

**SWINBURNE UNIVERSITY OF TECHNOLOGY**  
School of Science, Computing, and Engineering Technologies



**Software Architectures and Design**  
**SWE30003**

**Requirements Specification for The Relaxing Koala  
Restaurant Information System**

**LECTURER**

Mr. Trung Pham

**GROUP 5**

Thai Duong Bao Tan

Pham Quynh Chi

Le Huu Nhan

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# Introduction

The Relaxing Koala is a growing café/restaurant on Glenferrie Road, and it is expanding significantly. As part of this expansion, the owners have recognized the need to modernize their operations, which had previously been managed manually.

To manage the increasing demands, they plan to implement a comprehensive Restaurant Information System (RIS) that will automate essential processes such as reservations, order management, kitchen notifications, invoicing, payments, and menu statistics. Additionally, the system will provide online access to the menu and support take-away orders. To develop this solution, the owners have enlisted Swinsoft Consulting to create a tailored system that addresses these operational needs effectively.

## Project Background

### Overview

This document provides a comprehensive requirements specification for a RIS to be developed for The Relaxing Koala. The RIS is designed to modernize the restaurant's previously manual operations by automating key processes like reservations, order management, invoicing, payments, and menu statistics. The main focus of this document is on domain-level requirements, which are addressed using the Tasks & Support approach, as well as key quality attributes that the system must meet. Additionally, the document covers the context of the RIS, including the data/domain model, product-level, and design-level requirements to ensure a scalable, usable, and secure solution.

### Domain Vocabulary

- RK: Relaxing Koala
- Menu: A list of food and beverages available at the restaurant.
- Customer: An individual or group who visits RK to enjoy meals and services or orders food via an online system.

- Walk-in: Customer(s) who arrives at the restaurant without a reservation and is seated on a first-come, first-served basis, depends on table availability.
- Waiter: An RK employee who takes orders, serves food and drinks, and assists customers dining at the restaurant.
- Kitchen Staff / Chef: RK employees who prepare and cook the food served at the restaurant.
- Restaurant Manager: The person in charge of managing the overall operations of the RK.
- Delivery Personnel: An RK employee who transports food orders from RK to customers at their chosen locations.
- Cashier: An RK employee who is responsible for processing payments, handling cash and transactions, and providing receipts to customers.
- Reservation: A booking made by a customer to secure a table at the restaurant for a specific time and date.
- Order: A customer's request for specific menu items, whether for dining in or take-away.
- Take-away: A service where customers order food from RK and have it packed for them to eat elsewhere.
- Delivery: The process of transporting ordered food to a customer's location outside the restaurant.
- Invoice: A detailed list of food and beverage items, along with their prices, sent to the customer for payment.
- Receipt: A document provided to the customer after payment that confirms the completion of the transaction.

## Goals

The primary goals of the Restaurant Information System for the RK are as follows:

- **Scale capacity:** Allow the restaurant to efficiently serve up to 150 on-site customers per day while maintaining a 90% table occupancy rate during peak hours.

- **Boost customer engagement:** Increase online visibility by ensuring that all of the restaurant's offerings are available to view online.
- **Improve operational efficiency:** Automate 60% of daily tasks and reduce manual order entry by 40%, which allows employees to focus on improving the customer experience. This also leads to a 20% reduction in order processing errors and a 15% decrease in order processing time.
- **Automate reservation management:** Automate 80% of the reservation process, including customer confirmation and table assignments.
- **Collect order insights:** Generate daily and weekly reports on customer ordering patterns to inform menu updates and marketing strategies. The reports also highlight the top ten most popular menu items and trends.
- **Enable online ordering:** Provide a user-friendly online platform for customers to place takeaway orders, with the goal of handling 20% of total daily orders through this channel.
- **Optimize payment processing:** Integrate at least 3 different payment methods to ensure that 95% of transactions are completed within 10 seconds.
- **Prepare for future growth:** Ensure that the system is scalable and flexible enough to accommodate new features without negatively impacting overall performance.

## Assumptions

- Swinsoft Consulting has well-established and detailed UI guidelines, which will be followed throughout the development of this system.
- RK has high-quality, reliable hardware (such as modern servers, computers, or POS systems). This allows the development team to focus on software optimization rather than worrying about outdated or underperforming hardware.
- With the recent expansion, RK can now host up to 150 customers. This refers to the **maximum number of seated guests** in the restaurant and does NOT include online customers.
- Any third-party payment gateways or providers used in the system follow industry-standard security protocols.

