**Software Requirements**

**Specification**

**For**

**Warehouse Management System**

**Version 3.0 approved**

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**Team 6  
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# Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Date** | **Reason For Changes** | **Version** |
| Lam How Wei | 02/02/2018 | First draft | 1.0 |
| Mark Lee Yi Ern | 09/02/2018 | Review and edit subjects from 3.0 till 5.0 | 2.0 |
| Xu Ke | 09/02/2018 | Review and edit subjects from 1.0 to 5.0 | 3.0 |

# 1. Introduction

## 1.1 Purpose

<Identify the product whose software requirements are specified in this document, including the revision or release number. Describe the scope of the product that is covered by this SRS, particularly if this SRS describes only part of the system or a single subsystem.>

This purpose of this project is to produce a warehouse management system that comprise of an executable program. This product will assist the administrator, manager and operator of a warehouse organization to go about their daily operations digitally. This includes account management, stock management, stock review, stock tracking and stock taking.

## 1.2 Document Conventions

Main Section Titles   
Font: Times New Roman  
Face: Bold  
Size: 14

Sub Section Titles  
Font: Times New Roman  
Face: Bold  
Size: 14

Contents  
Font: Times New Roman  
Face: Normal  
Size: 12

## 1.3 Intended Audience and Reading Suggestions

This document is intended for developers, project managers, marketing staff, users, testers. It contains information on the product, its feature, purpose, goal and its functionality. Readers are strongly recommended to read the overall description section for the summarized details about the product. To get a gauge of the features this project intend to cover, read the requirement and non-requirement specification section.

## 1.4 Project Scope

This project aims to enables companies and their management to manage and keep track of the stocks, add stocks, update stocks accordingly and also use the information stored in the system for critical business and non-business decisions. This is greatly beneficial as more time would be saved from doing manual calculations and therefore improve productivity.

Security is important to prevent unauthorized access and only allow intended user to perform their permitted actions. A specialized menu will be displayed depending the user’s role in the organization, with each item on the menu covering a specific task the user is allowed to perform.

Project scope includes project management, workforce assignment, risk analysis & mitigation and project vision in two iterations of inception phase. Product design will then be the main focus in the three phases of elaboration phase. This include use case diagrams, component diagrams, class diagrams, activity workflow diagrams, identified key detailed use cases and its relative sequence diagrams.

# 2. Overall Description

## 2.1 Product Perspective

The warehouse management system consist of a program that is part of a system comprising of several databases. Program features available to the operator and manager will edit a formatted warehouse inventory database which stores details of stocks in each field separated by a colon “:”. Program features available to the administrator will edit a formatted account database which holds staff account information. All contents of the databases will be encrypted by the system for security measures.

## 2.2 Product Features Product features are further classified under three sub categories addressing mainly security, stock management and account management, refer to diagram 1.0 for full listing of features with numbering of system features in this document.

