12TH FEBRUARY 2024

PROPOSAL FOR ELECTRONIC POINT OF SALE (SaleSync)

JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

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About SaleSync

SaleSync is a transformative initiative poised to revolutionize our point-of-sale operations through the implementation of a state-of-the-art Electronic Point of Sale (EPOS) system. In response to the evolving landscape of sales, this proposal outlines a strategic plan to modernize and enhance our retail transactions for improved efficiency, accuracy, and customer experience.

In the fast-paced world of sales and stock management, the reliance on traditional point-of-sale systems has become increasingly limiting in numerous ways.

Some of the limitations of the traditional system are:

Increasing Consumer Expectations:	Demand for fast and seamless transactions challenges traditional cash registers.
Data-Driven Decision Making:	EPOS systems offer real-time data on sales, inventory, and customer behaviour, facilitating informed decision-making.
Inventory Management Challenges:	EPOS systems provide accurate, real-time inventory tracking, reducing stockouts, overstocking, and manual errors.

Problem Statement

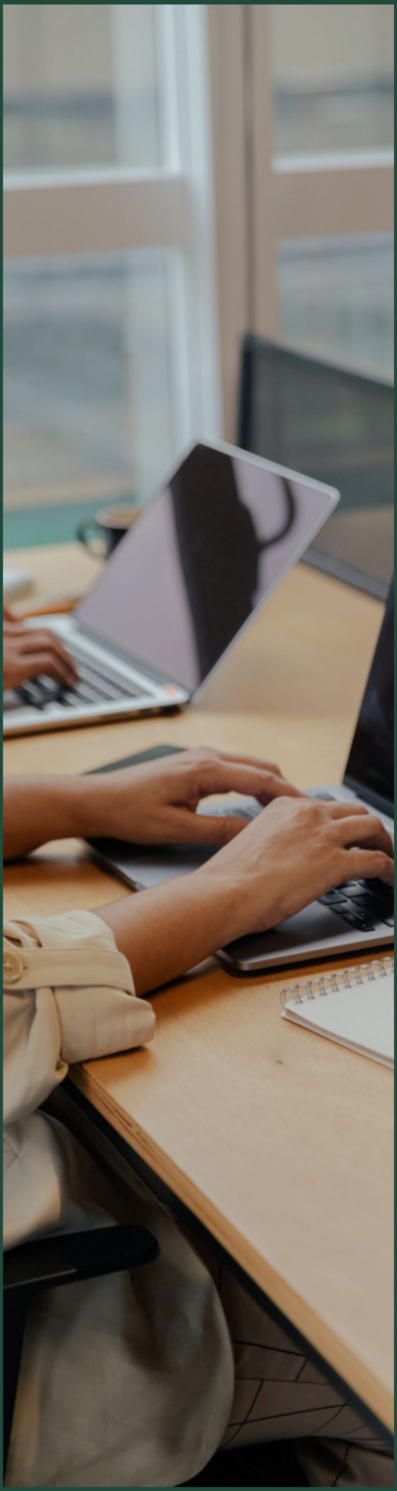
The current EPOS system in use lacks real-time synchronisation capabilities, leading to discrepancies in inventory levels between physical stores and the digital platform.

This inconsistency results in overselling, frustrated customers, and challenges in maintaining accurate financial records.

Additionally, the absence of a seamless integration with the online store creates manual intervention requirements, causing delays in updating product information and promotions across different channels.

To address this issue, the goal is to implement a comprehensive synchronisation solution within SaleSync that ensures real-time inventory updates across all sales channels, minimises discrepancies, and streamlines the integration between in-store and online operations over the next quarter.

This improvement aims to enhance the overall efficiency of sales processes, reduce errors, and provide customers with a consistent and reliable shopping experience across all platforms.



Potential Users

SaleSync will primarily serve clients and users seeking an efficient solution for retail operations. This includes retail shop owners,people managing a chain, or exploring tools for their business.

Retail Shop Owners

Retail shop owners, irrespective of their business's scale, form a vital part of our audience. SalesSync is designed to address their specific needs, offering a comprehensive solution for optimised management and growth

Warehouse Managers

For warehouse managers overseeing inventory logistics, SalesSync is an invaluable asset. Its capabilities facilitate efficient inventory tracking, real-time updates, and seamless integration with retail operations.

Stock Managers

Stock managers focused on maintaining optimal levels and minimising discrepancies will find SalesSync a powerful ally. The system simplifies stock management, offering real-time insights and precise control over inventory.

Requirements

This segment outlines the technical specifications for developers and the user-focused criteria for end-users. It is a crucial roadmap guiding development and ensuring a seamless user experience.

Functional Requirements

Product Catalogue

A centralised repository for managing and organising products.

Sales Processing

Efficiently process transactions, calculate totals, and generate receipts.