## Constraints

- The restaurant staff may be unfamiliar with advanced information systems.
- Online ordering adoption may be slow.
- Unstable internet access could affect the reliability of online features.
- May have difficulty managing external factors such as lost items during delivery or customers refusing to accept food upon delivery.

## Scope

The owners of the RK want a system that will replace the current manual, low-tech processes and efficiently support their expanded operations. The system should:

- automate tasks such as taking reservations, processing orders, and generating invoices,
- provide real-time updates for the kitchen staff about incoming orders,
- enable customers to view the restaurant's menu online,
- support take-away orders and arrange delivery,
- automate basic statistics tracking, such as analyzing popular menu items,
- handle multiple users at once, and
- be scalable to allow for additional features as needed.

## Problem Domain

### Pain Points

- Inefficient restaurant organization: Day-to-day operations of Relaxing Koala is still done in manual style with little involvement of modern technology, such as taking orders from the guests, passing on the orders to the kitchen, accounting, etc, thus limiting efficiency significantly and not being able to scale up to the new capacity.
- Lack of online marketing: Because there hasn't been an online menu before, the number of customers reached was severely limited to more traditional forms of advertisements like flyers or just word of mouth.

- Ineffective record keeping: The record keeping of many statistics related to ordered menu is currently outdated, so it is very time-consuming and frequently has errors. Consequently, it is difficult for RK to get an overview of the menu items the customers are ordering and draft a business strategy.

## Domain Entities

- Menu
- MenuItem
- Customer
- Order
- Chef
- DeliveryPerson
- Waiter
- Payment
- Receipt
- Cahsier
- Reservation
- Table

## Actors

- Waiter (must include online waiters)
- Chef
- Customer
- Restaurant manager
- Delivery personnel
- Cashier

## Tasks

1. User registration
2. Browse online menu
3. Make reservations
4. Walk-in management



5. Place order
6. Order processing
7. Arrange delivery
8. Create invoices and receipts
9. Payment processing
10. Order statistics tracking

