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PROCESS 1 PRESENTATION

Software Engineering

Members

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SESoft Consulting is dealing with a customized business process automation project for the restaurant industry. The project focuses on transitioning KTPHAM's manual operations (reservations, order management, billing, and statistics) to an automated system. It is a domain-specific, scalable software solution aimed at enhancing efficiency, improving customer experience, and supporting future growth with modular and incremental development. The project prioritizes operational reliability, usability, and integration with existing workflows.

The KTPHAM restaurant is expanding its capacity from 50 to 150 seats, creating a pressing need to modernize its operations. The current manual processes are inefficient and unsustainable for handling the increased volume of customers. These inefficiencies impact reservation handling, order processing, communication with the kitchen, payment collection, and business insights through statistics.

What problems do the restaurant have to struggle?

Some problems the restaurant have to struggle:

- Inefficient reservation management.
- Communication errors in order processing.
- Slow and error-prone billing.
- Lack of data insights on operations and menu performance.
- Limited scalability for increased customer capacity.
- No online menu or ordering options.
- High operational overhead with manual processes.

INCENSIVES

1. Operational Efficiency
2. Scalability
3. Data-Driven Insights
4. Customer Experience Improvement
4. Future-Readiness

To achieve these incentives, the following requirements have been identified:

- Reservation Management:
  - Allow customers to book tables in advance and notify staff of upcoming reservations.
- Order Processing:
  - Enable staff to input customer orders digitally and ensure accurate communication with the kitchen.
- Kitchen Notifications:
  - Automate the process of transmitting orders to the kitchen, improving speed and accuracy.
- Billing and Payment:
  - Provide functionalities for generating invoices, receipts, and handling payments (cash, card, or other methods).
- Statistical Reporting:
  - Collect and display data on menu items, such as order frequency, to support decision-making.
- User Access and Roles:
  - Define user roles (e.g., waitstaff, kitchen staff, managers) and provide tailored access to system functionalities.
- System Reliability and Usability:
  - Ensure the system is easy to use for staff with varying levels of technical expertise and is reliable under heavy operational loads.

Customer:

- Interacts with the system to:
  - Make reservations.
  - Place orders (in-person or for takeout/delivery).
  - Settle payments.
- Can be an individual or a group represented by a single customer profile

Waitstaff:

- Uses the system to:
  - Check and manage reservations.
  - Input customer orders.
  - View order statuses and updates from the kitchen.
  - Generate and issue invoices.

Kitchen Staff:

- Receives and processes orders sent from the system.
- Updates order preparation status (e.g., "In Progress," "Ready for Pickup").

Cashier:

- Handles payment processing using the system.
- Issues receipts to customers and updates payment status.

Manager:

- Oversees the overall operations using the system.
- Accesses reports and statistics on menu performance, customer trends, and sales.
- Manages system configurations, such as menu updates and user roles.

WORKFLOW

Reservation:
Booking confirmed, notification sent.

Table Assignment:
Check-in, table marked as "Occupied."

Order Placement:
Input orders, notify kitchen.

Kitchen Processing:
Order status updated

Order Served:
Mark as "Served."

Customer Departure:
Free table, mark as "Available."

Billing/Payment:
Generate invoice, mark as "Paid."

Data Logging:
Record for reporting and analytics.

