MGIS330 Systems Analysis and Design Project Report

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中度可信度描述已自动生成

**Project Report**

**Yum Hot Pot Ingredients Inventory Tracking**

GROUP: Brother Hot Pot

Section 2

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**Content**

1.Executive Summary3

2.Executive Overview4

2.1 Input4

2.2 Output4

2.3 Process5

3. Objectives6

4. New Tables and Reports7

4.1Sales Report7

4.2 Purchase Information Report13

5. Conclusion16

6. Appendix18

6.1 ER Diagram18

6.2 Gantt Chart18

6.3 Data Flow Diagram 19

6.4 Division of Labor19

6.5 Part 120

6.6 Part 224

6.7 Part 3 32

6.8 Part4 43

1. **Executive Summary**

Self-service hot pot is a popular business model which requires more fresh ingredients and less food waste compared with traditional hot pot. Our team designed a model of ingredients inventory management system, Yum Hot Pot Ingredients Inventory Tracking, in order to provide information to managers by presenting reports and forms. Through checking the system output, users can obviously identify expired ingredients and other condition of inventory. The manager can also forecast and decide the inventory management in the near future according to the output reports. Generally speaking, our system contains functions of sales report, inventory tracking, and customer tracking. Sales report can help managers to formulate some sales strategies such as making discount on specific food. Inventory tracking can help managers formulate different inventory plans according to the sales situation in different seasons, which not only meets the needs of customers, but also optimizes the inventory management. Customer tracking can formulate a series of promotion plans through the membership information of the members. We used ER Diagram and Data Flow Diagram to list and decide relationship of data, which also provides an overview of the whole database process.

Keywords: Inventory, Sale Report, Inventory Tracking, Customer Tracking, ERD, DFD

1. **Executive overview**

We divide the whole system development into three parts, which are input,

process, and output. The details of those parts will represent as follows.

* 1. Input

The first part is input. We mainly have three primary resources: customers and suppliers. First, the customer information can input into two tables. The first table is the customer table, which includes customer ID as primary key, First name, Last name, and VIP level. The information of those data come from those who have consumed in our stores. Moreover, that information can help with the inventory report and also have the relationship between sales reports. The second table is the product table. From the customers' perspective, we can decide the products in our database since we need to satisfy the customers' demand and make an excellent menu for the customers. Thus, these two tables are coming from the customer. Secondly, the suppliers can also input two tables. The first table is the supplier table. It takes supplier ID as the primary key and includes supplier name and supplier Address. With the list of the suppliers and the details of what they provide and how they provide, we can decide how to manage the purchase order. The second table is Raw Material, which takes Raw Material ID as the primary key. It has Raw Material Name, Warehouse Location, Recorder Point, Order Quantity, and Quantity On Hand. All those information is coming from suppliers, and that information can provide management information for the managers.

2.2 Output

In terms of output, we mainly have four kinds of reports: customer information report, inventory report, sales report, and purchase information report. Firstly, we have customer information report. We use customer and sales order tables to create a customer information table. We can get the discounts and consumption amounts of different customers in the store they consumed. Secondly, we have an inventory report. We use the purchase order table, item table, raw material table, and supplier table to create the daily inventory table. We can get the purchase order ID and raw material status corresponding to different raw materials. Thirdly, we have sales order report. The information comes from the regular sales order, and it can record every sale of the store. Thus, it will make some sales suggestions for the manager and also some strategies for the salesperson. Thirdly, we also have the purchase order report. It will help with the purchase decision report buy some buyers. It will also help with inventory management.

2.3 Process

From the perspective of the process, users can obtain the information they want by querying the information integrated in each table and the connection table between the tables. For example: in the inventory query window, the user can query by entering the date and store ID to obtain the remaining inventory of the corresponding store on the day and the status of the raw materials in the corresponding purchase order. In the sales query window, the user can obtain the sales status of the corresponding store on the day by entering the date and shop ID query, and can also obtain the sales status of the corresponding store in the current month by entering the month and shop ID query. At the same time, you can check customer consumption in the customer information query window.

1. **Objectives**

The objectives of our application are to store customer information, track inventory, and generate sales reports.

Store customer information: We store customer information in the system, and by entering the information of each customer in the database, to facilitate the management of the manager. We pass through the customer's purchase order and store the purchase order in the customer's information. At the same time, the VIP system of customers was recorded. At the same time, the inventory of food materials and the sales report were adjusted in a timely manner according to customers' consumption orders.

Inventory tracking: We will generate a daily inventory report in the system. We monitor the daily inventory through the purchase order, filter and view the required date, and we can get the purchase order ID and raw material status corresponding to different raw materials. For example, the shelf life, sales volume and quantity of food materials should be supervised, and the origin should be traced. Provide the product manager with better strategy deployment, better cater to the taste of customers, and improve the daily sales of hotpot restaurants.

Generate sales report: The system will generate daily sales reports. The system will automatically generate store sales in different regions. In the report generated daily, the amount payable and the actual amount can provide information for customers' purchasing behavior and discount activities. Meanwhile, according to the sales order, the source can be traced to the daily sales of food materials, and suggestions can be made on the types of food materials according to the short-term sales situation. According to different strategies, the sales manager can adjust the preferential terms of the hotpot restaurant or launch new products and attract new customers in time.

1. **New tables and reports**
   1. **Sales Report**

**4.1.1 Monthly Sales**

**4.1.1.1 Sales Order Table**

**表格

描述已自动生成**

**4.1.1.2 SQL Query**

SELECT TO\_CHAR(SALES\_ORDER.SALES\_DATE,'YYYY-MONTH') as SALES\_DATE,SUM(SALES\_ORDER.AMOUNT\_ACTUALLY\_PAID) as AMOUNT\_ACTUALLY\_PAID

 FROM SALES\_ORDER SALES\_ORDER

 GROUP by TO\_CHAR(SALES\_ORDER.SALES\_DATE,' YYYY-MONTH')

 ORDER by TO\_CHAR(SALES\_ORDER.SALES\_DATE,' YYYY-MONTH')

**4.1.1.3 Monthly Sales Report**

**图形用户界面, 应用程序

描述已自动生成**

**4.1.2 Monthly Receivable**

**4.1.2.1 Account Receivable Table**

**表格

低可信度描述已自动生成**

**4.1.2.2 SQL Query**

SELECT to\_char(ACCOUNT\_RECEIVABLE.RECEIVABLE\_DATE,' YYYY-month') AS RECEIVABLE\_DATE,

    SUM(ACCOUNT\_RECEIVABLE.RECEIVABLE\_AMOUNT) AS MONTHLY\_RECEIVABLE\_AMOUNT

 FROM ACCOUNT\_RECEIVABLE ACCOUNT\_RECEIVABLE

 GROUP BY to\_char(ACCOUNT\_RECEIVABLE.RECEIVABLE\_DATE,' YYYY-month')

 ORDER BY to\_char(ACCOUNT\_RECEIVABLE.RECEIVABLE\_DATE,' YYYY-month')

**4.1.2.3 Monthly Receivable Report**

**图形用户界面, 应用程序

描述已自动生成**

**4.1.3 Monthly Payable**

**4.1.3.1 Account Payable Table**

表格

描述已自动生成

**4.1.3.2 SQL Query**

SELECT TO\_CHAR(ACCOUNT\_PAYABLE.PAYABLE\_DATE,'YYYY-MONTH') as PAYABLE\_DATE, SUM(ACCOUNT\_PAYABLE.PAYABLE\_AMOUNT) as PAYABLE\_AMOUNT