## Data model

### Domain model

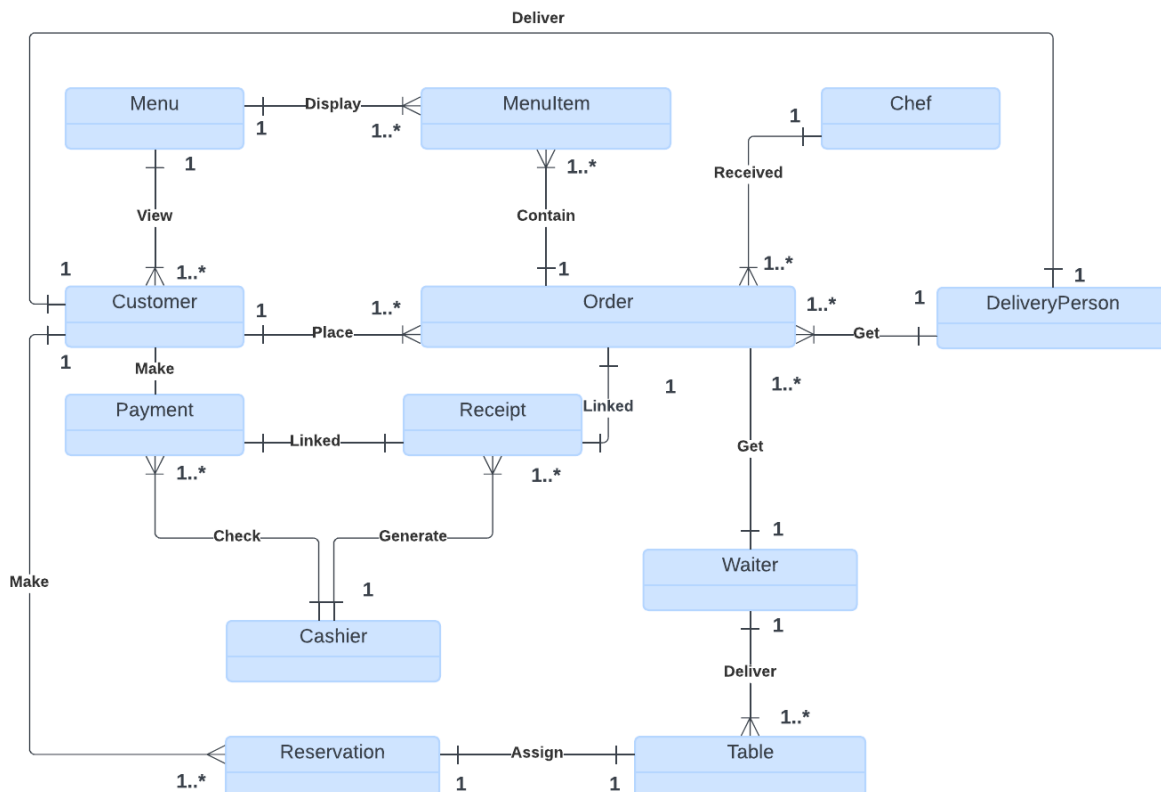


Figure 1. Domain model

### Entities description

**Menu:** Represents the restaurant's menu, organized by category (e.g., appetizers, main courses, desserts).

**MenuItem:** Represents individual items in the menu, such as dishes, with details including the name, price, and category.

**Customer:** Represents the customer, including their contact details and address if the order is for delivery.

**Order:** Tracks orders placed by customers, including their status, type (dine-in, take-away, delivery), and associated customer details.

**Chef:** Represents the kitchen staff who prepares orders, playing a central role in the order fulfillment process.

**DeliveryPerson:** Represents the person responsible for delivering food to customers when the delivery option is selected. Only one order per delivery person, if all delivery person are busy, orders are stacked in queue style.

**Waiter:** Waitstaff who serve customers, handle orders, and assist with payment processing.

**Payment:** Handles payment details for orders, including the type (cash, card) and payment status.

**Receipt:** Represents the financial summary of the order, capturing total amount and payment status.

**Cashier:** Handles the final transaction with the customer, ensures payment is made, and generates the receipt.

**Reservation:** Tracks table reservations for customers, including the date, time, number of guests, and reservation status.

**Table:** Represents the physical tables in the restaurant, detailing their capacity and location (indoor or outdoor).

## Task description

### Task 1: User registration

Task	User registration
Purpose:	To allow new users, such as customers, restaurant staff, and owners, to create accounts in the system and gain access to specific features based on their roles.
Trigger/Precondition:	A new user needs access to the system, whether to place orders or manage restaurant operations.
Frequency:	Whenever a new user create account
Critical:	Accurate user data collection and proper user role assignment

Work Area:	
Subtasks:	Example Solutions
1. Set up account credentials	The system provides a registration form that includes fields where users can create their username and password.
2. Enter personal details	After entering username and password, users fill out another form with the required personal information, such as their full name, email address, and phone number.
3. Assign user roles	Staff registrations are verified by owners/managers, while customers receive standard access automatically.
4. Confirm registration (Customers only) Problem: Spam filters or incorrect contact info	After submission, users will receive a confirmation message telling them to check their email/SMS for the verification link.
Variants:	
1a. Third-party registration	Customers may register accounts using third-party authentication (Google, Facebook, etc.)

## Task 2: Browse online menu

Task	Browse Online Menu
Purpose:	Promote the menu to the customers through online method
Trigger/Precondition:	The customer wants to know more about the offerings of RK
Frequency:	99% uptime
Critical:	The online menu goes down due to maintenance or server issues
Work Area:	
Subtasks:	Example Solutions

1. Promote restaurant's website through online platforms	Create advertisements on social media to increase publicity for the restaurant
2. Help customer search and filter menu according to preferences	The system allows the customers to browse all food and drinks available at the restaurant. The customer can filter out the menu items that he/she is interested in based on categories like price, type of food, food origin, availability, etc.
Variants:	

### Task 3: Make reservations

Task	Make Reservations
Purpose:	To allow customers to reserve tables in advance and staff to manage table availability.
Trigger/Precondition:	Customers want to reserve a table at a specific time.
Frequency:	Average 5 reservations/day
Critical:	No tables available
Work Area:	Cashier counter
Subtasks:	Example Solutions
1. Provide reservation details  Problem: Incorrect contact information or wrong party size	The system provides customers a form to enter details (party size, their contact info, dates and times) and special requests.
2. Assign table(s)  Problem: Lack of appropriately sized tables	The system suggests suitable tables or areas based on the details that customers provide. Staff is able to adjust the table allocation as needed.
3. Confirmation and Follow-up notification	Upon successful reservations, users receive an automatic confirmation email or SMS with the reservation details (date, time, number of seats, etc.). Automated reminders are sent 24 hours before the reservation time.

