FACULTY OF COMPUTING
UTM Johor Bahru

SECD2613 - 03

SYSTEM ANALYSIS AND DESIGN

INFORMATION SYSTEM GATHERING AND REQUIREMENT

KACANI ORDERING SYSTEM

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SUBMISSION DATE:

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1.0 Overview of the Project

In this project, our team wants to develop an efficient cafe' operating platform, which is the KACANI ordering system. For this system, it will help increase the efficiency of ordering and make things easier in the local cafes. Our target client is Kacani Cafe, a well-known eatery within UTM.

The current operating model of Kacani cafe uses the basic traditional manual process, so it may face difficulties when they are busy serving food orders for their customers. Some of them include long queues, order mistakes, and less real-time stock visibility. Therefore, to know more information about Kacani cafe's operating processes from current employees, we collect information through questionnaires, interviews, and actual observation processes regarding the use of questionnaires and also direct information with users themselves as our main source of data for identifying possible problems and needs.

The KACANI Ordering System will use a digitalization system, including the order management, tracking of inventory, payment, and customer feedback to alleviate these issues. Besides automating the order processing and providing exact information, it can give benefits like self-service ordering and serving the consumers with several payment options.

2.0 Problem Statement

Kacani Cafe currently uses a traditional manual ordering system, which mainly relies on employees to record orders and manage inventory manually. This manual process exposes many problems during peak hours (e.g breakfast, lunch and dinner), such as:

- Customers need to queue up for long periods of time to order.
- Employees often make mistakes or misunderstand customer requests.
- Customers cannot customize their orders (such as drink sweetness, special notes, etc.).
- Lack of systematic inventory management often results in ingredients being discovered after they are exhausted and unable to be replenished in time.
- The single payment method cannot meet the needs of college students who prefer cashless transactions.
- There is no convenient way to collect customer feedback and suggestions, which affects the improvement of service quality.
- Employees need to undertake multiple tasks (ordering, cashing, preparing meals), with heavy workloads and reduced service efficiency.

These problems lead to poor customer experience, inefficient ordering, chaotic operations, and may have a negative impact on the reputation and revenue of the cafe. Therefore, it is necessary to develop a digital and automated ordering system to optimize processes, reduce errors, improve customer satisfaction and enhance overall management capabilities.

3.0 Proposed Solutions

To improve operational efficiency and enhance customer experience, we proposed implementing a cafe' operating system tailored to manage orders, inventory, and day-to-day transactions. This system will reduce manual errors, optimize stock control, and provide data-driven insights to support business growth. The solution will include the following features :

First of all, the KACANI ordering system will provide an order management system that can accept, modify, and complete orders for customers easily. This feature allows staff to manage orders efficiently, from accepting new ones to modifying and completing them. For example, the system will be receiving the orders and sending them to the cafe so that the cafe employees can monitor the orders. Thus, it can reduce errors by preventing a wrong order, speed up the operation, and ensure a smoother service experience for both staff and customers.

Furthermore, KACANI ordering system has inventory management for the client. They can track their stock in their inventory and they could get low-stock alerts. Inventory tracking helps businesses monitor stock levels in real time and receive a notification when items run low. This prevents stock outs or overstocking, so that they can restock in time to ensure better availability and smoother operations.

Other than that, the KACANI ordering system also has a Payment Gateway Integration. This allows customers to choose their preferred payment option from various payment options, including online transfers via e-wallets and Bank QR, or physical methods like credit cards, debit cards, and cash. This variety makes the checkout process faster, more convenient, and secure, catering to different customer preferences and ensuring a smooth transaction experience.

Last but not least, KACANI's ordering system will be offering a customer feedback & rating system. The customer will be asked to give some feedback when they finish their dining experience. This allows customers to rate their experience by giving ratings from the environment, the food, or the employees' service, or just leaving feedback. This feedback will

be valuable insights for the client's cafe and suggest improvements for the cafe. This feature helps businesses identify strengths and areas to improve, leading to better service and stronger trust.

4.0 Information gathering process

4.1 Method used

For information gathering, we use up to 3 methods. We select a potential client that is located in UTM and may need our system. The restaurant is Kacani cafe. Kacani cafe faced some problems with its traditional ordering system. We decided to use a questionnaire, interview, and observation, these three methods, to have a deeper understanding of the cafe.