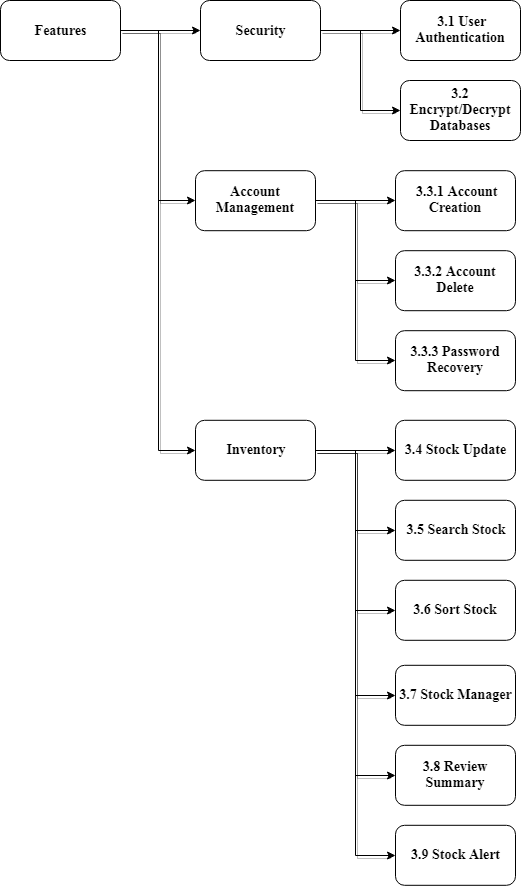


Figure .0 Feature Diagram

## 2.3 User Classes and Characteristics

User classes identified are operators, managers and administrators, with manager as the main intended user of this product. Managers are able to edit stocks, make stock orders, review transaction summary, and set stock alert threshold to assist in stock tracking. Warehouse operators are able to register incoming and outgoing stock quantity. The administrators are able to manage staff accounts, which includes adding new accounts and password recovery.

## 2.4 Operating Environment

Ubuntu 14.04.1 on Linux OS

## 2.5 Design and Implementation Constraints

Constraints identified includes the requirement to limiting the operating environment to Ubuntu 14.04.1 on Linux OS and also for program source code to be implemented in C++ language.

## 2.6 User Documentation

Product trainers will be assigned to be attached to organizations that patronize this product. Trainers will provide extensive tutorial lessons and program demonstration to organization staffs that are involved in usage of the product.

## 2.7 Assumptions and Dependencies

Product assumptions includes the main operating language of the organization to be English. Users are also assumed to key in information accurately during stocktaking as to prevent miscalculations.   
  
Product has dependency on the format of the databases. New databases to be incorporated are recommended to align with the format as of the original database provided with the release of the product to maintain consistency.

# 3. System Features

The following list of features below are necessary to allow the user to fulfill his daily operations.

## 3.1 User Authentication

### **3.1.1 Description and Priority**

This feature allows only authorized user to enter the warehouse management system through a login process. User will be further classified into their roles and permitted features.   
  
Priority: High

### **3.1.2 Stimulus/Response Sequences**

Stimulus: User enters his staff ID and password in the login menu.

Response: System will verify if ID and password is correct and will display the   
 permitted menu if success, and display error message if fail.

### **2.1.3 Functional Requirements**

REQ-1: System to do verification by matching user input with accounts database.

REQ-2: Account will be locked if fail count reaches three.

### **3.2 Encrypt/Decrypt Databases** **3.1.1 Description and Priority**

This an automated feature for the system to encrypt account database and stock database to prevent unauthorized view outside the system.  
  
Priority: High

### **3.1.2 Stimulus/Response Sequences**

Stimulus: System automated

Response: Any text file databases will be encrypted

### **2.1.3 Functional Requirements**

REQ-1: To encrypt text file database into binary file

## REQ-2: To decrypt binary file for reading in authorized usage

### **3.3 Manage Staff Accounts** **3.1.1 Description and Priority**

This feature allows the administrator to manage all staff accounts in the organization, he is able to create new accounts, do password recovery and remove accounts.  
  
Priority: Medium

### **3.1.2 Stimulus/Response Sequences**

Stimulus: User choose to a) create account, b) delete account or c) account recovery. a) User inputs account ID, account password and email address   
 b) User inputs the account ID to be deleted and re-enter admin password  
c) User choose from a list of locked account recover

Response: System will process user input for validation and display a message.  
a) If format meets the standard, account will be created, else an error message will be displayed.  
b) If validation is successful, account will be removed from the database, else an error message will be displayed.  
c) System displays message stating account has been recovered.

### **2.1.3 Functional Requirements**

REQ-1: Create account to validate format of user input and creates a new entry in account database. Account type will be based on the format of account ID.

REQ-2: Delete account to validate that account exists in the database and that the entered password is correct.  
REQ-3: Account recovery to change the status of a ‘locked’ account to ‘unlocked’ and generate a random new password to be emailed to the staff.

