

**Ecommerce inventory management system**

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# 1. System Overview

The E-Commerce Inventory Management System is designed to track products, manage inventory levels, handle supplier orders, trigger alerts when stock is low, and generate reports for monitoring stock and orders. Admins and Staff interact with the system to maintain smooth operations, prevent stockouts, and ensure efficient restocking and reporting.

# 2. ERD and Entities Explanation

The following entities and their descriptions are included in the system:

|  |  |
| --- | --- |
| Entity | Description |
| Product | Represents an item sold or stored, with details like SKU, price, and description. |
| Inventory | Tracks the physical stock available for each product in specific locations. |
| Supplier | External providers from whom products are purchased. |
| Order | Purchase orders made to suppliers to restock inventory. |
| Order\_Item (Associative entity) | Resolves many-to-many relation between orders and products, specifying quantities. |
| User | System users who interact with products, inventory, alerts, and reports. |
| Admin | Specialized users with higher access levels and audit capabilities. |
| Staff | Users who handle stock management and supplier coordination. |
| Alert | Notifications triggered when product stock falls below a threshold. |
| Report | General documents created for operational insights. |
| Stock\_Report | Summarizes inventory levels and low stock items. |
| Order\_Report | Summarizes order statuses and pending orders. |

# 3. Relationships Explanation

The system relationships between entities are described as follows:

|  |  |  |
| --- | --- | --- |
| Relationship | Description | Type |
| Product - Inventory | A product is tracked in inventory; inventory belongs to one product. | 1:1 |
| Supplier - Order | Each order is placed to one supplier; a supplier can have multiple orders. | 1:M |
| Order - Product | An order can include multiple products (via Order\_Item). | M:N |
| User - Report | A user generates many reports; a report is generated by one user. | 1:M |
| User - Admin/Staff | Each user can either be an admin or staff, not both. | Disjoint, Partial |
| Inventory - Alert | An alert is triggered for an inventory item at threshold. | 1:M |
| Report - Stock/Order | Each report must be either a stock or order report. | Disjoint, Total |

# 4. Participation and Constraints Summary

Participation and constraint types for subtype relations are summarized:

|  |  |  |
| --- | --- | --- |
| Subtype Relationship | Constraint Type | Participation |
| User → Admin, Staff | Disjoint (d) | Total participation |
| Report → Stock, Order Report | Disjoint (d) | Total participation |

# 5. Final System Flow Explanation

Products are added to the system and tracked in Inventory. When stock levels drop below a threshold, Alerts are triggered. Users (Admins/Staff) monitor alerts and generate Orders to Suppliers to replenish stock. Each order includes multiple products, linked through the Order\_Item table. Reports (Stock Reports or Order Reports) are generated by users to monitor inventory and order operations. This ensures real-time stock tracking, automated warnings, supplier coordination, and operational reporting.