Software Requirements Specification (SRS)

for

Inventory Control Ordering System

Version 1.0 Approved

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Sponsored by Earth Origins

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1. Introduction

1.1 Purpose

On the store level, Earth Origins faces two large issues with how its inventory is currently managed. One such issue is that low-demand items have their stock replenished at the same rate as high-demand items. This fast rate of replenishment causes issues, as the store is spending more replenishing this stock than they are profiting from sales of it. On the opposite end of the spectrum, high-demand items are being sold too quickly. This results in a loss of sales due to under-stocking. The current inventory system set in place cannot keep track of item stock when a given item is being sold, meaning that employees have to vigilantly watch stock. The proposed system seeks to resolve this problem by automating the inventory process to a certain extent. The express objectives are to maximize store profits and decrease the number of hours its staff has to dedicate to inventory management.

1.2 Scope

1.2.1 Product Name

The name of the system that will be developed is the **Inventory Control Ordering System (ICOS)**.

1.2.2 Overview

The proposed inventory management system has two primary functions that seek to maximize profits. The first is a minimum and maximum system that will control how much stock is ordered and at what minimum value said stock will be ordered at. This prevents both over-stocking and under-stocking. The second is an inventory report generation system. This generates and sends a report to Corporate offices with information on sales, profits, and other such metrics. Additionally, these reports include auto-filled forms for items the system has declared as in need of a restock.

When it comes to minimizing employee time spent on inventory, there are also two main functions. First is the automatic updating of stock upon being scanned in via a hand scanner. The other is the manual input mode. This allows for direct stock count editing, minimizing stock inaccuracies that could arise from expired or discarded stock.

1.2.3 Goals

Average store profits will increase by at least 5% within 6 months of system implementation.

Weekly hours per Sales Assistant that are spent on inventory management will decrease by 1 hour within 1 month of system implementation.

1.2.4 Out of Scope

A proposed feature of this system that is currently out of scope is a form of mobile app connectivity. Though this could be added at a later date, the funding and time is not there to plan out, design, and build an appropriate accompanying app.

