Requirements Document

Inventory Management Plan

Inventoria

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Revision History

Name	Date	Reason for Changes	Version
Team	22-Jan-2020	Initial Draft	0.0
Jonathan Parkes	27-Jan-2020	Draft of 1.1, 1.2, 1.5	0.1
Amaan Makhani	30-Jan-2020	Completed 3.1 and 3.5	0.2
Jonathan Parkes	30-Jan-2020	Draft of 3.2	0.3
Elizabeth Vellethara	30-Jan-2020	Draft of 3.3 and 5.3	0.4
Vivienne Zeng	30-Jan-2020	Draft of 2.1 - 2.4	0.5
Siddhant Kumar	30-Jan-2020	Completed 2.5, Draft of 2.6.1 & 2.6.2	0.6
Cameron Lindsay	30-Jan-2020	Draft of 4.1 - 4.4	0.7
Jonathan Parkes	01-Feb-2020	Added the DFD and context diagram	0.8
Team	02-Feb-2020	Final draft	0.9
Team	03-Feb-2020	Finalized released copy	1.0

1 Introduction

1.1 Purpose

The purpose of the following Requirements Document (RD 1.0) is to define the requirements for Kevin's Convenience Store's Inventory Management System. This system is to be integrated with existing systems and processes in place. The requirements in this document represent the needs of the inventory management system's method of stock manipulation, order tracking, user interaction, and existing company systems/infrastructure integration.

1.2 Project Scope

The scope of the solution system will cover the software used to manage inventory, new hardware needed to collect and interpret data, and the interactions required between the current systems and the new system. This resulting system is intended to be a simpler, smaller, and cheaper alternative to the current, larger and more expensive systems used in major grocery store chains. The desired outcome for the solution system will increase inventory accuracy, lower product losses, and optimize the ordering of products.

1.3 Glossary of Terms

Term	Definition
POS	Point of Sales, the machine at which the merchant conducts a transaction with a customer.
UI	User Interface, space where interactions between humans and machines.
Discrepancy	An inconsistency arising from the comparison between two or more facts.
Administrator	A user with special access due to their responsibilities, privileges, or position.

1.4 References

[1] *Request for Proposal*, Kevins's Convenience Corner, 2020 [Online]. Available: RFP - Inventory System.pdf. [Accessed: 25- Jan- 2020]

[2] "Kevin's Convenience Corner", 2020. [Online]. Available: https://sites.google.com/view/kevins-convenience-corner/home. [Accessed: 25- Jan- 2020].

1.5 Overview

This document, RD 1.0, is the first revision of the Requirements Document written for Kevin's Convenience Corner's Inventory Management Plan. This document contains a detailed description of the system, definitions of the system features, external interface requirements, and nonfunctional requirements. The system description will cover the product perspectives and features, user classes and characteristics, operating environment, design, implementation constraints, and assumptions/dependencies. Following this, the six current system features will be covered in greater detail containing a description, priority, and its functional requirements. After these are defined the details of the external interfaces for a user, hardware, software, and communication will be described. Lastly, both nonfunctional/additional requirements and quality attributes will be defined. Within this section requirements for performance, safety, and security will be defined in detail.

2 Overall Description

2.1 Product Perspective

To improve and digitize the existing inventory records and organization management system, a convenience store inventory management system is needed. It can be integrated with existing systems and processes in place to synchronize the various systems of the store. This will synchronize all product information and their quantities in a timely manner, reducing the frequency of product shortages and the number of products that expire before they are sold.

2.2 Product Features

The solution system includes sales, ordering, and inventory subsystems. Users can scan the barcode of products for inventory and either sell or discard a product. The system will record product information, including shelf life, and track the total quantity in storage. Ordering lists and shipping dates will be prescribed within the system. The system and the barcode contain this information in addition to the expiry date of products. When the expiry date of a product is approaching, or when the stock of a product is low, the system will notify the user and provide them with the relevant notification.

2.3 User Classes and Characteristics

There are two types of users that interact with the system: support staff and managers. Each user has different privileges of the system based on functional and administrative requirements.

2.3.1 Support Staff

Support staff can only use the application to sell, receive, count products, and view product descriptions. Users will be able to use the mobile application to check the information of products, scan in inventory or scan outsold products using the products' barcode. As a security measure, the support staff has the least privileges. Should support staff be required to perform duties outside of their access rights, a system administrator (Store Manager) must provide a user override to that staff member's account privileges.

