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# **Software Requirements Specification**

for

## **Inventory Management System**

**Prepared by - Group 02**

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# 1. Introduction

## 1.1 Purpose

- The purpose of this document is to specify the software requirements for the Inventory Management System for our faculty. This system aims to streamline the management of inventory items within the faculty, providing accurate tracking, automated notifications, and user-friendly interfaces for efficient inventory management.

## 1.2 Document Conventions

- This document follows standard software documentation conventions, including
  - Use of clear and concise language.
  - Prioritization of requirements using the MoSCoW method (Must have, Should have, Could have, Won't have).
  - Consistent formatting for requirement statements and attributes.

## 1.3 Intended Audience and Reading Suggestions

- This document's intended audience includes developers, department heads, faculty staff, and other stakeholders involved in developing and using the Inventory Management System.
- Developers will find detailed specifications of system functions and interfaces, while project leader will gain insights into project scope and timelines.
- Faculty staff and users will understand the system's capabilities and how it will impact their daily operations.
- It is recommended to begin reading with the overview sections and proceed through the detailed requirements relevant to each reader's role.

## 1.4 Project Scope

- The Inventory Management System is designed to facilitate efficient management of inventory items within our faculty.
- The system will allow Technical officers to add, update, and track inventory items, schedule maintenance, generate reports, and receive automated notifications for repair schedules.
- By providing accurate locations of inventory items and streamlined workflows, the system aims to enhance efficiency and productivity within the faculty.

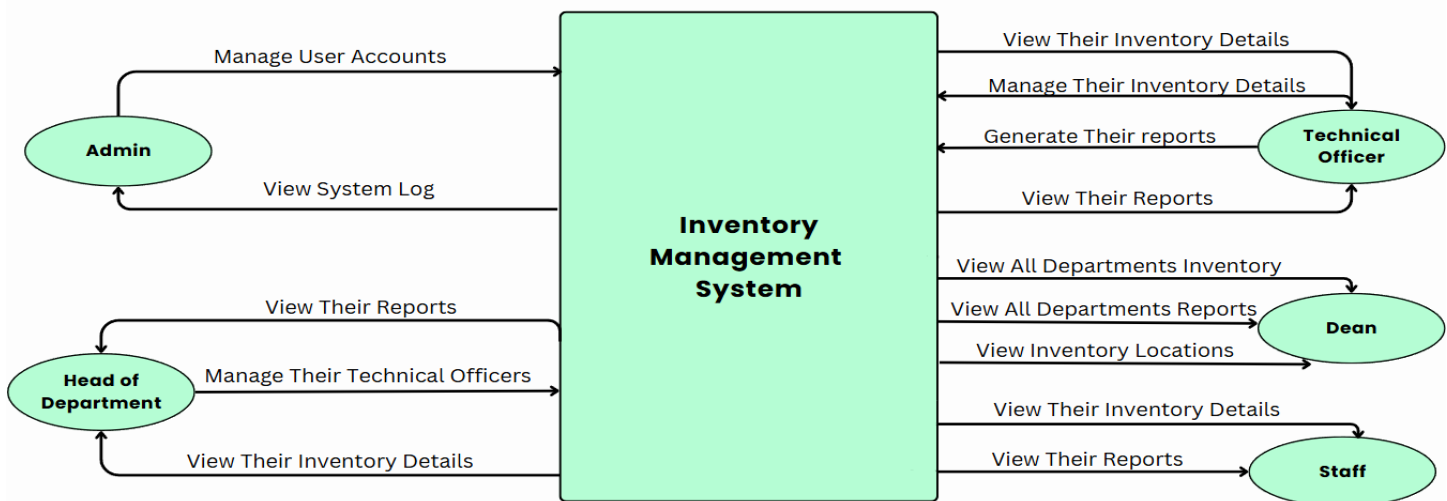
## 1.5 References

- [Project Proposal Document](#)

## 2. Overall Description

### 2.1 Project Perspective

- The Inventory Management System for our faculty is a new, self-contained product designed to address the specific needs of managing inventory within an academic environment. This system is not a follow-on member of a product family but is developed from the ground up to provide comprehensive solutions for inventory management. It is intended to replace existing manual and semi-automated systems that are currently used, streamlining the process of tracking and maintaining inventory items.
- The system will integrate seamlessly with existing faculty infrastructure, including the authentication system for user login and role management. The following diagram illustrates the major components of the system.



### 2.2 Project Functions

- The Inventory Management System will perform the following major functions
  - Detailed Reports Generation: Generate reports on inventory levels, item usage, condition, and other relevant metrics.
  - Accurate Location Tracking: Store and manage the precise location of each inventory item.
  - Automated Repair Notifications: Send automated notifications for item maintenance and repairs based on predefined schedules.
  - User-Friendly Inventory Interface: Provide an intuitive interface for adding, updating, and managing inventory items.
  - Security and Access Control: Implement robust security features including user authentication and role-based access control.
  - Increased Efficiency and Productivity: Enhance overall efficiency by automating processes and improving inventory visibility.

