2019 IEEE Symposium Series on Computational Intelligence (SSCI)
December 6-9 2019, Xiamen, China

Design and Implementation of Hotel Room Management System

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***Abstract*—With the continuous improvement of people's living standards, people's spare time life become more colorful than before.More and more people will choose traveling as a form of entertainment,so did the development of hotels for people who were traveling or on business.The competition between hotels is becoming more and more fierce, so improving the management level of hotels, implementing the information construction is undoubtedly a wise choice.Hotel room management system through the collection of information, transmission, sorting, processing, maintenance and use, improve the management level and efficiency, so as to achieve the automation, standardization and humanization of hotel management.**

According to the characteristics of hotel room management, this system uses Java Swing technology and Mysql database to connect, and develops under the development tool of Myeclipse. The system has the functions of reservation, checkout and settlement. With this system, hotel room can be managed conveniently and quickly, which greatly improves the efficiency of processing and makes management more modern.

Keywords—swing; Mysql; hotel room management.

I. INTRODUCTION

With the increasing competition among hotel rooms industry, the competition for customers and other resources among various hotels is becoming more and more fierce. Hotels need to constantly use useful and efficient information technology to expand their business scope and space, in order to reduce their operating and management costs,improve management and decision-making efficiency [1]-[9].

Typical examples of successful use of IT by foreign hotels in the management platform is Marriott [10]. As a part of the business strategy of an enterprise, the revenue management platform seeks for the consumption capacity and potential of each guest to increase the overall revenue through automatic identification of customers [11]-[12].

The current situation of domestic hotel development are as follows:

1. The unclear demand makes the hotel project strong in engineering and insufficient in productization. The overall cost of developement remains high and the research lacks motive force[13].

2. There is no unified standard in the industry, and manufacturers operate independently, which makes product integration difficult due to market differentiation[14]-[15].

3. Product promotion relies on administrative means and network, which inhibits the introduction of new technology and technological innovation, and is not conducive to the formation of its own product features and quality control [16]-[18].

4. The entry of foreign excellent brands at a low price monopolizes the domestic market, and the profit space of developers gradually decreases [19].

The hotel room management system based on Swing is a small information management platform with Java Swing + MYSQL + C / S mode. Users can login the hotel room management system, and then operate the functions under their authority. The system has room reservation, guest registration, guest checkout, related information query (guest information, room information, etc.) and management of room type, guest type, administrator[20]. The system adopts modular programming method, and divides the management platform into different modules according to the needs of users, which facilitates the expansion and maintenance of the program. The interface of the system is simple, beautiful and easy to operate.

II. SYSTEM DESIGN

In the system design stage, detailed design is carried out on the basis of requirement analysis, including system architecture design, functional module design and database design.

A. System Structure Design

The system adopts a three-tier architecture based on C/S structure. As shown in Fig. 1.

1) Presentation Layer: After visiting the platform, the client will display the calculation according to the specific business logic and rules, and then display the results. This platform adopts C/S architecture, that is, users can access the system through the client.

2) Business layer: It is responsible to the corresponding business logic processing and the corresponding presentation logic generation of the designed platform, and support requests

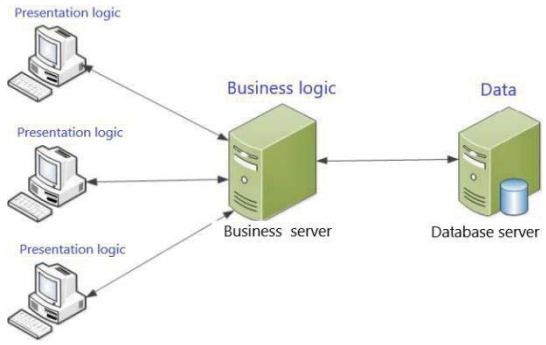

Fig. 1. System architecture diagram

from clients and querying them accordingly. Finally, the results of the processing are reflected to the user or sent to the corresponding database.

3) Data layer: It is mainly used to access the lowest database system, where the database system mainly refers to relational database system.

