Project Anglesea

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Vision

- Aim to revolutionise the sustainable coffee culture.

- Offering a subscription-based model for reusable coffee cups.

- Aim to pilot our project at MQU, encompassing the local uni community.

- Encouraging a greener and sustainable future.

System Design Overview

Architecture:

- Mobile Application
- Microservices Architecture
- Cloud-based Infrastructure

Storage / Data Strategy:

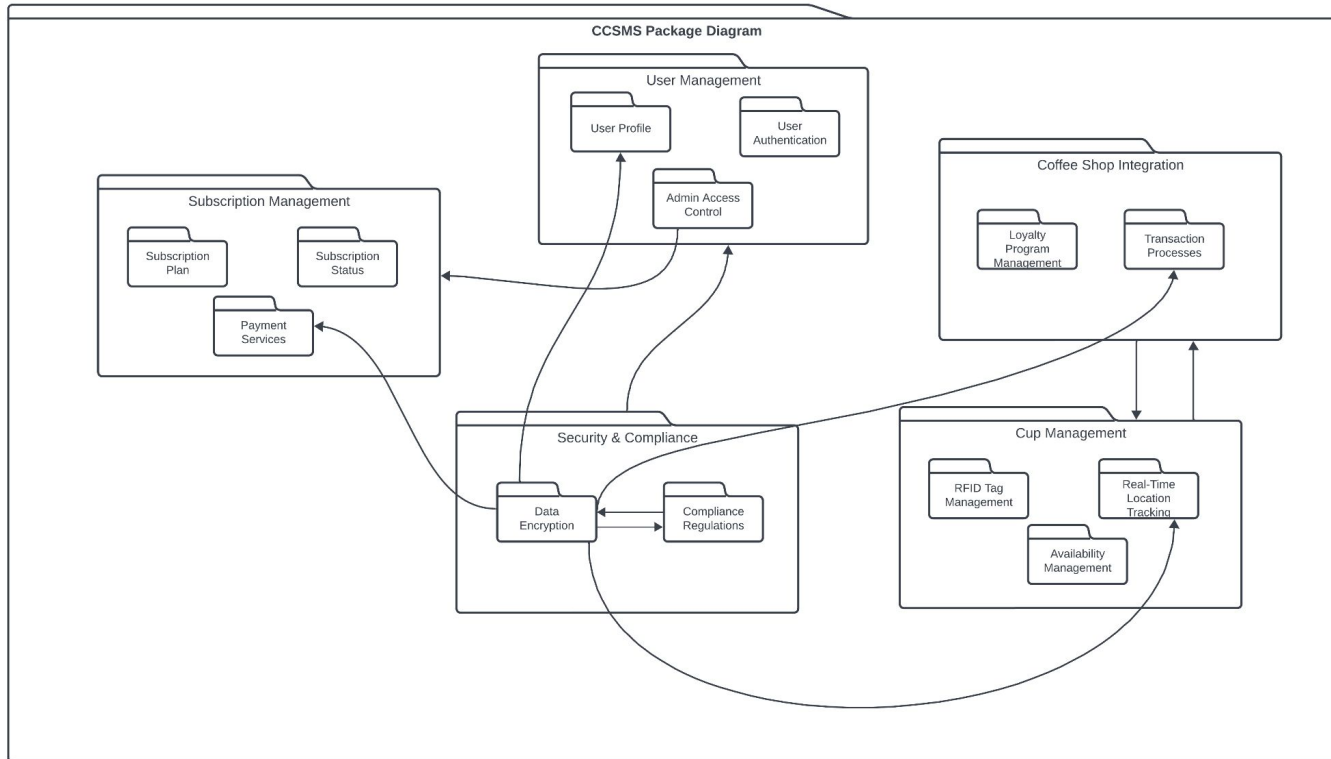- Relational Database
- NoSQL Database
- Data Encryption

Noteworthy Trade-offs / Choices:

