2. Analysis

Supermarket charging system

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[Revision history]

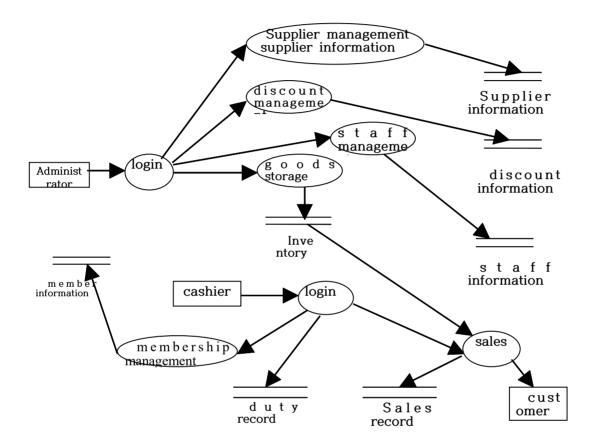| Revision date	Version #	Description	Author
2024/4/20	#1.1	Use Case Analysis、Application Analysis、User Interface	류륜장

= Contents =

1. Introduction

- Summarize the contents of this document.
- Describe the prominent features of your project (usefulness, significance, expandability etc).
- 12pt, 160%.

The focus of this project is on its ability to fundamentally implement process automation. It reduces a significant amount of manual labor, saving a lot of financial resources, manpower, space, and time. Additionally, the system adopts the commonly used MVC design pattern in a B/S model. It clearly delineates the database persistence layer, business logic functions, and interface design, enhancing its scalability and practicality. The separation of the front-end and back-end management also makes the entire system more secure and user-friendly.

2. Use case analysis

- Build a use case diagram.
- Make detailed description for each use case (Use case description)
- 12pt, 160%.

The system consists of two parts: the front-end and the back-end. The front-end is used by cashiers for sales-related cashier operations. The back-end is operated by managers and is primarily responsible for managing cashiers, sales data, system maintenance, supplier management, and product management.

(2). Use case description

Use case #1 : Membership Management	
GENERAL CHARACTERISTICS	
Summary	The feature used by administrators to register members for accessing specific functions of the system.
Scope	Supermarket consumers
Level	user Level
Author	
Last Update	
Status	Analysis
Primary Actor	user
Preconditions	You need to install an application.
Trigger	Provided that the customer wishes to apply for a membership.
Success Post Condition	The membership number is available for use.
Failed Post Condition	The membership number is not available for use.
MAIN SUCCESS SCENARIO	
Step	
1	Activated when a customer registers for membership.
2	The administrator enters the membership number, member's name, and member's phone number.
3	Click the add button.
4	A pop-up window displays a "success" button.
5	Clicking the "confirm" button completes the member registration.
6	
EXTENSION SCENARIO	
Step	Branching Action
3	Membership registration failed due to an incorrect phone number. Case
RELATED INFORMATION	
Performance	
Frequency	< 1 second
Concurrency	사용자당 1번
Due Date	No Limits

Use case #2 : Staff Management	
GENERAL CHARACTERISTICS	
Summary	The feature used by the administrator to manage staff.
Scope	All staff members.
Level	User Level
Author	
Last Update	
Status	Analysis
Primary Actor	admin
Preconditions	You need to install an application.
Trigger	When wanting to add staff members.
Success Post Condition	Staff can log in.
Failed Post Condition	Staff cannot log in.
MAIN SUCCESS SCENARIO	
Step	Action
1	Enter the staff management system.
2	Enter the staff ID, admin password, and staff name.
3	Click "Add".
4	Addition successful, a "Success" button pops up.
5	Click the confirm button to successfully complete the addition.
6	
EXTENSION SCENARIO	
Step	Branching Action
2	This staff member has already been added. Case
RELATED INFORMATION	
Performance	< 1 second
Frequency	사용자당 1번
Concurrency	No Limits
Due Date	

Use case #3 : Data Entry	
GENERAL CHARACTERISTICS	
Summary	Enter product information, store product information, add supplier information, and store it.
Scope	All products, suppliers.
Level	User Level
Author	
Last Update	
Status	Analysis
Primary Actor	admin
Preconditions	You need to install an application.
Trigger	When wanting to add product and supplier information.
Success Post Condition	Product and supplier added successfully.
Failed Post Condition	Product and supplier addition failed.
MAIN SUCCESS SCENARIO	
Step	Action
1	Enter the product management interface.
2	Enter product and supplier information.
3	Click the add button.
4	A pop-up window displays "Addition successful."
5	Click confirm to complete the operation.
6	
EXTENSION SCENARIO	
Step	Branching Action
3	Supplier information is duplicated. Case
RELATED INFORMATION	
Performance	< 1 second
Frequency	사용자당 1번 Product quantity can be added multiple times.
Concurrency	No Limits
Due Date	