- **Customer**
  - Represents the customer interacting with the system.
  - Manages customer details and links to reservations and orders.
- **Reservation**
  - Manages reservation information, including date, time, guests, and table assignment.
- **Table**
  - Represents tables in the restaurant.
  - Tracks table availability and status (e.g., "Available," "Occupied").
- **Order**
  - Tracks orders placed by customers, linked to tables.
  - Holds items, quantities, and special instructions.
- **MenuItem**
  - Represents items available for ordering, including pricing and availability.
- **Kitchen**
  - Manages the processing of orders, including status updates (e.g., "In Progress," "Ready").
- **Invoice**
  - Handles billing details for each order, including the total amount and payment status.
- **Report (Data-Holder Class)**
  - Collects and generates statistical insights, such as popular menu items and peak hours.
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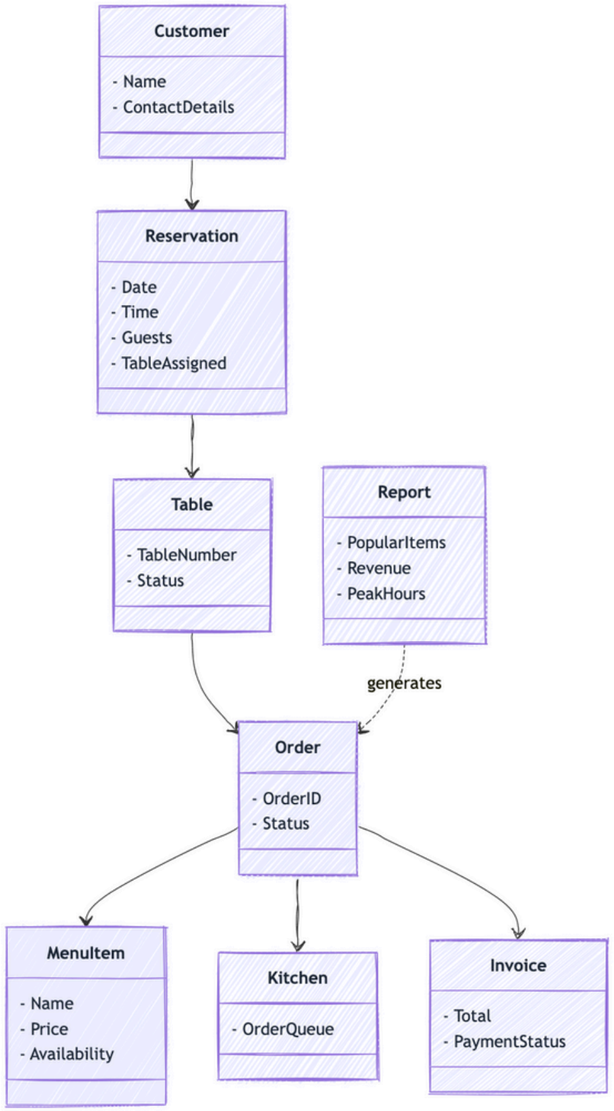

Customer
- Name
- ContactDetails
Reservation
- Date
- Time
- Guests
- TableAssigned
Table
- TableNumber
- Status
Report
- PopularItems
- Revenue
- PeakHours
generates
Order
- OrderID
- Status
MenuItem
- Name
- Price
- Availability
Kitchen
- OrderQueue
Invoice
- Total
- PaymentStatus

Customer

• Make reservations • Place orders	• Reservation • Order

Reservation

• Record reservation details • Assign tables to reservations	• Customer • Table

Order

• Manage order details • Notify kitchen of new orders • Update order status (e.g., "In Progress," "Ready")	• Customer • Menu Item • Kitchen