1.3 Product overview

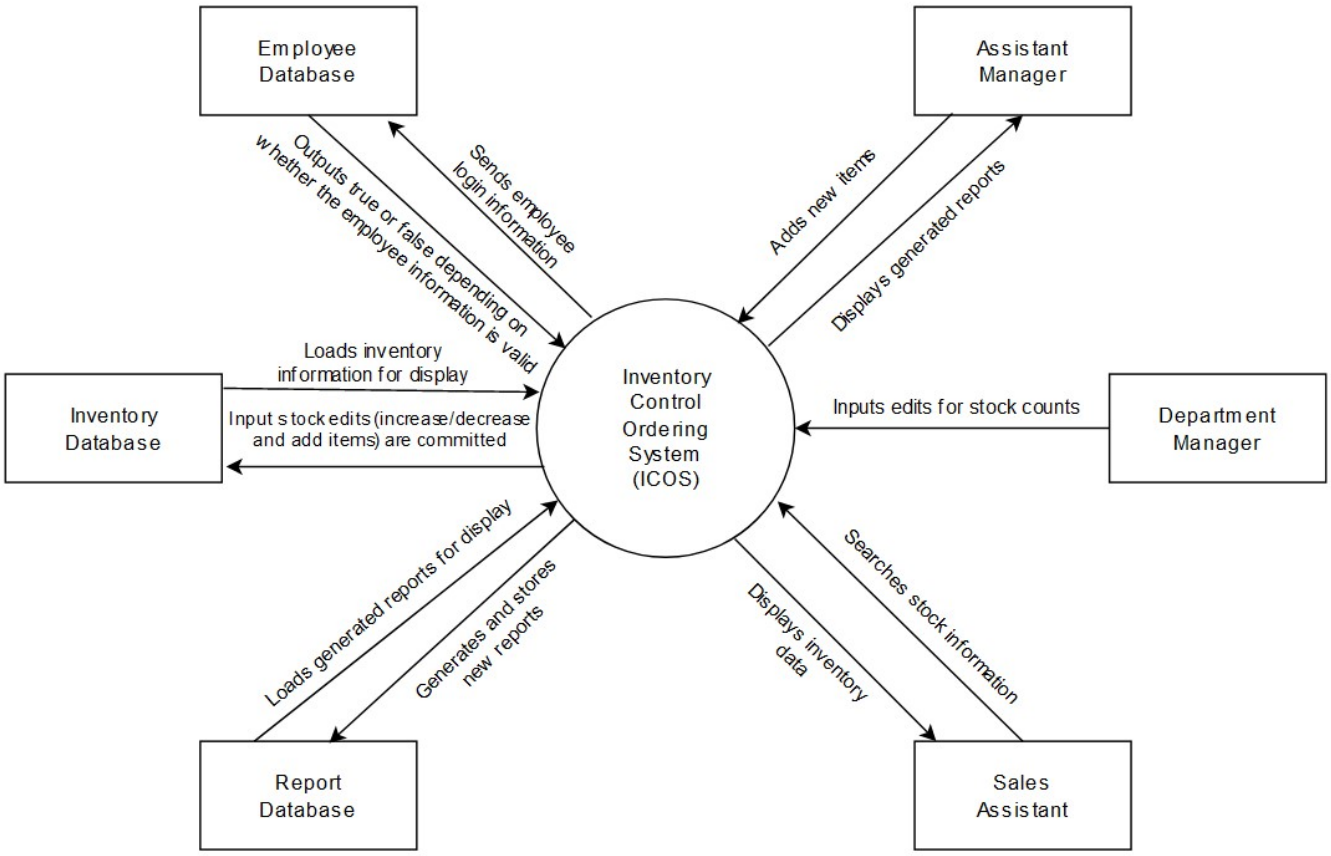
1.3.1 Product perspective

1.3.1.1 Context Diagram Background

A Context Diagram or, more descriptively, a Data Flow Diagram, is one of the many visual aids used in software development. Their primary purpose is to serve as a visual representation of how data flows to and from the system via external entities. They should be simple enough for any stakeholder of the project to understand, yet detailed enough for it to be clear how data flows to, form, and within the system. A given context diagram is made up of three key components: a black circle signifying the system itself, black boxes signifying external entities (human or non-human) that interact with the software, and directional lines with accompanying text that illustrate data flow and describe the data that is flowing.

To create this context diagram, I pulled up Notepad, my project notes, and my stakeholder feedback and asked myself, “In what ways does data flow to and from the system?” Immediately, I thought of the several databases that would accompany the project - I had one that would be used for the login tab, one that would be used for the stock-related tabs, and one that would be used for the report tab. I jotted these down and thought further before the more intuitive answer hit me - the database will need to display data to and receive data from the three primary user types associated with it. I jotted all 6 of these cases down, then roughly outlined their interactions (input/output) with the system. From there, I simply opened up draw.io, my diagramming site of choice, sketched out the diagram using the entities I’d thought of, and fleshed out the individual interactions that occur in a clear and concise manner.

1.3.1.2 Level 0 Context Diagram



1.3.1.3 Constraints

T	Key	Summary
	C3P-39	Generated reports will be stored in PDF format.
	C3P-38	The system must be operational on Windows 7, 8, and 10 systems.
	C3P-37	The system cannot automatically order new items, only fill out forms that detail orders.
	C3P-36	The system should only display features that the Employee who logged in can utilize.
	C3P-35	The system will be written in Java, with its corresponding database written using the JDBC and a Type 2 driver.

5 issues

1.3.2 Product functions

- Min/max system that controls the minimum and maximum amount of product on the shelves at a given time.
- Editing of min/max values (increase or decrease)
- Login system for users – uses Employee ID and an assigned password.
- Report generation that can be used to show best and worst sellers
- Real-time changes to inventory database (selling and buying)
- Manual editing of stock (increase or decrease)
- Automatic forwarding of reports to Corporate
- Allow for the addition of new items to the system

1.3.3 User characteristics

Corporate will likely have no issues with the usability of the system, as they will primarily be reading reports the system generates that are sent to them.

