Java EE Project Report

1.Oveview

project name: iExpress

matriculation numbers:03

team number:

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2.Functionalities implemented

2.1 Foreground System

Functionality	Description
Register	If the user is new to this system, then he/she can click into the page for registering and create an account with nickname, phone number, password and sex.
Login	If the user already has an account, then he/she can log in the system with his/her correct phone number and password.
Check information	After logging in, users can view his/her information, including nickname, phone number and address.
Change information	Users can change his/her information except the phone number.

Order to send expressages	This is one of the main functions in this system. Users can make an order to send expressages, and don't need to send them in person because employees in our station will come to pick the pakages and help users to send.
View packages	Users can check their pakages include those to be received and been received.
Receive packages	Sometimes management system may not change packages' status, then users can receive packages in person through mini program.
View orders	Users can check the orders made before, including ongoing orders, completed orders and orders having been cancelled.
Cancel order	Before employees come to pick packages, users can cancel the order if he/she has regretted.
Receive messages	Some messages like notices about the change of status of packages will be pushed to users, users can view them in the page of notice.

2.2 Background management system

Functionality	Description
Registry	Express station staff registers on the Sign Up page.
Login	Express station staff can login account on the Sign Up page.
Employee management	Express station staff can view the list of employees in the syetem and perform some operations, including adding employee, deleting employee, modifying employee and searching employee by position.
Message management	Express station staff can view the list of messages in the syetem and perform some operations, including deleting message, modifying employee, resending messages.and

|	searching message under certain condition.
Package inbound	After the express company comes to the station to collect the package, the express station staff will send out the express that the user needs to send, and change the express information in the background system.
Package stroage	After the express station staff gets the express that the user needs to send out, he / she will collect the express information from the warehouse of the outlet and enter the express information in the background system.
Warehouse capacity query	Express station staff can log in to the background system to view the warehouse capacity status.
Locker capacity query	Express station staff can log in to the background system to view the locker capacity status.
Package information management	Express station staff enters the express information management page to view all the express information, and can add, modify and delete the express information.
Order management	Express station staff enters the order information management page to view all the order information, and can edit, delete the order, besides, he/she can also take order and dispatch the courier. If the staff is courier, he/she can search the order he/she takes and finish it.

3.User manual

3.1 System Introduction

The iExpress System is set to meet the needs of large express service stations and mainly solve the problems of sending and receiving expressages, managing express information in the complex environment. The future development of IExpress System will be more oriented to efficient and orderly management of production and services, improving efficiency and quality of operation and service, increasing the level of profitability and competition, ensuring that logistics companies, customers, as well as the business of platform itself will be provided with consistent, timely, accurate, systematic and complete information service.

The system is divided into two parts —— system of user's management (Foreground System) and Backstage Management System. Foreground System mainly realizes user functions, including registration and login, management of user information, ordering to send expressages, getting messages and the management of packages and orders. Backstage Management System assists administrators in management of express and staff members, including registration and login, adding or modifying or laying off employees, processing orders from customers and packages to customers, and sending necessary messages to customers.

3.2 System deployment and configuration

3.2.1　System deployment
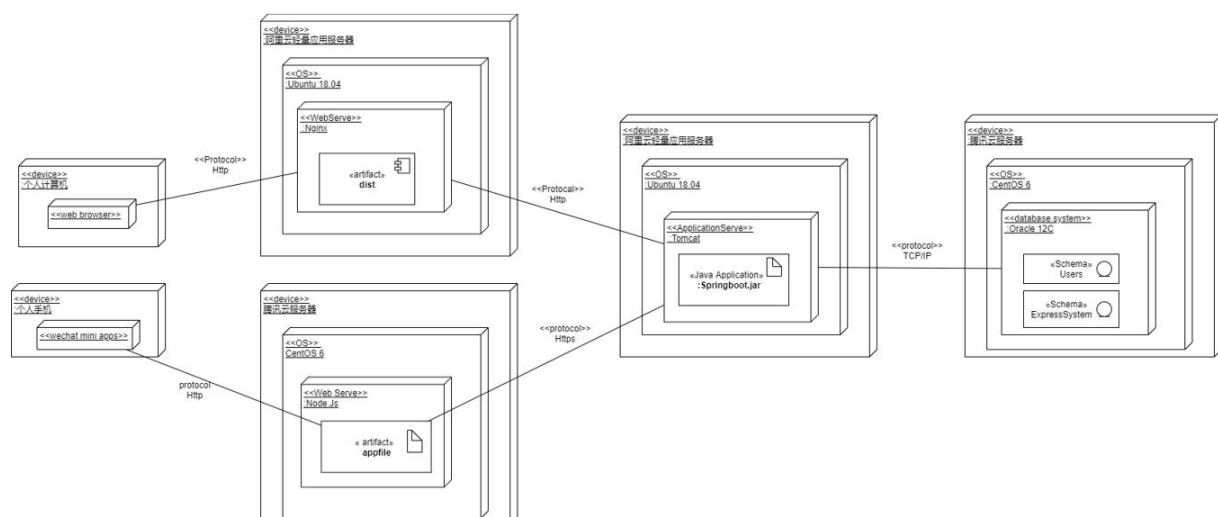
Background system is deployed in nginx environment of Ali cloud server. It can be accessed through the browser on a personal computer.The foreground system is deployed under the NodeJS environment of Tencent Cloud server. It can be accessed through the WeChat applet on the user's personal phone. The back end is deployed in the Tomcat

environment of Aliyun. Both the background and foreground access it to call the interface. And the back end controller is also connected to a database system which is deployed in the Oracle environment of Tencent Cloud server.The server configuration is 1 core 2G memory and a hard disk with a capacity of 50G.

3.2.2 Configuration

Foreground System：

    1.Download and install wechat_devtools

    (https://developers.weixin.qq.com/miniprogram/dev/devtools/stable.html)

    2. Import the project into wechat_devtools and run.

Background System

    1.install and configure Vue.

    2.Open the terminal in the file directory, and run the following statement

      npm install

      npm run dev

Server

    The Backend part of the project is deployed in Cloud sever, but if you want to run it locally,you can enter the backend project folder,and then run the following statement.

    mvnspring-boot:run   //Under the premise of you have installed   maven

3.3 Foreground System functionalities

3.3.1 Register

Users new to the system can register for an account. In this page, a user just only needs to input his/her nickname, phone number, password and check his/her sex, and then he/she can create an account.

It should be noted that phone number verification service is not available for the time being. Users must be responsible for the phone number used to register, as the number will be an important proof to log in and enjoy other functions.

What's more, the system will report an error if users input too long nickname or password, or the phone number has already been registered.

3.3.2 Login

Users already having account should input his phone number and password registered correctly to log in the system. The system will check both after users submit their input and return the result. If a wrong phone number or password is submitted, the system will return the warning and refuse to pass the user. If user logs in successfully, pages will be switched to center page.

3.3.3 Check information

After logging in the system, users can pick into their information page and check their personal information. Nickname, phone number, address are displayed.These informations are used to make it convenient for users when filling the order.

3.3.4 Change information

Through the page above, users can change their personal information. The province, city and region can be picked automatically, considering user convenience.

3.3.5 Order to send expressages

The system provides an important function for users which is ordering to send expressages without going to a courier station. Users can make an order through the following steps:

Firstly, users need to choose a logistics company users would like to transport their packages;

Secondly, users are required to input their information as sender's information which can be filled quickly by clicking the middle button;

Thirdly, a receiver's information is also needed because it determines whether the package can be correctly sended to the receiver;

Finally, users just need to choose a date when employees will come to pick the package. Attenion that the date must be after the time order been created and no later than three days.

