D^2: Software Design Document

1. Project Overview

Modernizing a canteen entails modernizing its facilities, services, and operations to match current standards and fulfill the changing needs of its customers. This could include things like improving the dining area, implementing efficient ordering and payment methods, increasing environmental practices, and embracing technology for a better client experience. Furthermore, updating the cafeteria supports broader organizational objectives such as boosting employee/student well-being, establishing a feeling of community, and displaying a commitment to sustainability and innovation.

Stakeholders:

Management/Administration: They are in charge of starting and supervising the modernization process. This includes establishing objectives, allocating resources, and ensuring the project is consistent with organizational goals.

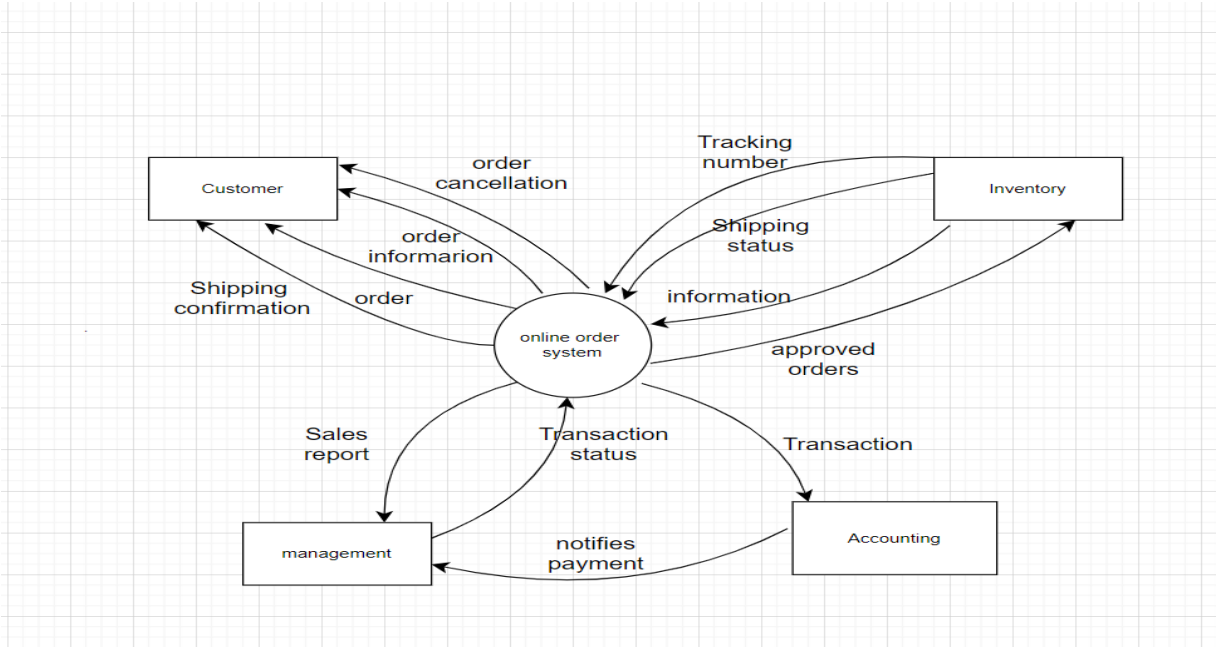
Employees/Staff: Canteen employees are immediately impacted by modernization efforts. Their input and collaboration are critical to successfully implementing modifications and efficiently running the updated canteen.

Customers/Users: These are the main beneficiaries of the updated canteen. Their views and preferences should be taken into account during the planning and implementation phases to ensure that the improved facilities and services fulfill their needs and expectations.

