

# Application Research on Information System of Multimedia Catering Management Based on Relational Database

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**Abstract:** Along with the rapid development of computer application technology in current society, information management is being applied to various industries. In this paper, through research on relational database, the author of this paper is going to create a modern efficient management system to change the catering enterprises' old management model that consumes labor and material resource. Through demand analysis, this paper will give design and standardization of business flow chart, data flow chart and E-R diagram to further develop database logical design and physical design, and create an efficient information system of multimedia catering management. While strengthening the management of enterprises, this will more satisfy the demand of the modern society on catering service industry.

**Keywords:** Catering management, E-R diagram, the relational database.

## 1. INTRODUCTION

With the development of computer information technology, the information tidal wave swept the world. In each industry, there is expectation of using the latest technology to drive the industry to a more rapid and beneficial development direction. Informatization's influence on the enterprises mainly reflects in two aspects: one is application management of computers within the enterprises and their derivatives; the other one is applying network to push their products to more users.

Food is always the paramount necessity of the people. In the modern society "food" is still pushed to a higher degree. Eating in the modern society pays attention to scientific and reasonable, as well as efficient enjoyment. The eating places that people look forward to shall not be just with good food as before, but are required to be efficient, environmental, comfortable and smart. With the rapid development of modern technology, combining modern technology and catering management is more and more popular around the people. In the contrary, tradition catering management not only needs a large amount of labor and material resource, while with low efficiency. This kind of management mode is against rapid development of catering enterprises and restricts large-scale development of catering enterprises and promotion of the whole catering industry's service level.

Following the constant improvement of China's economic development degree, increasing income of people, growing demand of catering consumption and increasing turnover of catering industry, China's catering industry is facing a broad market.

However, since small and medium-sized enterprises hold a large proportion in China's catering industry and there is

no fixed mode of business management, information system of multimedia catering management is urgently required to be popularized.

### 1.1. Writing Intention

Applying database that is an information management technical application into catering management is the development trend of modern catering industry. It will increase soft power of domestic catering brands while competing with foreign catering brands. Using database information management technique, some advantages of it cannot be accomplished by labor management. For example, it can quickly deliver the menu to the kitchen, fully utilize cooks' time and make the checkout counter settle quickly. Its feedback evaluation system is beneficial for timely mastering the shop's business status and adjusting plan, while with good security, reliability, large storage, long service life and low cost, etc. Building database of catering management information can greatly improve efficiency of catering management, and is an important condition for enterprises' scientific and standard management, and integration with the world [1].

### 1.2. Definition of the Software

The software that involve in development of this database are mainly as follows:

