



Project 1
Database Planning and Requirement Analysis

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Introduction

Group Members:

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AI Tools Used: ChatGPT (Version 4o mini):

1st Attempt:

- **Prompts:** "The mission of Burger King's database system is to efficiently collect and manage the data to support the Burger King's business for the staff and consumers, to support the business owner by using the data to dig deep into the insight of the business, and to support cooperation between branches by sharing the information." Is the following sentence could be a mission statement in database design?
- **Date of Use:** 30 January 2025

"The mission of Burger King's database system is to efficiently collect and manage the data to support the Burger King's business for the staff and consumers, to support the business owner by using the data to dig deep into the insight of the business, and to support cooperation between branches by sharing the information." Is the following sentence could be a mission statement in database design?

Yes, the sentence you've provided could be considered a mission statement in database design, but it could benefit from a bit more clarity and focus on the technical aspects of database management. A mission statement for database design typically outlines the goals and objectives of the database system in a concise manner, such as improving data efficiency, supporting decision-making, and enabling seamless data flow across systems.

Here's a refined version that might read more like a formal mission statement:

"The mission of Burger King's database system is to efficiently collect, store, and manage data to support business operations, enhance decision-making through actionable insights, and foster collaboration between branches by ensuring seamless data sharing and accessibility for staff, consumers, and business owners."

This version maintains the original points but is more direct in addressing the database's role in supporting the business. It also emphasizes the technical functionality (collecting, storing, managing) while staying aligned with the broader goals of supporting business needs and collaboration.

What do you think?



2nd Attempt:

- **Prompts:** "To share the data between branches to cooperate.", "To manage the data to support decision-making of the business owner.", "To track the data on staff and consumers in real-time update", "To perform searches on branches, information of consumers and staff.", "To maintain the data on staff, consumers, and branches." Have any sentences could not valid for mission objective in database design?
- **Date of Use:** 30 January 2025

"To share the data between branches to cooperate.",
"To manage the data to support decision making of the business owner.",
"To track the data on staff and consumers in real-time update",
"To perform searches on branches, information of consumers and staff.",
"To maintain the data on staff, consumers, and branches."
Have any sentences could not valid for mission objective in database design?

These sentences mostly seem valid as mission objectives in database design, but a few could use some clarification or tweaking to be more precise. Let's go through them:

1. **"To share the data between branches to cooperate."**
 - This is a valid objective. Sharing data between branches for collaboration is a common goal in database design, but it could be more specific. For example, "To facilitate real-time data sharing between branches for improved cooperation."
2. **"To manage the data to support decision making of the business owner."**
 - This is also valid. Managing data for decision-making is a typical use case for a database, especially in data warehouses or business intelligence systems. A more focused version could be: "To organize and manage data to support business decision-making."
3. **"To track the data on staff and consumers in real-time update."**
 - This is a valid goal, but could be phrased more clearly. For example, "To track and update staff and consumer data in real time." The "real-time update" part could be simplified to "real-time tracking" or something similar to make the meaning clearer.
4. **"To perform searches on branches, information of consumers and staff."**
 - This sentence is valid, but could be slightly improved for clarity. Perhaps: "To enable efficient searches on branch locations, consumer data, and staff information."
5. **"To maintain the data on staff, consumers, and branches."**
 - This is valid and clear. "To maintain" works well for database design objectives since it suggests ongoing data management. A slight refinement might be: "To ensure accurate and up-to-date maintenance of staff, consumer, and branch data."

Summary: All the sentences are valid objectives, but they could be refined slightly to enhance clarity and precision. The core mission of designing a database revolves around managing, sharing, maintaining, and enabling access to data efficiently, which is what you're describing here.



3rd Attempt:

- **Prompt:** Can you provide examples of reports that a restaurant database system typically generates?
- **Date of Use:** 3 February 2025

Can you provide examples of reports that a restaurant database system typically generates?

Sure! Here are some examples of reports that a restaurant database system typically generates:

1. Sales Report

- **Description:** This report provides a detailed breakdown of the restaurant's sales performance over a specific period (e.g., daily, weekly, monthly).
- **Data Included:**
 - Total sales revenue
 - Number of orders
 - Average order value
 - Sales by menu item
 - Discounts and promotions applied
- **Purpose:** To analyze revenue trends and identify high-performing dishes or areas for improvement.

2. Daily Transaction Report

- **Description:** A report that summarizes all the financial transactions for the day, including cash and card payments.
- **Data Included:**
 - Order ID
 - Customer details (if available)
 - Payment type (cash, card, etc.)
 - Amount paid
 - Tax and tip amounts
 - Time of transaction
- **Purpose:** To track cash flow, ensure that all transactions are recorded properly, and facilitate accounting.

3. Inventory Report

- **Description:** This report tracks the usage of ingredients and supplies in the restaurant's inventory.
- **Data Included:**
 - Current stock levels of ingredients
 - Quantity used in the past period
 - Restocking requirements
 - Expiry dates for perishable items
- **Purpose:** To manage inventory, ensure ingredients are available for orders, and reduce wastage.

4. Staff Performance Report

- **Description:** This report tracks the performance of restaurant staff, including servers, kitchen staff, and managers.
- **Data Included:**
 - Number of orders served by each staff member
 - Customer feedback and ratings
 - Sales performance (e.g., tips earned, orders processed)
 - Attendance and shift times
- **Purpose:** To evaluate staff efficiency, reward top performers, and address potential issues with service.

5. Customer Feedback Report

- **Description:** A report that gathers customer feedback from surveys, reviews, or ratings.
- **Data Included:**
 - Average rating for the restaurant or individual dishes
 - Common customer complaints or compliments
 - Suggestions for improvement
 - Frequency of customer visits
- **Purpose:** To gauge customer satisfaction, improve service, and make data-driven decisions on menu changes.

