

DESIGN OF ONLINE SHOPPING SYSTEM

LAHTI UNIVERSITY OF APPLIED
SCIENCES
Degree programme in
Business Information Technology
Thesis
Spring 2011
Yueyuan Li

Lahti University of Applied Sciences
Degree programme in Business Information Technology

LI, YUEYUAN:

DESIGN OF ONLINE SHOPPING
SYSTEM

Bachelor's Thesis of Degree Programme in Business Information Technology, 42
pages

Spring 2011

ABSTRACT

E-commerce is a kind of comprehensive activity of management automation, business information network and financial electronic technology. It is a kind of commercial activity accomplished through the information network in all kinds of business activities in the world. As a new marketing model, the emergence of on-line stores is an epoch-making revolution in the field of product circulation.

The thesis focuses on a study of how to design a small online shopping system which is simple and flexible to be used. This thesis is written based on design science methods and software engineering lifecycle. Online shopping system consists of two management levels: foreground (for consumers) and background composition (for sales). The design idea of the system includes: Introduction to online store shopping system - Feasibility analysis - Needs analysis - The overall design – The detailed design - Coding and testing. After testing, it can be put into operation.

In conclusion, the system can realize data input, query, modification, and other features to achieve the desired objectives and make the shopping process easier, faster and convenient.

Keywords: E-commerce, BC model, online shopping system, online store

CONTENTS

1	INTRODUCTION	1
1.1	The development of online shopping system	1
1.2	The advantages of online shopping system	1
1.3	Objective	2
1.4	Research question	3
1.5	Research methodology	3
1.6	Thesis structure	3
2	FEASIBILITY STUDY	4
2.1	Technical feasibility	4
2.2	Operational feasibility	5
2.3	Conclusion	6
3	NEEDS ANALYSIS	7
3.1	The overall objective	8
3.2	Detailed objective	8
3.3	The data flow diagram and functional analysis	8
3.4	Data Dictionary	12
4	OVERALL DESIGNS	15
4.1	Functional Design	15
4.1.1	The architecture of system (HIPO chart)	15
4.1.2	Module external design (IPO chart)	20
4.1.3	The description of module function	21
4.2	Interface design	22
4.2.1	External interface	22
4.2.2	Internal interface	25
4.3	Code design	25
4.3.1	The principle of code design	25
4.3.2	The code design for system	26
4.4	Conceptual Model Design (E-R diagram)	26
4.5	Input and output design	29
4.5.1	Input Design	29
4.5.2	Output Design	31
4.6	Design of error handling	32

4.6.1	Error messages	32
4.6.2	Strategy for error handling	33
4.7	Security Design	33
4.7.1	Login security	33
4.7.2	Operational security	33
5	DETAILED DESIGNS	34
5.1	Add-announcement module	34
5.2	Modify-announcement module	35
5.3	View-products module	36
5.4	Delete- products module	37
6	CODING AND TESTING	38
6.1	Coding	38
6.1.1	The meaning of coding	38
6.1.2	The purpose of coding	38
6.1.3	Code requirements	38
6.2	Testing	39
6.2.1	The task of testing	39
6.2.2	The objective of testing	39
6.2.3	The principle of testing	39
6.2.4	The choice of testing program	40
7	CONCLUSIONS	42
	REFERENCES	43

1 INTRODUCTION

1.1 The development of online shopping system

The rapid development of Internet has brought a full range of profound changes to human society, including production, lifestyles and so on. Businesses use the Internet to shop online, while reducing transaction costs. On the other hand, online shopping can create a new consumer model, which breaks the traditional consumption patterns where the two sides traded face to face, so that the consumer can trade in different space-time. (Man Kit Chang, 2005) (Jiunn-Woei Lian, 2008). An online shopping system is a business information system with the function of interaction. It can provide consumers the company introduction, management practices, types of goods, products quotes, products discounts and other information resources to achieve the purpose of the transaction. (Soon Jae Kwon, 2010)

1.2 The advantages of online shopping system

With the rising of the number of Internet users, more and more needs for online shopping arise. All of these needs may offer enormous business opportunities, and thus online shopping came into being, which mainly has the following advantages: (Tzyy-Ching Yang, 2006) (A. Vellido, 1999) (Hasan, 2010) (Kyoung-jae Kim, 2008)

First is the maximization of benefits. From the business point of view, an online shopping system has the advantage of small investment, big return. First of all, businesses do not need to pay for facade, renovation fees, and a huge amount of start-up funding, and just a computer with Internet access is ok. Secondly, small business inventory and inventory costs are low, because under normal circumstances the goods are stored only after the consumer order, so there's not a need for too much money to be used in the purchase. Again, it is easy for business to advance and retreat, because there is no inventory.

Second is the expansion of time. Traditional stores generally have business hours, and online stores expand the traditional business hours of the store. You can run around the clock, without seasonal and other factors, to achieve the limit expansion of time.

Third is the unlimited location. The selection of the site of traditional store is very important. There is a world of difference between the benefits for the same project in prime locations and non-prime locations; the area of the store is different. But even the largest ones are limited in space; and the number of stores is also the same case. The online store completely breaks the restrictions of place and number of stores, and trade will occur as long as consumers can order.

Fourth is the preferential price. Because of the lower transaction costs of an online store, businesses can achieve discounts and other promotions for absolute advantage, and thus attract more consumers.

1.3 Objective

The 21st century is information age. And information technology, digitalization and networking are the main features of this era, among which the core is network. The field of online shopping has brought a new revolution to the whole business. As a new business form, online shopping has a huge impact on the operation of the business process and operation mode. But its impact exists not only in business itself, but also in economic, political, social, cultural, and many other ideas to change people's way of thinking. As a modern business model, online shopping can use the power of the computer to retrieve the network to do so many things. They include providing decision-making services, understanding customer needs, access to business information, improving service quality and accelerating the speed of transactions. Therefore, the development of a functional and convenient online shopping system is very necessary.

The main research object of this design is the online store shopping system. It is designed for small exclusive shops and individual shops.

1.4 Research question

On the basis of above description, this thesis aims on a study of how to design a small online shopping system which is simple and flexible to be used.

1.5 Research methodology

The scientific method helps to organize thoughts and procedures. This thesis uses the tables and figures to presents the data. The thesis studies knowledge by observation and the knowledge consist of facts. The need analysis part is an application area of online shopping system, it is the basis of system development, and also it is an important factor in the quality and success of the system. So it must be critically reviewed using effective methods. This thesis is written based on science methods and software engineering lifecycle. The first thing to be done is the prepared work , including lots of technology studying and requirement investigation. On the basis of above work, I would like to proposed system architecture, the preliminary design, detailed design and coding and testing stage. And the design work was summarized at the end of the paper.

1.6 Thesis structure

The thesis structure is comprised of two parts which are theoretical review and empirical design. The theoretical review consisted of two parts: feasibility study and needs analysis. And the empirical design consisted of three parts: overall design, detailed design, coding and testing.

Chapter 2 and 3 belong to the theoretical review. Feasibility study and needs analysis are described separately in the two chapters.

Chapter 4, 5 and 6 belong to the empirical design. The overall design is proposed in Chapter 4, and chapter 5 shows the detailed design. The coding and testing method is described in Chapter 6.

2 FEASIBILITY STUDY

Feasibility Analysis is whether a project is operational in practice. The task of feasibility analysis is to analyze the problem to be addressed in the technical, economic, legal, use of viability. And the purpose of the project is the use of least cost in the shortest possible time to determine the problem definition stage of the envisaged system described by the basic objectives and whether the scale can be solved, or the possibility of solving the value of the size and address size. Its essence is to maximize the compression system analysis, system design, and a high level in a more abstract way in a system analysis, system design. (Ching-Torng Lin, 2010)

Generally speaking, feasibility analysis is studied from the following three aspects: (Sherif M.Yacoub, 2003) (Richardson Clay, 2005)

- 1) Technical feasibility. Technical feasibility from the technical point of view is based on the system functionality, performance and a variety of constraints required by user to achieve the feasibility of the system. It is often the most difficult during developing the system.
- 2) Operational feasibility. Operational feasibility is whether the design is suitable for the user organizations, and whether the management, personnel and operation are applicable.
- 3) Legal feasibility. Legal feasibility study of the system is involved in the contracts, liability, tort and legal issues during the development.

2.1 Technical feasibility

The system is developed using ASP and SQL Server 2000, not other professional technology.

ASP (Active Server Pages) is provided by Microsoft, which is a server-side script-based Web development tools and runtime environment. It can be used to create and run dynamic interactive Web application program. As we know, ASP and browser are separate, and the interpretation the implementation of ASP is in the server side. So there is no need to consider browser-based ASP support and worry about programming logic to be stolen by downloading program.

SQL Server 2000 is a scalable relational database, based on the Structured Query Language (SQL). It can support Internet applications Extensible Markup Language – XML. Its components are databases, relational databases, extensible markup language and structured query language. It has increasingly become one of ideal development tool for database application under the platform of Windows system because of its good performance. It can meet the enterprise's data processing system and Web site data storage and analysis needs through mutual cooperation a series of constituent components.

B/S (Browser / Server) is a client technology. The technology platform is very stable and it is suitable for medium and large enterprises. Hundreds of millions of users who wish to enjoy the rich information service can just through the browser interface.

Therefore, the requirement for technology developers is to master the basic ASP, SQL Server 2000, B / S mode and related skills on the basis of the hardware and its functions.

2.2 Operational feasibility

- 1) Requirements for system administrators: Have some computer expertise, and a training of system.

- 2) Requirements for the user's: Have the Internet and basic computer operations.

In the legal feasibility part, all software used is genuine.

2.3 Conclusion

As the Income more than investment, and the technical, economic, operational, legal feasibility are available, the system can be developed.

3 NEEDS ANALYSIS

The online shopping is a form of electronic commerce. In other words, the online shopping is process, let consumers directly buy the real-time sales commodities or services, intermediary services are not on the Internet. (wikipedia, 2010)The thesis focuses on a study of how to design a small online shopping system which is simple and flexible to be used. Online shopping system consists of two management levels: foreground (for consumers) and background composition (for sales). The system can realize data input, query, modification, and other features to achieve the desired objectives and make the shopping process easier, faster and convenient.

Needs analysis is the final stage of the proof process, whose basic task is to accurately answer "what does the system must do" such a question. One should carefully read and refine the document in the feasibility stage. Needs analysis is the basis of system development, and also it is an important factor in the quality and success of the system. So it must be critically reviewed using effective methods.

The basic principle of needs analysis should be (Steven John Metsker, 2007) (Bloch, 2007) (Johnson Rod, 2005):

- 1) Decompose the complex issues by function. If the general problem of dealing with is too broad and too complex, it will be broken down into several parts. And the whole function will be realized through the interface between different parts.
- 2) Data domain and function domain must be able to articulately express and understand the problem. Data domain includes data flow, data structure and data content. Function domain reflects control information of the data domain.

- 3) A logic model of the system should be created. System Model is a form of expression. It is mainly used to study the object it is the basis of system development.

3.1 The overall objective

Online shopping system is designed using small shops or individual store as the prototype. It is entirely managed by the administrator. So it reduces the staff, cashiers and other staff members of the stores. And also it reduces the store rent and other investment. Administrators only need to hire a delivery member, who will deliver the products to the user according to the day's shipping invoice.