Microsoft office visio 2003

Sybase powerdesigner15.1

Microsoft office word 2003

Microsoft SQL Sever 2000

### 1.3. Development Environment

Operating system: Microsoft Windows 7

Hardware structure: Genuine Intel(R) CPUi3@ 2.0 GHz  
2.0GHz

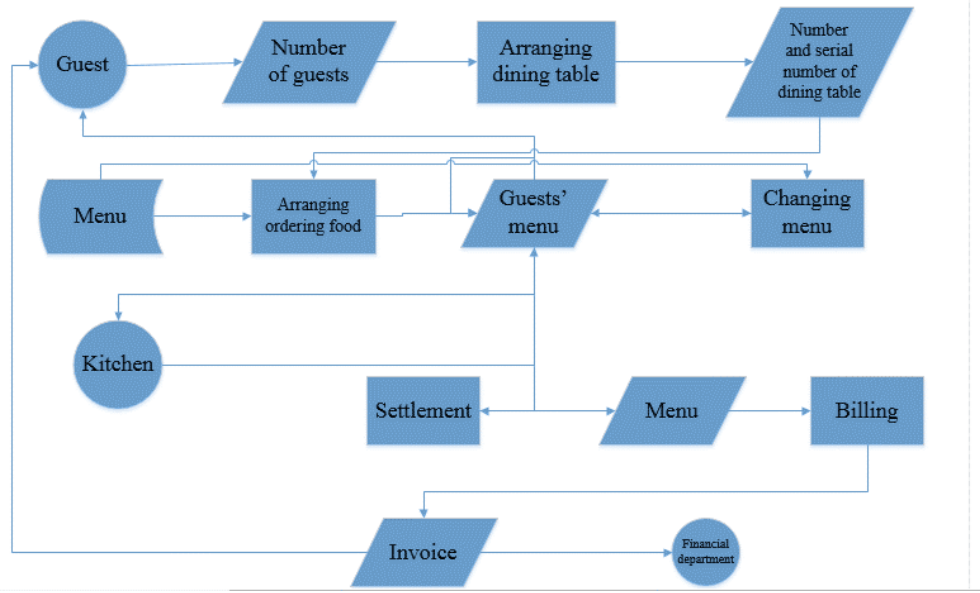


Fig. (1). Flow chart of business of catering management system.

2.0GB memory

2. DEMAND ANALYSIS

2.1. Problem Statement

In catering industry, after the guests come in, table number shall be firstly confirmed according to the number and willing of the guests; then according to the actual situation serving the guests to order; after taking an order, sending the menu to the kitchen, where will arrange professionals to prepare food; in addition, the menu shall also be sent to the checkout counter to complete settlement quickly; during guests' meal, if they want to order more or return, they can change in the menu, while the kitchen timely confirming the menu and the checkout counter changing the menu; at last, settling guests' menu, generating a bill and sending the invoice to the guest. In this system, each section has own authority and management way.

Users' authorities are as follows:

Waiter: inputting guests' menu information to the system, timely sending the menu to the kitchen and checkout counter, as well as changing the menu to resend the changed content to the kitchen and checkout counter.

Kitchen: receiving the menu information directly and timely update the menu, and feeling unchangeable content to waiter.

Cashier: calculating the consumption amount of guests, generating bills, collecting money and generating invoices.

Financial staff: recording in account according to the invoices and reviewing financial statements.

The specific flow is presented in Fig. (1).

2.2. Function Description

Information flows directly among guests, kitchen, financial department and catering management system. The information input and output from different objects is different. The details are as Fig. (2).

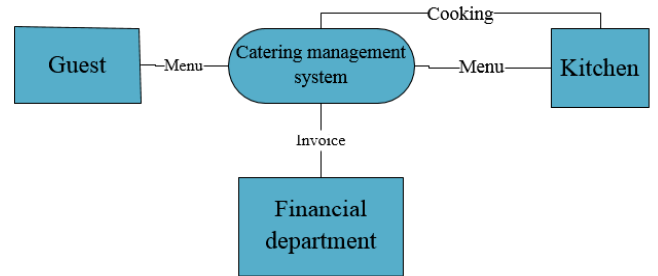


Fig. (2). Flow chart of first-class data of catering management system.

Subdividing information flow: after guests order food, there is need to provide menu for the, and timely provide the change one of menu after changing. At last, the settled invoice shall be delivered to guests and financial departments separately. This is shown as Fig. (3).

Subdividing data of each item more finely: when arranging dining table, there shall be information status and serial number of table; in the menu, there must be information of dish style and amount; unit price and consumption amount must be present in billing information; subdivide these process once again, as Fig. (4).

2.3. ER Model Diagram of Catering Management System

In accordance with the content of function description, the primary E-R diagram is designed, with the following entity and links:

2.3.1. Entities

Information of guests' menu (serial number of dining table, serial number of guests, number, names and respective price of dishes, consumption amount and details of dishes).

Information of guests' dining table (number of guests, consumption time, and serial number, position, status and type of dining table)