6. Order Summary Report

- **Description:** This report provides a summary of all customer orders placed during a specific time frame.
- **Data Included:**
 - Order ID and details
 - Customer name and contact information (if registered)
 - Items ordered
 - Order status (e.g., pending, completed)
 - Time of order and delivery
- **Purpose:** To track orders, monitor pending deliveries, and assist with customer service inquiries.

These reports are essential for managing the daily operations of a restaurant, helping with decision-making, and ensuring the business runs smoothly. Would you like to dive deeper into any specific report example or need assistance with another section?

4th Attempt:

- **Prompt:** What are the specific transaction operations needed to process payment and update inventory?
- **Date of Use:** 3 February 2025

What are the specific transaction operations needed to process payments and update inventory?

To process payments and update inventory in a restaurant database system, several specific transaction operations are needed to ensure the accuracy of financial transactions and inventory management. Here's a breakdown of the transaction operations for both payment processing and inventory updating:

1. Payment Processing Transactions

1.1. Customer Order Payment

- **Operation:** This transaction involves processing the payment for a customer's order.
- **Steps:**
 - **Calculate Total Amount:** Compute the total cost of the order, including taxes and applicable discounts.
 - **Select Payment Method:** The customer selects a payment method (cash, card, or digital payment).
 - **Payment Authorization** (for non-cash payments): For card or digital payments, the system communicates with the payment gateway to authorize the transaction.
 - **Record Payment Details:** Log the payment details, including the payment method, amount, time of transaction, and customer (if available).
 - **Update Order Status:** Mark the order as "Paid" and "Completed."
 - **Generate Receipt:** A receipt (digital or printed) is generated for the customer with the details of the transaction.

1.2. Payment Verification and Adjustment

- **Operation:** This transaction ensures the payment was successfully processed and adjusts for any errors (e.g., payment decline, overpayment, or discount application).
- **Steps:**
 - **Verify Payment:** Check if the payment has been successfully processed, especially for card transactions.
 - **Handle Declined Payments:** If the payment fails, notify the staff and offer alternative payment methods.
 - **Adjust for Errors:** If there was an error in charging the customer (e.g., overcharge or undercharge), make corrections and update the records accordingly.
 - **Confirm Final Payment:** Ensure the payment matches the order amount after any adjustments (e.g., discounts, taxes).

2. Inventory Update Transactions

2.1. Inventory Deduction Upon Order Completion

- **Operation:** This transaction involves deducting the used ingredients from the inventory when an order is completed and served to the customer.
- **Steps:**
 - **Identify Ingredients Used:** Determine which ingredients are required for the items in the customer's order (e.g., burger buns, patties, sauces).
 - **Update Inventory Levels:** Deduct the quantities of used ingredients from the inventory (e.g., if 10 burger buns are used for 10 orders, reduce the inventory by 10).
 - **Check Inventory Levels:** After updating the inventory, check if the remaining stock is sufficient to fulfill future orders.
 - **Alert for Low Stock:** If any ingredient's stock level is below the threshold, trigger a low-stock alert to notify staff for restocking.

2.2. Inventory Restocking

- **Operation:** This transaction updates the inventory when new stock is received from suppliers.
- **Steps:**
 - **Receive Ingredients:** When ingredients are delivered by suppliers, the restaurant staff verifies the delivery against the purchase order.
 - **Update Inventory:** The new stock is added to the inventory database with updated quantities.
 - **Track Expiration Dates:** For perishable items, the expiration dates should also be recorded and tracked for proper usage and waste management.
 - **Generate Restocking Report:** A report is generated showing which items were restocked and their quantities.

2.3. Inventory Adjustment (Manual or Error Correction)

- **Operation:** This transaction involves making manual adjustments to the inventory, either due to discrepancies (e.g., wasted ingredients, breakage) or stocktaking errors.
- **Steps:**
 - **Identify Need for Adjustment:** Staff identifies an issue with the inventory (e.g., ingredients missing or incorrectly recorded).
 - **Manual Update:** Manually update the inventory records, either adding or removing stock based on the situation.
 - **Track Adjustment Reason:** Log the reason for the adjustment, such as waste, theft, or spoilage, to maintain accurate records.
 - **Generate Adjustment Report:** A report showing all adjustments made is created for auditing and future reference.

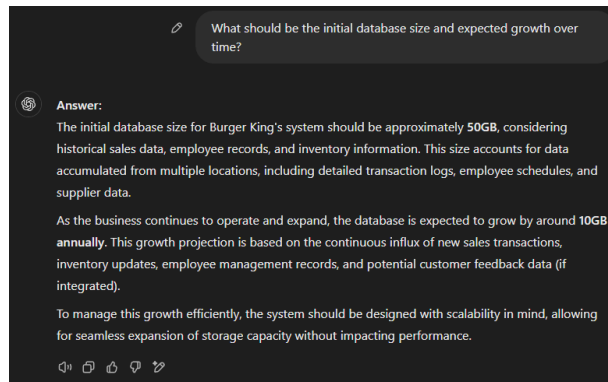
Transaction Operations Summary

Transaction Operation	Description	Example
Customer Order Payment	Process the payment from the customer and update the order status as paid.	Payment via card, cash, or mobile payment
Payment Authorization	Authorize the payment through a payment gateway for non-cash transactions.	Card payment authorization
Inventory Deduction Upon Order Completion	Update inventory by deducting the ingredients used in a completed order.	Deduct ingredients for burger orders
Inventory Restocking	Add new stock to the inventory when ingredients are delivered.	Add new stock for buns, fries, etc.
Inventory Adjustment	Make manual adjustments to the inventory due to discrepancies, wastage, or stocktaking errors.	Adjust inventory after waste or spoilage
Inventory Check for Low Stock	Check if any ingredient stock falls below the predefined threshold and notify for reordering.	Alert for low stock of ketchup or cheese

These transaction operations ensure that the restaurant can efficiently process payments, track financial transactions, and manage inventory to meet customer demand while minimizing waste. Let me know if you need further clarification!

