**DOKUZ EYLÜL UNIVERSITY**

**ENGINEERING FACULTY**

**DEPARTMENT OF COMPUTER ENGINEERING**

# CME 2210
# Object Oriented Analysis and Design

# RESTAURANT MENANGMENT SYSTEM

**by**

**2021510010 Çağrı AYDIN**

# CHAPTER ONE

# INTRODUCTION

In a fast-food world where every customer seek for a quick service and best performance for their money a restourant menagment system is a crucial for restourants. Our restourant menagment system are designed to fulfill all needs for a restourant. From managing supplys to store al the information needed for a good restourant.

Table Management System

For our staff a good table management system is crucial for faster operations which is what we seek most. A better and readable inferface for staff willcut time off our service time and there will be no confision along the staff.

Ordering and Kitchen Communication

Smooth communication between the front-of-residence body of workers and kitchen teams is essential for making sure activate and correct order achievement. Our gadget helps efficient order-taking with customizable menus and modifiers, whilst also streamlining conversation among servers and kitchen team of workers to reduce errors and delays.

Menu Engineering and Analytics

Creating and optimizing menus is a crucial aspect of eating place control. Our device offers menu engineering tools to investigate income records, become aware of popular gadgets, and optimize menu services primarily based on purchaser choices and profitability. With actionable insights and analytics, restaurants could make knowledgeable selections to maximise revenue and purchaser satisfaction.

Staff Training and Performance Management

Investing in staff schooling and improvement is key to preserving high carrier requirements and worker satisfaction. Our system includes features for creating schooling modules, monitoring worker progress, and carrying out overall performance reviews. By empowering body of workers with the necessary skills and know-how, eating places can deliver exceptional carrier and foster a subculture of continuous improvement.

Inventory Optimization and Supplier Management

Efficient inventory control and procurement methods are essential for controlling prices and minimizing waste. Our system automates inventory tracking, generates real-time reviews on stock degrees.

In end, our Comprehensive Restaurant Management System gives a holistic approach to restaurant operations, combining superior capabilities with consumer-friendly interfaces to supply unheard of performance and purchaser delight. Whether it is optimizing desk management, enhancing menu services, or engaging customers.

# CHAPTER TWO

# REQUIREMENTS

Specific Requirements

## 2.1 External Interfaces

None.

## 2.2 Functions

1. *Table Management and Reservation:* Allow hosts to manage table reservations, assign tables to guests, and track table availability.

- *Method:* manageTableReservation
  - *Parameters:*
    - reservationID (type: integer) - unique identifier for the reservation
    - tableNumber (type: integer) - number of the table reserved
    - reservationTime (type: datetime) - date and time of the reservation
    - guestName (type: string) - name of the guest
    - guestCount (type: integer) - number of guests in the reservation
  - *Return Value:*

- success (type: boolean) - indicates whether the reservation was successfully managed

2. *Ordering and Kitchen Communication:* Facilitate order-taking, customization of orders, and communication between front-of-house staff and kitchen teams.

- *Method:* placeOrder

  - *Parameters:*

    - orderID (type: integer) - unique identifier for the order

    - tableNumber (type: integer) - number of the table where the order was placed

    - items (type: list) - list of ordered items, each item containing name (type: string), quantity (type: integer), and special requests (type: string)

  - *Return Value:*

    - orderStatus (type: string) - current status of the order (e.g., "received", "in preparation", "ready")

3. *Menu Engineering and Analytics:* Provide tools for menu creation, modification, and analysis of sales data to optimize menu offerings.

- *Method:* analyzeSalesData

  - *Parameters:*

    - startDate (type: datetime) - start date for analyzing sales data

- endDate (type: datetime) - end date for analyzing sales data

- *Return Value:*

- menuOptimizationSuggestions (type: list) - list of suggestions for optimizing the menu based on sales data analysis

4. *Staff Training and Performance Management:* Enable the creation of training modules, tracking of employee progress, and conducting performance evaluations.

- *Method:* evaluateEmployeePerformance

- *Parameters:*

- employeeID (type: integer) - unique identifier for the employee

- performanceMetrics (type: dictionary) - dictionary containing performance metrics such as punctuality (type: float), customer satisfaction ratings (type: float), and sales performance (type: float)

- *Return Value:*

- performanceScore (type: float) - overall performance score calculated based on provided metrics

5. *Customer Engagement and Loyalty Programs:* Implement loyalty programs, personalized promotions, and targeted marketing campaigns to engage customers and drive repeat business.

- *Method:* enrollInLoyaltyProgram

- *Parameters:*

  - customerID (type: integer) - unique identifier for the customer

  - loyaltyPointsEarned (type: integer) - number of loyalty points earned by the customer

- *Return Value:*

  - enrollmentStatus (type: boolean) - indicates whether the customer was successfully enrolled in the loyalty program

6. *Inventory Optimization and Supplier Management:* Automate inventory tracking, generate real-time reports on stock levels, and streamline supplier management processes.

- *Method:* updateStockLevels

  - *Parameters:*

    - itemID (type: integer) - unique identifier for the item in inventory

    - quantityAdded (type: integer) - quantity of items added to the inventory

  - *Return Value:*

    - inventoryStatus (type: string) - current status of the inventory after updating stock levels

7. *Tableside Payment and Feedback:* Support tableside payment processing and real-time feedback mechanisms to enhance the dining experience.

- *Method:* processTablesidePayment

  - *Parameters:*

    - tableNumber (type: integer) - number of the table where payment is being processed

    - totalAmount (type: float) - total amount to be paid by the customer

  - *Return Value:*

    - paymentStatus (type: string) - status of the payment transaction (e.g., "successful", "pending", "declined")

8. *Marketing Integration and Campaign Management:* Integrate with social media channels, email marketing tools, and CRM software to streamline marketing efforts and analyze customer data.

- *Method:* createTargetedCampaign

  - *Parameters:*

    - campaignID (type: integer) - unique identifier for the marketing campaign

    - targetAudience (type: list) - list of target audience segments based on demographics, past behavior, or preferences

  - *Return Value:*

- campaignCreationStatus (type: boolean) - indicates whether the targeted campaign was successfully created

## 2.3 Performance Requirements

1. *Response Time:* The system shall respond to user actions within 5 seconds under normal load conditions.

2. *Scalability:* The system shall support a minimum of 30 concurrent users without degradation in performance.

3. *Availability:* The system shall have an uptime of at least 90% to ensure continuous availability for users.

## 2.4 Logical Database/File System Requirements

1. *Relational Database:* The system shall use a relational database management system (RDBMS) to store data related to orders, reservations, menus, and customer profiles.

2. *File Storage:* The system shall utilize file storage for storing multimedia content such as images and videos related to menu items and promotional materials.

## 2.5 Design Constraints

1. *Compatibility:* The system shall be compatible with all Windows Computers .

## 2.6 Software System Quality Attributes

1. *Reliability:* The system shall be highly reliable, with minimal downtime and error-free operation.

2. *Usability:* The system shall be intuitive and easy to use, requiring minimal training for restaurant staff and customers.

3. *Performance:* The system shall be responsive and performant, even under high load conditions, to ensure a smooth user experience.

4. *Scalability:* The system shall be scalable to accommodate growth in the number of users, transactions, and data volume over time.

## 2.7 Object Oriented Models

### - 2.7.1 Analysis Class Model (Static Model)

The system shall include classes representing entities such as tables, orders, menu items, employees, and customers, along with their attributes and relationships.