Every step finished, users should click the black button to continue the process.

3.3.6 View packages

Users can click into the page listing all the packages he will received or has received.Packages are divided into three types, users view specific type of packages by clicking the header which lines the types of packages.

3.3.7 Receive packages

When a user is viewing unreceived packages, he/she can choose to receive the package himself/herself since the system may go wrong that it didn't change the packages' status when the user has received them in station.

What is to be noted is that once the receipt is confirmed, it cannot be cancelled.

Users can find the package he/she just received in page of received packages.

3.3.8 View order

Users can click into the page listing all the orders he has made. Orders are divided into three types. Users view specific type of orders by clicking the header which lines the types of orders.

3.3.9 Cancel order
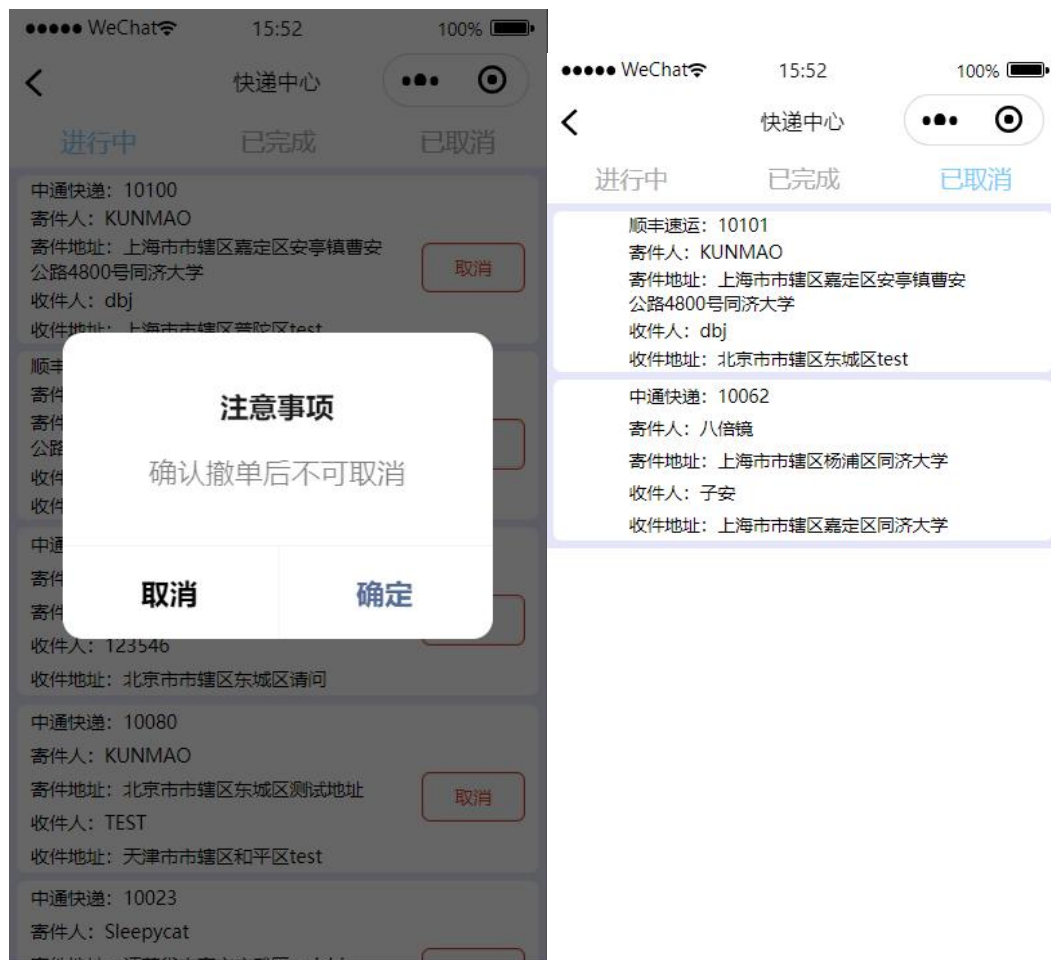
Before employees come to pick packages, users can cancel the order if he/she has regretted. In order page, unpicked orders are listed and each has a button right. Users click the button and cancel the corresponding order, then the cacelled order will appear in the list of cancelled orders.

Attention that once the order is cancelled, it cannot be recovered.

3.3.10 Acquire messages

In the other system, messages like noticing users to pick expressages and reminding users that their orders has been in process will be sended to users. So through the message page, users can receive and check the notice. The latest message will be show alone in the page, unless users choose to show all. It's a pity that users cannot recieve the message if they haven't logged in the system. Due to the time limitation, we can only show messages in this page.

3.4　Background management system functionalities
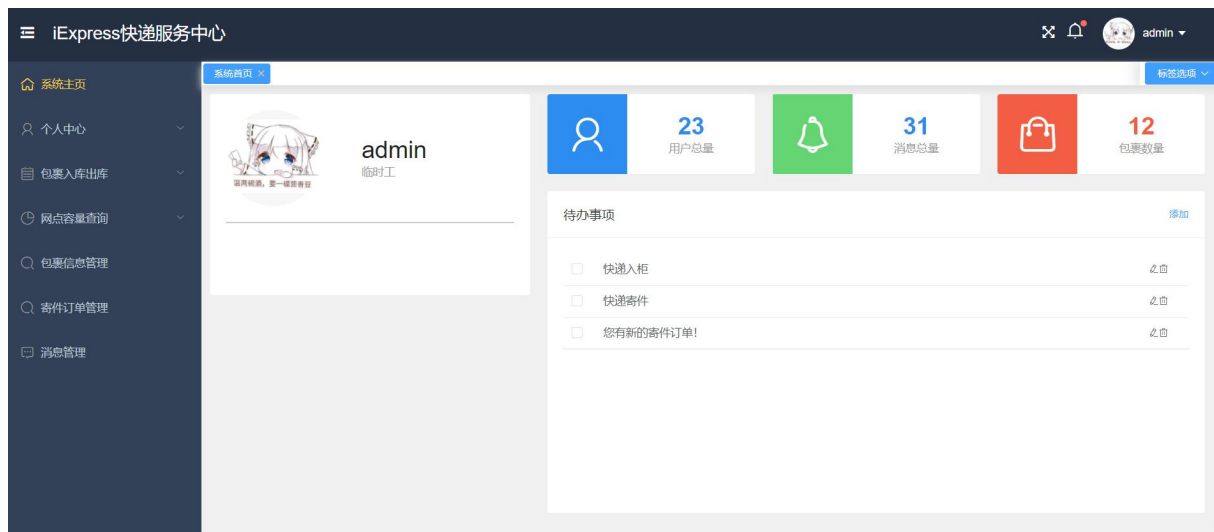
This is the home page of our background system. You can see the total number of users, messages and packages of the current system on the home page, or you can select the corresponding page according to the sidebar on the left side of the page.