3.2 Detailed objective

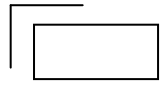


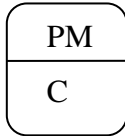
Under the guidance of the overall objective, the background management of the system is realized by designing some modules. The modules include: Announcement management (including add, modify, delete notice), products management (add, modify, delete product categories and add, modify, delete, view product information), order management (processing, delete orders; delivering; checkout), complaint management (view, deal with, delete the complaint information), user management (check, review, delete), administrator management (add, modify and delete administrator information).

3.3 The data flow diagram and functional analysis

Data flow diagram, also known as DFD diagram, is the basic tool used for the structured analysis. Its components include entity, data storage, data flow and processing. Data flow diagram is a very intuitive graphical representation, to achieve the conversion from abstract to concrete graphics.

Draw the diagram, can be drawn from the top down. First, we should study the overview of the system, and then go down layer by layer; finally we can draw up the detailed procedures. Symbol explanation for the data flow graph:

TABLE 3.1 The symbols of data flow diagram.

Symbol Name	Graphics	Explanation
Entity		Fill in the appropriate box diagram with entity name; describe the source of corresponding data.
Data Storage		DN box, fill in the serial number of stored data, S box, fill in the name of the stored data. Description of the corresponding store data.
Data flow		FM said that the name of the corresponding data flow. Arrows describe the data flow direction.
Treatment		PM box fill handle serial number, C box, fill in the name of treatment. Describe the handling of a business.

The data flow diagram of the system is as follows as:

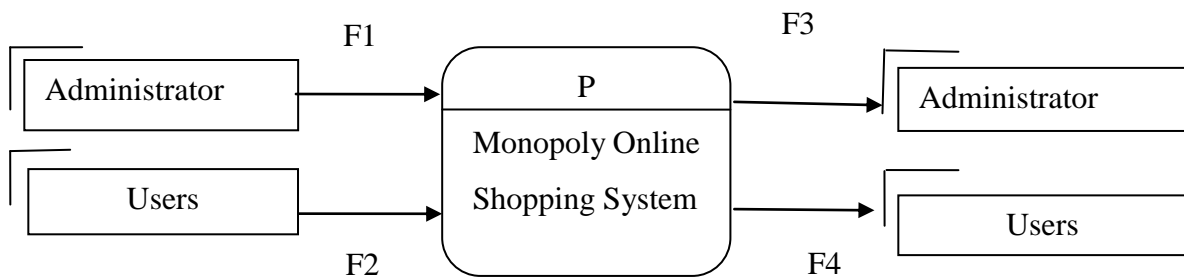
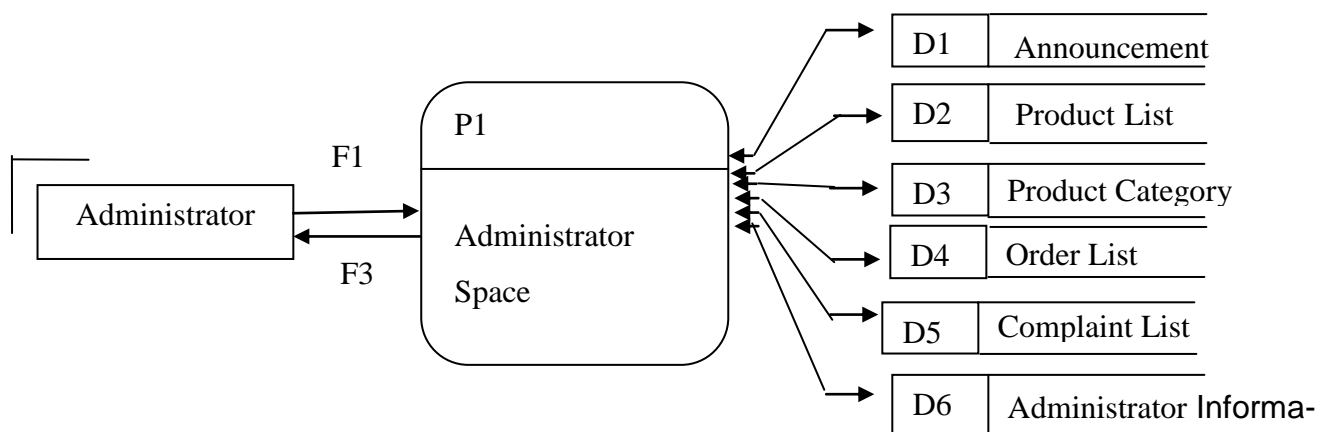


FIGURE 3.1 Top data flow diagram of online shopping system.



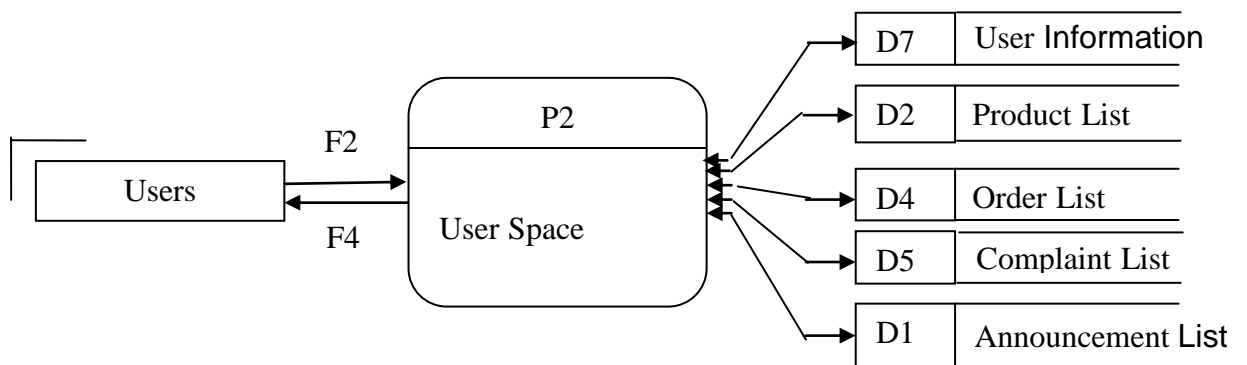
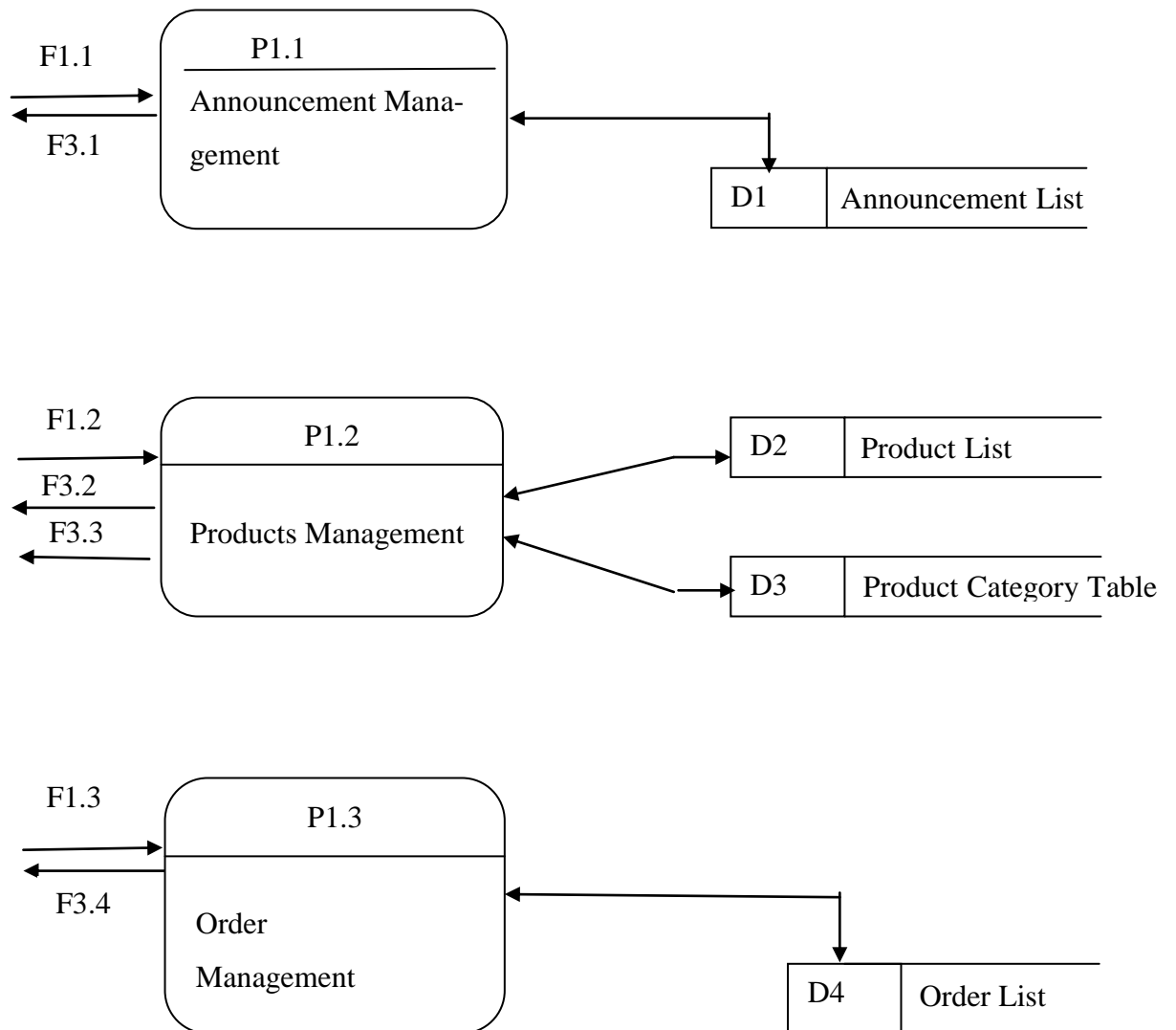


FIGURE 3.2 Online shopping system level data flow diagram.