### - 2.7.2 Analysis Collaborations (Dynamic Model)

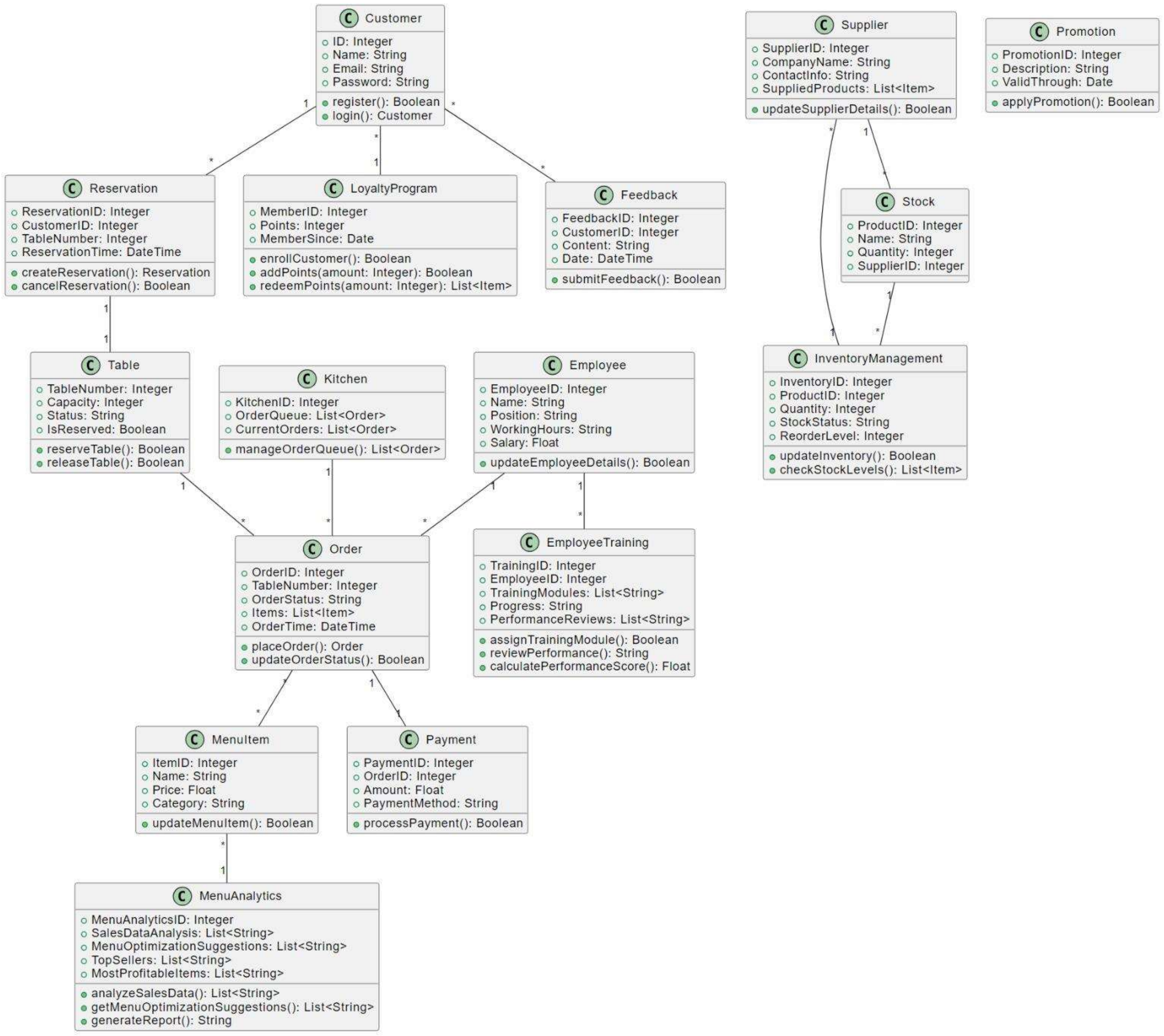
The system shall model interactions between classes to represent the flow of operations such as order placement, payment processing, and inventory management.

# CHAPTER THREE

## UML DIAGRAMS

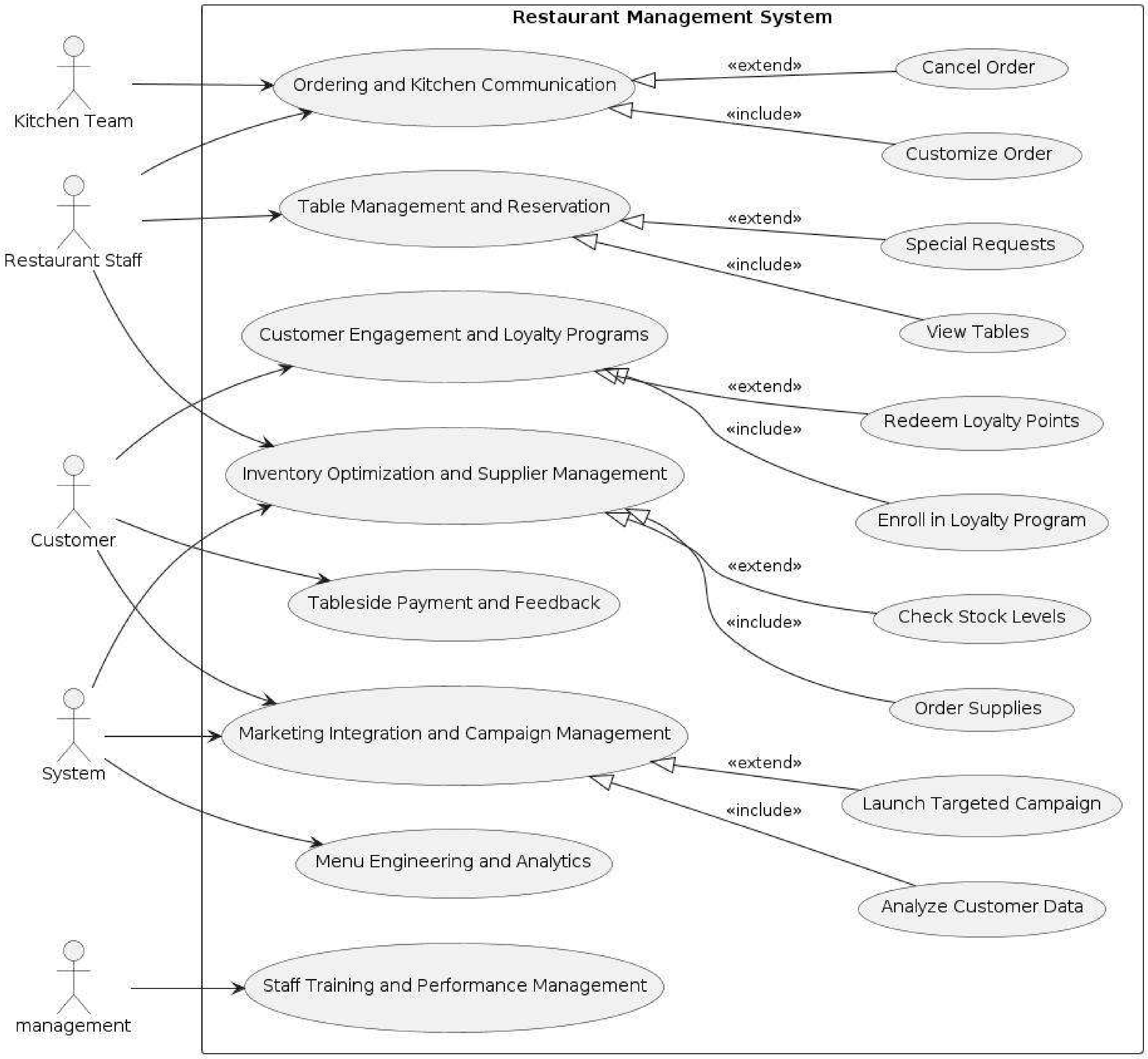
### CLASS DIAGRAM

This is the class structure representing relations between classes like Customer, Reservation, Table, and Employee with respect to a restaurant management software. Some of the important operations are managing the reservation and the loyalty program, and processing orders with respect to the inventory system. Class attributes and operations of these classes help to manage restaurant activities effectively, starting from table booking, stock control, to employee management. These classes help to show how data in the system is organized and manipulated for the smooth operation of the restaurant.