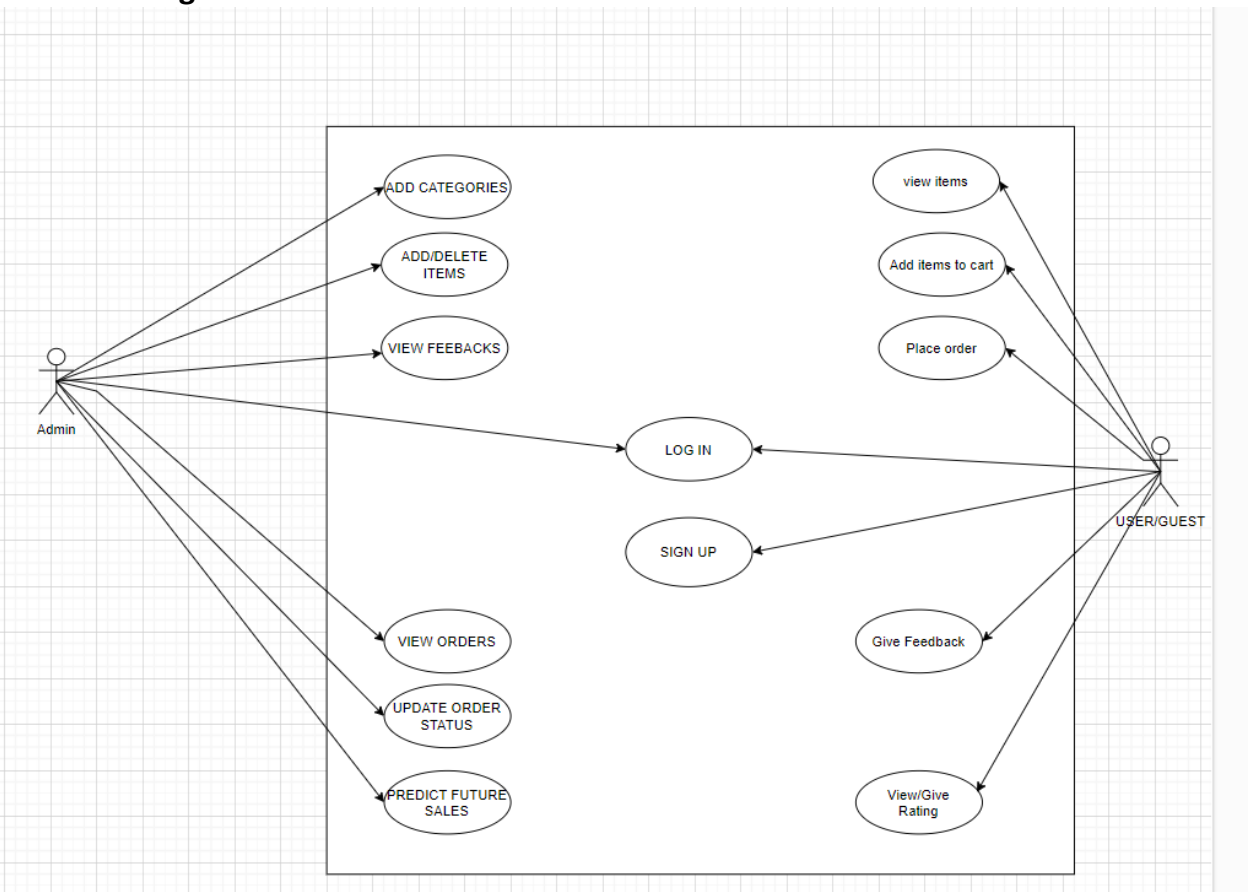
Vendors/Suppliers: Suppliers of food, equipment, technology, and other resources are critical to modernization. Working with dependable and innovative suppliers can help assure the quality and sustainability of the canteen's products.

Facilities/Operations Management: Those in charge of the canteen's physical infrastructure and day-to-day operations are crucial stakeholders. They provide useful information about logistical considerations, safety standards, and maintenance demands.

Context Diagram:



Use Case diagram:



2. Architectural Overview

The architectural concept for updating the canteen takes a holistic approach to redesigning both the physical infrastructure and the operational processes. It consists of several components, including technological integration, process optimization, and user experience improvement.