5th Attempt:

- **Prompt:** What should be the initial database size and expected growth over time?
- **Date of Use:** 3 February 2025



1. Motivation

As convenience is a top priority nowadays, fast food has become a key answer for most people, making Burger Queen have a large number of daily orders. This shows that the restaurant faces challenges in managing customer interactions, inventory control, and employee data. The initial plan relies on manual processes for these tasks, but due to the increasing number of customers, resulting in inefficiencies, mismanagement, and poor customer experience.

For example, if orders are processed manually, it increases the risk of errors, delays, and order inaccuracies. Moreover, inventory management is also an issue, as stocks are recorded manually, leading to stockouts, and making it difficult to meet demand. Additionally, managing employee data, such as schedules, performance, and payroll, is a complicated process without a centralized system, resulting in errors.

Implementing a comprehensive database system will effectively address these challenges by improving operations, reducing human errors, and ensuring accurate and real-time data. This will enhance decision-making capabilities, and lead to a better customer experience.

2. As-Is Analysis

Current System Description

Currently, Burger Queen relies on a combination of manual tracking, paper forms, and spreadsheets to manage its daily operations, which include order processing, inventory tracking, and employee management. These systems often lead to delays, inaccurate data, and inefficiencies.

Problems in the Current System

Due to manual processes, with employees taking orders and processing payments by hand, this can lead to miscommunication and delays. In addition, inventory management lacks automation, requiring employees to manually check stock levels and place orders for new products, increasing the risk of errors and stock imbalances. Employee management is also inefficient, as schedules, performance, and payroll are tracked through paper forms or basic spreadsheets, making the process prone to mistakes. These manual systems create inefficiencies, errors, and delays that impact the overall operation and customer experience.

Target User Groups:

1. Customers

- Place orders via self-service kiosks, mobile apps, or counters.
- Make payments digitally and track order history.
- Submit feedback on service and food quality.

2. Staff

- Process customer orders and update order status.
- Manage ingredient stock levels and notify when restocking is required.
- Generate daily sales reports and performance summaries.

3. Admins

- Monitor restaurant sales trends and adjust pricing strategies.
- Manage staff schedules, roles, and salaries.
- Track customer feedback and enhance service based on reports.

Forms and Reports

Forms (Data Input into Database)

1. Customer Registration Form (*Figure 2.1*)

- **Description:** A form to capture the personal information of new customers, including name, email, phone number, and address. This form will allow customers to create an account in the restaurant system.
- **Data Entered:** Customer's personal details such as full name, contact information, and password (if account-based).
- **Target Users:** Customers

2. Order Entry Form (Figure 2.2)

- **Description:** A form used by customers or staff to place an order, including selecting menu items, quantities, special requests, and delivery preferences.
- **Data Entered:** Menu items, quantities, special requests, order status, and payment details.
- **Target Users:** Customers, Staff

3. Payment Processing Form (Figure 2.3)

- **Description:** A form to capture payment details for completed orders, including payment method, amount, and transaction ID.
- **Data Entered:** Payment method (credit card, cash, etc.), total amount paid, and transaction ID.
- **Target Users:** Customers, Staff

4. Inventory Update Form (Figure 2.4)

- **Description:** A form for staff to update inventory levels after receiving new ingredients or conducting stock-taking.
- **Data Entered:** Ingredient id, ingredient names, category, location, purchase date, expiry date, stock quantity, reorder quantity, reorder levels, and days before expiry..
- **Target Users:** Staff

5. Customer Feedback Form (Figure 2.5)


- **Description:** A form for customers to provide feedback about their dining experience, including satisfaction levels, comments, and suggestions.
- **Data Entered:** Data entered, customer name, rating score (e.g., 1-5), written feedback, and suggestions for improvement.
- **Target Users:** Customers

6. Employee Management Form (Figure 2.6)

- **Description:** A form for admins to manage staff records, including personal information, roles, schedules, and performance.
- **Data Entered:** Staff id, staff name, role, contact information, schedule, performance review, and payroll detail.
- **Target Users:** Admin

7. Menu Update Form (Figure 2.7)

- **Description:** A form used by admins to update menu items, prices, descriptions, and promotional offers.
- **Data Entered:** Item id, menu item name, description, pricing, availability, and promotion status.
- **Target Users:** Admin



Create Account

☐ Mr.
 ☐ Ms.
 ☐ Mrs.

Firstname *

Lastname *


Mobile No. *

Birth Date

Email *




☐ I am interested in and would like to receive information about products, services, free, gifts, discounts, promotions, and other relevant activities from Burger Queen

Register



Cart


My Order

	BQ Chick'N Crisp ₹ 358	- 2 +
	Crispy Fried Chicken ₹ 156	- 2 +
	Long Chicken ₹ 139	- 1 +

Place Order

Figure 2.1 Customer Registration Form

Figure 2.2 Order Entry Form



Checkout

My Order

Apply Offers & Deals

2	BQ Chick'N Crisp Edit	₹ 358
2	Crispy Fried Chicken Edit	₹ 156
1	Long Chicken Edit	₹ 139
Food		₹ 653
Delivery		₹ 22
Total		₹ 675