 FROM ACCOUNT\_PAYABLE ACCOUNT\_PAYABLE

 GROUP BY TO\_CHAR(ACCOUNT\_PAYABLE.PAYABLE\_DATE,'YYYY-MONTH')

 ORDER BY TO\_CHAR(ACCOUNT\_PAYABLE.PAYABLE\_DATE,'YYYY-MONTH')

**4.1.3.3 Monthly Payable Report**

**图形用户界面, 文本, 应用程序

描述已自动生成**

* 1. **Purchase Information Report**

**4.2.1 Purchase Order Table**

**文本

描述已自动生成**

**4.2.2 SQL Query**

SELECT to\_char(PURCHASE\_ORDER.PURCHASE\_DATE,' YYYY-Month') as PURCHASE\_DATE,

    ITEM.ITEM\_NAME as ITEM\_NAME,

    SUM(PURCHASE\_ORDER.ITEM\_QUANTITY) as ITEM\_QUANTITY,

    ITEM.DESCRIPTIONS as DESCRIPTIONS,

    ITEM.UNIT\_PRICE as UNIT\_PRICE,

    SUPPLIER.SUPPLIER\_NAME as SUPPLIER\_NAME

 FROM SUPPLIER SUPPLIER,

    ITEM ITEM,

    PURCHASE\_ORDER PURCHASE\_ORDER

 WHERE SUPPLIER.SUPPLIER\_ID=ITEM.SUPPLIER\_ID

    AND PURCHASE\_ORDER.ITEM\_ID=ITEM.ITEM\_ID

 GROUP BY to\_char(PURCHASE\_ORDER.PURCHASE\_DATE,' YYYY-Month'),ITEM.ITEM\_NAME,ITEM.DESCRIPTIONS,ITEM.UNIT\_PRICE,SUPPLIER.SUPPLIER\_NAME

 ORDER BY to\_char(PURCHASE\_ORDER.PURCHASE\_DATE,' YYYY-Month')

**4.2.3 Monthly Purchase Information Report**

图形用户界面, 表格

描述已自动生成

1. **Conclusion**

For the system we built, we developed sales statistics, inventory statistics, customer information tracking and order inquiry through order information, sales information, raw material supplier information, customer information and warehouse storage management. With this information as the core, we can get sales statements, inventory records and accounting statements. Through these reports, the manager can determine the quantity of incoming inventory and make different inventory plans. At the same time, the manager can also make a series of promotion plans.

Here is a SWOT analysis of the system:

First of all, the advantages of this system are very obvious. The system connects hotpot raw material suppliers with hotpot restaurants and hotpot restaurants with customers through order information. Through the hot pot raw materials will be products and order information connected, the system structure is clear and clear. In this system, not only the type and quantity of inventory can be inquired, but also the storage time and shelf life of inventory can be inquired directly. In this way, the manager can know the quantity of raw materials sold and the remaining stock of each warehouse when managing the inventory. In order to prevent the waste of raw materials and the misuse of expired materials, timely adjust the purchase inventory plan. Through the analysis of sales reports, we can formulate marketing strategies, promotion activities, etc. Through the analysis of accounting reports, we can get the sales situation of hotpot restaurants in different regions, so as to make strategic development plans.

Secondly, the system also has some drawbacks. For example, for some uncontrollable errors, the system is not possible to achieve comprehensive monitoring. Because each hot pot raw material provided to customers in the system has a fixed weight and number of requirements. Ideally, the amount of raw materials we consume should be fixed. But in the actual hot pot material preparation, it is impossible to perfectly control the weight of raw materials, there will be a certain degree of deviation. And depending on the weather and the season, there is a certain amount of waste. And suppliers cannot guarantee that they will always provide high-quality raw materials. If the quality difference is large, a large amount of raw materials need to be returned to the supplier for restocking. But at present, this system is unable to solve this kind of problem.

In view of this opportunity, we can add the information of raw materials to the report. For example, the source information of raw materials and information statistics of some poor quality raw materials are added. In this way, when the system prepares the hot pot raw materials, it can know which supplier the raw materials come from and the reason for the poor quality of the materials. We can also add the price information of raw materials to the report. In this way, after a period of use, we can judge the price and quality of raw materials. Drop lower-quality, higher-priced suppliers, and the user can constantly add other new suppliers. In this way, users can always get the best raw materials through constant comparison.

In response to the threat of this system, the most important thing is to solve the system cannot handle the material error. The system needs to calculate and output the error of the inventory quantity per unit time to avoid the large deviation of the data in the inventory record due to the long-term neglect of the error. Since our system has the detailed weight, quantity and assortment of each material, we can get the ideal consumption of each material through the sales report. Then according to the consumption of each material in the actual inventory statement, the error of each material can be obtained. This eliminates the problem caused by major errors.

1. **Appendix**
   1. **ER Diagram**

**图示

描述已自动生成**

* 1. **图表

     低可信度描述已自动生成Gantt Chart**
  2. **图示

     描述已自动生成Data Flow Diagram**
  3. **Division of Labor**

|  |  |
| --- | --- |
| **Name** | **Labor** |
| Sheng Xinyuan | New table and reports, system building, DFD, and documents integration |
| Zhang Di | Executive overview-process, documents integration |
| Zhang Lu | Conclusion |
| Zhao Yumeng | New table and reports, System building, and Database building |
| Yang Jinghao | Objectives and Gantt chart |
| Wang Xudong | Executive overview – input &output |
| Chen Peilong | Executive summary and ERD |

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**Part 1**

The operating mode of traditional Chinese hot pot restaurant industry is restaurant offers fresh raw ingredients and cooking food by customers themselves. Some of the restaurant's operating mode is customers choose their food in the freezer, so the restaurant needs to make sure that the raw ingredients are fresh and that they are available in a timely manner to meet the customer's uncertain needs. Therefore, the restaurant needs to keep in touch with the suppliers of different ingredients. Our organization, called Yum Hot Pot, aims to solve the problem of providing enough fresh ingredients in time for the hot pot industry.

Our app can have the following three functions: sales report, inventory tracking, and customer tracking. First, sales report can help managers to formulate some sales strategies. For example, some discount when spending enough or package activities can be used to increase the consumption level of consumers. Second, inventory tracking can help managers determine the number of inventory purchases, and automatically manage inventory through the system, which can quickly maintain a certain amount of inventory to achieve the company’s stable operation. Meanwhile, Inventory tracking can help managers formulate different inventory plans according to the sales situation in different seasons, which not only meets the needs of customers, but also optimizes inventory management. Finally, customer tracking can formulate a series of promotion plans through the membership information of the members. On the one hand, it can attract more people to join the membership, on the other hand, it can better improve the CRM management and increase the dependency of customers.

The name of our app is Yum Hot Pot Ingredients Inventory Tracking. Our application tracks inventory of hot pot ingredients from three aspects: accounting, sales, and warehouse storage. The customer inputs the required type and quantity of raw materials into the application. After receiving the customer’s order, the application will automatically select the nearest warehouse to the customer to configure the ingredients based on the customer’s order, and automatically reduce the warehouse inventory quantity. The application will automatically calculate the amount of each raw material sold and the remaining stock in each warehouse. The application also can count and rank ingredients according to their popularity. The manager will forecast and adjust the inventory management in the next stage according to the situation. The application will also provide sales reports and financial reports. It can make profit statement, cash flow statement, and other financial statements according to the monthly sales situation to analyze the company’s financial status.