Inventory Management

Real-time tracking of stock levels, automating updates with each sale.

User Authentication

Securely authenticate users to manage access and permissions.

Sales Reporting

Generate reports on sales, revenue, and inventory for informed decision-making.

Discounts and Promotions

Apply discounts and manage promotional campaigns easily

Tax Calculation

Automated tax calculations based on product prices.

Offline Mode

Ability to continue processing sales even when the system is offline.

Product Images and Description

Enhance the catalogue with product images and detailed descriptions.

Employee Management

Track employee sales and manage access levels.

Non Functional Requirements

Performance

The system must process transactions within an acceptable period of time, even during peak hours.

Reliability

The EPOS system should be available 99.9% of the time, with a maximum downtime of an hour per month for maintenance.

Usability

The user interface must be intuitive, requiring no more than 2 hours of training for new staff members.

Scalability

The system should be able to handle a 20% increase in transaction volume without a significant decrease in performance.

Error Handling

The system must provide clear and user-friendly error messages, guiding users on how to resolve issues.

Accessibility

The user interface must adhere to accessibility standards (e.g., WCAG) to ensure usability for individuals with disabilities.

Documentation

Comprehensive documentation must be provided for easy system maintainance.

Auditability

The system must maintain an audit trail, logging all significant events, transactions, and user activities for a minimum of one year.

Hardware Requirements

Processor

Intel Core i3 or equivalent AMD processor.

RAM

8 GB DDR4 RAM for smooth multitasking and efficient performance.

Storage

256 GB Hard Disk Drive (HDD) or Solid State Drive (SSD)

Graphics

Integrated graphics (e.g., Intel UHD Graphics)

Operating System

Windows 7 or higher.

Platform Requirements

.NET Framework

The desktop application will be built primarily using this framework.

Docker

During development, a MYSQL image will run in a docker container to avoid locally installing the database.

Visual Studio

An integrated development environment (IDE) that will be used for developing, debugging, and testing SaleSync.

Lucidchart

A web-based diagramming tool facilitating collaborative creation of the entity relational diagrams (ERDs).

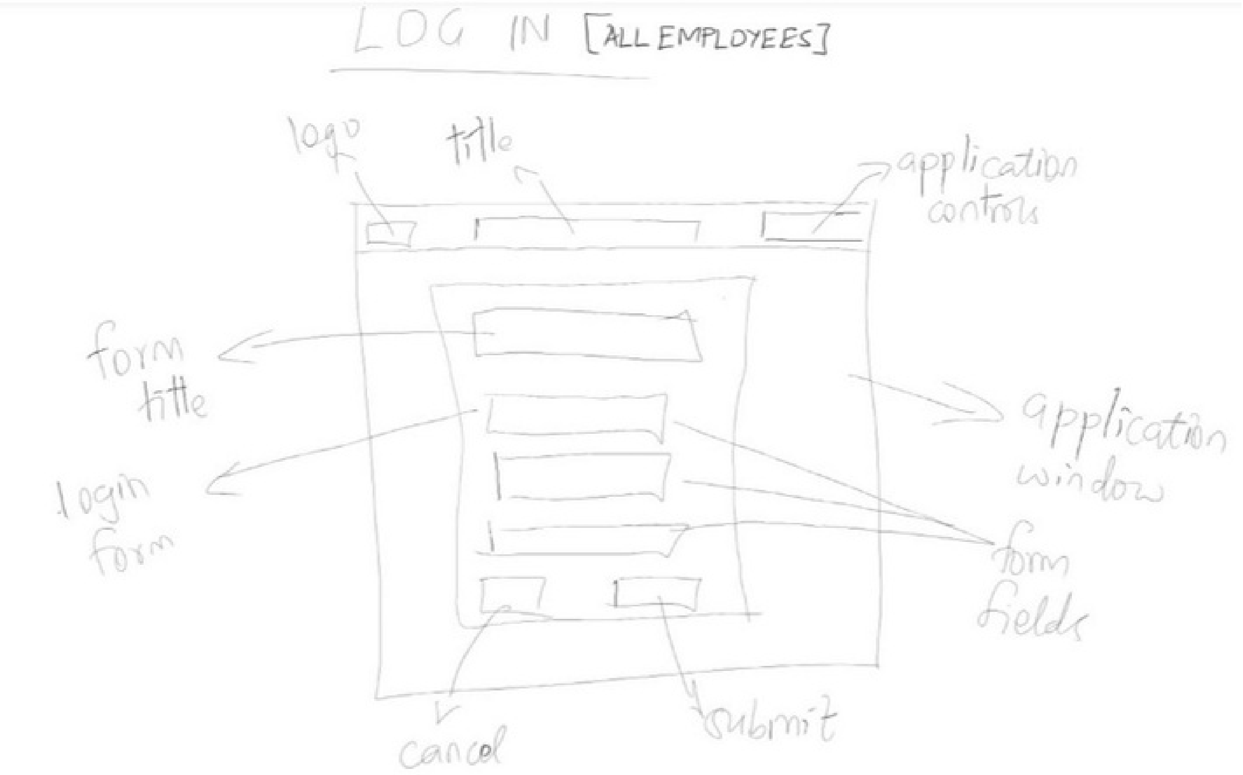
Jira

A widely used project management and issue tracking tool that will be heavily used in project planning and implementation of the Agile Methodology.