1) Questionnaire

   We prepared a questionnaire with 6 questions for Kacani cafe's employees, owner, and customers. This questionnaire is useful for gathering feedback about the current ordering process and suggestions for improvement. Here are the 6 questions that we included:

   1) **How do you usually place your order at this cafe?**

      Responses: Almost all of the respondents said they ordered at the cashier counter, and just a few respondents answered that they ordered using phone or WhatsApp for pick-up.

   2) **Would you prefer to use a digital self-ordering system (e.g., website, app)?**

      Responses: A lot of respondents give an answer of yes, they are willing to use a digital system for ordering. Some of them said maybe they prefer using a self-ordering system. Lastly, only a few people said that they do not prefer to order by using a digital self-ordering system.

   3) **What issues do you currently face when ordering?**

      Responses: The most 3 top answers given by respondents basically:

      - Long waiting time during peak hours

- Misunderstood or incorrect orders
- Lack of customization options (e.g., sugar level, special requirement)

4) **What features would you like in a digital ordering system?**

Responses: The most top four answers given by respondents basically:

- Menu with pictures
- Customise features
- Order tracking/status display
- Payment integration (Touch 'n Go, VisaPay)

5) **Do you feel the current ordering system is efficient?**

Responses: Almost all the respondents answered no, they think that the current system is not efficient. They also give reasons for their answer; among those answers, the two most frequent answers are long waiting times and mistakes and errors during peak hours.

6) **What are your biggest concerns about using a digital system?**

Responses: The cafe's customers said that some elderly customers may struggle with the interface, since they are not familiar with digital ordering. On the other hand, the cafe's employees said that they need a reliable and user-friendly system, so that the system could really help them.

2) Interview

We conducted an interview with Kacani cafe's owner and employees to understand their needs, challenges, and goals. In the interview, they told us their issues, which is during peak hours (breakfast, lunch, dinner time), they are always in a spin because of the huge number of customers and the inefficient system. The second problem they faced was basically, ingredient stock ran out without notice. Sometimes, when they memorize to restock, the ingredients run out of stock. So, they might not be able to fulfill every customer's order for this reason. After that, the owner also told us that he does care about every customer's

feedback and suggestions. Unfortunately, there is no systematic way to collect customers' ratings and feedback. Lastly, they talked about the payment method. They said that nowadays, a lot of their customers do not bring cash, since their clients are mostly university students. Mostly youngsters nowadays prefer cashless payment. An integrated payment could also prevent customers from waiting too long to make a payment, because they can make a payment via the system. So, the owner decided to give convenience to his customers.

3) Observation

We observed the cafe's environment and process during peak hours and non-peak hours. We have observed a few problems that faced by Kacani Cafe. Firstly, during peak hours, there are some errors and mistakes that happen. After that, we noticed that in Kacani cafe's staff need to play multiple roles. For example, a staff member needs to take customer orders, process the payment, and prepare drinks. This situation may have a counter-effect on their food and service quality. Lastly, we observed that some of their customers have a long waiting time in the Kacani cafe. There are 3 processes that take a long time to serve customers, which are taking orders, preparing food, and making payment.

4.2 Summary from method used

1) Summary from Questionnaire

   From the questionnaire, we can conclude that there are improvements needed for **Kacani cafe**. We conclude this, because their customers are not satisfied with the current ordering system. Their customers hope that the cafe could provide a more efficient ordering system, and they are willing to use a digital ordering system with multiple features. Kacani cafe needs a more systematic workflow to improve customer experience.

2) Summary from the interview

   After conducting the interview, we conclude a few key points from Kacani cafe:

   - Inefficient systems or workflows may cause customer dissatisfaction.
   - Lack of an inventory management system could lead to menu items being unavailable.

- Limited customer engagement, there is no systematic way to collect customer feedback and suggestions.
- Lack of an integration payment system, customers need to pay cash at the counter, which brings inconvenience to them.