Our application can generate inventory reports, record food purchase information, generate sales reports and record customer information. In the inventory report, the system will record the amount of inventory purchased and the amount of inventory consumed, and calculate the remaining amount of inventory and record the consumption cycle. Managers can use the inventory report to determine the replenishment volume and future inventory plans. The system can record food information, including food supplier, purchase time, type and quantity, so that managers can quickly check them.

In the generated sales report, our application can record the sales quantity of each

ingredient in different cycles, such as daily, weekly, and monthly. Managers can indirectly judge customer preferences based on the quality of sales, and at the same time better manage

inventory. In the customer information report generated by the system, the customer's membership information, preferred payment method and consumption date can be counted. At the same time, based on the collected information, more suitable promotional activities can be made to promote the customer's re-consumption, thereby increasing profits.

The automation of the system can also reduce the possibility of errors compared with manually. When we automate our application, we can save human resources, and there will be more data store in the database. Additionally, there is no doubt that the working efficiency can be improved a lot. Our company can view the visual inventory reports and sales reports directly and conveniently which performs much better than doing it manually. Under this circumstance, we can get high accuracy data that are significantly helpful for our main business like scheduling the number of materials for the hot pot and decision-making.

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**Part 2**

**Define the problem**

The Chinese hotpot industry requires restaurants to ensure raw materials are fresh and available on time. When many people order in stores or online, there are often problems such as too long preparation time, insufficient raw materials and stale food. This has led many customers to abandon their orders or choose to file complaints with the Consumer Rights Center. Hotpot restaurants are also under increasing pressure.

In addition, due to the lack of daily food sales and warehouse surplus food quantity statistics, businesses can not accurately predict the sales of products the next day. Moreover, most of the materials in hot pot restaurants have short shelf life and many kinds, so merchants need to order from different suppliers in advance. Therefore, there is still a problem that businesses cannot accurately estimate the number of dishes to be prepared. At the same time, in order to complete the delivery faster, the merchant must also be able to deliver from the nearest warehouse. These problems can cause hotpot restaurants to lose orders or create a surplus of dishes.

**Produce the project schedule**

Duration

**Confirm Project Feasible**

By calculating the budget in advance, we can implement the plan more efficiently. It mainly includes two parts of the budget, one is system development cost, and the other is the annual operating cost. The maximum total cost to develop and operate system is $20,000.

In the system development cost, we mainly consider four aspects: personnel cost, training cost, suppliers cost, and purchased hardware and software. For the personnel cost, we will have 1 systems analyst and 2 software developers to develop the system’s structure and realize the essential function. Their total cost is approximately approaching $2,250. Then we also need a technical writer to record important information, which may cost $1,000.

And then, we will need a data entry clerk during conversion to help with the data input, which may cost $240. Finally, we also need a project manager to lead the project participants, coordinate the entire system development process and make some crucial decisions to ensure the accuracy and timeliness of each step. For the training costs, we need to introduce our system’s goal to all those developers first and make them understand our demand for the software. Thus, we need the in-house course for them. Second, we also need training for our employees if we want to implement the system. We need to organize some courses to help them understand how to use the software and what information the software can provide. All of the training may cost $4,000. For the supplies, we need some printers, duplication, or other small pieces of stuff to help with the development of the system. These will cost $650 in total. For the purchased hardware and software, those are vital to carry out our plan, we are going to have 2 workstations, and we will need Windows, memory upgrades, mouse, and some network software to make sure we are going well. Those will cost us $1,400. Therefore, we budget the total system development costs of $10,540.

**1. Systems Development Costs**

**Personnel:**

1 Systems Analysts (50 hours @ $20/hour)  $1,000

2 Software Developers (50 hours/each @ $25/hour)         1,250

1 Technical Writer (50 hours @ $20/hour)  1,000

1 Data Entry clerk during Conversion (24 hours@ $10/hour)  240

1 Project manager (80 hours @ $30/hour) 2,400

**Training:**

3 day in-house course for developers $1,000

Users 3 day in-house course for 15 employees 3,000

**Supplies:**

Printers 50

Duplication 100

Disks, paper, desks, pen, etc.  500

**Purchased Hardware & Software:**

Windows for 2 workstations 100

Memory upgrades in 2 workstations 800

Mouse for 2 workstations 300

Network Software for 2 workstations   200

**Total systems development costs: $10,540**

For the perspective of annual operating costs budget, we mainly take three parts into account which are personnel costs, spending on upgrading hardware and software and supplies and miscellaneous items. For the first part, if we stipulate that we should work five days a week and then minus the days for holidays, we will have about 230 working days a year. we plan to have a maintenance programmer to work with the system once a month which every time can late 10 hours. Therefore, the annual total lobar time for maintaining is 120 hours and we pay the programmer $6,000 per year.

Finally, the continuous consuming supplies and miscellaneous items like paper and cartridge will cost $2000 each year. The timely supply and always adequate amounts of these items will improve employee job satisfaction. Above all, we will spend $8,000 total annual operating costs, so there will be $18,540 the total cost to develop and operate system, which is within the boundary of our expectance.

|  |  |
| --- | --- |
| **2. Annual Operating Costs (on-going each year)** |  |
| **Personnel:** |  |
| Maintenance Programmer/Analyst (120\*hrs/year@ $50/hr) | $6,000 |
|  |  |
| **Supplies and Miscellaneous items** | $2,000 |
| **TOTAL ANNUAL OPERATING COSTS:** | $8,000 |
| **TOTAL COST TO DEVELOP AND OPERATE THE SYSTEM:** | $18,540 |

**Staff the project**

**图表

描述已自动生成**

**Launch the Project**

Initial Design – Reports / Outputs

|  |  |  |  |
| --- | --- | --- | --- |
| Report Name | Frequency | Type of User | Type of Information |
| Monthly Sales | Monthly | CEO | Strategic |
| Daily Inventory | Daily | Manager & Buyer | Tactical |
| Monthly Purchases | Monthly | Manager& Buyer | Operational |
| Customer Information | Daily | Manager | Operational |

1. **Monthly Sales Report**

Monthly Sales of Yum Hot Pot in May, 2021

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Ingredient | Monthly Sales (Million Yuan) | Proportion of Sales | Best Match | Proportion of Set |
| Sliced Beef | 1.453 | 30.60% | Fried Tofu | 92.56% |
| Sliced Lamb | 0.982 | 20.69% | Lettuce | 89.78% |
| Beef Leaf | 0.874 | 18.41% | Potato | 95.13% |
| Sliced Pork | 0.746 | 15.72% | Spinach | 86.33% |
| Pork Belly | 0.692 | 14.58% | Enoki Mushroom | 88.29% |

Monthly Sales Report chart is used to show sales of different ingredients in a month as well as other information about these ingredients. Monthly sales and proportion of sales in the chart can be used to compare with past data and forecast sales soon. The chart also informs the best-match ingredients which helps to prepare sets for sale in order to meet needs of customers. Monthly Sales Report provides strategic information to CEO who can decide and change core market as well as main product.

**b. Daily Inventory Report**

Daily Inventory Report of Yum Hot Pot on 10th May, 2021

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ingredient | Amount(kg) | | Supplier | | Entry Date | | Expiration Date | |
| Beef | 59 | Nice Food | | May 10th, 2021 | | Jun 10th, 2021 | |
| Pork | 54 | Fresh Meat | | May 9th, 2021 | | Jun 9th, 2021 | |
| Lamb | 48 | Fresh Meat | | May 9th, 2021 | | May 20th, 2021 | |
| Lettuce | 26 | Vegetable Lover | | May 7th, 2021 | | May 11th, 2021 | |

Daily Inventory Report chart is used to present amount of inventory and other relevant information about remaining ingredient every day. The chart informs buyers how much.

inventory remains and what kind of ingredients are running out soon. The supplier column helps to track the source of the ingredient, which guarantees the security of food. Through the Entry Date and Expiration Date in the chart, a manager can tell ingredients that went expired and dispose those expired ingredients in time. Daily Inventory Report allows the manager to make tactical changes on stock arrangement and also adjust sales model in order to avoid waste and untimely supply.

