OOP PROJECT

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1.Introduction

1.1 Purpose

The purpose of the system is to provide a comprehensive solution for efficiently managing inventory, ensuring precise and real-time tracking of the incoming and outgoing merchandise. It will also enable the recording of sales transactions and the generation of detailed reports in an ice cream distributor, specifically the "Glacial Branch 3." This system will be managed by the administrator William Granda and all the employees.

1.2 Scope

The system will be named "Ice Cream Management System." The development of the system will provide precise tracking of the entire journey that products will undergo, aiming to optimize administrative management and generate detailed reports on ice cream distribution.

Efficient Tracking: To efficiently track and record all incoming and outgoing merchandise transactions in real time.

Real-Time Inventory Update: To keep the inventory updated in real time, accurately reflecting the available stock.

Detailed Sales Transaction Record: To generate a detailed record of each sales transaction, differentiating between wholesale and retail sales.

Sales Notes: To create precise and detailed sales notes for each transaction, providing a comprehensive report on capital and inventory status.

Management of Wholesale and Retail Sales: To differentiate and efficiently manage both wholesale and retail sales, providing specific information for each type of transaction.

Simplification of Administrative Management: To facilitate administrative management by automating processes, minimizing errors, and providing reports that simplify decision-making.

Generation of Detailed Reports: To provide detailed reports on capital, sales transactions, and inventory status to support informed decision-making.

1.3 Definitions, Acronyms, and Abbreviations

Sales Invoice: It is a commercial document used in the buying and selling process. Although the sales invoice does not carry tax weight, it contributes to the internal

management of the company. When a sale is made, the selling company issues a sales invoice detailing the transaction.

Sales Transaction: It is an agreement between two parties: a buyer and a seller. The seller provides a product or service in exchange for cash funds from the buyer.

Retail Sale: Focuses on the end consumer. Retailers sell products directly to buyers.

Wholesale Sale: Directed towards other businesses, such as retailers or corporate clients. They buy in bulk and sell in larger quantities than retailers.

1.4 Reference

Lazo, A. T., & Botero, J. G. G. (2016). Especificación de requisitos de software: una mirada desde la revisión teórica de antecedentes. *Entre Ciencia e Ingeniería*, *10*(19), 108-115.

ZAPATA, C. M., & Carmona, N. (2010). Un modelo de diálogo para la educción de requisitos de software. *Dyna*, *77*(164), 209-219.

Cardozzo, D. R. (2016). *Desarrollo de software: requisitos, estimaciones y análisis*. IT Campus Academy.

Machado, F. N. R. (2018). *Análise e Gestão de Requisitos de Software Onde nascem os sistemas*. Saraiva Educação SA.

1.5. Document Overview

The Software Requirements Specification (ERS) that follows is primarily intended to address the specific needs of the ice cream distributor "Glacial Branch 3", providing detailed guidance on the design, development and implementation of an IT system that optimizes the management of inventories and sales transactions, both wholesale and retail.

Main contents:

• **Project Context:** We will understand how the ice cream parlor is managed, including its daily processes, the relationship with suppliers and the distribution of products.

• **System Requirements:** We will detail specific system requirements, to include everything from inventory management to generating sales notes and detailed transaction records.

• **Price and Cost Tables:** Detailed tables of factory prices, prices for different types of customers and costs associated with each product will be included.

• **Link between Purchase Notes and Inventory:** We will explain how the relationship between sales notes and inventory will be established, allowing real-time monitoring of available products.

• **Profit Margin Optimization:** The importance of calculating and optimizing the gross and net profit margin will be addressed, considering production and maintenance costs.

2. General Description:

The "Ice Cream Management System" is a comprehensive inventory and sales management system designed for the ice cream distributor "Sucursal Glacial 3". Its main objective is to optimize daily operations, from the receipt of products to the generation of financial reports. This system seeks to reduce the administrative burden by automating processes such as the issuance of sales notes and inventory tracking. With an intuitive user interface, adoption by the different roles within the organization is facilitated. The implementation is Carry out considering the existing structure of the distributor, integrating coherently with the already established processes. The solution is designed with the necessary flexibility to adapt to possible changes in commercial operations and allow future business expansions.

2.1. Product Perspective:

The "Ice Cream Management System" is conceived as a comprehensive management tool designed exclusively for the ice cream distributor "Sucursal Glacial 3". The product perspective focuses on achieving operational efficiency and smoother management.

2.2. Product Features:

The "Ice Cream Management System" system performs several key functions that cover the entire operational process of the "Sucursal Glacial 3" distributor. Below is an organized summary of these functions:

1. Inventory Management:

• Detailed tracking of merchandise receipts and exits.