	The user can cancel or modify reservation details at least 1 day in advance.
Variants:	

## Task 4: Walk-in management

Task	Walk-in Management
Purpose:	Welcome customers and guide them to appropriate tables
Trigger/Precondition:	A customer arrives at the restaurant
Frequency:	Average 30 customers/day
Critical:	A large group of customers arrive together
Work Area:	Reservation desk
Subtasks:	Example Solutions
1. Find table	The system show available tables in the restaurant and assign table(s) to the customer
2. Mark table as occupied	(Standard data entry)
Variants:	
1a. Customer has reservation	Customers will be checked if they have reservations
2a. Customer cancels reservation or arrives late	The system will mark the table with reservation as available for walk-ins or new reservation

## Task 5: Place order

Task	Place Order
Purpose:	Take orders from customer
Trigger/Precondition:	The customer would like to order food
Frequency:	Average 40 orders/day
Critical:	A large number of customers order at once, like a group of customers go together
Work Area:	Dining tables or though online ordering

Subtasks:	Example Solutions
1. Recommend items in menu to customers	The system displays recommended food and drinks based on the customer's interest about taste, type of food, etc.
2. Record customer's choices of menu	The ordered items along with some additional details of customers (age, gender, etc.) are recorded in the database for future use
Variants:	
2a. The kitchen runs out of ingredients for certain menu items	The system check the remaining ingredients in the kitchen to confirm if a dish is available to order or not

## Task 6: Order processing

Task	Order Processing
Purpose:	Pass the order to the kitchen. Track the cooking process. Serve the food to the customers.
Trigger/Precondition:	A food order has already been taken
Frequency:	Average 40 orders/day
Critical:	An item in the menu unexpected take too long to make
Work Area:	Kitchen
Subtasks:	Example Solutions
1. Relay the order to the kitchen	The system will pass on the orders to the chefs in the kitchen
2. Monitor the cooking process	The system informs the customers of the remaining time to prepare the order based on an algorithm beforehand. In addition, the system will track the progress of the cooks to notify customers of any delays in the process.
3. Serve the ordered food to the customers	The system updates the status when an order is finished. After that, the waiter is requested by the system to serve the meal to the correct customer based on the information in the database.
Variants:	

## Task 7: Arrange delivery

Task	Arrange Delivery
Purpose:	To manage the restaurant's delivery process
Trigger/Precondition:	Customers place delivery orders through the online system
Frequency:	Average 20 delivery orders/day
Critical:	
Work Area:	Kitchen and online system
Subtasks:	Example Solutions
1. Receive delivery order	The system automatically records the order details.
2. Prepare the order	The system generates a printed or digital order slip that guides the kitchen staff on what needs to be prepared.
3. Assign delivery staff	The system automatically assigns a driver (who is also the restaurant's staff).
4. Track delivery status	GPS tracking allows customers and staff to monitor the driver's progress and estimated time of arrival.
5. Confirm successful delivery	Delivery staff confirms successful delivery with a signature or customer acknowledgment.
Variants:	
3a. Third-party Delivery Service	A third-party driver is assigned if customers place orders through a third-party app.
4a. Delivery is canceled	Customers cancel a delivery via the online system, and the system immediately updates the order status and notifies the assigned delivery personnel that the delivery has been canceled.

