DCCO



Second Semester

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OOP -

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Problem

We need a system that manages a company’s inventory, purchase records, sales returns, suppliers, and customers, to maintain a brief management of small businesses and this facilitates decision-making. To understand what the program should do, it is necessary to first understand some basic concepts about products, purchase and sales transactions, and related records.

Overview

In the field of inventory management, companies need to keep a detailed record of all product movements: when they are sold, when they are sold, when they are returned, and at what price. Additionally, the system will maintain a complete record of customers allowing tracking of their purchases and interaction history. An efficient inventory system helps reduce losses, optimize costs, and improve customer service through comprehensive management of products, suppliers and customers.

Background

In the modern business environment, any organization that handles physical products requires inventory control. This management system is designed to handle the full flow of goods, starting from purchasing from suppliers, through storage and stock control, to final sale to customers, including careful handling of any returns that may occur. The complexity of current business operations requires a robust technological solution that allows for complete traceability of each product throughout the entire internal supply chain. The platform is designed to manage different types of prices associated with each customer. Instead of classifying customers by traditional categories such as retail or wholesale, a system based on three types of prices has been implemented: Price 1, Price 2, and Price 3. Price 3 is the most economical and applies to customers located in the same city where the products are distributed, as they do not incur additional shipping costs. Price 2 is 3% higher than Price 3 and is assigned to customers who are not located in the main distribution city but maintain intermediate logistics conditions. Finally, Price 1 corresponds to customers located in the provinces, where transportation and shipping costs are higher, for this reason, this price is 3% higher than price 2.

This pricing structure provides significant commercial flexibility, allowing margins to be adjusted based on the customer's location and delivery conditions, optimizing profitability without losing market competitiveness. For example, the same product, say a brake pad,

could have Price 3 of $30 for local customers, Price 2 of $30.90 (3% more) for customers in other areas, and Price 1 of $31.83 (3% more than the previous price) for customers in provinces with higher logistics costs. Inventory management is the core of this system. Its operation is based on the meticulous recording of every movement that affects inventory, ensuring at all times that the theoretical stock reflected in the system exactly matches the physical stock available in the warehouse or point of sale. This control is exercised over three main types of operations. Purchases represent merchandise receipts, where all new purchases from suppliers are recorded, which immediately increases stock levels. For example, when the company receives a shipment of 100 brake pads from a supplier, the system updates the inventory by adding these units to the available count. Sales, on the other hand, constitute product outputs, managing all processes where products are shipped to customers, which consequently reduces the stock level. A sales transaction, such as five brake systems to a customer with Price 1, will automatically reduce inventory by that amount. Finally, returns handle cases where products are returned to the business, either from a customer (for reasons such as warranty or product dissatisfaction) or from a supplier (due to manufacturing defects or products received in poor condition), making the corresponding adjustments to inventory.

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| **Código** | **Barras** | **Descripción** | **Línea** | **Categoría** | **Existencia** | **Precio 1** | **Precio 2** | **Precio 3** | **Costo** | **Costo C.** | **Venta** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| D001 | 1234567890123 | HYUNDAI TUCSON 2020 FRENO DELANTERO | FRENOS | PCR | 10.500,00 | 18,5 | 17,9 | 17,2 | 0,02 | 0,02 | 1 |
| D002 | 1234567890124 | KIA SPORTAGE 2021 PASTILLAS TRASERAS | FRENOS | PASTILLAS | 9.870,00 | 22,3 | 21,7 | 21,1 | 0,03 | 0,03 | 1 |
| D003 | 1234567890125 | TOYOTA HILUX 2019 KIT DE FRENO | FRENOS | PCR | 11.230,00 | 25,6 | 24,9 | 24,1 | 0,05 | 0,05 | 1 |
| D004 | 1234567890126 | MAZDA CX5 2022 DISCO FRENO DELANTERO | FRENOS | PCR | 12.040,00 | 19,4 | 18,8 | 18,1 | 0,02 | 0,02 | 1 |
| D005 | 1234567890127 | CHEVROLET D-MAX 2020 PASTILLAS FRENO | FRENOS | PASTILLAS | 10.970,00 | 23,7 | 23,1 | 22,5 | 0,04 | 0,04 | 1 |

Analyst Comparison

The Comparative analysis system evaluates commercial performance through metrics calculated from inventory movements and transactions, using a “seed amount” as a baseline. Each analytical period begins with an initial inventory and a purchase budget, recording all business operations.

The Total Gross Profit (TGP) is calculated as the difference between Total Net Sales (revenue minus returns) and the cost of goods sold, reflecting basic operational efficiency. To measure temporal performance, the Gross Profit per Day (GPPD) divides the TGP by the number of days in the period.

The system employs a three-tier pricing structure: Price 3 (local base), Price 2 ( 3% higher for external customers), and Price 1( an additional 3% for provincial clients), adjusting margins according to location and logistical costs.

For specific analyses, the Product Gross Profit per Day measures an item’s profit divided by its Stock Investment Days (the period it remains available in inventory). Complementary metrics include average value and purchase frequency per segment, inventory turnover, and gross margin percentage.

These indicators allow for the comparison of results across periods, locations, and categories, providing a data-driven foundation for commercial decisions to optimize purchasing, adjust pricing, and maintain market competitiveness.

Attachments

Evidence:   


Link to Excel tables

Table 1  
<https://docs.google.com/spreadsheets/d/1u41OaDAEabK2DlruiwEyOBgwLdhY0JCA2yV6BQb2z9Q/edit?usp=sharing>

Table 2  
<https://docs.google.com/spreadsheets/d/12qDazIIehT6-gVEtyWmb-p41E__ZdVtgJDgGosK23po/edit?usp=sharing>