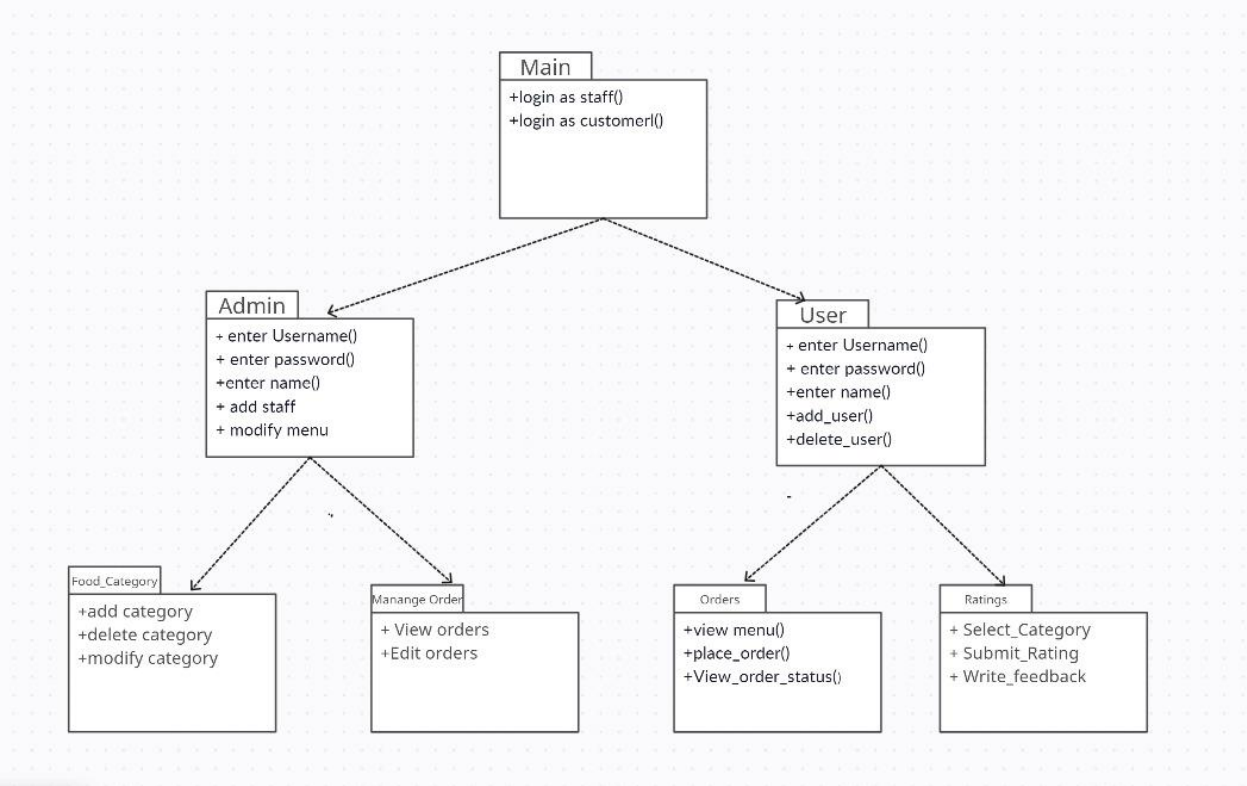
Design Rationale:

Technological Integration: The architectural design promotes technological integration to improve operational efficiency and user experience. This includes using computerized ordering systems, interactive menu displays, and cashless payment alternatives. By utilizing technology, the canteen may increase efficiency, minimize wait times, and create a more convenient dining experience for guests.

