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The Design and Implementation of the Online Shopping System Based on Spring Boot

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ABSTRACTA:

At present, with the continuous progress of science and technology and the gradual maturity of the application level, all aspects of people's life and social activities are actively integrating into the big family of the Internet, and the level of the Internet technology is becoming increasingly mature and the application fields are constantly expanding.
In supermarket shopping, the traditional way of buying is time-consuming, laborious, and also because of the lack of transaction accounts as evidence. The development of online shopping system is mainly designed for the convenience of supermarket sales and customers' shopping. The display shows a relatively simple interface, simple operation function and advanced payment means, which greatly improves the sales efficiency of the supermarket and saves the labor force of the staff in the supermarket. It is a win-win management system.
The online shopping system developed in this paper is developed based on the java object-oriented development language, the Java Web front-end technology, the Spring Boot framework, and the MySQL database. In the development process, it ensures the good operation, practicality and easy expansion of the system code and realizes the characteristics of convenient management and easy operation of the operators.

Key words: online shopping system, Spring Boot framework, Java Web technology, MySQL database

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I. INTRODUCTION

With the rapid development of society, the influence of computers is comprehensive and in-depth, which covers everything related to "food, clothing, shelter and transportation". Now social supermarket has become a daily purchase place, economic level improves at the same time, shopping traffic is increasing, shopping online then highlights its use, a good online shopping system can bring customers more comfortable shopping environment, more convenient way of choose and buy, corresponding can also bring the supermarket higher profit space, so the development and promotion of online shopping system is especially important. Today's online shopping system in today's society is the use of network technology to manage the existing goods in inventory, commodity classification and commodity sales through the computer, and to understand the supermarket goods through the query operation. For customers, the online shopping system can bring more convenience, which cooperates with the database management system software to meet the user's needs [1]. In the current era, the application of the Internet is becoming more extensive, the application of computer technology is becoming more appropriate to our life, and the Internet has become an important tool in people's daily life. The use of computer network technology boundaries the efficiency of people to obtain fragmented information while improving living standards and operation efficiency.
This paper develops the online shopping system using java language, MySQL database and meter Spring Boot front-end framework [2]. The purpose of online shopping system development is to improve the sales efficiency of supermarkets, meet the rapidly growing consumer demand of people, liberate the labor force of supermarket personnel, facilitate customers 'rapid shopping of the required goods, increase consumers' understanding of commodity quality information and the check of post-consumption goods bills. In order to bring a more concise and secure experience to administrators and users, the online shopping system constantly investigates and studies to optimize the problems found[3]。

II. SYSTEM DESIGN SUMMARY

TECHNICAL VIABILITY

The development of the midline online shopping system in this project is really built under the native Windows10 environment, using the J a D K 1.8 version of the Java environment. First, you can configure the download path of the bin directory of JRE and JDK in the environment variable to ensure that the Java file can be compiled smoothly. Then download the maven3.3.9 version installation package on the official website, extract the environment variable of the configuration maven, and the built-in setting. Download mirroring and loading address of the jar package in the xml file. Then there is the tomcat download on the official website, this topic is using the tomcat7.8 version, after configuring the environment variables through the bin directory of startup. To bat, test whether the tomcat service can be opened smoothly[4]. The database uses MySQL relational database, which is installed with version 5.7, using navicat to manage the data tables in MySQL, login test link port 3307, user name root, and password 123456.
In back-end development, intellij IDEA 2019.3.3, which is relatively mature and can avoid a few development problems. Configure the maven local warehouse via setting in the project instead of the maven libraries loaded by idea, and configure the tomcat and Java environments via project structure.

REQUIREMENTS ANALYSIS

The demand analysis of online shopping should be based on the purchase needs of users and the sales needs of supermarkets. After the factual investigation, the function of the system is obtained. With the support of the Internet "+", the reform of the online shopping system is also imperative. For the needs of the system, users can enter the system in the browser through the user login window, view the commodity information to buy goods, modify and improve personal information and view orders, and the administrator can log in to the system management page through a specific window to operate the commodity information and user information.
With the support of the Internet "+" technology, the online shopping system can not only meet the various needs of users, but also quickly collect the information about customer reactions and constantly optimize the system. The development of the online shopping system can not only meet the needs of users, but also improve the efficiency of the overall operation of supermarkets and reduce the input of the original labor force.