2.3.2 Store Managers (Administrator)

The store managers will interact with the system with full administrative privileges, interacting with the web portal to manage the overall system. Store managers are able to manually modify inventory data, place orders to distributors, manipulate expiry dates, as well as manage account privileges.

2.4 Operating Environment

This system is web-based and supports accessibility through desktop and mobile devices. The system will contain IOS and android functionalities to increase usability across mobile devices. The web and mobile user interfaces share the same UI and database. Product information is gathered by scanning the product barcode using a scanner which is uploaded to the database upon completion.

2.5 Design and Implementation Constraints

The digital system made by the developers would be subject to the following constraints:

1. The system must be accessible to users with physical disabilities and color blindness. Therefore, the system UI must employ the use of symbols, larger buttons, a minimalistic interface, as well as a grayscale option.
2. The system will be accessible on both mobile devices and desktop computers. This means that the web UI will be mobile friendly and scale down effectively to fit mobile device dimensions.
3. The system must make use of the software infrastructure already in place at the store including any established databases or tools.
4. The solution must integrate with the current POS system.
5. Inventoria would be responsible for maintaining the designed software following deployment. This includes performing regular maintenance checks, security updates, and software updates.

2.6 Assumptions and dependencies

2.6.1 Assumptions

For the scope of this project, the following assumptions are made:

1. The expiry date of a product, with the exception of fresh produce, would be embedded in the barcode of that particular product.
2. The store staff would be responsible for dealing with products nearing their expiration date and in the event of discrepancies arising in data.
3. Each product has one unique barcode which is equivalent throughout duplicates of that product.
4. Kevin's Convenience Store would be responsible for any direct communication with the distributors.

2.6.2 Dependencies

The system would have the following dependencies:

1. All Kevin's Convenience Store branches must have a stable internet connection in order to maintain accurate and real-time data distribution between the systems.
2. The system would utilize the database system already in place at the store which contains the current inventory and associated product information.
3. The system would utilize the current POS system which is used to tally up the number of products sold as well as commission the sale.

3 System Features

This section describes the six main features of the system which are relevant to its primary operations. Refer to data flow modeling diagrams in **Appendix B**. Each of the six features is assigned a priority based on the definitions below:

High: A feature that is required for the operation of the system.

Medium: The feature is not required for the operation of the system but will make a large impact on the usefulness of the system or has a required action by the system.

Low: The feature will only impact a small number of users or has no resulting action in the system other than notifications

3.1 Scan-in Inventory

3.1.1 Description and Priority

This feature will allow users to scan in inventory that was ordered and received into the system for tracking. Users will be able to scan or select a product and enter the number of products being added. The barcode of the product will contain the expiry dates, if the expiry date was unavailable, the user will manually enter the batch expiry date. This feature is the entry point for all tracked products and is of **high priority**.

3.1.2 Functional Requirements

REQ-1-1: The user must be able to add products by scanning the product barcode.

REQ-1-2: The user must be able to add products by finding them in a categorized product list.

REQ-1-3: The number of products being added must be specified by the user.

REQ-1-4: The user must specify the category of the product.

REQ-1-5: The user must enter an expiry date for perishables and dairy products if not obtained from the barcode.

REQ-1-6: An administrator user must be able to remove inventory products incorrectly entered.

REQ-1-7: An administrator user must be able to modify the details of the added inventory.

3.2 Scan-out Sold/Discarded Inventory

3.2.1 Description and Priority

Scanning out inventory is a crucial feature for the overall inventory management system. This feature will allow products to be scanned out of the system and remove them from the current store inventory. This may be done for two reasons: the product has been purchased or the product has been damaged. The resulting actions are to either remove the product from inventory and categorize it under sales or to remove the product from inventory and categorize it under losses. The requirement priority of this feature is a **high priority**.

3.2.2 Functional Requirements

REQ-2-1: The user must be able to scan or select a product using the POS system to remove it from inventory when it is purchased, then categorize it undersold goods.

REQ-2-2: Damaged or expired products are able to be scanned to remove it from inventory, then categorized appropriately.

REQ-2-3: Products removed from inventory through scanning must be categorized under either sold, expired, or damaged.

REQ-2-4: Products can be scanned out of inventory by both types of users.