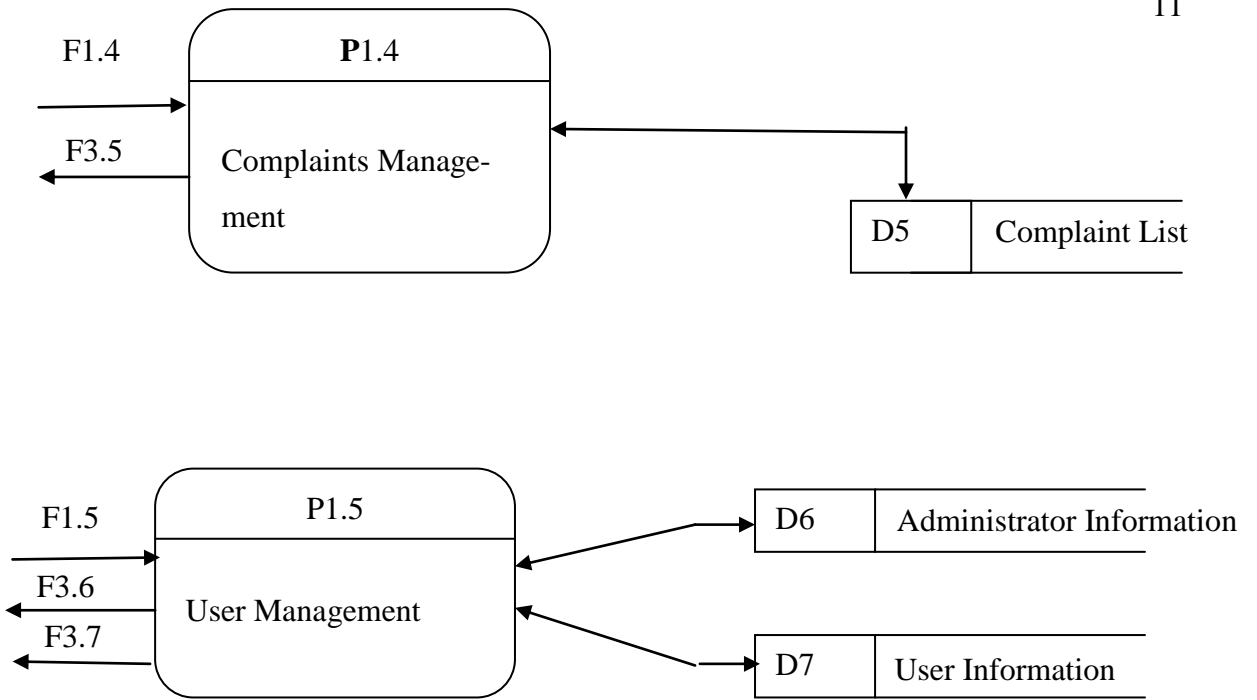
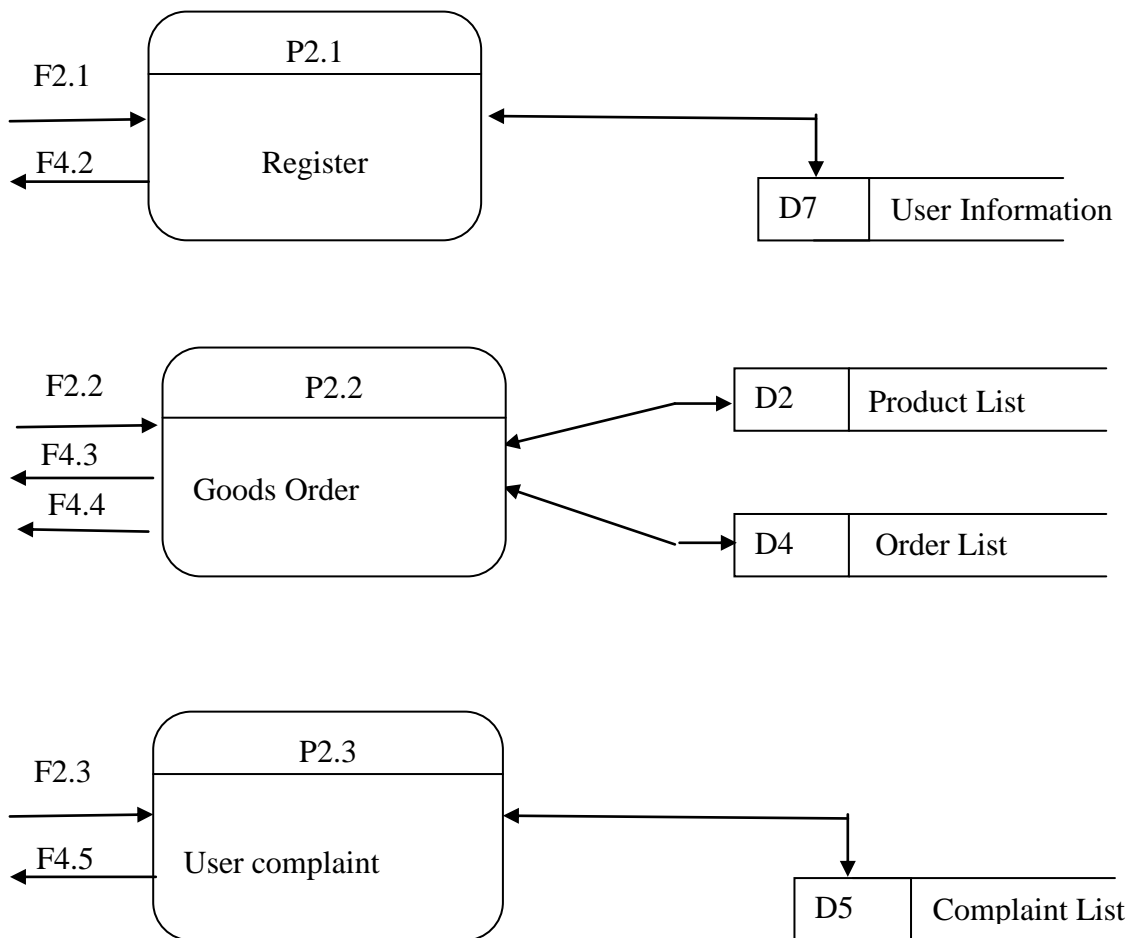


FIGURE 3.3 The two-story shopping system administrator online store spatial data flow diagram.



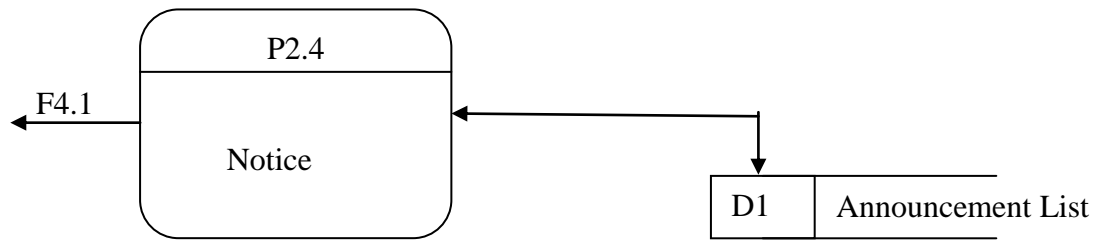


FIGURE 3.4 The two-story-line shopping system, the user space data flow diagram.

Description of the elements of data flow diagram:

F1: administrator enter information; F2: the user input information; F3: Administrators output; F4: user output; D1: Notice the list; D2: List of goods; D3: Product Category table; D4: order list; D5: list of complaints; D6: Administrator Information; D7: user information; F1.1: Notice of information; F1.2: product information; F1.3: order information; F1.4: Complaint Information; F1.5: Administrator Information; F2.1 : User Information; F2.2: order information; F2.3: Complaint Information; F4.1: Notice of information; F3.1: Notice of information; F3.2: product information; F3.3: product category information; F3.4 : order information; F3.5: Complaint Information; F3.6: Administrator Information; F3.7: user information; F4.2: user information; F4.3: product information; F4.4: order information; F4.5 : the content of the complaint.

3.4 Data Dictionary

Data dictionary is the data flow diagram of further explanation, and it mainly contains the following things:

1) Data items

Data items is a data unit, primarily including the data item name, alias, meaning instructions, data types, data length, data range, data meaning, logical relationship between different data, data item relationships and so on. The main data items of the system are as follows:

TABLE 3.2 The main data items of the system.

<p>Name: Product ID</p> <p>Description: It is the unique identification of goods, generated automatically by the system</p> <p>Data Type: int</p> <p>Length: 4</p>	<p>Name: Product Name</p> <p>Description: The product name</p> <p>Data Type: varchar</p> <p>Length: 60</p>
--	--

2) Data storage

Data storage is the position that a data structure is stored or suspended in the system. The form of it may be calculation document, manual document or manual vouchers, including data storage name, description of data storage, data storage number, input and output data flow, data structure, data access frequency, data access methods and so on. The main data storage of the system is as follows:

TABLE 3.3 The main data storage system.

<p>Name: Product list</p> <p>Description: Save Product Information</p> <p>ID: D2</p> <p>Composed of: product number, product category, product name, product serial number, product manufacturers, product packaging, product price, purchase price of commodities, commodity profiles, visits, sales numbers, product images.</p>	<p>Name: Order List</p> <p>Description: storing user order information</p> <p>ID: D4</p> <p>Components: order number, user name, product number, order time, order number, order number, user confirmation, and submit time, the administrator confirmed</p>
--	--

3) Data flow

Data flow is the path of running data structure in the system, including the name of the data flow, data flow specification, data flow code, data flow

source, destination and so on. The main data flow of the system is as follows:

TABLE 3.4 The main data flow of the system.

<p>Name: Administrator input Description: Enter the information management system administrator ID: F1 Components: Administrator information, commodity information, bulletin information, orders information, complaint information.</p>	<p>Name: User input Description: Shopping needs of the user input information ID: F2 Components: User information, order information, complaint information</p>
--	--

4) Data processing

Data processing is the process of data processing in the system, including the process name, process description, input and output data flow, data processing and so on. The main data processing system is as follows:

TABLE 3.5 The main data of the system.

<p>Name: Administrator space Description: The management of the administrator login screen ID: P1 Input data stream: Administrator input F1 Output data stream: Administrators to view information on F3</p>	<p>Name: User space Description: The operation of the user login screen ID: P2 Input data stream: User input F2 Output data stream: User to view information F4</p>
--	---

4 OVERALL DESIGNS

Next stage after the needs analysis is the overall design stage. The overall design, also known as macro-design or outline design, will determine the component modules and the relationship between modules through detailed analysis of needs analysis and the feasibility program according to data flow diagram.

4.1 Functional Design

4.1.1 The architecture of system (HIPO chart)

HIPO is an abbreviation, meaning that hierarchical graph plus input - processing - output graph. The logical model of the system expressed with data flow graph is transformed into hierarchical module structure expressed with HIPO diagram by structural design technology.

Online shopping system is designed using structural design technology combined with the data flow diagram, dividing the entire system structure into several levels of modules. Each module must complete a function, and each module has a single entrance and exit.

HIPO diagram of the system is as follows:

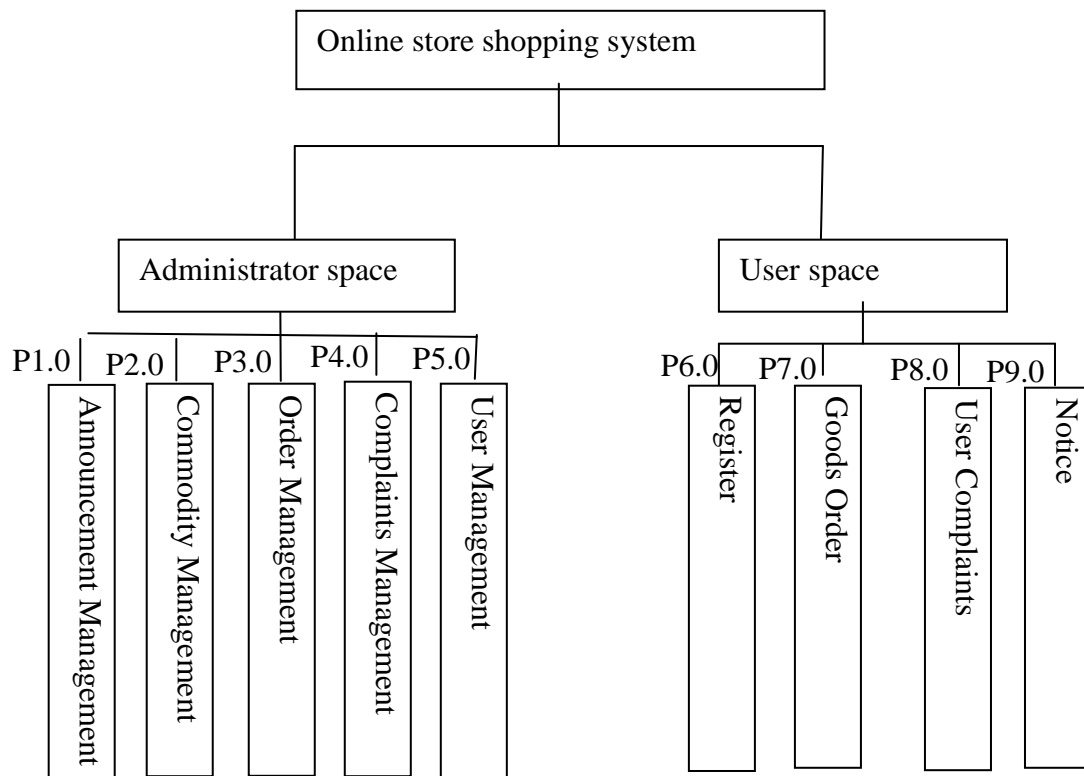


FIGURE 4.1 Block Diagram of Systems Function.