B. System Function Design

There are two types of users: system administrators and user administrators. Each user enters the main interface of the system platform after logining the interface, and completes different operations according to different needs[21].

Module description:

(1) Login module: realize the function of user logining;

(2) Individual billing module: the administrator realizes the checking in the room;

(3) Room reservation module: the administrator completes the room reservation, including adding room reservation information, modifying specific room reservation information, deleting room reservation information, inquiring room reservation information, and checking in the room on the basis of reservation information;

(4) Guest checkout module: check out the room and pay the bill;

(5) Business query module: realize the check-out query, in-store guests query, out-of-store guests query, all guests query;

(6) Customer management module: to add, modify and delete members;

(7) System setup module: realize room type management, customer type management, operator management functions.

C. Database design

1) Design of logical structure of database: The logical structure design of database refers specifically to the logical structure that transforms the basic E-R diagram of the conceptual structure design phase into the data model supported by the database management platform products[22]. Fig. 2. shows the logical structure of the database for administrators and room information.

In this system, there are administrators, room types, room information, check-in information, reservation information,

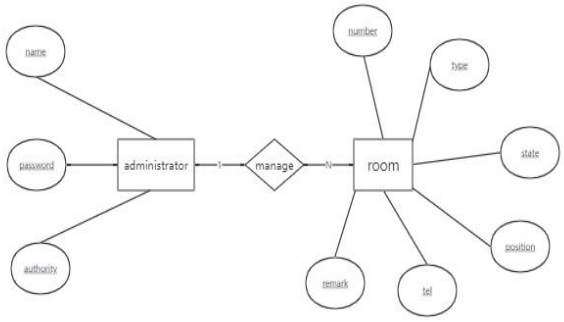

Fig. 2. E-R diagram

checkout information and other entities. All functions are carried out around these entities, and the relationship between administrators and other entities is one-to-many.

2) Design of physical structure of database: Physical database is the physical realization of the designed logical database. It describes the physical structure of all tables in the system database and the corresponding integrity constraints. The specific design of physical database depends on the specific database management system[23]. This platform uses MySQL database. Some of the data tables are as follows：

a) Administrator table: Used to store administrator information. Such as name, password, permission.

b) Room information table: Used to store room information. Such as room number, location, type, status, etc.

TABLE I. ADMINISTRATOR TABLE

name	Type	Can empty	Meaning
userid	varchar	×	User login ID
pwd	varchar	×	Login password
auth	int	×	User rights

TABLE II. ROOM INFORMATION TABLE

name	Type	Can empty	Meaning
id	varchar	×	Room No.
r_type_id	varchar	×	Room Type No.
state	varchar	×	Room status
location	varchar	×	Where it is
r_tel	varchar	×	Room phone
remark	varchar	√	Note

TABLE III. BOOKING INFORMATION TABLE

name	Type	Can empty	Meaning
c_name	varchar	×	Customer name
c_tel	varchar	×	Customer phone
r_type_id	varchar	×	Room Type No.
r_no	varchar	×	Room No.
pa_time	varchar	×	Pre-arrival time
keep_time	int	×	Retention time
eng_time	varchar	×	Scheduled time
remark	varchar	√	Note

TABLE IV. STATEMENT INFORMATION

name	Type	Can empty	Meaning
chk_no	varchar	×	Closing bill number
in_no	varchar	×	Check-in list Number
days	int	×	Live days
money	float	×	Amount
chk_time	varchar	×	Settlement time
remark	varchar	√	Note

c) Booking information table: Used to store reservation information. Such as reservation name, room type, room number, etc.

d) Statement information: Used to store settlement information. Such as billing number, check-in number, settlement amount, etc.

III. SYSTEM IMPLEMENTATION

In the whole lifecycle of the platform, after the analysis of user needs and the design of the whole system, the next step is the implementation of the system. In the early stage, the requirement analysis of system users and the specific design stage of the system are mainly focused on the specific design of the logic, function and technology of the system. The implementation stage of the system is to undertake the work accomplished in the previous stages and turn the specific design into the corresponding physical implementation. Therefore, the implementation of the system is the final result of the design and analysis of the system.