1. **Monthly Purchasing Information Report**

Monthly Purchasing Information Report in May, 2021

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Type** | **Amount (Kilogram)** | **Price**  **(Thousand Yuan)** | **Quality Level** | **Import** | **Supplier** |
| **Sliced Beef** | 300 | 19.8 | High | No | Nice Food |
| 200 | 12 | Medium | No | Dalian Frozen |
| 100 | 6.8 | High | Yes | Grassland |
| **Sliced Lamb** | 375 | 30 | High | No | Fresh Meat |
| 200 | 14.4 | Medium | No | XiaoFeiYang |
| 175 | 14.9 | Senior High | Yes | QingZhen |
| **Fish Ball** | 80 | 1.28 | Medium | No | XiangRuiZe |
| 60 | 1.2 | High | No | XuYi |
| 60 | 1.32 | High | No | FeiFan |

The monthly purchasing information report is used to record the amount, price, quality level and import of different types of ingredients. The report also records the different suppliers of each food ingredient, which is used for price comparison, so as to inform the buyers of the supplier's relevant information. Different suppliers provide ingredients of different quality and price. Through comparison, the manager can choose the right supplier or decide whether to continue cooperating with the supplier.

1. **Daily Customer Information Report**

Daily Customer Information Report on 12th May, 2021

|  |  |  |  |
| --- | --- | --- | --- |
| **Customer ID** | **VIP Level** | **Consumption Record (Yuan)** | **Recharge Record (Yuan)** |
| **3306** | 0 | 500 | 0 |
| **3307** | 1 | 430 | 1000 |
| **3308** | 2 | 520 | 2000 |
| **3309** | 3 | 370 | 3500 |

The daily customer information report is used to record daily customer consumption information, recharge information and their VIP level. The VIP level ranges from 0 to 3. Customers who come to eat in the restaurant can become a 0-level VIP. When a customer recharges a certain amount, he or she can become a premium VIP customer. The VIP level depends on the amount of the customer's top-up, the larger the amount, the higher the VIP level. Customer information reports can help managers launch better promotion strategies and develop different strategies for different levels of VIP customers. For example, 5% off for level 1 VIP while level 3 VIP can have 12% off during certain promotion days.

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**Part 3**

The following chart is the ERD for our system.

图示

描述已自动生成

Supplier table includes Supplier ID, Supplier Name, Supplier Address. These data come from the suppliers which our restaurants purchase raw materials from. A Supplier table talks about information of suppliers, which is available for purchases report for managers to track the source of materials in order to guarantee the security of ingredients.

|  |  |  |
| --- | --- | --- |
| **SupplierID** | **SupplierName** | **SupplierAdress** |
| GT3131 | Good Taste | Zhongshan 78th Rd 137, Liwan District, Guangzhou, Guangdong Province |
| NF3298 | Nice Food | Guiyuan Rd 46, Huadu District, Guangzhou, Guangdong Province |
| FM1049 | Fresh Meat | Hechuan District, Z211, Chongqing |
| VL4738 | Vegetable Lover | Dangui Rd 39, Shunqing District, Nanchong, Sichuan |
| YS2357 | Yummy Sauce | Fengtai Rd 78, Jinshui District, Zhengzhou, Henan |
| FC9153 | Fantastic Chicken | 59 Gongye S Rd, Lixia District, Jinan, Shandong |
| DP1483 | Delicious Pepper | Huanghai N Rd 98, Laishan District, Yantai, Shandong |

This is a purchase order table that contains purchase order ID, purchase date, item ID, item name, item quantity, item unit price, supplier ID, and store ID. The contents of this table can provide information for inventory management and sales reports, such as item ID and item name in the inventory report. It can calculate the remaining quantity of the warehouse and predict the future storage capacity of the warehouse. According to the order quantity and item unit price, the total profit can be calculated to make the sales report.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Purchase  OrderID | Purchase  OrderDate | Item  ID | Item  Name | Item  Quantity | ItemUnitPrice  (Yuan/kg) | Supplier  ID | Store  ID |
| XZ1005 | 5/16/2021 | GT0001 | Beef | 3 | 85 | GT3131 | 101 |
| ZL0205 | 5/17/2021 | YS0001 | Beef | 5 | 75 | YS2357 | 103 |
| XY0122 | 5/17/2021 | VL0001 | Beef | 2 | 77 | VL4738 | 105 |
| YM0803 | 5/18/2021 | GT0003 | Lamb | 1 | 70 | GT3131 | 100 |
| ZD0215 | 5/19/2021 | FM0002 | Pork | 10 | 65 | FM3298 | 102 |
| WQ0524 | 5/20/2021 | VL0005 | Mashroom | 9 | 50 | VL4738 | 104 |
| GZ0423 | 5/21/2021 | NF0001 | Beef | 8 | 80 | NF3298 | 106 |

This item table records the IDs of several types of raw materials from different suppliers, their names, and descriptions of freshness or customer satisfaction, unit prices, entry time and due time. This table also associates items with suppliers. The data comes from suppliers and buyers. This table provides information on raw materials from different suppliers, thus providing a comparison of various suppliers. And this table records the purchasing price of each item, which helps to generate monthly purchases report.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ItemID** | **ItemName** | **Description** | **UnitPrice**  **(Yuan/kg)** | **EntryTime** | **DueTime** | **SupplierID** |
| GT0001 | Beef | Fresh and yummy | 85 | 2021.5.23 | 2021.6.10 | GT3131 |
| GT0002 | Pork | Fresh | 60 | 2021.5.24 | 2021.6.11 | GT3131 |
| GT0003 | Lamb | A few is not fresh | 70 | 2021.5.25 | 2021.6.12 | GT3131 |
| NF0001 | Beef | Fresh but not so tasty | 80 | 2021.5.23 | 2021.6.13 | NF3298 |
| FM0004 | Lettuce | Good | 2 | 2021.5.22 | 2021.6.14 | FM3298 |
| FM0002 | Pork | Fresh, and customers like | 65 | 2021.5.24 | 2021.6.15 | FM3298 |
| VL0001 | Beef | Generally fresh | 77 | 2021.5.25 | 2021.6.16 | VL4738 |
| VL0005 | Mushroom | Tasty good | 50 | 2021.5.30 | 2021.6.17 | VL4738 |
| YS0001 | Beef | Not so fresh | 75 | 2021.5.31 | 2021.6.18 | YS2357 |
| FC0001 | Beef | Not so fresh | 89 | 2021.5.22 | 2021.6.19 | FC9153 |
| FC0003 | Lamb | Fresh | 78 | 2021.5.23 | 2021.6.20 | FC9153 |
| FC0003 | Lamb | Most is fresh | 73 | 2021.5.24 | 2021.6.21 | FC9153 |
| DP0001 | Beef | Fresh | 69 | 2021.5.25 | 2021.6.22 | DP1483 |

Account Payable table includes Payable ID, Payable Date, Payable Amount, and Supplier ID. These data come from bills from suppliers which can be used in purchases report that it shows how much all restaurants pay for the raw materials totally.

