UTM
UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTING
UTM Johor Bahru

SEMESTER II 2023/2024

SYSTEM ANALYSIS AND DESIGN (SECD2613)

PHASE 2

INFORMATION SYSTEM GATHERING AND REQUIREMENT

Lecturer: Cik Suhaimi Bin Yusof

Prepared By:

Group : 9

Name	Matric No.
CHONG LUN QUAN	A23CS0067
CHEW CHUAN KAI	A23CS0062
IZZ HAEIL BIN HAMISHAMSUL	A23CS0088
CHEN SHU YAN	A23CS0059

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1.0 Overview of the Project

We will kick off this project by collecting information requirements and examining system requirements. This process aims to uncover the information needs necessary for understanding the 4W1H (Who, What, When, Where, and How) of an operational system. Engagingly, we utilize Google Forms to poll customers, gathering valuable insights through nominal and scale queries to gather detailed data from various perspectives. With the requirements information in hand, we develop a solid grasp of the business function, focusing on people, objectives, data, and procedures.

Next, we visualize the business flow of the AS-IS system for the restaurant business using context diagrams. These diagrams serve as high-level Data Flow Diagrams (DFDs), illustrating information flow between the DineDart.com Restaurant Management System (RMS) and external entities, such as sellers and customers. Data flow diagrams, including parent and child diagrams, depict external entities, data flows, data stores, and procedures once the context diagram is established. The context diagram, also known as the parent diagram, is assigned an integer for each process and includes all external entities and main data storage. Each process in the parent diagram is further detailed in a child diagram, utilizing the same numbering system and replicating input and output.

Following the DFD, we construct Entity Relationship Diagrams (ERDs), depicting relationships within entity sets. Subsequently, data requirements and transaction requirements are delineated. Transaction requirements provide examples of how data is utilized, while data requirements elucidate how data is utilized.

Finally, tasks are concluded, providing us with a comprehensive understanding of the current system through data flow diagrams, entity relationship diagrams, and information requirements.

2.0 Problem Statement

1. Limited Website Access

Many restaurants have websites primarily designed to showcase their menu, ambiance, and location. However, access to these websites is often restricted to patrons physically present in the restaurant. This limitation arises from a traditional mind-set that views the website as an extension of the physical establishment rather than a tool for reaching potential customers beyond the premises. Consequently, individuals seeking information about the restaurant's offerings, making reservations, or placing delivery orders are unable to do so without visiting the restaurant in person. This restricts the restaurant's ability to attract new customers and limits the convenience for existing ones, particularly those who prefer to plan their dining experiences in advance or order food for delivery.

2. Lack of Reservation System

In the absence of a reservation system, customers may encounter difficulties securing a table, especially during peak dining hours or for special occasions such as holidays or anniversaries. This can lead to frustration, longer wait times, or even loss of business if potential diners opt for alternative establishments with reservation capabilities. Moreover, without a centralized system for managing reservations, restaurant staff may struggle to keep track of bookings, leading to overbooking or underutilization of available seating capacity. As a result, both customers and restaurant management are inconvenienced, impacting overall satisfaction and operational efficiency.

3. Absence of Delivery System

With the rise of food delivery platforms and changing consumer preferences, offering delivery services has become increasingly important for restaurants to remain competitive and meet the evolving needs of their customers. However, many restaurants still lack an integrated delivery system, relying instead on third-party delivery services that may impose high commission fees and compromise the restaurant's Brand experience. By not having control over the delivery process, restaurants risk inconsistency in food quality, longer delivery times, and potential disputes with delivery partners. Additionally, without a direct delivery option, restaurants miss

out on potential revenue streams from customers who prefer the convenience of having food delivered to their doorstep.

4. Limited Payment Methods

The payment landscape has evolved significantly with the advent of digital payment technologies, yet some restaurants continue to offer limited payment options such as cash-only or a select few credit/debit cards. This poses challenges for customers who prefer alternative payment methods such as mobile wallets, online payment platforms, or contactless transactions. By not accommodating diverse payment preferences, restaurants risk alienating a segment of their customer base and may lose out on potential sales opportunities. Moreover, in an increasingly cashless society, relying solely on cash payments may hinder operational efficiency and increase the risk of errors or theft.

5. Difficulty in Switching Menu Interface

Mr Kiho found that switching menu interfaces presents a formidable challenge. Each time he attempts to make a transition, he encounters a barrage of error codes that disrupt the process, necessitating the involvement of technicians to rectify the issues. This not only incurs significant expenses but also results in considerable time delays, hindering our ability to adapt our menu promptly to meet customer demands or market trends. The impact of this problem goes beyond financial and operational concerns; it also affects the overall customer experience. Inaccurate or outdated menu information can lead to dissatisfaction among patrons, eroding trust and potentially driving them to seek dining alternatives. This ongoing difficulty in switching menu interfaces poses a substantial obstacle to our business's efficiency and competitiveness in the market.

3.0 Proposed Solutions

DineDart system is a solution designed to revolutionize the dining experience for both customers and restaurant owner, Mr. Kiho. With a focus on convenience and efficiency, DineDart seamlessly integrates online ordering, reservation management, delivery services, and streamlined payment options.

One of the key features of the enhanced system is the ability for customers to place their orders online, eliminating the need to physically visit the restaurant or scan QR codes. This empowers customers to enjoy their favorite meals from the comfort of their homes or offices, enhancing convenience and accessibility.

Furthermore, the integration of a reservation system adds another layer of convenience for both Mr. Kiho and his customers. By managing table bookings effectively, Mr. Kiho can ensure a smoother dining experience, minimizing overcrowding and wait times. For customers, this means they can secure a table in advance and enjoy their meals without unnecessary delays.

Recognizing the growing preference for delivery services, DineDart now offers internal delivery options. This expansion extends Mr. Kiho's customer reach beyond the immediate vicinity of the restaurant, catering to a wider audience and increasing sales potential.

In addition to enhancing the ordering and dining experience, DineDart simplifies the payment process. By offering online payment options, customers can settle their bills from their seats, eliminating the need to queue at the counter. This not only adds convenience but also enhances security by promoting cashless transactions, addressing Mr. Kiho's safety concerns.

Moreover, DineDart empowers Mr. Kiho with greater control over his menu structure. Previously, menu alterations required intervention from a programmer, incurring additional costs and delays. Now, with administrative privileges, Mr. Kiho can customize his menu effortlessly. For instance, he can introduce a new menu column called "Menu Rahmah," reflecting his personal touch and preferences. This special menu column is designed to provide affordable meal options for individuals facing financial constraints, such as those in the B40 group.

4.0 Information Gathering Process

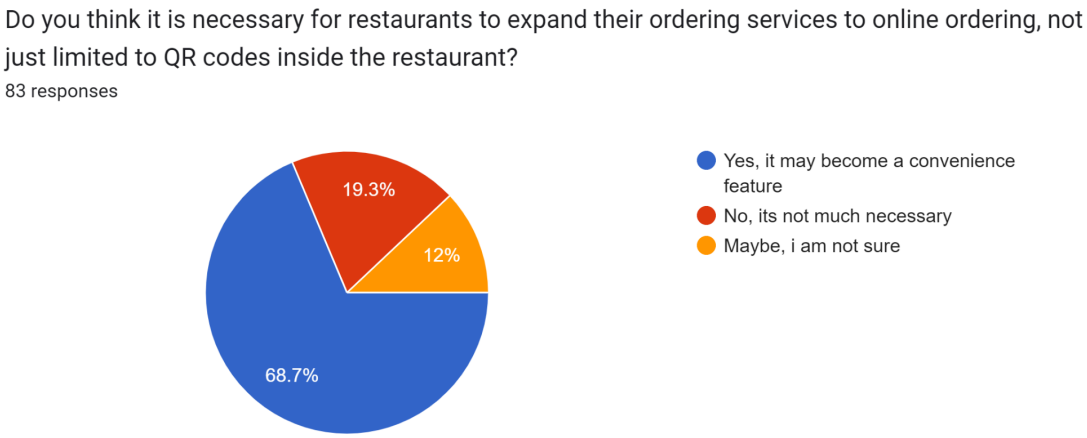
The most straightforward and effective method for comprehensively understanding the AS-IS system involves information collection. These insights were gathered from Mr. Kiho, a stakeholder in our project focused on the AS-IS system, as well as from 83 randomly selected customers utilizing the Restaurant Management System (RMS) for their meal ordering.

4.1 Method Used

To gain deeper insights into the AS-IS system, we utilized a combination of interviews and questionnaires featuring a mix of closed and open-ended inquiries. We employed Google Forms, an online questionnaire platform, to administer the survey. The questions, responses from 83 customers, and Mr. Kiho's comments are all documented here for thorough examination.

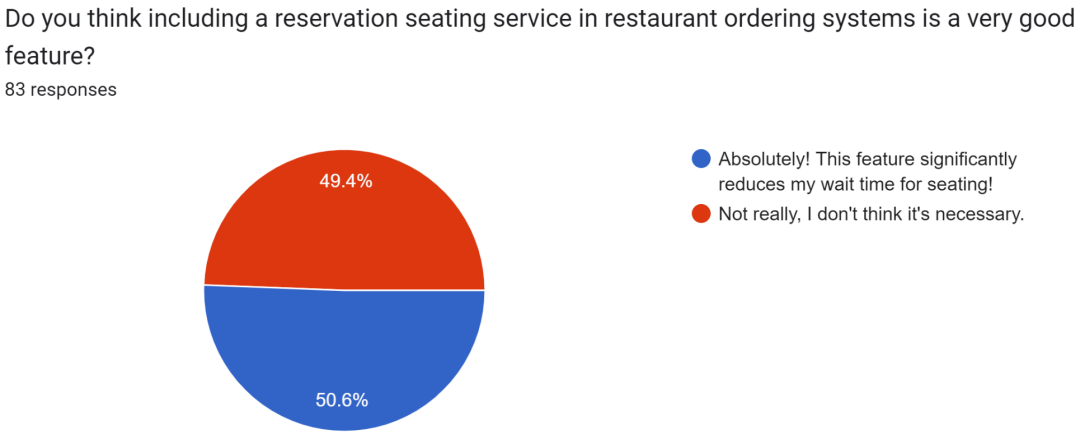
4.1.1 Questionnaire

Question 1: Do you think it is necessary for restaurants to expand their ordering services to online ordering, not just limited to QR codes inside the restaurant?



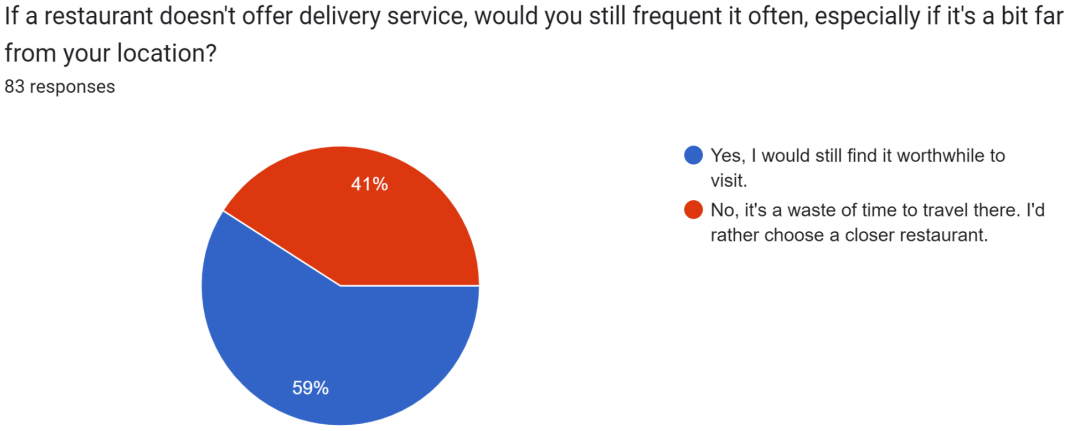
Based on the questionnaire responses, the majority of customers (68.7%) believe that the ordering services would be better if they shifted to online ordering, instead of just relying on in-person QR code scanning at the restaurant. They think this because online ordering would give customers more time to think about their orders before they get to the restaurant.