3.4.1 Login
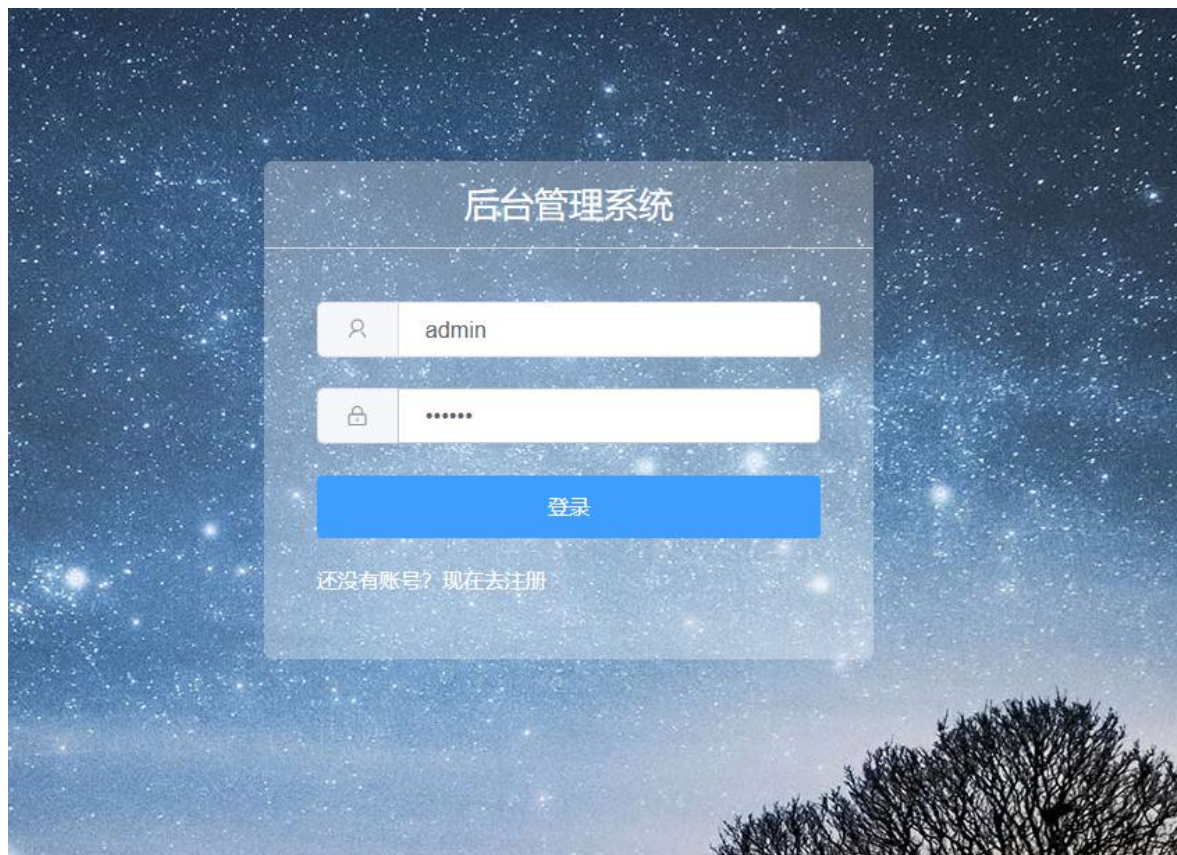
iExpress background management system can only be used after logging in.You can enter your username and password in the form and then enter the system after the system validation is passed.

3.4.2 Register

If you don't have an account, you can register it on the registration page as shown in the figure.You can enter the user name, password and employee id   in the form to register.The user name must be unique.if the username already exists or   Employee ID does not exist，The system will prompt that the registration failed.

Above are situations when employee ID does not exist and username already exists.

3.4.3 Employee manage

员工ID	姓名	性别	地址	联系电话	部门id	职位	状态	操作
000001	匡爬	male	上海嘉定	19966665566	000001	临时工	空闲	✎ 修改信息 🗑 删除
000002	马保国	男	上海嘉定	19966665557	000003	快递员	空闲	✎ 修改信息 🗑 删除
000003	卢本伟	男	上海嘉定	18855336660	000003	快递员	空闲	✎ 修改信息 🗑 删除
000004	乔碧萝	男	上海嘉定	18855336661	000003	快递员	空闲	✎ 修改信息 🗑 删除
000005	周波	男	上海嘉定	18855336662	000003	快递员	空闲	✎ 修改信息 🗑 删除
000006	嬴政	男	上海嘉定	18855336663	000003	快递员	空闲	✎ 修改信息 🗑 删除
000007	裴禽虎	男	上海嘉定	18855336664	000003	快递员	空闲	✎ 修改信息 🗑 删除
000008	李信	男	上海嘉定	18855336665	000003	快递员	空闲	✎ 修改信息 🗑 删除

On this page, you can view the information of all employees in the current system, including ID，name,sex,address,telephone,department id,position,and status.Status represents the current working status of the employee.You can do some operations on this page.

3.4.3.1 Add employee

You can add employees here. You need to fill in the employee ID, name, sex, contact number, address, position, Department ID and status. Note that the employee ID must be unique and the Department ID must be a real department.

3.4.3.2 Delete employee

You can delete an employee by clicking the delete button at the end of each line of the form.

Please make sure you want to delete before you confirm the deletion.

3.4.3.3Modify employee inforamtion.

修改员工消息 ×

用户id	000004
性别	男
姓名	乔碧萝
地址	上海嘉定
联系电话	18855336661
部门id	000003
职位	快递员
状态	空闲

取消　确定

You can click the Modify button at the end of each line of the form to modify the employee information. After modifying the form, submit it.

3.4.4 Message Manage

On this page, you can see all the messages sent to the user, including the ID of the message, the user sent, the content, the sending time and the status. You can do something about the message list on this page.

3.4.4.1delete message

You can delete the message by clicking the delete send button at the end of each line in the form.

3.4.4.2 resend message

You can resend the message by clicking the resend button at the end of each line of the form.

3.4.4.3search message

Look at the search bar at the top of the form, where you can search messages based on the type of message and the user ID which the message to.

3.5 Package In Warehouse

This is the first step for express delivery to enter our express station system. The staff of the express station fill in the express information of each page, then click the submit button, and the express information will be stored in the database.

This step consists of four pages, as shown below.

1. The first page, mainly fill in the package itself information

2. On the second page, fill in the sender's information

3. On the third page, fill in the recipient's information and click the submit button

4. The fourth page, if successfully stored, the server will return to the delivery time, and displayed on the page

3.6 Package Out Warehouse

Package out of the warehouse is also a package into the cabinet, express delivery station staff said that express delivery from the warehouse, moved to the express cabinet, employees need to enter the package in the warehouse number, package number, express cabinet number, express box detailed location and their own staff number, and then click the package into the warehouse button to put the package into storage.