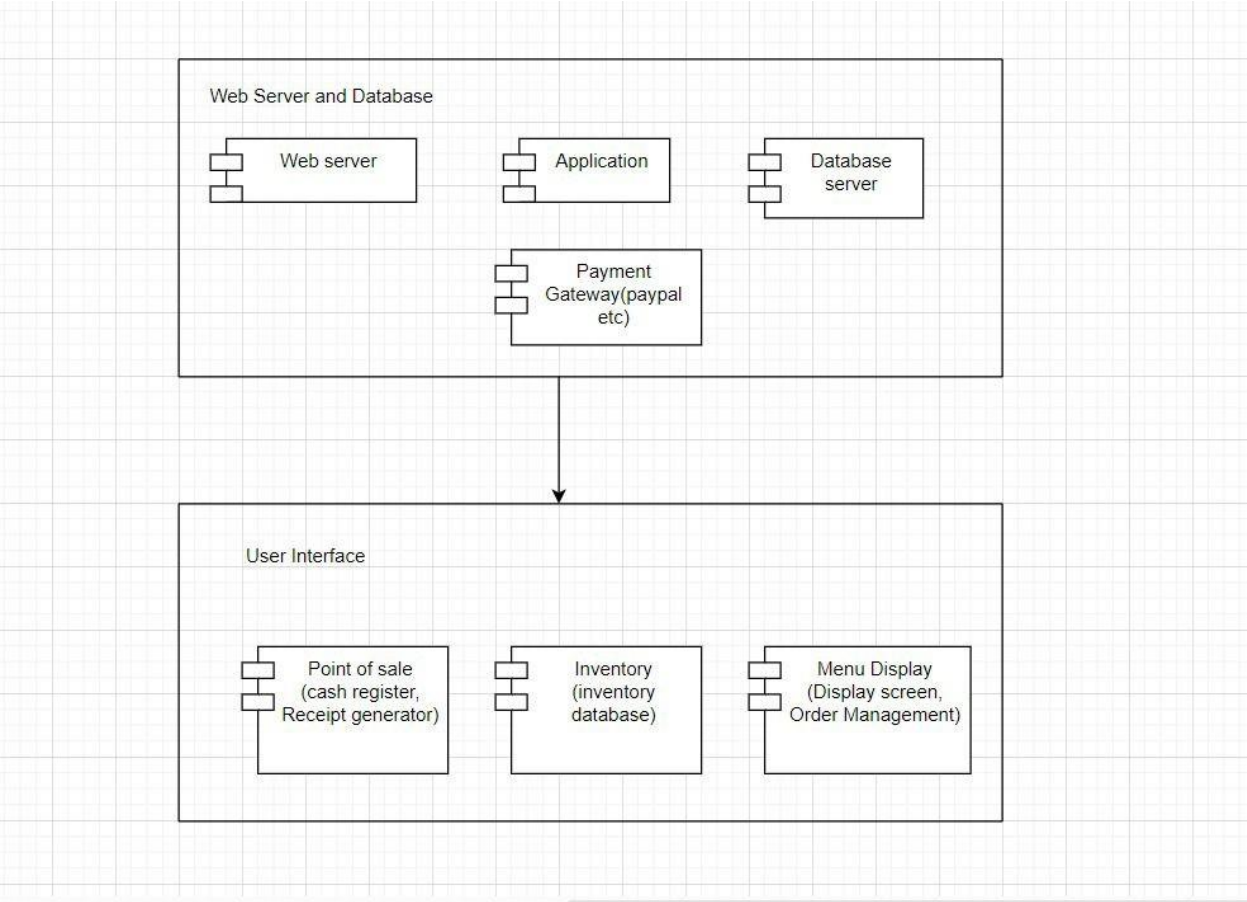
Workflow Optimization: Another important part of the architectural design is streamlining workflow operations within the canteen. This includes reorganizing kitchen layouts, adopting inventory management systems, and streamlining worker schedules. By increasing workflow efficiency, the canteen can reduce bottlenecks, waste, and ensure timely service delivery.

User Experience Enhancement: The architectural design stresses improving the entire user experience for customers. This involves improving eating facilities, including sustainable design aspects, and providing a wide menu.