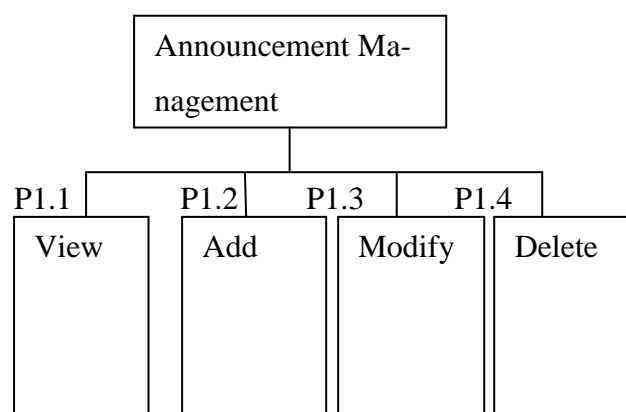


FIGURE 4.2 Block Diagram of Announcement Management Function.

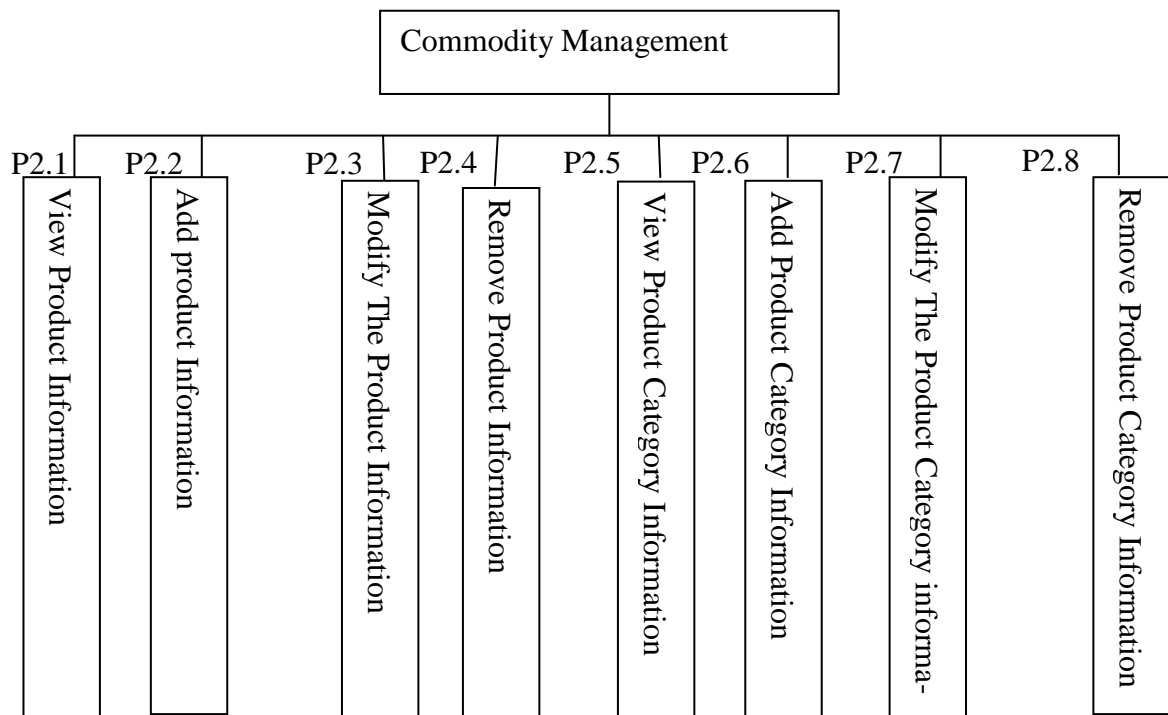


FIGURE 4.3 Block Diagram of Products Management Function.

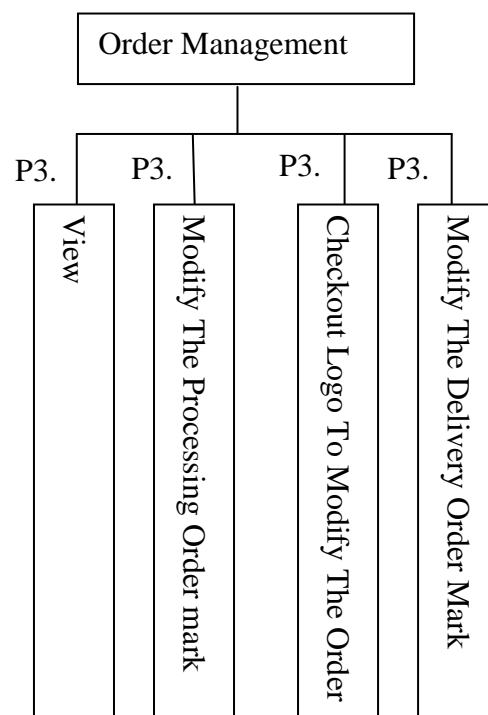


FIGURE 4.4 Block Diagram of Order Management Function.

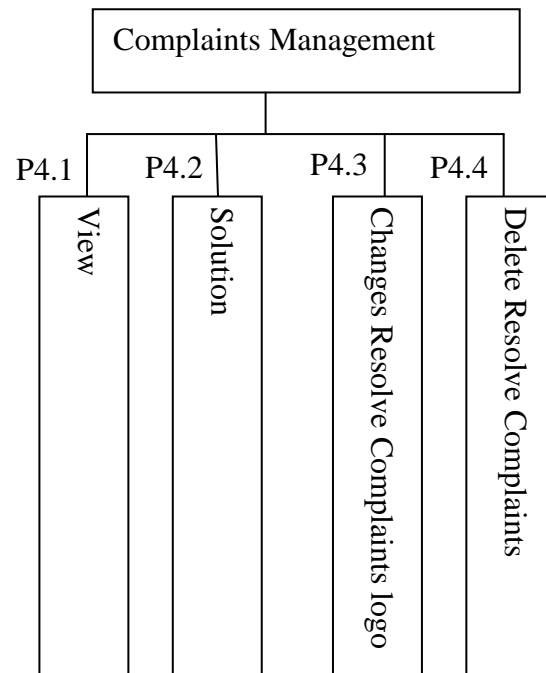


FIGURE 4.5 Block Diagram of complaints management.

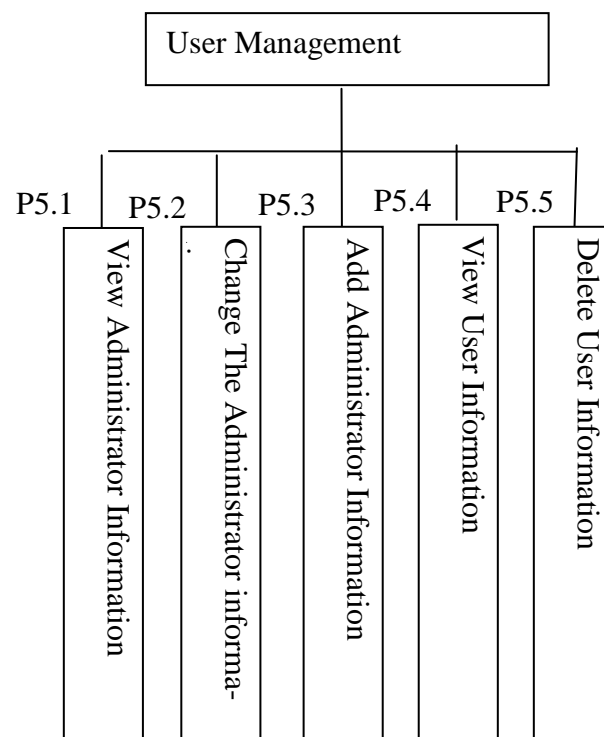


FIGURE 4.6 Block Diagram of User Management Function.

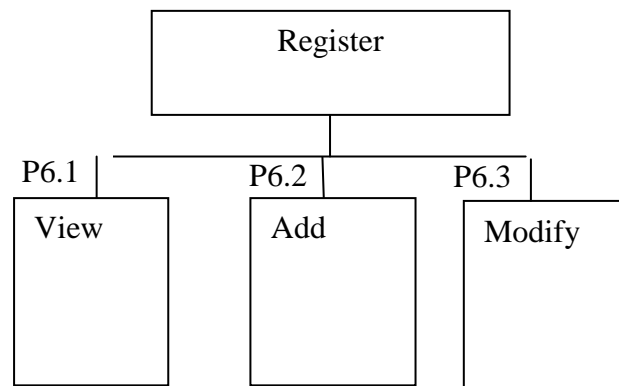


FIGURE 4.7 Block Diagram of Register Function.

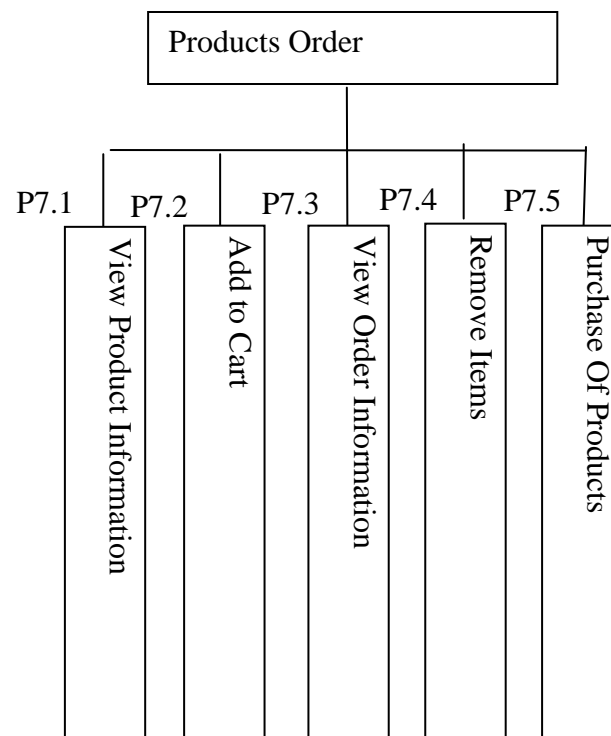


FIGURE 4.8 Block Diagram of Goods Ordered Function.