|  |  |  |  |
| --- | --- | --- | --- |
| **PayableID** | **PayableDate** | **PayableAmount** | **SupplierID** |
| 6000 | 5/21/2021 | ￥13,000 | GT3131 |
| 6001 | 5/23/2021 | ￥10,000 | NF3298 |
| 6002 | 5/25/2021 | ￥28,000 | FM1049 |
| 6003 | 5/29/2021 | ￥14,000 | VL4738 |
| 6004 | 6/1/2020 | ￥9,000 | YS2357 |
| 6005 | 6/11/2020 | ￥11,000 | FC9153 |
| 6006 | 6/15/2020 | ￥35,000 | DP1483 |
| 6007 | 7/1/2020 | ￥22,000 | VL4738 |
| 6008 | 8/2/2020 | ￥12,000 | FC9153 |

The same raw materials from different suppliers have the same ID, which facilitates the common processing of raw materials. Each warehouse has a variety of raw materials to meet the needs of customers for food materials. This table can provide information for inventory report like Reorder Point decides according to the needs of customers for different food materials. Data sources and standards are determined according to information provided by different suppliers.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **RawmaterialID** | **RawmaterialName** | **Reorder point(Kg)** | **Order quantity(Kg)** | **Quantity on hand(Kg)** |
| 18001 | Beef | 30 | 59 | 45 |
| 18002 | Pork | 40 | 64 | 56 |
| 18003 | Lamb | 30 | 56 | 44 |
| 18004 | Lettuce | 50 | 60 | 52 |
| 18005 | Mashroom | 15 | 26 | 17 |
| 18006 | Vermicelli | 20 | 30 | 25 |

This is a connection table to show the relationship between Raw material table and Purchase Order table.

|  |  |
| --- | --- |
| **RawmaterialID** | **PurchaseOrderID** |
| 18001 | QA1432 |
| 18002 | QA3828 |
| 18003 | WQ3443 |
| 18004 | WE4543 |
| 18005 | RT5423 |
| 18006 | GR7543 |

Here is store table. We set StoreID as the primary key, and the table concludes the specific information of the stores, we have the address and also the managers of the stores. Therefore, this table will show some information about our company.

|  |  |  |
| --- | --- | --- |
| **StoreID** | **Address** | **ManagerID** |
| 100 | Building NO.21, Qinghua Road, Weihai City, Shandong Province | 001 |
| 101 | Building NO.101, Feichang Road, Hefei City, Anhui Province | 002 |
| 102 | Building NO.1031, Yihan Road, Hangzhou City, Zhengjiang Province | 003 |
| 103 | Building NO.201, Songha Road, Shanghai City | 004 |
| 104 | Building NO.1101, Beiguo Road, Beijing | 005 |
| 105 | Building NO.131, Dinghao Road, Qingdao City, Shandong Province | 006 |
| 106 | Building NO.202, Ahalo Road, Binghai City, Fujian Province | 007 |

Account Receivable table includes Receivable ID, Receivable Date, Receivable Amount, and Store ID. These data come from accounting department. These data are used to show how much the accounts receivable from all stores and provide information for sales report to let managers identify whether we are slowly losing business due to not the tourist time.

|  |  |  |  |
| --- | --- | --- | --- |
| **ReceivableID** | **ReceivableDate** | **ReceivableAmount** | **StoreID** |
| 5000 | 5/21/2021 | ￥90,000 | 101 |
| 5001 | 5/23/2020 | ￥72,000 | 102 |
| 5002 | 5/25/2020 | ￥58,000 | 103 |
| 5003 | 5/29/2020 | ￥63,000 | 104 |
| 5004 | 6/1/2020 | ￥48,000 | 104 |
| 5005 | 6/11/2020 | ￥60,000 | 103 |
| 5006 | 6/15/2020 | ￥80,000 | 101 |
| 5007 | 7/1/2020 | ￥41,000 | 102 |
| 5008 | 8/2/2020 | ￥43,000 | 103 |

Here is the table for the customer. In this table, we set Customer ID as the primary key. We get the customer’s first name and last name and have their VIP level, which was set by their consumption. Additionally, we record the sales orders for the customer. This table will directly show us the specific information of the customers which can be useful for the customer information report.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CustomerID** | **FristName** | **LastName** | **VIPLevel** | **SalesOrdersID** |
| 1001 | Yihan | Wang | 1 | 100001 |
| 1002 | Kuaile | Lin | 2 | 100004 |
| 1003 | Kaixin | Han | 3 | 100009 |
| 1004 | Meili | Li | 2 | 100002 |
| 1005 | Haokan | Xie | 2 | 100006 |
| 1006 | Hua | Gao | 1 | 100005 |
| 1007 | Guilan | Shi | 3 | 100003 |
| 1008 | Luankexin | Ma | 3 | 100007 |
| 1009 | Zishuai | Shu | 1 | 100008 |

In this table, we show the specific product of our company from our internal database. We have the name of the products, and also the price of them. Beyond that, we also mark the raw material of these products to track our products to the suppliers.

|  |  |  |  |
| --- | --- | --- | --- |
| **ProductID** | **Name** | **Price** | **RawMaterialID** |
| 10000 | Boutique goose sausage | ¥30 | 18001 |
| 10001 | Boutique duck intestine | ¥40 | 18005 |
| 10002 | Sauced Beef with Hot Pepper | ¥50 | 18006 |
| 10003 | Coriander Beef Ball | ¥55 | 18004 |
| 10004 | Handmade Ribbon Filament | ¥38 | 18002 |
| 10005 | Coriander balls | ¥24 | 18003 |
| 10006 | Fresh tender beef | ¥19 | 18005 |
| 10007 | Fresh bullwhip | ¥48 | 18002 |
| 10008 | Handmade Ribbon Filament | ¥58 | 18004 |

This is a connection table to show the relationship between store table and product table.

|  |  |
| --- | --- |
| **StoreID** | **ProductID** |
| 100 | 10000 |
| 101 | 10001 |
| 102 | 10002 |
| 103 | 10003 |
| 104 | 10004 |
| 105 | 10005 |
| 106 | 10006 |

This is a connection table to show the relationship between customer table and product table.

|  |  |
| --- | --- |
| **CustomerID** | **ProductID** |
| 1001 | 10000 |
| 1002 | 10001 |
| 1003 | 10002 |
| 1004 | 10003 |
| 1005 | 10004 |
| 1006 | 10005 |
| 1007 | 10006 |
| 1008 | 10007 |
| 1009 | 10008 |

The manager table contains manager ID as primary key, name of manager and their phone numbers which are the personal information of the managers of each store. Each manager takes charge of one store and they will use the reports and make operational and managerial strategies.

|  |  |  |
| --- | --- | --- |
| **ManagerID** | **ManagerName** | **PhoneNum** |
| 001 | Sheng Xinyuan | 18345058923 |
| 002 | Zhang Di | 15248126340 |
| 003 | Zhang Lu | 15065158287 |
| 004 | Zhao Yumeng | 18369160705 |
| 005 | Wang Xudong | 15966793890 |
| 006 | Yang Jinghao | 18745057368 |
| 007 | Chen Peilong | 18945061116 |

