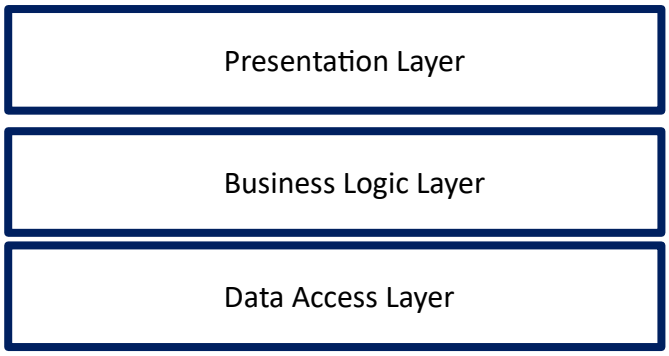
Design structure

The design structure of the ReserveWell Application is organized in a layered architecture, ensuring modularity, scalability, and maintainability. Each layer serves a specific purpose and collaborates seamlessly to achieve the overall goal of efficiently managing restaurant reservations.



Subsystems

Presentation Layer

The Presentation Layer is responsible for handling user interactions and presenting information to users. It includes components for user interfaces, input validation, and handling user requests.

Components for Static Perspective:

- User Interface Modules
- Input Validation Modules
- User Request Handling Modules

Components for Dynamic Perspective:

- User Interface Modules interact with Input Validation Modules to ensure data integrity.
- User Request Handling Modules process user inputs and communicate with the Business Logic Layer to initiate relevant actions.

Business Logic Layer

The Business Logic Layer contains the core functionality of the reservation application. It processes business rules, manages reservations, and orchestrates the overall behavior of the system.

- *Components for Static Perspective:*
- Reservation Management Modules
- Business Rules Modules
- Workflow Orchestration Modules

Components for Dynamic Perspective:

- Reservation Management Modules handle the creation, modification, and cancellation of reservations.
- Business Rules Modules enforce application-specific rules and policies.
- Workflow Orchestration Modules coordinate the flow of operations between different components within the Business Logic Layer.
- Authorization Modules control access to different functionalities based on user roles.
- Encryption/Decryption Modules secure sensitive data during transmission and storage.

Data Access Layer

The Data Access Layer is responsible for managing the application's interaction with the database. It includes components for accessing and updating data stored in the database.

Components for Static Perspective:

- Database Connection Modules
- Data Access Modules

Components for Dynamic Perspective:

- Database Connection Modules establish and maintain connections to the database.
- Data Access Modules handle the retrieval and storage of reservation-related data.

Patterns

Overview

The Optimized Reservation Workflow pattern is tailored to streamline the reservation process within the ReserveWell Application, specifically targeting the "Make Reservation" use case. With a focus on enhancing efficiency and user convenience, this pattern aims to provide a dynamic and adaptable framework for managing reservations effectively.

Intent: The primary intent of the Optimized Reservation Workflow pattern in the context of the "Make Reservation" use case is to create a seamless, user-friendly experience for diners while ensuring optimal utilization of restaurant resources. This pattern intends to automate and optimize the steps involved in making a reservation, offering a responsive system that caters to varying diner preferences and restaurant capacities.

Motivation: Traditional reservation systems often involve manual steps and may lack adaptability to real-time changes in diner preferences and restaurant availability. The Optimized Reservation Workflow pattern is motivated by the need to address these challenges by introducing automation and dynamic decision-making. By doing so, the pattern aims to improve the overall reservation process, benefiting both diners and restaurant managers.

Applicability: The Optimized Reservation Workflow pattern is particularly applicable to the "Make Reservation" use case within the ReserveWell Application. It caters to the interests of various stakeholders, including diners, restaurant managers, system administrators, the Payment Authorization Service, and the Development Team. The pattern is relevant in scenarios where:

- Diners seek an efficient and convenient reservation process.
- Restaurant managers aim to optimize table utilization and ensure a smooth dining experience.
- System administrators need a stable and scalable reservation system.
- The Payment Authorization Service requires seamless integration with the bank's system.

By adopting the Optimized Reservation Workflow pattern, the ReserveWell Application aims to provide a responsive, user-centric reservation experience while ensuring system stability, scalability, and adherence to best practices.

Structure

Diner:

- Role: Initiates the reservation process by interacting with the application's user interface.
- Relevant Data: Provides information such as the desired restaurant, the number of guests, preferred date and time, name, surname, email, and phone number.
- Behavior: Triggers the reservation confirmation process by confirming the provided information.