PROJECT DESIGN OBJECTIVES AND PRINCIPLES
DEVELOPMENT REQUIREMENTS OF ONLINE SHOOPING SYSTEM

(1) Function requirements: The main page displays various function buttons: personal center (password modification, information improvement), commodity classification, commodity information management, order information, etc.
(2) Security requirements: When login, the corresponding login type to obtain the corresponding system permission.
(3) Economic requirements: low cost, save personnel input.
(4) System requirements: the Windows10 system

DEVELOPMENT OBJECTIVES

The main development objectives of the online shopping system are as follows:
(1) Liberate the employee workforce.
(2) Strengthen the management of user information and commodity information management.
(3) Deal with the problems raised by users quickly.
(4) The operation interface of the system is simple and easy to read, simple and convenient operation mode.

DESIGN PRINCIPLES

Design principles of the online shopping system:
(1) Security: security is the first position, we must ensure the security of user information, in order to let more people accept.
(2) Integrity: The integrity of a transaction, a transaction must be complete from generation to end.
(3) Stability: the stability of the system, considering the excessive use of the system platform.
(4) Operation: the system is required to operate simple and convenient, easy to let non-professionals can also easily operate and use.
(5) Timeliness: after the data change operation of the system, the actual results can be displayed immediately.

SYSTEM PROCESS ANALYSIS
OPERATION PROCESS

System login flow chart, as shown in Fig 1 below.

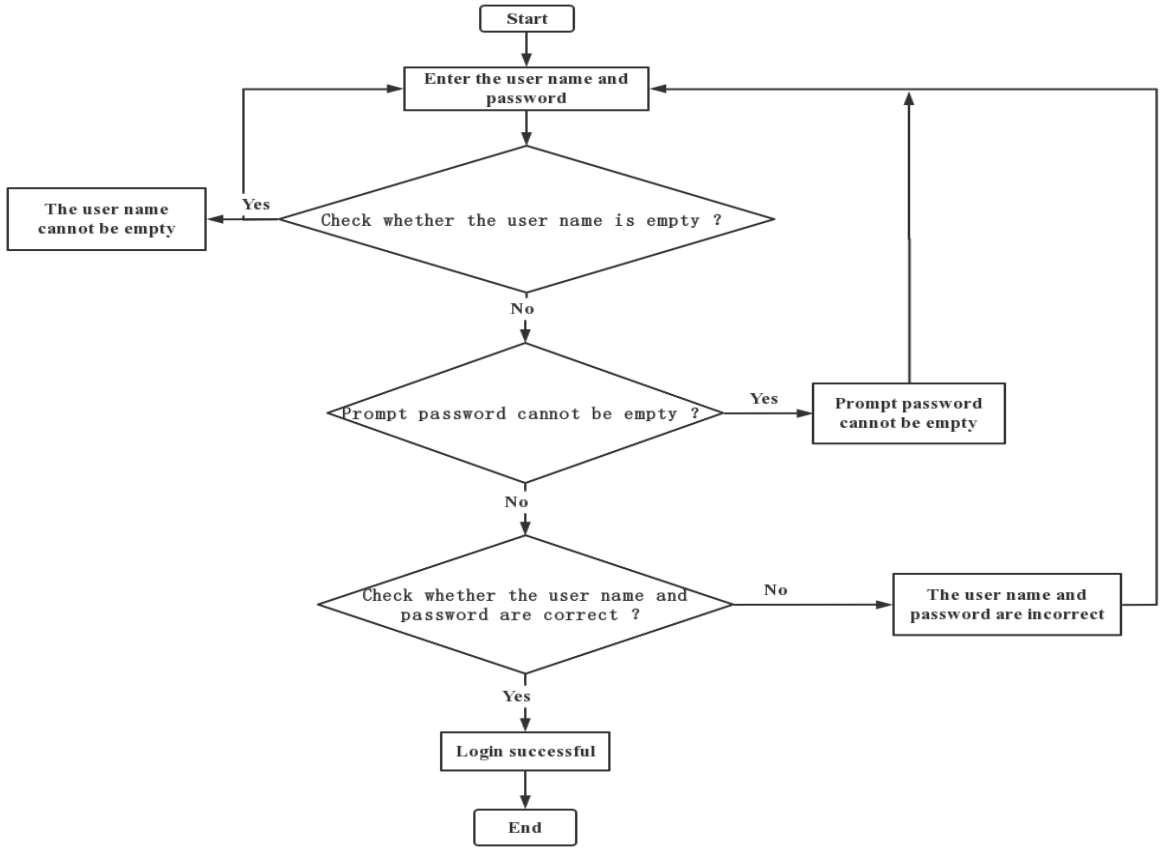

Fig 1 login flow chart

ADD INFORMATION PROCESS

Add an information flow chart, as shown in Fig 2.