The following table is for sales order which contains sales order ID, order date, amount payable, amount actually paid, customer ID and store ID which are obtained from all stores bill records. There may some discount activities like discount when spending enough and discount for VIPs. Therefore, the amount payable minus the amount discounted will be the amount actually paid. This table can provide information for customers purchasing behavior and preference discount activities which can help managers to determine the marketing tactics for attracting more customers.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SalesOrderID** | **SalesOrderDate** | **AmountPayable**  **(yuan)** | **AmountActuallyPaid**  **(yuan)** | **CustomerID** | **StoreID** |
| 100001 | 5/16/21 | 350 | 350 | 1001 | 100 |
| 100002 | 5/16/2021 | 199 | 189 | 1002 | 101 |
| 100003 | 5/17/2021 | 500 | 475 | 1003 | 106 |
| 100004 | 5/17/2021 | 236 | 207.68 | 1004 | 102 |
| 100005 | 5/18/2021 | 391 | 391 | 1005 | 105 |
| 100006 | 5/19/2021 | 267 | 267 | 1006 | 102 |
| 100007 | 5/19/2021 | 845 | 743.6 | 1007 | 103 |
| 100008 | 5/20/2021 | 430 | 344 | 1008 | 104 |
| 100009 | 5/20/2021 | 364 | 291.2 | 1009 | 102 |
| 100010 | 5/20/2021 | 338 | 270.4 | 1003 | 106 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table Name** | **Primary key** | **Source** | **Type** | **Size** | **Description** |
| Suppliers | Supplier ID | Suppliers Survey | Number/Letter | 7 | Start with 2 letters and then 4 numbers;  e.g. GT31331 |
| Purchase Order | Purchase Order ID | Purchase order | Number/Letter | 7 | Start with 2 letters and then 4 numbers;  e.g. XZ1005 |
| Store | Store ID | Market Survey | Number | 7 | Start with 3 numbers;  e.g. 100 |
| Raw Material | Raw Material ID | Raw Material Information | Number | 6 | Start with 5 numbers;  e.g. 18001 |
| Manager | Manager ID | Manager Survey | Number | 7 | Start with 3 numbers;  e.g. 001 |
| Item | Item ID | Item  Information | Number/Letter | 13 | Start with 2 letters and then 4 numbers;  e.g. GT0001 |
| Sales Order | Sales Order ID | Sales Order | Number | 10 | Start with 6 numbers;  e.g. 100001 |
| Customer | Customer ID | Sales Order | Number | 9 | Start with 4 numbers;  e.g. 1001 |
| Product | Product ID | Product  Information | Number | 9 | Start with 5 numbers;  e.g. 10000 |

The primary key in the suppliers table is the supplier ID. The data source is a survey of suppliers, and each supplier has a corresponding supplier ID. The primary key in the purchase order table is the purchase order ID. The data source is the purchase order, and each purchase order has a corresponding order ID. The primary key in the store table is the store ID. The data source is market survey because the store ID is based on the store’s geographic location and the code of the area in which the store is located. The primary key in the raw material table is the raw material ID. The data source is the information on the package of raw materials. The primary key in the manager table is the Manager ID. The data source is a survey of manager. The primary key in the Item table is the Item ID. The data source is the description of the same product information from different suppliers. The primary key in the sales order table is the sales order ID. The data source is form the sales order. The primary key in the customer table is the customer ID. The data source are from sales order and receipts. The primary key in the product table is the product ID. The data source is the information on the package of product.

MGIS330 Systems Analysis and Design Project Report

**Project Report**

**Yum Hot Pot Ingredients Inventory Tracking**

GROUP: Brother Hot Pot

Section 2

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Creation Date: 4/30/2021

Last Revised: 6/5/2021

Version: 1.0

**Part 4**

**I. Tables**

**1. Customer Table:**

**(1) Definition**

In the customer table, we set Customer ID as the primary key and we will obtain the customer's first name and last name, and obtain their VIP level, and record the customer's sales order.

|  |  |  |  |
| --- | --- | --- | --- |
| **Data Names** | **Data Types** | **Sizes** | **Fields** |
| CUSTOMER\_ID | CHAR | 10 | Number-field |
| FIRST\_NAME | VARCHAR2 | 20 | Text-field |
| LAST\_NAME | VARCHAR2 | 10 | Text-field |
| VIP\_LEVE | CHAR | 5 | Number-field |

**(2) Customer Table with Data Records**

表格

中度可信度描述已自动生成

**(3) Customer Table Input Interface**

图形用户界面, 文本, 应用程序, 电子邮件

描述已自动生成

**2. Sales\_Order Table**

**(1) Definition**

The sales order table contains the sales order ID as primary key, order date, amount due, actual payment amount, customer ID, and store ID. And customer ID and store ID are the foreign keys which respectively correspond to the customer ID in customer table and store ID in store table.

|  |  |  |  |
| --- | --- | --- | --- |
| **Data Names** | **Data Types** | **Sizes** | **Fields** |
| SALES\_ID | CHAR | 10 | Number-field |
| SALES\_DATE | DATE |  | Date |
| AMOUNT\_PAYABLE | CHAR | 10 | Number-field |
| AMOUNT\_ACTUALLY\_PAID | CHAR | 10 | Number-field |
| CUSTOMER\_ID | CHAR | 10 | Number-field |
| STORE\_ID | CHAR | 5 | Number-field |

**(2) Sales Order Table with Data Record**

表格

描述已自动生成

**(3) Sales Order Table Input Interface**

图形用户界面, 文本, 应用程序, 电子邮件

描述已自动生成

**3.Purchase\_Order Table**

**(1) Definition**

The purchase order table contains purchase order ID as primary key, purchase date, item ID, item name, item quantity, item unit price, supplier ID, and store ID. And supplier ID and store ID are the foreign keys of this table which respectively correspond to the supplier ID in supplier table and store ID in store table.

|  |  |  |  |
| --- | --- | --- | --- |
| **Data Names** | **Data Types** | **Sizes** | **Fields** |
| PURCHASE\_ID | CHAR | 10 | Text-field |
| PURCHASE\_DATE | DATE |  | Date |
| ITEM\_ID | CHAR | 10 | Text-field |
| ITEM\_NAME | VARCHAR2 | 20 | Text-field |
| ITEM\_QUANTITY | CHAR | 10 | Number-field |
| UNIT\_PRICE | CHAR | 5 | Number-field |
| SUPPLIER\_ID | CHAR | 10 | Text-field |
| STORE\_ID | CHAR | 5 | Number-field |

**(2) Purchase Order Table with Data Records**

文本

描述已自动生成

**(3) Purchase Order Table Input Interface**

图形用户界面, 文本, 应用程序, 电子邮件

描述已自动生成

**4. Item Table**

**(1) Definition**

The item table records the IDs of several raw materials from different suppliers, their names, descriptions of freshness or customer satisfaction, unit prices, purchase time, and expiration time.

|  |  |  |  |
| --- | --- | --- | --- |
| **Data Names** | **Data Types** | **Sizes** | **Fields** |
| ITEM\_ID | CHAR | 10 | Text-field |
| ITEM\_NAME | VARCHAR2 | 20 | Text-field |
| DESCRIPTIONS | VARCHAR2 | 35 | Text-field |
| UNIT\_PRICE | CHAR | 5 | Number-field |
| ENTRY\_DATE | DATE |  | Date |
| DUE\_DATE | DATE |  | Date |
| SUPPLIER\_ID | CHAR | 10 | Text-field |

**(2) Item Table**

表格

描述已自动生成

**(3) Item Table Input Interface**

图形用户界面, 表格

描述已自动生成

**II. Reports**

**1. Customer Information Report**

**(1) Definition**

We use customer and sales order tables to create customer information table. We select the customer ID from the customer table, and query the store ID, sales order date, total amount payable and amount actually paid from the sales order table, and put the data under these attributes into the daily customer information report. We can get store ID using the customer ID of the customer table in this report which corresponds to the customer ID of the sales order table. In addition, by filtering the date we want to view, we can get the discounts and consumption amounts of different customers in the store they consumed.