3.7Warehouse capacity query

1.This page is divided into two parts, the above part is the warehouse information, that is, how much space each warehouse has left
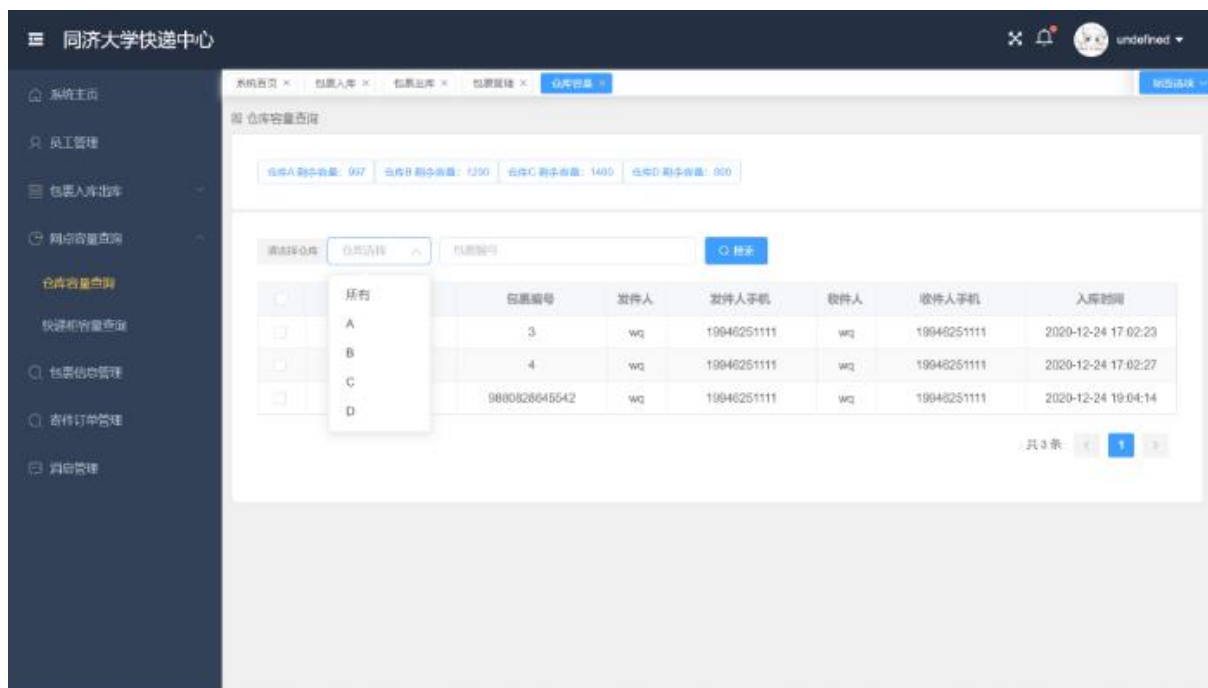
The following part is the specific express information in the warehouse, you can query him.

2.You can click on the selection Warehouse selection box on the top left and click on a warehouse, which will show the information of the current selected warehouse.

3.You can enter the package number in the search box again, the package information will be displayed below, and no data will be displayed.
To re-display all package information, click the talk page to refresh.
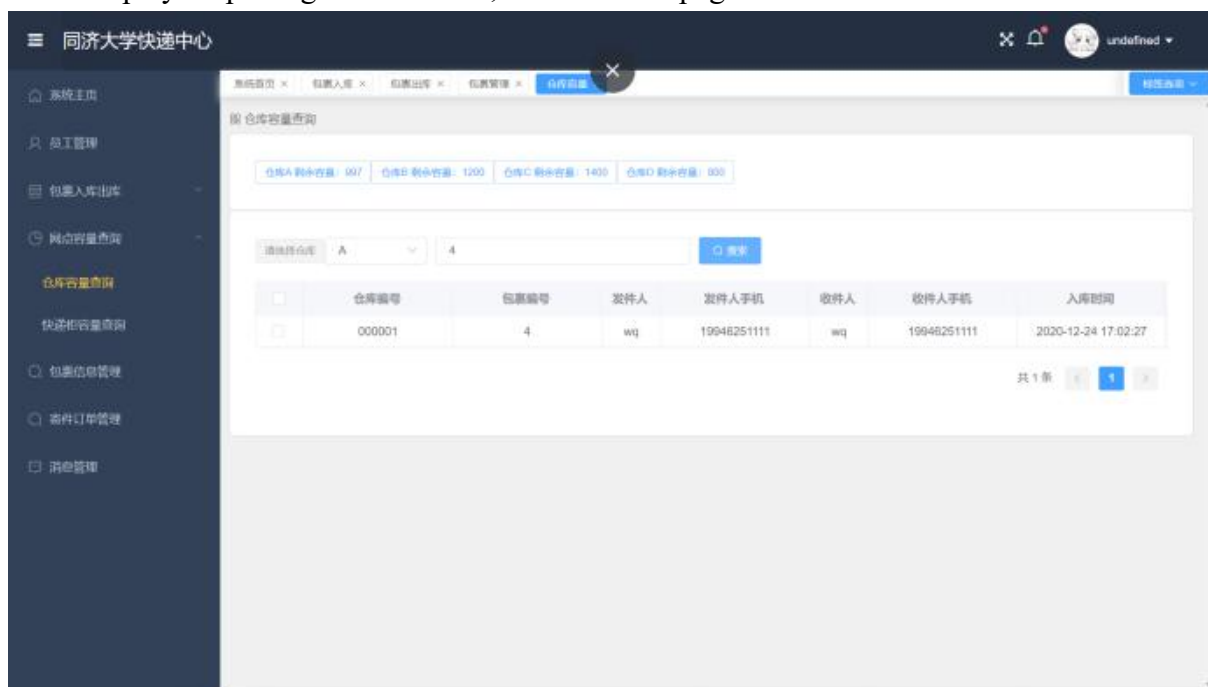
3.8Cupboard capacity query

This page is also divided into two pieces, the top one shows the remaining capacity of the current express cabinet; the bottom shows the specific occupation of a express cabinet, you can click on the upper left express cabinet selection box, select a express cabinet, The following will show the current occupancy of express cabinets

3.9 Package Information Management

This is the package information management page, you can manage all package information from here, can edit, query operations on it.

1. You can click on the selection status selection box on the upper left and click on a status, which will show the package of the current selected status. There are three kinds of status: problem package, unpicked, picked up.

2. You can enter the package number in the search box again, the package information will be displayed below, and no data will be displayed.To re-display all package information, click the talk page to refresh.

3. You can select a line and click the edit button in the right action bar to pop up an edit page. You can enter information from the new page and click OK. If there is no error in the information, the system will automatically save the changed information.

4. Finally, you can select a line and double-click the line to get the traceability information of the current package, which will show when the current package is stored, by whom, which warehouse to enter, and the information to enter and sign for.

3.10 Order Information Management

1.Basic functions

As before, you can use the status query box on the top left to implement the status query, as well as the middle search
function.