A. System physical structure

The physical structure of the system is mainly composed of user login module, setting up room module, reservation room module, guest checkout module, business query module, customer management module and system setup module. The business query module includes checkout number, inquiry of shop guests and departure guests, and system setup module, room type, guest type and operator type can be set (add, delete or modify). As shown in Fig. 3.

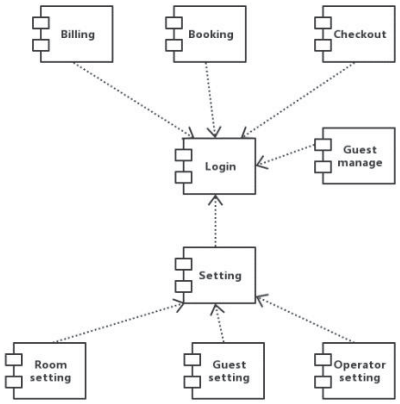

Fig. 3. System component diagram

Fig. 4. Landing interface

Fig. 5. Home page

B. Realization of Main Functions

1) Implementation of System Login : The system login interface allows system administrators to login the system for corresponding operations, as shown in Fig. 4.

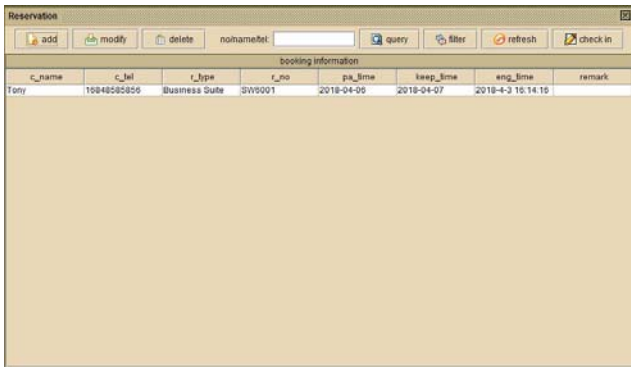

Fig. 6. Preset interface

Fig. 7. Guest checkout interface

In the user login interface, drop-down list shows all administrator user names, you can select manually without user name input. And if you enter the wrong password three times, the system will be forced to exit the login interface.

After successful login, it will enter the main interface, which includes the function of individual billing, guest checkout, room reservation, business query, customer management, system settings and so on, as shown in Fig. 5.

*2) Implementation of room reservation :*With the system, you can book a room in advance. When the room has been reserved, the state of the room will change to the reserved state. At this time, other residents are not allowed to operate the room again. Residents can use this function to reserve their favorite rooms, thereby improving the popularity of the hotel. The room reservation interface is shown in Fig. 6.

In this interface, we can add reservation information, modify reservation information, delete reservation information, inquire about reservation information, and check in rooms according to reservation information. Users can query the reservation record according to the information of the reservation room number, name and so on.

3) Implementation of Guest Checkout : This interface is used to checking out. When checking out for guests, you need to select the consumed room for checking out. Otherwise, the system will pop up prompts to let the administrator choose the consumed room immediately. As shown in Fig. 7.

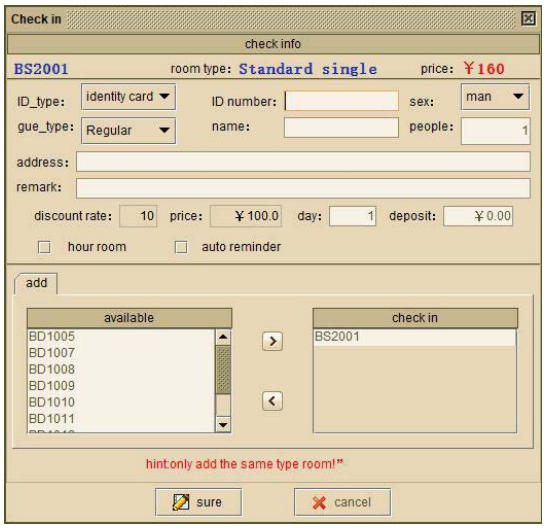

Fig. 8. Individual bill

```
user<-getUsername from the select item
pwd<-getPassword from the text
flag<-0
excute the query sql code
if(user exist)
then if(password is right)
                then login the system
        else
                then output( "the password is wrong,please enter the password again" )
                        if(flag=3)
                        then exit the login interface
                        end if
        end if
else
output( "user is not exist" )
end if
```