- Security over Convenience

Concurrent Processes:

- Coffee Cup Borrowing, Returning & Availability
- Subscription & Real-time Tracking

Package Diagram

CCSMS Package Diagram

User Management
- User Profile
- User Authentication
- Admin Access Control

Subscription Management
- Subscription Plan
- Subscription Status
- Payment Services

Coffee Shop Integration
- Loyalty Program Management
- Transaction Processes

Security & Compliance
- Data Encryption
- Compliance Regulations

Cup Management
- RFID Tag Management
- Real-Time Location Tracking
- Availability Management

Data Definitions

Name Field	Type	Meaning	Example
ID's	Hexadecimal	The unique identifier	0xfe253a
User Details	String	Name, Password, Email etc	John Smith
Subscription	Boolean	Subscription status	True | False
Admin Authentication	Integer	System Authentication Access	1234

Class Diagram

Coffee Cup Subscription System Overview:

- User: Interacts via a Mobile App to manage subscriptions and borrow/return cups.
- CoffeeCupSubscriptionSystem: Central system managing available CoffeeCups and associated CoffeeShops.
- CoffeeCup: Reusable cup with a tracking ID.
- CoffeeShop & CollectionPoint: Locations for borrowing and returning cups, respectively.
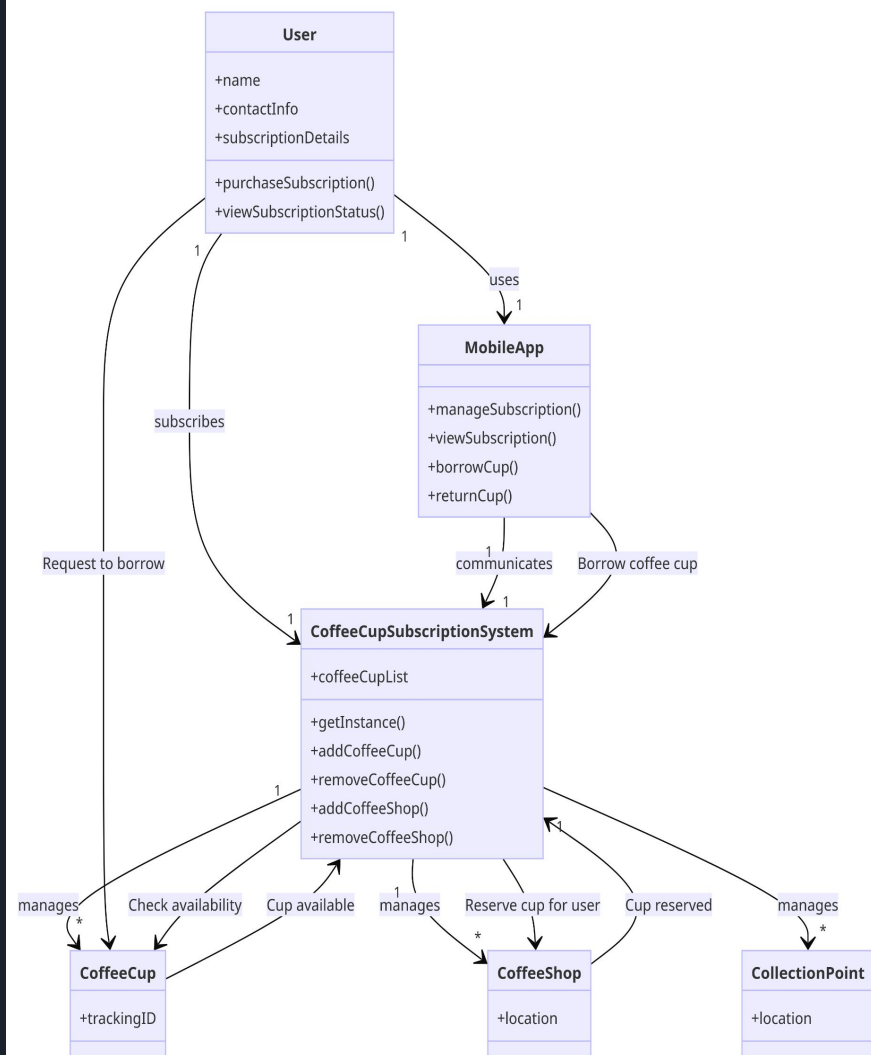
State Diagram

State Diagram for managing the Coffee cup subscription

InitialState: Starting point of a user's subscription journey.