## 2.3 User Classes and Characteristics

### ❖ Technical officers,

**Role:** Technical officers have full control over the IMS, including system configuration, and overall oversight of inventory management processes in their departments.

Technical Expertise	They must be highly skilled technically and have a thorough understanding of inventory management concepts.
Security/Privilege Levels	They have the highest level of security clearance and access privileges within the system.
Frequency of Use	Technical officers interact with the system frequently to perform system setup, configuration, and maintenance tasks.
Subset of Product Functions Used	They utilize all functions of the IMS, including check repair notification, and generating comprehensive reports.
Experience	Technical officers are in charge of making sure the IMS runs smoothly and typically have experience managing information systems.

### ❖ Faculty Members (Dean, Head of Department, Lectures, Lab staff members, Office members)

**Role:** Faculty Members have limited access to the system functions such as viewing inventory items and searching.

Technical Expertise	Faculty members have varying levels of technical proficiency, ranging from basic to advanced.
Security/Privilege Levels	They have moderate access privileges and limited control over system configuration.
Frequency of Use	Faculty members utilize the system frequently to search for and monitor goods that are available in the hallways.
Subset of Product Functions Used	<p>Their access capabilities are modest, enabling them to browse inventories, filter items, View reports, and locate locations However, their authority over system settings is restricted.</p> <p>The dean has access to the full inventory of the faculty other members have privileges only in their departments.</p> <p>However, the department head can change the technical officer accounts in their department.</p>
Experience	While some faculty members may have experience with digital tools, others may require additional support to navigate the IMS effectively.

## 2.4 Operating Environment

- Hardware platform

The Inventory Management System (IMS) operates as a web application, requiring minimal hardware resources on the client side. The hardware platform includes,

- Client Devices: Users access the IMS using standard computing devices such as,
  - ✓ Desktop computers
  - ✓ Laptops, tablets
  - ✓ Smartphones

These devices must have a modern web browser installed to interact with the web application.

- Operating System and Versions

The IMS is platform-independent and compatible with various operating systems. The following considerations apply

- Server-Side Operating System: The IMS backend is hosted on servers running Linux-based operating system (e.g., Ubuntu Server) depending on the deployment environment and preference. The choice of operating system is based on factors such as compatibility, security, and performance.
- Client Devices: Users can access the IMS from devices running different operating systems, including,
  - ✓ Windows (versions 7, 8, 10)
  - ✓ macOS (versions 10.11 and above)
  - ✓ Linux distributions (e.g., Ubuntu, Fedora)
  - ✓ Android (versions 5.0 and above)

- Software Components and Applications

The IMS interacts with various software components and applications to ensure functionality and interoperability

- Web Browsers: The IMS is accessed through modern web browsers such as
  - ✓ Google Chrome
  - ✓ Mozilla Firefox
  - ✓ Microsoft Edge
  - ✓ Opera

The web application is designed to be compatible with the latest versions of these browsers, ensuring optimal performance and user experience.

- Web Server: The IMS backend is deployed on a web server such as Apache HTTP Server or Microsoft Internet Information Services (IIS). The web server handles client requests, serves web pages, and interacts with the application logic.
- Database Management System (DBMS): The IMS utilizes a relational database management system (RDBMS) such as MySQL for data storage and management. The choice of DBMS depends on factors such as scalability, performance, and compatibility with the deployment environment.

- Programming Languages and Frameworks:
  - web technologies such as,
    - ✓ HTML5
    - ✓ CSS3
    - ✓ JavaScript
  - server-side scripting language
    - ✓ PHP
  - Framework
    - ✓ Laravel

## 2.5 Design and Implementation Constraints

- The development of the Inventory Management System is subject to the following constraints:
  - Corporate Policies: Adherence to faculty IT policies and data protection regulations.
  - Hardware Limitations: The system must be optimized for performance on standard faculty-provided hardware.
  - Integration Requirements: Seamless integration with existing authentication systems and other faculty software.
  - Security Considerations: Implementation of secure communication protocols (HTTPS) and data encryption.

Technology Stack: Use of specific technologies such as React for front-end and Node.js for back-end development.

## 2.6 User Documentation

- The following user documentation components will be delivered with the software:
  - User Manual: Comprehensive guide covering all functionalities of the system.
  - Online Help: Context-sensitive help accessible within the system interface.
  - Tutorials: Step-by-step guides for common tasks and system features.
  - Quick Reference Guides: Concise documents for quick lookup of essential functions.