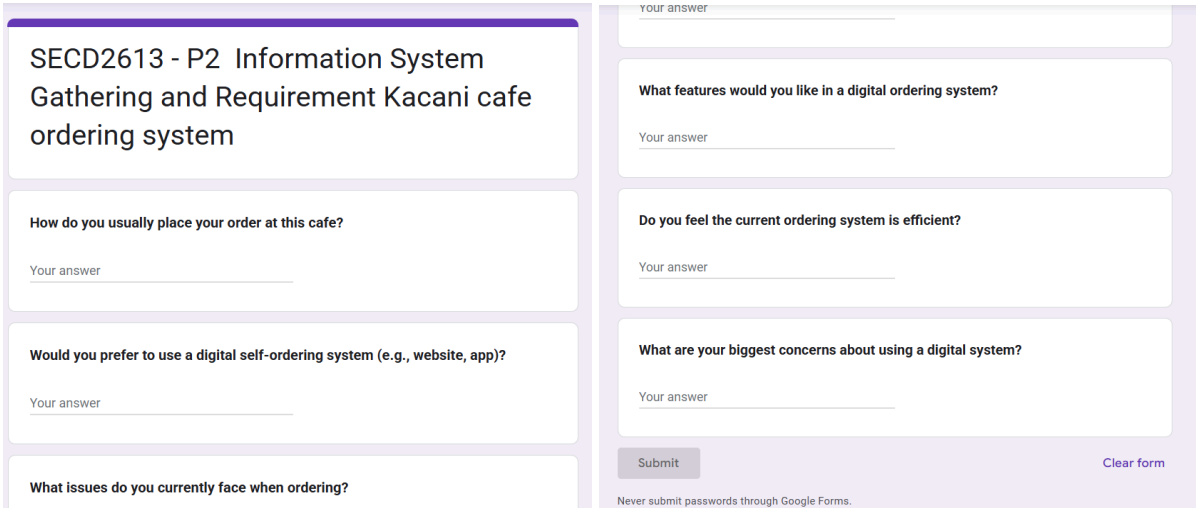
3) Summary from observation

From our observation, we noticed a few key points from Kacani cafe:

- Manual ordering causes errors and long waiting times when serving customers.
- Staff overload, a staff member spends too much time doing other things, instead of focusing on service quality and speed.
- No integration between front and kitchen, delay or confusion in communication between order takers and kitchen staff, especially when orders are modified last-minute.
- customers' customised requirements may be ignored, due to their manual ordering system.

Evidence

-Here is some supporting evidence.



SECD2613 - P2 Information System Gathering and Requirement Kacani cafe ordering system

How do you usually place your order at this cafe?

Your answer

Would you prefer to use a digital self-ordering system (e.g., website, app)?

Your answer

What issues do you currently face when ordering?

Your answer

What features would you like in a digital ordering system?

Your answer

Do you feel the current ordering system is efficient?

Your answer

What are your biggest concerns about using a digital system?

Your answer

Submit

Clear form

Never submit passwords through Google Forms.

Figure 1: the questionnaire that we prepare

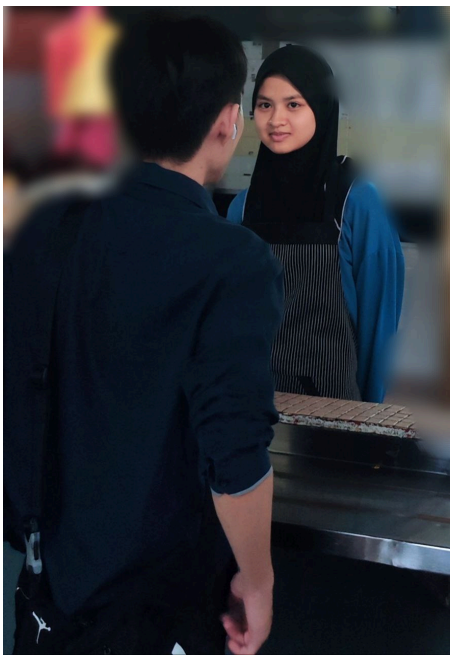


Figure 2: Interviewing staff

Figure 3: Wrong order occurs

5.0 Requirement Analysis (based on AS-IS analysis)

5.1 Current business process (scenarios, workflow)

5.1.1 Customer Workflow: Placing and Picking Up an Order

Scenario: A customer wants to order coffee and a pastry for pickup.