Menu Item

• Provide menu item details • Check availability	• Order

Invoice

• Generate invoices. • Track payment status.	• Order • Customer

Table

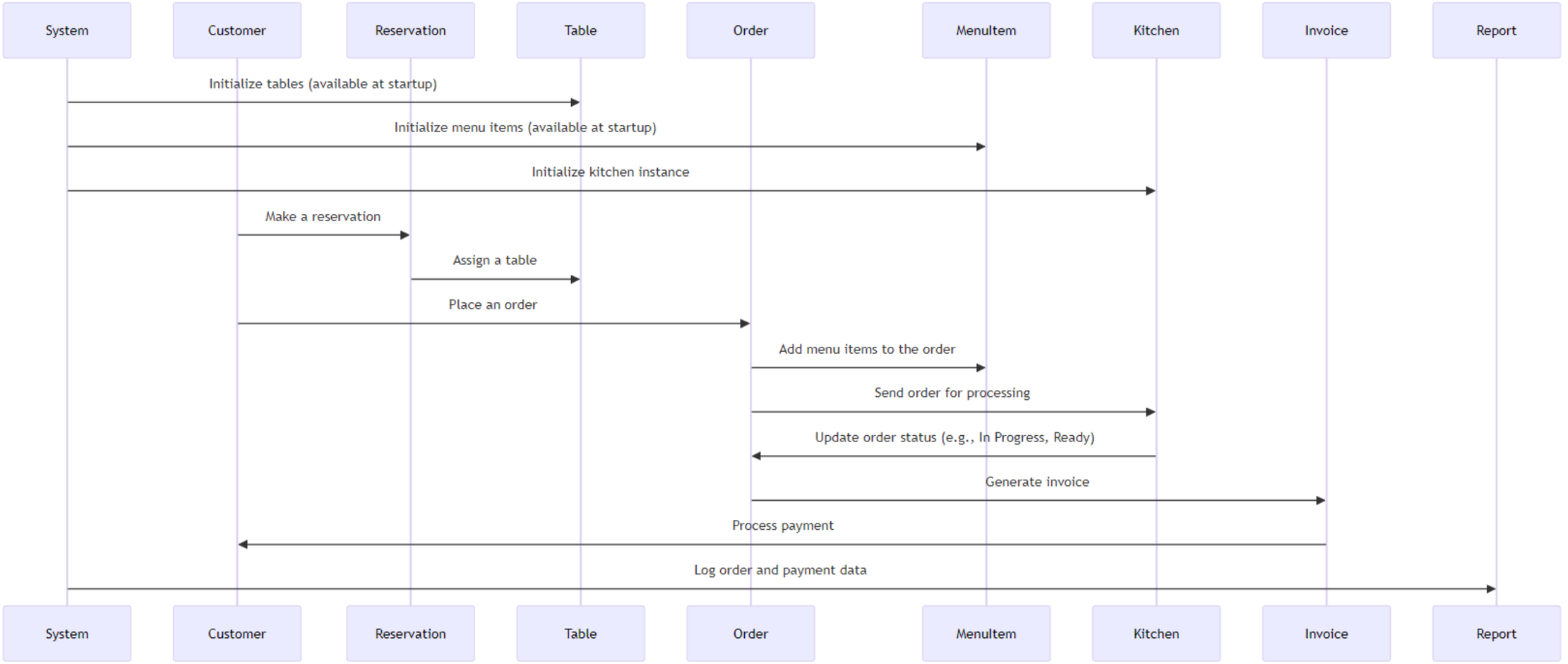
• Track table status	• Reservation • Order