2.Receiving orders

You can select a line and click the order button in the right action bar. The system will receive the order and save it. At the same time, the system will send a message to the user of the order (your order has been received). For faster work, you can select multiple lines through the multi-box on the left, then click on the order above, and the system will accept all the orders you
choose
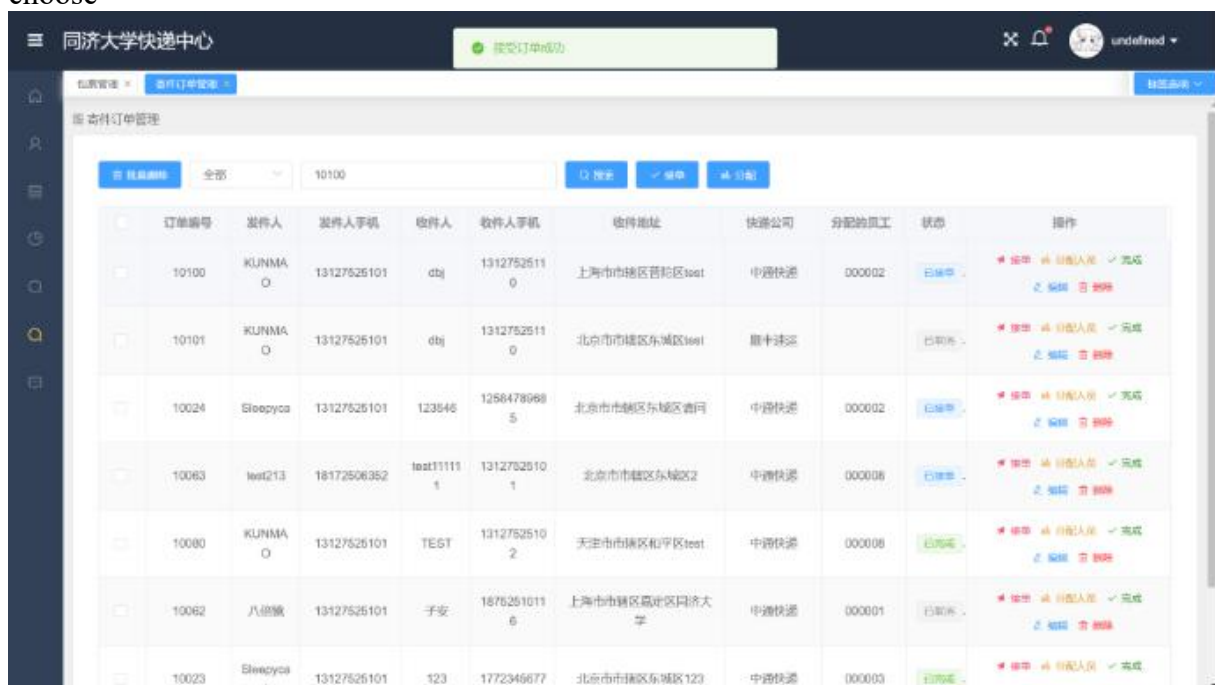
3.You can select a line and click the assign employee button in the right action bar. A new interface will pop up. The interface shows that the current employees are idle, and you can choose the idle employees to assign. When the distribution is complete, the system will send a message to the user of the order :& quot; your order has been assigned to an employee, it is recommended that you contact the employee by telephone & quot;. In order to work faster, you can select multiple lines through the left multi-box, and then click on the allocation above, the system will automatically assign all orders you choose.

4.Complete the order

After the employee completes the piece, can click the completion button, the system will restore the employee's status to idle, after the order will have the express delivery station to hand over to the express
merchant
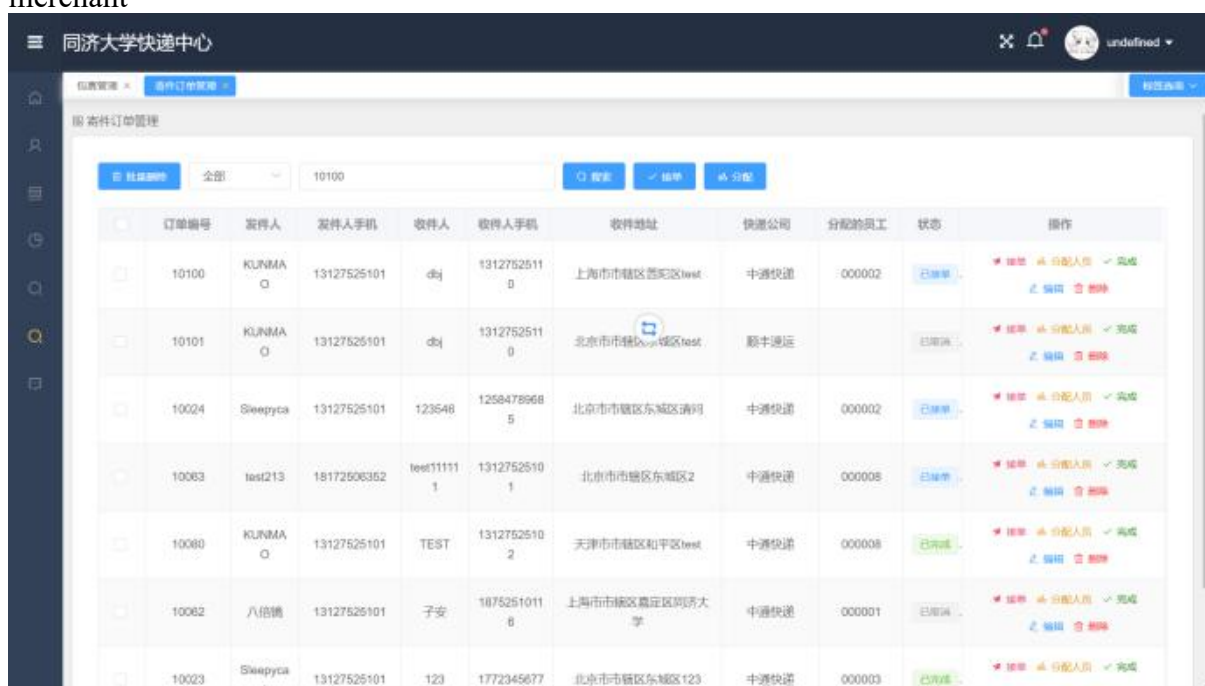
5.Editorial   order information

You can select a line and click the edit button in the right action bar to pop up an edit page.You can enter information from the new page and click OK. If there is no error in the information, the system will automatically save the changed information.
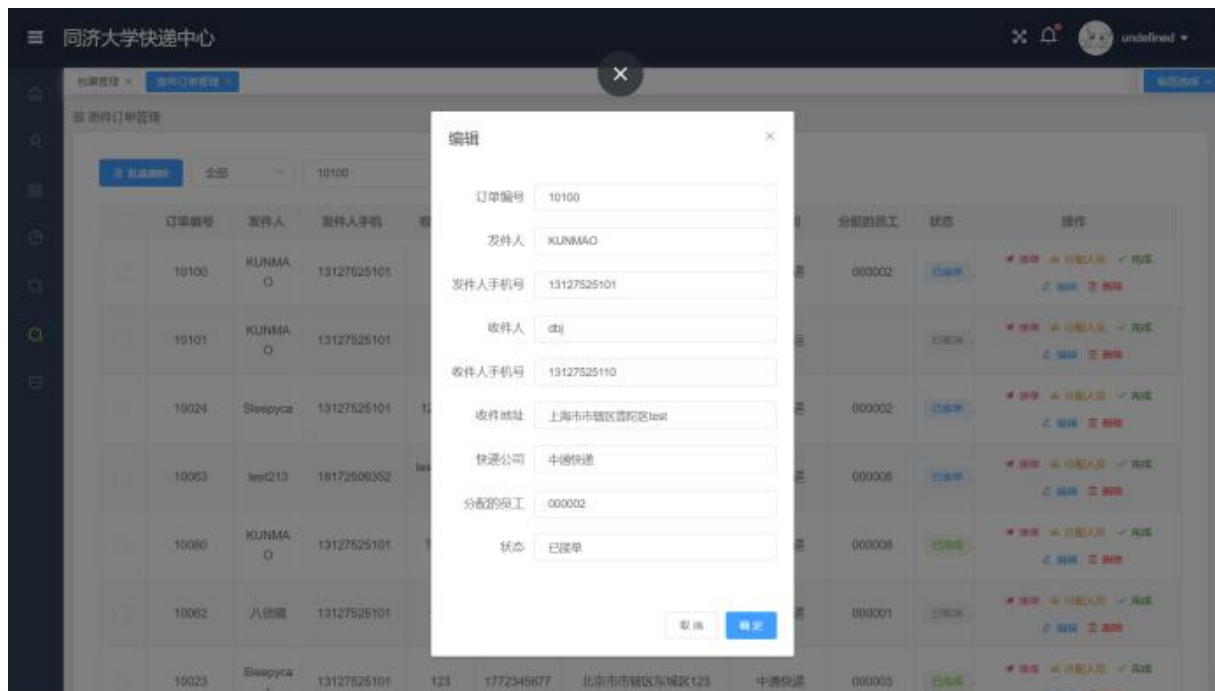
6.Delete orders

If you want to delete an order, select a line and click Delete order, the system will delete the selected order. In order to work faster, you can select multiple lines through the left multi-box, and then click the batch delete button above, the system will delete all orders you choose.