## 2.7 Assumptions and Dependencies

- We will consider MERN to develop our item management system web-side application, MERN stack is a collection of technologies that help developers build robust and scalable web applications using JavaScript. The acronym “MERN” stands for MongoDB, Express, React, and Node. js
  - **MongoDB:** MongoDB is a NoSQL database that is used to store data in a flexible, JSON-like format. It allows for fast and efficient data storage and retrieval, making it a popular choice for web applications.
  - **Express:** Express is a web application framework for Node.js that provides a minimalist and flexible approach to building web applications. It simplifies the process of creating APIs and handling HTTP requests, making it easier for developers to build and maintain web applications.

- **React:** React is a JavaScript library for building user interfaces. It allows developers to create reusable UI components that can be easily updated and rendered on the client side. React is known for its performance and scalability, making it a popular choice for building dynamic web applications.
- **Node.js:** Node.js is a JavaScript runtime environment that allows developers to run JavaScript code on the server side. It provides a non-blocking, event-driven architecture that enables developers to build fast and scalable web applications. Node.js is often used in conjunction with Express to create server-side logic for web applications.
- By combining MongoDB, Express, React, and Node.js, developers can create full-stack web applications that are efficient, scalable, and easy to maintain.

## 3. External Interfaces and Requirements

### 3.1 User Interface

- The Inventory Management System will provide a user-friendly interface for faculty members, staff, and administrators. The user interface (UI) will follow established GUI standards to ensure consistency and usability across the system. The key characteristics and components of the UI include
- **Sample Screen Images:** Screens will include the main dashboard, inventory item details, item maintenance schedule, and user management screens.
- **Screen Layout Constraints:** The layout will be responsive to accommodate different screen sizes, including desktops, tablets, and mobile devices.
- **Standard Buttons and Functions:** Each screen will include standard buttons like "Save", "Cancel", "Delete", "Search", and "Help".
- **Keyboard Shortcuts:** Common keyboard shortcuts will be implemented for efficiency, such as Ctrl+S for Save, Ctrl+F for Search, and Esc for Cancel.
- **Error Message Display Standards:** Error messages will be clear, concise, and consistent, providing meaningful information to help users correct issues.
- **User Interface Components:** The system will have components for viewing, adding, updating, and deleting inventory items, as well as managing user roles and permissions.
- **User Interface Design Documentation:** Detailed UI design will be documented in a separate user interface specification document.



## 3.2 Software Interfaces

- The Inventory Management System will interface with various software components and platforms to ensure seamless operation and integration. The key software interfaces include.
- **Database:** The system will use a relational database management system (RDBMS) such as MySQL or PostgreSQL to store inventory data. Data items include inventory items, user information, maintenance schedules, and departmental details.
- **Operating Systems:** The system will be compatible with major operating systems including Windows, macOS, and Linux.
- **Web Server:** The system will run on a web server such as Apache or Nginx.
- **APIs:** APIs will be provided for integration with other faculty systems, such as a student information system (SIS) or a learning management system (LMS). These APIs will support data exchange and synchronization.
- **Libraries and Tools:** The system will use modern web development libraries and frameworks such as React for the front-end and Node.js for the back-end.
- **Commercial Components:** Integration with third-party commercial components such as authentication services (e.g., OAuth) and notification services (e.g., Twilio for SMS notifications).

## 3.3 Communications Interfaces

- The Inventory Management System will support various communication protocols and standards to ensure secure and reliable data exchange. The key communication interfaces include
- **Email Notifications:** The system will send automated email notifications for upcoming maintenance and repair reminders using SMTP.
- **Web Browser:** Users will interact with the system through a web browser. The system will be compatible with major browsers like Chrome, Firefox, Safari, and Edge.
- **Network Protocols:** Communication between the client and server will use HTTPS to ensure secure data transmission.
- **Data Transfer:** Data transfer rates will be optimized to ensure quick loading times and responsiveness. Synchronization mechanisms will be implemented to handle data updates and ensure consistency.
- **Security and Encryption:** Data security will be enforced through the use of SSL/TLS encryption for all data transmitted over the network. User authentication and authorization protocols will ensure secure access control.

## 4. System Requirements

### 4.1 Functional Requirements

#### 4.1.1 FREQ-1: Inventory Management

- **Description:** The system should allow users to add, update, and delete inventory items.
- **User Priority (4/5):** This requirement is crucial for users as it forms the core functionality of the system, enabling efficient management of inventory items.
- **Technical Priority (5/5):** Implementing inventory management functionality is essential for the system to fulfill its purpose and provide value to users.

#### 4.1.2 FREQ-2: Accurate Location Tracking

- **Description:** The system should accurately track the location of each inventory item within the faculty premises.
- **User Priority (5/5):** Accurate location tracking is vital for users to easily locate and retrieve inventory items, enhancing operational efficiency.
- **Technical Priority (4/5):** Implementing robust location tracking functionality is technically important to ensure the system provides accurate and reliable information to users.