Kitchen

• Process orders. • Update order readiness status.	• Order

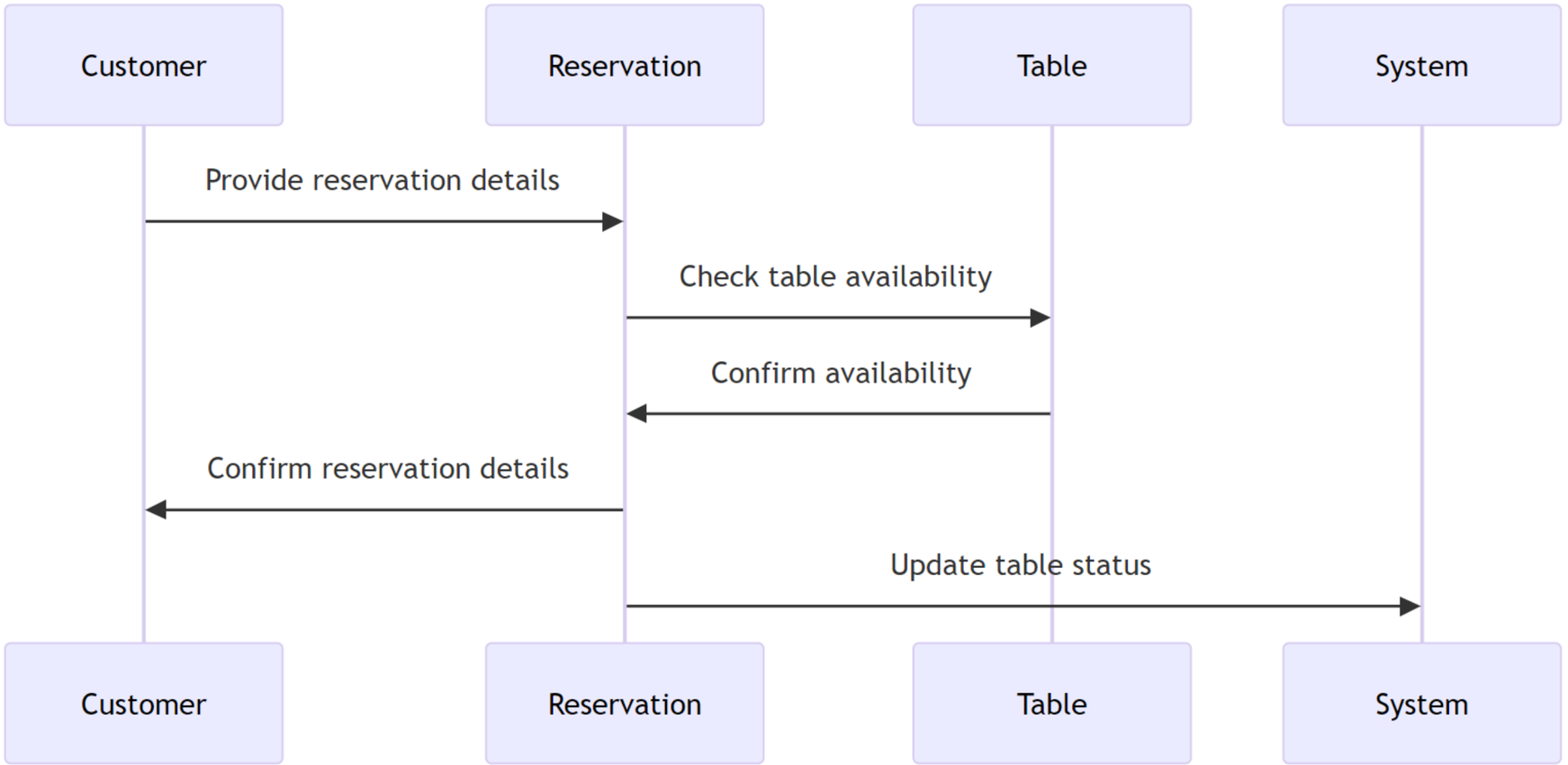
Report

• Generate statistics and insights.	• Order • Menu Item


System
Customer
Reservation
Table
Order
MenuItem
Kitchen
Invoice
Report
Initialize tables (available at startup)
Initialize menu items (available at startup)
Initialize kitchen instance
Make a reservation
Assign a table
Place an order
Add menu items to the order
Send order for processing
Update order status (e.g., In Progress, Ready)
Generate invoice
Process payment
Log order and payment data
System
Customer
Reservation
Table
Order
MenuItem
Kitchen
Invoice
Report