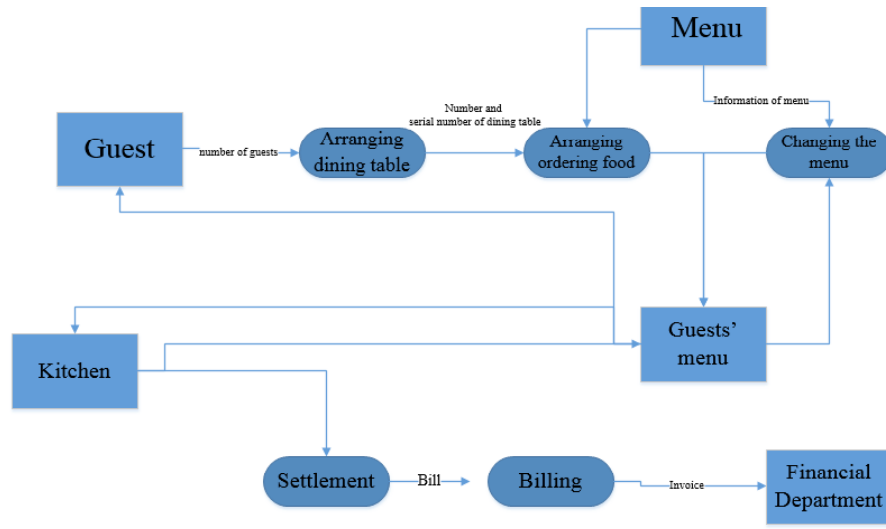


Fig. (3). Flow chart of secondary data of catering management system.

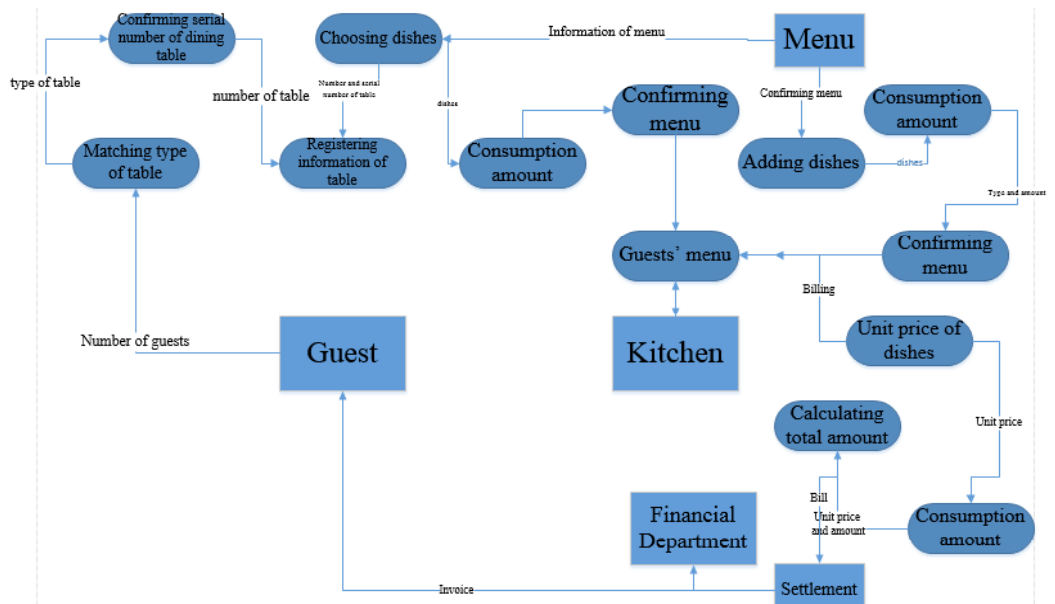


Fig. (4). Flow chart of third-class data of catering management system.

Bill (serial number of bill, total consumption amount and serial number of guests)

Kitchen (serial number and names of cooks)

Financial department (serial number and name of staffs, and reviewing date)

2.3.2. Links Between Entities

Guests' menu information—guests' dining table information: to order food

Guests' menu information—kitchen: to cook (cooking time)

Guests' menu information—bill: checkout (handler)

Financial department—bill: financial management (form filling date)

The specific E-R diagram is as Fig. (5).