Question 2: Do you think including a reservation seating service in restaurant ordering systems is a very good feature?



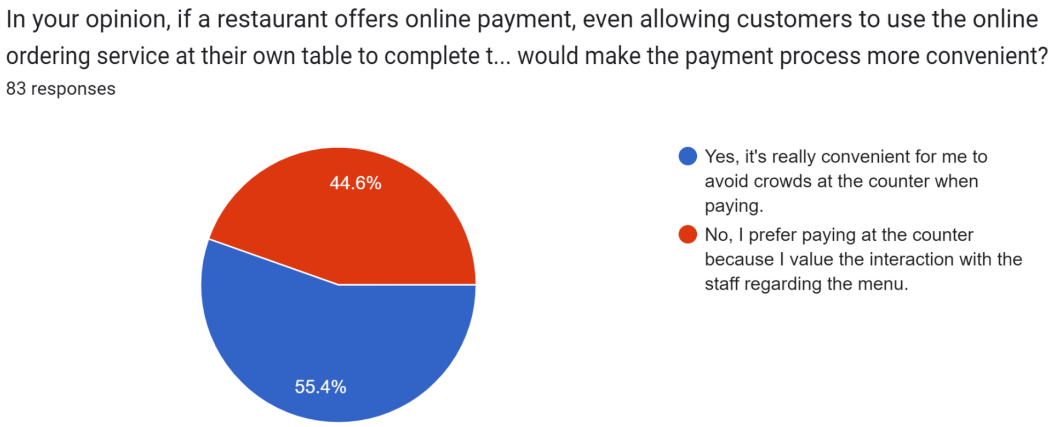
Based on the responses to the second question in the survey, it's clear that there are two distinct groups of customers. The first group (50.6%) believes that the reservation service is valuable because it saves time by avoiding waiting for a seat during busy hours. Conversely, the second group (49.4%) doesn't see the necessity of this service. However, despite this division, the majority of customers express a desire for the reservation service to enhance their dining experience.

Question 3: If a restaurant doesn't offer delivery service, would you still frequent it often, especially if it's a bit far from your location?



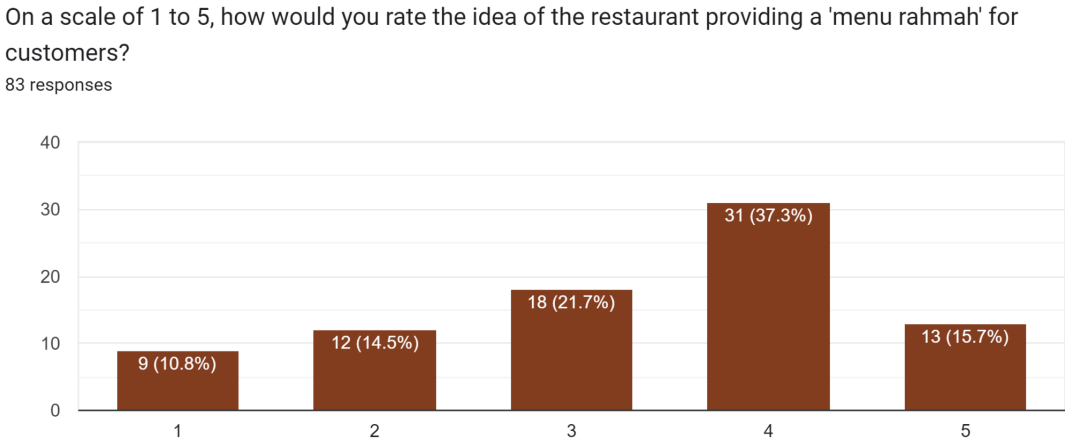
Based on the data gathered from the questionnaires, a significant portion of respondents believe that delivery service is an optional way to enjoy their meal, not significantly impacting their dining experience. However, there is still a notable group of customers (41%) who consider delivery service to be important, particularly during busy times.

Question 4: In your opinion, if a restaurant offers online payment, even allowing customers to use the online ordering service at their own table to complete the online payment, do you think it would make the payment process more convenient?



As per the survey question, 55.4% of customers agree that having the option for complete online payment at their own table is a highly desirable feature for the future. They believe that this payment method would enable them to avoid crowds at the counter, enhancing their overall dining experience.

Question 5: On a scale of 1 to 5, how would you rate the idea of the restaurant providing a 'menu rahmah' for customers?

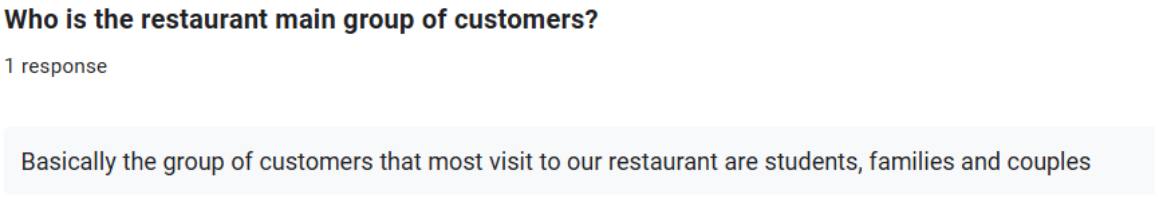


According to the question, respondents were asked to rate their approval of the 'menu rahmah' idea on a scale of 1 to 5, with 1 indicating strong disapproval and 5 indicating strong approval. The majority of customers chose a score of 4 out of 5, signifying approval of the 'menu rahmah' concept, albeit not strongly, as it is

based on demand. This indicates that there are still customers who prefer to have more affordable meal options.

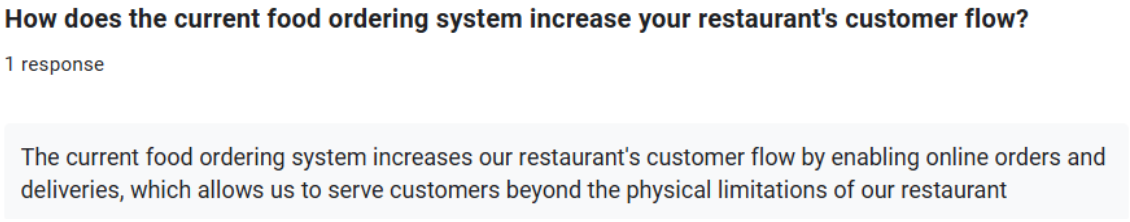
4.1.2 Interviewing

Question 1: Who are your restaurant's main group of customers?



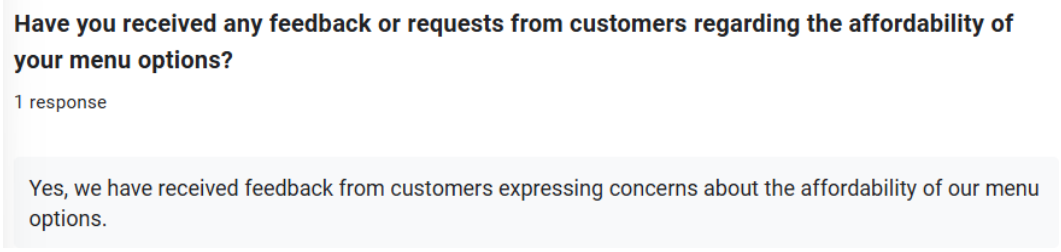
The interview shows that Mr. Kiho's restaurant should prepare an affordable menu price.

Question 2: How does the current food ordering system increase your restaurant's customer flow?



Mr Kiho declared that the current food ordering system performed well but only contains some functions such as the food order, pick up and menu display. To access their website, customers need to dine into their restaurant to order the food instead of placing their order online.

Question 3: Have you received any feedback or requests from customers regarding the affordability of your menu options?



Based on the interview, Mr Kiho noticed this kind of request after receiving feedback from their customers. Mr Kiho is considering changing his menu or providing a season offering prices.

Question 4: What challenges do you encounter in managing table reservations, especially during peak dining hours or special occasions?

What challenges do you encounter in managing table reservations, especially during peak dining hours or special occasions?

1 response

Managing table reservations during peak dining hours and special occasions presents several challenges.

Mr Kiho found difficulty in securing a table for customers during peak dining or special occasions, leading to frustration and longer wait times for customers. This will lead to inconvenience for both customers and restaurant management, affecting overall satisfaction and operational efficiency.

Question 5: What do you think is the weakest of the current system and how do you improve it?

What do you think is the weakest of the current system and how do you improve it?

1 response

The weakest part of the current system is the absence of an integrated delivery and reservation system. To improve this, a well-completed system will a big plus for me

Based on the interview with Mr Kiho, he acknowledged that the weakness of the current system is the absence of a comprehensive online and integrated delivery system, along with limited payment options and the difficulty in switching menu interfaces. To improve this, Mr Kiho hopes that the new system will implement a fully integrated online ordering and reservation system to streamline the customer experience and introduce an internal delivery service to reduce reliance on third-party platforms, ensuring better control over the delivery process. The system also could expand payment options to include mobile wallets, online payment platforms, and contactless transactions, catering to diverse customer preferences.

4.2 Summary from Method Used

By delving into perspectives from our stakeholder and customers, we gained valuable insights into the functioning of our RMS (Restaurant Management System). This enabled us to identify areas for improvement, focusing particularly on enhancing the system's ability to gather consumer interests automatically and effectively based on their orders. Upon analyzing the survey responses, we were able to prioritize which aspects of the current system require attention. For instance, we recognized the need to make online ordering more convenient for customers, allowing them to browse the menu before arriving at the restaurant to scan a QR code. This is crucial for retaining customers and surpassing their expectations of the dining experience.