Workflow:

- **Step 1: Accessing the Menu & Browse**
    - **Input:** Customer navigates to the Click&Sip website or mobile app.
    - **Process:** The system loads and displays the cafe's current menu, categorized by food/beverage type, with item descriptions and prices.
    - **Output:** Customer sees the available menu items.
- **Step 2: Selecting Items and Building an Order**
    - **Input:** Customer taps or clicks on desired items (e.g., "Latte," "Croissant") and specifies quantities. The customer might also add customizations (e.g., "extra shot," "almond milk").
    - **Process:** The system adds the selected items to a virtual shopping cart. It calculates the running subtotal and updates the cart display in real-time.
    - **Output:** The customer's shopping cart shows the selected items, quantities, and subtotal.
- **Step 3: Reviewing the Order & Specifying Pickup**
    - **Input:** Customer clicks on the "View Cart" or "Checkout" button. They then review their selections and choose a desired pickup time from available slots.
    - **Process:** The system presents a summary of the cart, applies any relevant taxes/fees, and calculates the final total. It validates the selected pickup time against the cafe's operating hours and current order load.
    - **Output:** A complete order summary with final price and a prompt to confirm the pickup time.
- **Step 4: Payment**
    - **Input:** Customer provides payment details (e.g., credit card information, e-wallet selection).

    - **Process:** The system securely transmits payment details to the integrated payment gateway. The gateway processes the transaction and returns a success or failure response.
    - **Output:** Payment confirmation or an error message if the transaction fails.
- **Step 5: Order Confirmation**
    - **Input:** Successful payment.
    - **Process:** The system generates a unique order ID, records the order in the database, and sends an automated confirmation (via email/app notification) to the customer with the order details and pickup time.
    - **Output:** A "Thank You" screen with the order ID and pickup time displayed to the customer, and a confirmation email/notification received by the customer.
- **Step 6: Picking Up the Order**
    - **Input:** Customer arrives at the cafe at the specified pickup time and provides their order ID or name.
    - **Process:** Cafe staff verifies the order ID against their "ready for pickup" list.
    - **Output:** Customer receives their prepared order.

5.1.2 Cafe Staff Workflow: Managing Orders and Menu

Scenario 1: Processing a New Order

Workflow:

- **Step 1: New Order Notification**
    - **Input:** A customer places a new order through Click&Sip.
    - **Process:** The system immediately pushes a real-time notification (e.g., sound alert, visual highlight) to the staff dashboard.
    - **Output:** Staff dashboard displays the new incoming order prominently.
- **Step 2: Viewing Order Details**
    - **Input:** Staff member clicks on the new order notification.

    - **Process:** The system retrieves and displays all details of the specific order, including items, quantities, customizations, customer name, and desired pickup time.
    - **Output:** A detailed view of the customer's order.
- **Step 3: Updating Order Status (Preparation)**
    - **Input:** Staff acknowledges the order and begins preparation. They click "Mark as Preparing."
    - **Process:** The system updates the order's status in the database to "Preparing." This status change is visible on the staff dashboard and, potentially, to the customer via their order tracking.
    - **Output:** Order status updated on the system.
- **Step 4: Updating Order Status (Ready for Pickup)**
    - **Input:** Staff completes the order preparation and places it in the pickup area. They click "Mark as Ready for Pickup."
    - **Process:** The system updates the order's status to "Ready for Pickup" and automatically sends a notification (e.g., in-app push, email) to the customer.
    - **Output:** Order status updated, customer notified their order is ready.

Scenario 2: Managing Menu Items

Workflow:

- **Step 1: Accessing Menu Management**
    - **Input:** An authorized staff member logs into the Click&Sip admin panel and navigates to the "Menu Management" section.
    - **Process:** The system loads the current list of menu items with their details.
    - **Output:** Display of existing menu items, categories, prices, and availability.
- **Step 2: Adding a New Item**
    - **Input:** Staff clicks "Add New Item" and inputs item name, description, price, category, and uploads an image (if applicable).
    - **Process:** The system validates the input, creates a new entry in the menu database, and assigns a unique ID.
    - **Output:** The new item appears on the menu for customers.