Restaurant Manager:

- Role: Manages reservations effectively and ensures a seamless dining experience.
- Relevant Data: Accesses and updates reservation information, including table availability, to optimize the dining experience.
- Behavior: Utilizes tools and functionalities to oversee the reservation process and ensure a smooth flow of restaurant operations.

Waitstaff:

- Role: Provides efficient and high-quality service to customers, including arranging tables' physical availability based on reservation updates.
- Relevant Data: Receives real-time updates on reservations and allocates tables accordingly to enhance customer service.
- Behavior: Utilizes tools within the application to organize seating arrangements and deliver a positive dining experience.

Reservation System

- Role: Central component responsible for managing reservations.
- Relevant Data: Stores and processes diner-provided information, generates a unique reservation ID, and updates the system with new reservations.
- Behavior: Validates and records diner reservations, ensuring the availability of the reserved table or dining area during the specified date and time.

Payment Authorization Service:

- Role: Facilitates payment-related interactions with the bank's system.
- Relevant Data: Manages transaction details and authorization status.
- Behavior: Coordinates payment authorization, ensuring a secure and seamless financial transaction if applicable.

User Interface Modules:

- Role: Facilitates interaction between the diner and the reservation system.
- Relevant Data: Displays restaurant options, reservation details, and confirmation messages.
- Behavior: Presents a user-friendly interface, collects diner inputs, and communicates reservation status.

Behavior

Diner Initiates Reservation:

The diner interacts with the user interface, selects a restaurant, specifies the number of guests, and chooses a date and time for the reservation.

Data Submission

Diner enters personal details (name, surname, email, phone number) and submits the reservation request.

System Validation:

The reservation system validates diner inputs, checking for availability and adherence to business rules.

Unique Reservation ID Generation:

Upon successful validation, the reservation system generates a unique reservation ID and associates it with the diner's reservation.

Payment Authorization (if applicable):

If a payment is required, the Payment Authorization Service coordinates with the bank's system for secure transaction processing.

Reservation Confirmation

The reservation system updates its records, marking the reserved table or dining area as unavailable during the specified date and time.

Confirmation Message:

The user interface modules present a confirmation message to the diner, indicating a successful reservation.

Example

Consider a scenario where a diner, Sarah, uses the ReserveWell Application to make a reservation for two at her favorite restaurant. After entering the necessary details and confirming the reservation, the system generates a unique ID, reserves a table, and sends a confirmation message to Sarah's device. If payment is required, the Payment Authorization Service ensures a secure transaction with the bank. This example illustrates a seamless and optimized reservation workflow facilitated by the pattern.

Requirement realizations

View of participants

Diner

- Behavior: Initiates the reservation process, provides necessary information, and confirms the reservation.
- Attributes: Name, surname, email, phone number, selected restaurant, number of guests, preferred date and time.
- Relationships: Interacts with the user interface, triggers reservation confirmation.

Restaurant Manager

- Behavior: Manages reservations effectively, oversees real-time updates, and ensures a smooth dining experience.
- Attributes: Access to reservation management tools, real-time updates on reservations and table availability.
- Relationships: Interacts with the system to optimize table allocation and enhance the dining experience.

Waitstaff

- Behavior: Provides efficient and high-quality service, organizes tables based on real-time reservation updates.
- Attributes: Access to tools for table arrangement, real-time updates on table availability.
- Relationships: Interacts with the system to optimize table arrangements and contribute to positive customer service.

Reservation System

- Behavior: Validates diner inputs, generates unique reservation IDs, updates system records.
- Attributes: Reservation ID, restaurant availability status, reservation details.
- Relationships: Receives inputs from the diner, interacts with the Payment Authorization Service if required.

Payment Authorization Service:

- Behavior: Coordinates payment transactions, manages transaction details.
- Attributes: Transaction status, authorization details.
- Relationships: Collaborates with the Reservation System for secure payment processing.

User Interface Modules

- Behavior: Presents restaurant options, collects and displays reservation details, communicates confirmation messages.
- Attributes: User interface components, reservation status messages.
- Relationships: Facilitates interaction between the diner and the Reservation System.

Basic scenario

Diner Initiates Reservation

Diner interacts with the user interface, selects a restaurant, and specifies the number of guests, date, and time for the reservation.

Data Submission

Diner enters personal details, and the system collects and validates the reservation request.

System Validation

The Reservation System validates diner inputs, checks restaurant availability, and confirms the reservation's feasibility.

Unique Reservation ID Generation

Upon successful validation, the Reservation System generates a unique ID and associates it with the reservation.