#### 4.1.3 FREQ-3: Automated Repair Notifications

- **Description:** The system should send automated notifications to administrators when items are due for repair based on predefined maintenance schedules.
- **User Priority (4/5):** Automated repair notifications help ensure timely maintenance of inventory items, reducing downtime and preventing disruptions to faculty operations.
- **Technical Priority (4/5):** Implementing automated notification functionality is technically important to enhance system reliability and minimize manual intervention.

#### **4.1.4   FREQ-4: User-Friendly Interface**

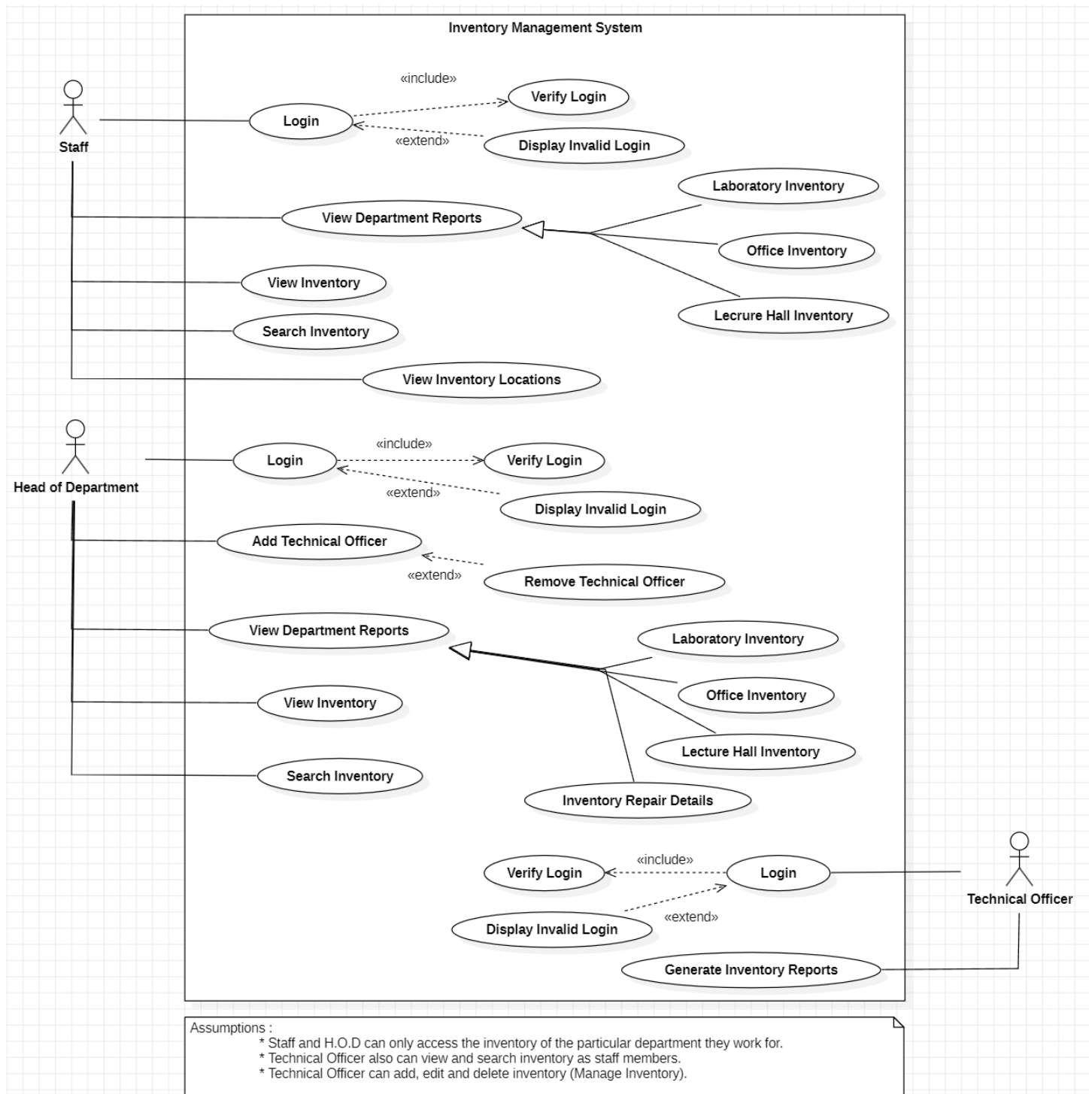
- **Description:** The system should feature a user-friendly interface that allows users to easily interact with inventory management functions.
- **User Priority (5/5):** A user-friendly interface is essential for ensuring user adoption and satisfaction, enabling faculty staff to perform tasks efficiently.
- **Technical Priority (4/5):** Designing and implementing a user-friendly interface is technically important to ensure usability and accessibility for all users.