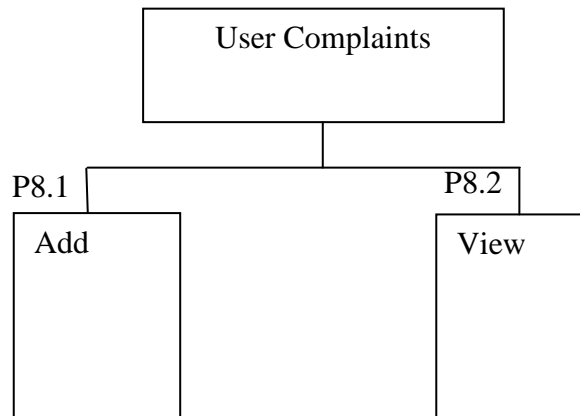


FIGURE 4.9 Block Diagram of Customer Complaints Function.

4.1.2 Module external design (IPO chart)

IPO is also an abbreviation, meaning that the input-processing - output graph. It is a graphical tool, a graphical table. It is mainly used to describe the input, processing, output process, mainly including the processing contents of each module, input and output relationship, the data for each module, the shifting and relationship between each module. It is one of the major achievements through the overall design of the system, and the main basis constituting the establishment and design of program mission statement. The main IPO chart of the system is as follows:

TABLE 4.1 The IPO chart of product management module.

ID:	2.0
Module Name:	Products Management
shifted:	No
Shifting:	2.1; 2.2; 2.3; 2.4; 2.5; 2.6; 2.7; 2.8
Input:	The products and their category information entered by administrator
Output:	The list of goods and their category
Treatment:	View, add, modify, and delete the list of goods and their category

TABLE 4.2 The IPO charts of order management module.

ID:	3.0
Module Name:	Order Management
Shifted:	No
Shift:	3.1; 3.2; 3.3; 3.4
Input:	User order information and the resolve-order information entered by administrators
Output:	Order list
Treatment:	View and edit the order list

4.1.3 The description of module function

- 1) The function of announcement management module: Administrator notifies the store information to the user by publishing announcement and manages the announcement list by viewing, adding, modifying, and deleting operation.

- 2) The function of products management module: Administrator manages the list of goods and their category by viewing, adding, modifying, or deleting operation.
- 3) The function of order management module: Administrator manages customer orders, and viewing, modifying the list of orders.
- 4) The function of complaint management modules: Administrator manages customer complaints, and viewing, modifying the list of complaints.
- 5) The function of user management module: Administrator manages the information of the user and himself.
- 6) The function of user registration module: The users view, add, and modify their personal information.
- 7) The function of products ordering module: The users view their orders.
- 8) The function of user complaints module: The users view and add their complaints.
- 9) The function of announcements browsing module: The users browse announcement information.

4.2 Interface design

4.2.1 External interface

1) User Interface

It can be seen from the needs analysis that it is very important to provide users with a friendly interface. Therefore, the interface designed should be a

simple, decent, generous one firstly, and secondly it should facilitate the operation. Special attention should be paid to the overall layout of the interface, and the appearance should be reasonable. WINDOW style can be appropriately adopted because most users are familiar with it. System design language should be based on user interface with WINDOWS-style, and use ASP to program. In short, the user interface should be reliable, simple, and easy to operate.

The layout for main page of new website design:



The layout for main page of old website:

Login	Register	My Account	Favorite Box	Help
Website Logo				
		Search		
Announcement				
Service Category		New Product	Activity	
		Hot Product	Rules	
Production Category				
Cooperative Website				

The new design of system can achieve the desired objectives and make the shopping process easier, faster and convenient.

2) Software Interface

The interface to the SQL SERVER 2000 can be used in the server program to achieve the access to all the databases. The error-free transmission protocol and the sliding window method can be used in network software to achieve a network transmission and network reception of data.

3) Hardware interface

Input interface includes the keyboard, mouse input for processing. And the output interface includes printer connections and use. Fast Ethernet can be

used in network transmission part in order to achieve high-speed transmission.

4.2.2 Internal interface

The information is transported between the modules mainly by parameter passing, return values, function shifts and other ways. The structure of concrete parameters will be described in following data structure design section. The message will be transferred between the modules through Interface. And the main form of transmission is parameter.

4.3 Code design

4.3.1 The principle of code design

Computer code design is a code or symbol, the main purpose of which is to make it easy to sort, search, find and so on.

- 1) Code-standard principle. This means that as far as possible the use of coding should be in accordance with relevant international, national, industry-standard design.
- 2) Easy-to-modify principle. This means that when the characteristics, conditions or the entity-relationship of the code is changed, it should be easy to make it changes.
- 3) Simple-structure principle. This means that the length of the code should be appropriate, and the structure of the code should be simple. The basic prerequisite is to meet current needs and scalability requirements, because the length of the code affects the storage space occupied, information processing speed and code error rate.

- 4) Value-only principle. This means that the code value should ensure Uniqueness cannot be repeated.

4.3.2 The code design for system

Since the announcement system, commodities, products groups, order, complaint numbers are natural numbers starting from 1, accumulated by the system automatically, so there is no need to subdivide it.

4.4 Conceptual Model Design (E-R diagram)

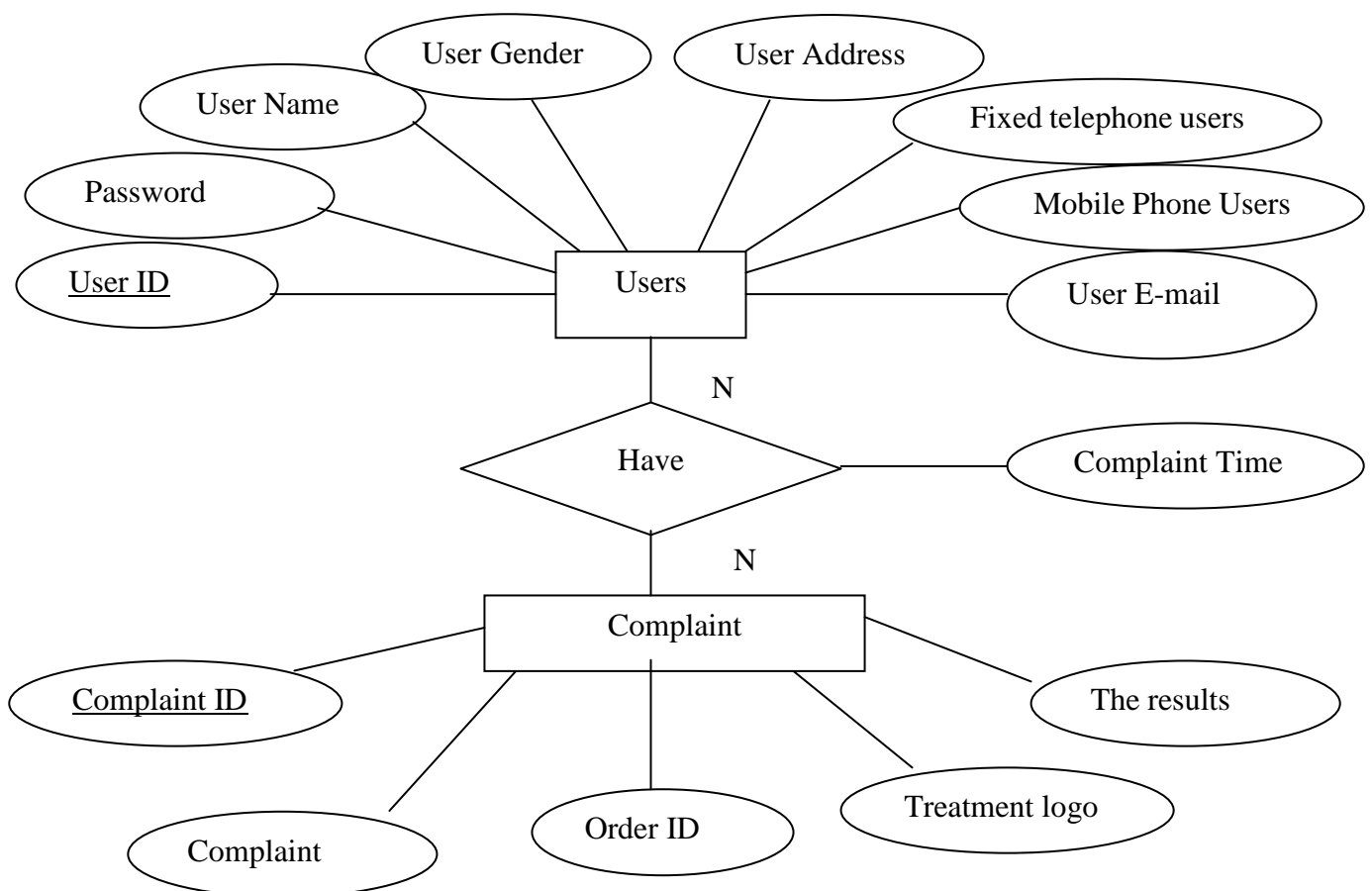


FIGURE 4.10 Local E-R diagram of a complaint.

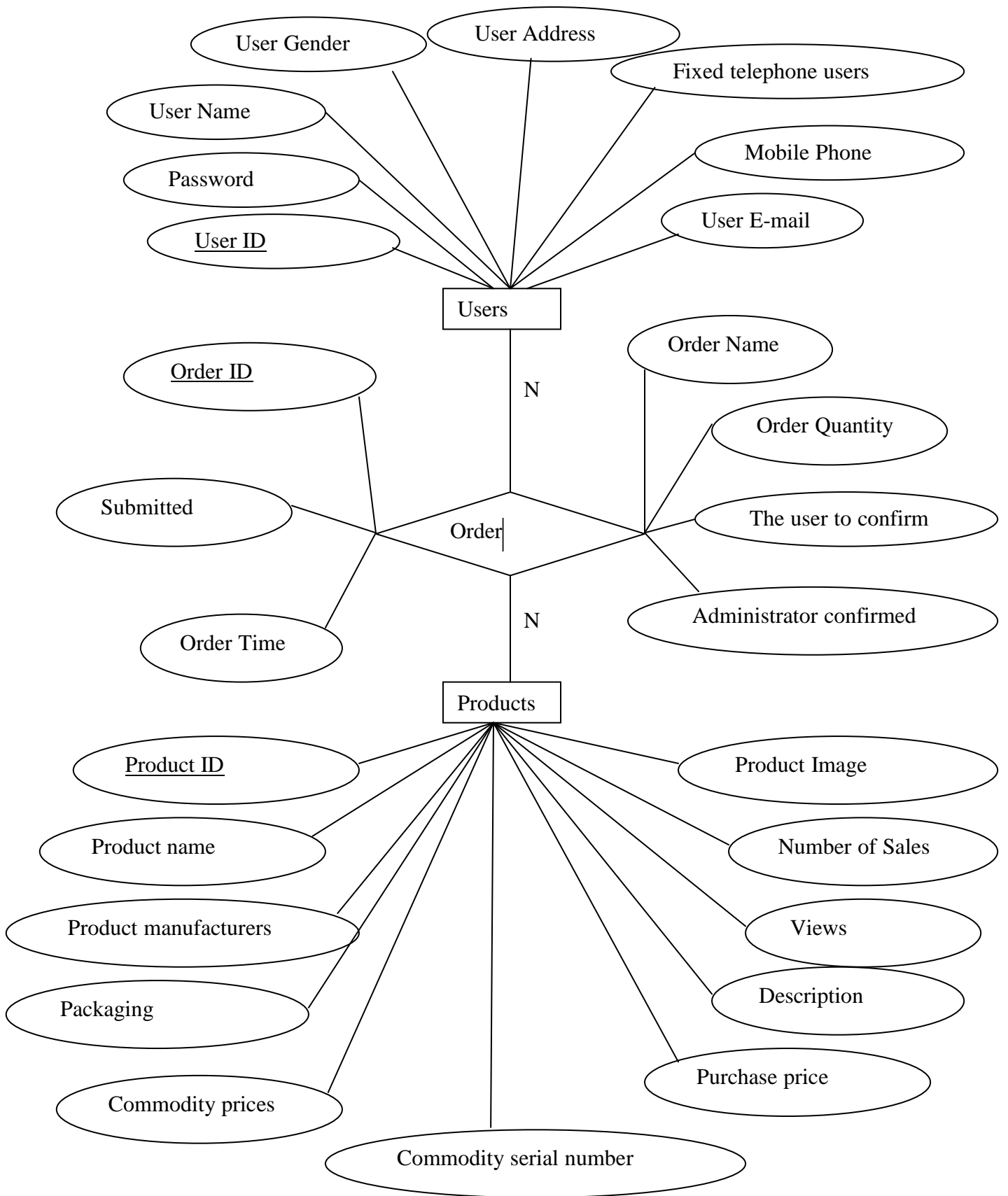


FIGURE 4.11 Subscription E-R diagrams of local goods.

