Software Requirement Specification

29.0.2024

Contents

Introduction

Smart Inventory is a comprehensive web-based inventory management system designed to streamline and automate the process of tracking, ordering, and managing inventory for businesses, restaurants, and laboratories. This system captures detailed inventory information, including supplier details, expiration dates, and product usage, to ensure efficient ordering and stock requests. By incorporating a tendering and quoting system, Smart Inventory automates much of the heavy lifting for end users, ensuring stock is always available and back-ordered when necessary. The user-friendly interface allows administrators, inventory controllers, and end users to easily capture stock details, request stock, and generate insightful reports, facilitating successful inventory management.

Objectives

This document outlines the types of users for the Smart Inventory System, their needs, and guides stakeholders through its features and functionalities. It also explains how client requirements are gathered and evaluated using a structured software engineering methodology.

Research

Overview of Inventory Management Applications

Inventory management applications are software tools designed to help businesses track and control their inventory levels. The main goals of inventory management applications are to:

1. Track stock levels in real-time
2. Automate ordering and replenishment processes
3. Optimise inventory levels to minimize costs and stock-outs
4. Provide reporting and analytics on inventory performance

Common Features of Inventory Management Applications

Inventory management applications are essential tools for businesses of all sizes. These

software solutions offer a wide range of features designed to streamline operations, reduce costs, and improve overall efficiency in handling inventory. By automating many aspects of inventory control, these applications help businesses make informed decisions, maintain optimal stock levels, and enhance customer satisfaction. Some features found in modern inventory management applications are the following:

1. Item/stock keeping unit (SKU) management
2. Purchase order generation and tracking
3. Demand forecasting and reorder point calculations location management
4. Inventory valuation
5. Reporting and dashboards
6. Supplier management
7. Expiration date management
8. Safety stock level management
9. Inventory transfer and allocation between locations
10. Real-time inventory updates
11. Low stock alerts and notifications

These features help enable businesses to maintain accurate inventory records, optimize stock levels, and make data-driven decisions to improve their overall inventory management processes.

Similar Popular Software Options

QuickBooks Enterprise

- Features: Advanced inventory tracking, bar-code scanning, cycle counting
- Special attribute: Seamless integration with QuickBooks accounting soft- ware, making it ideal for businesses already using QuickBooks for financial management

Oracle NetSuite

- Features: Multi-location inventory management, demand planning, supply chain management
- Special attribute: Cloud-based ERP system offering end-to-end business management, including advanced inventory control suitable for large enterprises and multinational corporations

Zoho Inventory

- Features: Order management, multi-channel selling, automated reorder points

- Special attribute: Part of the Zoho ecosystem, allowing for easy integration with other Zoho apps and providing a cost-effective solution for small to medium-sized businesses

Fishbowl Inventory

- Features: Manufacturing inventory control, asset tracking, bill of materials management
- Special attribute: Strong focus on manufacturing and warehouse management, making it particularly suitable for businesses in the manufacturing sector

Each of these software options caters to different business sizes and specific industry needs, offering a range of features from basic inventory tracking to advanced supply chain management

Users

User Types

The users of Smart Inventory can easily be split into these two groups of users:

- Business Owners/Managers(Administrators)
- Employees(Inventory Controllers/End-Users)

User Characteristics

Business Owners/Managers (Administrator):

In today's fast-paced business environment, owners and managers need tools that empower them to manage their operations effectively. The ideal inventory management app should prioritize ease of use, offering a clear and intuitive interface that minimizes technical jargon and complex features. Furthermore, mobility is key, allowing access and management at the owner/manager's convenience. This functionality should not come at a premium. Affordable models that scale with business size ensure accessibility for all. The app should adapt to diverse business needs and product types. Finally, data-driven insights and reports are crucial for informed decision-making, while robust security measures ensure the protection of sensitive business information.

- Minimise technical jargon and complex features.
- Allow access and management from smartphones and tablets.
- Offer a pricing model that fits the size and budget of the business.
- Adapt to different business needs and product types.
- Provide insights and reports to support informed decisions.

- Protect business data with strong security measures.

Employees (Inventory Controllers/End-Users):

In today's dynamic business world, empowering your employees is crucial for efficient inventory management. A well-designed inventory management app can be a game-changer, streamlining processes and boosting productivity. The ideal app prioritizes a user-friendly experience with minimal technical jargon and complex features. Instead of overwhelming employees with vast amounts of data, the focus should be on clear task management and visibility into relevant information like current stock levels. An intuitive interface further enhances efficiency, minimizing training time and ensuring everyone can contribute effectively. Finally, the employee should not have to worry about security;therefore,e robust security measures safeguard sensitive business information, providing both employees and managers peace of mind. By prioritizing user-friendliness and clear functionalities, inventory management apps can empower employees and become valuable tools for a more efficient and collaborative work environment. Minimize technical jargon and complex features for a smooth experience.

- Focus on specific tasks relevant to employees, like real-time stock checks or order fulfillment.
- A good design minimizes training time and ensures everyone can con- tribute effectively.
- Provide limited, relevant data insights that assist with daily tasks (e.g., current stock levels for specific products).
- Maintain strong security measures to protect sensitive business information.

User Stories

Authentication and Authorisation

- As an administrator, I want to be able to securely login, and manage user accounts. So that I can ensure appropriate access levels are maintained.
- As an administrator, I want to manage user roles and permissions, so that users have appropriate access rights within the system.
- As an employee, I want to be able to securely sign in and manage my own account settings. So that I can be able to adjust the application according to what I want.