#### **4.1.5   FREQ-5: Security and Access Control**

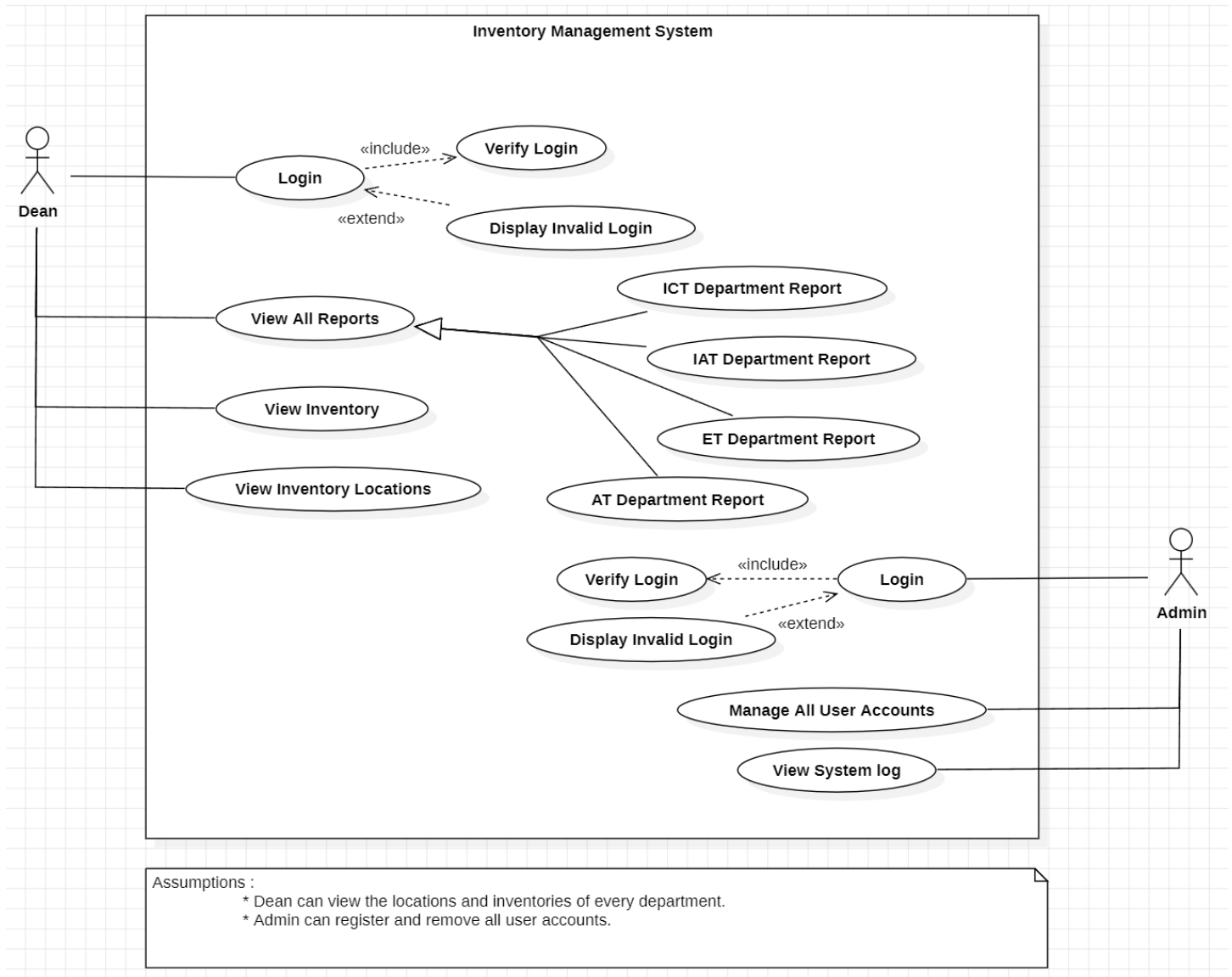
- **Description:** The system should implement robust security measures, including user authentication and access control, to protect sensitive inventory data.
- **User Priority (5/5):** Security and access control are critical for safeguarding confidential inventory information and ensuring data integrity.
- **Technical Priority (5/5):** Implementing strong security measures is technically important to mitigate the risk of unauthorized access and data breaches.

## 5. System Scenarios

### 5.1 Use-case Diagram



- The above diagram illustrates the primary use cases for the Inventory Management System, showing interactions between the system and different user roles: Staff, Head of Department, and Technical Officer.



- The above diagram illustrates the primary use cases for the Inventory Management System, showing interactions between the system and different user roles: Dean and Admin.

