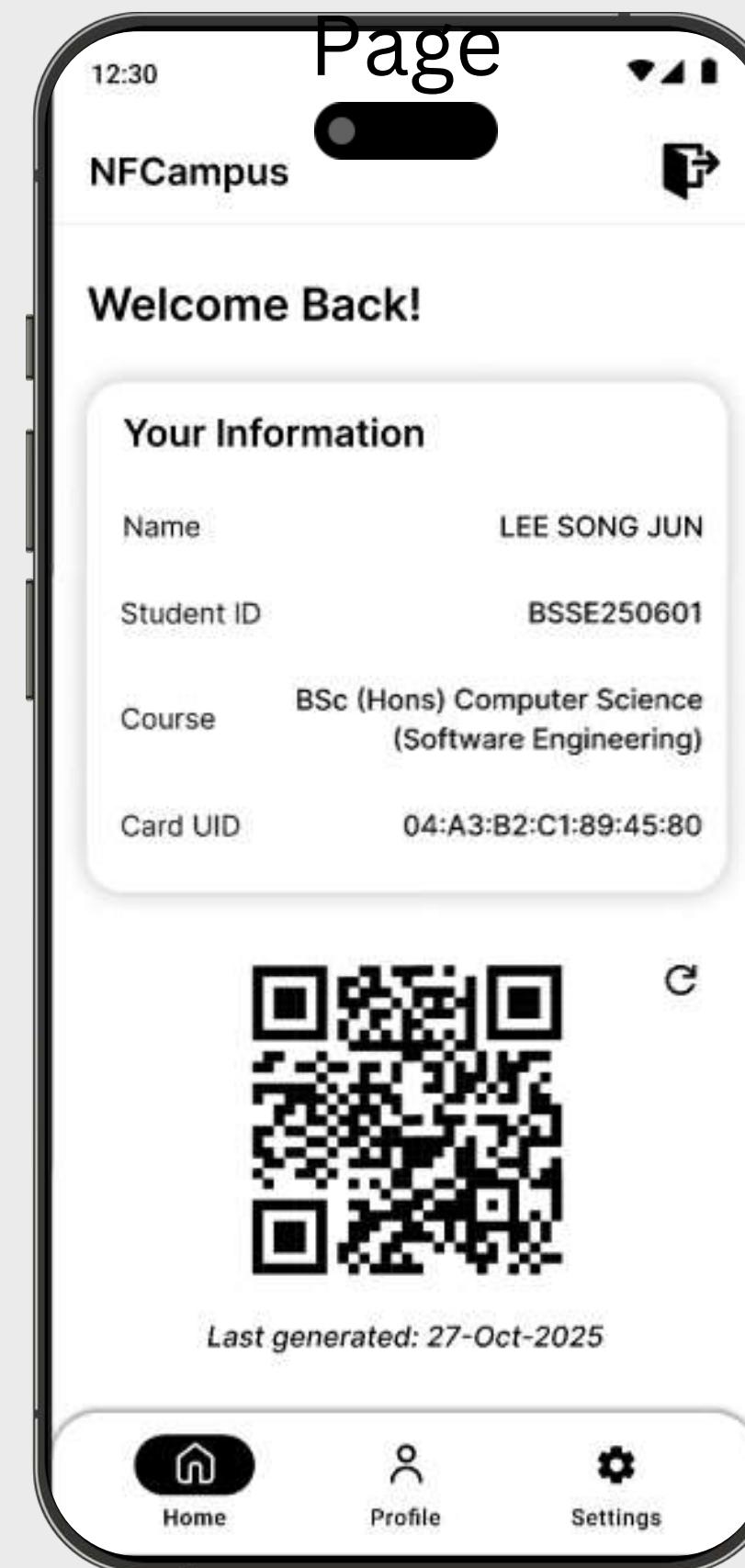




# Login



# Home



# Profile





# Profile

(Back)

12:30

NFCampus

Campus Card

In partnership with

UNIVERSITY OF PLYMOUTH

- This card must be displayed at all times within the premises of Peninsula College.
- This card is non-transferable and may be revoked by Peninsula College without prior notice.
- This card is valid only for the education of your studies at Peninsula College.
- Any loss or damage to this card must be reported to the Registry.

Your Employability...  
Our Priority

This card is the property of Peninsula College.  
If found, kindly return to:  
Peninsula College (Northern) Sdn Bhd  
Reg No: 201201028285 (1012772-P) DK266-03(P)  
The Ship Campus, No.1, Education Boulevard,  
One Auto Hub, Batu Kawan Industrial Park, 14110,  
Bandar Cassia, Pulau Pinang  
Tel: 04-5456 000 Email: enquiry@peninsulacollege.edu.my

Back

Home

Profile

Settings

# Settings

12:30

NFCampus

Account & Security

Change Email Address & Password

Change your email / password anytime

Biometric Login

Use Touch ID to login the app

Access & NFC

Haptic Feedback

Vibrate on successful tap

NFC Troubleshooting

Guide on how to use NFC correctly

Linked Card

View, update or unlink your NFC card

Notifications

Push Notifications

Access Alerts

Notify when access is granted or denied

About

Privacy Policy

Terms of Service



*THE*  
*END*