In-store workers at all levels will be the most important users to accommodate. Though the system will not be particularly complex, those new to it will need a brief primer on how it works. This can be accomplished by either coworker mentoring or a brief, detailed instruction manual. Additionally, the GUI will need to be designed in such a way that accommodates colorblind people. This should be a simple matter to implement, only requiring some careful consideration of button placement and appearance.

1.3.4 Limitations

Key	Summary
C3P-23	The system must be operational on Windows 7, 8, and 10 systems.
C3P-22	The system cannot go down between the hours of 7 PM and 10 PM.
C3P-21	The system is reliant on its connective databases.
C3P-20	The system will be written in Java, with its corresponding database written using the JDBC and a Type 2 driver.
C3P-6	Sales, accounting information, pay information, and store statistics are confidential.

5 issues

1.4 Definitions

Invoice - The paperwork that comes with a given product shipment. Used to keep track of how many items are sent in a shipment. Also used to calculate payment for these shipments.

Minimum - The minimum amount of a given product that the proposed system shall allow. A numeric value.

Maximum - The maximum amount of a given product that the proposed system shall allow. When an item's stock count hits its minimum, the system will automatically fill an order that replenishes the stock to this number. A numeric value.

2. References

I primarily spoke to Steven Paul, the assistant manager of his respective franchise location.

I additionally sent questionnaires and communicated with Christina Kelton and Sandra Thompson, who occupy the roles of Store Manager and Department Manager respectively within their stores.

Approval for the project was given by Corporate Office, who also made executive decisions.

Corporate's decisions were delivered through a Corporate Representative who wishes to remain unnamed.

Additionally, the company policies and procedures manual for Earth Origins was referenced.

3. Specific requirements

3.1 Requirements Set

Key	Summary	Description	T	Linked Issues	P	Labels
C3P-52	The migration process of the system shall occur on the night of October 9th, 2021, with employees of the minimum rank of Assistant Manager staying late to copy the current state of their store's inventory over.	**Source:** Earth Origins Corporate Office. Those of the rank Assistant Manager and up will partake in a post-store-closing event wherein they will manually migrate their store's paper inventory to the system via the Add Items feature. This is counted as a one-time special event, like C3P-4 TO DO specifies. This will be a paid event, with overtime pay awarded if needed.				nonfunctional
C3P-51	If a logged-in Employee logs out, the system shall clear the fields in the Inventory, Add Items, and Reports tabs before returning the Employee to the login screen.	**Source:** Assistant Manager Steven Paul. Security-based requirement that was formed from a user story.		C3P-17		interface, nonfunctional
C3P-50	If an Assistant Manager logs in, the system shall display the same UI elements outlined in C3P-49, the minimum and maxmum editing function of the Inventory tab, the Add Items tab, and the Reports tab that allows for the viewing of archived reports.	UI requirement that prevents unauthorized personnel from accessing certain features of the system.		C3P-12 , C3P-15 , C3P-18		interface, nonfunctional
C3P-49	If a Department Manager logs in, the system shall display the same UI elements outlined in C3P-48 and a stock quantity editing box in the same tab.	UI requirement that prevents unauthorized personnel from accessing certain features of the system.		C3P-9		interface, nonfunctional
C3P-48	If a Sales Assistant logs in, the system shall only display the Inventory tab and the tab's searchable database.	UI requirement that prevents unauthorized personnel from accessing certain features of the system.		C3P-10		interface, nonfunctional
C3P-47	The system shall display an error screen and and prevent further action until re-connection if the system drops a connection with any of the three databases specified in C3P-43, C3P-44, and C3P-45.	**Source:** Adam Paul. System requirement that relates to security and data loss risks posed by a previously-unchecked facet of the system.		C3P-16		database , functional
C3P-46	The system shall display an error screen and terminate the program if the system cannot establish a connection with the Employee Database, the Inventory Database, and the Reports Database on program startup.	**Source:** Adam Paul. System requirement that relates to security and data loss risks posed by a previously-unchecked facet of the system.		C3P-16		database , functional
C3P-45	On program startup, the system shall connect to a Reports Database for the purposes of sending new generated reports and loading archived reports.	Database requirement.		C3P-12 , C3P-14		database , functional
C3P-44	On program startup, the system shall connect to an Inventory Database for the purposes of loading inventory items, increasing and decreasing inventory items' stock count, and adding new inventory items.	Database requirement.		C3P-9 , C3P-10 , C3P-11		database , functional
C3P-43	When an Employee logs in, the system shall connect to an Employee Database to verify that the user's employee ID and password exist in the database, then granting the permissions corresponding to the Employee's role.	Database requirement relating to security risks.		C3P-17		database , functional
C3P-34	Sunday at 11 PM, the system shall			C3P-12 ,		functiona