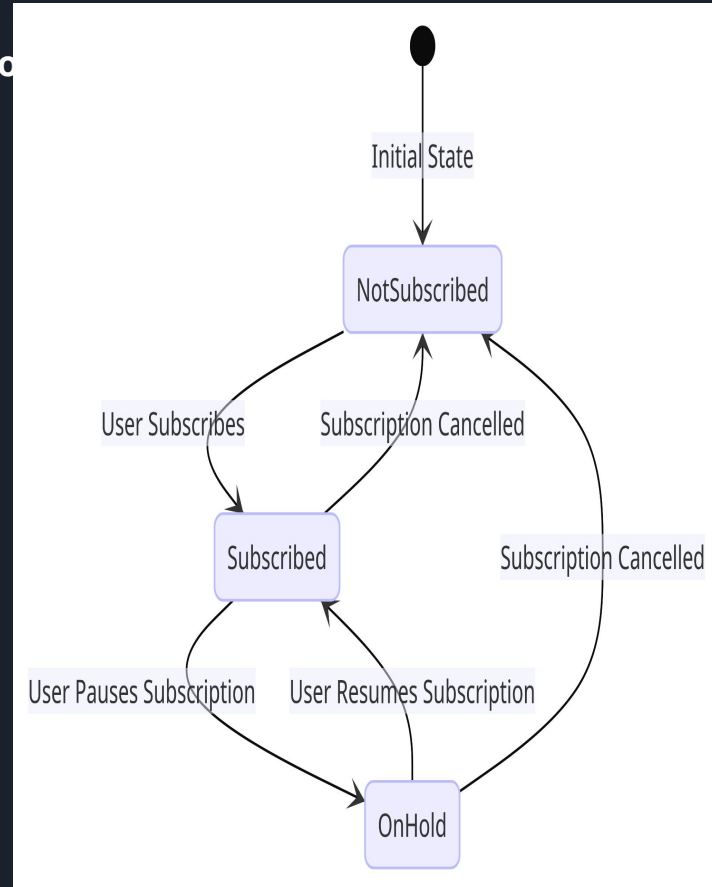**NotSubscribed:** Default state, user hasn't subscribed.

Subscribed: User is active after subscribing.

- Can transition to OnHold if paused.
- Returns to NotSubscribed if cancelled.

OnHold: Temporary pause of subscription.

- Resumes to Subscribed when user opts back in.