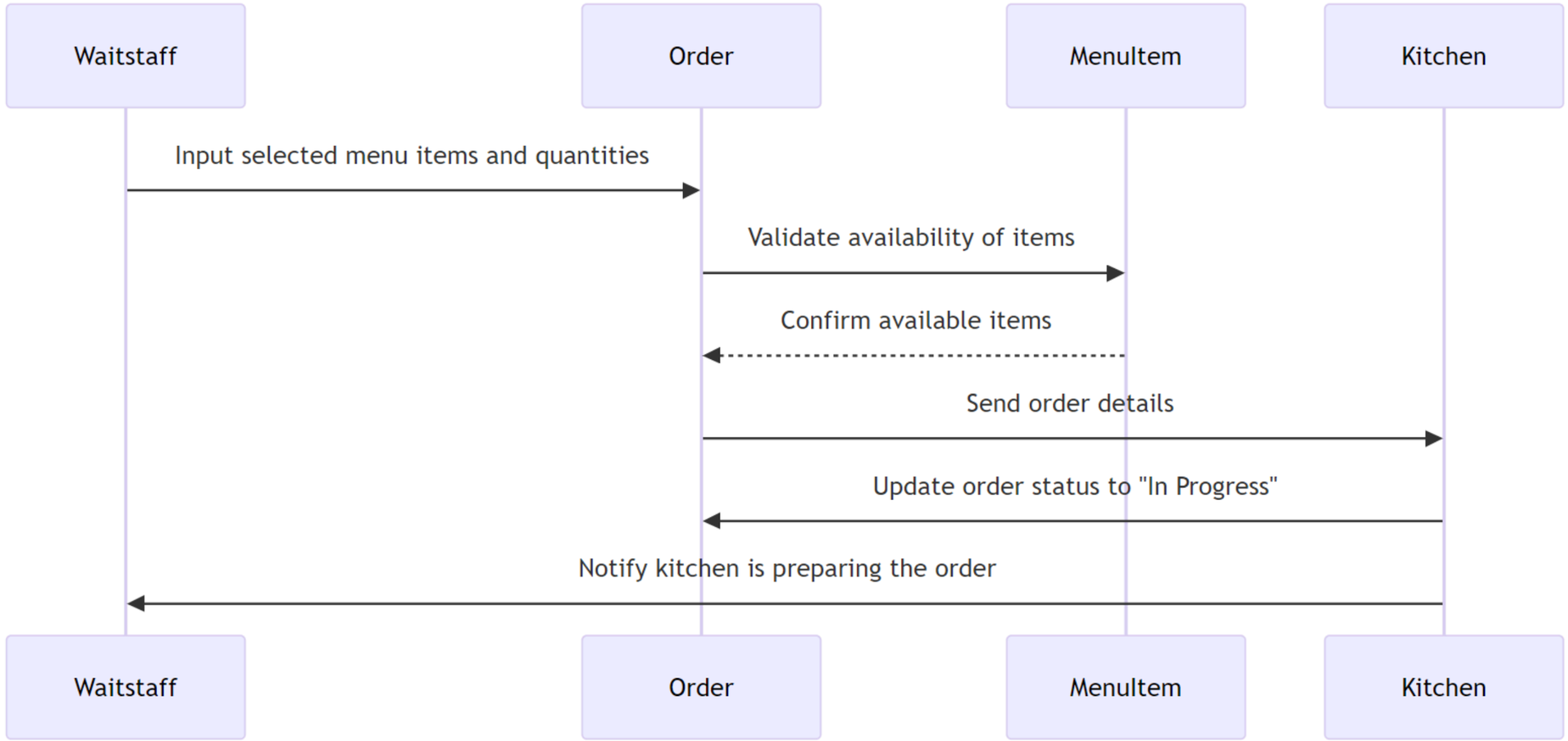
Scenario 1: Customer Reservation Validation

- **Description:** A customer attempts to make a reservation for a specific date and time.
- **Interaction Flow:**
  - Input: Customer provides details (name, contact, date, time, party size).
- **System Validation:**
  - Checks if the requested date and time are available.
  - Ensures the party size can be accommodated.
- **Process:**
  - Creates a Reservation instance if validation passes.
  - Assigns an available Table to the reservation.
- **Output:**
  - Confirms reservation to the customer and updates system availability.
- **Verification:** Ensure system prevents double booking or overcapacity errors.


Customer
Reservation
Table
System
Provide reservation details
Check table availability
Confirm availability
Confirm reservation details
Update table status
Customer
Reservation
Table
System