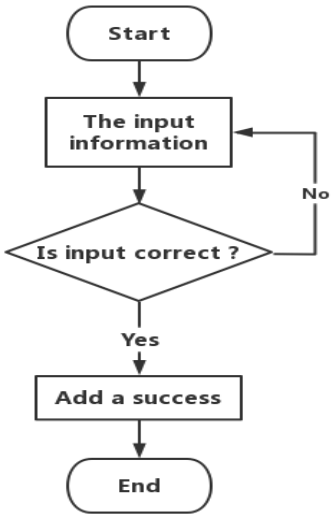

Fig 2 Add information flow chart

DELETE INFORMATION PROCESS
Delete the information flow chart, as shown in Fig 3.

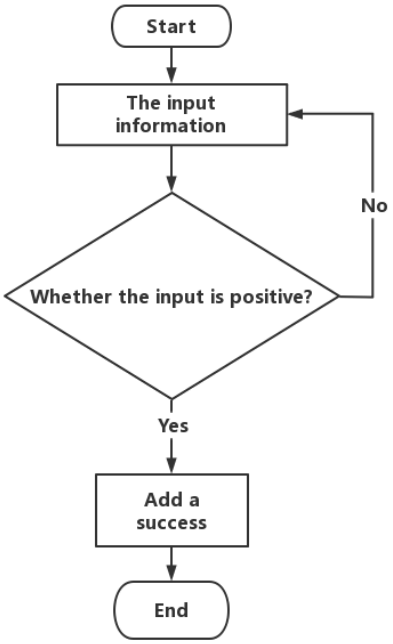

Fig 3 Delete information flow chart

III. SYSTEM DESIGN

SYSTEM ARCHITECTURE
Structure diagram of the online shopping system, as shown in Fig 4.

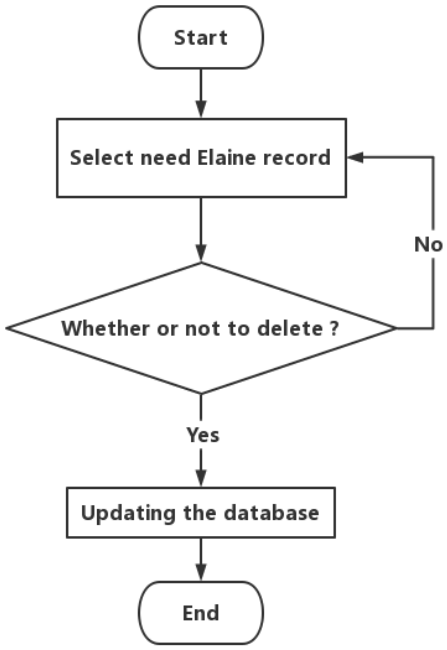

Fig. 4. System Structure

Login system structure diagram, as shown in Fig 5.

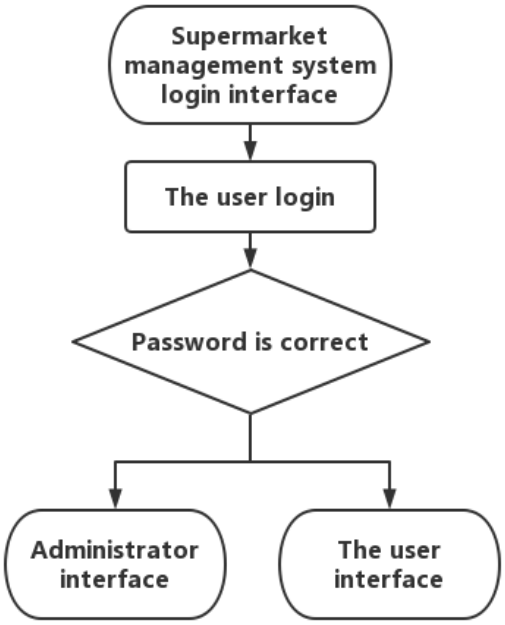

Fig 5. Login system

Structure diagram of the online shopping system, as shown in Fig 6.