5.0 Requirement Analysis

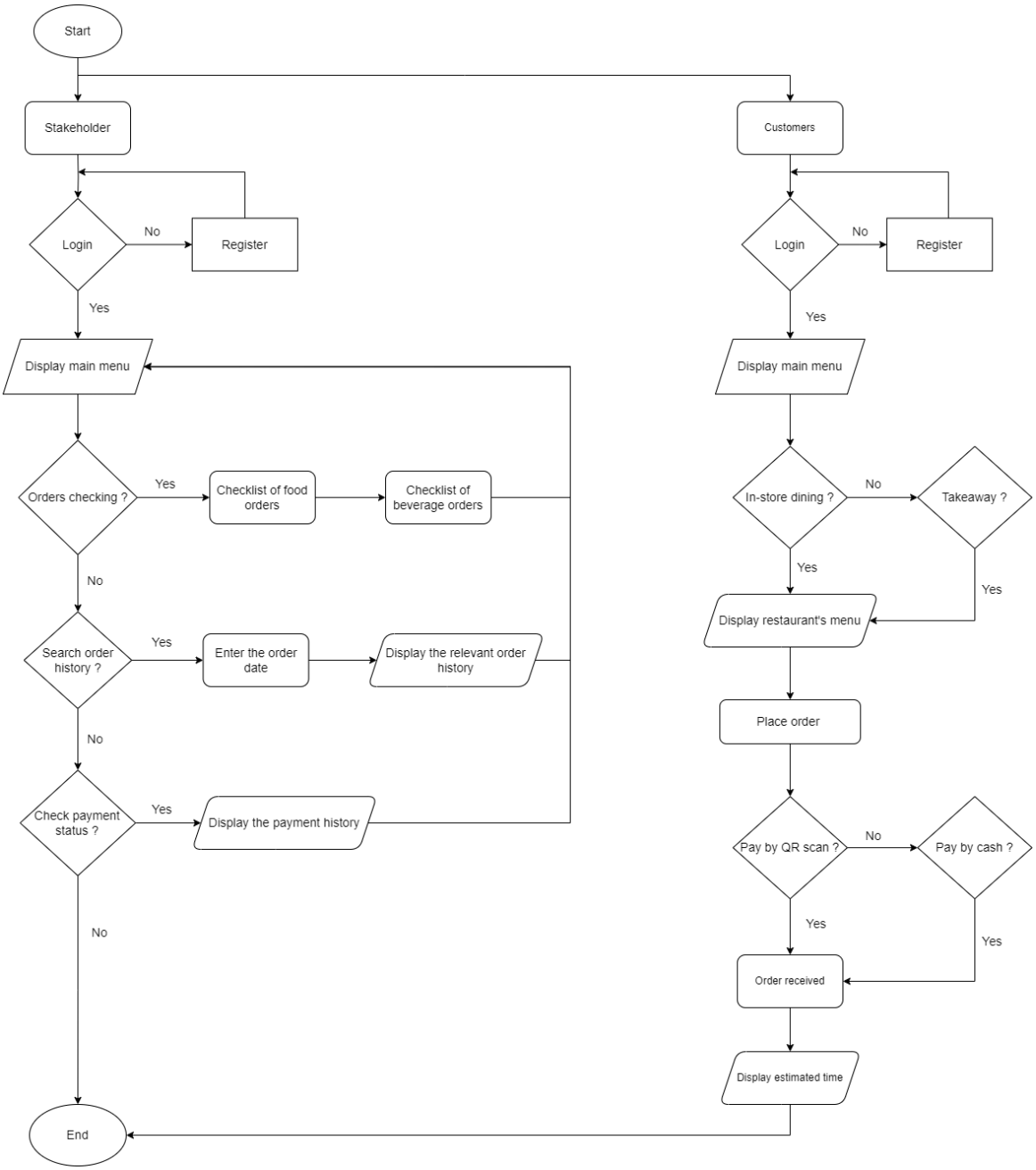
5.1 Current Business Process (scenarios, workflow)

Here are the scenarios and workflow of current business process for **stakeholder**:

1. Log in to the system.
2. Customize the main page according to preference.
3. Several options are displayed on the main menu.
4. Option for checking the orders from the customers.
    4.1 Food ordering checklist
    4.2 Beverage ordering checklist
5. Option for searching the order history.
    5.1 Stakeholder is required to enter the order date.
    5.2 System will display the relevant order history to the stakeholder.
6. Option for checking the payment status.
    6.1 Display the payment history either QR scan or cash done by the customers.

Here are the scenarios and workflow of current business process for **customers**:

1. Login to the system.
2. Customize the main page according to preference.
3. Display option for ordering meals.
    3.1 In-store dining.
    3.2 Takeaway.
4. Display the restaurant's menu.
5. Place orders in the system.
6. Display payment options at the counter.
    3.1 QR scan
    3.2 Cash
4. While the order is received, the customer will be given an estimated time of preparation.



AS-IS System Workflow

5.2 Functional Requirement (AS-IS System)

5.2.1 Context Diagram

PROCESS	INPUT	OUTPUT
Food Ordering System	Menu information Order placement Payment information Feedback provision Restaurant information	Menu information Feedback display Payment detail Order checklist Estimated time to prepare

5.2.2 Level 0 Diagram

PROCESS	INPUT	OUTPUT
View menu availability	Restaurant information Menu information Food information Beverages information	Restaurant information Menu information Food availability Beverages availability
View Customers order	Order placement Order status	Order status Order checklist
View Payments Status	Payment detail Payment information Order information	Payments information Payment detail
View Feedback	Feedback provision Updated feedback	Feedback information Feedback display
View Order Status	Order checklist	Estimated time

5.2.3 Level 1 Diagram

5.2.3.1 Process 1: View Menu Availability

PROCESS	INPUT	OUTPUT
Menu search	Restaurant information Menu information	Restaurant information Menu information
View food menu	Food information	Food availability
View beverages menu	Beverages information	Beverages availability

5.2.3.2 Process 2: View Customers Order

PROCESS	**INPUT**	**OUTPUT**
Place order according to the customer need	Food availability Beverages availability Order placement	Selected food Selected beverages
View order	Order details	Order status
Confirm order	Order details Order status	Order checklist

5.2.3.3 Process 3: View Payment Status

PROCESS	**INPUT**	**OUTPUT**
Calculate the payment	Order information	Sum of the payment
Check payment status	Payment information Payment detail	Payment information Payment detail

5.2.3.4 Process 4: View Feedback

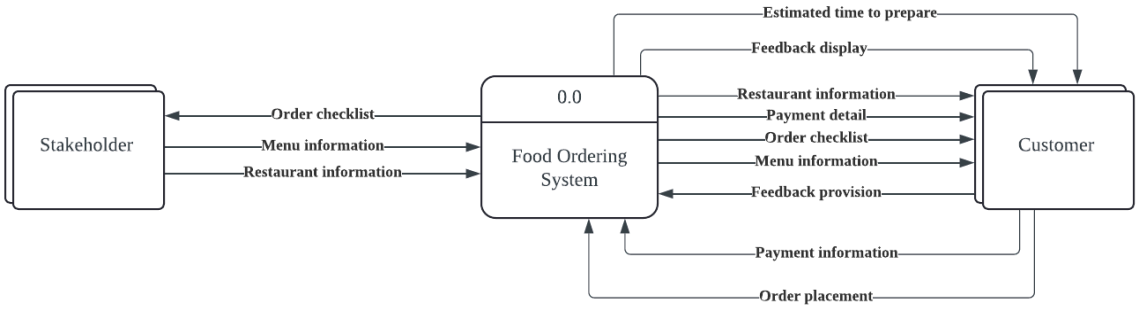
PROCESS	**INPUT**	**OUTPUT**
Receive feedback	Feedback provision	Feedback information
Update received feedback	Feedback information Updated feedback	Feedback information
Show feedback to customers	Feedback information	Feedback display

5.2.3.5 Process 5: View Order Status

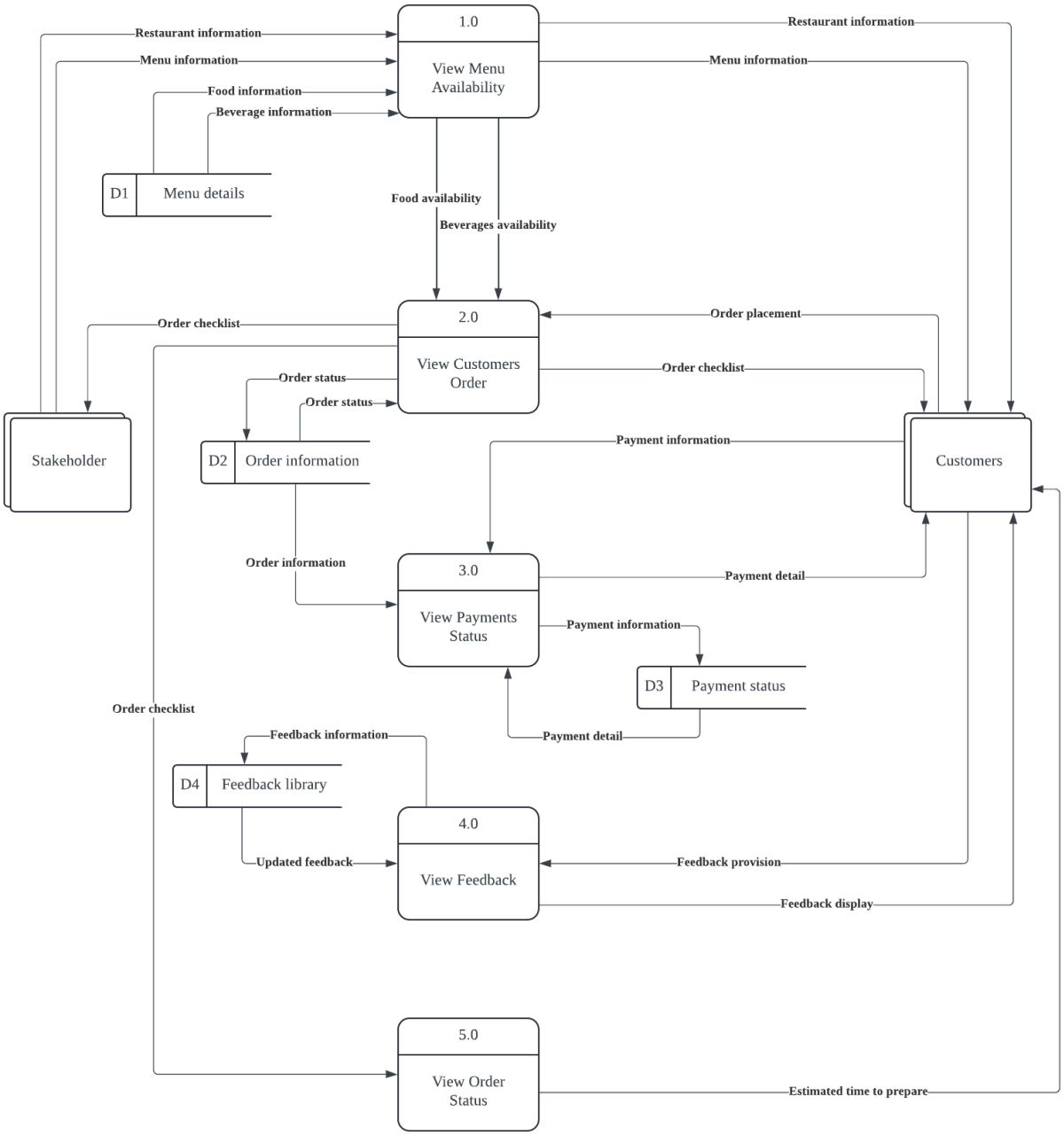
PROCESS	**INPUT**	**OUTPUT**
Receive order	Order checklist	Received order
Prepare the meal	Received order	Preparation of the meal
Estimate the time to prepare the meal for customer	Preparation of the meal	Estimated time to prepare