## Task 8: Create invoice and receipts

Task	Create Invoice and Receipts
Purpose:	Remove workload for the cashier and helps keep track of cash inflow and outflows

Trigger/Precondition:	<p>A customer onsite just finished dining and wants to pay for their meal</p> <p>A customer just received their delivery meal and wants to pay</p>
Frequency:	Average 20 receipts/day
Critical:	A large influx of customers/ meal ordered
Work Area:	Checking counter
Subtasks:	Example Solutions
1. Verify customer identification	The system provides an easy method to keep track of customer identification ( table id, customer id etc)
2. Connect identification to meal ordered	The system connects the customer id to the amount of meals ordered and its price to output the receipt.
3. Output receipt	The system outputs a digital and printable receipt
Variants:	

## Task 9: Payment processing

Task	Payment Processing
Purpose:	Handle payment from receipts
Trigger/Precondition:	A receipt has been made and the customer is ready to pay
Frequency:	Average 20 receipts/day
Critical:	Large influx of customers
Work Area:	Checking counter
Subtasks:	Example Solutions
1. Confirm receipt	System displays receipt for customer to check before paying
2. Select payment type	System let the user select their payment method (cash or credit)
3. Confirm payment	System confirms the payment, if cash it will confirm with the billing machine, if credit it will check with the bank
Variants:	



## Task 10: Order statistics tracking

Task	Order Statistics Tracking
Purpose:	To monitor, analyze, and report on customer order data to assist the restaurant in evaluating performance, optimizing menu, and improving service efficiency.
Trigger/Precondition:	When an order is placed, the system will automatically record the necessary data.
Frequency:	Anytime an order is placed. There is also a report being generated daily, at the end of the business day.
Critical:	
Work Area:	Back-office
Subtasks:	Example Solutions
1. Collect order data	The system automatically records and compiles data, such as item quantities, revenue, and order times.
2. Organize data	The system categorizes data by order time, type of meal, and payment methods.
3. Generate report(s)	The system exports data in report formats. The report contains business summaries and highlights key metrics, such as sales trends, popular menu items, peak ordering times, and recurring customer preferences.
4. Store data Problem: Fail to archive data properly	The system stores previous data in a storage, which will be used for future comparisons and seasonal analysis.
Variants:	

