# 1. Introduction

## 1.1 Purpose

The Warehouse Management (WM) Tool provides a better understanding of day-to-day operation and better efficiency during retrieval of summary reports about warehouse performance. WM Tool allows managers to make better management decisions and warehouse assistants to keep track of stocks. WM Tool includes a few features:

* Login Management
* Stock Management
* Record Management
* Report Management
* Search Portal

## 1.2 Document Conventions

There are no document conventions.

## 1.3 Intended Audiences and Reading Suggestions

Our targeted audiences are stakeholders of the warehouse, management board of the warehouse, project manager, system developers, system testers and documentors.

## 1.4 Project Scope

The Warehouse Management (WM) Tool is a C++ system developed in Linux to keep track of warehouse operations. It is aimed at streamlining and optimizing warehouse operations by summarising it into a report for critical management decisions.

## 1.5 References

No reference used in this report.

# 2. Overall Description

## 2.1 Product Perspective

This product has a few features which allow warehouse personnel to manage their warehouse efficiently and effectively.

## 2.2 Product Features

1. Login Management - This feature allows the administrator to create user accounts, unlock locked user accounts, and remove accounts of ex-employees.
2. Stock Management - This feature allows any user to add/remove/update stocks that are stored in the system database. The user may set a threshold level that would show when stock is at low quantity.
3. Record Management - This feature allows any user to record incoming, outgoing stocks down into the system for further processing.
4. Report Management - This feature allows any user to generate report of a selected timeframe.
5. Search Portal - This feature allows the warehouse assistants/manager to search and display stocks in accordance to different filters.

## 2.3 User Classes and Characteristics

1. Warehouse Managers (Warehouse Personnel) (High Priority User)

* In-charge overlooking operations within the warehouse.
* Required to gather and interpret information produced by the summary.

2. Warehouse Assistants (Warehouse Personnel) (Medium Priority User)

* Mainly in-charge of creating records of every incoming and outgoing stock.
* They are mostly non-tech savvy.

3. Administrator (Low Priority User)

* In-charge of the user accounts of the system.
* Create and remove accounts of the employees.
* Unlock locked accounts of employees.
* They are usually tech savvy.

## 2.4 Operating Environment

Warehouse Management (WM) Tool will require a Linux-based operating system with C++ language installed to run.

## 2.5 Design and Implementation Constraints

The program is to be implemented in C++ code, requires C++ language to be installed. The customer’s company will be responsible for maintaining the delivered software.

## 2.6 User Documentation

A user manual will be provided to guide users through every feature of WM Tool. Explanation and steps of each feature are included.

## 2.7 Assumptions and Dependencies

The system will need the following assumptions and dependencies:

1. Warehouse personnel have been educated on the usage of WM Tool.
2. All warehouse personnel have had their accounts created by the administrator.

# 3. System Features

Our system features are summarized into 5 major components, each component explained using use case description format.

3.1 Login Management - Create Accounts, Unlock Accounts, Remove Accounts

3.2 Stock Management - Add Stock, Remove Stock, Update Stock

3.3 Record Management - Add Record, Remove Record, Update Record

3.4 Report Management - Daily Report, Weekly Report, Monthly Report, Yearly Report

3.5 Search Portal - Search by Categories, Sub-Categories, Price, Quantity

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## 3.1 Login Management

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| **Description** | This feature allows the administrator to create user accounts, unlock locked user accounts, and remove ex-employee’s account. |
| **Actor** | Administrator |
| **Pre-Condition** | User logs into account which has “Administrator” rights |
| **Main Scenario** | Step 1: Administrator can do one of the following:   * Create User * Unlock/Remove User Accounts   **Create User**  Step 2: Administrator selects “Create User”  Step 3: System/Administrator creates an user ID  Step 4: System validates that user ID is unique  Step 5: System generates a random password  Step 6: System encrypts password and user id  Step 7: System stores data into database |
| **Sub-Scenarios** | **Unlock account:**  Step 2: Administrator selects “Unlock/Remove User Accounts”  Step 3: Administrator enters user ID  Step 4: System shows user account  Step 5: Administrator chooses to unlock user’s account  Step 6: System changes user’s account locked status “True” to “False”  **Remove account:**  Step 2: Administrator selects “Unlock/Remove user account”  Step 3: Administrator enters user ID  Step 4: System shows user account  Step 5: Administrator chooses to remove user’s account  Step 6: User account and details removed from database |
| **Exceptional** | **Administrator decides to exit:**   1. Administrator selects “Log Out”. 2. System exit. 3. No changes made to User Account database. |