急件订单管理
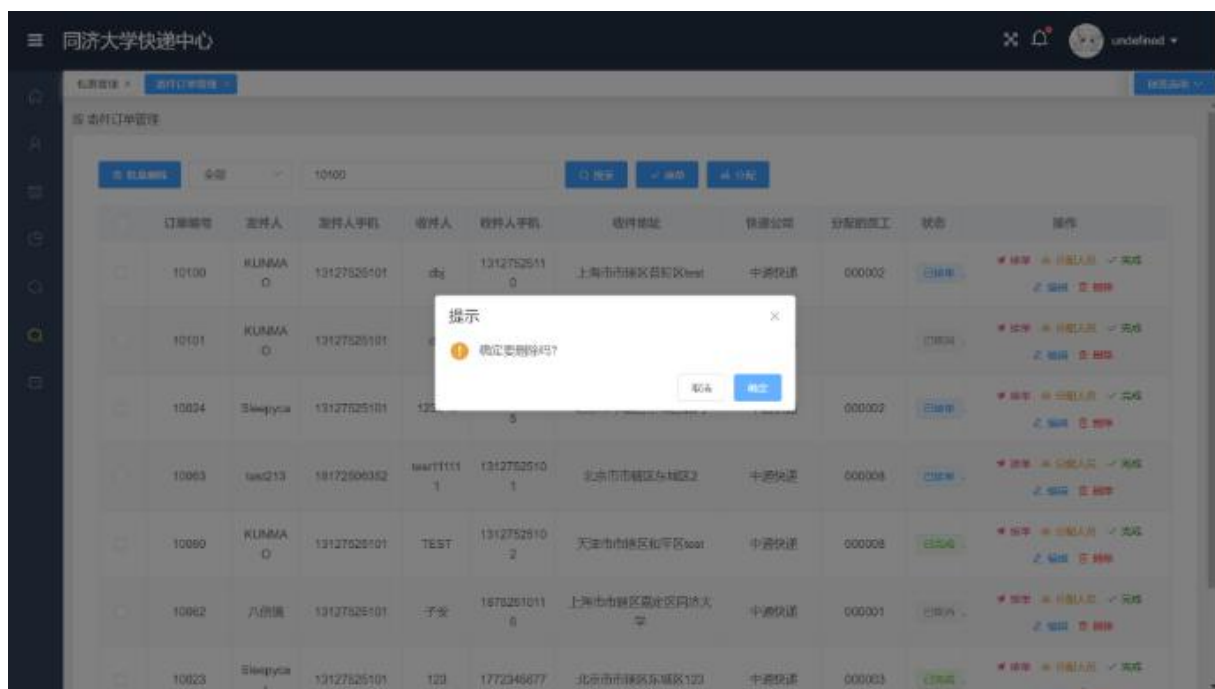
	订单编号	发件人	发件人手机	收件人	收件人手机	收件地址	快递公司	分配的员工	状态	操作
	10100	KUNMAO	13127525101	dbj	13127525110	上海市市辖区昌平区test	中通快递	000002	已结单	接单 分配人员 完成 编辑 删除
	10024	Sleepyca	13127525101	123646	12584789685	北京市市辖区东城区asd问	中通快递	000002	已结单	接单 分配人员 完成 编辑 删除
	10063	test213	18172506352	test11111	13127525101	北京市市辖区东城区2	中通快递	000008	已结单	接单 分配人员 完成 编辑 删除
	10080	KUNMAO	13127525101	TEST	13127525102	天津市市辖区和平区test	中通快递	000008	已完成	接单 分配人员 完成 编辑 删除
	10062	八倍镜	13127525101	子安	18752510118	上海市市辖区嘉定区同济大学	中通快递	000001	已结单	接单 分配人员 完成 编辑 删除
	10023	Sleepyca1	13127525101	123	1772345677	北京市市辖区东城区123	中通快递	000003	已完成	接单 分配人员 完成 编辑 删除

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4.Architecture and component design
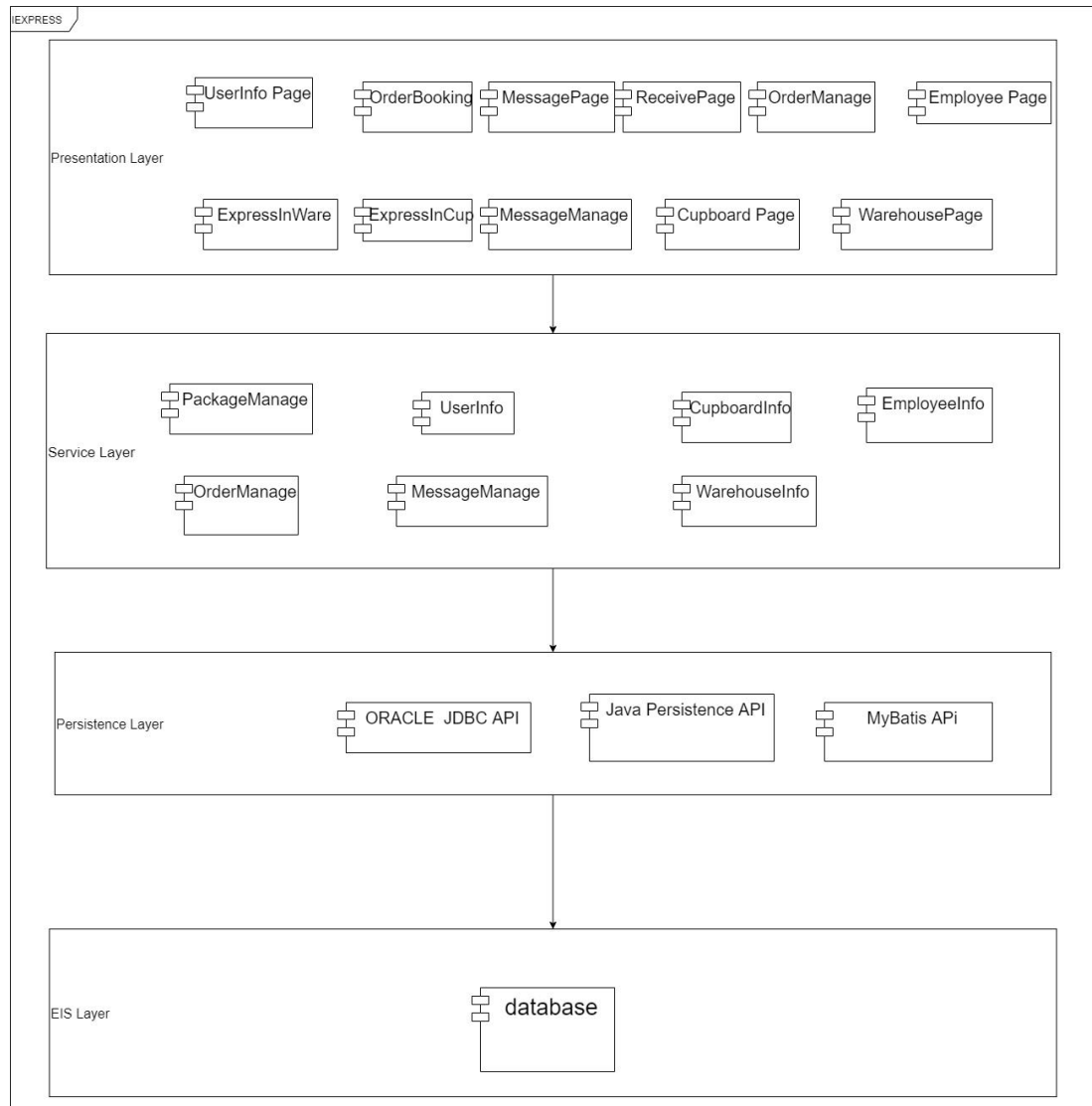
The total system has a four-layer architecture, which includes presentation layer, service layer, persistence layer and EIS layer.