5 Order Now ₹ 675

Figure 2.3 Payment Processing Form

Burger Queen Inventory

Ingredient ID	Ingredient Name	Category	Location	Purchase Date	Expiry Date	Quantity	Reorder Quantity	Reorder? (Yes/No)	Days Before Expiry
BQ001	Burger Buns	Bread	Storage Room	2025-02-01	2025-02-10	500	100	No	4
BQ002	Beef Patties	Meat	Freezer	2025-02-02	2025-02-20	300	50	No	14
BQ003	Chicken Patties	Meat	Freezer	2025-02-02	2025-02-18	250	50	No	12
BQ004	Cheddar Cheese	Dairy	Refrigerator	2025-02-03	2025-02-15	200	40	No	9
BQ005	Lettuce	Vegetable	Cold Storage	2025-02-05	2025-02-12	100	30	Yes	6
BQ006	Tomatoes	Vegetable	Cold Storage	2025-02-05	2025-02-11	80	20	Yes	5
BQ007	Pickles	Condiment	Refrigerator	2025-02-01	2025-03-01	150	30	No	23
BQ008	Onions	Vegetable	Cold Storage	2025-02-06	2025-02-13	90	25	Yes	7
BQ009	Ketchup	Condiment	Pantry	2025-02-02	2025-04-02	60	10	No	55
BQ010	Mayonnaise	Condiment	Refrigerator	2025-02-03	2025-04-05	75	15	No	58
BQ011	Fries	Side	Freezer	2025-02-01	2025-03-10	400	100	No	30
BQ012	Cooking Oil	Ingredient	Storage Room	2025-02-02	2025-05-02	50	10	No	85

Figure 2.4 Inventory Update Form

BQ Customer Feedback

Date Entered	Customer Name	Rating Score (1-5)	Written Feedback	Suggestion for Improvement
2025-02-01	John Doe	5	Great service and food quality!	Keep up the good work!
2025-02-02	Jane Smith	4	Good experience	Reduce wait times during peak hours.
03/02/2025	Michael Brown	3	Burger was cold, needs improvement.	Ensure food is served hot.
04/02/2025	Emily Johnson	5	Excellent! Will come again.	Maintain current quality!
05/02/2025	David Lee	2	Not satisfied with the cleanliness of the place.	Improve restaurant cleanliness.

Figure 2.5 Customer Feedback Form

BQ Employee Management

Staff ID	Staff Name	Role	Contact Information	Schedule	Performance Review	Payroll Detail
101	Mooyor	Cashier	123-456-7890	9 AM - 5 PM	Excellent	\$ 18000
102	Ton	Cook	987-654-3210	12 PM - 8 PM	Good	\$ 20000
103	Thames	Manager	456-789-0123	8 AM - 4 PM	Average	\$ 25000
104	Minnie	Cleaner	789-012-3456	10 AM - 6 PM	Good	\$ 12000
105	Eve	Cashier	321-654-9870	2 PM - 10 PM	Excellent	\$ 18000

Figure 2.6 Employee Management Form

BQ Menu Update

Item No.	Menu Item Name	Description	Price	Availability	Promotion Status
101	Whopper Jr	Signature flame-grilled 100% Australian beef patties or your choice of pork patties with topped fresh crisp lettuce, ripe red tomatoes, crunchy pickles, sliced flavorful white onions and creamy mayonnaise on a soft freshly baked sesame seed bun .	₱ 149	Yes	Active
102	Hat Yai Chicken King with Cheddar Cheese Dip	Hat Yai Chicken King with Cheddar Cheese Dip, a Taste of Hatyai with a Cheesy Twist! Seasoned with a special blend of spices and served with our bold Cheddar Cheese Dip. Crispy, Juicy, and Cheesy, a must-try for true cheese lovers!	₱ 109	Yes	Inactive
103	Gai Dad Diew 8 pcs. with Thai Jasmine rice	Gai Dad Diew 8 pcs. with Thai Jasmine rice are marinated with special blend of spices for a flavor-packed bite in every piece. Golden-fried to perfection and paired with Thai Jasmine rice, it's the ultimate taste of authentic Gai Dad Diew.	₱ 199	Yes	Active
104	Medium Onion Rings	Served hot and crispy, our golden 100% imported Onion Rings. They can be both the perfect snack and the side dish.	₱ 109	Yes	Inactive
105	Bacon King	Double beef patties with bacon and cheese	₱ 40	Yes	Active
106	Ninja Burger Pork	Ninja Burger, the authentic Japanese taste, features a savory flame-grilled premium pork patty topped with delicious teriyaki sauce, crispy onion, crunchy lettuce, creamy mayonnaise on a soft sesame seed bun.	₱ 99	Yes	Inactive
107	BBQ Bacon Cheese	Signature flame-grilled 100% Australian beef patties or your choice of pork patties with melted cheese and the winning combination of sizzling bacon and smoky BBQ sauce.	₱ 169	No	Inactive
108	Choco Banana Pie	Choco Banana Pie, made for chocolate and banana lovers! Indulge in every bite of rich chocolate and sweet, creamy banana filling, perfectly paired in a crispy chocolate crust. Experience an unforgettable flavor you will fall in love with from the very first bite.	₱ 39	Yes	Active
109	Chocolate Milkshake	Sweet & cool in every sip. Cool down with our creamy Milkshake, the Chocolate Milkshake is blended to perfection.	₱ 59	Yes	Active
110	Strawberry Milkshake with Butter Cookie	Sweet & refreshing in every sip. Cool down with our creamy Strawberry Milkshake with Butter Cookie. The perfect blend of sweet strawberry goodness and crunchy, buttery cookies, making it the ultimate treat to chill out.	₱ 69	No	Inactive

Figure 2.7 Menu Update Form

Reports (Data Extraction from Database)