Note: At any given state, the user can cancel their subscription and return to the NotSubscribed state.
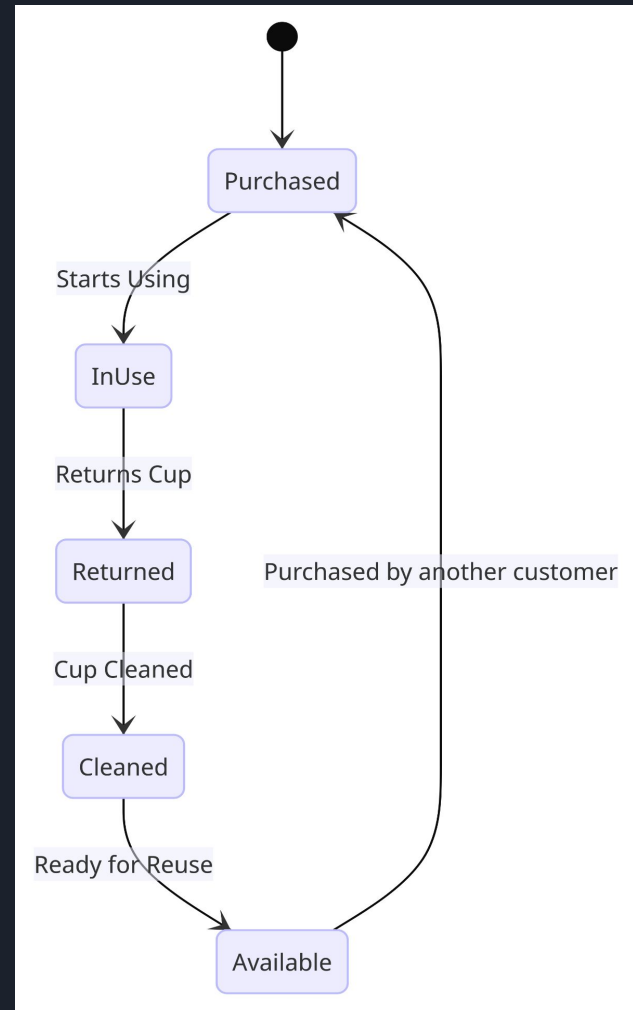
State Diagram for Lifecycle Reusable Coffee Cup:

Purchased: The starting point where the cup is acquired by a customer.

InUse: Once the customer begins using the cup.

Returned: After usage, the cup is returned.

Cleaned: The returned cup undergoes a cleaning process.

Available: Once cleaned, the cup is ready for reuse and can be purchased by another customer.

Requirement traceability Matrix

Requirement-ID	Use Cases	Classes	Methods	Packages
Functional 1	Use Cases 1, 2, 3	RFID tags, collection points	Track Collection	App
Functional 2	Use Case 2	users,	Status	App
Functional 3	Use Case 3	users,	Login, account creation	App
Functional 4	Use Case 1, 3	users,	Purchasing	App
Functional 5	Use case 1, 2, 3	users, collection points	Payment	App
Non-Functional 1	N/A	N/A	N/A	N/A
Non-Functional 2	N/A	users	Encryption	App
Non-Functional 3	N/A	N/A	N/A	N/A
Non-Functional 4	N/A	users, collection points	Encryption	App
Non-Functional 5	N/A	N/A	N/A	Policies

Test Specification

Functional Requirement 1: RFID Tracking

Test ID: TCF01.1

Test Name: RFID Tag Tracking

Test Description: Verify that the RFID tags can track the cup's collection points, including where it was purchased from.

Requirements Tested: Functional Requirement 1

Input Specification: RFID-tagged cups, RFID readers/scanners, tracking software.

Testing Procedure:
1. Attach an RFID-tagged cup to an RFID reader/scanner.
2. Initiate tracking using the tracking software.
3. Record the collection point and purchase location information.

Output Specifications: The RFID system should accurately track the cup's collection points and purchase locations.

Test Plan for Functional Requirement 1: RFID Tracking

Test Schedule:
- Start Date: Day 1
- End Date: Day 10

Testing Resources Required:
- RFID-tagged cups
- RFID readers/scanners
- Tracking software
- Test environment

Testing Milestones:

Milestone 1: RFID Tag Tracking - Day 3
- This milestone will focus on testing the basic functionality of RFID tag tracking. Test cases will include attaching RFID-tagged cups to RFID readers/scanners and ensuring that the tracking system accurately records collection points and purchase locations.

Milestone 2: Multiple RFID Tag Tracking - Day 6
- In this milestone, the system's ability to track multiple cups simultaneously will be tested. Multiple RFID-tagged cups will be attached to RFID readers/scanners, and the system's performance in tracking all cups will be assessed.