	generate a weekly report that utilizes the prior seven daily reports to detail the week's profit, the week's sales, the items sold that week, and the orders filled that week.	Describes when weekly reports are generated and how their fields differ from daily reports.		C3P-14		l
C3P-33	System-generated reports shall detail daily profit, daily sales, items sold, and auto-filled orders.	Defines how daily reports are generated for the system.		C3P-12 , C3P-13	↑	nonfunctional
C3P-32	The system's Add Items feature shall require a S.K.U., price, stock count, and in-store location when adding new items.	Defines required fields for the “Add Items” feature.		C3P-15	↓	nonfunctional
C3P-31	If the user is at minimum the rank of Assistant Manager, the system shall allow the user to add new items to the inventory system while logged in.	Defines security permissions for the “add item” function.		C3P-15	↓	nonfunctional
C3P-30	If the user is at minimum the rank of Assistant Manager, the system shall allow the user to change the values of product minimums and maximums while logged in.	Defines security permissions for the “edit product minimums and maximums” function.		C3P-18	↑	nonfunctional
C3P-29	When an item's stock count reaches the item's minimum value, the system shall auto-fill an order form that will bring the stock count back up to the item's maximum.	Explains how the system will automate the ordering process.			↑	functional
C3P-28	The system's Employee Login feature shall require an employee ID and employee-chosen password to grant device permissions to employees.	Defines how the most crucial security component of the system will work.		C3P-36 , C3P-17	↑	nonfunctional
C3P-27	The Report Generation system for a given store shall generate daily reports with auto-filled orders one hour after the system's respective store closes.	Sets an exact time for when daily reports will be generated so that backup records are guaranteed.		C3P-13	↑	functional
C3P-26	The Report Archival system shall display generated reports in order from newest to oldest.	Describes a UI aspect of the Report Archival system.			↓	nonfunctional
C3P-25	When an employee scans a non-new inventory item in, the system shall increase the item’s current stock count by one within three seconds.	This is one half of the functionality required for this inventory system to be automated. This automatically handles stock being increased when scanning in items from incoming shipments.		C3P-16	↑	functional
C3P-24	When a cashier confirms a customer’s purchase of an item, the system shall decrease the item’s current stock count by an amount equal to the quantity purchased within three seconds.	This is one half of the functionality required for this inventory system to be automated. This automatically handles stock being removed.		C3P-16	↑	functional

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3.2 Use Cases

UC ID and Name	UC 1: Login to System
Description	Employees login to the system by inputting their employee ID and a self-chosen password.
Precondition	The Employee has been assigned an employee ID and has chosen a password.
Post-condition	The Employee is logged into the system.
Basic Flow	**Employee Logs In** 1. The Employee inputs their Employee ID and password. 2. The Employee is logged into the system and granted their appropriate permissions.
Alternate Flow	**Login is Invalid** 1. The User (or Employee) inputs an invalid Employee ID or password. 2. The login interface informs them that one of the two was incorrect, clears the fields, and tells them to try again.