Use case #4 : Product Query	
GENERAL CHARACTERISTICS	
Summary	The product management function includes the ability to query products by number, supplier, or name. Product management also involves managing supplier information. Each product must have a supplier, and only after entering the corresponding supplier information can the products supplied by that supplier be stored in the inventory.
Scope	All products.
Level	User Level
Author	
Last Update	
Status	Analysis
Primary Actor	admin
Preconditions	The database contains product information.
Trigger	When wanting to perform a product search.
Success Post Condition	Product search successful.
Failed Post Condition	Product search failed.
MAIN SUCCESS SCENARIO	
Step	Action
1	Enter the product management interface.
2	Enter the product ID, name, and supplier ID.
3	Click search.
4	Display the searched product information.
5	
6	
EXTENSION SCENARIO	
Step	Branching Action
3	Product information entered incorrectly results in a failed search.
RELATED INFORMATION	
Performance	< 1 second
Frequency	사용자당 1번
Concurrency	No Limits
Due Date	

Use case #5 : Delete Product Information	
GENERAL CHARACTERISTICS	
Summary	Deleting corresponding product information involves many other related pieces of information, such as sales information and discount information. Therefore, when deleting a product, the administrator will be warned. If confirmed, the system will also delete the associated sales and discount information.
Scope	All products.
Level	User Level
Author	
Last Update	
Status	Analysis
Primary Actor	admin
Preconditions	The database contains product information.
Trigger	Wanting to delete a product.
Success Post Condition	Product successfully deleted.
Failed Post Condition	Product deletion failed.
MAIN SUCCESS SCENARIO	
Step	Action
1	Enter the product management interface.
2	Enter the previously stored product information.
3	Click delete.
4	Prompt to confirm whether to delete this product.
5	Click yes, deletion successful.
6	
EXTENSION SCENARIO	
Step	Branching Action
3	Product information entered incorrectly, unable to locate the product information. Case
RELATED INFORMATION	
Performance	< 1 second
Frequency	사용자당 1번
Concurrency	No Limits
Due Date	

Use case #6：销售管理	
GENERAL CHARACTERISTICS	
Summary	Sales records track the total number of a particular product sold on a given day. By conducting queries, administrators can analyze sales trends of a product over a period, or compare the sales of various products within a single day, providing data to inform operational strategies.
Scope	All products.
Level	User Level
Author	
Last Update	
Status	Analysis
Primary Actor	admin
Preconditions	This product has a recorded sales quantity within the queried time.
Trigger	Wanting to query the sales quantity of a certain product on a specific day.
Success Post Condition	Product query successful.
Failed Post Condition	Product query failed.
MAIN SUCCESS SCENARIO	
Step	Action
1	Enter the sales management interface.
2	Enter the product ID and sales date.
3	Click search.
4	Display the query information.
5	
6	
EXTENSION SCENARIO	
Step	Branching Action
3	This product did not have any sales during the queried period. Case
RELATED INFORMATION	
Performance	< 1 second
Frequency	사용자당 1번
Concurrency	No Limits
Due Date	

Use case #7：折扣管理	
GENERAL CHARACTERISTICS	
Summary	The discount management feature allows administrators to easily apply discounts to specific products. Of course, discounts can also be cancelled at any time by simply deleting the discount information. The discount values set here will automatically be taken into account at the time of checkout.
Scope	All products, members.
Level	User Level
Author	
Last Update	
Status	Analysis
Primary Actor	admin
Preconditions	Want to add, delete, or query discounts.
Trigger	When adding, deleting, or querying discounts.
Success Post Condition	Adding, deleting, querying discount successful.
Failed Post Condition	Adding, deleting, querying discount failed.
MAIN SUCCESS SCENARIO	
Step	Action
1	Enter the sales management interface.
2	Enter the product ID and discount.
3	Click on the desired action (add, delete, or query).
4	Add, delete, or query the information as needed.
5	
6	
EXTENSION SCENARIO	
Step	Branching Action
3	1.Incorrect product ID entered. 2.No such product ID to delete.　　　　　　Case 3.The product ID queried does not exist.
RELATED INFORMATION	
Performance	< 1 second
Frequency	사용자당 1번
Concurrency	No Limits
Due Date	

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Use case #8 : 收银功能	
GENERAL CHARACTERISTICS	
Summary	Since it is a supermarket billing system, the cashier function is naturally the core feature of the system because it is the most frequently used function. The highlight of the cashier function designed in this system is the consideration of a membership mechanism, which encourages members to spend more to accumulate points. The specific mechanism works as follows: for members, every 100 points earned through spending returns 5 yuan to the member.
Scope	All customers.
Level	User Level
Author	
Last Update	
Status	Analysis
Primary Actor	Cashier
Preconditions	Customers purchase products.
Trigger	Customers purchase products.
Success Post Condition	Customers successfully purchase products.
Failed Post Condition	Customers decide not to purchase products for some reason.
MAIN SUCCESS SCENARIO	
Step	Action
1	Enter the cashier interface.
2	Enter the product ID and quantity.
3	Click confirm to display product information and amount due.
4	Enter the amount received or click reset.
5	Complete the cashier operation, checkout successful.
6	
EXTENSION SCENARIO	
Step	Branching Action
3	Product ID entered incorrectly. Case
RELATED INFORMATION	
Performance	< 1 second
Frequency	사용자당 1번
Concurrency	No Limits
Due Date	

3. Domain analysis

- Find all of classes in your project.
- Describe the meaning of each class.
- 12pt, 160%.