## USE CASE DIAGRAMS

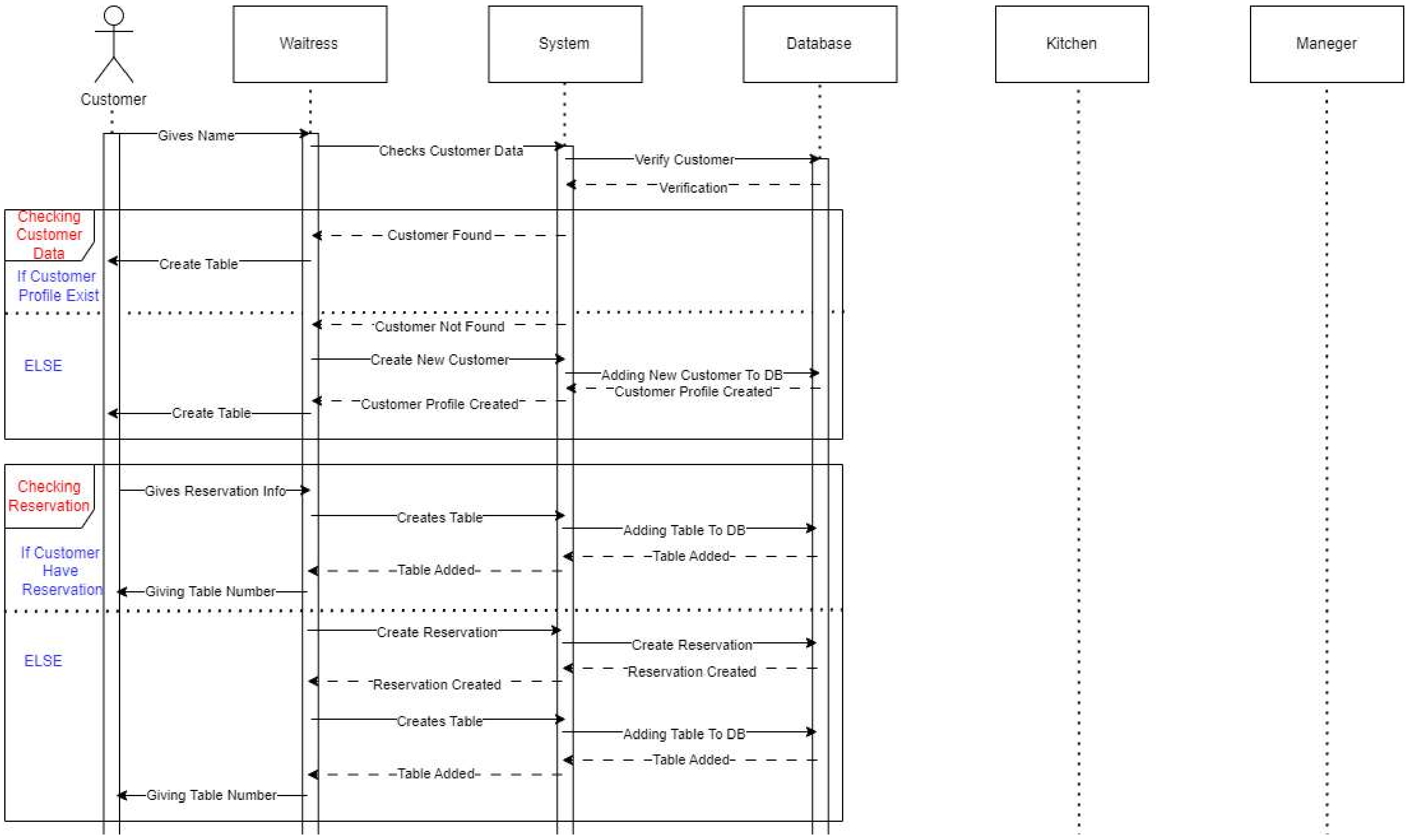
This is a complex diagram of different functionalities in a restaurant management system. It gives details of the different user touchpoints in the system, such as the kitchen team dealing with orders and communications, staff taking bookings and dealing with customers, and administration dealing with stocks and marketing information. It supports functionalities that will help to enhance customer service, such as loyalty programs, feedback mechanisms, all to ensure the smoothness in operations and, most importantly, improved customer experience.


Restaurant Management System
Kitchen Team
Restaurant Staff
Customer
System
management
Ordering and Kitchen Communication
Table Management and Reservation
Customer Engagement and Loyalty Programs
Inventory Optimization and Supplier Management
Tableside Payment and Feedback
Marketing Integration and Campaign Management
Menu Engineering and Analytics
Staff Training and Performance Management
«extend»
Cancel Order
«include»
Customize Order
«extend»
Special Requests
«include»
View Tables
«extend»
Redeem Loyalty Points
«include»
Enroll in Loyalty Program
«extend»
Check Stock Levels
«include»
Order Supplies
«extend»
Launch Targeted Campaign
«include»
Analyze Customer Data

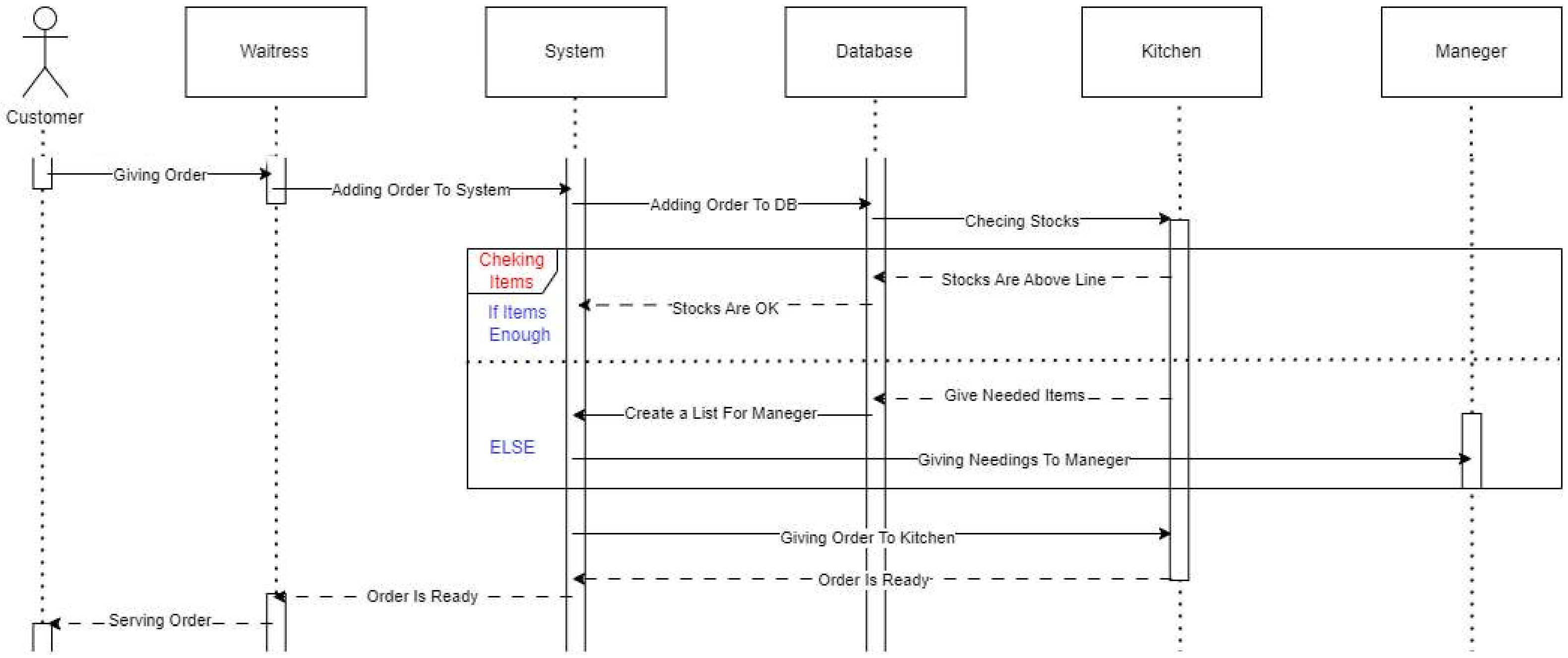
# SEQUENCE DIAGRAMS

These three diagrams represent the complex interactions in the restaurant business process, especially the customer care process, order processing, closing activities and customer arrivals and table management that generates customer information true and check the saved order so that the tables are allocated accordingly. The second figure shows the order control system where orders are received, stock availability is checked and repaired, establishing the interaction between waitress, system and kitchen in managing inventory stock and filling orders is confirmed Finally, this final diagram supports billing and claims, including payment processing, claims. It also allows tables in the system to be locked. Together, these diagrams detail the processes required to improve customer service, data management and operational efficiency in a restaurant environment.