The presentation layer contains components of user interfaces, that are pages directly shown to users including UserInfo Page, OrderBooking Page, Message Page, Receive Page, Order Page, Employee Page, ExpressInWare Page, ExpressInCup Page, MessageManage Page, Cupboard Page and Warehouse Page.

In the server layer, there are interfaces offered to the presentation page to realize corresponding functions.

Oracle JDBC api, Java persistence api and MyBatis api are placed in the persistence layer which encapsulates the classes of accessing methods to text files, relational databases, object databases, and so on.The purpose of the persistence layer is to use a session at run time to associate mapping metadata and a data source in order to create, read, update, and delete persistent objects, queries and expressions, as well as transactions.

The last layer is EIS layer which contains the database system.

5. Database design

5.1 Conceptual Design

In the conceptual design process, the team members, after a variety of requirements analysis and multi-angle user analysis, firstly identified each database entity, then analyzed and tested.During this session,we remove redundant data and finally finished the design of entity.

Once the entity part is established, the linkages between the entities come apparent, thus combining the linked entities with contact tables. Finally, the whole table is checked, some repetitive contents are deleted, some flaws are added, and a complete organizational structure is formed.

ER 图
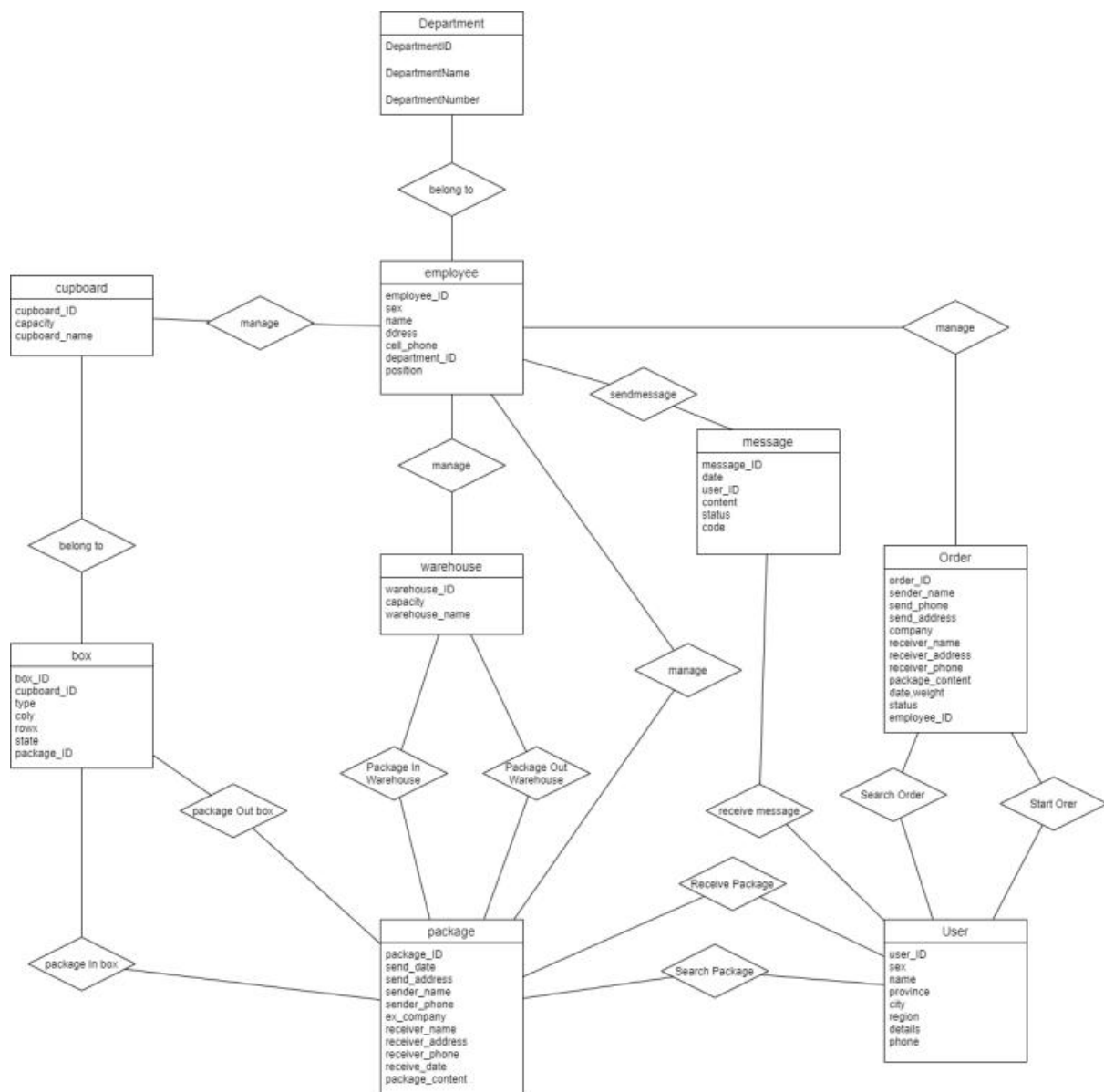
5.2 Logical structure design

5.2.1 Conversion rule

1）Converts entity sets to relationships

    – The body set corresponds to a relationship
    – Relational Name: The same name as the entity set.
    – Attributes: all attributes of an entity set.
    – Main code: the main code of the entity set.

2）Convert to relationship

① Method of transformation for 1:1 linkages
    a) The 1:1 connection is converted into an independent relationship: the codes of each entity connected to the connection and the attributes of the connection themselves are converted into the attributes of the relationship, and the codes of each entity are candidate codes for the relationship.
    b) If the 1:1 connection is merged with the relationship corresponding to one end of the entity set, it is necessary to add attributes to the merged relationship. The new attributes are the attributes of the connection itself and the code of another entity set related to the connection.

② The transformation method of 1：n connection
    a)A method is to transform the relation into an independent relation whose attributes consists of the code of each entity set connected to the relation and the attribute of the relation itself, and the code of the relation is the code of the n end entity set;
    b)Another method is to add new attributes in the n end entity set. The new attribute is composed of the code of the corresponding 1 end entity set and the attribute of the contact itself.

③ The transformation method of m：n connection transforms

    M：N connection into a relation when converting to a relational model. The conversion method is as follows: the code of each entity set connected with the connection and the attribute of the connection itself are converted to the attribute of the relation, and the code of the new relation is the combination of two connected entity codes (this code is a combination code composed of multiple attributes).