**(2) SQL query**

SELECT CUSTOMER.CUSTOMER\_ID, FIRST\_NAME, LAST\_NAME, VIP\_LEVEL, to\_char(SALES\_DATE,'yyyy-mm-dd'), AMOUNT\_PAYABLE, AMOUNT\_ACTUALLY\_PAID, STORE\_ID

FROM CUSTOMER

INNER JOIN SALES\_ORDER

ON CUSTOMER.CUSTOMER\_ID = SALES\_ORDER.CUSTOMER\_ID

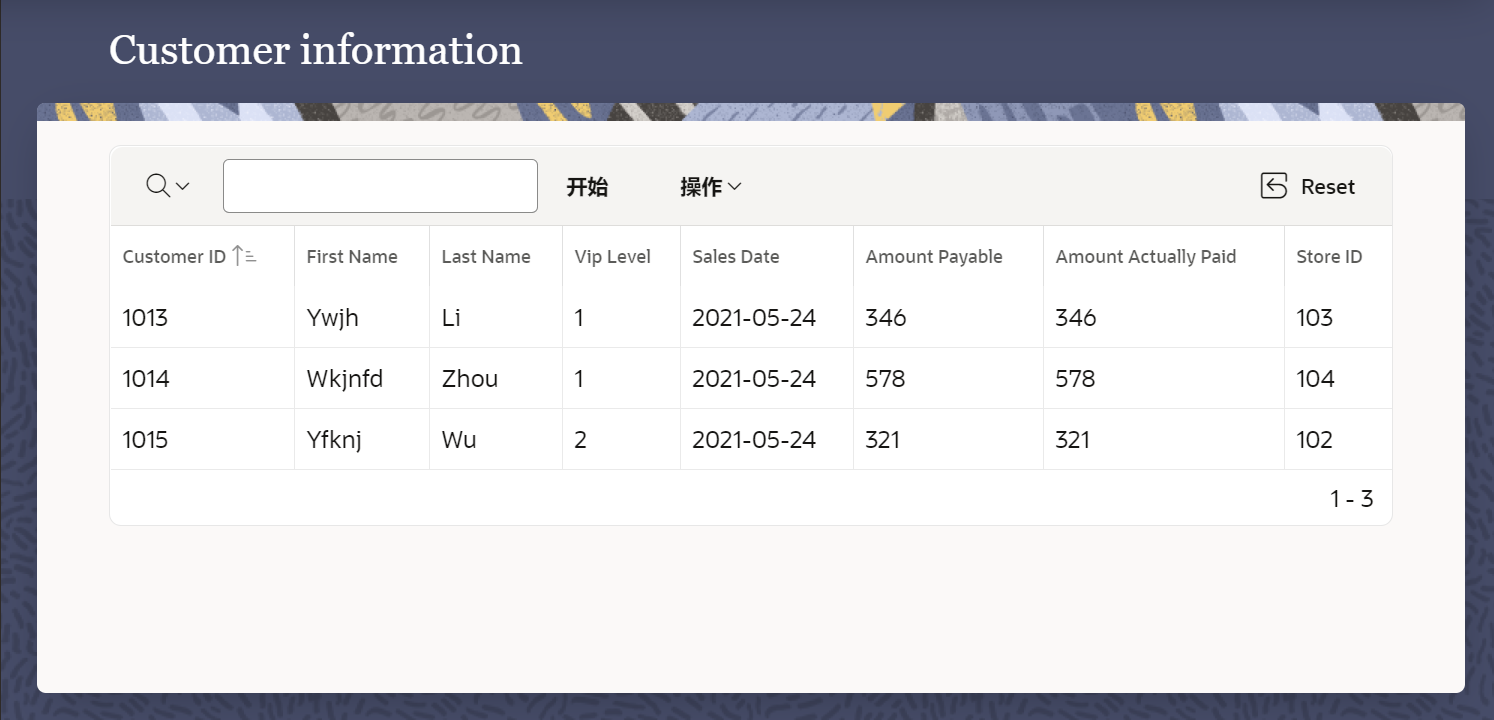
ORDER BY to\_char(SALES\_DATE,'yyyy-mm-dd')

**(3) The results of query**

表格

描述已自动生成

**(4) Actual Daily customers reports**



**2. Inventory Report**

**(1) Definition**

We use the purchase order table, item table, raw material table, and supplier table to create daily inventory reports. We query the purchase order ID, purchase order date, and item quantity from the purchase order table, and query the item name from the item table. unit price, description, entry time and due time, query the reorder point and order quantity, and the quantity on hand from the raw material table, and query the supplier name and supplier address from the supplier table. Since the purchase order table and the raw material table are many-to-many, we created a relationship table to match the purchase order ID and the raw material ID, so that the purchase order ID in the daily inventory report corresponds to the raw material ID. By filtering and viewing the desired date, you can get the purchase order ID and raw material status corresponding to different raw materials.