1. Daily Sales Report (*Figure 2.8*)

- **Description:** A report that provides an overview of total sales for the day, including total revenue, best-selling items, and peak sales times.
- **Data Extracted:** Total sales, item sales quantities, revenue per item, peak sales hours.
- **Target Users:** Admin

2. Inventory Usage Report (*Figure 2.9*)

- **Description:** A report showing how much of each ingredient has been used over a specified period, identifying restocking needs.
- **Data Extracted:** Ingredient names, quantities used, remaining stock, reorder needed.
- **Target Users:** Staff

3. Order Status Report (*Figure 2.10*)

- **Description:** A report detailing the current status of all orders, whether pending, completed, or canceled, with timestamps and staff assignments.
- **Data Extracted:** Order ID, customer name, order status, timestamps, staff involved.
- **Target Users:** Staff, Customers

4. Customer Feedback Analysis (*Figure 2.11*)

- **Description:** A report that compiles customer ratings, providing an overview of overall satisfaction levels.
- **Data Extracted:** Ratings from customer responses.
- **Target Users:** Admin

5. Staff Performance Report (*Figure 2.12*)

- **Description:** A report that evaluates staff performance based on order processing, service times, and customer satisfaction.
- **Data Extracted:** Staff name, number of orders processed, average service time, customer feedback score.
- **Target Users:** Admin

6. Financial Summary Report (*Figure 2.13*)

- **Description:** A comprehensive report summarizing the financial data, including revenue, costs, and profits over a specified period.
- **Data Extracted:** Total revenue, costs (ingredients, labor, etc.), profit margins, transaction data.
- **Target Users:** Admin