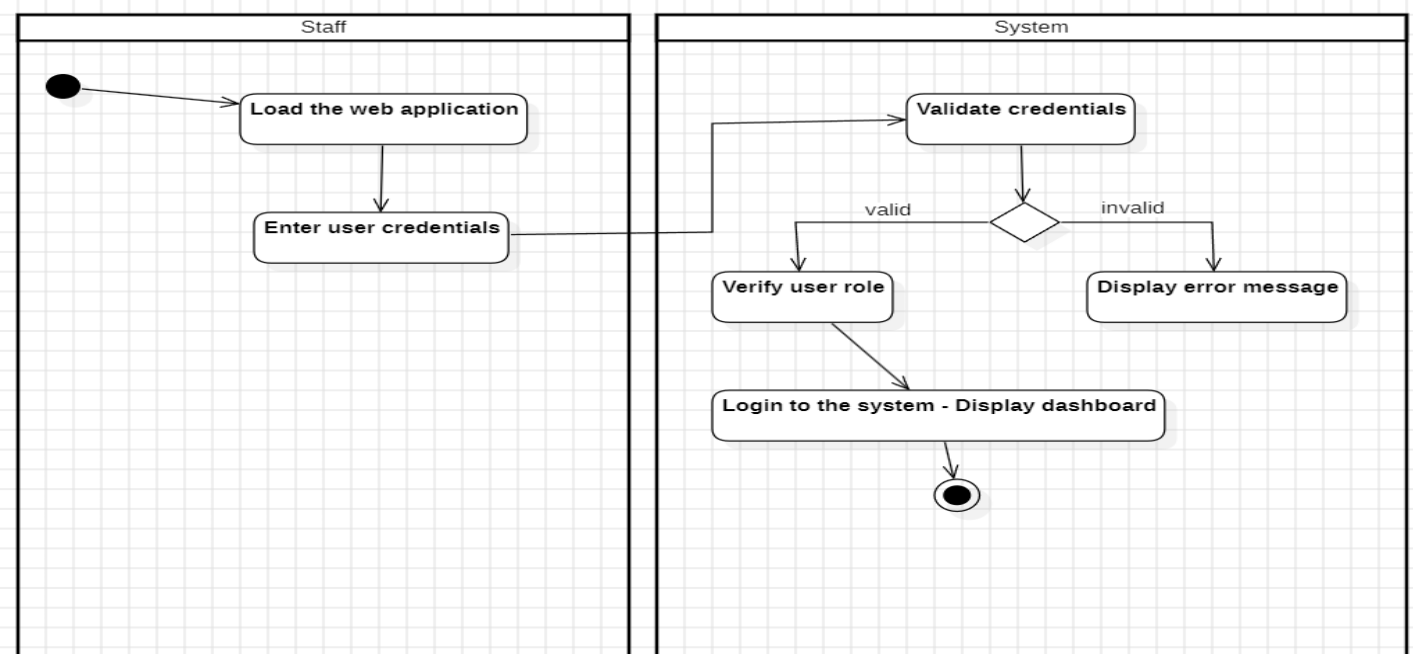
## 5.2 Scenarios

### 5.2.1 SCN-1: Login

<b>FREQ reference</b>	NFREQ-1
<b>NFREQ reference</b>	NFREQ-1
<b>Short Description:</b>	The Staff logs into the Inventory Management System.
<b>Activation action:</b>	The Staff clicks the "Login" button after entering their credentials.
<b>Precondition:</b>	The Staff is on the login page with valid credentials.

Basic flow: Login		
Step	User action	System response
1	Staff enters username and password	System validates credentials
2	Staff clicks "Login"	The system verifies user role and logs the user in
3		The system redirects to the appropriate dashboard
<b>Post-condition:</b>		The user is logged into the system and sees their dashboard.