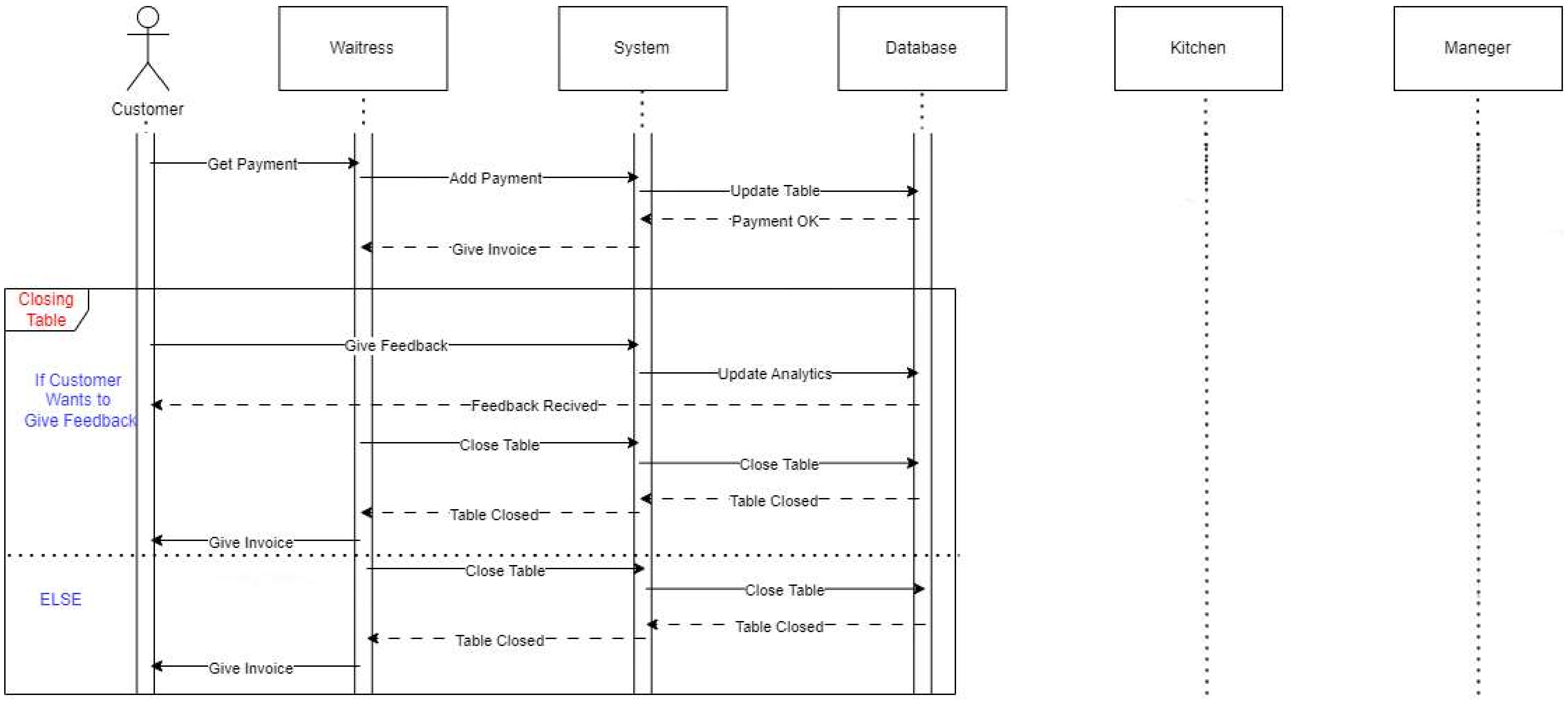
Example 1 :



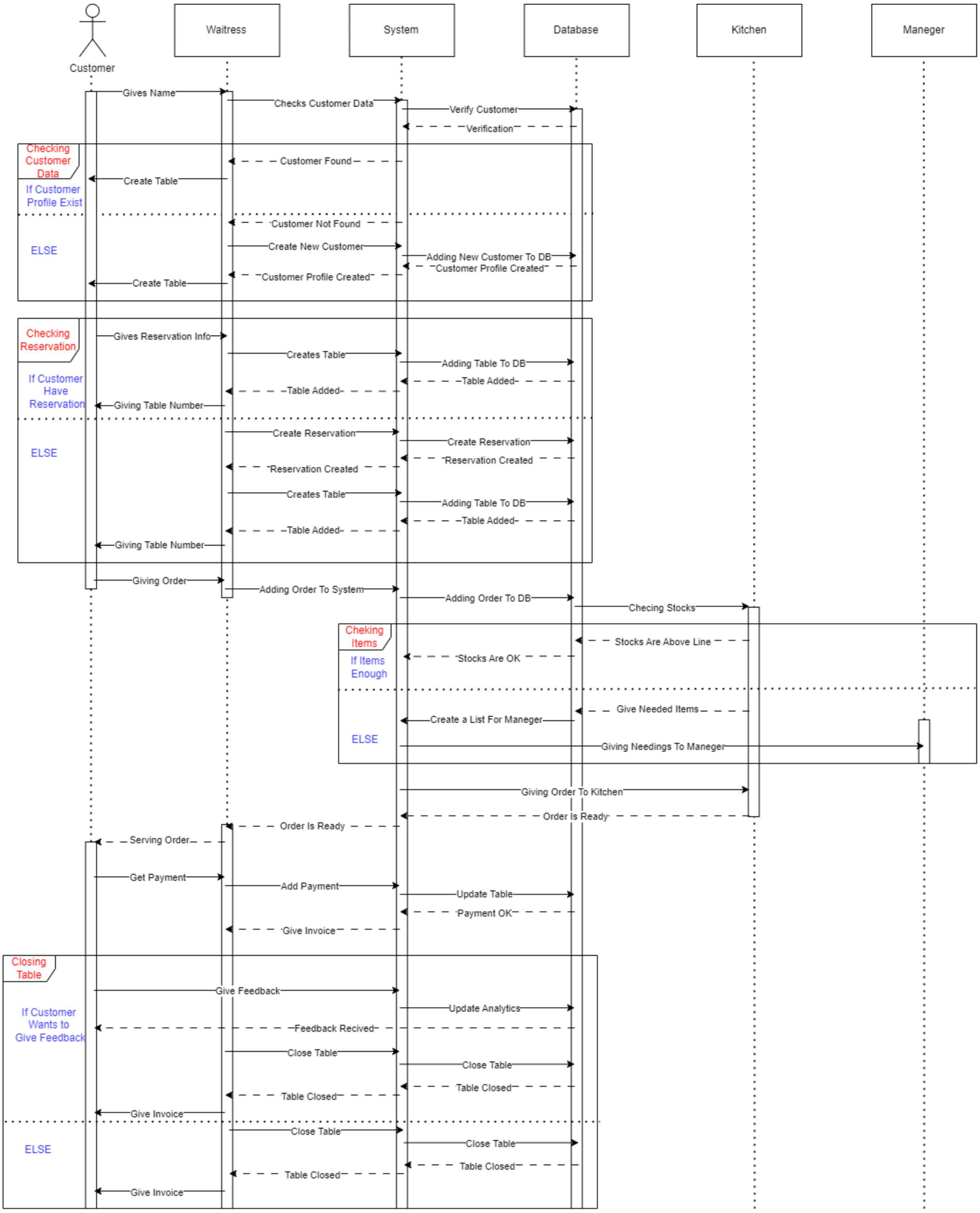
Example 2:



Example 3:



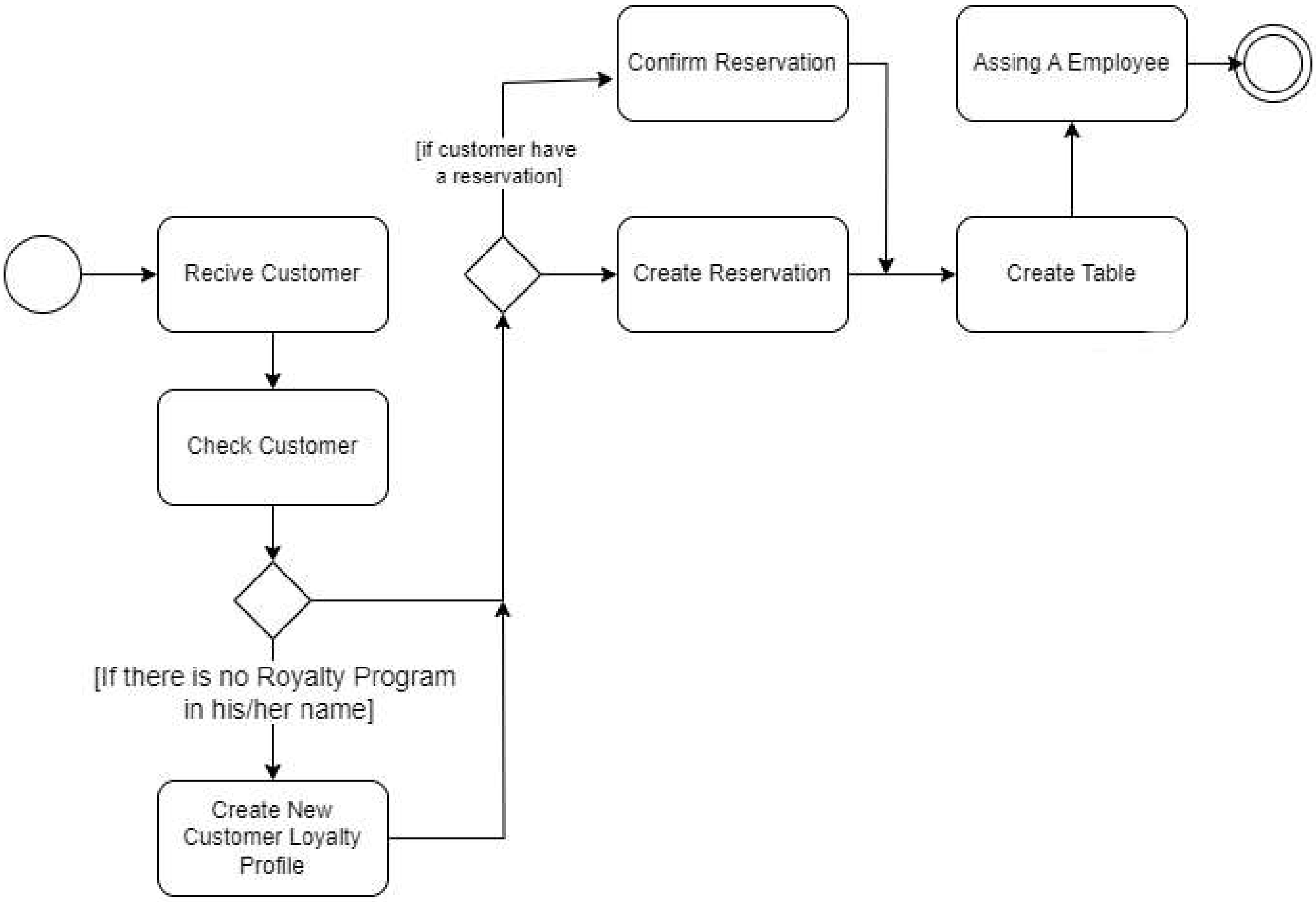
All Wiew On Sequence Diagram


Customer
Waitress
System
Database
Kitchen
Maneger
Gives Name
Checks Customer Data
Verify Customer
Verification
Checking Customer Data
If Customer Profile Exist
Customer Found
Create Table
Customer Not Found
ELSE
Create New Customer
Adding New Customer To DB
Customer Profile Created
Customer Profile Created
Create Table
Checking Reservation
Gives Reservation Info
Creates Table
Adding Table To DB
If Customer Have Reservation
Table Added
Table Added
Giving Table Number
Create Reservation
Create Reservation
ELSE
Reservation Created
Reservation Created
Creates Table
Adding Table To DB
Table Added
Table Added
Giving Table Number
Giving Order
Adding Order To System
Adding Order To DB
Checing Stocks
Cheking Items
Stocks Are Above Line
If Items Enough
Stocks Are OK
Give Needed Items
Create a List For Maneger
ELSE
Giving Needings To Maneger
Giving Order To Kitchen
Order Is Ready
Order Is Ready
Serving Order
Get Payment
Add Payment
Update Table
Payment OK
Give Invoice
Closing Table
Give Feedback
Update Analytics
If Customer Wants to Give Feedback
Feedback Recived
Close Table
Close Table
Table Closed
Table Closed
Give Invoice
Close Table
ELSE
Close Table
Table Closed
Table Closed
Give Invoice