Milestone 3: Real-time RFID Tracking - Day 10
- The final milestone will evaluate the real-time tracking capabilities of the RFID system. Users will attach RFID-tagged cups, initiate tracking using the software, and verify that real-time tracking information is provided.

Test Deliverables:
- Test results and logs for each milestone

Test Specification

Non-Functional Requirement 1: Response Time

TestID: TCNF01.1

Test Name: Login Page Response Time.

Test Description: Verify that the login page grants users access to the system within 3 seconds.

Requirements Tested: Non Functional Requirement 1

Input Specifications: Login initiation.

Testing Procedure:
1. Open the mobile app.
2. Initiate the login process.
3. Measure the time taken for the page to load.

Output Specifications: The login page should load within 3 seconds.

Test Plan for Non-Functional Requirement 1: Response Time

Test Schedule
- Start Date: Day 1
- End Date: Day 5

Testing Resources Required
- Mobile devices with the app installed
- Test accounts

Testing Milestones

Milestone 1: Login Page Response Time - Day 3
- This milestone will focus on verifying that the login page grants users access to the system within 3 seconds. Users will access the login page and measure the response time.

Milestone 2: Application Response Time - Day 5
- In this milestone, the overall response time of the application will be tested. Users will navigate through the app and measure the response time for various actions.

Test Deliverables
- Test results and response time measurements for each milestone

Minimal Viable Product

- Basic version of the CCSMS

- Essential to have all the functional requirements.

- Some of the functional requirements include tracking the RFID tags and an option to purchase coffee and reusable cups.

- Using the non-functional requirements is not needed but having essential components for the architecture is necessary.

- Some of these components include the application, online servers, and accounts.

Milestones

- **Milestone 1:** Application and networks are setup

- **Milestone 2:** Coffee cups are obtained from supplier

- **Milestone 3:** Software development completed and coffee shops signed up approved.

- **Milestone 4:** Real test users review how well the CCSMS works.

- **Milestone 5:** Product is launched.

☐ Tasks ☐

Task ID	Description	Dependencies	Effort (S-XL)	Milestone
1	Basic version of application is setup for the MVP	None	L	1
2	Servers are setup to connect application	1	L	1
3	Coffee cups collected	None	M	2
4	Tracking is connected from coffee cups to the servers	1, 2	M	2

Task ID	Description	Dependencies	Effort (S-XL)	Milestone
5	Software development is completed	1, 2	XL	3
6	All coffee shops that have partnered with CCSMS have been approved	3, 4	M	3
7	Test users review CCSMS	1, 2, 3, 4, 5, 6	L	4
8	Product is launched	1, 2, 3, 4, 5, 6, 7	XL	5

Risks

Risk ID	Description	Probability	Severity	Mitigation Strategies
1	Change in stakeholders	30%	70%	Find reliable stakeholders and ensure they are in favour of the product.
2	Team member is not available to work on project anymore	5%	80%	Ensure members have the necessary qualifications and are responsible. Some aspects of this risk are unavoidable (e.g. death or injury)
3	Change in functional requirements	20%	70%	Ensure functional requirements are not misleading or not thought out well
4	Change in non-functional requirements	30%	50%	Ensure non-functional requirements are written out well and the team is confident they can manage them.

Risks

Risk ID	Description	Probability	Severity	Mitigation Strategies
5	Code is low quality	5%	90%	Ensure all software engineers and programmers on the project are very confident and have qualifications necessary for writing code
6	Software is not up to date	8%	80%	Ensure software used is consistently still updated and is not an old version of the software
7	Programming language choice was poor	15%	80%	Ensure the language chosen will be appropriate for the CCSMS project
8	Servers are poor quality	15%	85%	Ensure servers chosen are reliable and easy to connect to

Design Assumptions

Assumption ID	Assumption
A01	RFID Tag Reliability
A02	Coffee Shop System Usability
A03	Coffee Cup Returning
A04	Technology Compatibility with System

Questions?