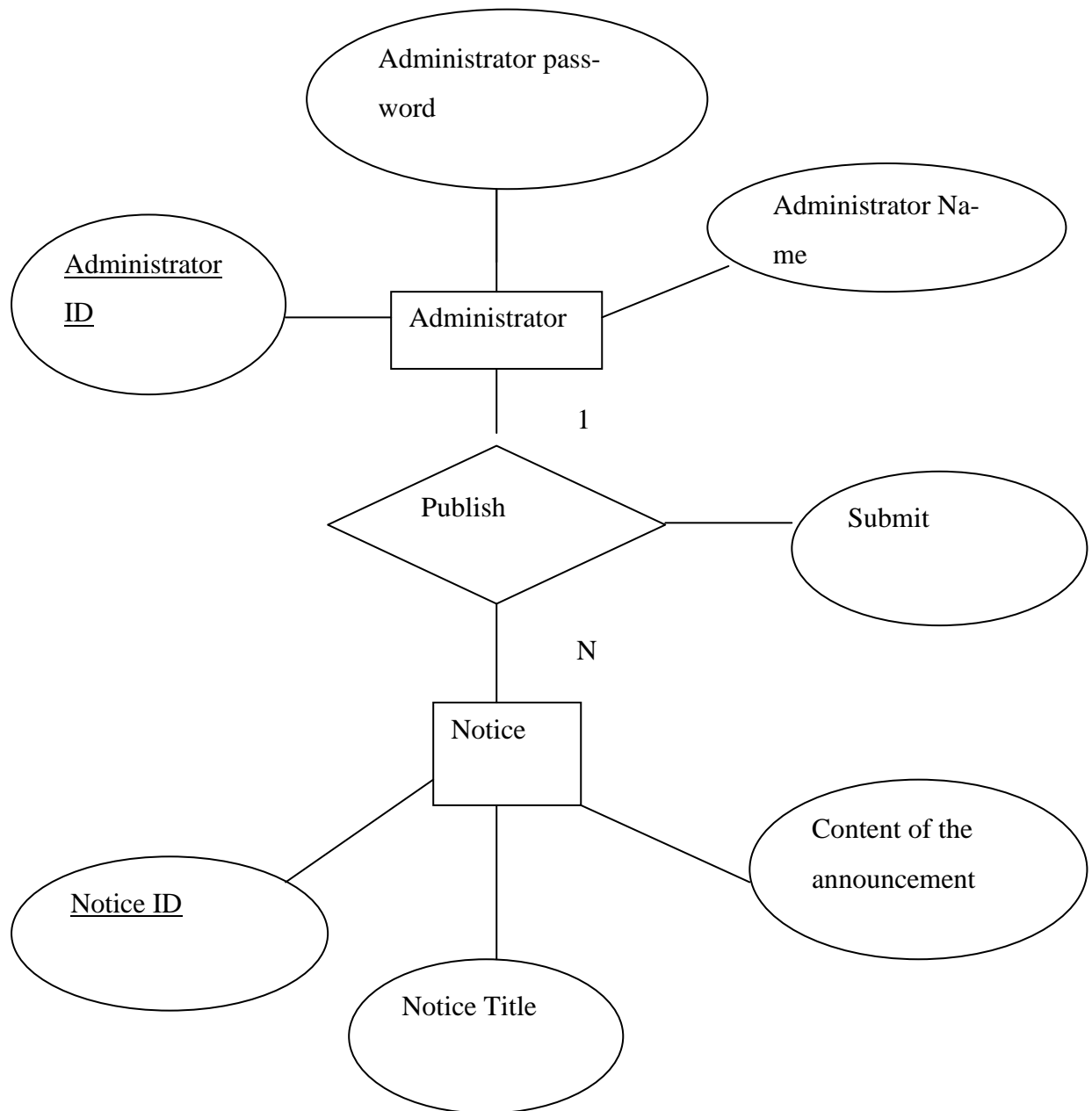


FIGURE 4.12 Local administrators announced E-R diagram.

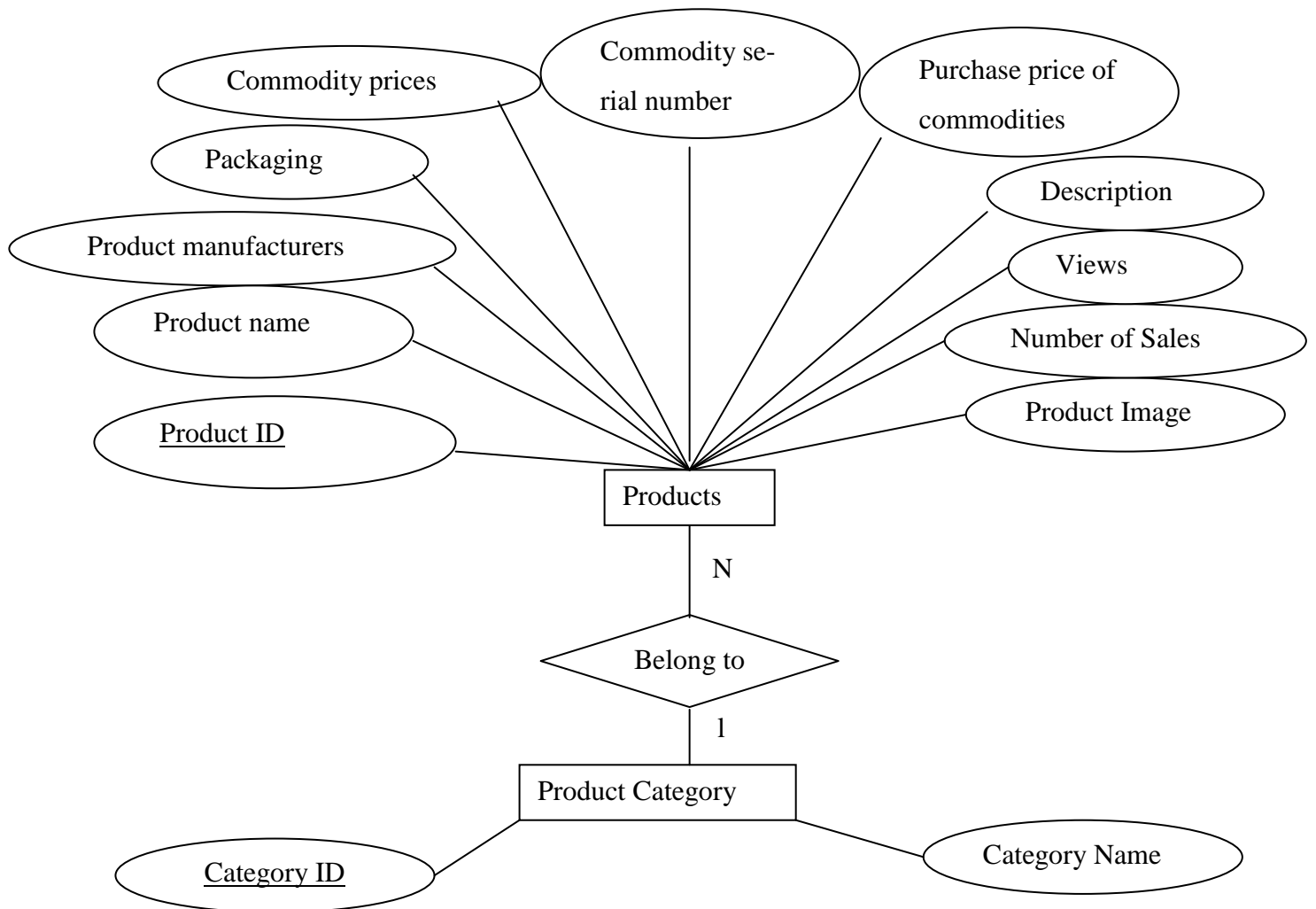


FIGURE 4.13 Categories of local E-R diagram.

4.5 Input and output design

4.5.1 Input Design

A fixed pattern is used in input design of the system at the basis of design principles to get a unified and generous interface. The input information includes: input name and number, input source, input devices and media, input time and frequency, data validation, and so on. The main input design of the system is as follows:

TABLE 4.10 Input design of product information.

Enter a name: Product Information		Input devices and media: Keyboard	
Source: System Administrator		Enter the time and frequency: a randomized	
Enter the amount of information:		Sharing Scope: This system uses	
Input format and content:			
Data item name	Type	Actual length	Remarks
Product Category	varchar	60	List to select the input
Product name	varchar	60	Administrator Enter
Product Number	int	4	Administrator Enter
Product manufacturers	varchar	60	Administrator Enter
Packaging	varchar	60	Administrator Enter
Products prices	float	8	Administrator Enter
Purchase price of commodities	float	8	Administrator Enter
Description	varchar	1200	Administrator Enter
Product Image	varchar	60	Administrator Enter

TABLE 4.11 Design of the user input basic information.

Enter a name: the user basic information	Input devices and media: Keyboard
Input sources: user	Enter the time and frequency: a randomized

Enter the amount of information:		Sharing Scope: This system uses	
Input format and content:			
Data item name	Type	Actual length	Remarks
Username	varchar	16	User input
User Name	varchar	30	User input
Password	varchar	16	User input
Confirm Pass- word	varchar	16	User input
User Gender	bit	1	List input
Fixed telephone users	varchar	120	User input
Mobile Phone Users	varchar	60	User input
User E-mail	varchar	60	User input
User Address	varchar	1200	User input

4.5.2 Output Design

Output mainly refers to the report output. Output design plays an important role in this system design. Input to the design of the output occupies an important position. The information entered can be determined according to the output requirements. The output of this system is as follows:

TABLE 4.12 Output of the system design.

Output Name: order has been closing	Output devices and media: printers, printing paper
Output Type: Print Output	Output time and steps: output once a day

Output format and content:			
Order No.	Subscribers	Submitted	Product Number
varchar(60)	varchar(16)	datetime(8)	int(4)
Product name	Products price	Quantity	Total
varchar(60)	float(8)	int(4)	float(8)

4.6 Design of error handling

4.6.1 Error messages

There are usually two kinds of errors of the program during operation: one is the soft error. The soft error is due to input information or being unable to meet the requirements. The other is a hard error, and the hard error is due to the network transmission and other issues.