# Workflow

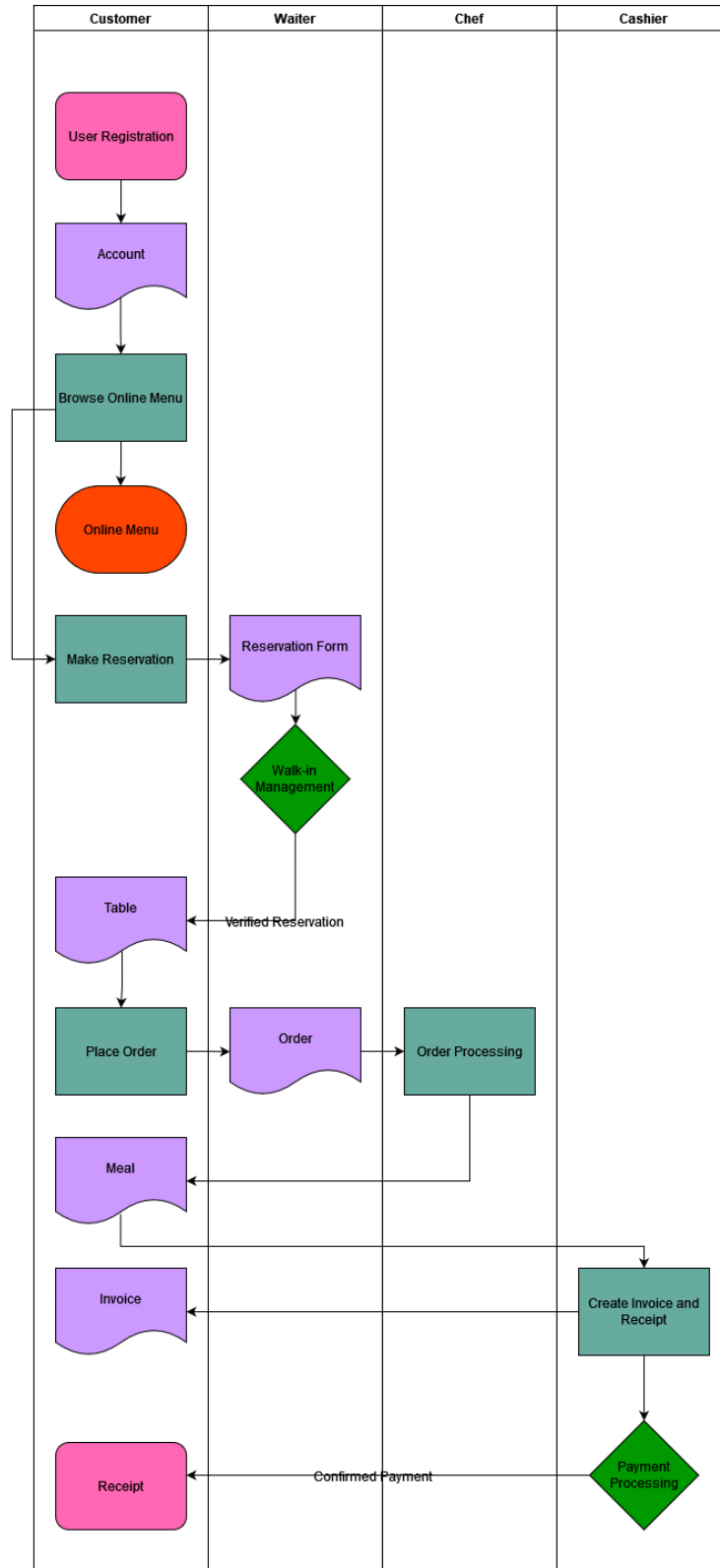


Figure 2. Workflow of high-level tasks

# Quality Attributes of System

## Security

Security is a top priority for the system, as protecting both user and business data is essential not only for RK but also for SwinSoft's reputation. Although it is assumed that third-party payment gateways and providers used in the system follow industry-standard security protocols, the system itself must protect the sensitive data it handles, such as customer information, reservation details, and business operational data.

To meet this quality attribute, the system must:

- ensure that all access attempts are appropriately authenticated and authorized,
- implement strong user authentication mechanisms, such as MFA, to prevent unauthorized access,
- restrict access to specific data and functions based on user role,
- use data encryption for sensitive information both in transit and at rest, and
- automate weekly security updates.

## Usability

Given that The Relaxing Koala's current operations are low-tech and mostly manual, it is expected that the staff has little to no experience with advanced technology systems. Similarly, customers will need time to get used to the new system. As a result, the system must prioritize usability to make it easy for both staff and customers to adapt quickly and effectively. Furthermore, a user-friendly interface will not only increase customer satisfaction but also help build trust between the restaurant and SwinSoft.

To meet this quality attribute, the system must follow the UI guidelines provided by SwinSoft Consulting. These guidelines will help to ensure consistent design, accessibility, and usability.

## Scalability

The system must be scalable to handle an unpredictable increase in users and activities without a decrease in performance. As the system will be available online, the restaurant may experience a significant increase in customer interactions through the

system. This increase in digital engagement can happen gradually or suddenly, which makes it crucial for the system to manage larger volumes of transactions and multiple users at once without slowing down or causing delays.

To meet this quality attribute, the system must:

- support an annual increase in users by 30% without affecting performance,
- ensure that key functions such as placing orders, managing reservations, and processing payments have response times of less than 2 seconds, even during peak demand, and
- allow for future expansion with minimal modifications.

## Availability

To effectively support RK's operations, the system must be highly available. The system should be fully operational during RK's working hours to handle critical processes such as reservations, order processing and payment processing. Given the restaurant's reliance on this system to manage day-to-day tasks, any downtime during working hours would disrupt operations and negatively impact customer experience.

To meet this quality attribute, the system must:

- achieve at least 99% uptime during working hours,
- be allowed a maximum of 3 hours of downtime per month, and
- ensure a maximum recovery time of 15 minutes for critical functions, such as order and payment processing.

While the system does not have to be available 24/7, scheduled maintenance should take place outside of working hours to avoid disruptions to both staff and customers during business operations

## Portability

Although portability is not a top priority for the system, it is still worth considering. By ensuring the system is accessible across multiple platforms, such as desktops, tablets, and mobile devices, the restaurant can reach a broader range of users. Moreover,

portability enhances convenience for both staff and customers by allowing them to access the system from anywhere.

To meet this quality attribute, the system must:

- be compatible with the major operating systems (Windows, macOS, iOS, and Android),
- ensure a responsive design that adapts to various screen sizes and resolutions well,
- keep full functionality for both web browsers and mobile apps.