Scenario Diagram for SCN-1 Login

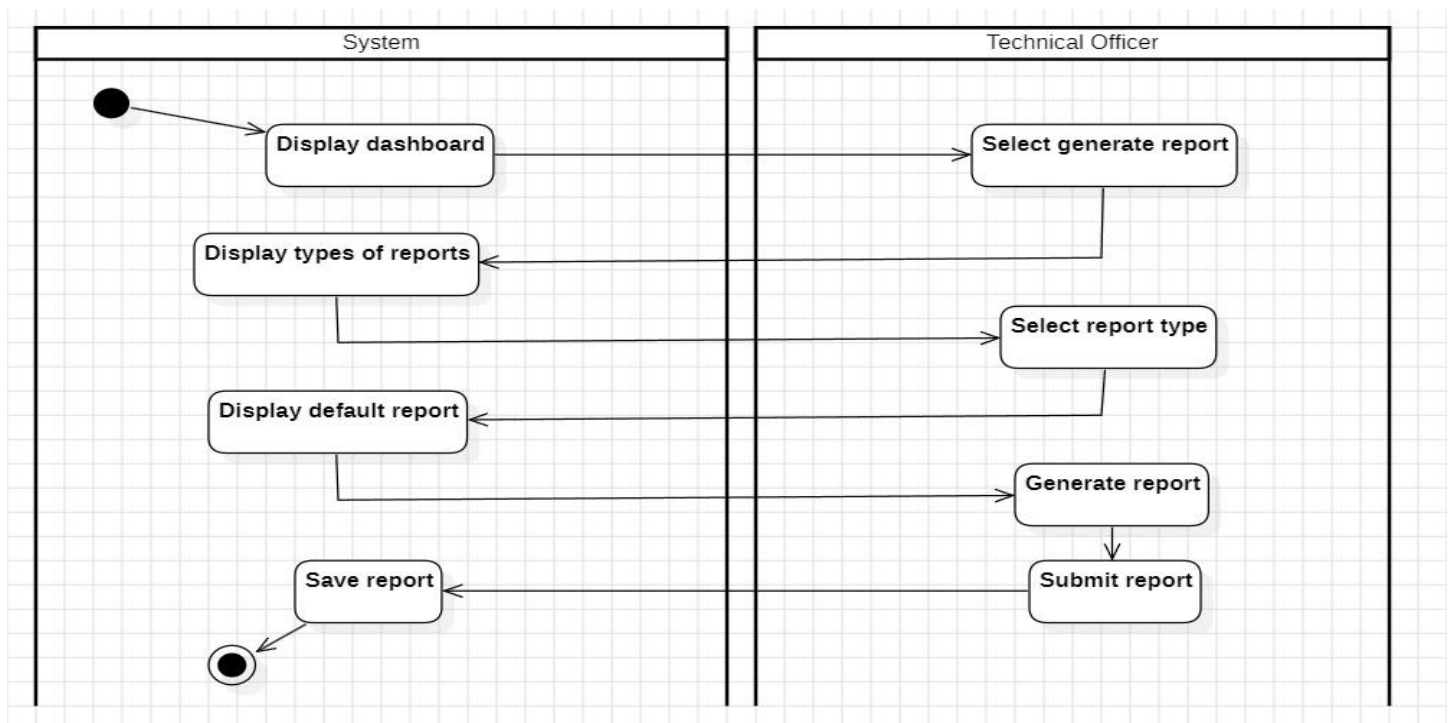


### 5.2.2 SCN-2: Generate Reports

<b>FREQ reference</b>	FREQ-2
<b>NFREQ reference</b>	-
<b>Short Description:</b>	Technical officer generates detailed inventory reports.
<b>Activation action:</b>	Technical officer selects "Generate Reports" from the menu.
<b>Precondition:</b>	Technical officer is logged into the system and has the necessary permissions

Basic flow: Generate Reports		
Step	User action	System response
1	Technical officer selects "Generate Reports"	The system displays report options
2	selects report criteria	The system retrieves and processes data
3	clicks "Generate"	The system generates and displays the report
<b>Post-condition:</b>		The technical officer views or submits the generated report.