Team/User Management

- As an administrator, I want to add new team members to the system, providing

their name, surname, email, and role. So that I can manage user access and permissions effectively.
- As an administrator, I want to view a list of all team members, including their name, surname, email, and role. So that I can have an overview of the team structure and contact information.
- As an administrator, I want to edit team member details, such as name and surname. So that I can keep user information up to date.
- As an administrator, I want to change a team member's role, with a confirmation dialog to ensure the change is intentional. So that I can manage user permissions and adapt to changing responsibilities.
- As an administrator, I want to remove team members from the system, with a confirmation dialog to prevent accidental deletion. So that I can revoke access for users who no longer require it.

Reporting

- As an administrator, I want to view a customizable dashboard with key metrics and visualizations so that I can quickly assess the overall state of our inventory.
- As an inventory manager, I want to generate a detailed report on current stock levels for all products so that I can make informed decisions about restocking.
- As a team leader, I want to see a list of products nearing expiration within a configurable time frame so that I can prioritize their use or consider discounting.
- As an inventory controller, I want to generate reports for physical inventory counts and automatically calculate discrepancies, so that I can ensure our digital records match our physical stock.
- As an inventory controller, I want to track and analyze supplier performance metrics, so that I can make informed decisions about which suppliers to use.
- As an admin, I want to view user activity reports, so that I can monitor team performance and system usage patterns.
- As an admin, I want to generate activity audit reports, so that I can identify potential security risks or unusual activities.
- As a manager, I want to export reports in CSV format, so that I can share them with stakeholders, use them in other applications, or personalize my analytics my way.
- As an administrator, I want to view system-wide predictive analytics on inventory trends, so that I can make strategic decisions about resource allocation and system improvements.
- As an inventory controller, I want to access forecasted stock levels for each product based on historical data and current trends, so that I can optimize my inventory management strategies.
- As an inventory controller, I want to see predicted reorder points for each product, taking into account lead times and forecasted demand, so that I can maintain optimal stock levels.
- As an inventory controller, I want to access predictive analytics on potential stock-outs or overstock situations, so that I can take preventive actions to

maintain balanced inventory levels.

Inventory Management

- As an inventory controller, I want to be able to manage products and stock levels so that I can ensure accurate inventory records.
- As an administrator, of the inventory management system, I want to view a real-time dashboard showing current stock levels. So that I can have immediate visibility into inventory status.
- As a user managing inventory, I want to search for specific stock items by name, SKU, or supplier and sort them by name, SKU, quantity, or expiration date. So that I can quickly locate and organize inventory items.
- As an authorized user, I want to edit stock details for inventory items and have all edits logged in the stock transaction history. So that changes to inventory are accurately tracked.
- As a user of the inventory management system, I want the system to automatically detect when orders should be created based on predefined rules considering product usage and expiration dates. So that I can ensure timely replenishment of inventory.

Stock Request

- As an employee, I want to request stock from the inventory, providing the item details, quantity, and purpose. So that I can obtain the necessary items for my work.
- As an inventory controller, I want to be notified of stock requests and have the ability to approve or reject them. So that I can manage stock distribution effectively.
- As an administrator, I want to view an audit trail of all stock requests, including the requester, item, quantity, purpose, and approval status. So that I can monitor stock usage and maintain accountability.

Supplier Management

- As an administrator, I want to add new suppliers to the system, providing their company name, contact name, contact email, phone number, and address details. So that I can maintain a comprehensive supplier database.
- As an administrator or inventory controller, I want to view a list of all suppliers, including their company name, contact name, contact email, phone number, and address. So that I can quickly access supplier information when needed.
- As an administrator or inventory controller, I want to edit supplier details, such as company name, contact name, contact email, and phone number. So that I can keep supplier information current and accurate.
- As an administrator or inventory controller, I want to update a supplier’s address details in a separate popup window. So that I can make address changes easily without modifying other supplier information.
- As an administrator, I want to remove suppliers from the system, with a confirmation dialog to prevent accidental deletion. So that I can maintain an accurate supplier database.

Order Placement

- As an administrator, I want to create and edit purchase order templates so that I can standardize our ordering process across different suppliers.
- As an inventory manager, I want the system to automatically generate purchase orders when a stock item falls below a set threshold so that we can maintain optimal inventory levels without constant manual monitoring.
- As an inventory controller, I want to manually generate purchase orders when needed so that I can respond to unexpected demand or special circumstances.
- As an inventory controller, I want to modify auto-generated orders before sending them so that I can adjust quantities or add special instructions if necessary.
- As an inventory controller, I want the system to automatically select the best supplier based on predefined criteria so that we can optimize our purchasing decisions.
- As an admin, I want to receive and process supplier responses via email automatically, so that we can streamline our communication and order confirmation process.

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Subsystems

Authentication and Authorization Subsystem

This subsystem forms the security backbone of the Smart Inventory system. It manages user access through secure registration, login, and logout processes. The subsystem implements role-based access control, ensuring that users can only access features appropriate to their assigned roles. It also handles password management, including secure storage and recovery mechanisms. An important feature is the audit trail, which logs all authentication events for security monitoring.

Team/User Management Subsystem

The Team/User Management subsystem is crucial for maintaining the organisational structure within the Smart Inventory system. It allows administrators to register new team members, assign roles, and manage permissions. Users can manage their own profiles, updating personal information and preferences. This subsystem also handles session management, ensuring secure and personalized user experiences throughout the application.