**(2) SQL Query**

SELECT

    ITEM.ITEM\_NAME AS ITEM\_NAME,

    ITEM.ENTRY\_DATE AS ENTRY\_DATE,

    ITEM.DUE\_DATE AS DUE\_DATE,

    RAW\_MATERIAL.REORDER\_POINT AS REORDER\_POINT,

    RAW\_MATERIAL.ORDER\_QUANTITY AS ORDER\_QUANTITY,

    RAW\_MATERIAL.QUANTITY\_ON\_HAND AS QUANTITY\_ON\_HAND,

    SUPPLIER.SUPPLIER\_NAME AS SUPPLIER\_NAME,

    SUPPLIER.SUPPLIER\_ADDRESS AS SUPPLIER\_ADDRESS

 FROM RM\_PO RM\_PO,

    SUPPLIER SUPPLIER,

    RAW\_MATERIAL RAW\_MATERIAL,

    PURCHASE\_ORDER PURCHASE\_ORDER,

    ITEM ITEM

 WHERE ITEM.ITEM\_ID=PURCHASE\_ORDER.ITEM\_ID

    AND PURCHASE\_ORDER.PURCHASE\_ID=RM\_PO.PURCHASE\_ID

    AND RM\_PO.RM\_ID=RAW\_MATERIAL.RM\_ID

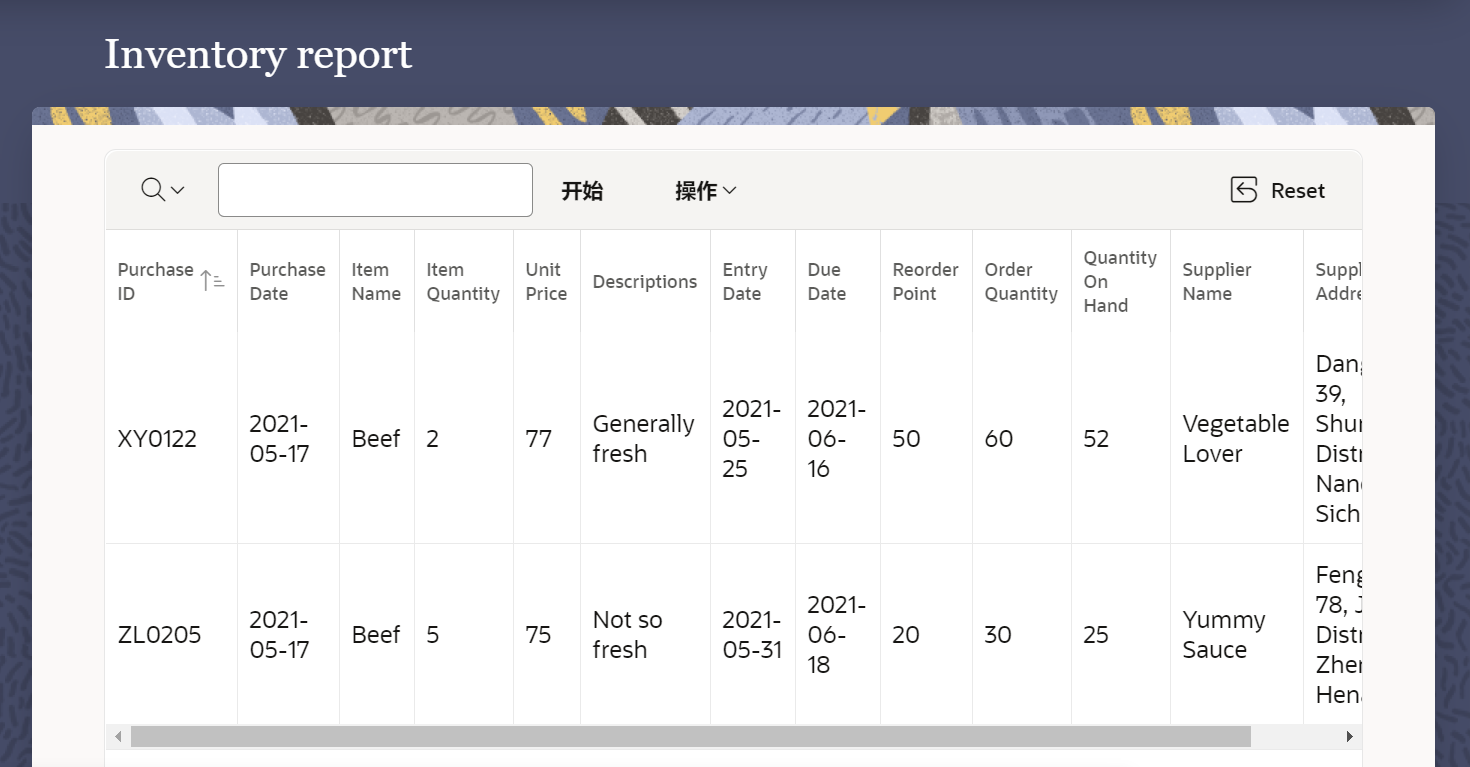
    AND ITEM.SUPPLIER\_ID=SUPPLIER.SUPPLIER\_ID

**(3) The result of query**

文本, 表格

描述已自动生成

**(4) Actual Daily Inventory Report**



**III. Overview**

In the final project, we will develop additional components below.

1. **Tables**

Item table: The table contains seven fields: Item ID, Item Name, Description, Unit Price, Entry Time, Due Time and Supplier ID

Customer table: The table contains five fields: Customer ID, First Name, Last Name, VIP Level and Sales Orders ID

Supplier table: The table contains three fields: Supplier ID, Supplier Name and Supplier Address

Product table: The table contains four fields: Product ID, Product Name, Product Price and Raw Material ID

Raw material table: The table contains five fields: Raw Material ID, Raw Material Name, Reorder Point, Order Quantity and Quantity on Hand

Purchase order table: The table contains eight fields: Purchase Order ID, Purchase Order Date, Item ID, Item Quantity, Item Unit Price, Supplier ID and Store ID

Account Payable table: The table contains four fields: Payable ID, Payable Date, Payable Amount and Supplier ID

Account receivable table: The table contains four fields: Receivable ID, Receivable Date, Receivable Amount and Store ID

1. **Queries and Reports**

Food purchase information query: This report requires supplier table and purchase order table to record food information over a period of time.

Customer information query: This report requires customer information table, purchase order table to record the member information, customer payment method and customer consumption date.

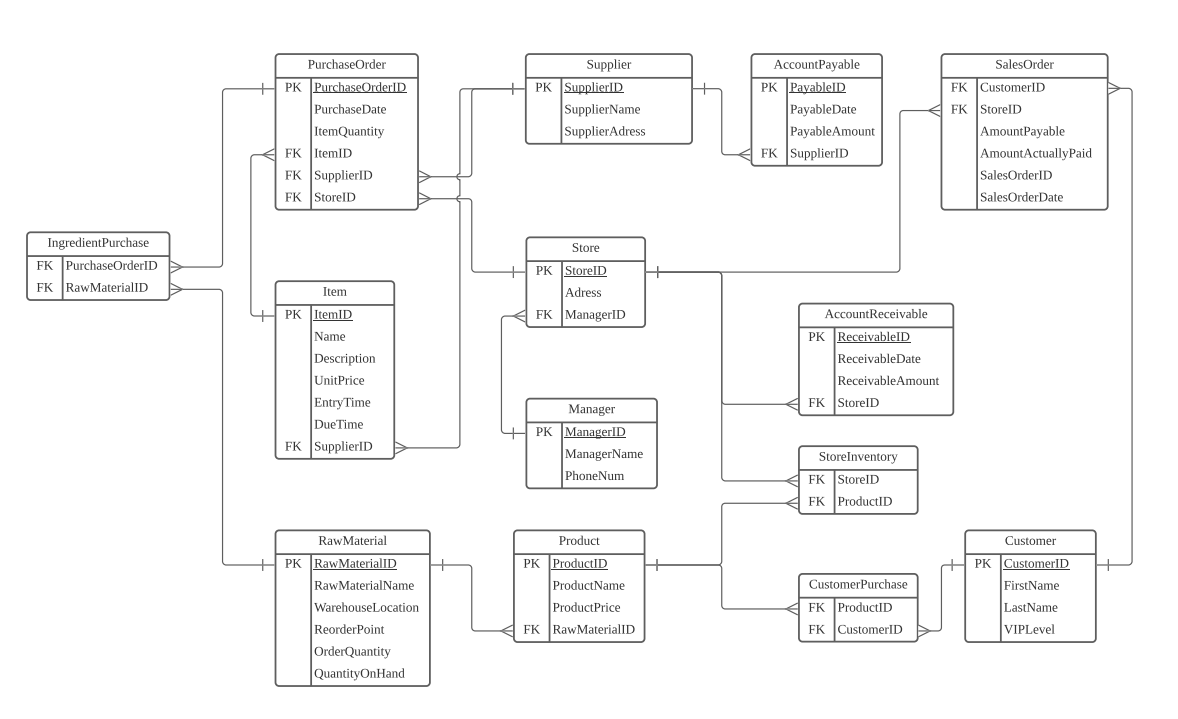
Inventory report: This report requires raw material table, purchase order table, product table, and customer table. The inventory report will calculate the raw materials consumed according to the amount of hot pot materials remaining on the day, and calculate the inventory that each warehouse needs to prepare the next day according to the inventory.

Sales report: This report requires customer table, product table, raw material table, purchase order table, account payable table and account receivable table. It can be used to capture the sales of hotpot ingredients in different regions

In addition, to create these reports, we need to aggregate, multiply, divide, and calculate and record the data through filters.

**IV. Gantt chart of part 4**

**V. ERD for Our System**



**VI. DFD for Our System**

**图示

描述已自动生成**

**VII. Homepage User Interface**

**图形用户界面, 应用程序

描述已自动生成**