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## 3.2 Stock Management

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| **Description** | This feature allows the authenticated user to Add/Remove/Update stocks that are stored in the system database. The system will set a threshold level that would alert the warehouse assistant/manager. |
| **Actor** | Warehouse Personnel |
| **Pre-Condition** | User logs into an account within the system |
| **Main Scenario** | Step 1: Warehouse Personnel can do one of the following:   * Add Stock * Remove Stock * Update Stock   **Add Stock:**  Step 2: User selects “Add Stock”  Step 3: System asks for stock details from user  Step 4: User enters stock details  Step 5: System formats the input details  Step 6: Formatted stock details is saved into the database |
| **Sub-Scenarios** | **Remove/Update Stock:**  Step 2: User selects “Remove/Update Stock”  Step 3: User enters stock name  Step 4: System validates if stock is in the system  Step 5: System displays stock details  **Remove Stock:**  Step 6: User selects stock to be removed  Step 7: System removes the selected stock’s data from database  **Update Stock:**  Step 6: User selects “Update Stock”  Step 7: User enters stock name  Step 8: System validates if stock is in System  Step 9: System displays an update menu(eg.Set Threshold Quantity, Stock Name etc)  Step 10: User selects an option and enter details  Step 11: System updates the stored data and stores it in database |
| **Exceptional** | **Warehouse personnel decides to exit:**   1. Warehouse personnel selects “Log Out” 2. System exit. 3. No changes made to Stocks database   **Warehouse personnel entered details invalid format(Add/Update):**   1. Manager/Assistant enters details that is of invalid format 2. System informs that format is not accepted 3. System waits for new input of stock details   **Warehouse personnel entered details not found(Update/Remove):**   1. Manager/Supervisor enters details that cannot be found in database 2. System informs that stock not found 3. System displays menu and wait for new option |

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## 3.3 Record Management

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| **Description** | This feature allows authenticated user to record incoming and outgoing stocks into the system for further processing. |
| **Actor** | Warehouse Personnel |
| **Pre-Condition** | User is authorised after logging into the system |
| **Main Scenario** | Step 1: Warehouse Personnel can do one of the following:   * Add Record * Remove Record * Update Record   **Add Record:**  Step 2: User selects “Add Record”  Step 3: System asks for record details  Step 4: User enters record details  Step 5: System formats the input details  Step 6: Formatted record details is saved into the database |
| **Sub-Scenarios** | **Remove Record:**  Step 2: User selects “Remove Record”  Step 3: System asks for record details  Step 4: User enters record details  Step 5: System searches for the record and displays  Step 6: User selects the record to be remove  Step 7: System removes stored data of record in the database  **Update Record:**  Step 2:User selects “Update Record”  Step 3: System asks for record details  Step 4: User enters record details  Step 5: System searches for the record and displays  Step 6: User selects to update record  Step 7: System updates new stored data and stores it in the database |
| **Exceptional** | **User decides to exit:**   1. User selects “Log out” 2. System exit. 3. No changes made to Record database.   **Warehouse personnel entered details invalid format(Add/Update):**   1. Warehouse personnel enters details that is of invalid format 2. System informs that format is not accepted 3. System waits for new input of record details   **Warehouse personnel entered details not found(Update/Remove):**   1. Manager/Supervisor enters details that cannot be found in database 2. System informs that record not found 3. System displays menu and wait for new option |

## 3.4 Report Management

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| **Description** | This feature allows warehouse personnel to view a summary report of total incoming and outgoing stocks details. |
| **Actor** | Warehouse Personnel |
| **Pre-Condition** | User logs into an account within the system |
| **Main Scenario** | Step 1: Warehouse personnel selects to view summary report  Step 2: Users can do one of the following:   * Daily Report * Weekly Report * Monthly Report * Yearly Report   **Daily Report:**  Step 3: User selects “Daily Report”  Step 4: System prompts user for range of date  Step 5: User enters the range of date to be summarized  Step 6: System displays summary report for range of date |
| **Sub-Scenarios** | **Weekly Report:**  Step 3: User selects “Weekly Report”  Step 4: System prompts user for start date  Step 5: User enters start date of the week to be summarized  Step 6: System displays summary report for 7 days from the start date  **Monthly Report:**  Step 3: User selects “Monthly Report”  Step 4: System prompts user for month  Step 5: User enters month to be summarized  Step 6: System displays summary report for that month  **Yearly Report:**  Step 3: User selects “Yearly Report”  Step 4: System prompts user for year  Step 5: User enters year to be summarized  Step 6: System displays summary report for specified year |
| **Exceptional** | **User decides to exit:**   1. User selects “Log out” 2. System exit. |