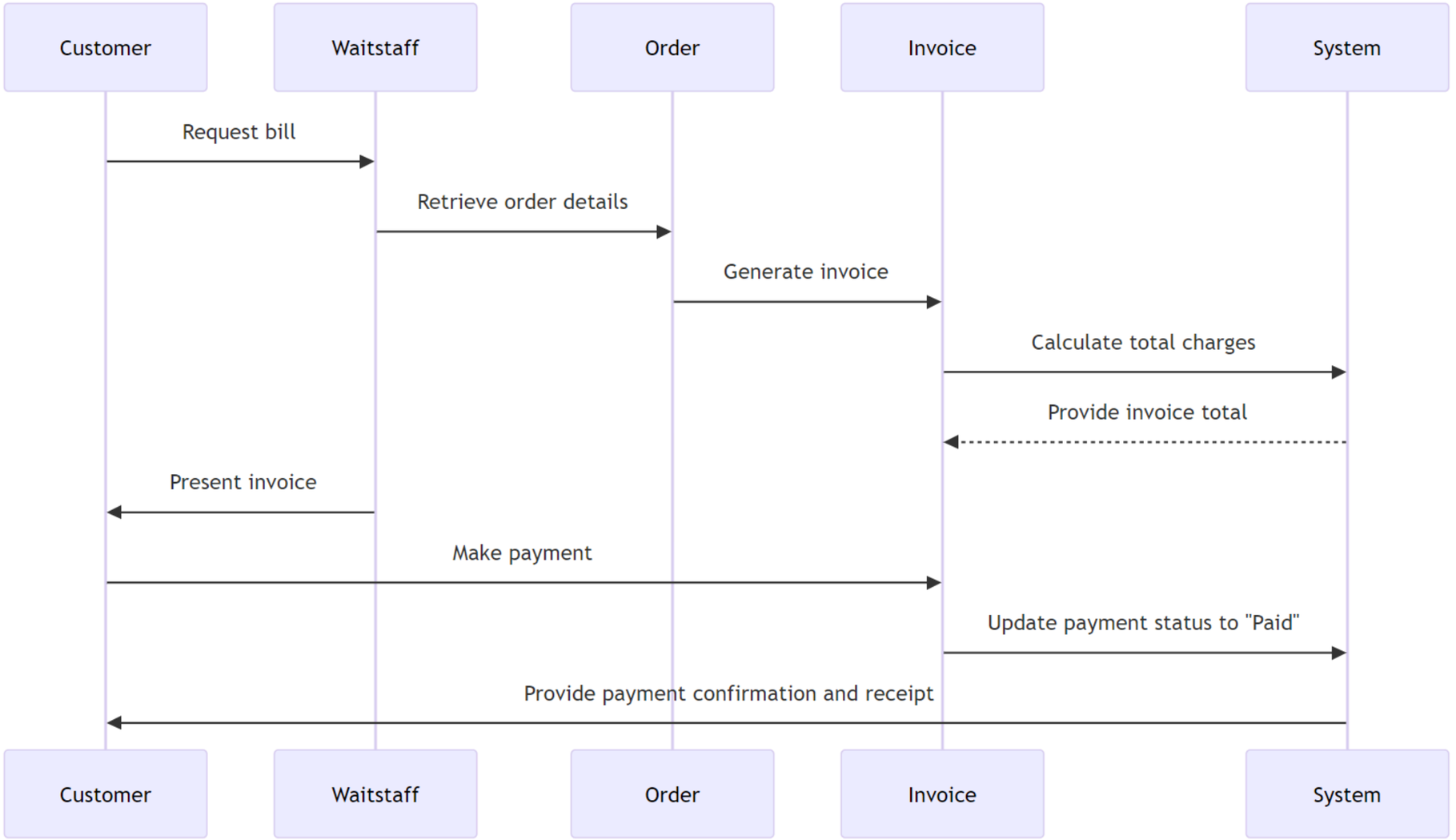
Scenario 2: Order Placement and Kitchen Notification

- **Description:** A customer places an order through the waitstaff.
- **Interaction Flow:**
  - Input: Waitstaff selects menu items and specifies quantities.
- **System Validation:**
  - Ensures all selected menu items are available.
- **Process:**
  - Creates an Order instance and associates it with the table.
  - Sends the order to the Kitchen for processing.
- **Output:**
  - Notifies the Kitchen with order details and updates order status to "In Progress."
- **Verification:** Check if unavailable menu items are rejected, and valid items proceed to the kitchen.


Waitstaff
Order
MenuItem
Kitchen
Input selected menu items and quantities
Validate availability of items
Confirm available items
Send order details
Update order status to "In Progress"
Notify kitchen is preparing the order
Waitstaff
Order
MenuItem
Kitchen