UC ID and Name	UC 2: View Reports
Description	Displays a report of sales, auto-filled orders, and stock for the Assistant Manager.
Pre-condition	The Assistant Manager is logged in via *UC1 Login to System*.
Post-condition	A pre-generated report is brought up for viewing.
Basic Flow	**Viewing the Last Report** 1. The Assistant Manager clicks the “View Last Report” button. 2. The last report generated by the system is displayed.
Alternate Flow	**Viewing an Archived Report Without Searching** 1. The Assistant Manager clicks the “Browse Archived Reports” button. 2. A list of archived reports is brought up. 3. The Assistant Manager scrolls through a list of archived reports sorted by date and selects their desired report. 4. The selected report is displayed. **Viewing an Archived Report by Searching** 1. The Assistant Manager clicks the “Browse Archived Reports” button. 2. A list of archived reports is brought up. 3. The Assistant Manager clicks the “Search” button. 4. The Assistant Manager inputs the month and year that they wish to view reports from. 5. The Assistant Manager selects the report they wish to view after searching. 6. The selected report is displayed.

UC ID and Name	UC 3: Edit Minimums and Maximums
Description	The Assistant Manager either increases or decreases the minimum or maximum of a specified item.
Pre-condition	The Assistant Manager is logged in via *UC1 Login to System*.
Post-condition	The maximum or minimum of a specified item is either increased or decreased.
Basic Flow	**Edit a Minimum or Maximum** 1. The Assistant Manager selects an item to edit. 2. The Assistant Manager selects whether they want to edit the minimum or maximum. 3. The Assistant Manager inputs the new value of their selected minimum or maximum.
Alternate Flow	N/A

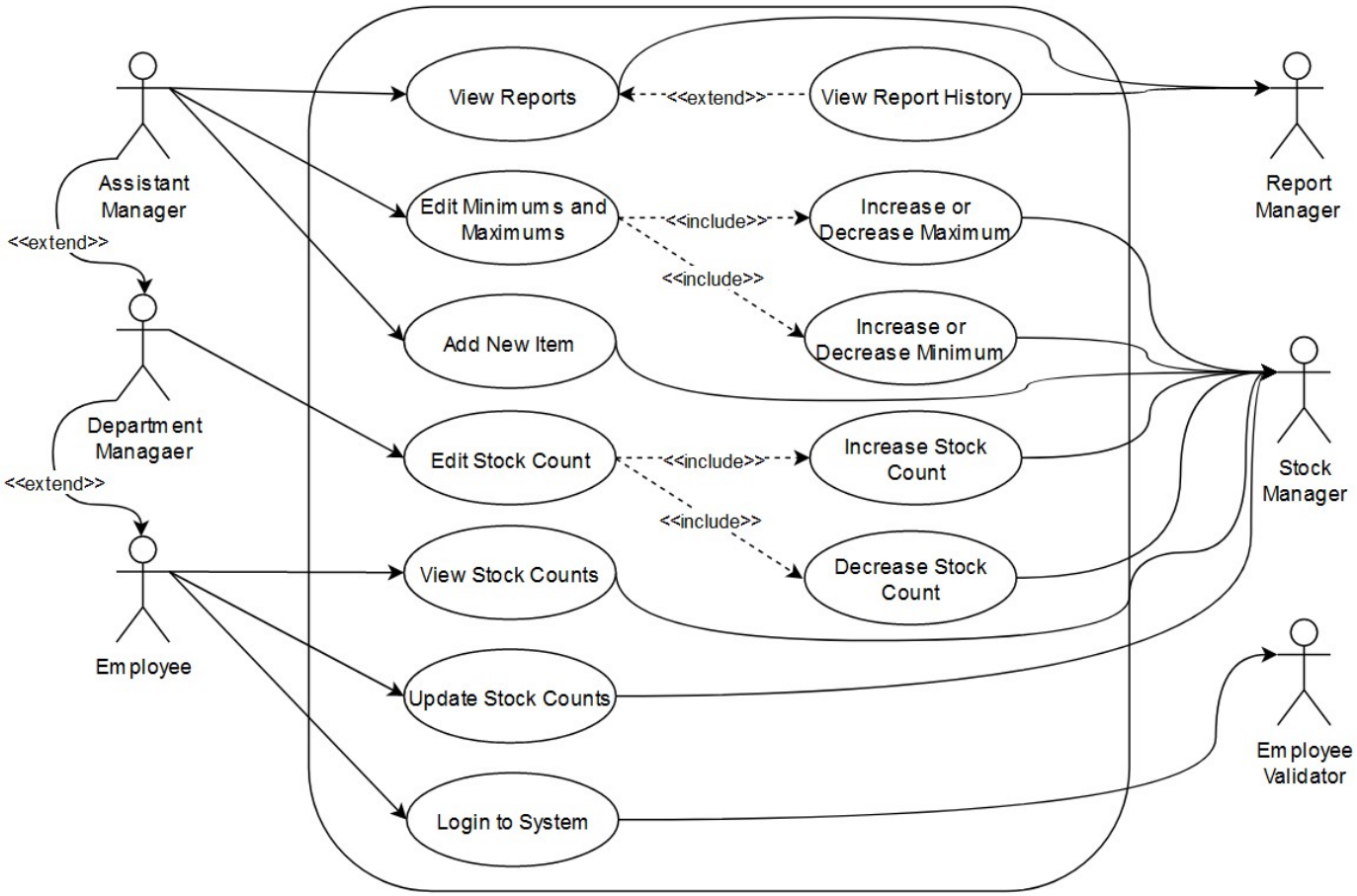
UC ID and Name	UC 4: Add New Items
Description	The Assistant Manager adds a new item to the system using a Corporate-generated SKU. The Assistant Manager sets the price, shelf location, and stock count of said item.
Pre-condition	The Assistant Manager is logged in via *UC1 Login to System*.
Post-condition	A new item is registered to the inventory management system.
Basic Flow	**A New Item is Added** 1. The Assistant Manager inputs the SKU and other assorted information regarding the new item. 2. The system checks if the SKU is already used in the inventory system. It isn't. 3. The system creates a new entry in the inventory database for the item and informs the user that it was added.
Alternate Flow	**The Item Already Exists** 1. The Assistant Manager inputs the SKU and other assorted information regarding the new item. 2. The system checks if the SKU is already used in the inventory system. It is. 3. The system informs the user that the item exists and does not add a new entry for it.