During operation, the soft errors due to input information or being unable to meet the requirements will appear. For this kind of error, you must enter the data validation module for data analysis, analyze errors to determine the error type, and then generate a certain degree of precautionary statements, and send to the output module.

For error message, the system must provide the cause of errors, such as: system prompt: "You are not registered and can not login", indicates that the user does not register on the site, but he goes to shopping cart or check order; system prompts: "user name length is too small ", indicates that the user name in the registered user list, but the user name entered is too short; system prompts: " The new password entered is the same as the original password", indicates that the user change password, enter the new password the same as the original password, etc.

4.6.2 Strategy for error handling

When some of the above errors occur, the user must re-check the input options and modify the error.

In reality, power outages or voltage instability and other reasons may cause data loss, so an uninterruptible power supply must be installed for the server to prevent the above from happening.

Network transport can also cause a corresponding loss. So a backup network should be prepared to ensure that network transport does not interrupt or the main network can communicate properly.

The quality of the hardware also has a great influence in order to ensure the normal operation of the system, as far as possible to pick a stable, reliable server.

4.7 Security Design

4.7.1 Login security

In the login interface, the system provides a valid password for every legitimate user only, the password is entirely personal to be maintained by the user, and the system ensures user authentication security.

4.7.2 Operational security

The user is safe in specific operations. Although the administrators have the rights to grant permission, they cannot arbitrarily change the user information. System here has a set of safety design.

5 DETAILED DESIGNS

Detailed design is the premise of the overall design, through detailed description of the specific target system, to achieve the required system. After the detailed design stage, the detailed description can be translated into procedures using a language program in the coding stage. Here are several typical modules for a description.

5.1 Add-announcement module

Function: Administrators add new public notices to the announcement list. Program flow chart:

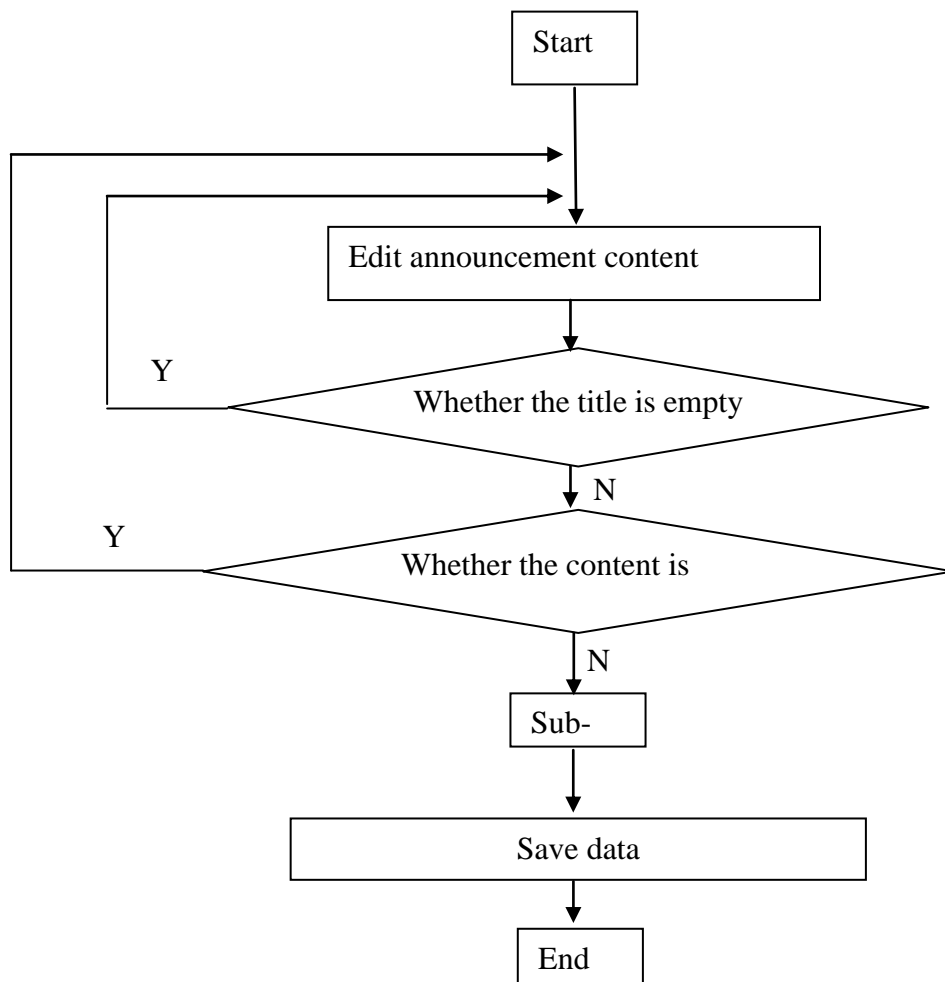


FIGURE 5.1 Flowchart of add announcement module.

5.2 Modify-announcement module

Function: Administrators modifies the bulletin announcement in the announcement list.

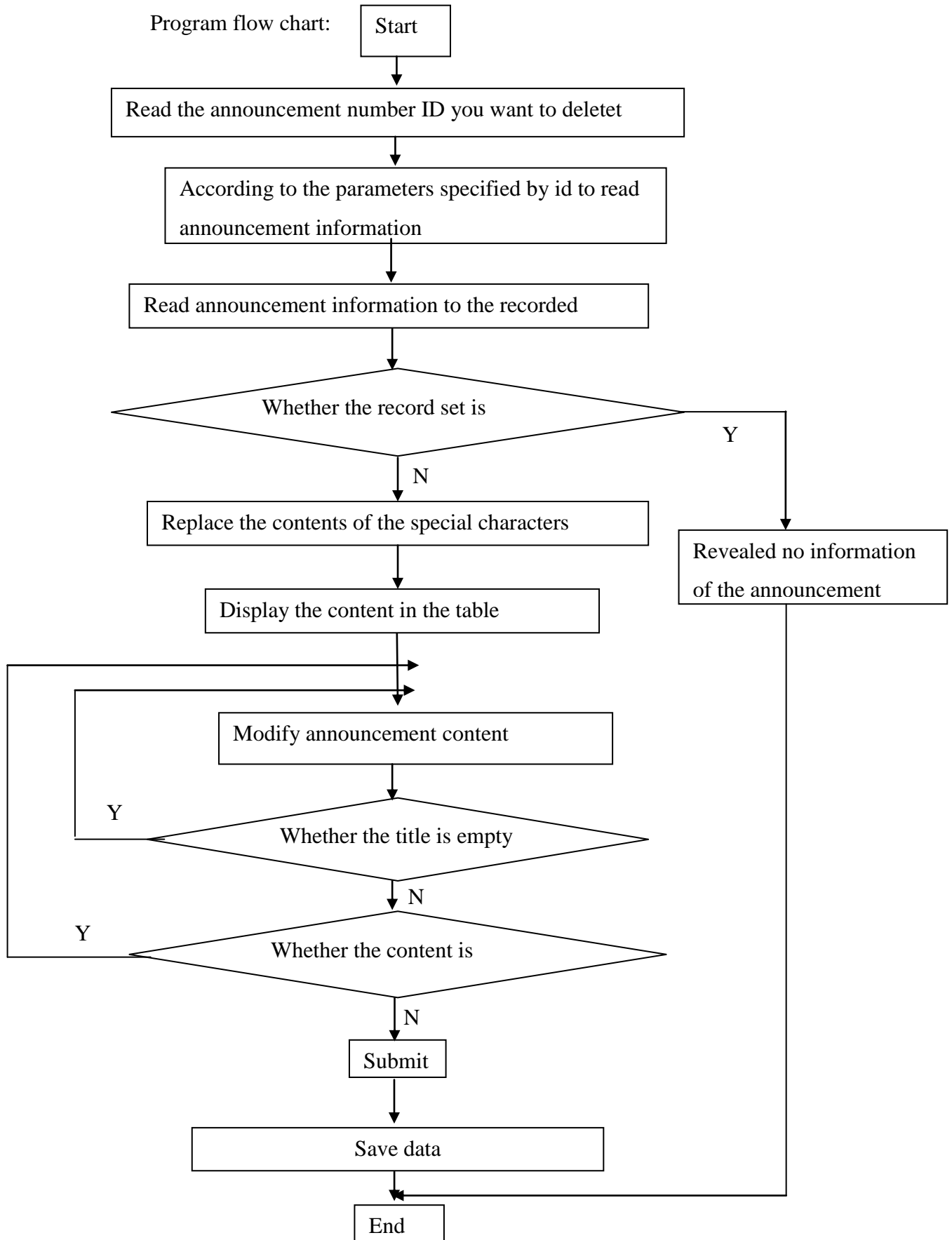


FIGURE 5.2 Flowchart of modify-announcement module.

5.3 View-products module

Function: View product information in product list.

Program flow chart:

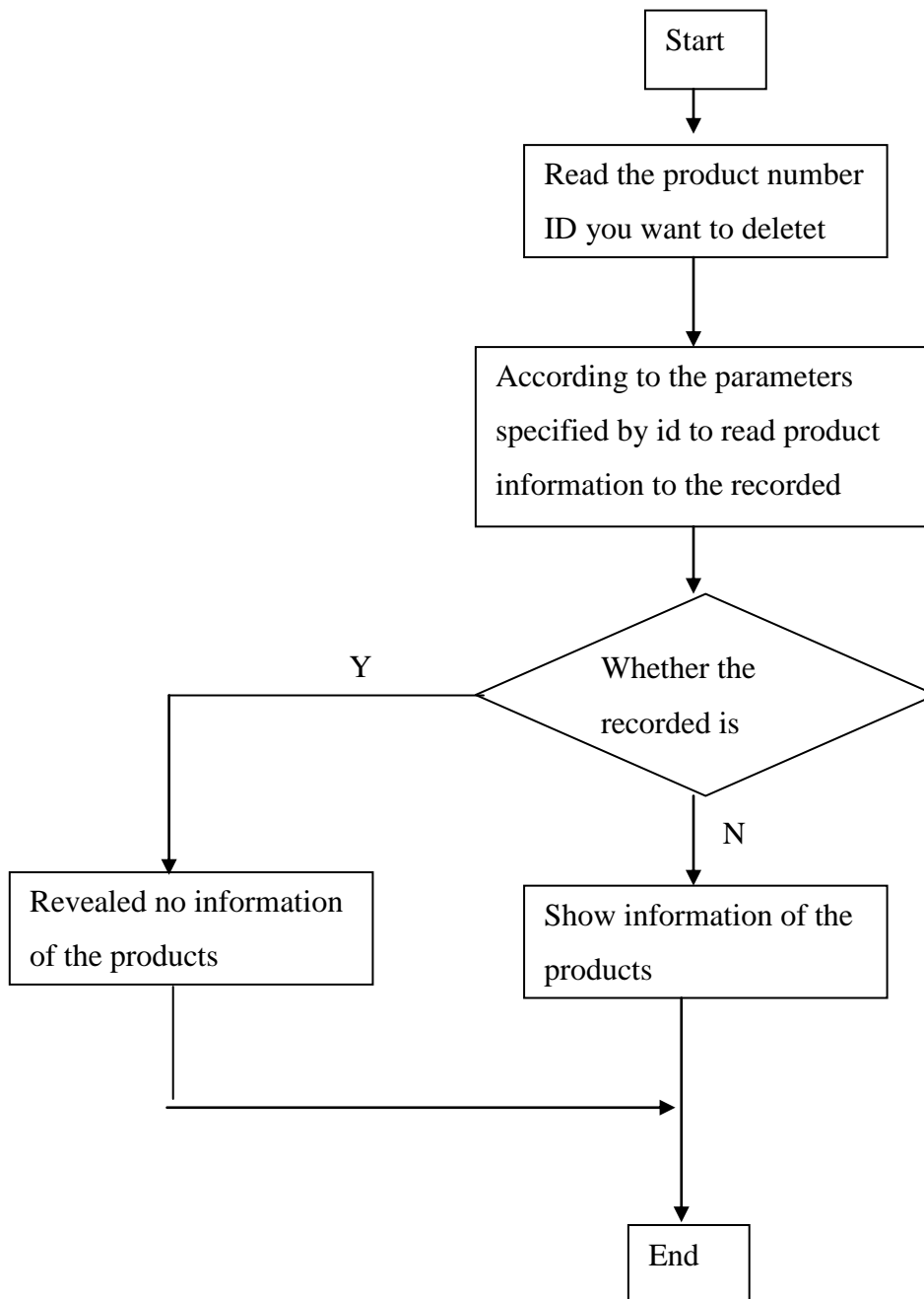


FIGURE 5.3 Flowchart of view product module.