- **Step 3: Updating an Existing Item**
    - **Input:** Staff selects an existing item and modifies its details (e.g., price change, description update, marking as "out of stock").
    - **Process:** The system updates the corresponding record in the menu database. If an item is marked "out of stock," it removes it from active display for customers.
    - **Output:** The menu displayed to customers reflects the updated item details or its unavailability.
- **Step 4: Removing an Item**
    - **Input:** Staff selects an item and confirms "Remove Item."
    - **Process:** The system deletes the item record from the menu database.
    - **Output:** The item is no longer visible on the customer-facing menu.

5.2 Functional Requirement (input, process and output)

5.2.1 Order Management

- A user shall be able to **browse the cafe's menu** (input: user selection; process: display menu items with descriptions and prices; output: rendered menu).
- A user shall be able to **add items to a shopping cart** (input: item selection and quantity; process: update cart contents and total price; output: updated cart display).
- A user shall be able to **remove items from a shopping cart** (input: item selection; process: update cart contents and total price; output: updated cart display).
- The system shall **process online payments** for orders (input: payment details; process: integrate with payment gateway, validate payment; output: payment confirmation/error).
- The system shall **generate a unique order ID** for each placed order (input: confirmed order; process: generate unique alphanumeric ID; output: displayed order ID).
- The system shall **send order confirmations** to the user via email or in-app notification (input: confirmed order; process: compose and send notification; output: email/notification sent).
- Cafe staff shall be able to **view new incoming orders** in real-time (input: new order placed; process: update staff dashboard; output: new order displayed on dashboard).

- Cafe staff shall be able to **mark an order as "preparing"** (input: staff action; process: update order status; output: updated order status for staff and customer).
- Cafe staff shall be able to **mark an order as "ready for pickup"** (input: staff action; process: update order status; output: updated order status for staff and customer, notification to customer).
- Cafe staff shall be able to **view order details** including items, quantities, and customer information (input: staff selection of order; process: retrieve order data; output: detailed order display).

PROCESS	**INPUT**	**OUTPUT**
Browse Menu	User selection	Rendered menu with descriptions and prices
Add Items to Shopping Cart	Item selection, quantity	Updated cart display and total price
Remove Items from Shopping Cart	Item selection	Updated cart display and total price
Process Online Payment	Payment details	Payment confirmation or error message
Generate Order ID	Confirmed order	Unique alphanumeric order ID
Send Order Confirmation	Confirmed order	Email or in-app notification sent to user
View New Incoming Orders (Staff)	New order placed	New order displayed on staff dashboard
Mark Order as Preparing	Staff action	Updated order status (for staff and customer)

Mark Order as Ready for Pickup	Staff action	Updated status and customer notification
View Order Details (Staff)	Staff selects order	Displayed item list, quantities, and customer info

5.2.2 User Accounts

- A user shall be able to **create a new account** (input: user details like phone number, password; process: validate input, store credentials securely; output: account creation confirmation).
- A user shall be able to **log in to their account** (input: phone number and otp verification; process: authenticate credentials; output: access to user account features).
- A user shall be able to **view their order history** (input: user request; process: retrieve past orders associated with account; output: list of past orders).
- A user shall be able to **update their profile information** (input: new user details; process: validate and update database; output: updated profile confirmation).
- A user shall be able to **reset their password** (input: email address; process: send password reset link; output: password reset instructions sent).

PROCESS	**INPUT**	**OUTPUT**
Create New Account	Phone number, password	Account creation confirmation
Log In to Account	Phone number, OTP	Access to user account features
View Order History	User request	List of past orders
Update Profile Information	New user details	Updated profile confirmation

Reset Password	Email address	Password reset instructions sent

5.2.3 Menu Management (for Cafe Staff)

- Cafe staff shall be able to **add new menu items** (input: item name, description, price, category; process: store item data; output: item added to menu).
- Cafe staff shall be able to **update existing menu items** (input: updated item details; process: modify item data; output: item updated on menu).
- Cafe staff shall be able to **remove menu items** (input: item selection; process: delete item data; output: item removed from menu).
- Cafe staff shall be able to **mark menu items as "out of stock"** (input: staff action; process: update item availability status; output: item displayed as unavailable to customers).

PROCESS	**INPUT**	**OUTPUT**
Add New Menu Item	Item name, description, price, category	New item added to the menu
Update Existing Menu Item	Updated item details	Item updated on the customer-facing menu
Remove Menu Item	Item selection	Item removed from the menu
Mark Item as Out of Stock	Staff action	Item shown as unavailable to customers

5.3 Non-functional Requirement (performance and control)

5.3.1 Performance

- The system is designed to maintain an average response time of estimated 3 seconds during peak hours.