3. DATABASE LOGICAL DESIGN

3.1. Converting E-R Diagrams to Relation Table

Relation schema can be divided into:

Guests (serial number of guests, number of guests, serial number of dining table, serial number of dishes and consumption amount)

Menu (serial number of dishes, and names, price and details of dishes)

Dining table (serial number of dining table, location, status and type of dining table)

Bill (serial number of bill, total consumption amount, serial number of guests and handler)

Kitchen (serial number of cooks, name of cooks and cooking time)

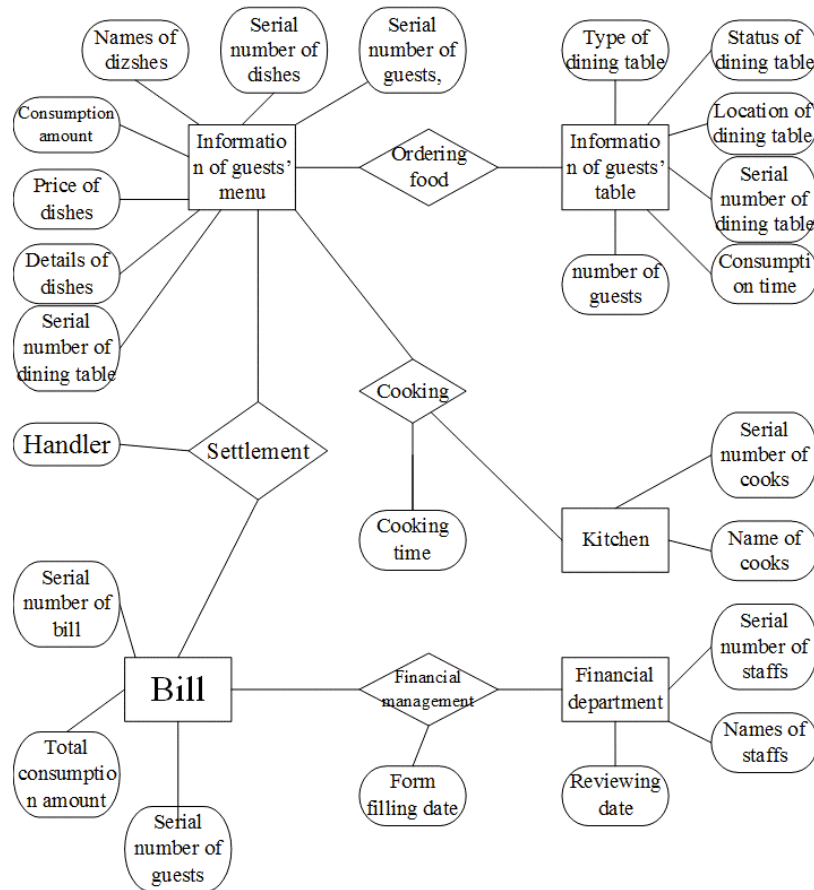


Fig. (5). E-R diagram of catering management system.

Financial department (serial number of staffs, names of staffs, reviewing and form filling dates)

### 3.2. Relational Descriptions of Basic Table

Guests (serial number of guests, number of guests, serial number of dining table, serial number of dishes and consumption amount)

In this mode, there is no partial functional dependency or transitive functional dependency of any attributes to the primary code, “serial number of guests” [2]. Therefore, this mode is regarded as 3NF. In the meantime, “serial number of guests” is the only primary code, so that this mode belongs to BCNF [3].

Menu (serial number of dishes, and names, and price of dishes) [4].

In this mode, there is no partial functional dependency or transitive functional dependency of any attributes to the primary code, “serial number of dishes”. Therefore, this mode is regarded as 3NF. In the meantime, “serial number of dishes” is the only primary code, so that this mode belongs to BCNF.

Dining table (serial number of dining table, location, status and type of dining table) [5].

In this mode, there is no partial functional dependency or transitive functional dependency of any attributes to the primary code, “serial number of dining table”. Therefore, this mode is regarded as 3NF. In the meantime, “serial number of dining table” is the only primary code, so that this mode belongs to BCNF.

Bill (serial number of bill, total consumption amount, serial number of guests and handler) [6].

In this mode, there is no partial functional dependency or transitive functional dependency of any attributes to the primary code, “serial number of bill”. Therefore, this mode is regarded as 3NF. In the meantime, “serial number of bill” is the only primary code, so that this mode belongs to BCNF.

Kitchen (serial number of cooks, name of cooks and cooking time)

In this mode, there is no partial functional dependency or transitive functional dependency of any attributes to the primary code, “serial number of cooks”. Therefore, this mode is regarded as 3NF. In the meantime, “serial number of cooks” is the only primary code, so that this mode belongs to BCNF.