Payment Authorization (if applicable)

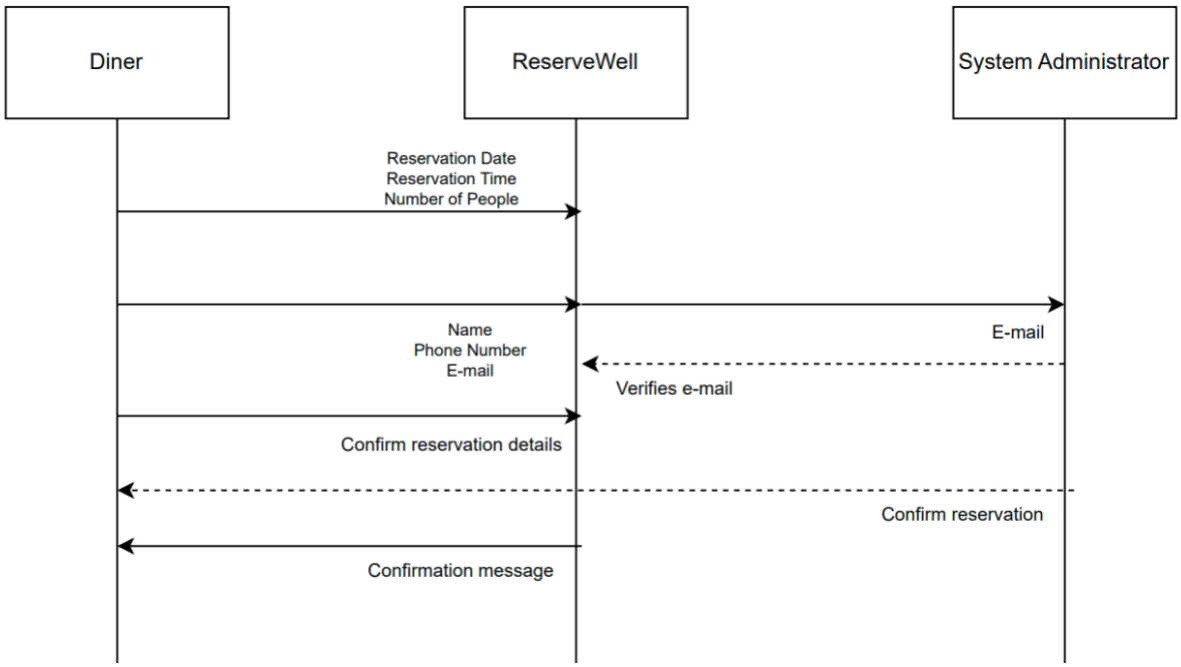
If payment is required, the Payment Authorization Service collaborates with the Reservation System to process the transaction securely.

Reservation Confirmation

The Reservation System updates its records, marking the reserved table or dining area as unavailable during the specified date and time.

Confirmation Message

The User Interface Modules present a confirmation message to the diner, indicating a successful reservation.



Sequence Diagram For Basic Scenario

Additional scenarios

Scenario 1: System Failure and Recovery

In the event of a system failure, the diner restarts the system, triggering a request for recovery of the prior state. The system then reconstructs the prior state, ensuring a seamless continuation of the reservation process.

Scenario 2: Anomalies preventing recovery

If the system detects anomalies preventing recovery, it signals an error to the diner, records the error, and enters a clean state. The diner is then prompted to start a new reservation, ensuring data integrity and system stability.

Scenario: Diner with Membership

The diner with a membership logs in by providing the required information and password, allowing personalized access to the reservation system.

Scenario: Diner Entered Incorrect Information

In case the diner enters incorrect membership information, the system notifies the diner, redirects to the login screen, and prompts the diner to re-enter the information until successfully verified.

Scenario: Diner Account Creation

Description: When a diner wants to create an account, they enter essential details such as name, surname, desired password, phone number, and email. The system processes this information, creating a new account and redirecting the diner to the main screen.

Scenario: Reservation with Additional Charges

In scenarios where a diner wants to reserve more than the maximum group size for a restaurant (with additional charges), the system guides the diner through payment details, securely processes the payment, and verifies the transaction through a confirmation code sent by the bank.

Scenario: Reservation at a Restaurant with an Event

For reservations at restaurants hosting events, the system facilitates the payment process, securely processes the transaction, and ensures the diner's reservation is confirmed through a verification code sent by the bank.

Scenario: Diner Cancels Reservation

When a diner decides to cancel a reservation, the system promptly cancels the reservation for the selected restaurant, freeing up the table or dining area. The diner can then exit from the website.

Scenario: Diner Modifies Reservation

In cases where a diner needs to modify a reservation, the diner updates the reservation information, triggering the system to adjust and update the reservation details for the selected restaurant accordingly.