Practical 10

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Inventory Management System

In today's manufacturing and retail world, managing inventory well is crucial for running a successful operation. To understand how these systems work, we can look at a simple inventory management system designed for a manufacturing company. This system will handle tracking products and managing discounts, giving us a clear picture of how inventory systems work in real life.

System Overview

The inventory management system is designed to handle various aspects of product management, inventory tracking, and reporting. The core functionalities include adding and updating products, managing product discounts, and generating detailed reports. This system is intended to help businesses track inventory levels, apply discounts, and generate insightful reports to aid decision-making.

Product Management

The system begins with product management, which includes several key operations:

1. **Adding Products:** The system allows users to input details for new products, including product ID, name, category, quantity, price, and discount percentage. Each product is represented by a data structure that holds these attributes. The system can handle up to 100 products. Users are prompted to enter the following details for each product:
    - **ID:** An integer representing the unique identifier for the product.
    - **Name:** A string with a maximum length of 50 characters, representing the product name.
    - **Category:** A string with a maximum length of 30 characters, representing the product category.
    - **Quantity:** An integer representing the amount of product in stock.
    - **Price:** A floating-point number representing the base price of the product.
    - **Discount Percentage:** A floating-point number between 0 and 100 representing the discount percentage applied to the product.

The addProducts function utilizes a loop to gather this information for multiple products, ensuring efficient batch processing.

2. **Updating Product Details:** Users can update the quantity and discount percentage of existing products. The system searches for the product by its ID and adjusts the quantity or discount as specified. This feature is crucial for maintaining accurate inventory records and applying promotional discounts.
3. **Deleting Products:** The system supports the removal of products from the inventory. If a product needs to be deleted, the system searches for the product by its ID and removes it from the inventory array, shifting subsequent entries as necessary.

Inventory Tracking

Effective inventory tracking is essential for managing stock levels and pricing:

1. **Checking Product Quantity:** Users can retrieve the current quantity of a specific product. This feature helps in monitoring stock levels and planning restocking actions.
2. **Calculating Discounted Prices:** The system calculates the discounted price of a product based on its base price and discount percentage. The formula used is:

$$\text{Discounted Price} = \text{Price} - \left(\frac{\text{Price} \times \text{Discount Percentage}}{100} \right)$$

This calculation helps in determining the final selling price after applying discounts. For example, if a product has a base price of $100 and a discount of 15%, the discounted price would be $85.

Reporting

The reporting features of the system provide valuable insights:

1. **Generating Inventory Reports:** The system generates reports that list all products along with their current quantities, prices, and discount percentages. This report helps in understanding the overall inventory status.

Example report entry:

ID: 1, Name: Widget A, Category: Gadgets, Quantity: 50, Price: 20.00, Discount: 10.00%

2. **Generating Discounted Inventory Reports:** A specialized report displays products with their discounted prices. This report is particularly useful for analyzing the impact of discounts on sales and inventory turnover.

Example report entry:

ID: 1, Name: Widget A, Category: Gadgets, Quantity: 50, Discounted Price: 18.00

Implementation Details

The system utilizes arrays to store product information, with a maximum limit of 100 products. Each product is represented by a Product structure containing attributes such as ID, name, category, quantity, price, and discount percentage. The implementation includes functions for adding products, updating details, calculating discounted prices, and generating reports.