Reporting Subsystem

This subsystem is the analytical powerhouse of Smart Inventory. It provides a customizable dashboard with real-time updates on critical inventory metrics. The subsystem generates a wide range of reports, including current stock levels, expiration dates, inventory turnover, order history, supplier performance, and team activities. It also offers advanced analytics and data visualization tools, enabling users to gain deep insights into inventory management processes and make data-driven decisions.

Inventory Management Subsystem

The Inventory Management subsystem is the core of Smart Inventory, handling all aspects of stock control. It maintains a comprehensive database of inventory items, monitors stock levels, and generates alerts for low stock or approaching expiration dates. The subsystem provides advanced search and filtering capabilities for efficient inventory navigation. It also manages stock requests, edits, and removals, maintaining a detailed transaction history for each item.

Stock Request Subsystem

This subsystem streamlines the process of requesting stock from inventory. It allows all authorized users to submit stock requests, capturing essential details like requester, item, quantity, and purpose. The subsystem validates stock availability, updates inventory levels for successful requests, and notifies relevant parties. For unsuccessful requests due to low stock, it can trigger autonomous ordering processes. It also maintains an audit trail of all stock requests for administrative oversight

Supplier Management Subsystem

The Supplier Management subsystem handles all supplier-related operations. It stores and manages supplier information, facilitates communication with suppliers, and tracks supplier performance. A unique feature is the web-based supplier portal, allowing suppliers to update their own information. The subsystem also supports the addition, editing, and removal of suppliers, with robust search and retrieval functionalities for efficient supplier management.

Order Placement Subsystem

This subsystem automates and manages the order placement process. It supports both automated low-stock order generation and manual order placement. The subsystem includes features for purchase order configuration, automated supplier selection, and email-based order communication. It maintains a comprehensive order history and incorporates a quote evaluation system to help select the best supplier for each order. This subsystem plays a crucial role in maintaining optimal inventory levels and streamlining the procurement proces

Functional Requirements

Authentication and Authorization Subsystem

1. User Registration (Create Account)
    (a) Allow users to create an account with a unique username and email address.
    (b) Enforce strong password policies (e.g., minimum length, complexity requirements).
    (c) Implement secure password hashing and storage.
    (d) Validate user inputs in real time and provide clear feedback on user errors.

(e) Require email verification to activate new accounts.

2. Log in
   (a) Provide secure login for different user roles.
   (b) Implement secure session management.
   (c) Warn users of incorrect login attempts with appropriate error messages.
   (d) Implement account lockout after multiple failed login attempts.
   (e) Warn the user on incorrect inputs provided and details as to why it might be incorrect.
3. Role-based access control (RBAC)
   (a) Grant full access to administrators.
   (b) Grant partial management access to inventcontrollers (excludingding team management).
   (c) Grant stock requests and deprecation access to end users.
4. Logout
   (a) Allow users to manually log out, requiring re-authentication for access.
   (b) Implement automatic logout for inactive sessions.
5. Auditing and Monitoring
   (a) Maintain a detailed audit trail of user activities within the system.
   (b) Log all authentication events, including successful and failed login attempts.
   (c) Provide administrative tools for reviewing audit logs and user activities.
6. Password Management
   (a) Allow users to change their password while logged in.
   (b) Implement a secure ”Forgot Password” feature with an email-based reset.
   (c) Implement secure password storage.
   (d) Provide password recovery mechanisms.

Team/User Management Subsystem

1. Team Registration
   (a) Allow administrators to register new users with necessary details (name, email, role, department).
   (b) Validate and ensure the uniqueness of user details, especially email addresses.
   (c) Implement real-time validation and provide clear feedback for data entry errors.

(d) Generate and send a secure, time-limited account activation link via email.

2. Team Member Management
   (a) Allow administrators to create accounts.
   (b) Allow administrators to modify existing accounts and permissions.
   (c) Allow administrators to deactivate/delete user accounts.
3. User Profile Management
   (a) Allow users to view their account and its details.
   (b) Allow users to update their profile information, such as name, contact details, and preferences.
   (c) Users are able to change their password while logged into their account.
   (d) Provide options for users to manage notification preferences and communication settings.
   (e) Provide options for users to customize their dashboard or user interface preferences.
4. Session Management
   (a) Implement secure session handling with proper timeout mechanisms.
   (b) Store user preferences and details in session for personalisation.

Reporting Subsystem

1. Dashboard
   (a) Provide a customizable dashboard with key metrics and visualisations.
   (b) Display real-time updates on critical inventory levels, recent orders, and team activities
   (c) Allow users to configure widgets based on their roles and preferences
   (d) Implement interactive charts and graphs for quick data analysis
   (e) Include alert indicators for items requiring immediate attention.
2. Inventory Reports
   (a) Current Stock
      i. Generate detailed reports on current stock levels for all products Include product name, SKU, category, quantity, and expiration date
      ii. Implement advanced filtering and sorting options
   (b) Expiration
      i. List products nearing expiration within a configurable time frame
      ii. Highlight expired products or those critically close to expiration
      iii. Calculate potential loss due to expired inventory
   (c) Inventory Turnover

i. Calculate and display inventory turnover ratios for products and categories
ii. Identify slow-moving and fast-moving inventory items

(d) Stock Take

i. Generate reports for physical inventory counts
ii. Allow input of actual quantities and automatic discrepancy calculation.
iii. Provide a summary of stock take results, including accuracy percentages.