5.3 Logical DFD AS-IS System

5.3.1 Context Diagram（Current System）

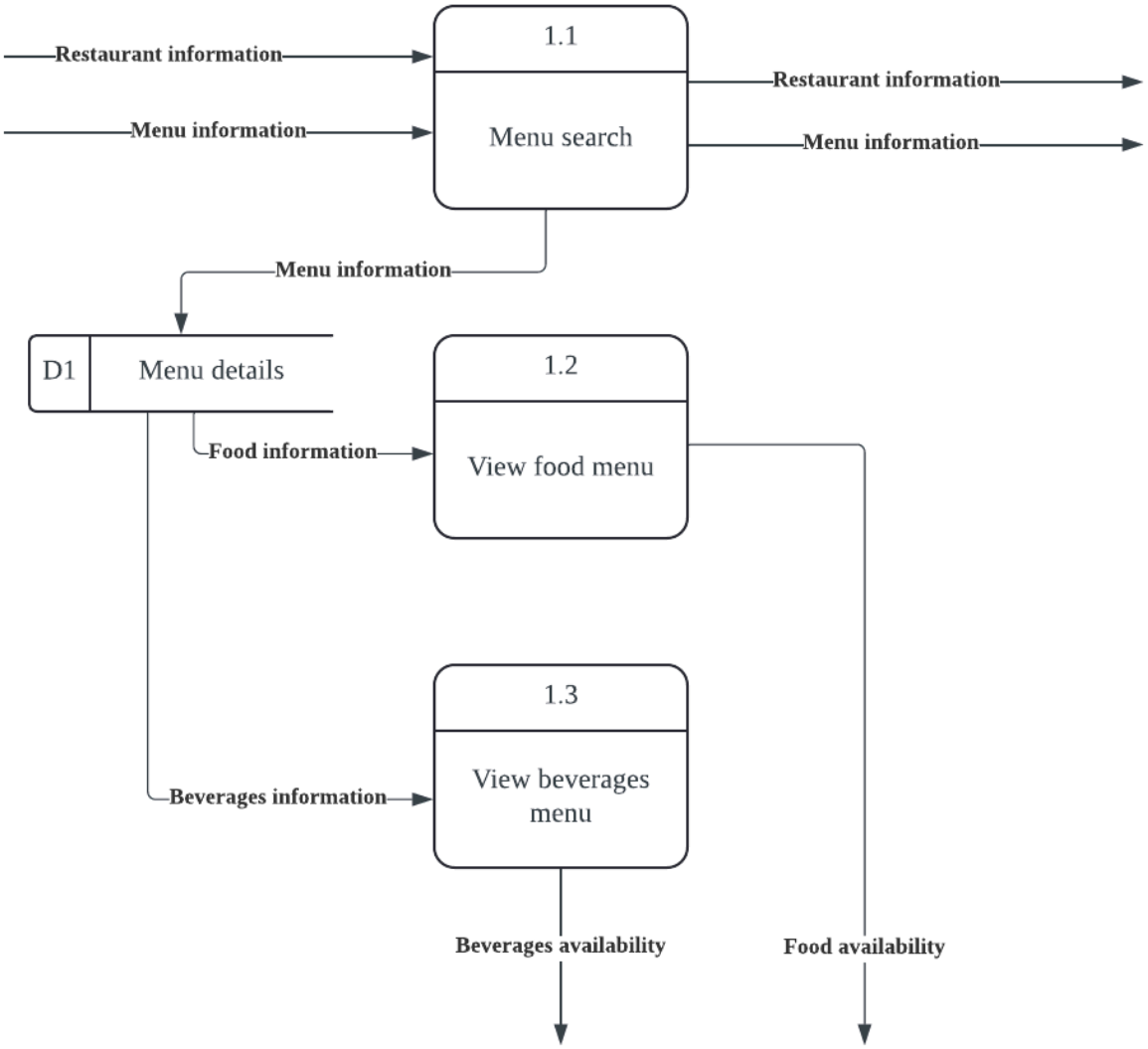


5.3.2 Diagram 0

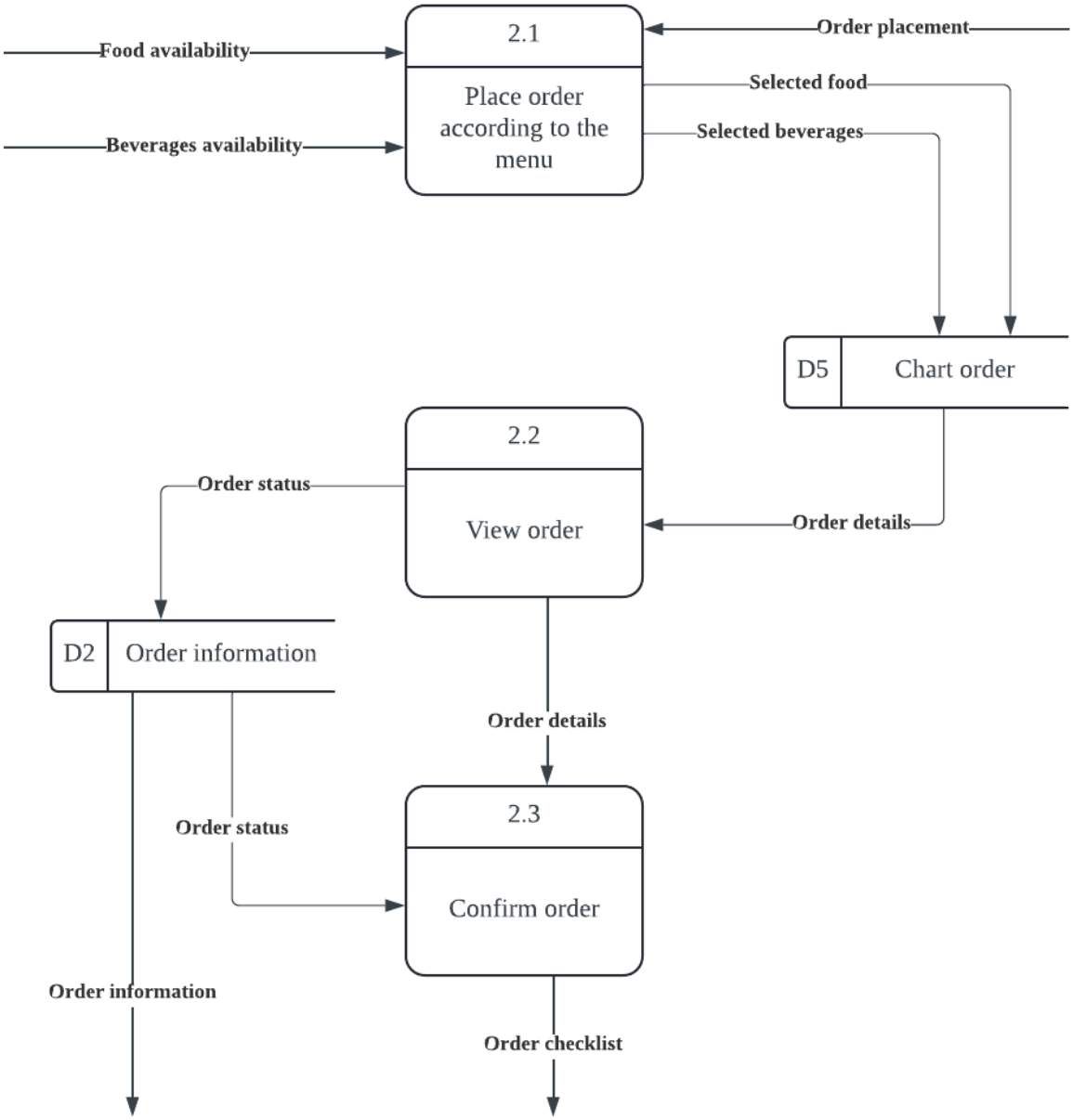


5.3.3 Child Diagram

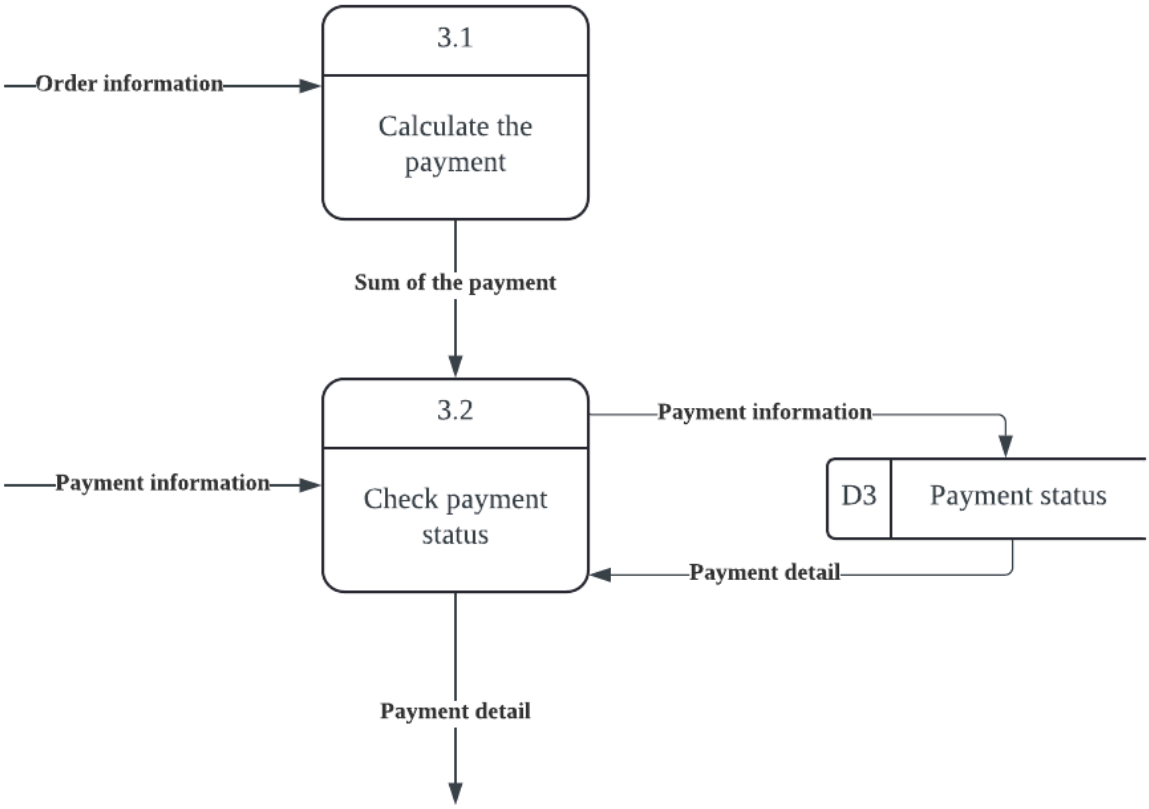
5.3.3.1 Process 1: View Menu Availability