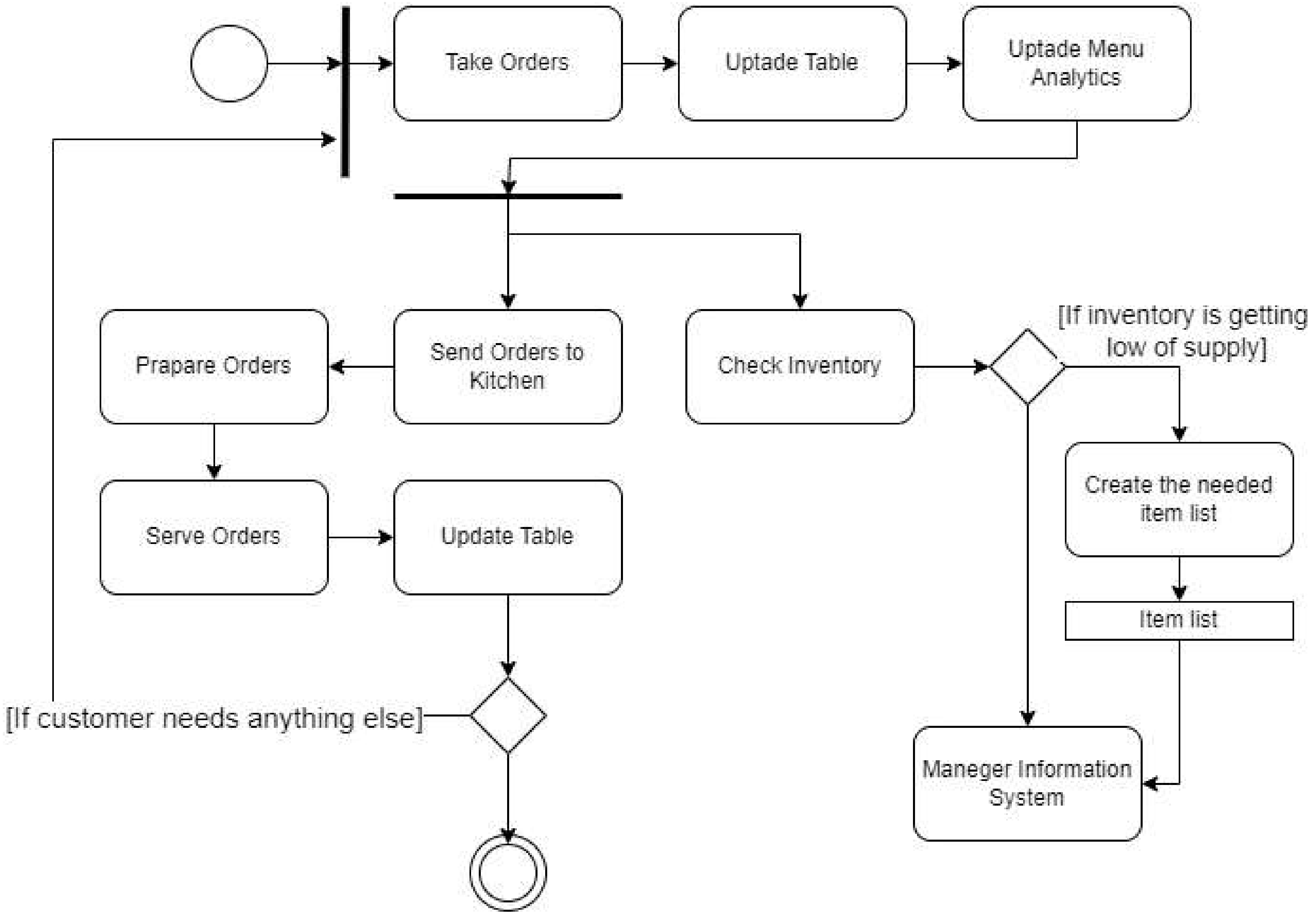
# ACTIVITY DIAGRAMS

The three activity diagrams are a comprehensive overview of the operational process involved in managing the interaction of the restaurant customers. The first captures how customers are welcomed in, their bookings and loyalty profiles are checked, and may be created, and making every customer feel recognized and valued upon arrival at the restaurant. The second diagram captures the kitchen, the very heart of the restaurant, where orders are taken, prepared, and served quickly and with care, and where the smart management system keeps a close eye on inventory and menu trends. The third diagram captures the end-to-end dining experience—where, for each interaction with a customer, there is gathering of quite valuable feedback, processing invoices efficiently, making payments, and updating staff performance records as well as loyalty program features, to ensure that every encounter with a customer is satisfying as possible.

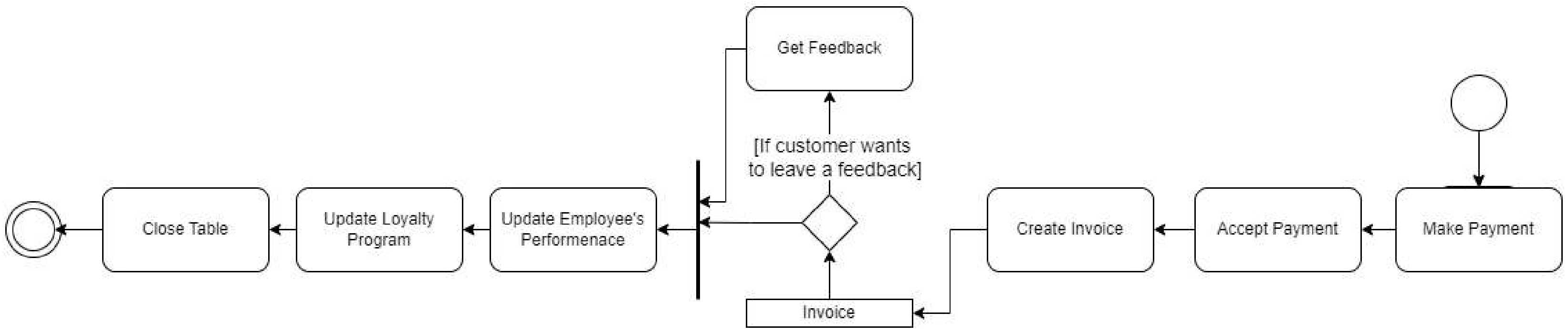
Example 1:



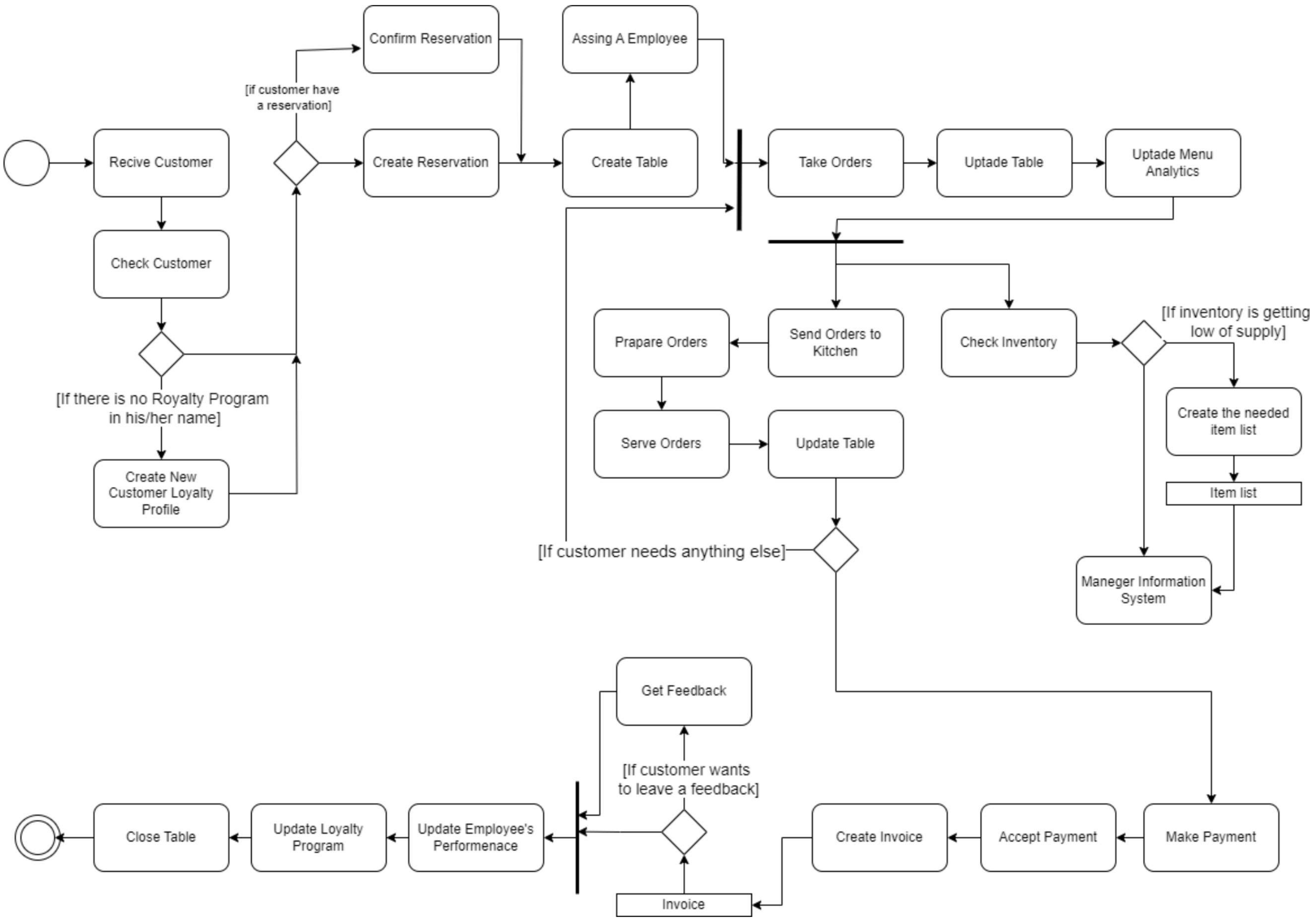
Example 2:



Example 3:



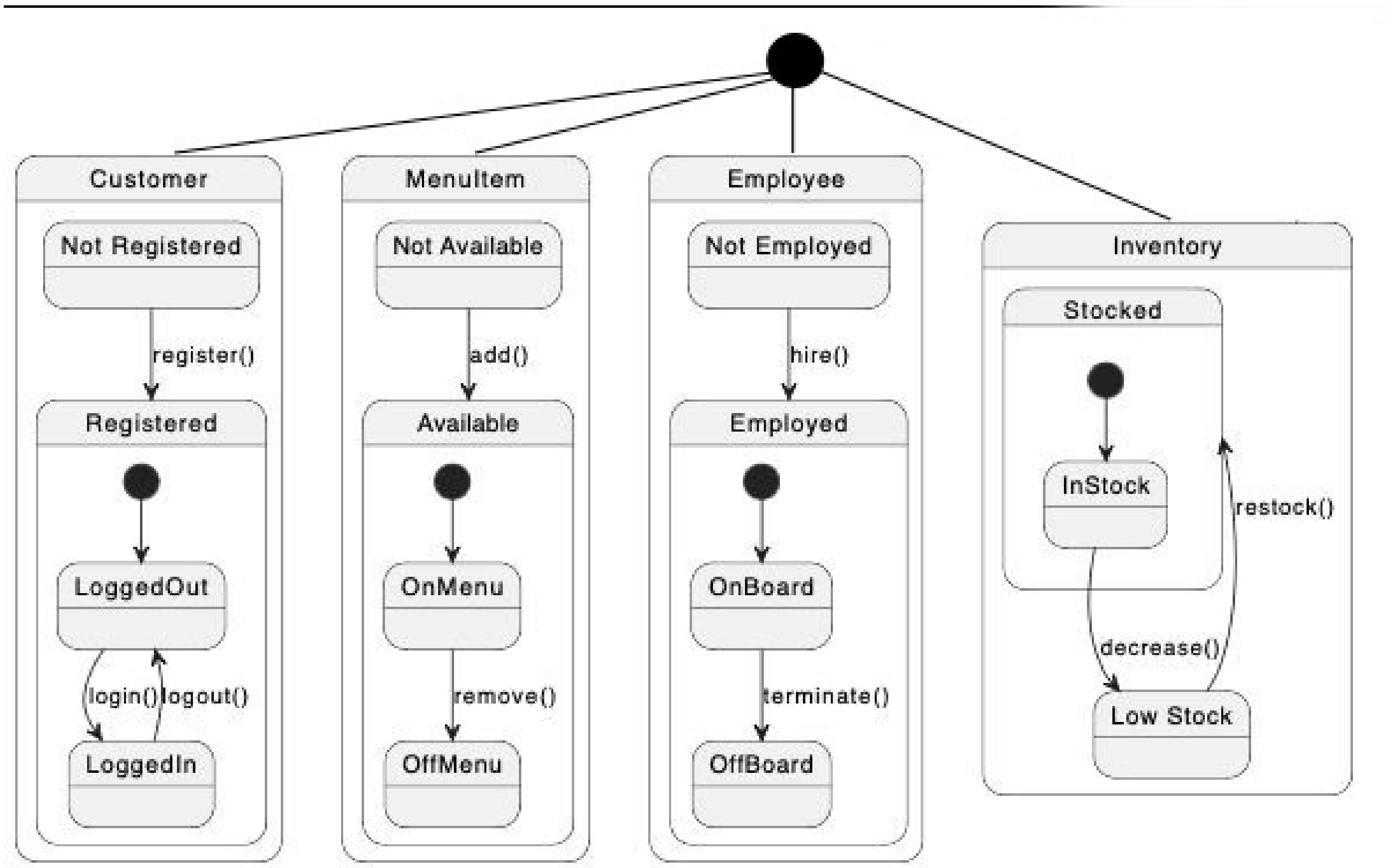
All Wiew On Activity Diagram



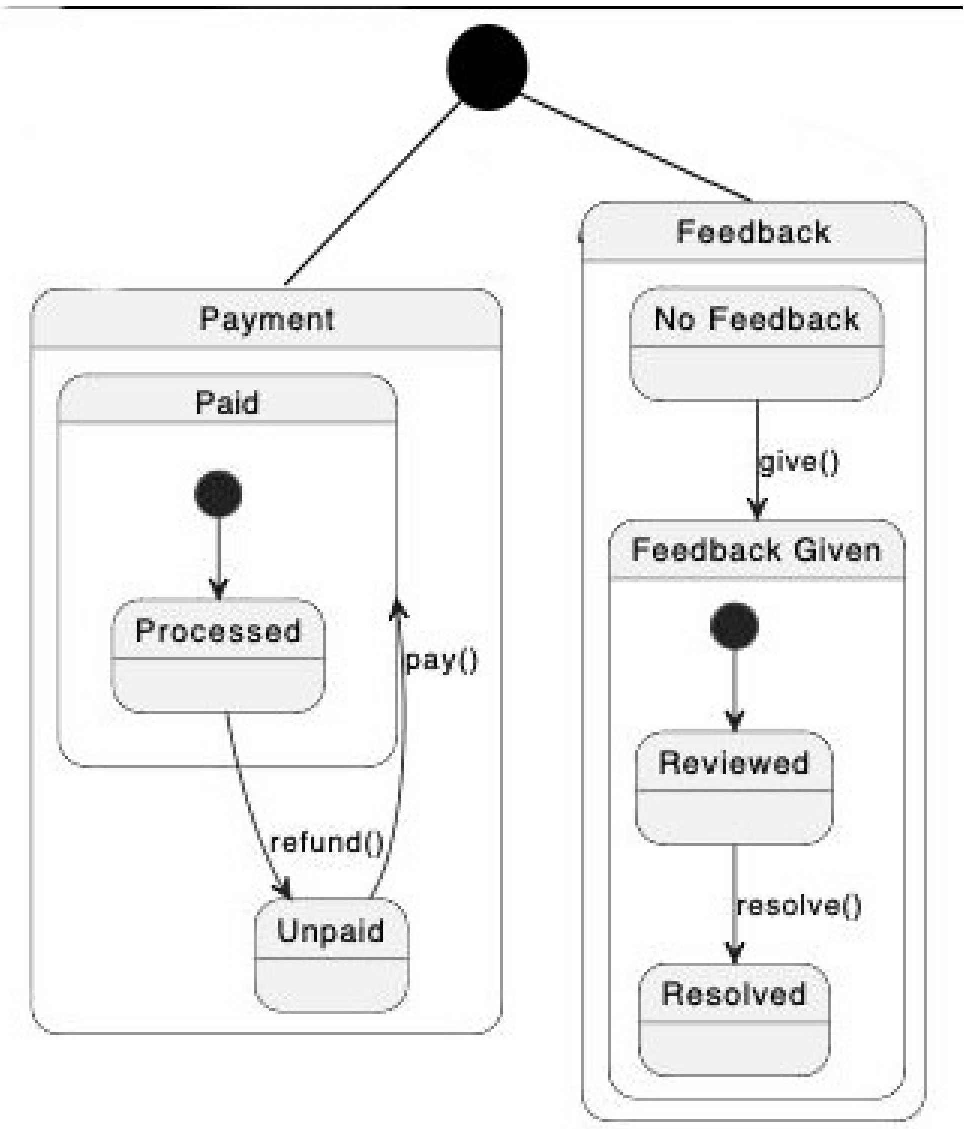
## **STATE DIAGRAMS**

The presented state layout diagrams illustrate concepts within the restaurant location management device, providing a pure social order of customers, employees, food items, inventory, billing, comments , orders, and a clean description of inventory means To be on the menu, for personnel who are no longer provided on board or onboard, and for stock less than stock inventory, which means as each company state evolves in responding specifically to movement. The second account focuses on economic explanatory mechanisms, which show how payments evolve from unpaid to processed and the response is no longer paid and proceeds to an unambiguous decision. Figure 3 shows the sequence from installation to loading and storage from arrival to cancellation or crowning, together these diagrams encapsulate the operation of a restaurant internal flows are discussed, with systematic oversight and a variety of operational elements that are essential for effective systems and customer pride.