3. Order Reports

(a) Order History

i. Detail order history for each product, including date, supplier, quantity, and status
ii. Implement filtering by product, supplier, date range, order status, and if the order was automated.

(b) Autonomous Ordering

i. Track the performance of the autonomous ordering system
ii. Compare autonomous orders with manual orders for efficiency and accuracy
iii. Analyze cost savings and inventory optimization achieved through autonomous ordering

(c) Back-order Report

i. List all back-ordered items, their quantities, and expected arrival dates
ii. Calculate the impact on inventory levels and potential stock-outs

4. Supplier Reports

(a) Supplier Performance Report

i. Calculate and display key performance indicators (KPIs) for each supplier
ii. Compare supplier performance over time and against benchmarks.

(b) Cost Analysis Report

i. Analyze cost trends for products from different suppliers
ii. Compare quoted prices with actual invoiced amounts
iii. Identify opportunities for cost savings or negotiation.

5. Team Reports

(a) User Activity

i. Track and display user logins, actions, and system usage
ii. Identify patterns in user behavior and system interaction

(b) Security Audit

i. Log and report on all security-related events (e.g., failed login attempts, permission changes)
ii. Highlight potential security risks or unusual activities.

6. Analytics and Visualization
    (a) Implement advanced analytics capabilities for all report types
    (b) Provide interactive data visualization tools (e.g., charts, graphs, heat maps)
    (c) Enable trend analysis and forecasting based on historical data
7. Report Management
    (a) Implement role-based access control for report viewing and creation
    (b) Provide options to export reports in CSV.

Inventory Management Subsystem

1. Database Management
    (a) Store comprehensive inventory item details in a secure database
    (b) Allow administrators to import data from Excel or CSV spreadsheets to initialize or update the database
    (c) Enable bulk update of inventory data through file import
    (d) Implement data validation checks during import to ensure data integrity
    (e) Provide the option to export the entire inventory database in CSV format
2. Search and Filter Functionality
    (a) Implement advanced search capabilities for locating specific stock items
    (b) Allow multi-criteria filtering of inventory items
    (c) Enable custom sorting of inventory lists based on user-defined parameters
3. Role-based Access Control
    (a) Allow administrators full access to all inventory management features
    (b) Grant inventory managers full access permissions to edit and manage stock details
    (c) Provide read-only access to basic users for viewing inventory information
4. Inventory Editing and Removal
    (a) Allow administrators and inventory managers to add new items to the inventory
    (b) Enable editing of existing item details, including quantity adjust- ments
    (c) Implement a process for removing or deactivating items from the active inventory
    (d) Require justification and approval for significant quantity changes or item removals
    (e) Maintain an audit trail of all edits and removals
5. Transaction History

(a) Maintain a detailed history of all stock transactions

(b) Record date, time, transaction type, quantity change, and user for each transaction.

Stock Request Subsystem

1. Role-Based Access control

   (a) Allow authorized all users to request stock from the system

   (b) Capture details such as requester, item, quantity, and purpose (inventory controller can specify purposes) for audit trail.

2. Monitor Stock

   (a) Validate stock availability before processing requests

   (b) Notify requesters about the status of their requests.

3. Successful Requests

   (a) Update inventory levels.

   (b) Notify inventory controllers of the requests.

   (c) Update user activity as well as dashboard.

4. Unsuccessful Requests

   (a) Notify inventory controllers of the requests.

   (b) autonomously order more stock.

5. Allow admin to view the audit trail

Supplier Management Subsystem

1. Supplier Information Management

   (a) Store essential supplier details in a secure database, including name, contact information, and location

   (b) Maintain a history of their associated details

   (c) Implement version control for supplier information changes

2. Supplier Communication

   (a) Implement an email-based communication system for interacting with suppliers

   (b) Generate and send automated emails for supplier-related events (e.g., quote requests, order updates)

   (c) Provide email templates for common supplier communications (e.g, purchase orders)

3. Web-based Supplier Portal

(a) Develop a secure web form for suppliers to access and update their information
(b) Allow suppliers to view and edit their contact details through the web form
(c) Enable suppliers to update information about items requested for orders with reasons for changes
(d) Implement data validation on the web form to ensure accuracy of submitted information

4. Supplier Performance Tracking
   (a) Implement a system to track key performance indicators (KPIs) such as delivery time, product quality, and order fulfillment rates
   (b) Update performance metrics automatically based on order data and user feedback
   (c) Implement alerts for significant changes in supplier performance
5. Supplier Management Operations
   (a) Provide an interface for administrators and inventory controllers to add new suppliers to the system
   (b) Enable editing of existing supplier information with proper change tracking
   (c) Implement a process for deactivating or removing suppliers, including handling of associated data
6. Search and Retrieval
   (a) Enable filtering of suppliers based on various attributes (e.g. location)
   (b) Allow sorting of supplier lists based on user-defined parameter

Order Placement Subsystem

1. Purchase Order Configuration
   (a) Provide an interface for administrators to create and edit purchase order templates
   (b) Implement a system for autonomously selecting the best supplier based on predefined criteria
2. Automated Low Stock Order Generation
   (a) Implement an automated system to monitor stock levels continuously
   (b) Set configurable thresholds for low stock alerts
   (c) Automatically generate purchase orders using appropriate templates when stock falls below threshold
   (d) Implement logic to determine optimal order quantities based on historical data and forecasts
3. Automated Order Communication

(a) Develop an email-based system for sending purchase orders to suppliers

(b) Generate and send automated emails with purchase order details to selected suppliers

(c) Implement a mechanism to receive and process supplier responses via email

4. Manual Order Placement

   (a) Provide an interface for users to manually generate purchase orders

   (b) Allow users to select suppliers or use the automated supplier selection system

   (c) Enable users to modify auto-generated orders before sending

   (d) Implement the same automated emailed web portal link communication process for manual orders

5. Order History and Record Keeping

   (a) Maintain a comprehensive database of all placed orders

   (b) Implement a versioning system to track changes in order details

   (c) Use historical data to inform and improve order templates and automated processes

6. Quote Evaluation System

   (a) Develop an automated system to receive and process supplier quotes via an emailed web portal link

   (b) Implement algorithms to evaluate and rate received quotes based on predefined criteria.