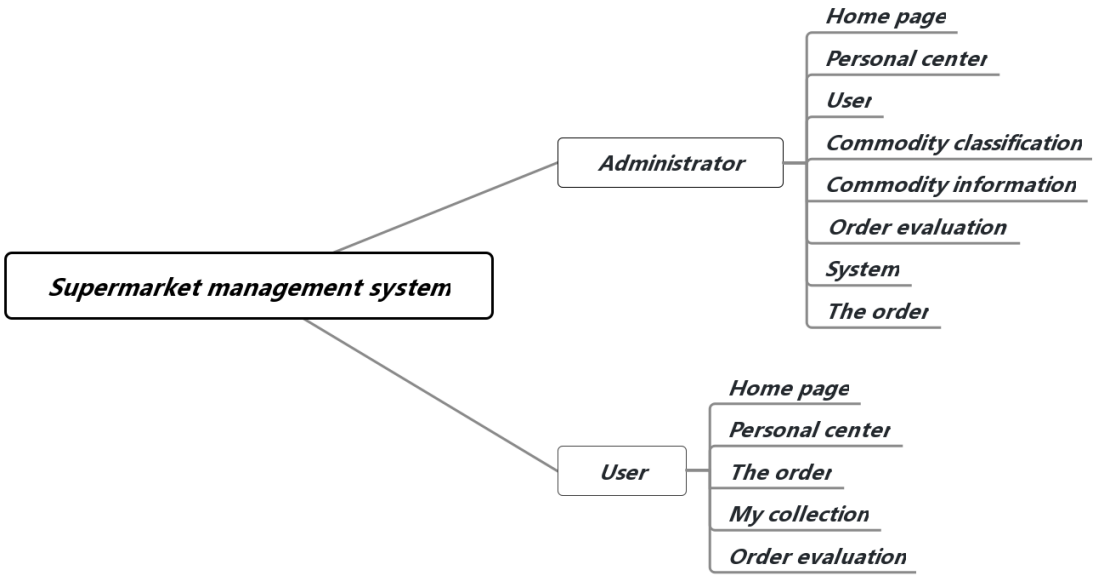

Fig 6. Structure diagram of the online shopping system

DEVELOPMENT PROCESS DESIGN

Through the results of the traditional system investigation, the system development process of the Internet "+" is analyzed and summarized. In the process of function development, we should follow the principle of simple operation, and the system can operate safely. From the beginning of the registration function and the login function, the relevant functional framework should be designed in advance, and each mold frame should have a corresponding relationship[5]. Finally, the test item of the system is adjusted to ensure the sound function of the system development.

Flow chart of the online shopping system development, as shown in Fig 7.

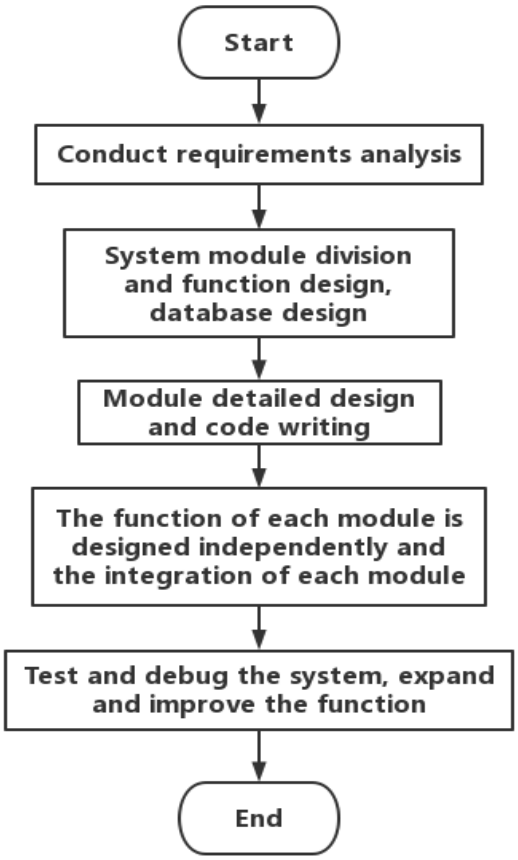

Fig 7 Flow chart of the development system

DATABASE DESIGN PRINCIPLES

Database design is designed based on the relevant system requirements, and we design the data table according to the corresponding data relationship to store the data information. The data stored in the database is the core and foundation of the information management system. Meanwhile, the database also provides the function of adding, deleting, modifying and checking for the data management, so that the system can quickly query the relevant information[6]。

By analyzing the information required by each part of the online shopping system, the data and data types need to be stored, transform each piece of data into physical objects, and using ER diagram:

The entity attribute diagram of the administrator module, as shown in Fig 8.