### **3.4 Stock Update** **3.1.1 Description and Priority**

This feature allows the operator to add stock quantity and reduce stock quantity to be recorded in the stock database.  
  
Priority: High

### **3.1.2 Stimulus/Response Sequences**

Stimulus: User inputs stock to be edited and amount to be add or removed.

Response: System outputs error message if stock does not exists. System   
 increase or decrease stock quantity from the database if stock exists.

### **2.1.3 Functional Requirements**

REQ-1: System to validate if stock to be edited exists in database

REQ-2: System to edit the stock quantity in the database based on user input

### **3.5 Search Stock** **3.1.1 Description and Priority**

This feature allows the manager to search for a specific stock based on all different  
fields’ attributes of the stock detail and display the result.  
  
Priority: High

### **3.1.2 Stimulus/Response Sequences**

Stimulus: User choose the field to search by from a menu and enters search input

Response: System displays the stock result that matches the input from the database  
 else displays error message if stock does not exists

### **2.1.3 Functional Requirements**

REQ-1: To allow user to search by stock ID, description, category, sub-category,   
 price range and quantity range.

REQ-2: Price range and quantity range to output stock in ascending and descending   
 order of price and quantity.

### **3.6 Sort Stock** **3.1.1 Description and Priority**

This feature allows the manager to sort the stock database and display the output according in ascending or descending order to his choice for better insight that affects managerial decisions.  
  
Priority: Medium

### **3.1.2 Stimulus/Response Sequences**

Stimulus: User choose to sort by category, sub-category, price or quantity.

Response: System displays search result in ascending and descending order.

### **2.1.3 Functional Requirements**

REQ-1: To sort the inventory in ascending order on the first sort call and descending   
 order if inventory is already sorted in ascending order.

REQ-2: To highlight stocks that are below the alert threshold.

### **3.7 Stock Manager** **3.1.1 Description and Priority**

This feature allows the manager add new stock, remove existing stock or to edit any field of a selected stock record.  
  
Priority: High

### **3.1.2 Stimulus/Response Sequences**

Stimulus: User choose to a) add new stock, b) remove stock or c) edit stock.  
 a) User inputs stock ID, description, category, sub-category, price, and quantity.  
b) User inputs stock ID to be removed.  
c) User inputs stock ID to be edited, then choose any field to be edited.  
 Response: a) System output stock created if successful and error message if stock already exists.  
b) System output stock removed if successful and error message if stock does not exists.  
c) System output sub menu to let user choose a field to edit. Success message is displayed if edit does not clash with other existing record else display error message.

### **2.1.3 Functional Requirements**

REQ-1: System to validate stock does not exists in database when adding new stock.

REQ-2: System to validate if stock exists in database when removing stock.  
 REQ-3: System to validate if stock exists in database when editing stock before   
 displaying submenu.  
 REQ-4: System to validate if edited stock clashes with existing stock before making  
 making changes to the database.

### **3.8 Review Transaction Summary** **3.1.1 Description and Priority**

This feature allows the manager to view the daily, weekly, month or yearly stock  
transaction summary to assist him to make managerial decisions.  
  
Priority: High

### **3.1.2 Stimulus/Response Sequences**

Stimulus: User choose to view daily, weekly, monthly or yearly summary

Response: Display the chosen summary

### **2.1.3 Functional Requirements**

REQ-1: Summary to display stock ID, in and out quantity within the timeframe,  
 price and total sale amount to be computed within the timeframe.

### **3.9 Manage Stock Alert** **3.1.1 Description and Priority**

This feature allows the manager to set stock alert which includes a threshold amount  
and a message to be displayed when stock quantity falls below the threshold.  
  
Priority: Medium

### **3.1.2 Stimulus/Response Sequences**

Stimulus: User enters threshold amount and message.

Response: System sets the threshold to all stocks and display success message.

### **2.1.3 Functional Requirements**

REQ-1: Displays alert message in the main menu stating the message and the   
stock that has fallen below the set threshold.

