Semester Project Group 1

A Proposal for Smart Stock

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Project Background

Small businesses in our home country often used to rely on manual inventory methods, such as paper logs or outdated spreadsheets. These methods are inefficient, error-prone, and lack real-time insights. As a result, businesses (especially local businesses) struggle with stock shortages, excess inventory, and financial loss due to expired or misplaced goods.

During our studies in the U.S, we observed that many businesses here use advanced inventory management systems, which help them ease operations and improve efficiency. Inspired on this, we plan to develop Smart Stock, a database based smart inventory management system, designed to simplify stock tracking for small businesses with personal community-based modification.

Built using .NET MAUI, C#, and MSAL.Net, Smart Stock will provide real-time stock monitoring, unique product identifiers, and automated alerts for low stock or approaching expirations. Our goal is to create an affordable and user-friendly platform that empowers entrepreneurs to make data-driven decisions and reduce administrative overhead.

Project Functions and Features:

i) **Authentication (Login/Sign-Up)**
Using authentication feature, user (businesses) will be able to create accounts and log in securely using a unique username and password. This feature will ensure data security and prevent unauthorized access in Smart Stock.

Technical Requirements:

- Web Authenticator
- MSAL.Net for authentication and security

ii) **Create, Read, Update and Delete (CRUD) functionality**
The system will allow businesses to add new products, edit product details such as price, available stock, and descriptions, and remove products from inventory when necessary. Also, when removing items, users can specify reasons (personal notes) such as expiration or damage to maintain accurate records.

Technical Requirements:

- Database Connection (SQL)
- CRUD Operations in backend (C# MAUI)

iii) Automated Low Stock Notification System

Smart Stock will automatically monitor stock levels and notify users when inventory reaches a predefined low-stock threshold, which allows user to set their own definition. Notifications will be sent via in-app alerts and also via email or text message (as required by, only for premium users).

Technical Requirements:

- Email/SMS notification integration
- Push notification services

iv) Filter And Search Stock Information

The system will allow users to search and filter inventory based on criteria such as product name, category, expiration date and stock level. This feature will ensure quick access to specific items, which will improve efficiency in managing inventory.

Technical Requirement:

- LINQ for filtering and searching in the database

v) Bar Code Scanning Integration

Businesses will be able to scan barcodes using a mobile device's camera to instantly retrieve product details and update stock levels, which will eliminate manual data entry errors and speeds up the inventory management process.

Technical Requirements:

- Microsoft Barcode Scanner
- Camera and hardware access for barcode scanning

vi) Upload And Store Invoice Documents

Users will have the ability to upload and securely store invoice documents and receipts for record keeping and future reference. Supported file types will include PDFs and images.

Technical Requirements:

- File storage integration
- PDF/Image processing for document storage

Justification for Proposal

Smart Stock addresses the critical challenge of inefficient inventory management faced by small businesses, where manual methods like paper logs lead to errors such as stock shortages and financial losses. Inspired by advanced U.S. technologies, this project efficiently uses real-time tracking, automated low-stock alerts, and barcode scanning, while prioritizing affordability for local communities. Built with .NET MAUI, C#, and MSAL.Net, Smart Stock integrates technical components like secure authentication (MSAL.Net), SQL database, CRUD operations, LINQ filtering, and hardware dependent barcode scanning. These elements require proficiency in GUI design, backend logic, API integration, and cross-platform development which aligns with CSC 317 (Software Development Foundations) class objectives focused on C#, databases, and modern software workflows. The six-week timeline is achievable through clear role delegation (frontend, backend, QA) and Agile practices like GitHub version control and iterative testing. Beyond technical rigor, Smart Stock empowers local entrepreneurs by simplifying inventory management.