   (c) Provide recommendations for the best supplier based on quote evaluation result

Use Case Diagrams

Authentication and Authorization Subsystem

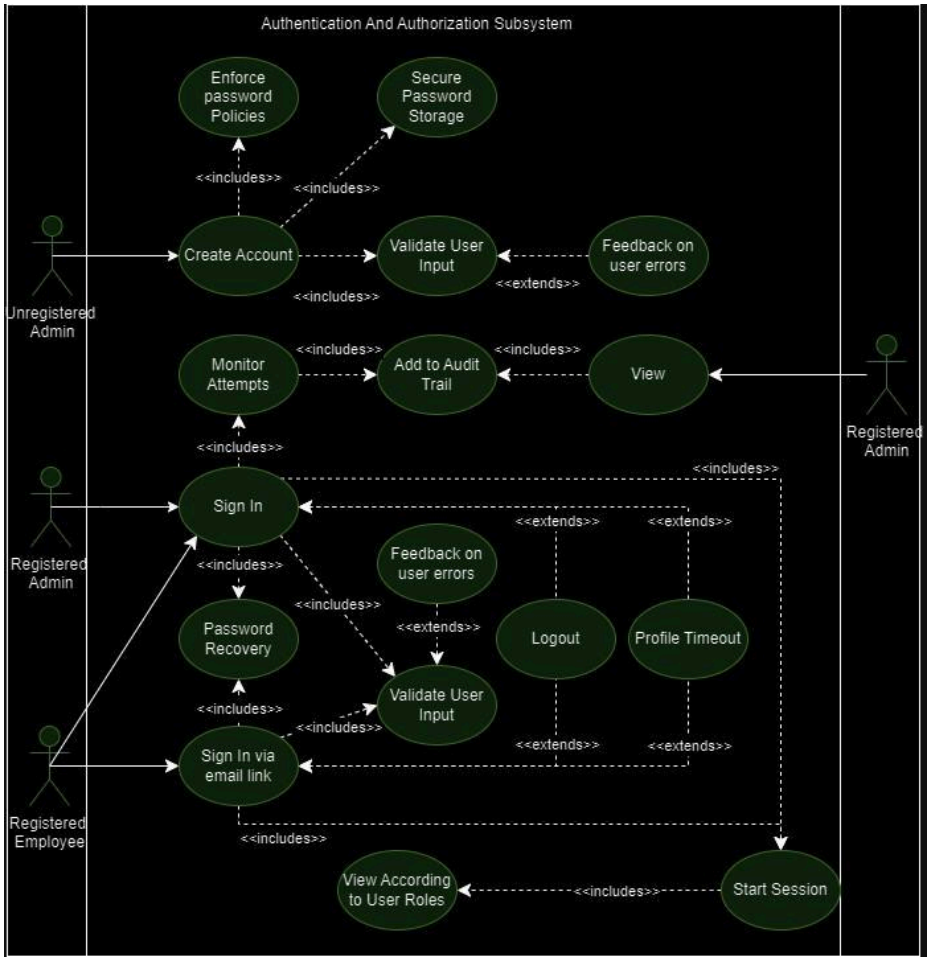

Figure 1: Authentication and Authorisation Subsystem