Name	Description
Product	Represents an item for sale in the supermarket, including its ID, name, and price.
User	Describes a system user, including user ID, username, and password. In a real system, passwords should be encrypted.
Inventory	Manages the stock of products. Allows adding stock, checking product availability, and reducing stock for sold items.
Cart	Manages a list of products that a user has added to their shopping cart. It can add products and calculate the total cost of the items in the cart.
Order	Represents a user's order, including a shopping cart and payment information. Processes payment using the specified payment method.
Payment	Handles the payment process using a specified payment strategy.
DiscountStrategy	Defines how discounts are applied to purchases. Different implementations can represent different types of discounts.
Promotion	Manages promotional campaigns including promo codes, discount percentages, start and end dates. Includes methods to check if the promotion is currently active.
PaymentDetail	An extension of the Payment class that includes a payment date. It processes the payment and records the date.

4. User Interface prototype

- Develop user interfaces of your system.
- It will be easy if you just think that you make a preliminary user manual of your system based on your user interface.
- 12pt, 160%.

前端图 1

Cashier Function: As this is a supermarket billing system, the cashier function is naturally the core feature of the system because it is the most frequently used function. A major highlight of the cashier function designed in this system is the incorporation of a membership mechanism, which encourages members to spend more and accumulate points. Specifically, for every 100 points a member accumulates through purchases, they receive a 5 yuan rebate.

前端图 2

For the convenience of managing memberships, the member management functionality has been placed at the front end. The main functions of member management include querying members, adding members, and deleting members. When a new member is added, their points are automatically initialized to zero. The more a member spends, the more their points will gradually increase. Once the points reach the system's minimum rebate threshold (set at 100 points in this system), for every 100 points accumulated, 5 yuan will be returned to the member, and the points that have been returned will be deducted from the member's total points.

后端：

后端图 1

This part of the functionality is aimed at managing supermarket staff (cashiers). It includes adding, deleting, and querying cashier information. Administrators use this function to set up unique usernames and passwords for each cashier, who then log in with this information to handle sales. Additionally, there is a distinctive feature: querying duty information. Whenever a cashier logs into the system, it automatically records their login date and username. This log-like feature allows the administrator to clearly see the daily duty information, facilitating rewards and penalties for cashiers. For example, if sales are particularly high on a given day, the cashier on duty can be rewarded; conversely, if a theft occurs, the cashier on duty that day can be penalized. It's important to note that staff information is linked to duty information. If a staff member is deleted, the duty information associated with that staff member will also be removed.

后端图 2

Products are the primary source of profit for supermarkets, so managing them is a key function of this system. This feature primarily includes the entry of product information, which is the function for product stocking. It also allows for querying products, for example by ID, supplier, or name. Product management further includes managing supplier information, as each product must have a supplier; only after entering the corresponding supplier information can the products supplied by that supplier be stocked.

In addition to this, it is also possible to delete product information. However, because products are related to many other types of information, such as sales and discount information, there is a cautionary step involved: when deleting a product, the system will warn the administrator that confirming the deletion will also remove associated sales and discount information.

后端图 3

Sales Management: This feature records the total number of units sold of a particular product on a specific day. Through querying, administrators can analyze sales trends of a product over a period or compare the sales of various products within a single day, providing valuable insights for strategic planning.

Discount Management: This functionality allows administrators to easily apply discounts to specific products. Discounts can also be canceled at any time simply by deleting the discount information. The discount values set are automatically considered during the checkout process. This helps in dynamically adjusting pricing strategies to optimize sales and customer satisfaction.

5. Glossary

- Specifically describe all of the terms used in this documents
- 12pt, 160%.

Terms	Annotations
Supermarket Cashier System	Name of this software system.
Administrator	Manage users.
Cashier	Responsible for using the cashier system to check out customers.
Member	Enjoy member discount benefits.
Purchasing Management Function	Categorize and record incoming goods into the database.
Sales Management Function	Count and manage goods for sale, remove related product information from the database.
Inventory Management System	Provides the function to query goods in inventory, receive and process data from the purchasing management module, receive and process data from the shipping management module.
Ordering System	Query existing orders.
Sales Inquiry System	Product sales inquiry.

6. References

- Describe all of your references (book, paper, technical report etc).
- 12pt, 160%.

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