2.1 Subsystem Architecture



2.2 Deployment Architecture



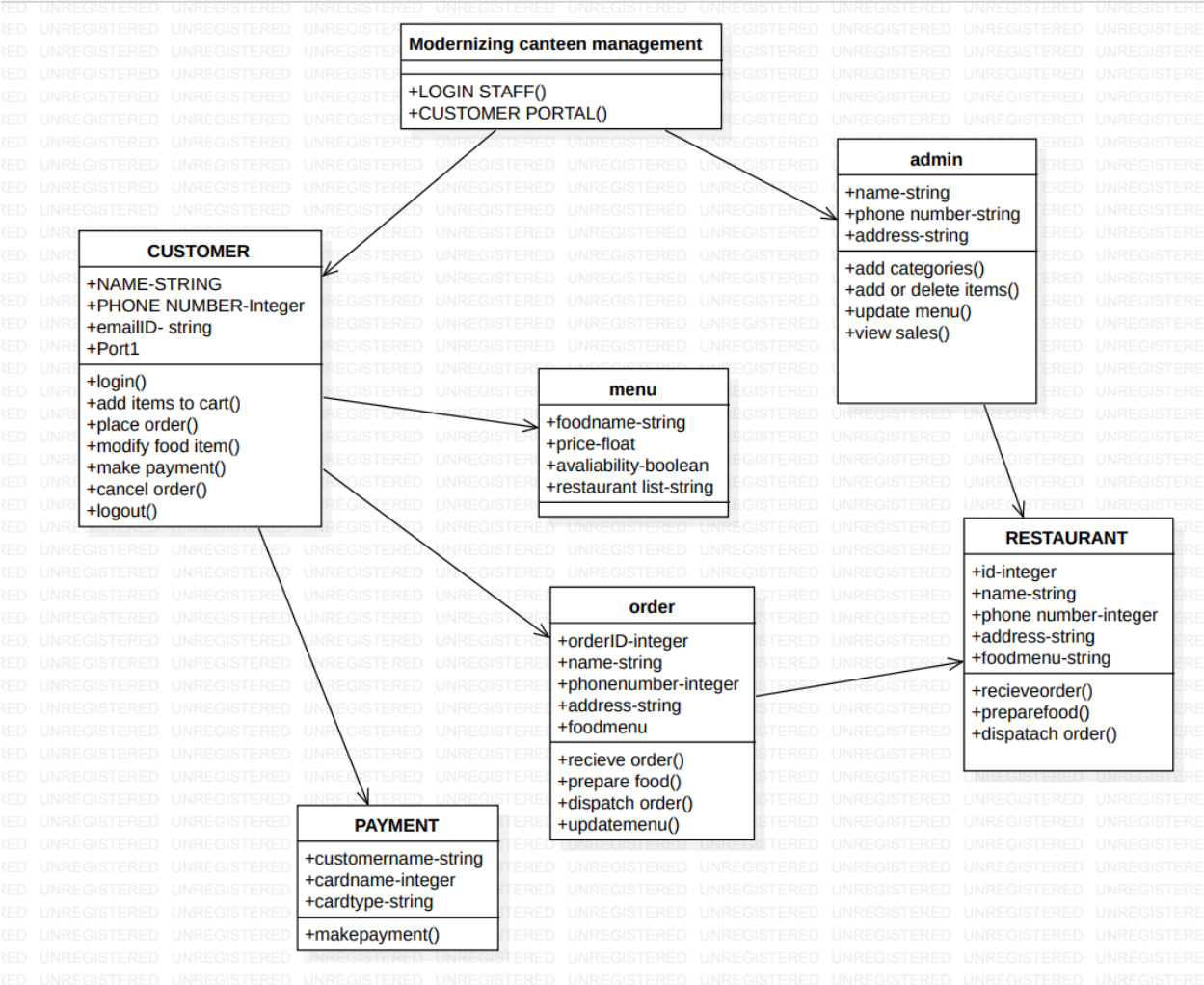
2.3 Persistent Data Storage

1. **Identification of Data Types and Purpose**:
    - Customer Information: Name, contact details, purchase history.
      Purpose: To personalize customer interactions and analyze buying patterns.
    - Inventory Data: Product IDs, quantities, locations.
      Purpose: To track stock levels, optimize ordering, and prevent stockouts.
    - Transaction Records: Date, time, items purchased, payment method.
      Purpose: To track sales, reconcile accounts, and identify trends.
2. **Description of Data Storage**:
    - Relational Database: Using MySQL or PostgreSQL to store structured data in tables with defined relationships between them. This will be suitable for systems with complex data models and transactional requirements.