Financial department (serial number of staffs, names of staffs, reviewing and form filling dates)

In this mode, there is no partial functional dependency or transitive functional dependency of any attributes to the primary code, “serial number of staffs”. Therefore, this mode is regarded as 3NF. In the meantime, “serial number of staffs” is the only primary code, so that this mode belongs to BCNF.

### 3.3. Definition View and Index, Primary Key Words and Definition Authority

#### 3.3.1. Definition View

(1) Code preview of view kitchen list

```
if exists (select 1
  from sysobjects
  where id = object_id('KitchenList')
  and type = 'V')
  drop view KitchenList
go
```

```
/*=====*/
/* View: KitchenList */
/*=====*/
```

```
create view KitchenList as
select names of cooks and cooking time
from kitchen
go
```

(2) Code preview of view food list

```
if exists (select 1
  from sysobjects
  where id = object_id('FoodList')
  and type = 'V')
  drop view FoodList
go
```

```
/*=====*/
/* View: FoodList */
/*=====*/
```

```
create view FoodList as
select names of dishes, price of dishes, details of
dishes
from menu
go
```

(3) Code preview of view financial department list

```
if exists (select 1
  from sysobjects
  where id = object_id('FinanceDepartmentList')
  and type = 'V')
  drop view FinanceDepartmentList
go
```

```
/*=====*/
/* View: FinanceDepartmentList */
/*=====*/
```

```
create view FinanceDepartmentList as
select names of staffs, reviewing date, form filling
date
from financial department
go
```

(4) Code preview of view bill list

```
if exists (select 1
  from sysobjects
  where id = object_id('BillList')
  and type = 'V')
  drop view BillList
go
```

```
/*=====*/
/* View: BillList */
/*=====*/
```

```
create view BillList as
select total consumption amount, serial number of
guests, handler
from bill
go
```

(5) Code preview of view guest list

```
if exists (select 1
  from sysobjects
  where id = object_id('GuestList')
  and type = 'V')
  drop view GuestList
go
```

```
/*=====*/
/* View: GuestList */
/*=====*/
```

```
create view GuestList as
select serial number of guests, serial number of din-
ing table, serial number of dishes, consumption amount
from guests
go
```

(6) Code preview of view table list

```
if exists (select 1
  from sysobjects
  where id = object_id('TableList')
  and type = 'V')
  drop view TableList
go
```

```
/*=====*/
/* View: TableList */
/*=====*/
```

```
create view TableList as
select serial number of dining table, status of dining
table
from dining table
go
```

#### 3.3.2. Definition Index

(1) Code preview of index of tabular kitchen

```
/*=====*/
/* Index: CookID */
/*=====*/
```

```
create index CookID on Kitchen (
)
Go
```

(2) TABCode preview of index of tabular menu

```
/*=====*/
/* Index: FoodID */
/*=====*/
```

```
create index FoodID on Food (
)
Go
```