# 4. External Interface Requirements

## 4.1 User Interfaces Program will communicate information with the user through a menu style interaction. All users are to go through a start-up menu to log in followed by his permitted menu.

**4.1.1 Start-up Menu**

1. Login
2. Reset Password
3. Change Password

Enter your choice:

**4.1.2 Login Menu**

Username:

Password:

**4.1.2.1 Authentication Fail**

Sorry your username and password do not match!

You have 3 tries left!

**4.1.2.2 Account Lock**

Sorry you have 0 tries left!

Your account has been locked. Please approach an admin staff to unlock it.

**4.1.3 Login Success (Operator)**

Welcome to WM tool please select an option below.

1) Add or Update stock

2) Quit

Enter your option:

**4.1.4 Login Success (Manager)**

Welcome to WM tool please select an option below.

1. Search Stock
2. Sort Stock
3. Stock Manager
4. Review Stock
5. Stock Alert
6. Quit

Enter your option:

**4.1.5 Login Success (System Administrator)**

Welcome to System Administrator

1. Create New Account
2. Remove account
3. Account Recovery
4. Quit

Enter your option:

## 4.2 Hardware Interfaces

The software interacts with a keyboard where the user keys in information and it will be process by the software to execute its respective tasks depending on the information keyed in. The results will be displayed to the monitor.

## 4.3 Software Interfaces

The software will be running on Ubuntu 14.04.1 on Linux OS and the program source code will be implemented in C++ language. The data we will be reading in will be in text format for the stock data and will be converted to a binary file for encryption purpose.

## 4.4 Communications Interfaces

During the reset password option, an email will be generated and sent with the new password to the registered email account of the user.

At the order stock option, the request to order additional stock will be sent by creating an electronic form and sending it to the supplier.

# 5. Other Nonfunctional Requirements

## 5.1 Performance Requirements

During program execution, transition time between menus should fall within one second. Search and sorting functions should not take more than five seconds to loop through the database to display the results.

## 5.2 Safety Requirements

System databases such as stock data and account data will be affected directly by the user inputs. Both the data files must only be open for writing in new data and closed immediately after use. Data validation is necessary during user input to prevent database format corruption during writing.

## 5.3 Security Requirements

Login authentication is required before accessing the system. Operators and Managers will only be able to access their personal user data and change their password, a login is required for authentication before doing so. Only the system admin will be able to change and edit user data after login. The user account will also be locked after 3 failed attempts in a row, only the system admin will be able to unlock the account.

User account database and stock inventory database are to be encrypted in such a way that unauthorized users are unable to view the contents to prevent information leak. Only authorized user may have restricted access to decrypt the data for display.

## 5.4 Software Quality Attributes

**5.4.1 Portability**  
  
Data encrypting and decrypting should be implemented to ensure the portability of databases. In the event such that a new inventory database is to be transferred or concatenated into the current database, encryption and decryption should be able to work for the new content as long as the specified format is followed.

**5.4.2 Robustness**System should be implemented in such a way such that it can withstand an infinite amount of invalid user inputs and formats to prevent corruption of databases. Proper data validation should be implemented to allow user to input until data is of valid format.

**5.4.3 Reliability**A failure free software should be of an important emphasis in a warehouse management organization as business operation heavily rely on the product. Mean time between failures should not be more than two years. Mean time to repair should not take longer than five days.

**5.4.4 Availability**Software availability is crucial as any software downtown will cause the business to suffer. The software availability is based on the calculation of mean time between failures and mean time to repair, which is computed to be at least 99.31%.

# Appendix A: Glossary

# Mean Time between Failure (MBTF) – Period of time software is available to use before a crash Mean Time to Repair (MTTR) – Amount of time taken to repair a system failure Encryption - Process of converting plain data information into unintelligible text or ciphertext Decryption - Process of converting ciphertext back into plain data information Sorting - To arrange a list of data in alphabetical order or numerical order based on data type