• Real-time inventory update.

• Categorization and efficient organization of products.

2. Purchase Processes:

• Integration with product purchasing processes.

• Record of purchase transactions and corresponding inventory update.

3. Wholesale and Retail Sales:

• Automation of the issuance of sales notes.

• Detailed record of wholesale and retail transactions.

4. Automatic Calculation of Profit Margins:

• Automatic determination of profit margins by product.

• Detailed analysis of the costs associated with sales.

5. Effective Link between Sales Notes and Stock:

• Direct relationship between the sales notes issued and the current state of the inventory.

• Ensure consistency between sales information and available stock.

6. Intuitive User Interface:

• Friendly and accessible design for various roles within the organization.

• Differentiated access according to responsibilities (administrators, salespeople, warehouse).

7. Generation of Financial Reports:

• Providing detailed reports on income, expenses and profit margins.

• Financial analysis that supports decision making.

8. Adaptability to Operational Changes:

• Integration with the existing structure of the distributor.

• Flexibility to adapt to possible changes in business processes.

2.3. User Characteristics:

The characteristics of the users of the "Ice Cream Management System" system adapt to the various roles within the "Sucursal Glacial 3" distributor. Outlined below:

1. Administrator:

Person who has more knowledge in the sector, preferably training in business administration or related areas with a level of previous experience in business management with technical experience of basic knowledge of management systems and business software.

2. Sellers:

It is an individual with a secondary or higher education preferred with a background in sales and customer service and skills in using computer systems.

2.4 Restrictions

Ice Cream Shop Software System Constraints

The software system designed for the ice cream shop is subject to certain constraints to ensure optimal functionality and performance. These constraints are crucial for the effective operation of the system and to meet the specific needs of the heladería. The following are the key constraints:

·   Hardware Limitations:

The software must be compatible with the existing hardware infrastructure of the ice cream shop, including point-of-sale terminals, display screens, and any other devices used in the business.

·   Operating System Compatibility:

The system is constrained by the choice of operating systems used in the ice cream shop. It must be compatible with the selected operating systems, ensuring seamless integration without causing disruptions.

·   Network Requirements:

The software relies on a stable and secure network connection for real-time updates and data synchronization. Constraints include network bandwidth, reliability, and security measures to protect customer and transaction data.

·   User Accessibility:

The system must adhere to accessibility standards to accommodate users with disabilities. This includes features such as screen reader compatibility and keyboard navigation to ensure a user-friendly experience for all customers and staff.

·   Regulatory Compliance:

The software must comply with local and national regulations related to data privacy, financial transactions, and any other applicable laws governing the operation of businesses, especially in the food industry.

· Scalability:

The system should be designed to accommodate the potential growth of the ice cream shop. It must be scalable to handle an increased volume of transactions, inventory items, and customer data without compromising performance.

· Data Backup and Recovery:

Constraints include the implementation of robust data backup and recovery mechanisms to prevent data loss in case of system failures, ensuring business continuity and minimizing downtime.

2.5 Assumptions and dependencies

The successful development and implementation of the ice cream shop software system depend on various factors and external elements. These dependencies play a crucial role in ensuring the functionality, performance, and integration of the software within the heladería environment. The following are the key dependencies for the project:

1. **Hardware Procurement and Installation:**
   - The acquisition and installation of compatible hardware components, including point-of-sale terminals, servers, and display devices, are essential prerequisites for the software implementation.
2. **Selection of Operating Systems:**
   - The project is dependent on the choice of operating systems used in the ice cream shop. The software development and configuration must align with the selected operating systems for seamless integration.
3. **Network Infrastructure Setup:**
   - The establishment of a reliable and secure network infrastructure, including internet connectivity and local area network (LAN) configuration, is a critical dependency for real-time communication and data synchronization.

2.6 Future requirements

As businesses evolve and technology advances, it's important to anticipate and plan for future requirements to ensure the ice cream shop software system remains relevant and effective. Here are some potential future requirements for consideration:

· **Mobile Ordering and Payment:**

- ○ Anticipate the growing demand for mobile solutions. Implement features for customers to place orders and make payments through a mobile app, enhancing convenience and reducing wait times.

  · **Online Presence and E-commerce Integration:**

- ○ Consider expanding the system to support online ordering and integrate with e-commerce platforms. This can open up new revenue streams and provide customers with the option to order ice cream products remotely.

  · **Customer Loyalty Programs:**

- ○ Plan for the implementation of customer loyalty programs to encourage repeat business. This could include features like points accumulation, discounts, or special promotions for frequent customers.