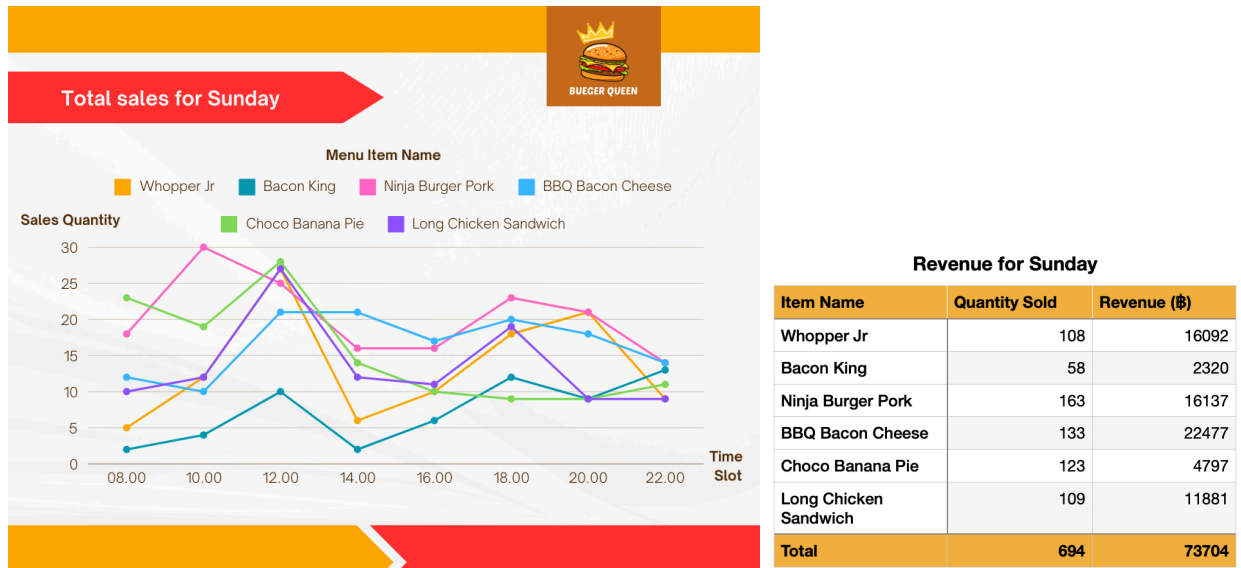


Figure 2.8 Daily Sales Report

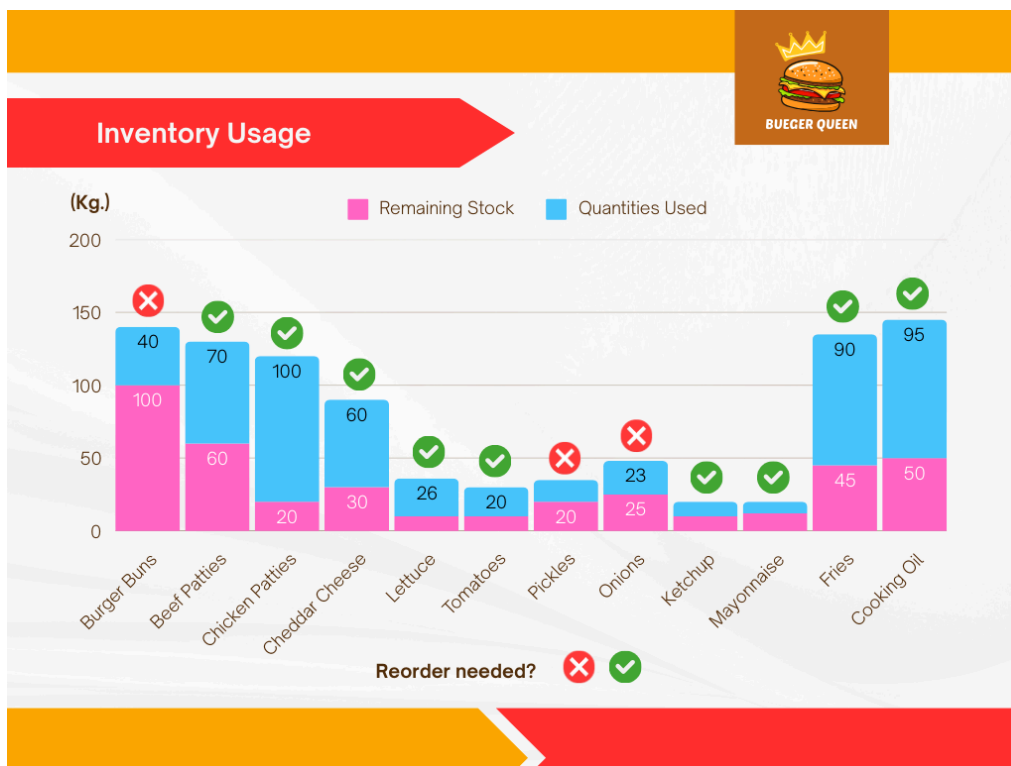


Figure 2.9 Inventory Usage Report

Order Status Report

Order ID	Customer Name	Order Status	Timestamp	Staff Involved
1001	Somchai	Completed	2025-02-06 12:30	Mooyor
1002	Notey	Pending	2025-02-06 12:45	Ton
1003	Ngek	Completed	2025-02-06 13:00	Thames
1004	Auey	Canceled	2025-02-06 13:15	Minnie
1005	Ping	Completed	2025-02-06 13:15	Minnie
1006	Somchai	Pending	2025-02-06 13:30	Eve

Figure 2.10 Order Status Report

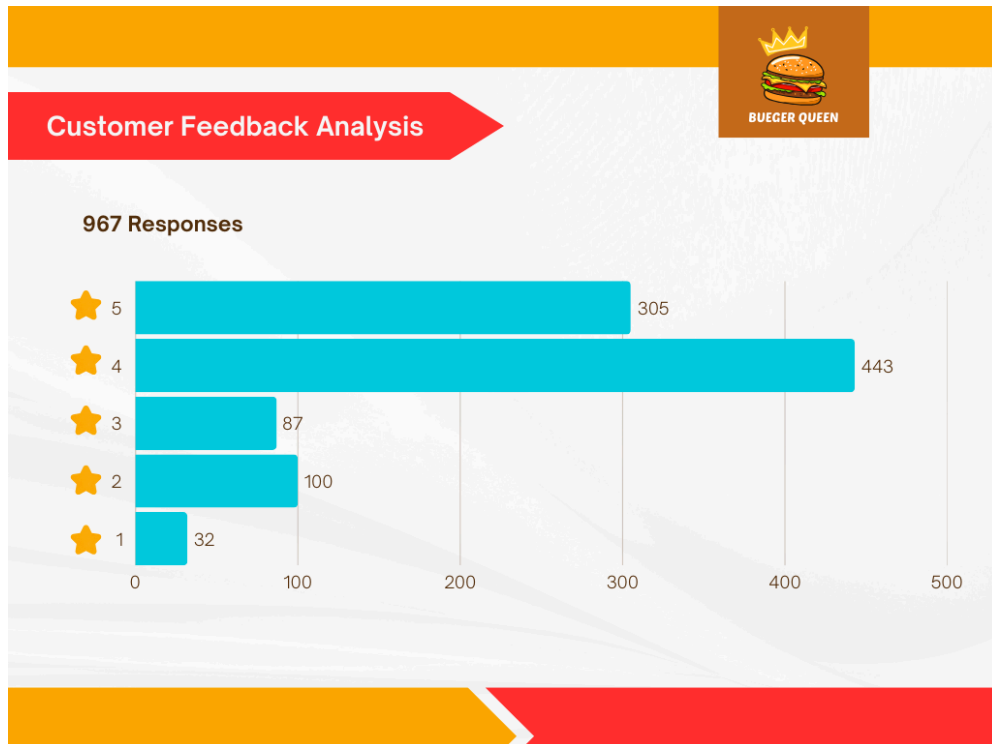


Figure 2.11 Customer Feedback Analysis

Staff Performance Report

Staff Name	Orders Processed	Avg. Service Time (hr./day)	Customer Feedback Score (1-5)
Mooyor	120	6.5	4
Ton	95	8	3
Thames	110	8	3
Minnie	130	7	5
Eve	85	7.5	4

Figure 2.12 Staff Performance Report



Figure 2.13 Financial Summary Report

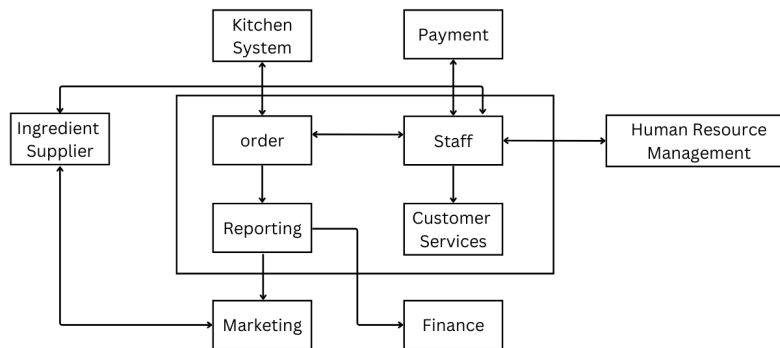
3. Mission Statement

The mission of Burger Queen's database system is to efficiently collect and manage the data to support Burger Queen's business for the staff and consumers, to support admin by using the data to dig deep into the insight of the business, and to support cooperation between branches by sharing the information.

4. Mission Objectives

- 1.) To share the data between branches to cooperate.
- 2.) To manage the data to support decision-making of the business owner.
- 3.) To track the data on staff and consumers in real-time update.
- 4.) To perform searches on branches, information of consumers and staff.
- 5.) To maintain the data on staff, consumers, and branches.