Team/User Management Subsystem

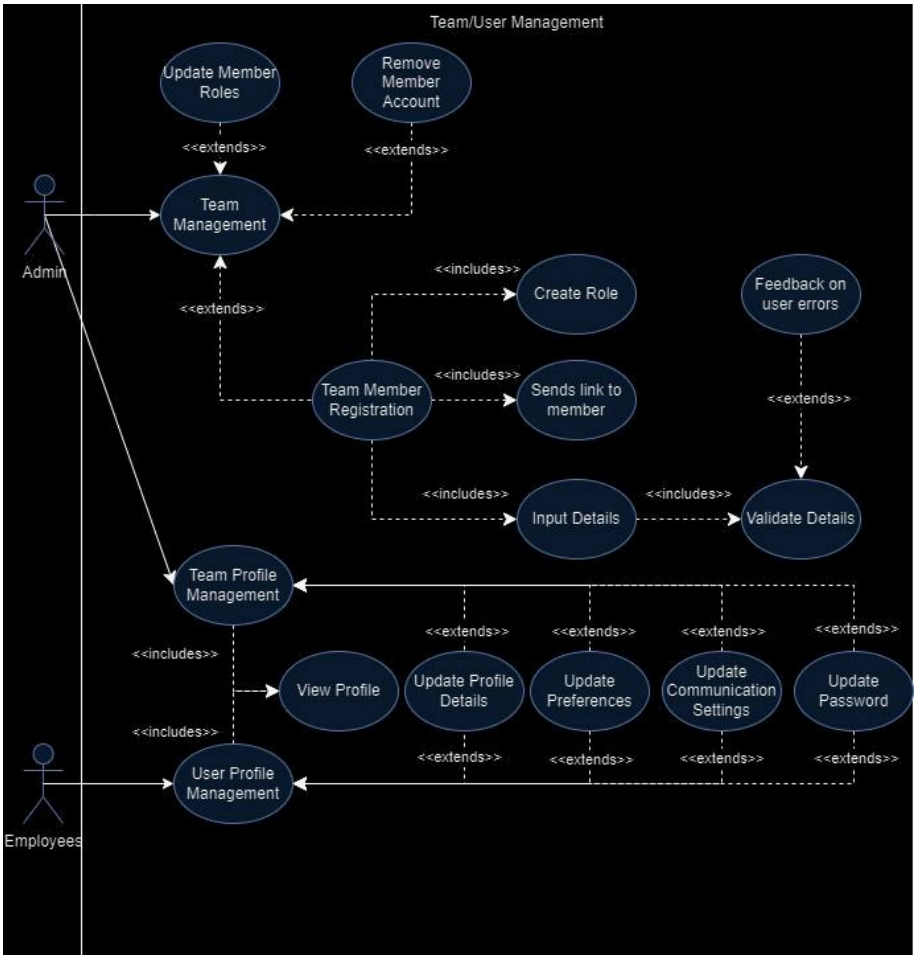

Figure 2: Team/User Management Subsystem

Reporting Subsystem

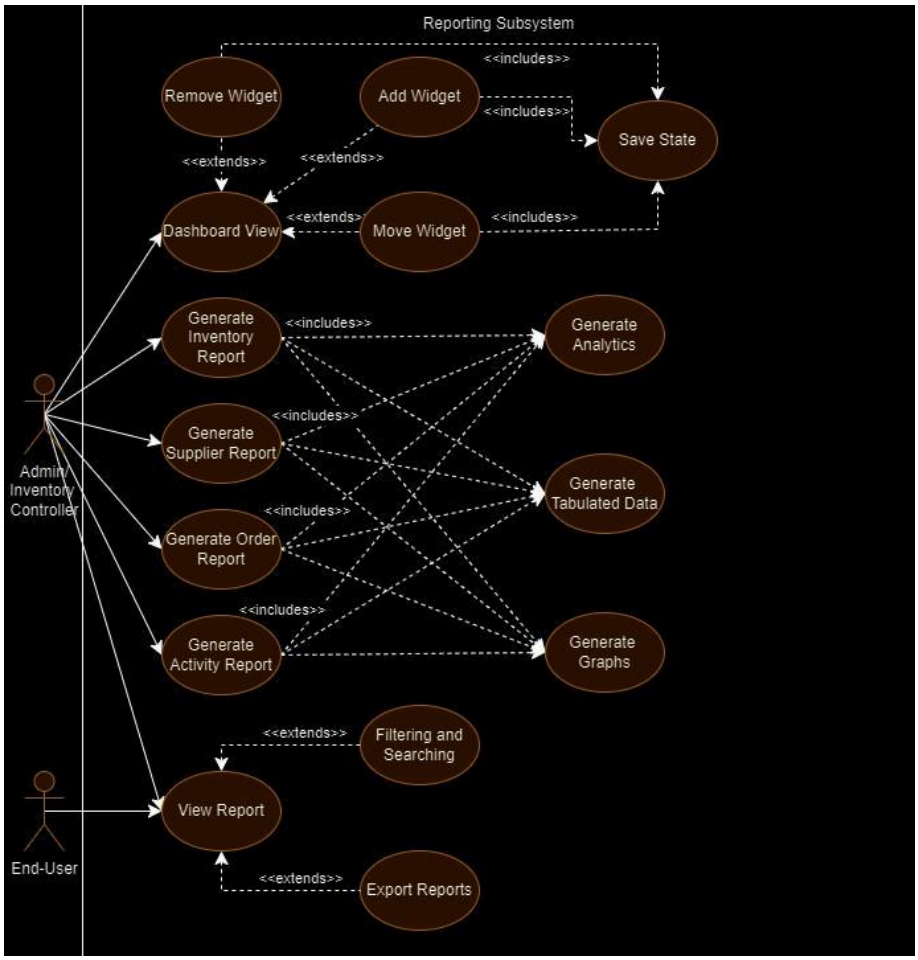

Figure 3: Reporting Subsystem