  · **Advanced Analytics and Reporting:**

- ○ Enhance the reporting capabilities of the system to provide detailed analytics on sales trends, popular products, and customer behavior. This data can inform business decisions and marketing strategies.

  · **Inventory Forecasting and Management:**

- ○ Implement intelligent inventory management that uses historical data and trends to predict demand. This helps in optimizing stock levels, reducing waste, and ensuring popular products are always available.

3.Specific requirements

3.1 External interfaces

External Interfaces for Ice Cream Shop Software System

The Ice Cream Shop Software System interfaces with various external systems and services to enhance functionality, streamline operations, and provide a seamless experience for customers and staff. Here are the key external interfaces:

· Payment Gateways:

The software interfaces with external payment gateways to process transactions securely. This includes integration with credit card processors, digital wallets, and other payment methods to facilitate smooth and reliable transactions.

· Inventory Suppliers:

Interfaces with external inventory management systems or suppliers to track and manage the availability of ingredients and products. Automatic updates ensure that inventory levels are accurate, reducing the risk of stockouts.

·   Delivery Services:

Integration with external delivery services allows customers to place delivery orders through the software. This interface provides real-time order updates and delivery tracking, enhancing the overall customer experience.

3.2 Features

For the software system of an ice cream shop, functions may vary based on the specific needs of the business. Here is a list of functions that could be useful for such a system:

1. **Inventory Management:**
   - Recording and tracking inventory levels of ingredients, ice cream flavors, cones, tubs, etc.
   - Low inventory alerts to prevent product shortages.
2. **Point of Sale (POS):**
   - Processing ice cream and related product sales transactions.
   - Integration with credit/debit card readers and other payment methods.
   - Generation of receipts and invoices.
3. **Order Management:**
   - Recording and managing orders, whether in-store, online, or for delivery.
   - Tracking order status and providing completion notifications.

3.3 Performance Requirements

To ensure the efficient and reliable operation of the ice cream shop software system, specific performance requirements must be established. These requirements focus on factors such as speed, response times, scalability, and overall system reliability. Here are key performance requirements:

·   **Response Time:**

- The system should respond to user inputs (e.g., order placement, payment processing) within 2 seconds to provide a seamless and efficient customer experience.

·   **Transaction Throughput:**

- The software must handle a minimum of 100 transactions per hour during regular business hours to accommodate peak demand periods.

- · **Scalability:**

  - ○ The system should scale to support a 20% increase in transaction volume during promotions, holidays, or special events without a significant decrease in performance.

- · **Concurrent User Handling:**

  - ○ The software should support at least 50 concurrent users without degradation in response time or system performance.

- · **Inventory Update Frequency:**

  - ○ Inventory updates, including additions and subtractions, should be reflected in real-time to prevent discrepancies and ensure accurate stock levels.

3.4. Design Constraints

Location Requirement:

• The system will need to be adjusted whether it is sold to the north or south.

Software Updates:

• Software updates must be implemented in a manner that does not significantly disrupt the distributor's day-to-day operations.

3.5. System Attributes

Reliability:

• The system must have a 99% availability rate during standard operating hours, excluding scheduled maintenance periods.

Maintainability:

- · Scheduled software updates should be performed once a month, and these updates should not interfere with normal system operations.

- · A separate development environment will be established to test new features and updates before deploying them to the production environment

Portability:

- · The system must be compatible with Windows 7 and higher operating systems, as well as Mac and Linux.

·   The system should support a variety of screen resolutions, from large desktop screens to smaller laptops.

Security:

·   All users must authenticate with a username and password to access the system.

Access control:

·   Access will be restricted only to the following users: the administrator and seller.

3.6. Other requirements

Cloud backup:

·   The system must offer the option to perform automated backups to a secure cloud storage service.

Ability to Export Reports:

· The system will allow users to export financial reports to custom formats, such as CSV, JSON or Excel files, to facilitate customization of reports according to user needs.

4. Appendices

Appendix A: Data Input/Output Formats:

A.1 Sales Note Format:

Date:
Hour:
Customer name:
Customer type:
Sold Quantity:
Unit price:
Total:
Appendix B: Cost Analysis Results Format:

B.1 Estimated Operating Costs:

Maintenance:
Cloud Services:
Monthly total:

Appendix C: Programming Language Restrictions:

C.1 Platform Restrictions:

· The system will be developed using the Java programming language.

C.2 Compatibility with External Technologies:

· The system will be compatible with accounting systems that support the import and export of data in JSON format.