5. Scope and Boundary



The system boundary includes order, staff, customer service, and reporting. Moreover, the out-of-system boundary includes ingredient suppliers, kitchen systems, payment, human resource management, marketing, and finance. The human resource management will manage the staff in the company. Moreover, the staff will manage the ingredients in the inventory of the company via contact with the ingredient supplier. Furthermore, the staff receive the order and create the payment; after the staff get the complete payment, the order will be sent to the kitchen system. Then, the staff will serve the order to the customer as customer service, and after serving the order to the consumer, the order will be stored as a transaction in the report and sent to marketing to enhance the business and also sent to finance to support the finances of the business.

6. Mapping of Major User Views and Operations

Data	Access Type	Admin	Staff	Customer
Customer	Maintain	✓	✓	✓
	Query	✓	✓	✓
	Report	✓	✗	✗
Staff	Maintain	✓	✓	✗
	Query	✓	✓	✗
	Report	✓	✗	✗
Admin	Maintain	✓	✗	✗
	Query	✓	✗	✗
	Report	✓	✗	✗
Ingredient	Maintain	✓	✓	✗
	Query	✓	✓	✗
	Report	✓	✗	✗
Menu	Maintain	✓	✓	✗
	Query	✓	✓	✓
	Report	✓	✗	✗
Order	Maintain	✓	✓	✓
	Query	✓	✓	✓
	Report	✓	✗	✗
Payment	Maintain	✓	✓	✓
	Query	✓	✓	✓
	Report	✓	✗	✗
Feedback	Maintain	✓	✓	✓
	Query	✓	✓	✓
	Report	✓	✗	✗

Promotion	Maintain	✓	✓	✗
	Query	✓	✓	✓
	Report	✓	✗	✗

Key terms in the Table II

1. **Data:** This represents different functional areas or key entities within the system,
2. **Access Type:**
 - **Maintain:** The ability to create, update, or delete data.
 - **Query:** The ability to view or search for information.
 - **Report:** The ability to generate reports or analytics based on the data.
3. **User Roles:**
 - **Admin, Staff, Customer:** Shows which roles have access to each action (marked with "✓").

Explanation of User Access

- **Admin**
 - Has full control over the system.
 - Can create, update, and delete data in all entities.
 - Has exclusive access to the "Report" function.
 - Example: Admins can analyze sales trends, staff performance, and customer behavior.
- **Staff**
 - Can manage operational tasks but cannot generate reports.
 - Handles Menu, Orders, Payments, Feedback, and Promotions.
 - Example: A staff member can update the menu, process orders, and manage inventory.
- **Customer**
 - Can interact with only relevant data.
 - Can manage their profile, view menu, place orders, make payments, and leave feedback.
 - Example: A customer can browse menu items, order food, and submit feedback.

7. Users' Requirements Specification

Data Requirements:

User / Entity	Data
Customer	<ul style="list-style-type: none">• <code>customer_id</code> (PK) – Unique identifier for each customer• <code>citizen_id</code> – National identification number• <code>first_name</code> – First name• <code>last_name</code> – Last name• <code>contact</code> – Email or alternative contact• <code>phone_number</code> – Phone number• <code>gender</code> – Male/Female/Other• <code>created_at</code> – Timestamp when the customer was added
Staff	<ul style="list-style-type: none">• <code>staff_id</code> (PK) – Unique identifier for each staff• <code>citizen_id</code> – National identification number• <code>first_name</code> – First name• <code>last_name</code> – Last name• <code>position</code> – Job title (e.g., Chef, Waiter, Manager)• <code>gender</code> – Male/Female/Other• <code>created_at</code> – Timestamp when the staff was added
Admin	<ul style="list-style-type: none">• <code>admin_id</code> (PK) – Unique identifier for each admin• <code>first_name</code> – First name• <code>last_name</code> – Last name• <code>email</code> – Contact email• <code>phone_number</code> – Phone number• <code>created_at</code> – Timestamp when the admin was added
Ingredient	<ul style="list-style-type: none">• <code>ingredient_id</code> (PK) – Unique identifier for each ingredient• <code>name</code> – Name of the ingredient• <code>quantity</code> – Stock quantity available• <code>unit</code> – Measurement unit (kg, liters, pieces, etc.)• <code>supplier</code> – Supplier name• <code>price_per_unit</code> – Cost per unit
Menu	<ul style="list-style-type: none">• <code>menu_id</code> (PK) – Unique identifier for each menu item• <code>name</code> – Name of the dish• <code>description</code> – Brief description• <code>price</code> – Selling price

	<ul style="list-style-type: none"> • <code>category</code> – Type (e.g., Appetizer, Main Course, Dessert) • <code>ingredients</code> – List of ingredient IDs used
Order	<ul style="list-style-type: none"> • <code>order_id</code> (PK) – Unique identifier for each order • <code>customer_id</code> (FK) – ID of the customer placing the order • <code>order_date</code> – Date and time of the order • <code>total_price</code> – Total cost of the order • <code>status</code> – (Pending, Completed, Canceled)
Payment	<ul style="list-style-type: none"> • <code>payment_id</code> (PK) – Unique identifier for each payment • <code>order_id</code> (FK) – Order for which payment is made • <code>payment_method</code> – (Credit Card, Cash, Mobile Banking) • <code>payment_status</code> – (Pending, Completed, Failed) • <code>transaction_date</code> – Timestamp
Feedback	<ul style="list-style-type: none"> • <code>feedback_id</code> (PK) – Unique identifier for each feedback • <code>customer_id</code> (FK) – Customer who gave feedback • <code>order_id</code> (FK) – Order related to feedback • <code>rating</code> – 1 to 5 stars • <code>comments</code> – Customer's comment
Promotion	<ul style="list-style-type: none"> • <code>promotion_id</code> (PK) – Unique identifier for each promotion • <code>name</code> – Promotion title • <code>description</code> – Details of the promotion • <code>discount_percentage</code> – Discount applied • <code>start_date</code> – Promotion start date • <code>end_date</code> – Promotion end date