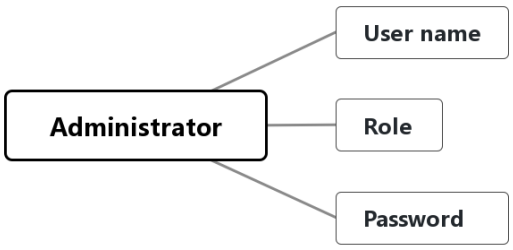

Fig 8. Administrator information entity attribute diagram

The entity attribute diagram of the user management module, as shown in Fig 9.

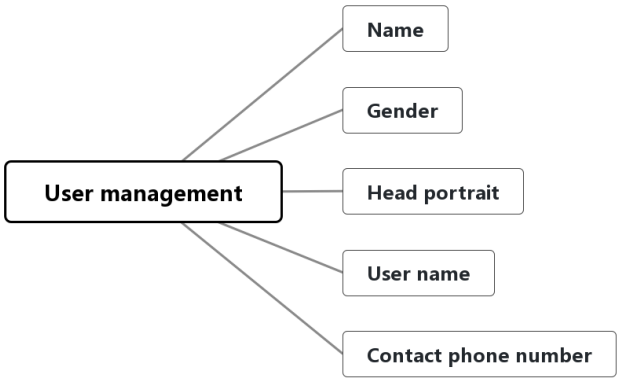

Fig 9 User Management Property diagram

The entity attribute diagram of the commodity information management module is shown in Fig. 10.

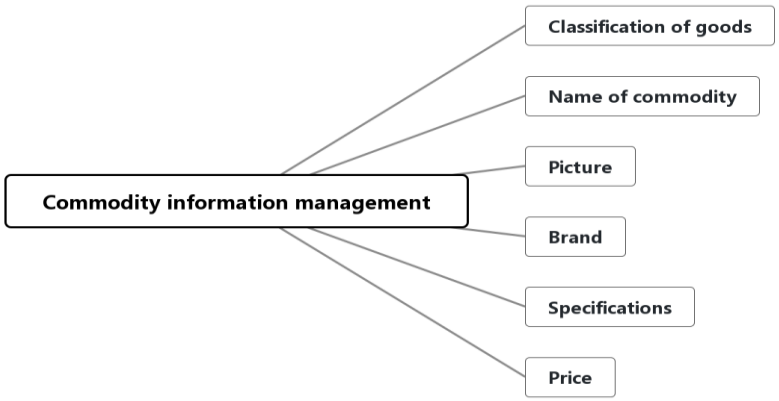

Fig 10 Commodity information management entity attribute diagram

The entity attribute diagram of the order information management module, as shown in Fig 11.

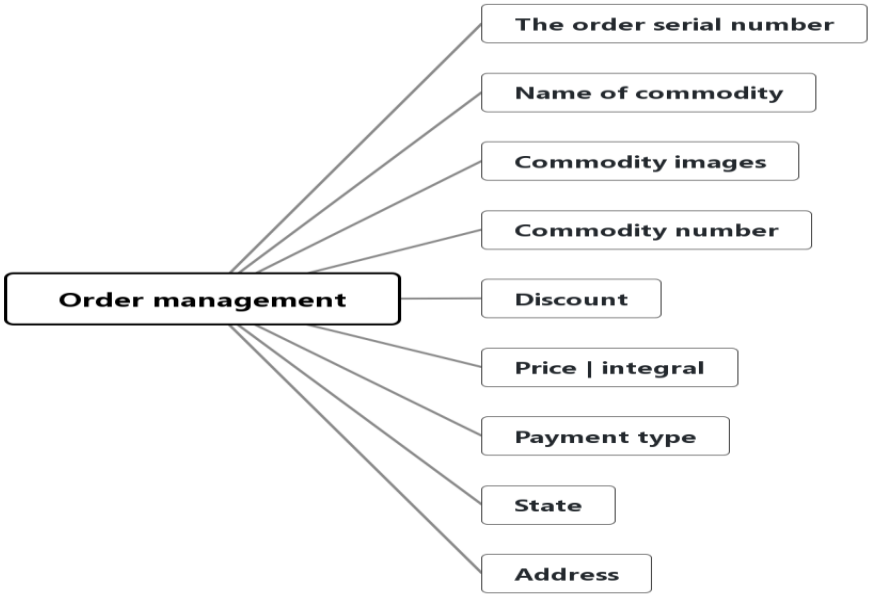

Fig 11 Order Management entity property diagram

DATA SHEET

According to the relationship data tables transformed from the E-R plots obtained from the analyzed data relationships, Table allusers is shown in Table 1, Table dingdanpingjia in Table 2, Table shangpinxinxi in Table 3, and Table yonghu in Table 4