- Order processing, from item selection to confirmation, is expected to complete within approximately 5 seconds.

- The system is intended to support up to 80 users in a server without significant performance degradation.

- The user interface is optimized with an average page size of around 2.7MB to ensure fast loading.

- During peak hour operation, the system is expected to handle approximately 120 backend requests per hour with consistent throughput**.**

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5.3.2 Control (Non-Functional Control Requirements)

- **User Access Management**: The system ensures that only authorized users can access specific features of the system such as inventory tracking or rating review page.

- **Authentication**: All users entering their username and password to access their account.

- **Data Integrity**: The system will protect the data accuracy and consistency by validating the inputs.

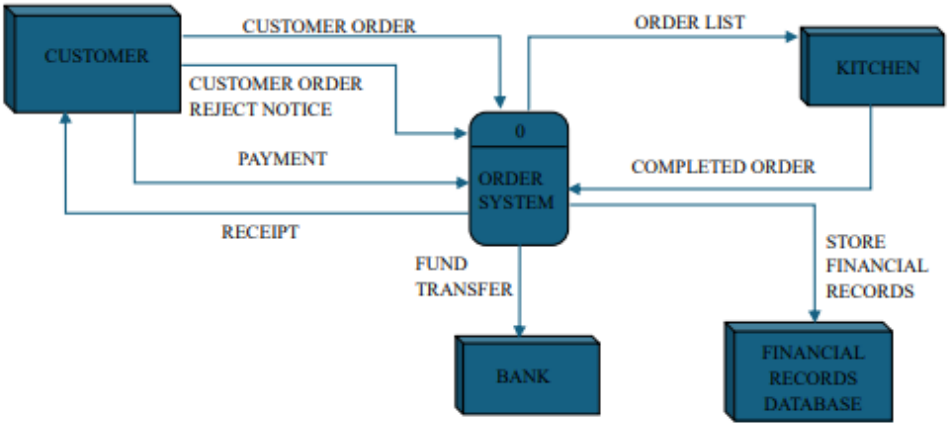
- **Audit Logging**:Whenever employees or admin make changes to the system,the system will record the changes automatically.

- **Error Recovery**: If the system crashes unexpectedly, it is able to restore the latest uncompleted transaction within 10 minutes.

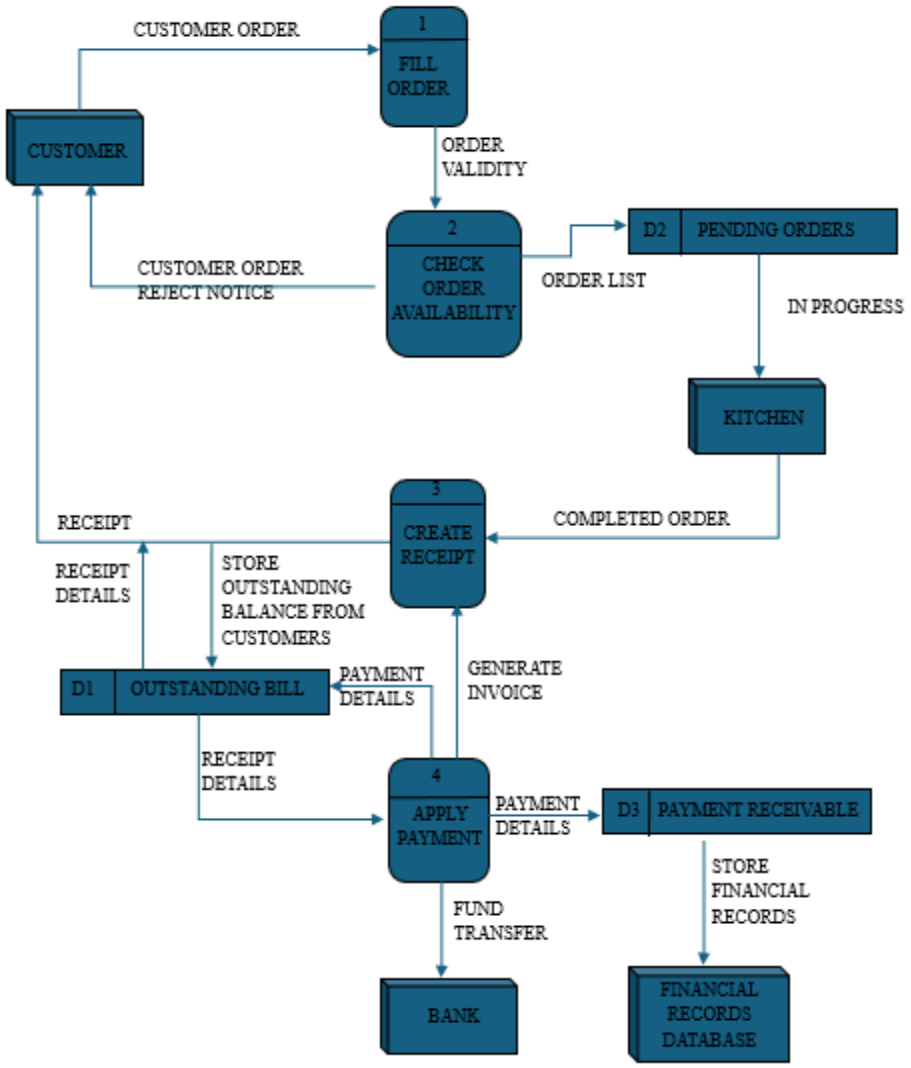
- **Session Management**: User sessions automatically logout after 10 minutes of idling for security purposes.