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## 3.5 Search Portal

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| **Description** | This feature allows warehouse personnel to search for stocks in different formats:   * Category * Sub-Category * Category and Sub-Category * Price Range (Ascending or Descending) * Quantity (Ascending or Descending) |
| **Actor** | Warehouse Personnel |
| **Pre-Condition** | User logs into an account within the system |
| **Main Scenario** | Step 1: Warehouse personnel can do one of the following:   * Category * Sub-Category * Category and Sub-Category * Price Range (Ascending or Descending) * Quantity (Ascending or Descending)   **Category:**  Step 2: User selects “Category”  Step 3: System prompts user for category  Step 4: User enters category  Step 5: System search for stocks that match the category  Step 6: System displays the results |
| **Sub-Scenarios** | **Sub-Category:**  Step 2: User selects “Sub-Category”  Step 3: System prompts user for sub-cateory  Step 4: User enters sub-category  Step 5: System search for stocks that match the sub-category  Step 6: System displays the results  **Category and Sub-Category:**  Step 2: User selects “Category & Sub-Category”  Step 3: System prompts user for category and sub-category  Step 4: User enters category and sub-category  Step 5: System search for stocks that match the category and sub-category  Step 6: System displays the results  **Price Range:**  Step 2: User selects “Price Range (Ascending/Descending)”  Step 3: System prompts user for minimum and maximum price range  Step 4: User enters minimum and maximum price range  Step 5: System prompts user for ascending or descending  Step 6: User enters ascending/descending  Step 7: System search for stocks that match the price range in ascending/descending order  Step 8: System displays the results  **Quantity:**  Step 2: User selects “Quantity (Ascending/Descending)”  Step 3: System prompts user for minimum and maximum quantity range  Step 4: User enters minimum and maximum quantity range  Step 5: System prompts user for ascending or descending  Step 6: User enters ascending/descending  Step 7: System search for stocks that match the quantity range in ascending/descending order  Step 8: System displays the results |
| **Exceptional** | **User decides to exit:**   1. User selects “Log out” 2. System exit. |

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# 4. External Interface Requirements

## 4.1 User Interfaces

Since the system is developed in command line format, users are expected to key-in inputs via keyboard and “Enter” key to submit inputs. Error messages will be displayed in text form if users inputted the wrong input.

## 4.2 Hardware Interfaces

WM Tool does not require additional hardware interfaces.

## 4.3 Software Interfaces

C++ input/output stream library files required for retrieving and storing data in binary files.

## 4.4 Communications Interfaces

WM Tool does not require additional communication interfaces..

# 5. Other Nonfunctional Requirements

## 5.1 Performance Requirements

The system must be easy to use such that users are able to learn in a day’s time.

The system should response immediately to user’s requests, within two second time frame.

The system should relay error-free information when generating summary.

## 5.2 Safety Requirements

WM Tool must be backup regularly to prevent loss of data. Users are recommended to quit it instead of closing it suddenly to allow system to save all changes.

## 5.3 Security Requirements

Security was taken as a severe non-functional requirement so that data and information is protected from visibility and possible alteration by the unauthorized personnel. Thus, WM tool system provides a user account which requires users to login. All data of records, stocks, passwords, user ID are all encrypted before storage.

## 5.4 Software Quality Attributes

Portability - The system should be able to be implemented onto another computer that has the required C++ libraries.

Maintainability - The system should be able to troubleshoot within a short period, hours not days, as long maintenance period would cause back logging.

Availability - The system should be ready for users to use at all times

Reliability - The system should be able to produce error-free reports, as this affects the decisions to be made by the managers (High priority users).

Usability - The system should be able to guide users through the whole process without having any trouble

# 6. Other Requirements

There are no further requirements.

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