Fig. 9. Code of login

If the amount of payment is less than the actual amount of receivable, it will be prompted. Otherwise, the payment will be successful, and the consumed room will be cleaned and become available for 30 minutes.

4) Implementation of Individual Check in : In the process of checking in, the available room must be selected, and you can select the type of room as you like. When the room is not selected, the system will prompt that you must select the room for operation. The opening interface is shown in Fig. 8.

As shown in the figure, the room number, room type and room price of the selected room are displayed above the interface. The following is the basic information that the guests need to provide, and you can add another room. The basic information, it includes the type of ID card, the number of ID card, the gender, the type of residents (different types of residents have different discounts), the name, number, address, notes, the number of days reserved and deposit. After filling in the information, the room will be checked in successfully, and the successful room will be displayed in the main interface and become a living state.

C. *Implementation of Main Classes*

1) Realization of login class : Login class is used to realize the login function of the system. It monitors the login button and the input text box. When the user clicks the login button, the login operation is performed if the content of the text box and the password exists and have no mistakes. The pseudocode is shown in Fig. 9.

```
chNo<-getNumber from the sql // checkout record number
chTime<-getNowTime
count<-getRowcount from the sql //the count of checkout record
for i<-0 to count*3
  add data to the statement
  change the state of the check-in form
  change room state
if(transaction operate successful)
        change the icon
else
output( "operation fails" )
continue enter information
```

Fig. 10: Code of checkout

```
Rs<- result of the state and number of the room
If(Rs is null)
        output( "Refresh the room information" )
else
        if(room is available)
                transfer room number to billing information
                transfer room type to billing information
                transfer room price to billing information
                initialize the billing table
                add current room information
                set the current room state
        else
                exit the interface
        end if
end if
```

Fig. 11: Code of hotelframe

2) Implementation of checkout class: The Checkout class is used to construct the settlement interface and save the data after settlement. When the required data is obtained from the interface, it is written and saved according to whether it meets the requirements. The pseudocode is shown in Fig. 10.

3) Implementation of HotelFrame class: HotelFrame class is mainly used to display the system's home interface. When you successful login, the system's main interface will be displayed. At this time, the server of the system will read the corresponding data from the database and initialize the interface of each part of the main interface. The pseudocode is shown in Fig. 11.

IV. CONCLUSIONS

This platform adopts the principle of software engineering and completes the design and implementation of hotel room management system by analyzing the market demand. The detailed design of each part ensures the complete implementation of the system[24]-[27]. Leveraging the advantages of the Java platform and layered architecture technologies, a advanced, applicable and reliable system is realized to meet the long-term development goal of the system[28]. It realizes the informatization of hotel room management and plays a positive role in improving the efficiency of hotel room management information.

The specific needs of users will not remain unchanged. How to better meet the final needs of system users is still the main direction of this paper[29]-[30]. At present, the work of this paper is only a beginning, and there are many other areas to study. specifically in the following points:

(1) Improve the interface and add some humanized functions;

(2) Increasing the credit rating system can achieve better communication with customers and let customers have better choices and experiences.

(3) To upgrade c/s architecture to b/s architecture, database servers can be used less, without considering data synchronization between servers.

ACKNOWLEDGMENT

This work is supported by the National Natural Science Foundation of China(No.61702091), the Key Research and Development Program of Shaanxi Province(No.2018ZDXM-GY-036), the Fundamental Research Funds for the Central Universities(No.2572018BH06) and Scientific Research Program Funded by Shaanxi Provincial Education Department (Program No.2013JK1139).

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