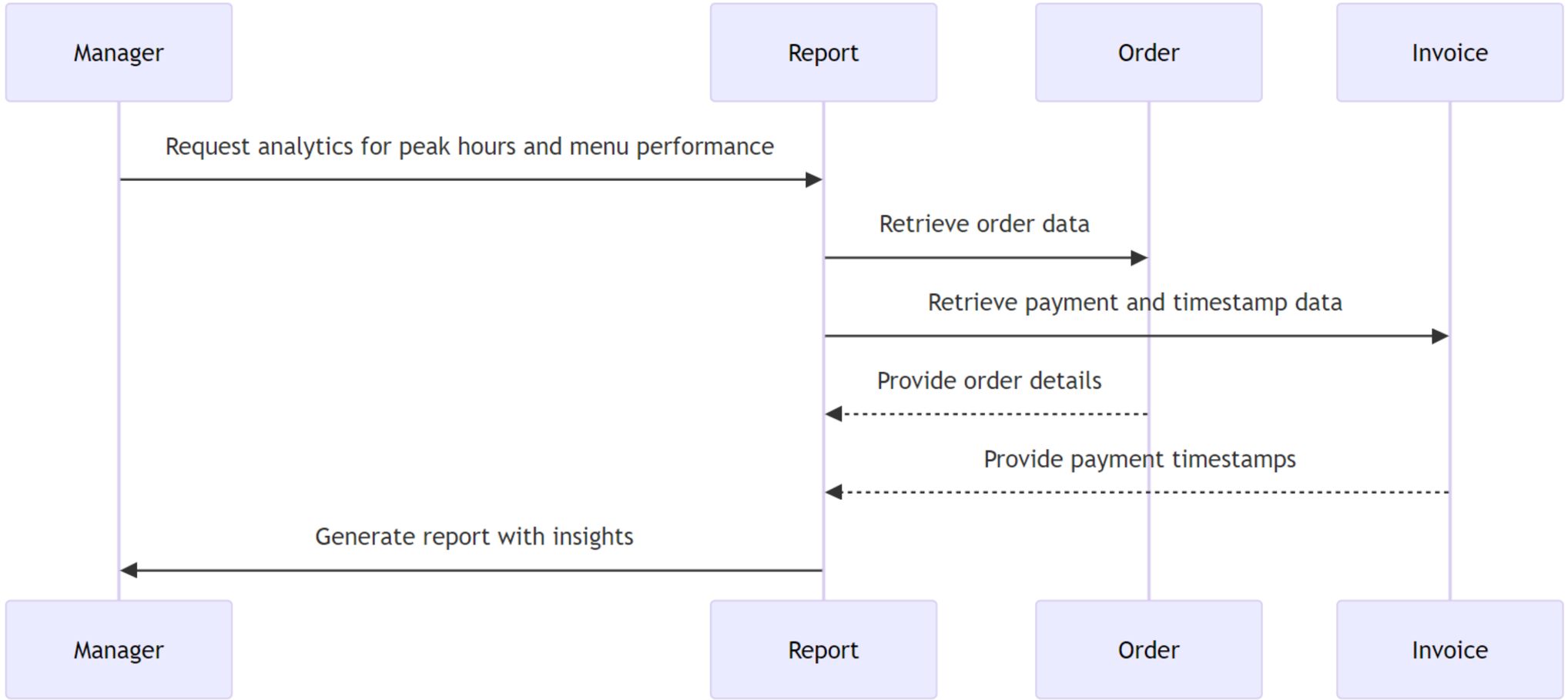
Scenario 3: Invoice Generation and Payment

- **Description:** A customer requests the bill after completing their meal.
- **Interaction Flow:**
  - Input: The system generates an invoice based on the completed order.
- **System Validation:**
  - Ensures all order items and charges (taxes, service fees) are accurately calculated.
- **Process**:
  - Creates an Invoice instance linked to the Order.
  - Updates payment status upon receipt.
- **Output**:
  - Provides a printed or electronic receipt to the customer.
- **Verification:** Confirm invoice totals are correct, and payment updates are logged accurately.


Customer
Waitstaff
Order
Invoice
System
Request bill
Retrieve order details
Generate invoice
Calculate total charges
Provide invoice total
Present invoice
Make payment
Update payment status to "Paid"
Provide payment confirmation and receipt
Customer
Waitstaff
Order
Invoice
System

Scenario 4: Report Generation for Peak Hours

- **Description**: The manager requests a report on peak dining hours and popular menu items.
- **Interaction Flow:**
  - Input: Manager requests analytics through the reporting interface.
- **System Validation:**
  - Verifies sufficient data is available for analysis.
- **Process:**
  - Aggregates data from Order and Invoice instances.
  - Analyzes time slots and item frequencies.
- **Output:**
  - Generates a report showing peak hours and most-ordered items.
- **Verification**: Ensure accuracy of data aggregation and meaningful insights in the report.


Manager
Report
Order
Invoice
Request analytics for peak hours and menu performance
Retrieve order data
Retrieve payment and timestamp data
Provide order details
Provide payment timestamps
Generate report with insights
Manager
Report
Order
Invoice

THANK YOU

for your listening!