REQ-2-5: Damaged products can only be removed from the inventory manually by an administrator, then categorized as damaged.

3.3 Order Handling

3.3.1 Description and Priority

The store manager is notified when a product in stock is at or below its minimum amount. By scanning a product, the system must highlight the quantity of the said product in stock, whether or not an order containing the product has been placed, as well as the estimated arrival date of the order. This feature will be capable of drafting orders and store the order history of a product. The store managers will use this feature to scan a product or select it manually and draft orders by entering the total quantity needed. The order history of a product must store the arrival date, the quantity ordered, the total cost, and the invoice for every past order made. The store manager can use this feature of the system to confirm the arrival date or enter the actual date of arrival in addition to checking the amount ordered on the day of arrival. This feature is a **medium priority.**

3.3.2 Functional Requirements

REQ-3-1: The administrator will get notified when the quantity of a product becomes less than or equal to 25% of the original amount.

REQ-3-2: The current amount and estimated arrival date for an incoming order must be visible to all users.

REQ-3-3: A PDF summary of the inventory will be produced when requested.

REQ-3-4: The administrator must be able to manually change the order arrival date to improve accuracy.

REQ-3-5: The administrator must be able to print the order confirmation page as a PDF

3.4 Manage discrepancies - Discrepancy Sniffer

3.4.1 Description and Priority

The system with the responsibility of alerting the ordering manager of any discrepancies in stock is called the ‘Discrepancy Sniffer’. The Discrepancy Sniffer’s algorithm will allow for any discrepancies in product inventory to surface based on inconsistency in the amount of product originally received, the amount of product sold, and the amount of product still on the shelf. This

will be facilitated using information made available by Sections 3.1 and 3.2 defined above. The Discrepancy Sniffer will also accumulate the amount of revenue lost due to the missing products not being sold. This feature is a **low priority.**

3.4.2 Functional Requirements

REQ-4-1: An administrative user must be able to see which products are missing from the store and the quantities of each.

REQ-4-2: The administrative user must be able to see the total amount of revenue lost due to discrepancies in inventory.

REQ-4-3: The administrative user must be able to differentiate between product loss due to expiration and product loss use to theft and mishandling.

REQ-4-4: An administrative user must be able to adjust the period of time over which the inventory count is being issued.

3.5 Manage product expiry

3.5.1 Description and Priority

Expiry dates that are collected when inventory is entered will be tracked. Inventory that is close to expiry or has expired will be presented to the staff as an alert when they ask for a product summary. Once presented, these alerts will remain until dismissed. It is the user's responsibility to remove expired products from the shelf when notified. This feature is a **low priority**.

3.5.2 Functional Requirements

REQ-5-1: Users will be notified of upcoming expiries when products are two weeks away from expiring, then again when they are four days from expiring.

REQ-5-2: Users will be notified when products are expired.

REQ-5-3: Expired products will be removed from the inventory.

REQ-5-4: Expired product notifications will require dual confirmation prior to being dismissed.

3.6 View Current Stock

3.6.1 Description and Priority

The system will allow for the current stock to be viewed through the software's user interface. This information will be displayed to the device in a manner that is easy to read for all users. This feature is a **high priority**.

3.6.2 Functional Requirements

REQ-6-1: Users will be able to view the current stock of all stores.

REQ-6-2: Users will be able to sort the stock view by keyword, expiry date, or a section.

REQ-6-3: The default product stock viewed by a user will be based on the employees' primary work location.

REQ-6-4: Users will be able to search product stock through the product barcode.

4 External Interface Requirements

This section describes external user, hardware, software and communication interfaces required by Kevin's Convenience Store branch to run the Inventory Management System.

4.1 User Interfaces

The web-based application places a heavy emphasis on mobile hardware that requires a touch-screen style input, where a user will be able to interact with the application through standardized digit motions across the device's screen. However, desktop users are expected to use the application as well, thereby necessitating standard mouse and keyboard input. Upon starting the application the user will require to log in through the company website. Two separate user types, store managers and support staff will have slightly varied options. Store managers will be able to draft orders to distributors through the application as well as change prices. The support staff will only be able to enter and view stock/product information into the store database. A "menu" button will allow easy switching between windows. To scan information from product shelves/shipments, the user will hit a button from the app to bring up the scanner. The user will scan in the barcode which automatically populates the product page with the appropriate information. The user will make any additions or changes where appropriate. The disability requirements of employees result in unique changes to a standard mobile UI. A color-blindness option will be available that applies a grey-scale filter to the entire application. Additionally, larger buttons will be implemented as part of the standard UI to accommodate the members of Kevin's Convenience Corner with physical disabilities.