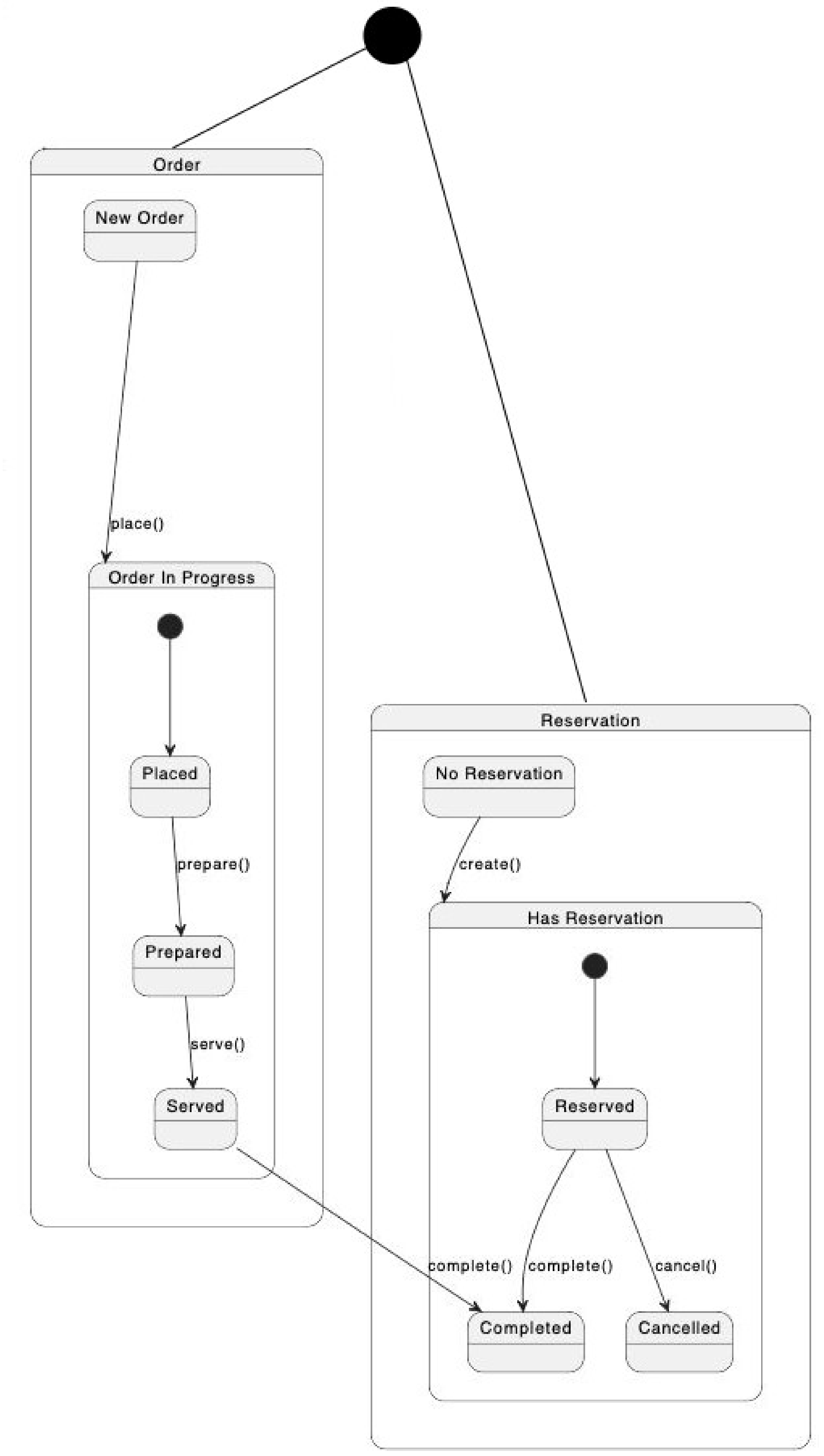
Example 1:



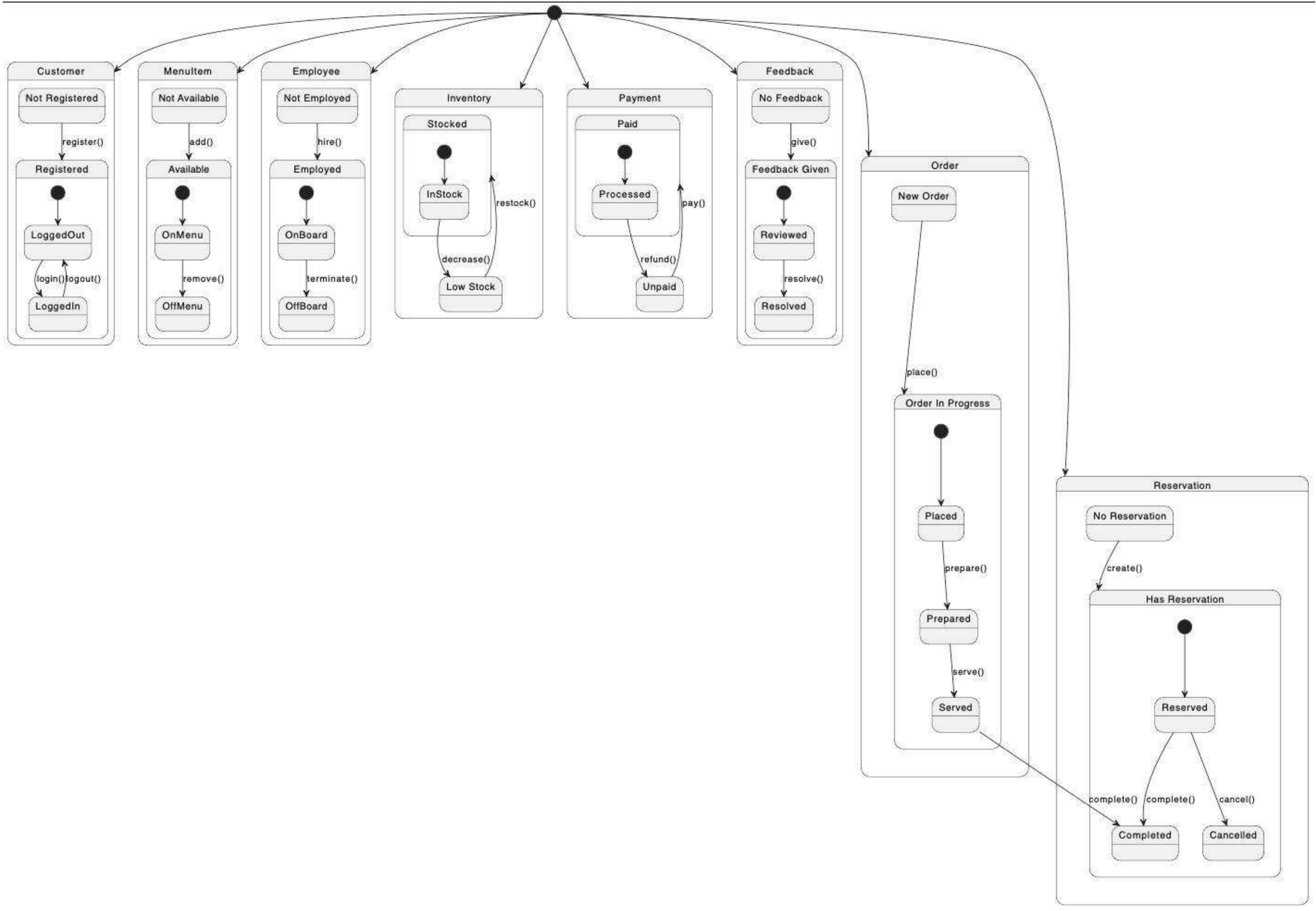
Example 2:



Example 3:


Order
New Order
place()
Order In Progress
Placed
prepare()
Prepared
serve()
Served
Reservation
No Reservation
create()
Has Reservation
Reserved
complete()
complete()
cancel()
Completed
Cancelled

All Wiew On State Diagram



Customer
Not Registered
register()
Registered
LoggedOut
login()
logout()
LoggedIn
MenuItem
Not Available
add()
Available
OnMenu
remove()
OffMenu
Employee
Not Employed
hire()
Employed
OnBoard
terminate()
OffBoard
Inventory
Stocked
InStock
restock()
decrease()
Low Stock
Payment
Paid
Processed
pay()
refund()
Unpaid
Feedback
No Feedback
give()
Feedback Given
Reviewed
resolve()
Resolved
Order
New Order
place()
Order In Progress
Placed
prepare()
Prepared
serve()
Served
Reservation
No Reservation
create()
Has Reservation
Reserved
complete()
complete()
cancel()
Completed
Cancelled