Inventory Management Subsystem

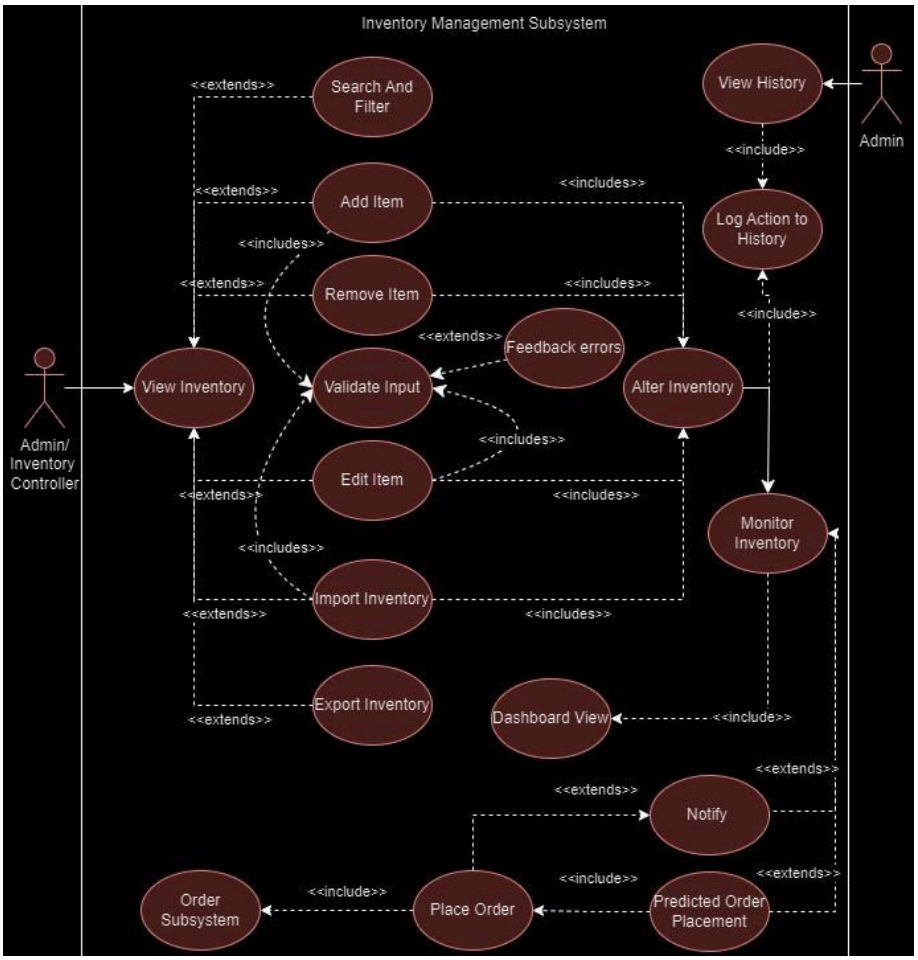

Figure 4: Inventory Management Subsystem

Stock Request Subsystem

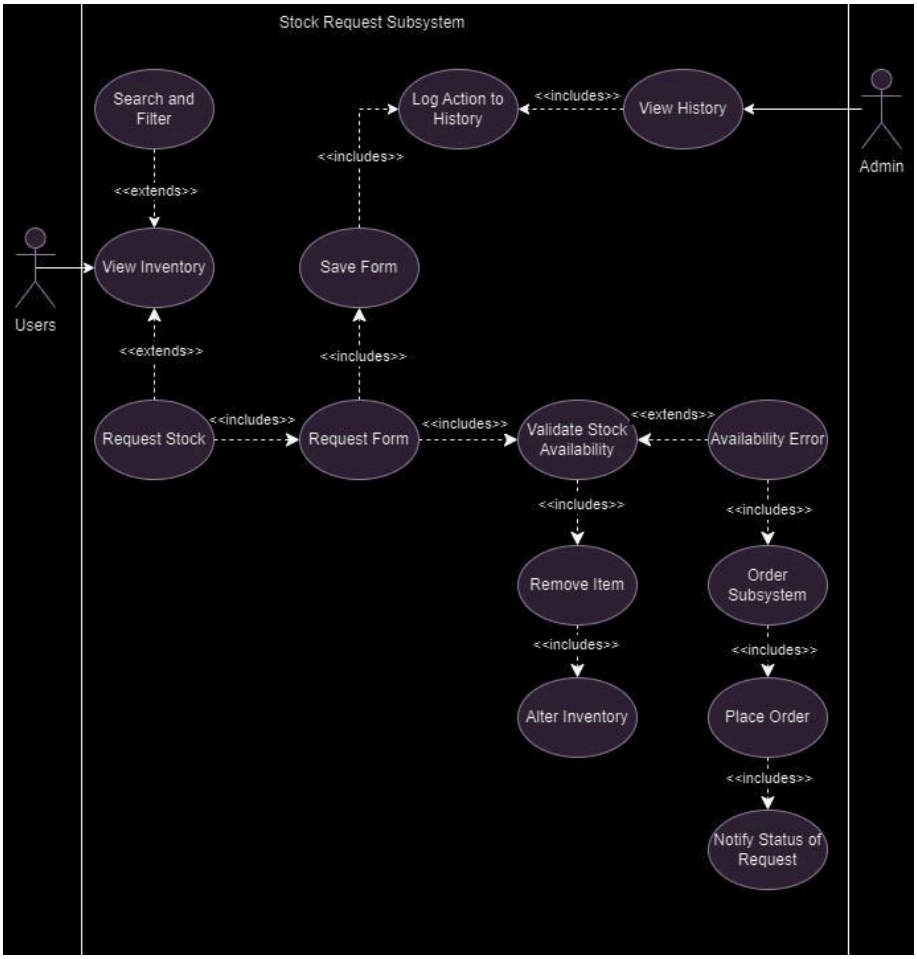

Figure 5: Stock Request Subsystem