Proposed Mockups

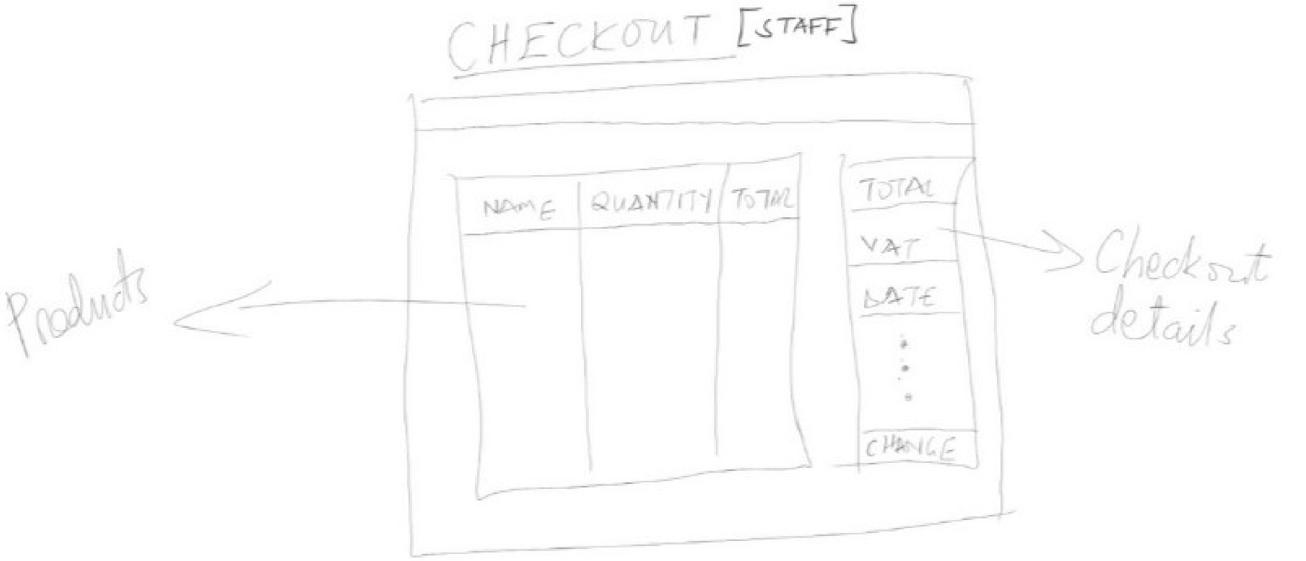
Login Page

The login page serves as a pivotal point of interaction, providing a user-friendly form equipped with fields for employees to securely access the system. With a focus on authentication and authorization, this crucial gateway ensures a seamless and protected entry into the platform. The design not only prioritises simplicity for user convenience but also incorporates robust security measures to safeguard sensitive information. The login page, as visualised in the mockups, is a foundational component, setting the tone for a secure and efficient user experience within the broader system.