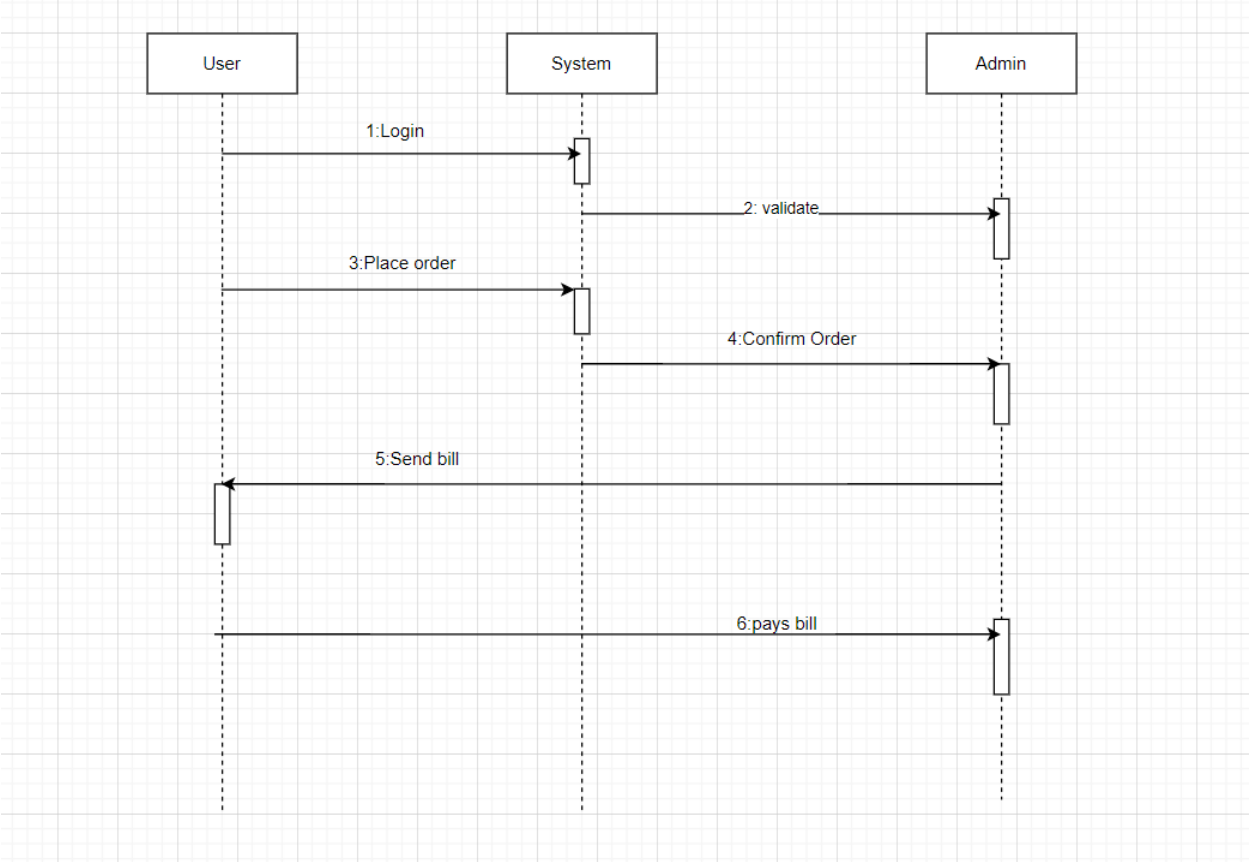
- NoSQL Database: Employing MongoDB or Cassandra for flexible, schema-less storage, ideal for handling large volumes of unstructured or semi-structured data, such as user-generated content or logs.
- Cloud Storage: Leveraging services like Amazon S3 or Google Cloud Storage for scalable, durable storage of files and objects, suitable for multimedia assets or archival data.

3. **Representation of Data**:
    - Customer Table: Fields might include customer ID, name, email, and phone number, with relationships to tables for orders and payments.
    - Inventory Table: Fields could include product ID, name, description, quantity, and price, with indexes for efficient searching and updating.
    - Transaction Table: Fields might include transaction ID, date, time, customer ID, product ID, quantity, and total amount, with foreign keys linking to related tables.

3 Detailed System Design 3.1 Static view



3.2 Dynamic view



Design Rationale:

The design reasoning is critical for complementing diagrams in a canteen management system. It provides context, justification, and reasoning for the design decisions made during the development process. Here's how design logic can be used in a canteen management system:

Design justification should explain why certain design decisions were made. For example, if a specific architectural pattern, such as the Facade Pattern, was chosen to manage various subsystems of the canteen, the reasoning should describe why it was thought appropriate. Perhaps it was chosen to simplify the relationships between different components, improve maintainability, or increase scalability.

The design logic should be consistent with the demands and desires of stakeholders, such as canteen management, employees, and consumers. It should address any issues made by stakeholders and demonstrate how the chosen design fits their expectations and needs.

GITHUB Repo Link:
https://github.com/AsvithaVibeeshanan/ITCS6112_MDSP24_Group11