UC ID and Name	UC 5: Edit Stock Count
Description	The Department Manager either manually increases or decreases the amount of stock of a given item.
Pre-condition	The Department Manager is logged in via *UC1 Login to System*.
Post-condition	The stock count of the selected item is increased or decreased.
Basic Flow	**The Stock Count is Edited** 1. The Department Manager selects an item. 2. The Department Manager selects the item's stock count. 3. The Department Manager inputs the new stock count of the specified item.
Alternate Flow	N/A

UC ID and Name	UC 6: View Stock Counts
Description	Displays the name, stock count, and location of a specific item on a given company device.
Pre-condition	The Employee is logged in to the system via *UC1 Login to System*.
Post-condition	The stock count, name, and location of the item queried is displayed.
Basic Flow	**Lookup by Name/SKU** 1. The Employee selects the search function and inputs the name or SKU number of the desired item. 2. The stock count, name, and location of the item queried is displayed.
Alternate Flow	**Lookup by Hand Scanner** 1. The Employee selects the search function and scans the item via hand scanner. 2. The stock count, name, and location of the item queried is displayed.

UC ID and Name	UC 7: Update Stock Counts
Description	Automatically updates the stock count of items upon them being scanned in or sold.
Pre-condition	The Employee is logged in to the system via *UC1 Login to System*.
Post-condition	The amount added or subtracted from the stock is automatically reflected by the inventory system.
Basic Flow	**Add to Stock via Hand Scanner** 1. The Employee scans in an existing item via hand scanner. 2. The Employee confirms the item and quantity scanned in. 3. The system automatically adds to the item's stock count with the amount that was confirmed.
Alternate Flow	**Subtract from Stock via Register** 1. The Employee rings up the customer's items via cash register. 2. The Employee confirms the customer's purchase. 3. The stock count of the purchased items is decreased according to the amount purchased. **Invalid Item is Scanned** 1. The Employee scans an item that is not in the system. 2. The hand scanner informs the Employee that the scanned item is not in the inventory.