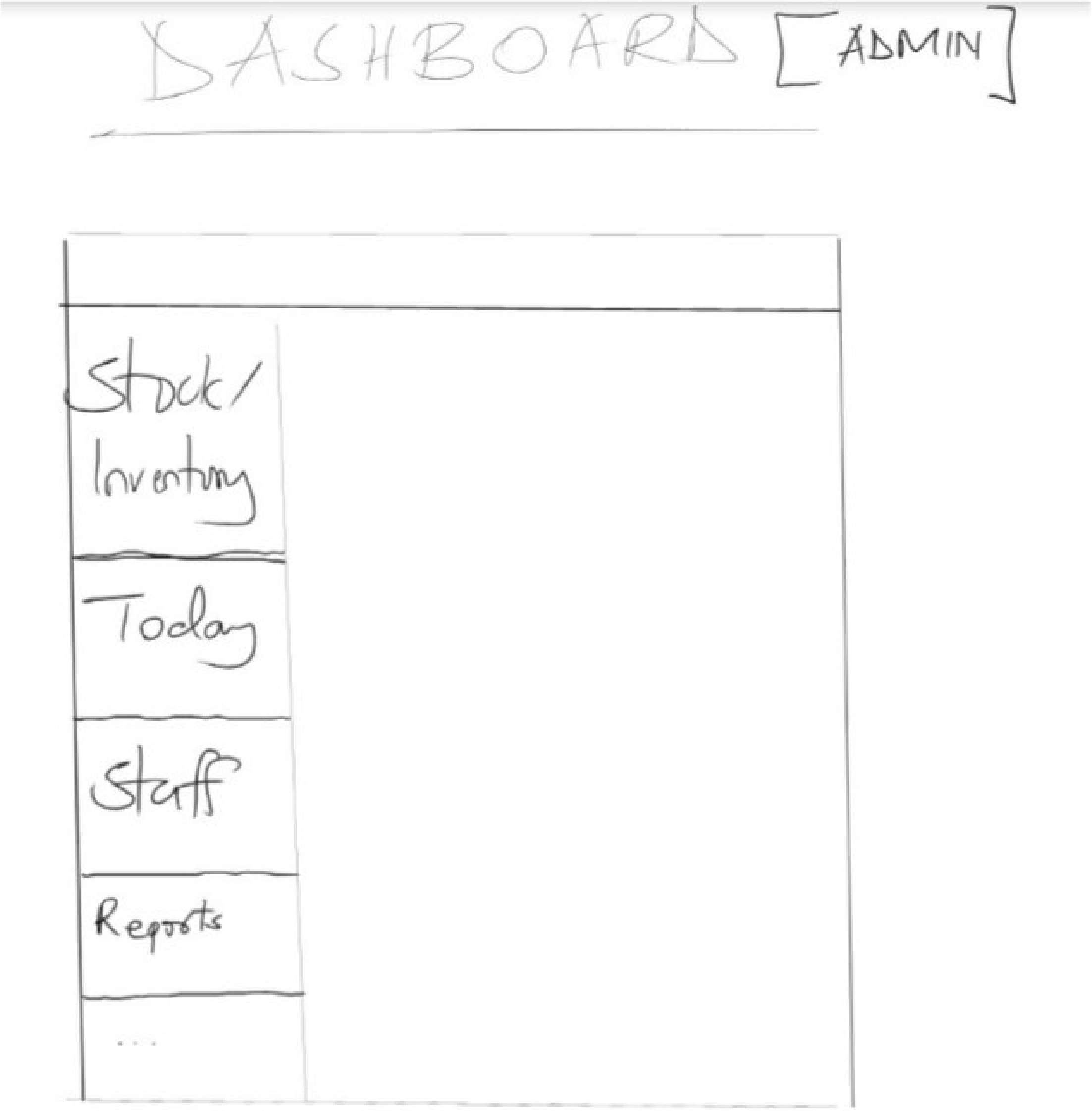
Checkout

Primarily accessed by employees at terminals, the checkout page is a central operational interface. It displays products entered for checkout, detailing the total amount, VAT, and today's date. Employing an intuitive layout, this page integrates essential transactional details, facilitating efficient processing at the point of sale. Through meticulous design, it ensures a seamless user experience for employees handling transactions, offering real-time insights into sales data and financial metrics.