(3) Code preview of index of tabular financial de-  
partment

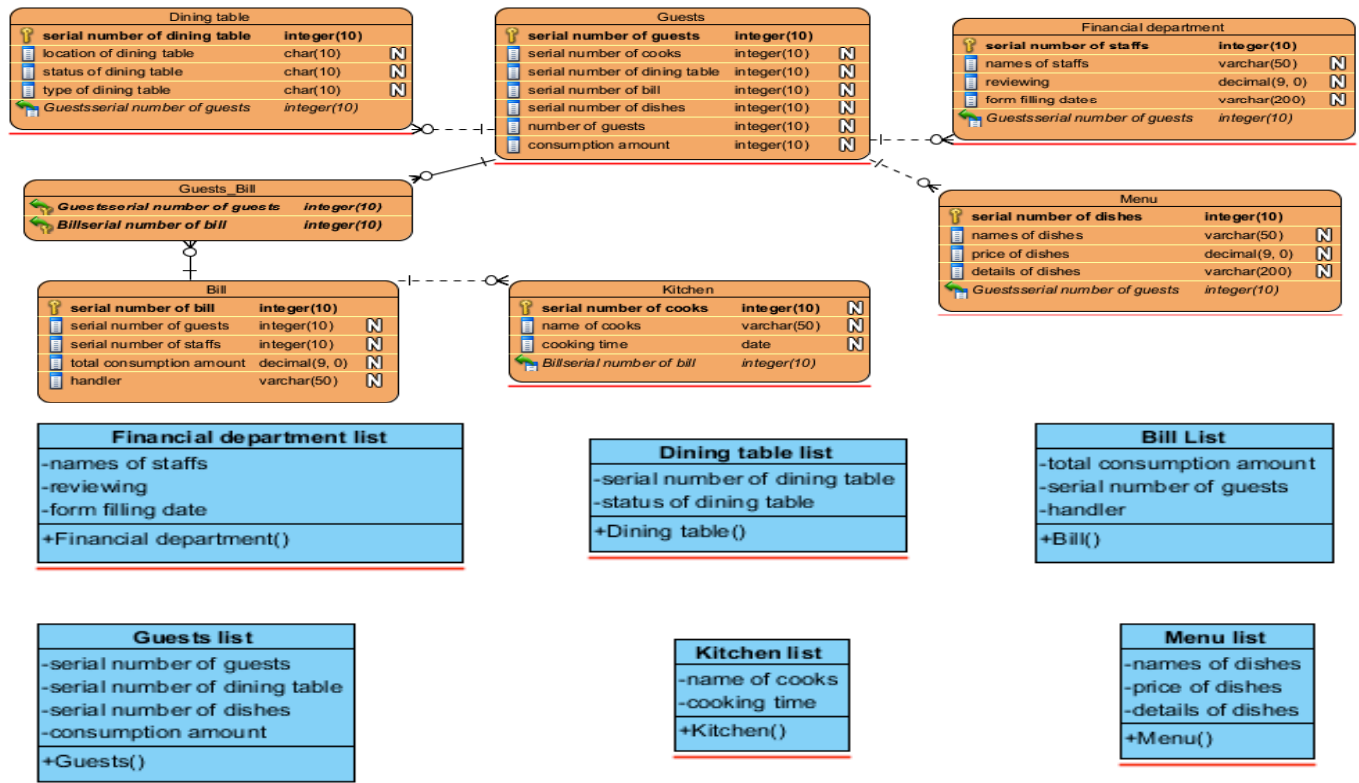


Fig. (6). Observation plans for the annual and quinquennial samples.

```

/*=====*/
/*          Index:          WorkerID
*/
/*=====*/
create index WorkerID on FinanceDepartment (
)
Go
(4) Code preview of index of tabular bill
/*=====*/
/* Index: BillID          */
/*=====*/
create index BillID on Bill (
)
Go
(5) Code preview of index of tabular guest
/*=====*/
/* Index: GuestID        */
/*=====*/
create index GuestID on Guest (
)
Go
(6) TABCode preview of index of tabular dining
table
/*=====*/
/* Index: TableID        */
/*=====*/
create index TableID on Table (
)

```

Go

3.3.3. KEY WORD Primary Key Words

- Guest: serial number of guests
- Menu: serial number of dishes
- Dining table: serial number of dining table
- Bill: serial number of bill
- Kitchen: serial number of cooks
- Financial department: serial number of staffs

4. DATABASE LOGICAL DESIGN

The design shows from Tables 1-10. Physical model of database of catering management system is as Fig. (6).

Table 1. Table list of catering management system.

Name	Code
Kitchen	Kitchen
Menu	Food
Financial Department	FnanceDepartment
Bill	Bill
Guest	Guest
Dining Table	Table

**Table 2. Table column list of catering management system.**

Name	Code
Serial number of guest	GuestID
Serial number of cook	CookID
Serial number of dining table	TableID
Serial number of bill	BillID
Serial number of dishes	FoodID
Number of guests	GuestNum
Consumption amount	FoodSum
Serial number of dishes	FoodID
Name of dishes	FoodName
Price of dishes	FoodPrice
Details of dishes	FoodDescription
Serial number of dining table	TableID
Location of dining table	TableLocation
Status of dining table	TableStatus
Type of dining table	TableType
Serial number of bill	BillID
Serial number of guest	GuestID
Serial number of staff	WorkerID