## Other Requirements

### Product level requirements

- Store information of users (customers, restaurant staff, etc.) and assign suitable roles
- Display all menu items to the online website along with relevant information like price, availability, discount, ingredients, etc.
- Record both orders from customers at dining tables and takeaway
- Track the cooking process to notify when the food needs to be served
- Print receipts, invoices
- Store statistics of the restaurant like number of orders for each menu item, preference of group of customers based on gender, age.

### Design level requirements

- The online menu needs to follow design guidelines of Relaxing Koala while still being simple, intuitive for customers to use
- The reservation form will include name, phone number, email, booking time, number of guests, as well as any additional information like allergy or birthday event request
- The system can output tables, charts, diagrams to process and analyze the data of the restaurant

- The system will be integrated with payment gateway to allow the customer to choose how to pay their meal
- Adhere to the user-interface guidelines in the document by Swinsoft Consulting

## Validation of Requirements

Task/Entity	Customer	Menu	Order	Chef	Cashier	Receipt	Delivery Person	Waiter	Reservation
User registration	C, R, U, D								
Browse Online Menu	R	R							
Make Reservations	C, R, U, D								
Walk-in Management								R, U	
Place Order	C, R, U, D	R						R	
Order Processing	R			R, U, D				R	
Arrange Delivery	R						R, U		
Create Invoice and Receipts	R				C, R, U, D				
Payment Processing	C, R, U, D				R, U, D				
Order Statistics Tracking			C, U, D			C, U, D			C, U, D

## Verifiability

Some basic problems that may present challenges for verifiability:

- **Vague Frequency Descriptions:** Some tasks, such as browsing the online menu, have a frequency listed as “99% uptime,” which may not provide sufficient clarity. Defining more precise, measurable criteria (e.g., downtime allowed per month) could improve verifiability.
- **Task Assumptions:** Certain workflows, like walk-in management or order placement, include assumptions about customer behavior (e.g., frequency of customers or table occupancy rates). These might be hard to verify unless more data or precise performance metrics are included.
- **Edge Case Handling:** Some problem scenarios, such as when ingredients are out of stock or customers cancel delivery orders, lack specific verification criteria. Testing for these scenarios would require detailed test cases.
- **Usability Testing:** While usability can be tested, it often involves subjective feedback. Clear benchmarks for usability (e.g., time taken to complete tasks, error rates) should be defined to ensure verifiability.

## Possible Solution

### Web-based system

A web-based system is one of the simplest ways to implement the system. By accessing the system through a web browser, customers can easily interact with various features, such as viewing the menu, placing orders, making reservations, and even processing payments. Of course, customers would need to register on the platform in order to do anything more than view the menu. Additionally, the system can provide valuable insights for restaurant owners and managers by allowing them to access order statistics and other management features.

The primary advantages of a web-based solution are the removal of the need for compatibility with different operating systems, as it can be accessed from any device with a web browser. This approach also broadens the system's reach by allowing more users to gain access without having to download an app (all they need is internet connection). Furthermore, adding or updating features can be done quickly, with changes applied almost immediately across the platform.

However, there are few drawbacks to consider. A stable internet connection is necessary for smooth operation, and hosting the system could lead to significant server costs. Additionally, security must be prioritized, as web-based systems can be vulnerable to hacking if proper security measures are not implemented.

## Kiosk-based system and mobile application

An alternative solution is the combination of a kiosk-based system for onsite customers and a mobile application for online customers. In the restaurant, customers can use self-service kiosks to place orders, which reduces the need for staff interaction and potentially saves money on labor. This also reduces wait times, as customers no longer have to stand in queues like in traditional settings. On the other hand, the mobile application will complement this system by offering a way for customers to place takeaway orders that the kiosks may not support.

The kiosk system provides several benefits, such as improving restaurant space and speeding up the order process, but it has higher hardware setup costs compared to the web-based system. Furthermore, some customers may struggle to adapt to the kiosk interface, which leads to a potential loss of business. In contrast, the mobile app allows customers to interact with the restaurant from anywhere using their smartphones, offering convenience and opportunities for personalization. The app can also increase customer engagement by sending notifications about new menu items or discounts.

However, the mobile application comes with its own challenges, which includes higher development and maintenance costs when compared to the web-based solution, as it requires continuous updates to remain compatible with different operating systems. Plus, some customers may be hesitant to download the app due to privacy concerns. They might suspect that their personal data will be collected and used illegally. Moreover, only customers with smartphones will be able to access the app, limiting its accessibility.