Dashboard

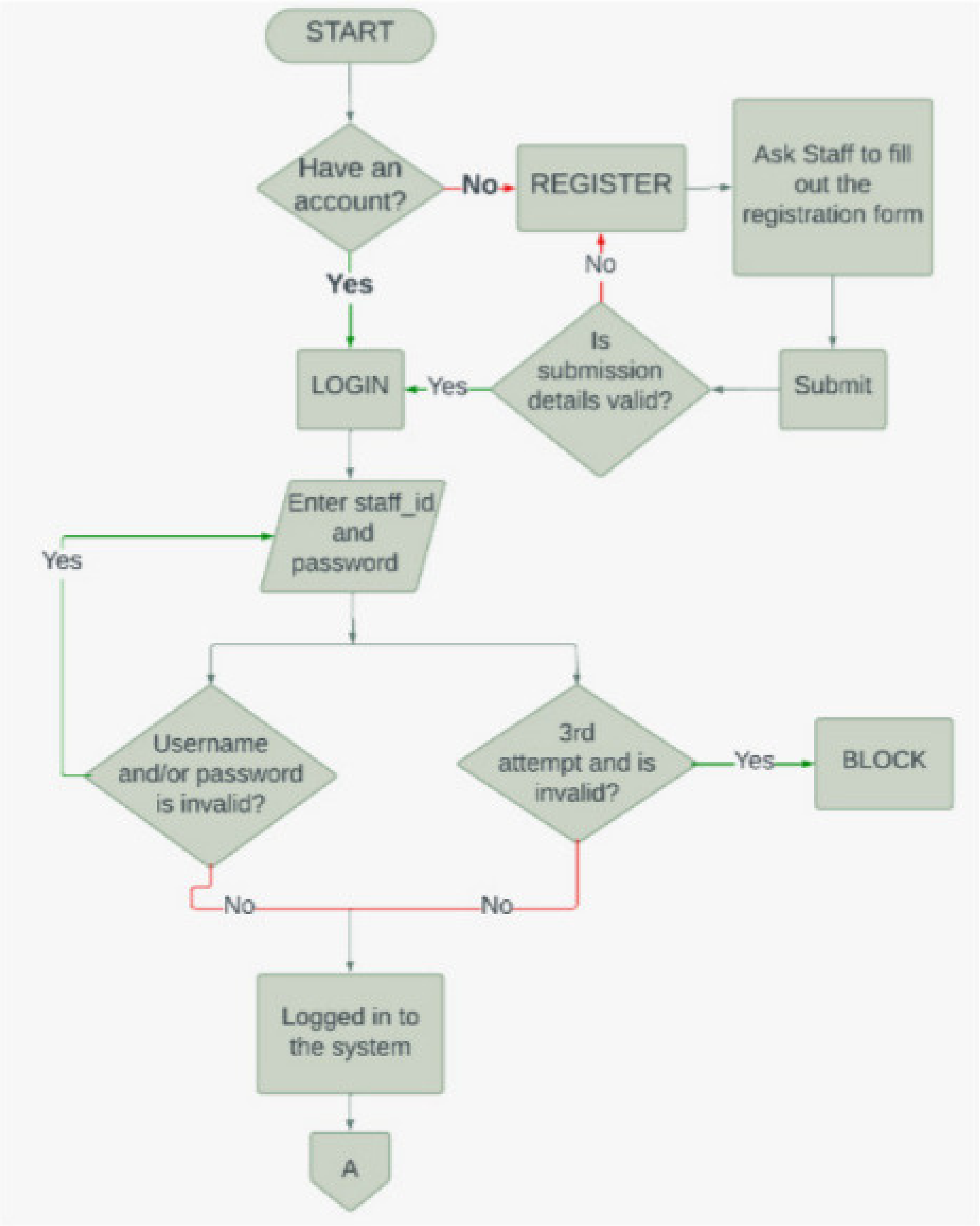
Accessible exclusively to system administrators, the dashboard is a central control hub featuring advanced functionalities. Admins can perform crucial operations such as intricate stock management, real-time sales monitoring, staff administration, and report generation for various system entities. Leveraging robust authentication protocols, the dashboard integrates data visualisation tools and reporting mechanisms, ensuring secure and efficient management. Designed for scalability, this dashboard empowers administrators with essential tools for streamlined system control and optimization.