Supplier Management Subsystem

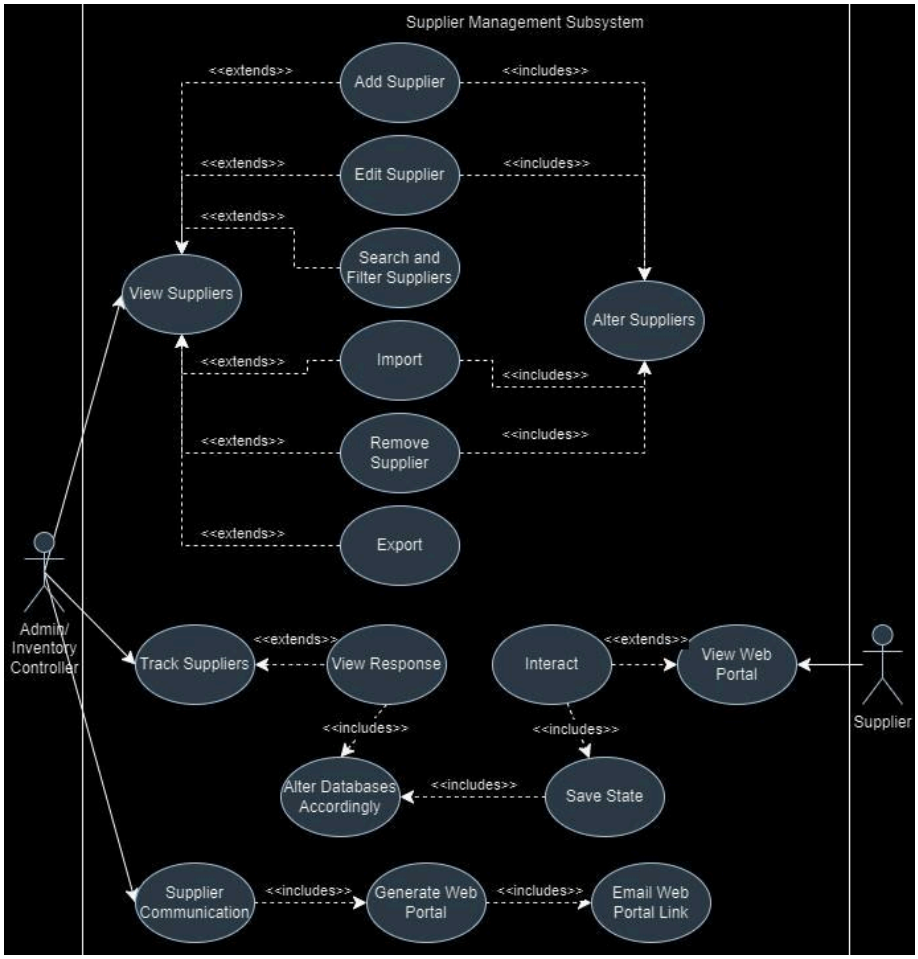

Figure 6: Supplier Management Subsystem

Order Placement Subsystem

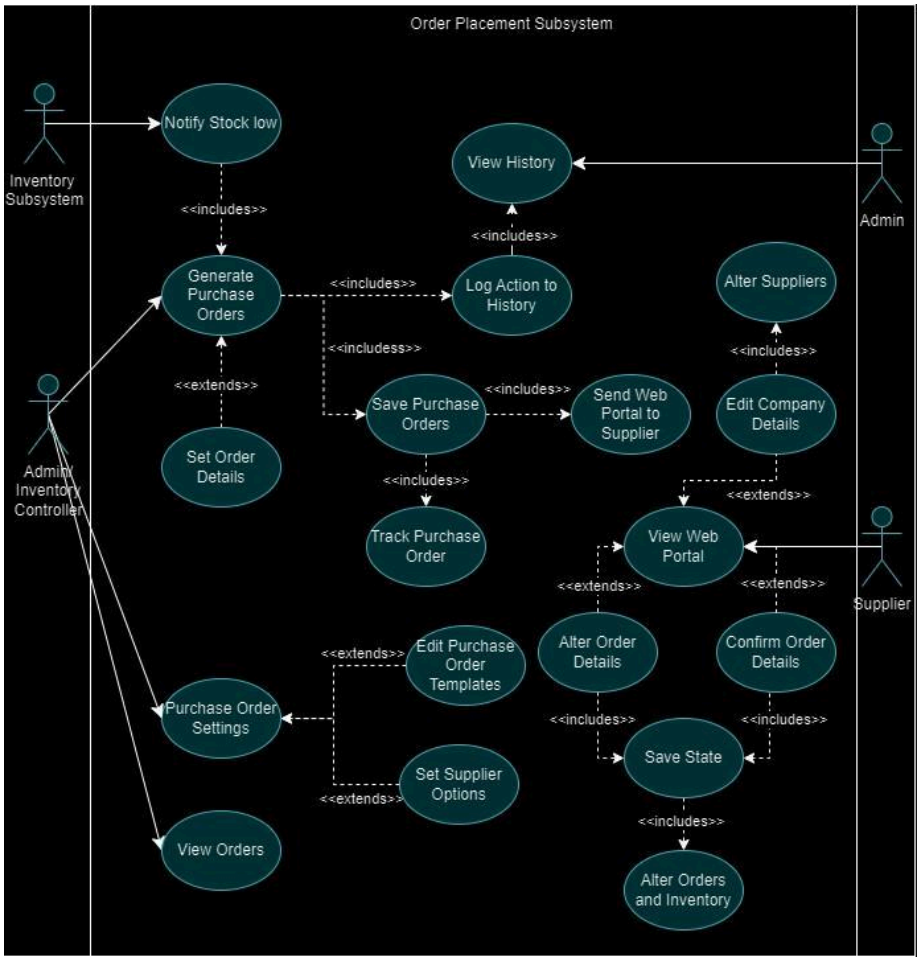

Figure 7: Order Placement Subsystem

Class Diagram