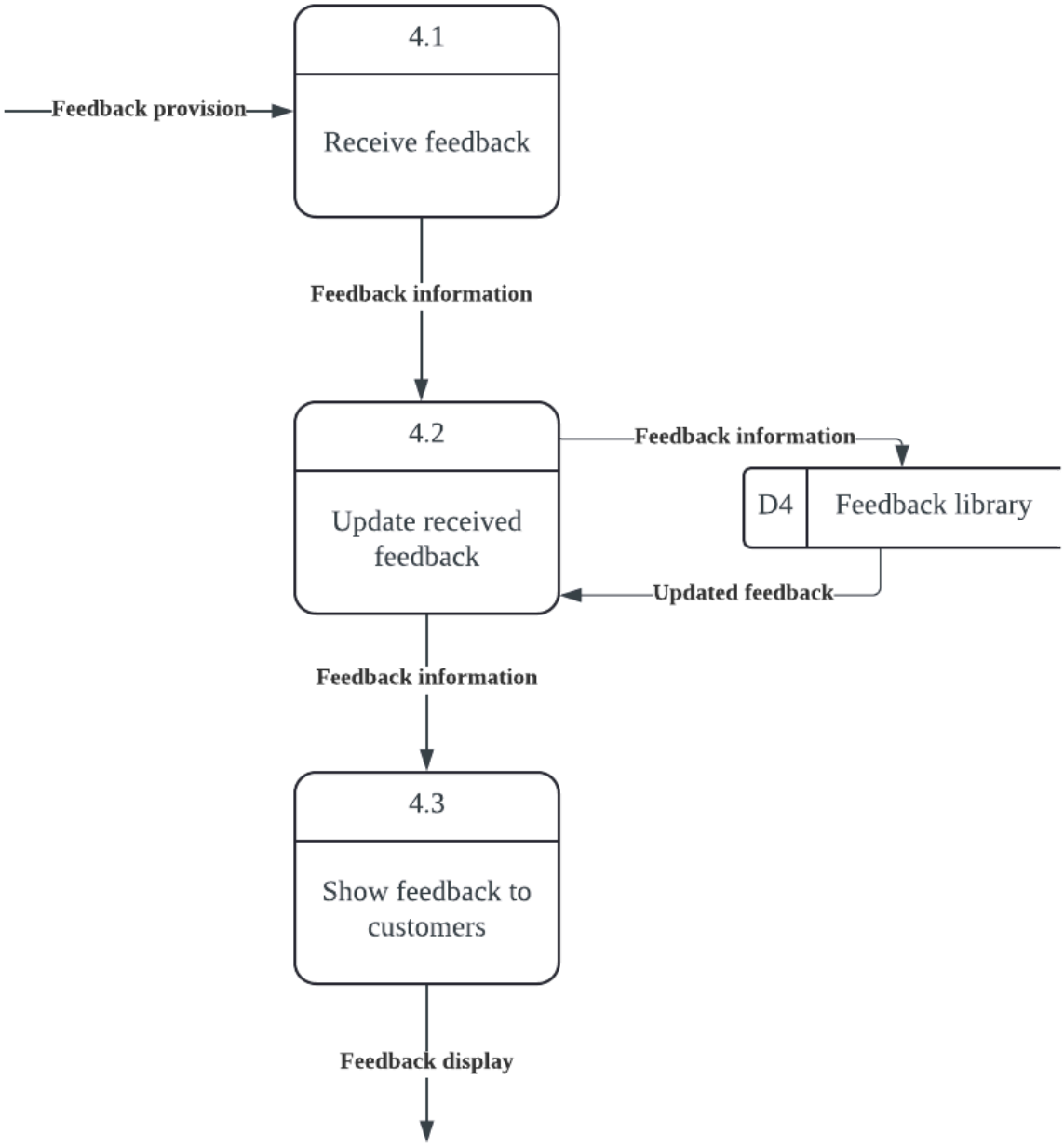
5.3.3.2 Process 2: View Customers Order



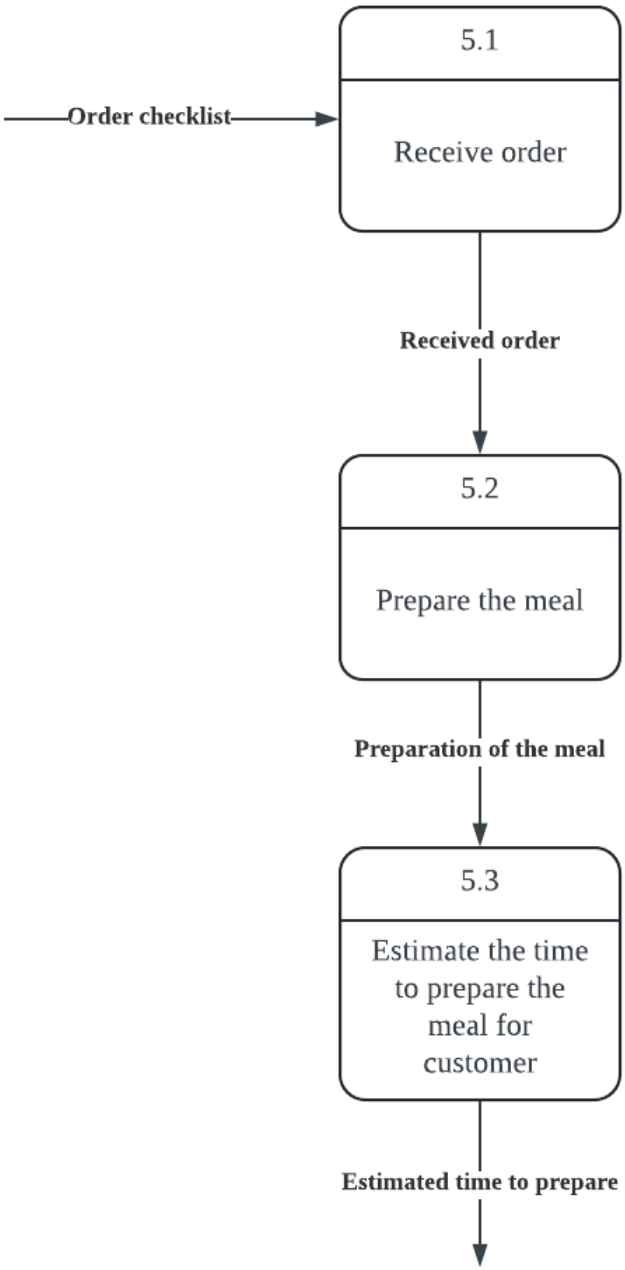
5.3.3.3 Process 3: View Payment Status



5.3.3.4 Process 4: View Feedback



5.3.3.5 Process 5: View Order Status



5.4 New Proposed Business Process - DineDart System (scenarios, workflow)

Here are the scenarios and workflow of current business process for **stakeholder**:

1. Log in to the system.
2. Customize the main page according to preference.
3. Several options are displayed on the main menu.
4. Option for updating the menu list.
    4.1 Update food menu
    4.2 Update beverages menu
5. Option for checking the orders from the customers.
    5.1 Food ordering checklist
    5.2 Beverage ordering checklist
6. Option for searching the order history.
    6.1 Enter the order date.
    6.2 Display the relevant order history.
7. Option for checking the payment status.
    7.1 Display the payment history either online banking, QR scan or cash done by the customers.

Here are the scenarios and workflow of current business process for **customers**:

1. Login to the system.
2. Customize the main page according to preference.
3. Option for reserving seats.
    3.1 The number of seats to reserve.
    3.2 The date to reserve.
    3.3 The time to reserve.
4. Option for ordering meals.
    4.1 In-store dining.
    4.2 Takeaway.

4.3 Delivery.

5. Option for using delivery services.

5.1 Enter the address.

5.2 Select standard delivery or express delivery

5.3 Done the payment

5.4 Deliver the meal by delivery driver

5.5 Track the meal delivery status.

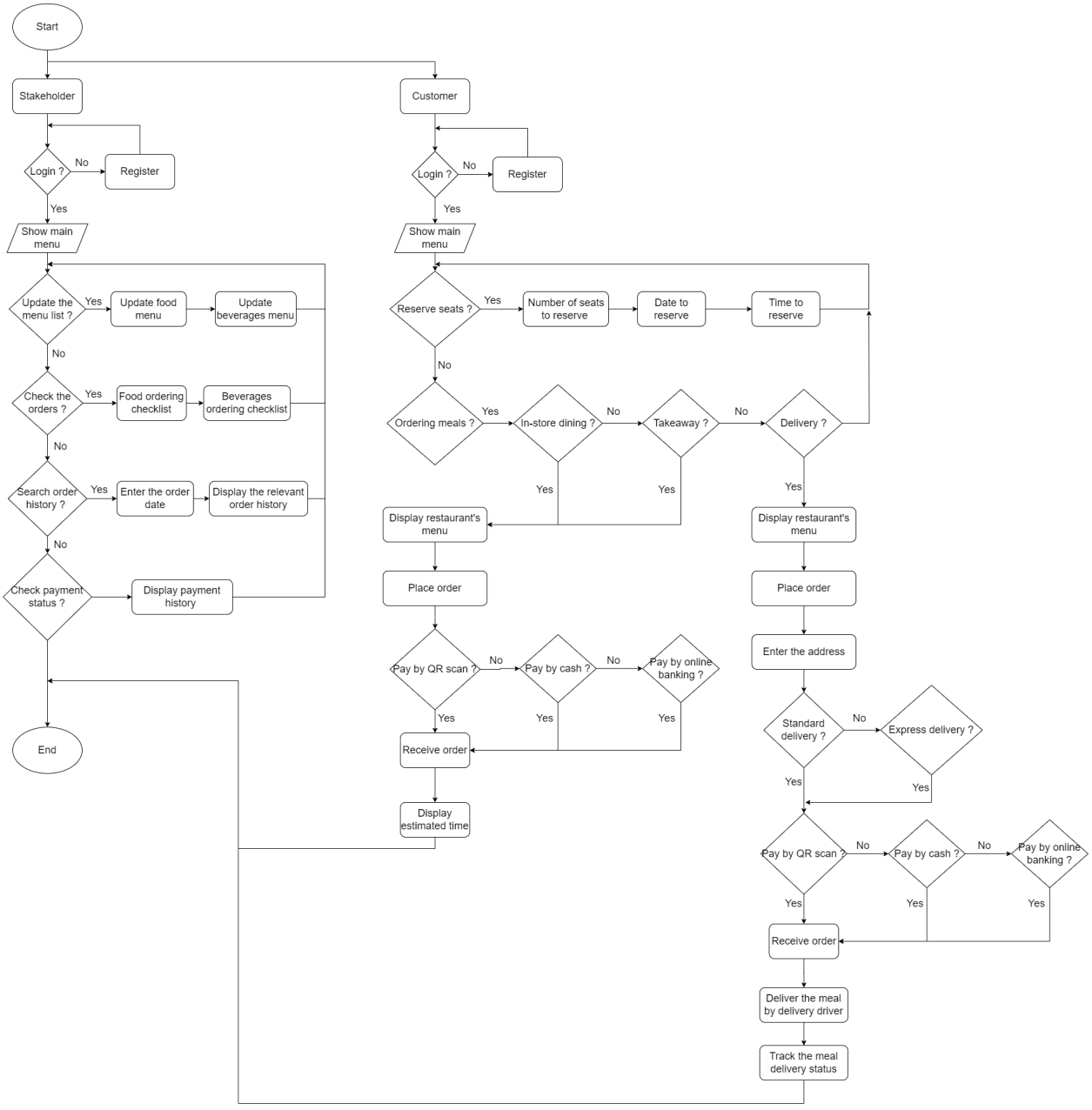
6. Option for payment method.