Sample Flowcharts

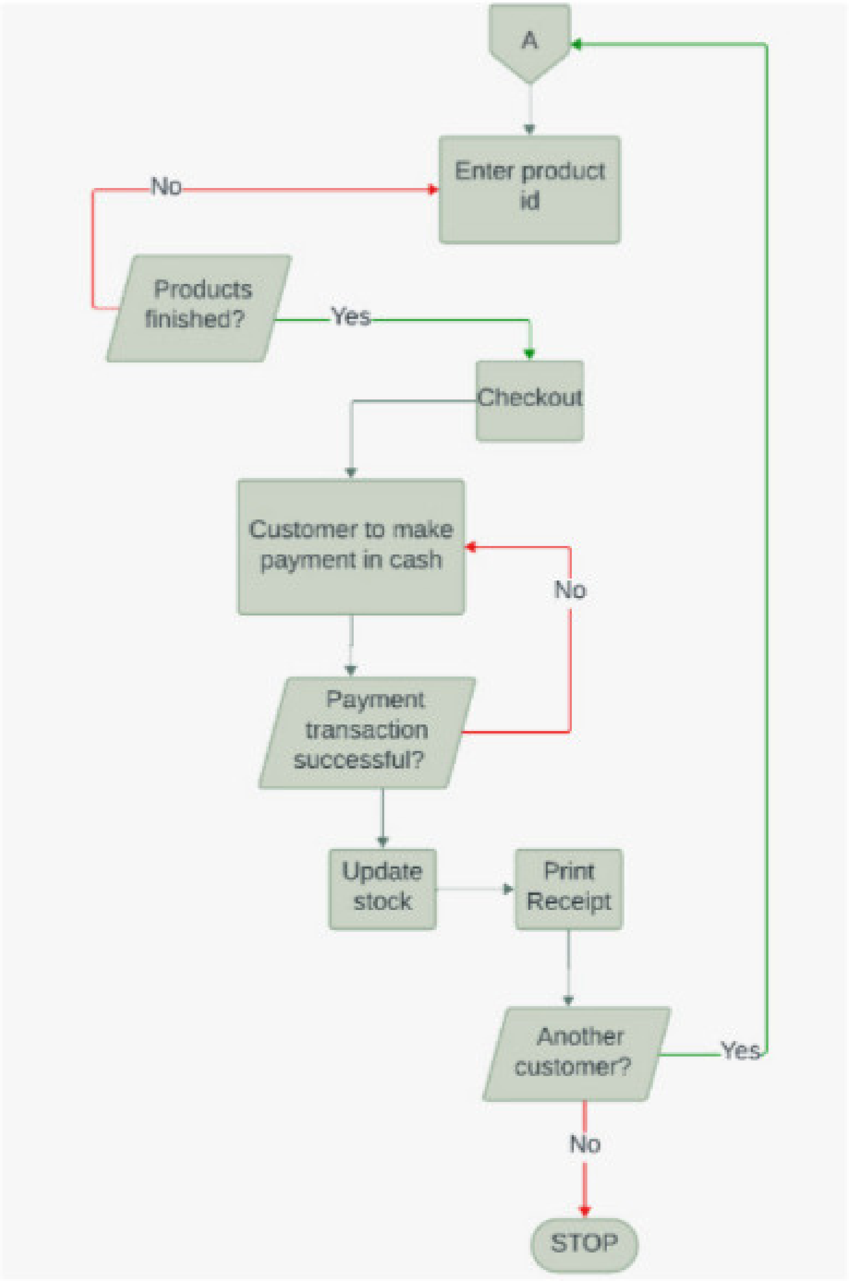
User Authentication

The system will implement user authentication mechanism where a user can login (employees) or sign up in the event that the user does not have an account in the system.


START
Have an account?
No
REGISTER
Ask Staff to fill out the registration form
Yes
No
LOGIN
Yes
Is submission details valid?
Submit
Enter staff_id and password
Yes
Username and/or password is invalid?
3rd attempt and is invalid?
Yes
BLOCK
No
No
Logged in to the system
A

Customer Checkout

This flow chart highlights how a user's products are keyed into the system and updating of the stock.



Proposed Models

Product

- ID (Primary Key)
- Name
- Description
- Price
- Quantity
- Created At
- Updated At

Sale

- ID (Primary Key)
- DateTime
- Total Price
- Served By (Employee ID Foreign Key)
- Created At
- Updated At

SaleItem

- ID (Primary Key)
- Sale (Foreign Key)
- Product (Foreign Key)
- Quantity
- Unit Price

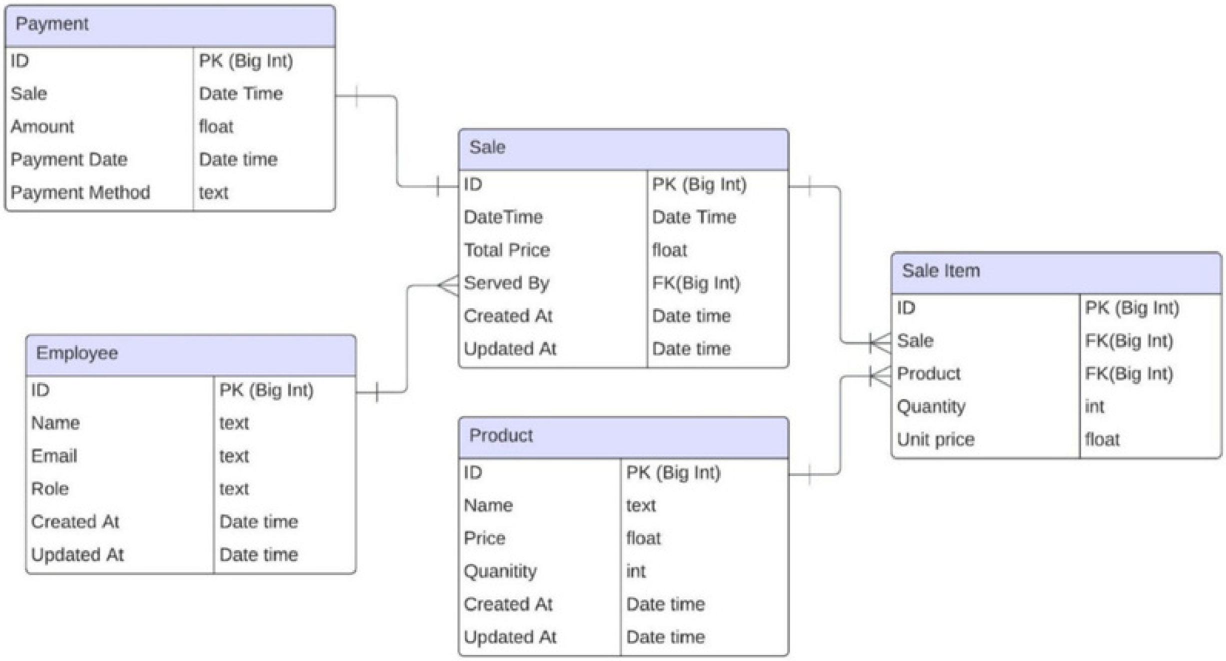
Employee

- ID (Primary Key)
- Name
- Email
- Role
- Created At
- Updated At

Payment

- ID (Primary Key)
- Sale ID (Foreign Key)
- Amount
- Payment Date
- Payment Method