#### Scenario Diagram for SCN-2 Generate Reports



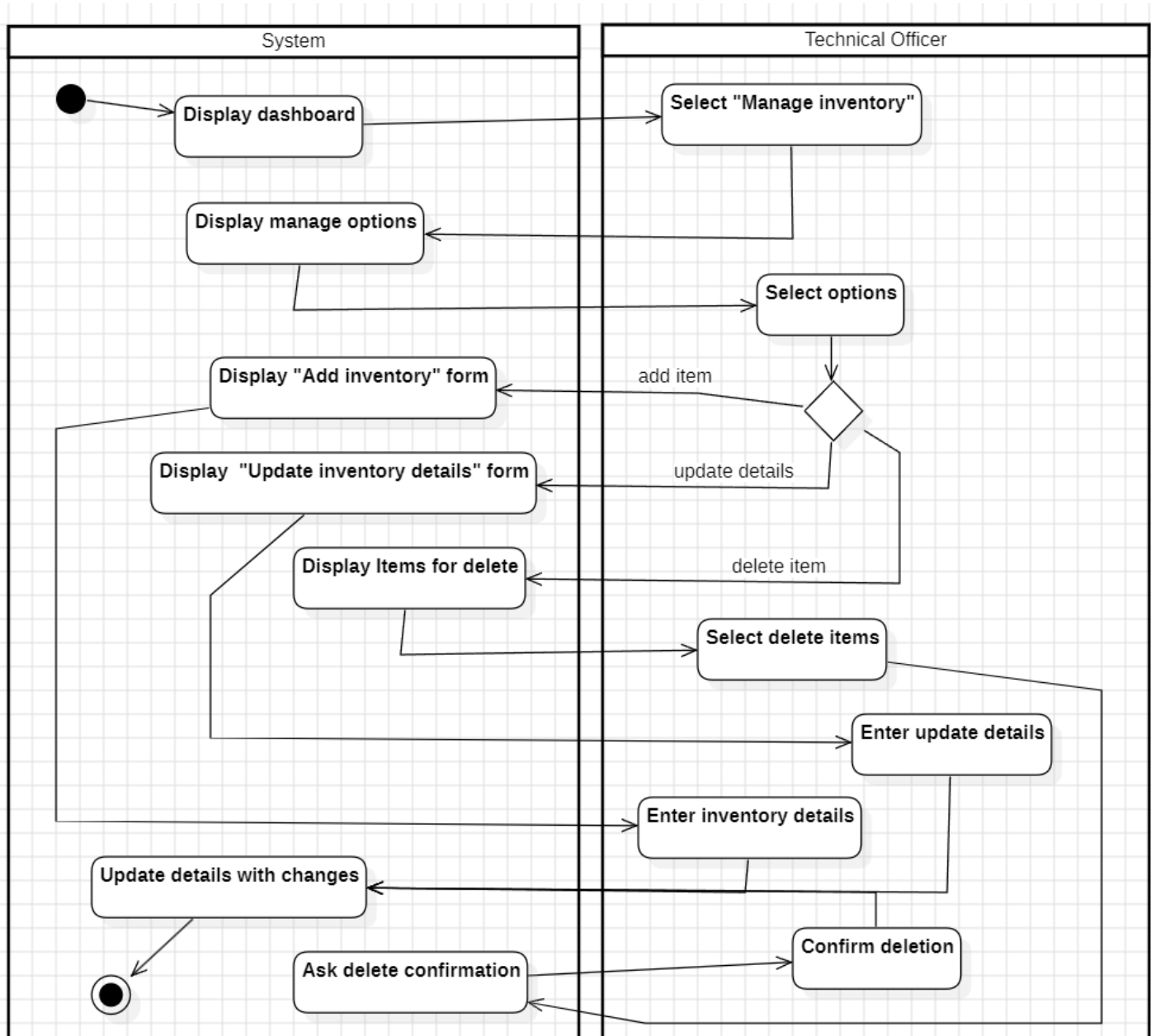
### 5.2.3 SCN-3: Manage Inventory

<b>FREQ reference</b>	FREQ-3
<b>NFREQ reference</b>	-
<b>Short Description:</b>	The technical officer manages inventory items (add, update, delete).
<b>Activation action:</b>	The technical officer selects "Manage Inventory" from the menu.
<b>Precondition:</b>	The technical officer is logged into the system and has the necessary permissions.

<b>Basic flow: Manage Inventory</b>		
<b>Step</b>	<b>User action</b>	<b>System response</b>
1	Technical officer selects "Manage Inventory"	The system displays inventory management options
2	Technical officer selects "Add Item"	The system displays a form for adding a new item
3	Technical officer fills in item details and submits	The system validates and adds the item to the inventory
4	Technical officer selects an existing item and updates details	The system validates and updates the item in the inventory
5	Technical officer selects an item to delete	The system removes the item from the inventory
<b>Post-condition:</b>	The inventory is updated with the new, modified, or removed items.	



## Scenario Diagram for SCN-3 Manage Inventory



## 6. System Constraints

### 6.1 Important Nonfunctional Requirements

#### 6.1.1 NFREQ-1: Performance

- **Description:** The system should be able to handle a large volume of inventory items and user interactions without significant degradation in performance.
- **User Priority (4/5):** Performance is crucial for user satisfaction and productivity, especially during peak usage periods.
- **Technical Priority (5/5):** Ensuring high performance is technically important to maintain system responsiveness and scalability as the inventory database grows.

#### 6.1.2 NFREQ-2: Usability

- **Description:** The system should have an intuitive and user-friendly interface, allowing users to easily navigate and perform tasks without extensive training.
- **User Priority (5/5):** Usability directly impacts user satisfaction and adoption, making it essential for ensuring the system meets user needs effectively.
- **Technical Priority (4/5):** Designing and implementing a user-friendly interface is technically important to enhance usability and minimize user errors.

#### 6.1.3 NFREQ-3: Security

- **Description:** The system should implement strong security measures to protect sensitive inventory data from unauthorized access, manipulation, or breaches.
- **User Priority (5/5):** Security is critical for maintaining the confidentiality and integrity of inventory information, ensuring user trust and compliance with data protection regulations.
- **Technical Priority (5/5):** Implementing robust security measures is technically important to mitigate the risk of data breaches and safeguard system integrity.

#### **6.1.4 NFREQ-4: Reliability**

- **Description:** To ensure uninterrupted access to inventory information and functions, the system should be highly reliable, with minimal downtime and errors.
- **User Priority (4/5):** Reliability is essential for maintaining user trust and confidence in the system's ability to perform critical tasks reliably.
- **Technical Priority (5/5):** Ensuring system reliability is technically important to minimize system failures and disruptions to faculty operations.

#### **6.1.5 NFREQ-5: Scalability**

- **Description:** The system should be designed to scale efficiently to accommodate future growth in inventory data and user base without significant performance degradation.
- **User Priority (4/5):** Scalability is important for ensuring the system can support the faculty's evolving needs and accommodate increases in inventory items and users over time.
- **Technical Priority (5/5):** Designing for scalability is technically important to ensure the system can handle increased workload and data volume without sacrificing performance or stability.