Table 1 Table of allusers

column name	data type	length	restrain
id	int	11	NOT NULL
username	varchar	50	default NULL
pwd	varchar	50	default NULL
cx	varchar	50	default NULL

Table 2 Table of dingdanpingjia

column name	data type	length	restrain
id	int	11	NOT NULL
addtime	varchar	50	default NULL
dingdanbianhao	varchar	50	default NULL
shangpinmingcheng	varchar	50	default NULL
shangpinfenlei	varchar	50	default NULL
pinpai	varchar	50	default NULL
guige	varchar	50	default NULL
pingfen	varchar	50	default NULL
tianjiatupian	varchar	50	default NULL
pingjianeirong	varchar	50	default NULL
pingjiariqi	varchar	50	default NULL
yonghuming	varchar	50	default NULL
sfsh	varchar	50	default NULL
shhf	varchar	50	default NULL

Table 3 Table of shangpinxinxi

column name	data type	length	restrain
id	int	11	NOT NULL
addtime	varchar	50	default NULL
shangpinmingcheng	varchar	50	default NULL
shangpinfenlei	varchar	50	default NULL
tupian	varchar	50	default NULL
pinpai	varchar	50	default NULL
guioge	varchar	50	default NULL
shangpinxiangqing	varchar	50	default NULL

Table 4 Table of yonghu

column name	data type	length	restrain
id	int	11	NOT NULL
addtime	varchar	50	default NULL
yonghuming	varchar	50	default NULL
mima	varchar	50	default NULL
xingming	varchar	50	default NULL
xingbie	varchar	50	default NULL
touxiang	varchar	50	default NULL
lianxidianhua	varchar	50	default NULL

IV. SADSYSTEM TESTING

PURPOSE OF THE SYSTEM TEST

Any management system has some loopholes in the development process, but we can constantly optimize the system by constantly testing and maintenance, so that the system tends to be rigorous to achieve stable maturity. So system testing is a very important for a new management system.
The test is to test the feasibility, safety and accuracy of the project in practical application. Testing for Java development projects often uses a combination of conventional black-box tests (structural tests) and white-box tests (functional tests) to test the credibility of the software. Find the problem in the test, analyze the cause of the problem, in order to find the solution to the problem, and then the second test, until the standard of the system, can be put into normal production. The process can be very cumbersome, and it is also very necessary.
After the construction of the online shopping system is completed, the main functional modules of the system should be preliminarily tested to test the accuracy of the system operation, so that it can be better put into use in life. After testing the system, the found problems found should be timely corrected to ensure safety and accuracy when provided to users and administrators.

FUNCTIONAL TEST

The user login test of the user login function, the login failure prompt of the login module is shown in Table 5.

Table 5: User Login test

Function module name	test case	expected result	actual result	Test for success
Login module	user name:hkh Password: 000	Error prompt: Wrong input password	Error prompt: Wrong input password	success
Login module	User name: 123 Password: 123	Error prompt: User name input error	Error prompt: User name input error	success
Login module	user name:hkh Password: 123	The Administrator / user login was successful	The Administrator / user login was successful	success

The system commodity deletion classification test situation, and the deletion commodity classification test is shown in Table 6.

Table 6 Delete commodity classification test

Function module name	test case	expected result	actual result	Test for success
Delete classification	Classification name: Latest notification	Delete successfully, and the page will jump automatically	Delete successfully, and the page will jump automatically	success

Modify the password test in the system's personal center, including the input error prompt to confirm the new password and the successful modification prompt. The modified password test is shown in Table 7.

Table 7: The Modified Password Test

Function module name	test case	expected result	actual result	Test for success
Password modification	Original password: 123 New password: 000 Confirm the password: 123	Error prompt: confirm the password input error	An error prompt popped up to indicate the original password	success
Password modification	Original password: 000 New password: 123 Confirm the password: 123	Password modification was successful	Password modification was successful	success

Through the function test, it can be concluded that there is no problem with logging in to the online shopping system, and most of the functional modules inside the system can also function normally, so the operating system is feasible.

V. CONCLUSION

This paper develops an online shopping system, utilizing the java object-oriented development language, the Jav a Web front-end technology, the Spring Boot framework, and the MySQL database implementation. The interfa ce is relatively simple, simple operation function, and advanced means of payment, which greatly improves the s ales efficiency of the supermarket and saves the labor force of the staff in the supermarket, which is a win-win management system.

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