The diagram below illustrates the relationships between the entities



Payment	
ID	PK (Big Int)
Sale	Date Time
Amount	float
Payment Date	Date time
Payment Method	text

Sale	
ID	PK (Big Int)
DateTime	Date Time
Total Price	float
Served By	FK(Big Int)
Created At	Date time
Updated At	Date time

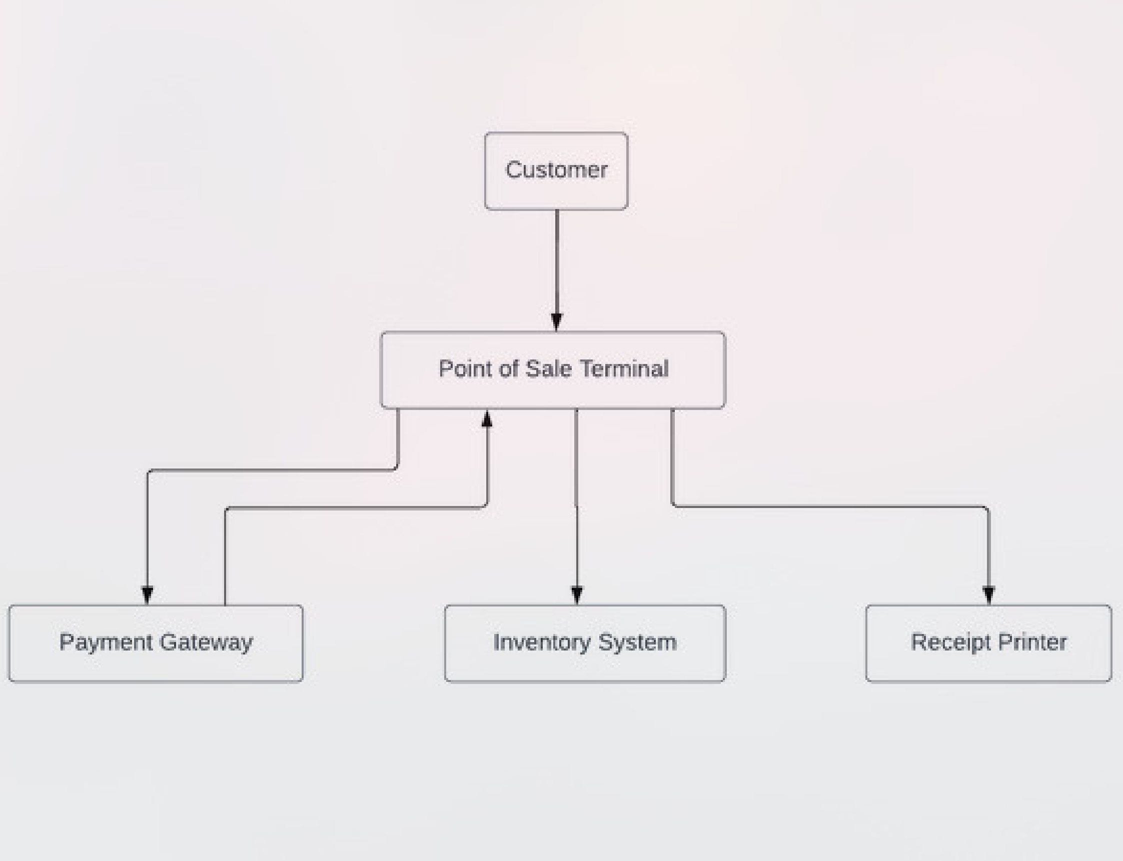
Sale Item	
ID	PK (Big Int)
Sale	FK(Big Int)
Product	FK(Big Int)
Quantity	int
Unit price	float

Employee	
ID	PK (Big Int)
Name	text
Email	text
Role	text
Created At	Date time
Updated At	Date time

Product	
ID	PK (Big Int)
Name	text
Price	float
Quanitity	int
Created At	Date time
Updated At	Date time