3.3 Use Case Diagram



4. Verification

Key	Summary	Verification Approach
C3P-52	The migration process of the system shall occur on the night of October 9th, 2021, with employees of the minimum rank of Assistant Manager staying late to copy the current state of their store's inventory over.	Inspection
C3P-51	If a logged-in Employee logs out, the system shall clear the fields in the Inventory, Add Items, and Reports tabs before returning the Employee to the login screen.	Inspection
C3P-50	If an Assistant Manager logs in, the system shall display the same UI elements outlined in C3P-49, the minimum and maxmum editing function of the Inventory tab, the Add Items tab, and the Reports tab that allows for the viewing of archived reports.	Inspection
C3P-49	If a Department Manager logs in, the system shall display the same UI elements outlined in C3P-48 and a stock quantity editing box in the same tab.	Inspection
C3P-48	If a Sales Assistant logs in, the system shall only display the Inventory tab and the tab's searchable database.	Inspection
C3P-47	The system shall display an error screen and and prevent further action until re-connection if the system drops a connection with any of the three databases specified in C3P-43, C3P-44, and C3P-45.	Demonstration
C3P-46	The system shall display an error screen and terminate the program if the system cannot establish a connection with the Employee Database, the Inventory Database, and the Reports Database on program startup.	Demonstration
C3P-45	On program startup, the system shall connect to a Reports Database for the purposes of sending new generated reports and loading archived reports.	Inspection
C3P-44	On program startup, the system shall connect to an Inventory Database for the purposes of loading inventory items, increasing and decreasing inventory items' stock count, and adding new inventory items.	Inspection
C3P-43	When an Employee logs in, the system shall connect to an Employee Database to verify that the user's employee ID and password exist in the database, then granting the permissions corresponding to the Employee's role.	Inspection

C3P-34	Sunday at 11 PM, the system shall generate a weekly report that utilizes the prior seven daily reports to detail the week's profit, the week's sales, the items sold that week, and the orders filled that week.	Test
C3P-33	System-generated reports shall detail daily profit, daily sales, items sold, and auto-filled orders.	Inspection
C3P-32	The system's Add Items feature shall require a S.K.U., price, stock count, and in-store location when adding new items.	Inspection
C3P-31	If the user is at minimum the rank of Assistant Manager, the system shall allow the user to add new items to the inventory system while logged in.	Inspection
C3P-30	If the user is at minimum the rank of Assistant Manager, the system shall allow the user to change the values of product minimums and maximums while logged in.	Inspection
C3P-29	When an item's stock count reaches the item's minimum value, the system shall auto-fill an order form that will bring the stock count back up to the item's maximum.	Demonstration
C3P-28	The system's Employee Login feature shall require an employee ID and employee-chosen password to grant device permissions to employees.	Inspection
C3P-27	The Report Generation system for a given store shall generate daily reports with auto-filled orders one hour after the system's respective store closes.	Test
C3P-26	The Report Archival system shall display generated reports in order from newest to oldest.	Inspection
C3P-25	When an employee scans a non-new inventory item in, the system shall increase the item’s current stock count by one within three seconds.	Demonstration
C3P-24	When a cashier confirms a customer’s purchase of an item, the system shall decrease the item’s current stock count by an amount equal to the quantity purchased within three seconds.	Demonstration

21 issues

5. Appendices

5.1 Assumptions and dependencies

- The client assumes that the GUI will include error handling.
- The client assumes that the system will improve store profits.
- The client assumes the system will have compatibility with all company computers.
- I assume that the system will minimize connections with external devices.
- I assume that the system will require an archival system for Corporate to keep track of sales.
- I assume that Corporate will need the ability to view the reports from all store locations.

5.2 Acronyms and abbreviations

S.K.U. - Stock Keeping Unit. A 12 digit product number that serves to identify its respective product. Each type of item in the store would be assigned one in the proposed system. Also known as a P.L.U. (Price Look-Up).