

# Inventory Management System

## Abstract:

The Inventory Management System is a comprehensive solution designed to streamline inventory control and enhance efficiency in various industries. This report presents an overview of the system, highlighting its features, functionalities, and the methods employed in its development. The system utilizes JSON for data storage and retrieval, leverages the Streamlit framework for building a user-friendly interface, and applies specific formulas for calculating reorder points and Economic Order Quantity (EOQ). This report provides a detailed analysis of the system's capabilities and aims to educate the audience on the benefits of adopting modern inventory management tools.

## 1. Introduction:

The report begins by introducing the Inventory Management System and its purpose. It emphasizes the importance of efficient inventory management in optimizing operations and minimizing costs in industries such as retail, manufacturing, and distribution.



## 2. System Overview:

The system's key features and functionalities are discussed, including the ability to add, update, and remove items, real-time inventory display, search capabilities, report generation, and the option to delete the entire inventory if necessary. The user-friendly interface and intuitive navigation are highlighted, emphasizing the system's usability and accessibility.

## 3. Methods Used:

### JSON (JavaScript Object Notation):

The Inventory Management System utilizes JSON for data storage and retrieval. JSON provides a lightweight and structured format for representing inventory data. It enables efficient data handling and seamless integration with the

system's functionalities. The inventory data is stored in a JSON file named "inventory.json," ensuring data consistency and easy access.

### **Streamlit:**

The user interface of the Inventory Management System is built using the Streamlit framework. Streamlit simplifies the creation of web-based applications with interactive and user-friendly interfaces. It allows for seamless integration of the system's features, providing a smooth and intuitive user experience. Streamlit facilitates real-time inventory updates, dynamic search capabilities, and interactive report generation.

## **4. Formulas Used:**

### **I. Reorder Point Formula:**

The system employs the following formula to calculate the reorder point for each item:

$$\text{Reorder Point} = \text{Lead Time} * \text{Demand Rate}$$

The reorder point indicates the inventory level at which a new order should be placed to avoid stockouts. By multiplying the lead time (time taken for an order to arrive) with the demand rate (average consumption or sales per day), the system determines the optimal reorder point. This calculation ensures efficient stock replenishment and prevents inventory shortages.

### **II. Economic Order Quantity (EOQ) Formula:**

The system utilizes the following formula to calculate the Economic Order Quantity (EOQ) for each item:

$$\text{EOQ} = \sqrt{(2 * \text{Demand Rate} * \text{Setup Cost}) / \text{Holding Cost}}$$

The EOQ represents the optimal order quantity that minimizes the total cost associated with ordering and holding inventory. It takes into account the demand rate, setup cost (cost of placing an order), and holding cost (cost of carrying inventory). By calculating the EOQ, the system helps optimize inventory management, striking a balance between ordering costs and inventory holding costs.

## **5. Implementation:**

The report details the implementation of the Inventory Management System, outlining the development process and the technologies used. It highlights the seamless integration of JSON for data storage and retrieval and Streamlit for building the user interface.

## **6. System Functionality:**

The system's various functionalities are explained in detail, including adding new items to the inventory, updating quantity, removing items, displaying the current inventory, searching for specific items, generating comprehensive reports, and the option to delete the entire inventory if necessary. The user interface screenshots and step-by-step instructions are provided to demonstrate the system's usage.

## **7. Results and Benefits:**

The report presents the results and benefits of using the Inventory Management System. It emphasizes the system's ability to enhance inventory control, reduce stockouts, optimize order quantities, and minimize costs associated with inventory management. The real-time inventory updates, accurate reports, and improved decision-making capabilities are highlighted as key advantages.

## **8. Conclusion:**

The report concludes by summarizing the features, functionalities, and methodologies employed in the Inventory Management System. It emphasizes the importance of efficient inventory management in today's competitive business landscape. The system's utilization of JSON and Streamlit, along with the application of reorder point and EOQ formulas, enables businesses to

optimize their inventory control processes. The report encourages the audience to leverage modern inventory management tools to improve operational efficiency and drive business success.