4.2 Hardware Interfaces

The application is web-based and focuses on mobile devices with a functional scanner peripheral. Desktop access will share the same features and UI. Navigation through the application will be accessible through touch-screen interface or, if on desktop, mouse, and keyboard. The device should also be able to maintain a constant internet connection to allow for real-time updating of the inventory database. However, in the event of an internet connection being unavailable, the application will require access to the device's local storage to ensure user input is maintained. Data entered will be uploaded as soon as a connection becomes available.

4.3 Software Interfaces

Upon entering login information, the app will connect with Kevin's Convenience Corner database and display appropriate windows, buttons, and menus based on user administrative privileges.

4.3.1 Product Scanning

Upon entering the scanning menu the user will press a button to prompt the scanning functionality. The user will scan the product's barcode whereby the software will bring up the appropriate product from the database. The scanning menu will close automatically and barcode information will auto-populate the product's information page. The user will be able to manually enter data for fields where information is unavailable or inaccurate (expiry, quantity, etc.). Once the user submits the completed page, the application will upload the new product information to the inventory database and display an empty product page.

4.3.2 Inventory Management

The application will connect to the inventory database whereby the user will be able to scroll through product data tables containing immediately pertinent information. Inventories of alternate stores are viewable via a dropdown menu. A product search function via manually entering key terms or through a product scanner will be available to the user. Should the user wish to investigate the details of a particular product further, they can either touch or double click on the product of interest to bring up the product page. End of day inventory logging and management will calculate total losses with the ability for the user to manage the reason for loss (i.e. theft, product expiry, customer relations).

4.3.3 Product Ordering and Tracking

Order numbers, distributer, and estimated delivery dates will be summarized and displayed in a data table similar to that displayed in 4.3.2 (Inventory Management). Creating a new order or modifying an existing order requires the user to either touch or double click on the create new order button/order of interest to bring up the order information page. The user will be able to

manually change all data except ‘communication history’ on this page should they have the appropriate administrative privileges. Due to the inability to interact with distributor databases, the quality of information on this page will be the responsibility of the user. Should the distributor have an associated email that accepts product orders, the user will be able to press a button at the bottom of the order page to redirect to the company’s email. The email will have a new message composed containing a pdf copy of the order in addition to the distributor’s email auto-populated. Once sent, the page will return to the orders data table along containing a newly populated date of last communication.

4.4 Communications Interfaces

The application will have a constant internet connection to maintain real-time database management as well as access to the device’s local storage for temporary storage should the event of an internet connection failure occur. Additionally, the application will require direct access to both the third-party POS system and inventory databases to ensure logged inventory and prices are maintained in real-time. Interaction with the company website and email is required for security, product ordering, and tracking features.The ability to print specific pages of interest requires a connection to a local network printer.

5 Other Non-Functional Requirements

5.1 Performance Requirements

The system will be capable of handling a request such as summarizing an inventory report with up to 5000 varying products. Each listed product will contain an associated count as well as any other pertinent information. Requests of this size are likely to occur every time the system is used and must be responsive within 500ms. When edits are being made by the user, the system will be capable of updating the database within 100ms. When a sale is being finalized using the POS, the system will update the database within 10ms to remove sold products from stock. The store is open up to 128 hours a week, requiring round-the-clock runtimes. Therefore, the application should be run and tested for 140 hours prior to release.

5.2 Security Requirements

Access to data is restricted to the employees of Kevin’s Convenience Store. This may be implemented using a login feature. The login feature will require staff to enter their user ID and password for authentication. Financial security is of low concern as the current POS system prevents access to payment information. This system will only convey product sales.The system must have a daily end-of-day scan for any bugs and vulnerabilities. If any unusual activity is discovered, the store manager and an Inventoria security engineer will be notified with the error

type. In addition to the error type, Inventoria's security engineer will receive a detailed event history to better address the issue. The system will also be subjected to regular system updates.

5.3 Software Quality Attributes

Our system is concerned with two primary quality attributes:

Accessibility - The system must be accessible for physically disabled employees as well as support for color blindness. This can be validated by providing a grayscale option in the system.