6.1 QR scan

6.2 Cash

6.3 Online banking

7. While the order is received, the customer will be given an estimated meal preparation time.



TO-BE System Workflow

5.5 Functional Requirement (New System)

5.5.1 Context Diagram

PROCESS	INPUT	OUTPUT
DineDart.com System	New menu information Order history date Reservation information Dining method Address information Payment information	Latest menu information Order checklist Order history information Payment history Payment invoice Reservation detail Location of meal Order placement

5.5.2 Level 0 Diagram

PROCESS	INPUT	OUTPUT
View Menu Availability	New menu information Updated latest menu information Menu information	New menu information Latest menu information Available food choice Available beverage choice
View Customers Order	Food ordering checklist Beverages ordering checklist Order information	Order information Order checklist
View Order History	Order history date Order history information Payment history	Order history information Payment history
Order the meal	Dining method Available food choice Available beverage choice Order placement	Food ordering checklist Beverages ordering checklist Order checklist Order detail
Reserve for seats	Reservation information Reservation availability	Reservation detail
Deliver the meal order	Order information Address information Delivery method	Location of meal
Purchase the meal order	Order detail Payment information	Online payment details Payment invoice

	Valid online payment status	

5.5.3 Level 1 Diagram

5.5.3.1 Process 1: View Menu Availability

PROCESS	**INPUT**	**OUTPUT**
View current menu	Menu information	Current menu information
Update new menu	Current menu information New menu information	New menu information
Renew the menu	Updated latestmenu information	Latest menu information
Check the availability of the menu	Menu information	Available food choice Available beverage choice

5.5.3.2 Process 2: View Customers Order

PROCESS	**INPUT**	**OUTPUT**
Receive order information	Food ordering checklist Beverages ordering checklist	Food ordering checklist Beverages ordering checklist
Combine food and beverages checklist	Food ordering checklist Beverages ordering checklist	Order information
Show the order information in an order checklist	Order information	Order checklist

5.5.3.3 Process 3: View Order History

PROCESS	**INPUT**	**OUTPUT**
Enter the research key	Order history date	Order history date
Check order history	Order history date Order history information Payment history	Selected order history
Show the order history	Selected order history	Order history information Payment history

5.5.3.4 Process 4: Order the meal

PROCESS	**INPUT**	**OUTPUT**
Select dining option	Dining method	In-store dining Takeaway Delivery
Order the meal	In-store dining Takeaway Delivery Available food choice Available beverage choice	Order information
Confirm order information	Order placement	Order information
Form order checklist	Order information	Food ordering checklist Beverages ordering checklist Order checklist Order detail

5.5.3.5 Process 5: Reserve for seats

PROCESS	**INPUT**	**OUTPUT**
Provide the reservation information	Reservation information	Reservation information
Check reservation availability	Reservation information Reservation availability	Available reservation
Send reservation detail to customer	Available reservation	Reservation detail

5.5.3.6 Process 6: Deliver the Meal Order

PROCESS	**INPUT**	**OUTPUT**
Receive the order information	Order information	Order information
Get the address to deliver	Address information	Address information
Choose delivery option	Delivery method	Delivery method
View order information, address and delivery option	Order information Address information Delivery method	Delivery information
Pick up order by delivery driver	Delivery information	Driver location
Track the location of meal	Driver location	Location of meal

5.5.3.7 Process 7: Purchase the meal order

PROCESS	**INPUT**	**OUTPUT**
Check the order detail	Order detail	Price of each item
Calculate the sum of the order	Price of each item	Total price
Payment options	Total price Payment information	Online payment detail
Check payment status	Online payment detail Valid payment status	Online payment detail Payment detail
Send payment invoice	Payment detail	Payment invoice

5.6 Non-functional Requirement

Website for : https://dinedart.mystrikingly.com

5.6.1 Performance

- The performance grade for the DineDart website is 71, which corresponds to a grade of C.
- The total page size of the DineDart website is 5.70 MB.
- The website takes 12.9 seconds to load.
- There are 204 requests made by the DineDart website.

5.6.2 Security

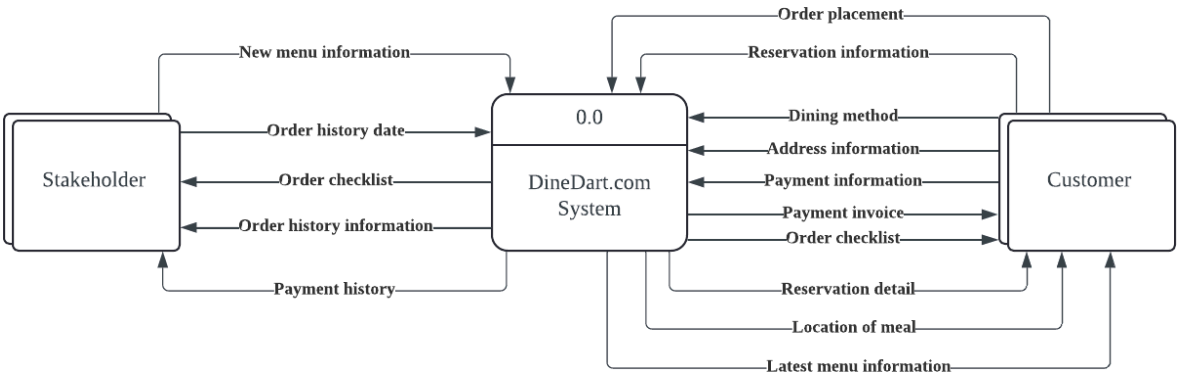
- Online payment transactions of the order are considered safe and secured.
- The personal information of the client is secured.

5.6.3 Compatibility

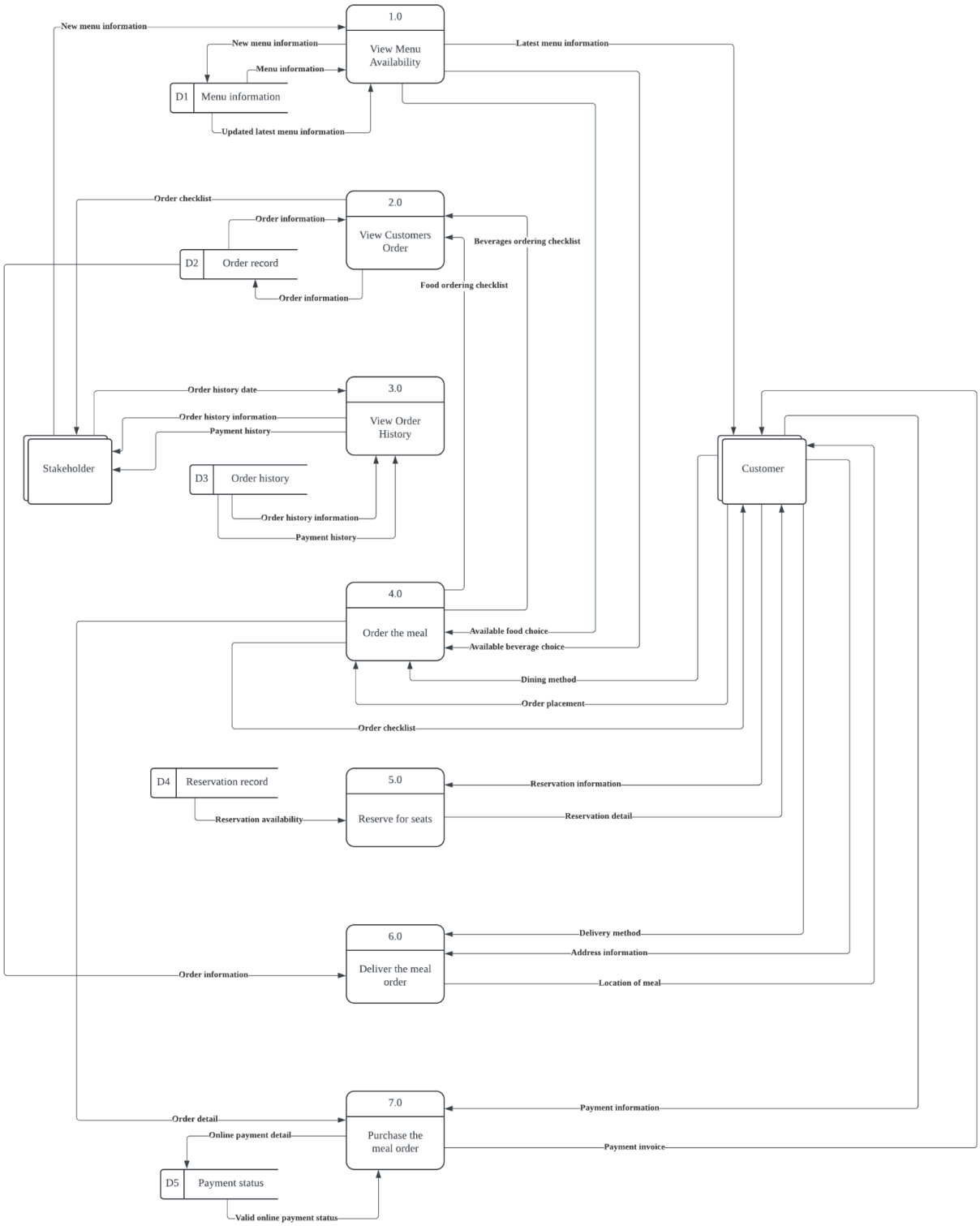
- Operating system of the device should be Windows 7/macOS High Sierra 10.11 or later
- Processor should be Intel Pentium 3 or later
- A minimum memory of 1GB is required.
- Internet connection is required.