5.4 Delete- products module

Function: Delete the information of goods in the list.

Program flow chart:

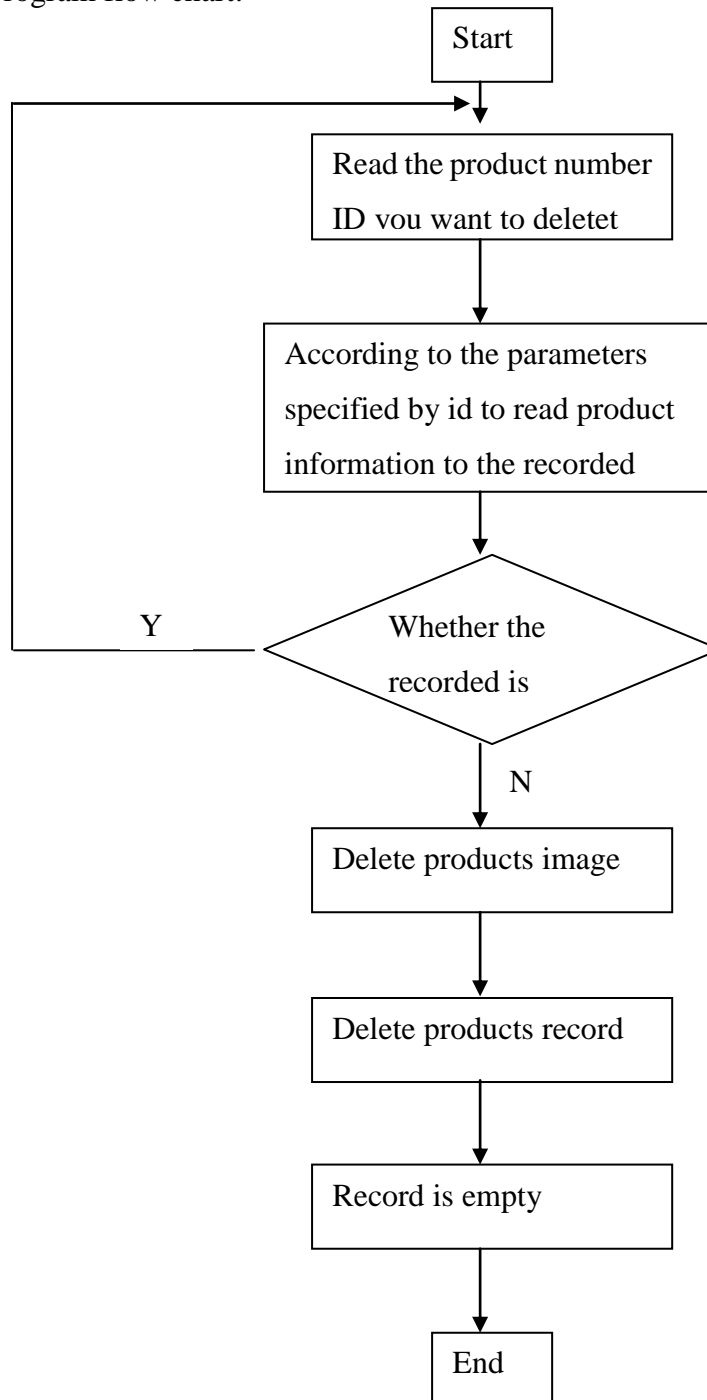


FIGURE 5.4 Flowchart of delete products module.

6 CODING AND TESTING

This thesis only to study the design process, not for the coding and testing, but I would like to suggest using the following coding and testing.

6.1 Coding

6.1.1 The meaning of coding

Code is program written using a programming language, which can translate the result of the design into a form the computer can "understand".

6.1.2 The purpose of coding

Coding is to achieve human-computer interaction, in accordance with the wishes of people to direct the operation of the computer properly.

6.1.3 Code requirements

From the perspective of project development, the requirements are as following:

- 1) Program should have a portable feature.

The so-called portable is the software program can be transplanted from one computer to another different computer. In the design of programs, generally you can not directly operate the hardware, and you should use standard software programming languages and database operations.

- 2) Developing tools should have the available feature.

The so-called available is a capability for developing tools, which is reflected in reduced coding time and improve the quality of the source code. At present, most programming languages have integrated development environment, whose developing tools can provide a variety of library functions,

graphics development environment, and debugger for writing source code.

3) Software should have reusable feature.

The so-called reusable indicates that the software components of programming language should have the ability to reuse. Programming languages with such capability can greatly increase the utilization of the source program.

4) Program should have maintainable feature.

The so-called maintainable indicates that the detailed design of the system can be converted to source code and it is easy to maintain the source code.

6.2 Testing

6.2.1 The task of testing

The task of testing is to find errors that may exist in the design to ensure the good operating performance and avoid the losses caused by mistake in the production.

6.2.2 The objective of testing

The objective of testing is to find bugs that may exist, mainly through the implementation of the whole program. A good testing scheme can achieve not only the goal of finding bugs but also the goal of maximizing efficiency.

6.2.3 The principle of testing

In order to design an effective testing scheme, we should follow the basic principles below:

- 1) All tests should follow the user's needs. The purpose of the testing is to find errors. And for the users, the biggest mistake is that the program cannot meet customer needs.
- 2) The testing scheme must be pre-designed before the test.
- 3) Pareto principle should be applied in the testing. The principle shows that 80% of mistakes are likely to be concentrated in 20% of the modules. How to find out these modules and testing them is the key to solving the problem.
- 4) First test local, and then test the whole program. Firstly, we should focus on a single module test and then test the integrated module group, and finally test the entire system.
- 5) Without exhaustive testing. Testing program should be designed for the full coverage of all the conditions of the program.
- 6) In order to achieve optimal test results, the testing scheme should be designed by a third-party.

6.2.4 The choice of testing program

Base on software engineering lifecycle method, there are two kinds of testing methods: white box testing and black box testing.

The so-called white-box testing, namely, refers to structural testing. The main intent of white-box testing is to detect the main execution path in the program, check its ability to work properly according to the requirements scheduled. This approach is in accordance with the logic of the test procedures, and its basic pre-

mise is that the tester needs to be fully aware of the program structure and algorithms.

The so-called black box testing is functional testing. The main function is to detect whether the program can be exactly used according to the specification, whether it can receive input data normally, generate the correct output, and maintain a database or a file of such external information integrated. The black box testing method process includes: plan-design-development-execution-evaluation.

In this thesis, I suggest the system using black box testing method, mainly testing for software interface and software function. The thesis study on how to design a small online shopping system which is simple and flexible to be used. As a result, the interface and function are important in this system. For the black box testing method there one example for the "products management" section is as following:

Through the "products management" section in administrator interface of the system, one can open the product list, and then click "add products" button. Then you can enter the product information and add pictures in the pop-up window. First of all, you should submit images, and it will display "pictures uploaded successfully"; Secondly, you should submit products, and it will display "products saved successfully". From the list of goods in the main management interface, you can see the product information; And then log in the user interface, the products information can be seen among the latest goods in the user interface. It means that this test of adding products was successful.

This example to show how to use black box to test this system, and announcements, orders, complaints should be tested in turn, and the entire test will pass.

If pass all the above test, the initial design will be proved successful.

7 CONCLUSIONS

The design idea of the system includes: Introduction to online store shopping system - Feasibility analysis - Needs analysis - The overall design – The detailed design - Coding and testing. After testing, it can be put into operation.

The system can realize data input, query, modify, and has other features to achieve the desired objectives and make the shopping process easier, faster and convenient. However, there are still some shortcomings and deficiencies in the system, such as the fact that membership system and points reward system are not set; there are not enough beautiful interfaces, etc. These various shortcomings will be improved in the future during learning and maintenance.

During this design process, I have gained a more profound understanding of basic knowledge and skills of software development. At the same time, I also improved my ability in analyzing problems and solving problems. I can understand exactly the combination of theory and practice.

REFERENCES

- [1] Man Kit Chang, Waiman Cheung, Vincent S. Lai. Literature derived reference models for the adoption of online shopping. *Information & Management*, 2005, 42(4): 543-559
- [2] Jiunn-Woei Lian, Tzu-Ming Lin. Effects of consumer characteristics on their acceptance of online shopping: Comparisons among different product types. *Computers in Human Behavior*, 2008, 24(1): 48-65
- [3] Soon Jae Kwon, Namho Chung. The moderating effects of psychological reactance and product involvement on online shopping recommendation mechanisms based on a causal map. *Electronic Commerce Research and Applications*, 2010, 9(6): 522-536
- [4] Tzyy-Ching Yang, Hsiangchu Lai. Comparison of product bundling strategies on different online shopping behaviors. *Electronic Commerce Research and Applications*, 2006, 5(4): 295-304
- [5] A. Vellido, P. J. G. Lisboa, K. Meehan. Segmentation of the on-line shopping market using neural networks. *Expert Systems with Applications*, 1999, 17(4): 303-314
- [6] Bassam Hasan. Exploring gender differences in online shopping attitude. *Computers in Human Behavior*, 2010, 26(4): 597-601
- [7] Kyoung-jae Kim, Hyunchul Ahn. A recommender system using GA K-means clustering in an online shopping market. *Expert Systems with Applications*, 2008, 34(2): 1200-1209
- [8] Ching-Torng Lin, Wei-Chiang Hong, Yi-Fun Chen, etc. Application of salesman-like recommendation system in 3G mobile phone online shopping decision

support. *Expert Systems with Applications*, 2010, 37(2): 8065-8078

[9] Sherif M.Yacoub, Hany H.Ammar. *Pattern-Oriented Analysis and Design: Composing Patterns to Design Software Systems*, Addison Wesley, 2003

[10] Richardson Clay, Avondolio Donald. *Professional Java Programming*, John Wiley&Sons Inc, 2005

[11] Steven John Metsker, William C.Wake. *Design Patterns in Java*(2nd Edition), Addison Wesley, 2007

[12] Joshua Bloch. *Effective Java Programming Language Guide*(2nd Edition), Prentice Hall Ptr, 2007

[13] Johnson Rod, Hoeller Juergen. *Expert One-on-One J2EE Development without EJB*, John Wiley&Sons Inc, 2005

[14] Wikipedia, http://en.wikipedia.org/wiki/Online_shopping, 2010