Learnability - Since the system simplifies the current procedure for the employees, the system must be learned by the employees within one workday.

Scalability - The system must be able to accommodate and integrate the databases of new branches, as the company expands.

Appendix A: Issues List

- The scanner to be used for scanning barcodes is to be determined (TBD) since the current systems for scanning barcodes have not been investigated enough to make an informed choice.

Appendix B: Analysis Diagrams

The data flow diagrams created in the analysis process summarize the use and interactions between features.

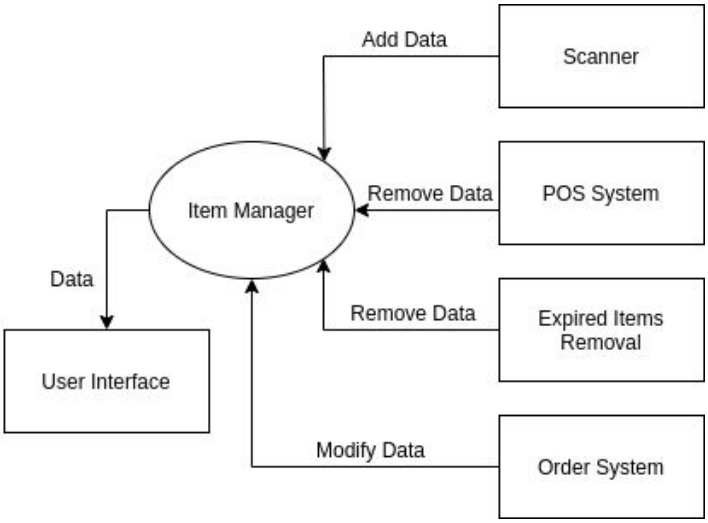

Figure 1.0 Context Diagram

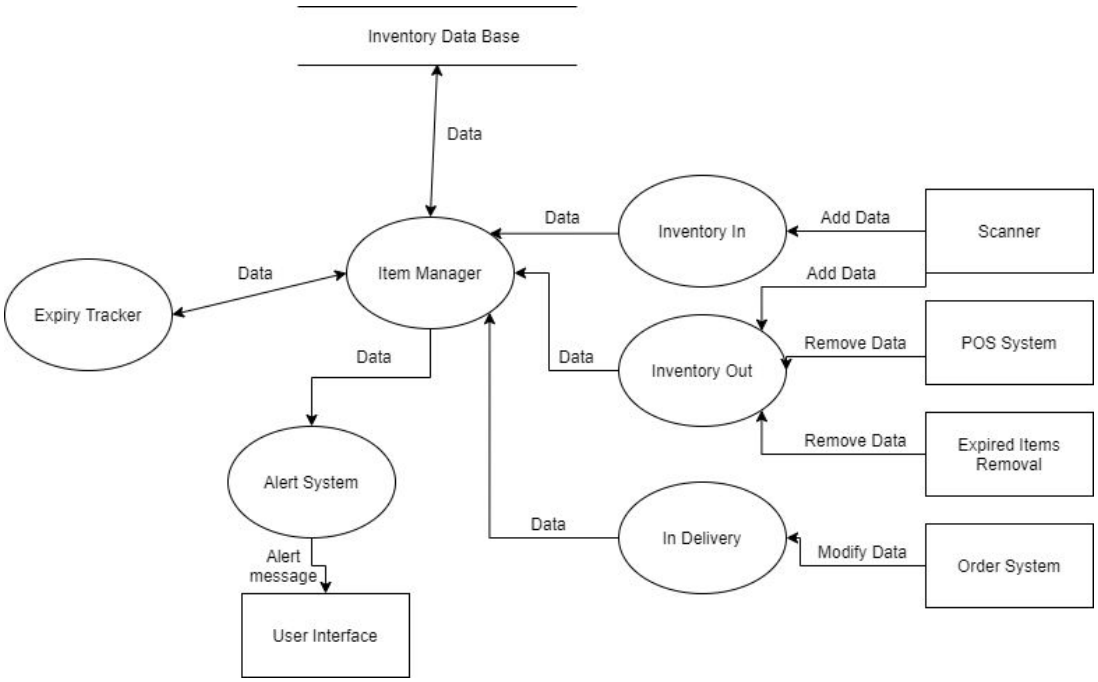

Figure 2.0 Level 1 diagram