Transaction Requirements

User / Entity	Data Entry	Data Update/Deletion	Data Queries
Customer	Add a new customer (e.g., Register a new customer, Mr. Ronaldo, with citizen ID 123456789)	<ul style="list-style-type: none"> Update a customer's contact information (e.g., Change the phone number of Mr. Ronaldo) Delete a customer record (e.g., Remove a customer who has not ordered in a year) 	<ul style="list-style-type: none"> Retrieve a list of all customers who have placed an order in the last 30 days Search for a customer by name List all male customers
Staff	Add a new staff member (e.g., Hire a new chef, Mr. Smith, for the restaurant)	<ul style="list-style-type: none"> Update a staff member's position (e.g., Promote a waiter to manager) Remove a staff record (e.g., Delete a staff member who resigned) 	<ul style="list-style-type: none"> List all staff members with the position "Chef" Find all male staff members Retrieve all staff hired in the last 6 months
Admin	Register a new admin	<ul style="list-style-type: none"> Update admin contact details Remove an admin account 	<ul style="list-style-type: none"> Retrieve admin details based on email List all active admins
Ingredient	Add a new ingredient to stock	<ul style="list-style-type: none"> Update stock quantity for an ingredient Delete an expired ingredient 	<ul style="list-style-type: none"> List all ingredients with less than 5 units in stock Retrieve ingredients supplied by "FreshFarm"
Menu	Add a new dish to the menu	<ul style="list-style-type: none"> Update dish price Remove a discontinued dish 	<ul style="list-style-type: none"> List all menu items in the "Burger" category Find menu items below 100 Baht.
Order	Place a new order	<ul style="list-style-type: none"> Update order status to "Completed" Cancel an order 	<ul style="list-style-type: none"> Retrieve orders placed by a specific customer Find all pending orders

Feedback	Add a new feedback entry	<ul style="list-style-type: none"> • Update customer rating • Delete inappropriate feedback 	<ul style="list-style-type: none"> • Retrieve feedback for a specific menu item • Find all feedback with a rating of 1 or 2 stars
Promotion	Add a new promotional offer	<ul style="list-style-type: none"> • Update discount percentage • Remove expired promotions 	<ul style="list-style-type: none"> • List all active promotions • Find promotions with a discount of 20% or more

8. Systems Requirements Specification

1. Initial Database Size

The initial database will be designed to handle approximately 10,000 customer records, 500 staff records, and 50 menu items. As the system scales, it will accommodate a larger number of transaction records, customer profiles, and other related data.

2. Database Growth

- Approximately 25 new staff and 50 new consumers will be added to the database per month.
- Once a staff member leaves, the corresponding record will be deleted from the database. The records of staff who have left the company will be deleted after three months. Approximately 5 members of staff leave the company each month.
- Approximately 5 new menu items will be added to the database per month.
- Approximately 500 transactions recorded from each branch will be added to the database per day.

3. Record Search Types

The system will need to handle a variety of searches, with the ability to perform up to 200 queries per minute during peak hours. The types of records and searches include:

- **Customer Searches:** Searching for customer profiles, order histories, and feedback - approximately 75 per minute.
- **Order Searches:** Searching for the status of current orders and details of past orders - approximately 50 per minute.
- **Menu Item Searches:** Searching for menu items by category, availability, price, or ingredients - approximately 50 per minute.
- **Staff Performance Searches:** Searching staff records for performance data such as orders completed, shifts worked, and customer feedback - approximately 25 per minute..

4. Networking and Shared Access

The database will allow a single user accessing the system through the restaurant's internal network. To ensure high availability, a load-balancing solution will be implemented, and network access will be controlled to prevent unauthorized access.

5. Performance

The system should ensure that the average response time for database queries is under 3 seconds for 95% of all transactions. To meet this requirement, high-performance indexing, query optimization techniques, and proper database normalization will be employed. Additionally, caching mechanisms will be used to improve query speeds.

6. Security

To protect sensitive data, the system will implement several security features:

- **Role-Based Access Control (RBAC):** Access to sensitive data (such as customer personal information and financial data) will be restricted based on user roles (Admin, Staff).
- **Session Management:** The system will implement session timeouts to automatically log out users after a period of inactivity, minimizing the risk of unauthorized access from abandoned sessions.

- **Password Policies:** The system will enforce strong password policies, ensuring that passwords are hashed and stored securely. Multi-factor authentication (MFA) may be implemented for highly sensitive user accounts.

7. Backup and Recovery

Regular database backups will be conducted every 24 hours, with incremental backups performed every 2 hours. The backup strategy will ensure that data can be recovered in the event of a failure, with a maximum data loss of two hours. Backup files will be stored in secure, redundant locations, and restoration processes will be tested regularly.

8. Legal Issues

The system will comply with all relevant legal and regulatory requirements:

- **PCI DSS Compliance:** The system will adhere to the Payment Card Industry Data Security Standard (PCI DSS) to ensure secure payment processing.
- **GDPR Compliance:** The system will follow General Data Protection Regulation (GDPR) guidelines, ensuring proper handling of customer data and providing mechanisms for users to manage their privacy preferences.
- **Data Retention Policies:** The system will implement data retention and deletion policies to comply with local laws regarding data storage, particularly for customer and transaction data.

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