**Table 2. Contd.....**

Name	FoodAllPrice Code
Total consumption amount	
Handler	PersonHandling
Serial number of cook	CookID
Name of cook	CookName
Cooking time	CookingTime
Serial number of staff	WorkerID
Name of staff	WorkerName
Reviewing date	ReviewDate
Form filling date	FillingDate

**Table 3. Table key list of catering management system.**

Name	Code	Table
Identifier_1	Identifier_1	Guest
Identifier_1	Identifier_1	Menu
Identifier_1	Identifier_1	Dining table
Identifier_1	Identifier_1	Bill
Identifier_1	Identifier_1	Kitchen
Identifier_1	Identifier_1	Financial department

**Table 4. Table index list of catering management system.**

Name	Code	Only	Clusters	Primary	External Key	Candidate Key	Table
Guest_PK	Guest_PK	TRUE	FALSE	TRUE	FALSE	FALSE	Guest
Use_FK	Use_FK	FALSE	FALSE	FALSE	TRUE	FALSE	Guest
SettleAc- counts_FK	SettleAc- counts_FK	FALSE	FALSE	FALSE	TRUE	FALSE	Guest
Order_FK	Order_FK	FALSE	FALSE	FALSE	TRUE	FALSE	Guest
Cooking_FK	Cooking_FK	FALSE	FALSE	FALSE	TRUE	FALSE	Guest
Food_PK	Food_PK	TRUE	FALSE	TRUE	FALSE	FALSE	Menu
Table_PK	Table_PK	TRUE	FALSE	TRUE	FALSE	FALSE	Dining table
Bill_PK	Bill_PK	TRUE	FALSE	TRUE	FALSE	FALSE	Bill
SettleAc- counts2_FK	SettleAc- counts2_FK	FALSE	FALSE	FALSE	TRUE	FALSE	Bill
FinanceMan- age_FK	FinanceMan- age_FK	FALSE	FALSE	FALSE	TRUE	FALSE	Bill
Kitchen_PK	Kitchen_PK	TRUE	FALSE	TRUE	FALSE	FALSE	Kitchen
FinanceDepart- ment_PK	FinanceDepart- ment_PK	TRUE	FALSE	TRUE	FALSE	FALSE	Financial de- partment

**Table 5. List of table kitchen of catering management system.**

Name	Code
Serial number of cooks	CookID
Name of cooks	CookName
Cooking time	CookingTime

**Table 6. List of table menu of catering management system.**

Name	Code
Serial number of dishes	FoodID
Name	Code
Name of dishes	FoodName
Price of dishes	FoodPrice
Details of dishes	FoodDescription

**Table 7. List of table financial department of catering management system.**

Name	Code
Serial number of staffs	WorkerID
Name of staffs	WorkerName
Reviewing date	ReviewDate
Form filling date	FillingDate

**Table 8. List of table bill of catering management system.**

Name	Code
Serial number of bill	BillID
Serial number of guest	GuestID
Serial number of staff	WorkerID
Total consumption amount	FoodAllPrice
Handler	PersonHanding

**5. CONCLUSION**

According to actual users' requirements, this paper conducts analysis and design, seeks the inter relation, construct the concept of database and the relative logical mode and physical structure, and create database based on the previous to storage and manage data effectively. Through research on relation database, this paper constructs a modern and efficient management system. By constructing logical and physical design of database, this paper creates a high-

**Table 9. List of table guest of catering management system.**

Name	Code
Serial number of guest	GuestID
Serial number of cook	CookID
Serial number of dining table	TableID
Serial number of bill	BillID
Serial number of dishes	FoodID
Number of guests	GuestNum
Consumption amount	FoodSum

**Table 10. List of table dining table of catering management system.**

Name	Code
Serial number of dining table	TableID
Location of dining table	TableLocation
Status of dining table	TableStatus
Type of dining table	TableType

efficiency information system of multimedia catering management.

**CONFLICT OF INTEREST**

The author confirms that this article content has no conflict of interest.

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