5.2.2 Converted Table

1. Employee table
   employee(employee_ID,sex,name,address,cell_phone,department_ID,position)
   FK：department_ID
2. Warehouse Table
   warehouse(warehouse_ID,capacity,warehouse_name)
3. Waredetails Table
   waredetails(package_ID,warehouse_ID)
   FK：package_ID,warehouse_ID
4. Department Table
   department(department_ID,dept_name,dept_number)
5. Cupboard Table
   cupboard(cupboard_ID,capacity,cupboard_name)
6. boxes Table
   boxes(box_ID，cupboard_ID，type，coly，rowx,state,package_ID)

FK: cupboard_ID, package_ID
7. package Table
   package(<u>package_ID</u>,send_date,send_address,sender_name,sender_phone,ex_company,
    receiver_name,receiver_address,receiver_phone,receive_date,package_content)
8. pack_in_ware Table
   pack_in_ware(<u>package_ID</u>,<u>warehouse_ID</u>,<u>date</u>,employee_ID)
   FK: package_ID,employee_ID,warehouse_ID
9. package_out_ware table
   package_out_ware(<u>package_ID</u>,<u>warehouse_ID</u>,<u>date</u>,employee_ID,box_ID,message_ID)
   FK: package_ID,employee_ID,warehouse_ID,box_ID,message_ID
10. Users table
    user(<u>user_ID</u>,sex,name,province,city,region,details,phone)
11. EX_order table
    order(<u>order_ID</u>,sender_name,send_phone,send_address,company,receiver_name,receiver_
    address,receiver_phone,package_content,date,weight,status,employee_ID)
    FK: employee_ID
12. message table
    message(<u>message_ID</u>,date,user_ID,content)
    FK: user_ID
13. Administrator table
    administrator(<u>admin_name</u>, password,employee_ID)
    FK: employee_ID

5.3 Physical Structure Design

5.3.1   employee Table

Table 3-1 employee

COLUMN_NAME	DATA_TYPE	LENGTH	ILLUTRATION	REMARKS
employee_ID	varchar	20	the ID of employee	PK/not null
sex	varchar	4	sex	not null
name	varcharr	20	name	not null
address	varchar	40	address	not null
cell_phone	Number	11	phone	not null
department_ID	varchar	20	which department	FK/not null
position_ID	varchar	20	the position of employee	FK/not null
status	varchar	20	the status of employee	not null

5.3.2 department Table

Table 3-3 department

COLUMN_NAME	DATA_TYPE	LENGTH	ILLUTRATION	REMARKS
department_ID	varchar	20	the id of department	FK
dept_name	varchar	20	the name of department	not null
dept_number	Number	10	the number of department	not null

5.3.3 warehouse Table

Table 3-4 warehouse

COLUMN_NAME	DATA_TYPE	LENGTH	ILLUTRATION	REMARKS
warehouse_ID	varchar	20	the id of warehouse	PK
capacity	Number	10	the capacity of warehouse	not null
warehouse_NAME	varchar2	20	the namew of warehouse	not null

5.3.4cupboard Table

Table   3-5 cupboard

COLUMN_NAME	DATA_TYPE	LENGTH	ILLUTRATION	REMARKS

cupboard_ID	varchar	20	cupboard ID	PK
capacity	Number	10	cupboard capacity	not null
cupboard_NAME	varchar2	20	cupboard name	

5.3.5boxes Table

Table 3-6 boxes

COLUMN_NAME	DATA_TYPE	LENGTH	ILLUTRATION	REMARKS
box_ID	varchar	10	the ID of box	PK
cupboard_ID	varchar	10	the ID of cupboard	FK
type	Enum	{large,middle,small}	three type	not null
COLY	varchar2	20	which col	not null
ROWX	varchar2	20	which row	not null
STATE	varchar2	20	the status of box	not null
PACKAGE_ID	varchar2	20	the id of package	
USER_ID	varchar2	20	the id of user	
CODE	varchar2	20	Pick-up code	

5.3.6 package Table

Table 3-7 package

COLUMN_NAME	DATA_TYPE	LENGTH	ILLUTRATION	REMARKS
package_ID	varchar	20	the ID of package	PK
send_date	Date		the ID of package been sent	not null
send_address	varchar	40	the address of sender	not null
sender_name	varchar	20	the name of sender	not null
sender_phone	Number	11	the phone of sender	not null
company	varchar	20	express company name	FK/not null
receiver_name	varchar	20	the receiver	not null
receiver_address	varchar	0	the address of receiver	not null
receiver_phone	Number	11	the phone of receiver	not null
receive_date	Date		the date of receive	
package_content	varchar	20	the content of package	

status	varchar	20	the status of package	not null
weight	varchar	20	the weight of package	

5.3.7 pack_in_ware Table

Table 3-8 pack_in_ware

COLUMN_NAME	DATA_TYPE	LENGTH	ILLUTRATION	REMARKS
package_ID	varchar	20	the ID of package	PK/FK
warehouse_ID	varchar	20	the ID of warehouse	FK/not null
date	Date		the date of package in warehouse	not null
employee_ID	varchar	20	the ID of employee	FK/not null

5.3.8 package_out_ware Table

Table 3-9 package_out_ware

COLUMN_NAME	DATA_TYPE	LENGTH	ILLUTRATION	REMARKS
package_ID	varchar	20	the ID of package	PK/FK
warehouse_ID	varchar	20	the ID of warehouse	FK/not null
date	varchar	20	the date of package out warehouse	not null
employee_ID	varchar	20	the ID of employee	FK/not null
box_ID	varchar	20	the ID of box	FK/not null
message_ID	varchar	20	the id of message	FK

5.3.9 User Table

Table 3-11 User

COLUMN_NAME	DATA_TYPE	LENGTH	ILLUTRATION	REMARKS
user_ID	varchar	20	the id of user/the phone of user	PK
sex	varchar	4	sex	not null
name	varchar	20	name	not null
province	varchar	40	province	not null
password	varchar	20	password	
city	varchar	20	city	not null
region	varchar	20	region	not null
detail	varchar	20	detail address	not null

5.3.10 ex_order table

Table 3-12express

COLUMN_NAME	DATA_TYPE	LENGTH	ILLUTRATION	REMARKS
order_ID	varchar	20	the ID of order	PK/FK
sender_name	varchar	20	the sender	not null/FK
sender_phone	varchar	20	the phone of sender	not null
sender_address	varchar	20	thev address of sender	not null
company	varchar	20	express company	not null/FK
receiver_name	varchar	20	the receiver	not null

receiver_address	varchar	40	the address of receiver	not null
receiver_phone	Number	11	the phone of receiver	not null
package_content	varchar	20	the content of package	
weight	varchar	20	the weight of package	

5.3.11 message table

table 3-17 message

COLUMN_NAME	DATA_TYPE	LENGTH	ILLUTRATION	REMARKS
message_ID	varchar	20	message ID	PK
send_date	Date		message send date	not null
content	varchar	100	message content	not null
user_ID	Number	11	user id	not null / FK
message_type	varchar	20	package message or order message	not null
status	varchar	20	the status of message	not null

5.3.12 Administrator table

table 3-17 Administrator

COLUMN_NAME	DATA_TYPE	LENGTH	ILLUTRATION	REMARKS
admin_name	varchar	20	the username of administrator	PK
password	varchar	20	password	not null
employee_id	varchar	20	the id of employee	not null/FK

5.3.13 WareDetails table

table 3-17 **WareDetails**

COLUMN_NAME	DATA_TYPE	LENGTH	ILLUTRATION	REMARKS
package_id	varchar	20	the ID of package	PK/FK
warehouse_id	varchar	20	the ID of warehouse	not null/FK