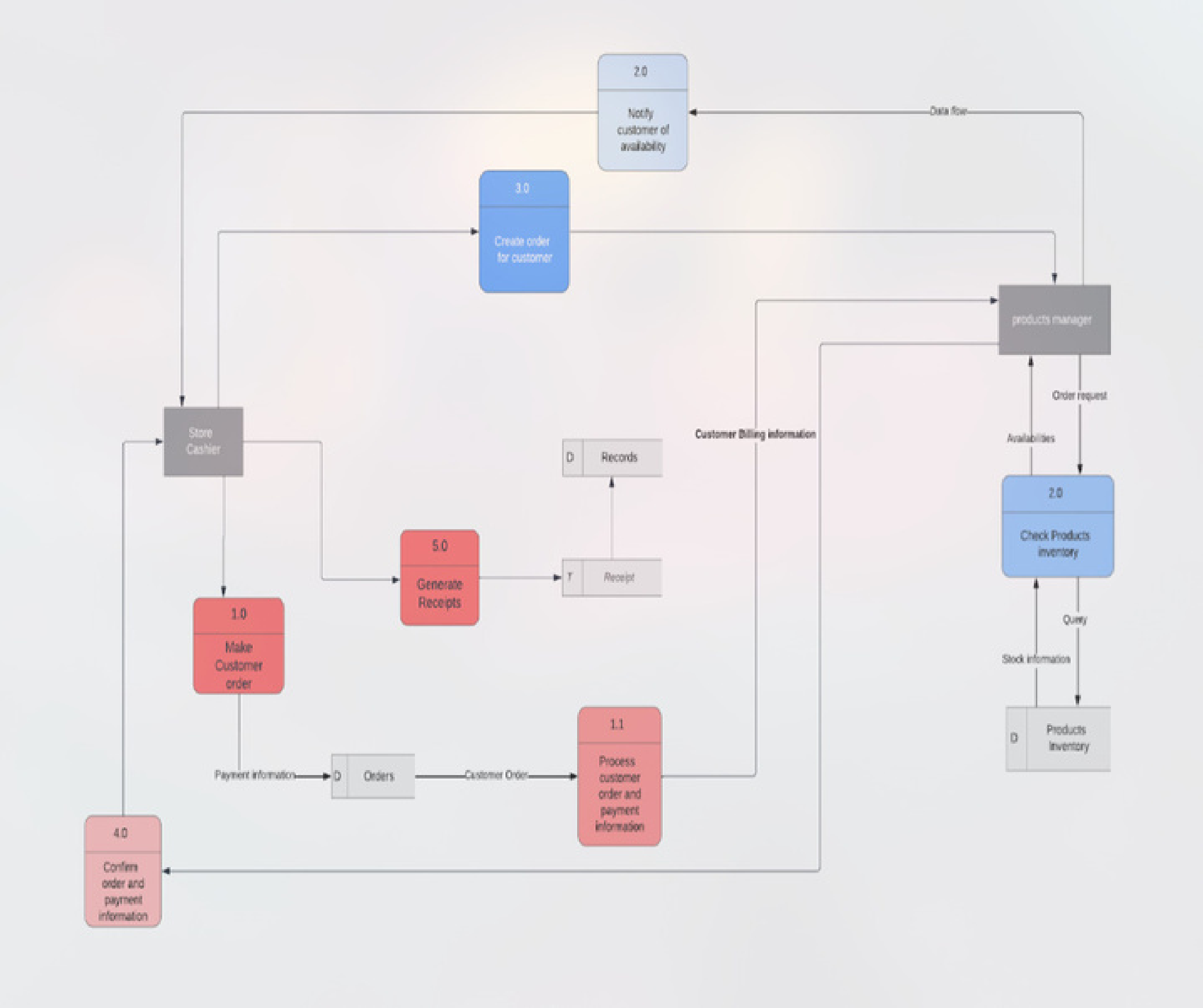
Architecture

Architecture diagrams help you assess the potential impact that upgrading, replacing, or merging existing applications may have on the system. This also makes them especially useful for code maintenance, enabling developers to easily review code and find and patch bugs.



Data Flow Diagram

Data flow diagram shows the flow of data within our system. Data enters through the cashier and is finally output in the receipts and records, In the below DFD data flows in the direction of the arrows and in sequential from 1.0 - 5.0



Proposed Timeline

The Project Covers 7 weeks from 12/2/2024 to 1/4/2024

Task	Start	End	Duration (Weeks)	Description
Database modelling	12/2/2024	19/2/2024	1	Develop the Entity-Relationship Diagram (ERD) to represent the structure and relationships within the database, guiding the design of the database schema.
UI design	19/2/2024	26/2/2024	1	Create the visual elements and layout for the user interface (UI) to ensure a user-friendly and aesthetically pleasing design.
UI Implementation	26/2/2024	11/3/2024	2	Translate the finalised UI design into functional code, implementing the graphical elements and interactivity as per the design specifications.
Implementation of features	11/3/2024	25/3/2024	2	Code and integrate the various features and functionalities outlined in the project requirements, aligning the system behaviour with the intended functionalities.
Testing	25/3/2024	1/4/2024	1	Conduct thorough testing of the developed system to identify and rectify any issues, ensuring the reliability, functionality, and usability of the software before deployment.

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