5.7 Logical DFD TO-BE System

5.7.1 Context Diagram（New Proposed System）

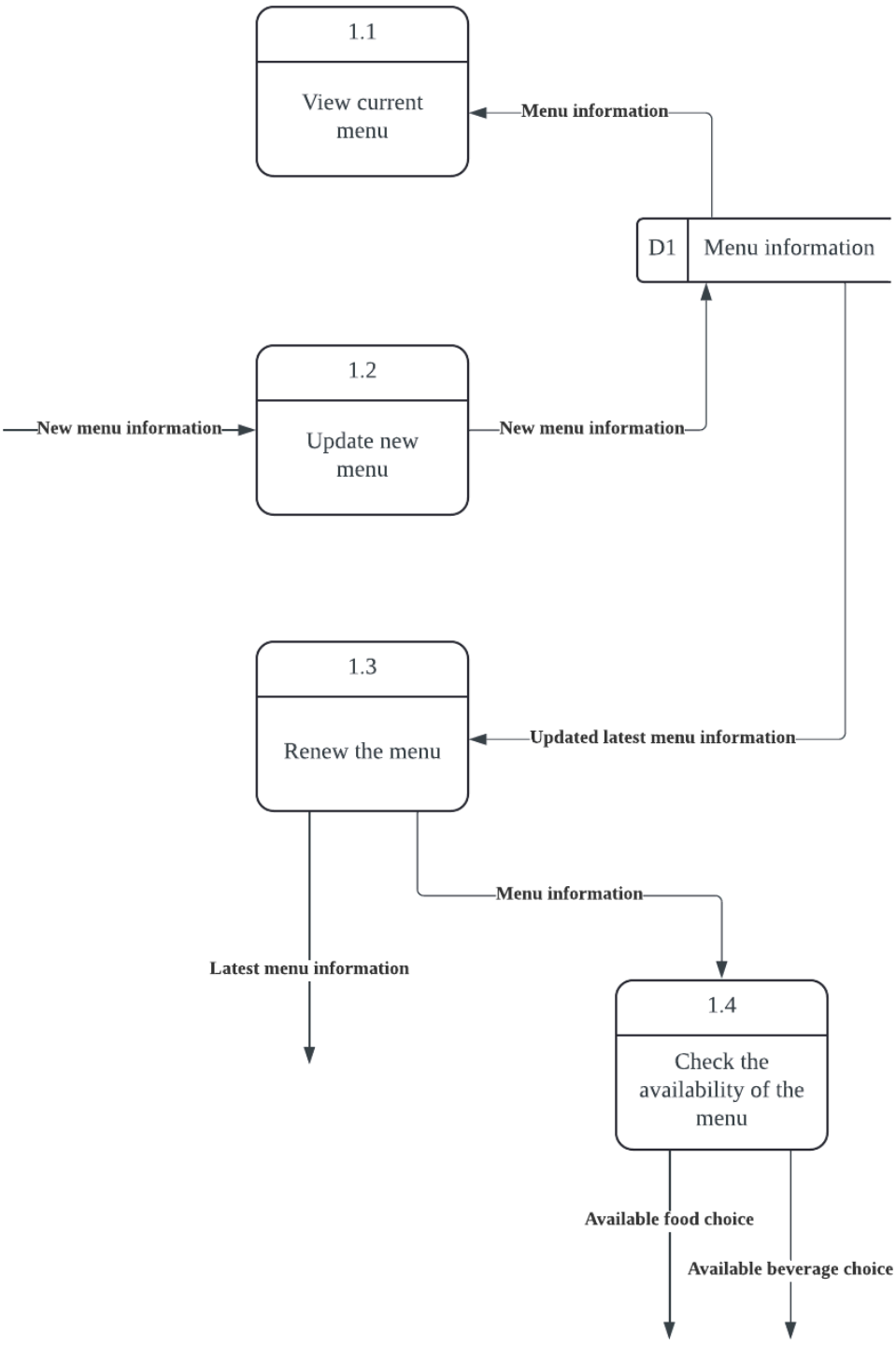


5.7.2 Diagram 0

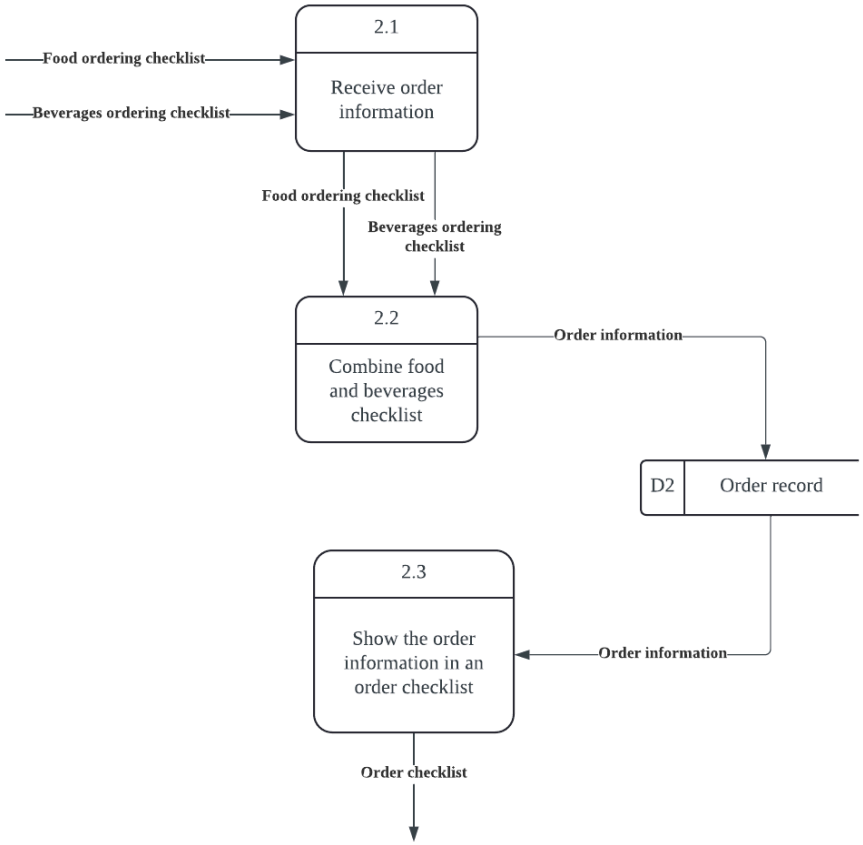


5.7.3 Child Diagram

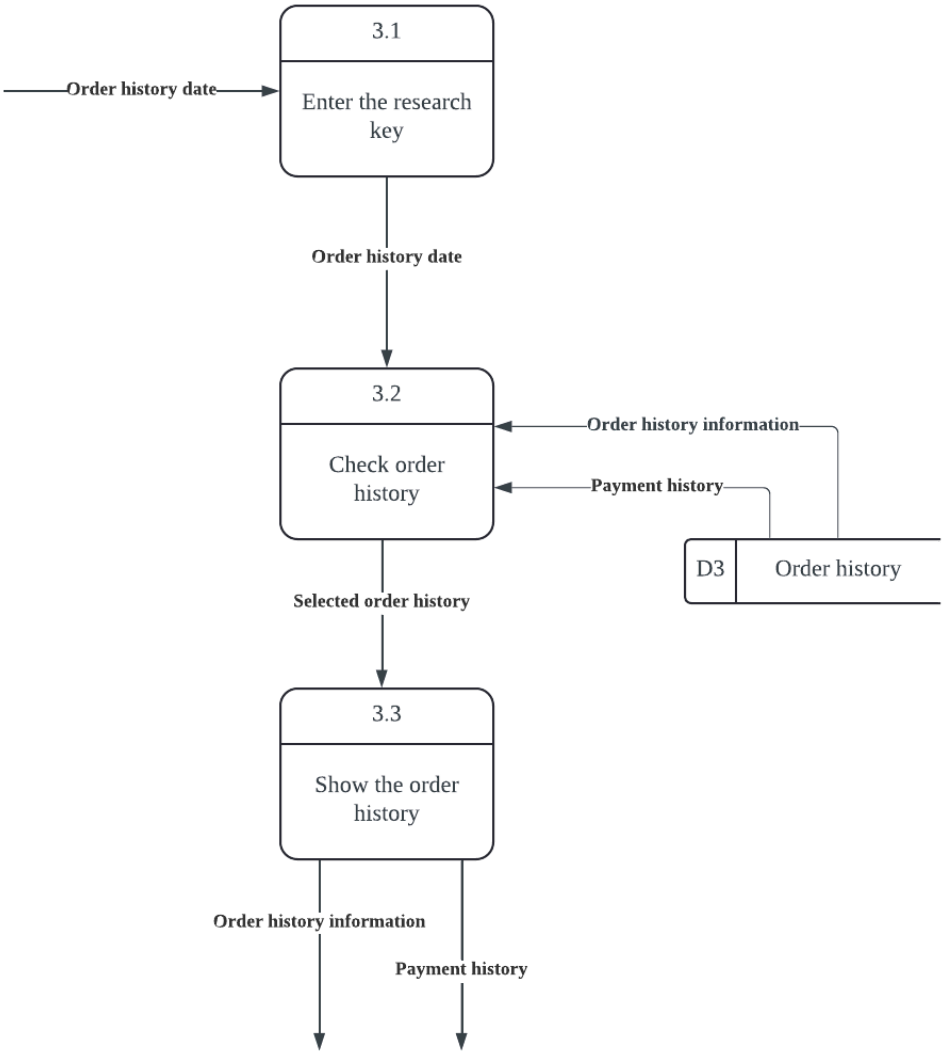
5.7.3.1 Process 1: View Menu Availability