5.4 Logical DFD AS-IS system (Context Diagram, Diagram 0, Child)

5.4.1 Context Diagram

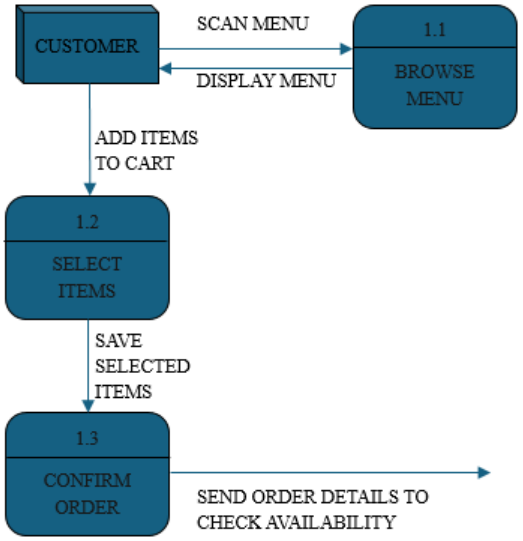


5.4.1 Diagram 0

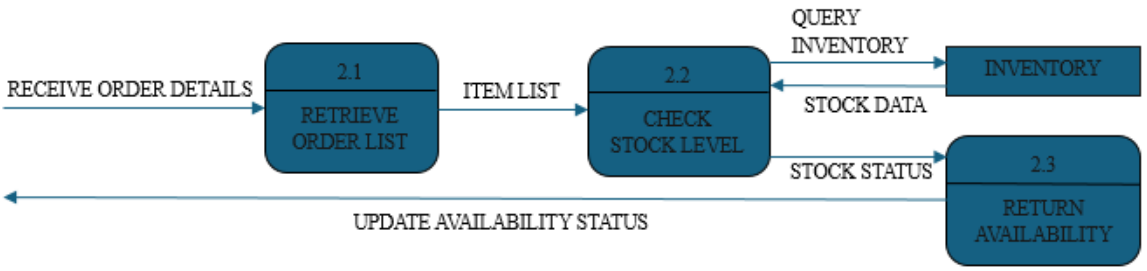


5.4.1 Child Diagram

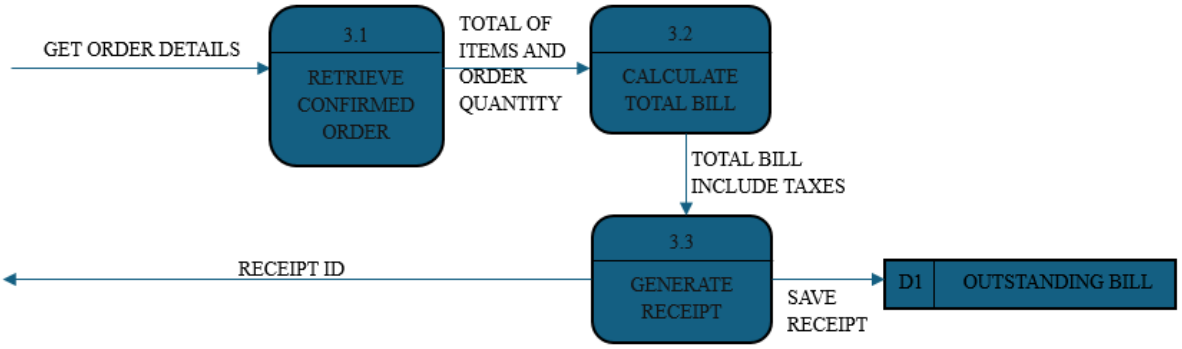
5.3.1 Process 1 - Fill Order



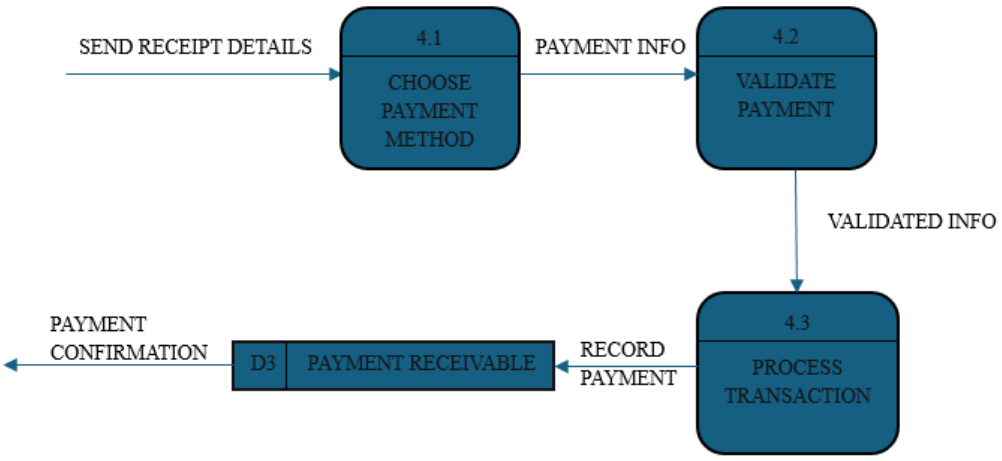
5.3.2 Process 2 - Check Order Availability



5.3.3 Process 3 - Create Receipt



5.3.4 Process 4 - Apply Payment



6.0 Summary of Requirement Analysis Process

In this project, we conducted a detailed needs analysis process to gain a deep understanding of the problems and limitations faced by Kacani Cafe in its current operations. To ensure the comprehensiveness and accuracy of the analysis, we used three main information collection methods: questionnaires, interviews, and field observations. These methods helped us collect data from different perspectives, including customer experience, employee operation processes, and overall business process efficiency.

Through the questionnaire survey, we learned that most customers are dissatisfied with the current ordering process, especially during peak hours, where long waiting times and frequent order errors are the main problems. At the same time, many customers expressed their desire to use a self-service ordering system with menu graphics, personalization, order tracking, and electronic payment functions.

In interviews with employees and store owners, we further confirmed the severity of these problems. The store owner said that because the current system relies on manual operation, employees often have to handle multiple tasks such as ordering, cashiering, and beverage preparation at the same time during peak hours, resulting in reduced service efficiency. In addition, inventory management relies entirely on manual memory, and materials are often exhausted but not replenished in time. Customer feedback is also not systematically collected, making it difficult to use for service optimization.

After comprehensive analysis, we clearly put forward the functional requirements that the system should have, such as digital ordering, inventory management, order tracking, user accounts, electronic payment and customer feedback systems; at the same time, we also put forward non-functional requirements, such as system response speed, concurrent user support, security, data integrity, error recovery mechanism and access control.

Through this demand analysis process, we have laid a solid foundation for the design and development of the KACANI Ordering System. The system goal is not only to solve the current problems of Cafe Kacani, but also to comprehensively improve operational efficiency, improve customer experience, and provide support for future business expansion through the introduction of information systems.