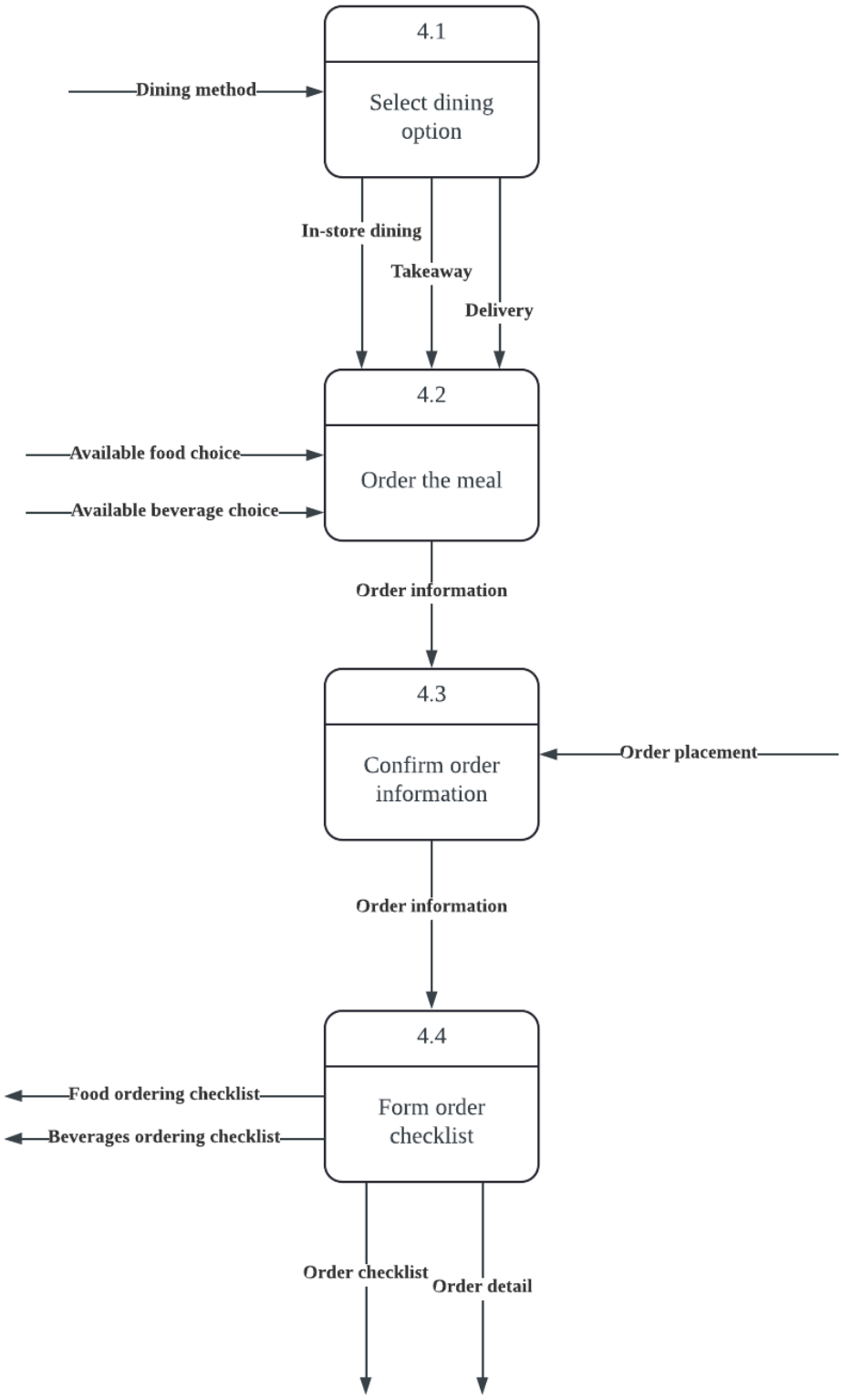
5.7.3.2 Process 2: View Customers Order



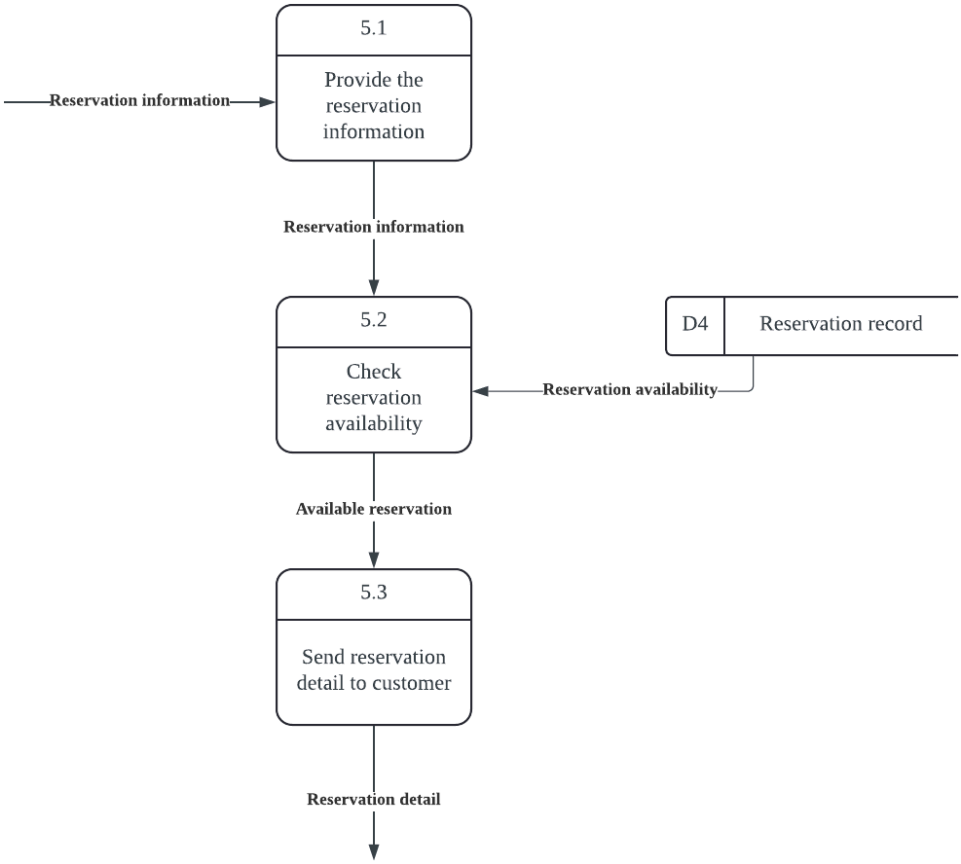
5.7.3.3 Process 3: View Order History



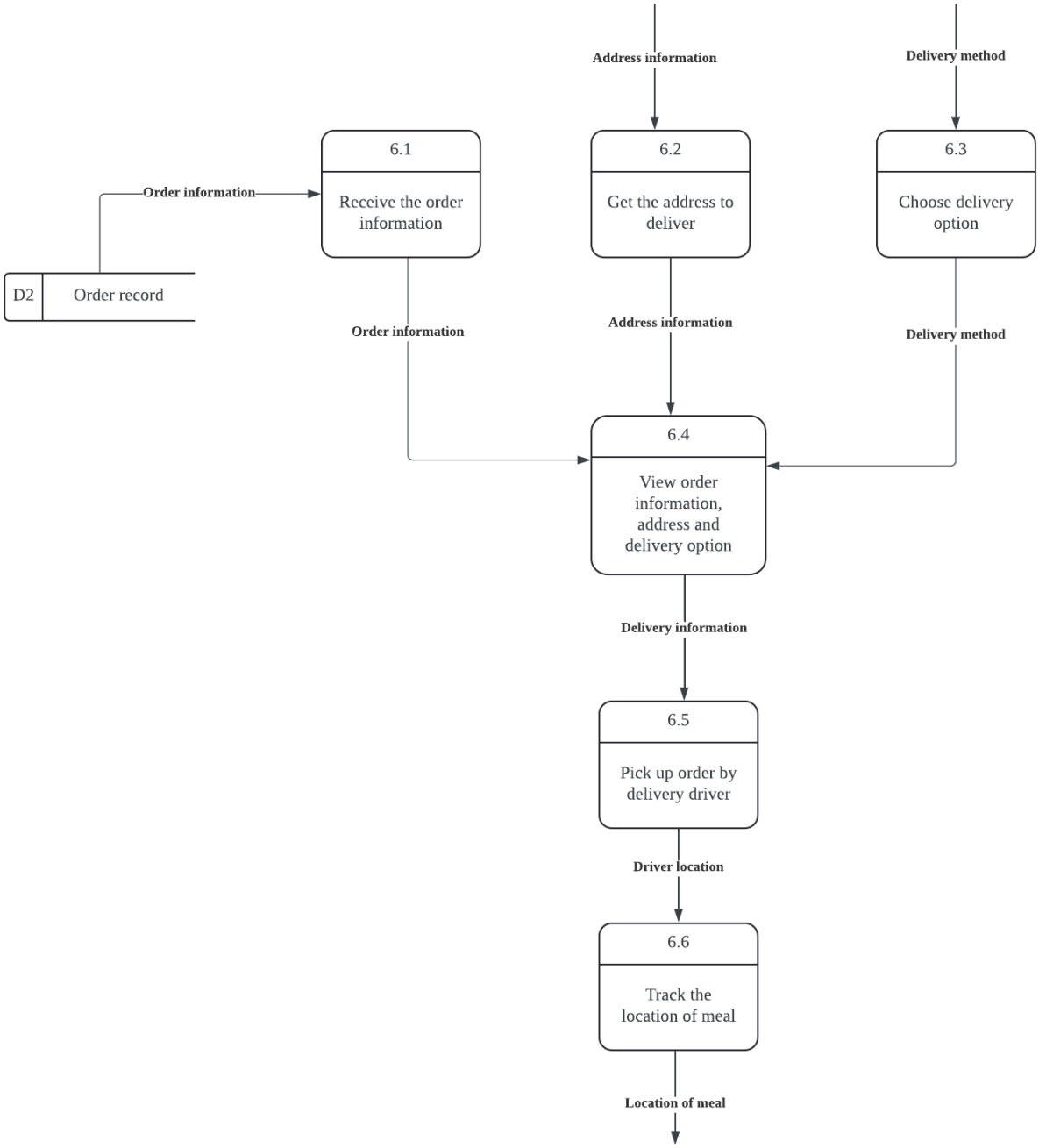
5.7.3.4 Process 4: Order the meal



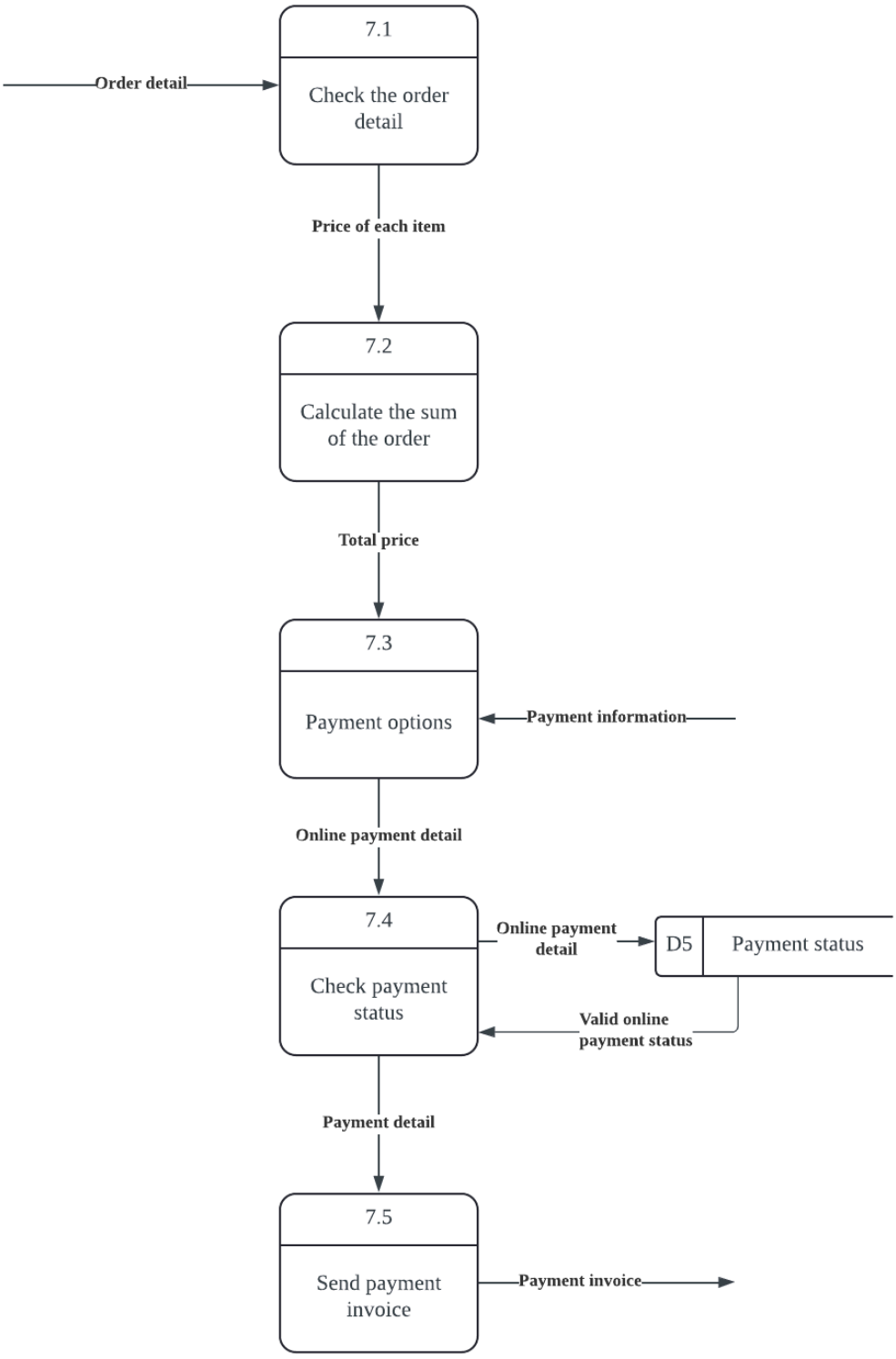
5.7.3.5 Process 5: Reserve for seats



5.7.3.6 Process 6: Deliver the meal order



5.7.3.7 Process 7: Purchase the meal order


7.1
Check the order detail
Order detail
Price of each item
7.2
Calculate the sum of the order
Total price
7.3
Payment options
Payment information
Online payment detail
7.4
Check payment status
Online payment detail
D5
Payment status
Valid online payment status
Payment detail
7.5
Send payment invoice
Payment invoice

6.0 Summary of Requirement Analysis Process

The current Restaurant Management System of Siao Sheng Ya has several areas with potential for improvement. By automating these parts and adding new features, the system can become more efficient and enhance customer flow into the restaurant.

The functions of the To-Be system are as follows:

1. Enhanced Online Food Ordering Access
2. Customer Reservation System
3. Delivery Services
4. Flexible Payment Methods
5. Comprehensive Menu Information Database

These enhancements aim to optimize operations, improve customer experience, and maximize the flow of customers into the restaurant.