Task 2 – System Design Documentation (35 Marks) Using the information gathered for Task 1B, produce robust and detailed design documentation which should include at least the following categories of documents; • Requirement Specification • Logical Designs • Physical Designs

System Design Documentation

Fresh Insight Technology

12 June 2024

Requirement Specification

1. Digital Menu

- **Description:** A digital menu accessible via smartphones, tablets, and laptops.
- **Features:**
  - Viewable on various devices.
  - Easy updates to menu items, descriptions, prices, and images.
- **Non-Functional Requirements:**
  - Responsive design for compatibility with different screen sizes.
  - User-friendly interface for easy navigation.

2. Remote Ordering

- **Description:** Allows users to place orders ahead of time.
- **Features:**
  - Pre-ordering functionality.
  - A notification system will inform users when their order is ready.
- **Non-Functional Requirements:**
  - Real-time order processing.
  - Reliable notification system.

3. Payment System

- **Description:** Digital payment system integrating with popular payment gateways.
- **Features:**
  - Support for PayPal, Stripe, etc.
  - Contactless payment using smartphones.
- **Non-Functional Requirements:**
  - Secure payment processing.
  - Compliance with financial regulations.

4. Feedback and Rating

- **Description:** Allows users to leave feedback and rate their dining experience.
- **Features:**
  - Feedback submission form.
  - Rating system.
- **Non-Functional Requirements:**
  - Data privacy and anonymity for users.
  - Easy access to feedback for canteen management.

5. Maintenance and Updates

- **Description:** Structured procedure for regular system maintenance.
- **Features:**
  - Scheduled maintenance plans.
  - Easy update mechanisms for future needs.
- **Non-Functional Requirements:**
  - Minimal downtime during updates.
  - Documentation of maintenance procedures.

6. Safety and Security

- **Description:** Ensures the safety of users' personal information and system security.
- **Features:**
  - Data encryption.
  - User authentication and authorisation.
- **Non-Functional Requirements:**
  - Compliance with data protection regulations.
  - Regular security audits.

Logical Designs

1. System Architecture Diagram

2. Use Case Diagram

3. Entity-Relationship Diagram (ERD)

Physical Designs

1. System Architecture

Description: The system will be based on a client-server architecture with the following components:

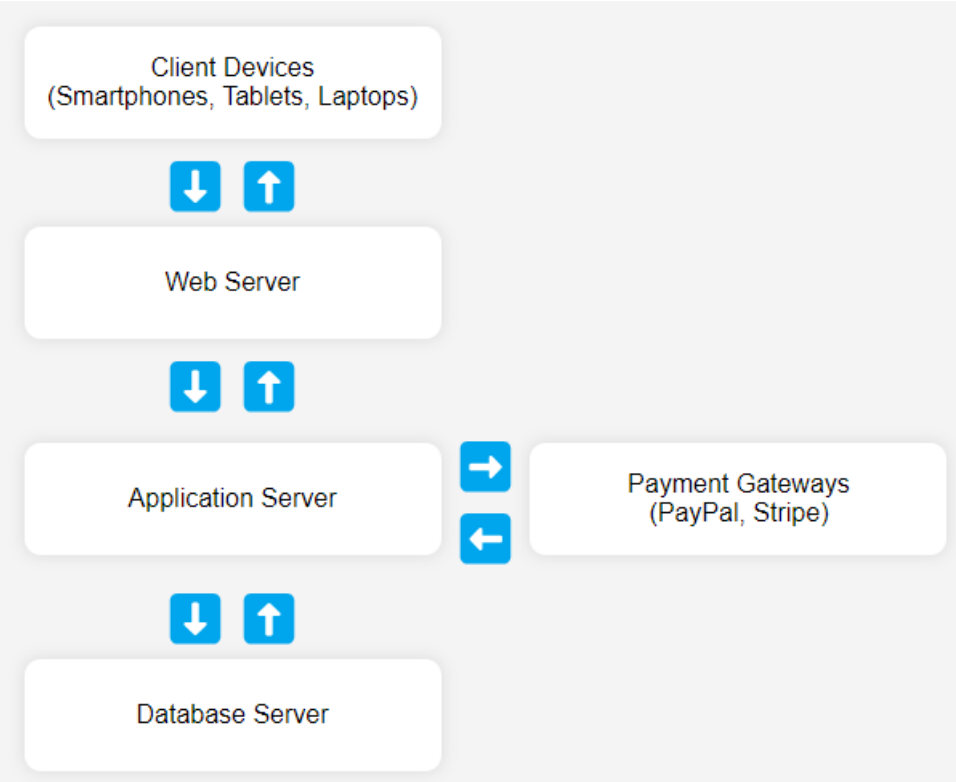
- **Client-side:** Web and mobile applications accessible via smartphones, tablets, and laptops.
- **Server-side:** A central server to handle requests, process orders, and manage the database.
- **Database:** A robust database system to store menu items, orders, user data, and feedback.

Components:

- **Web Server:** Hosts the web application and handles HTTP requests.
- **Application Server:** Manages business logic and order processing.
- **Database Server:** Stores all the data and ensures data integrity and security.
- **Payment Gateway Integration:** Interfaces with external payment services like PayPal and Stripe.

2. Network and Dataflow Diagram

Description: The network diagram outlines the communication between the client devices, web server, application server, database server, and payment gateways.

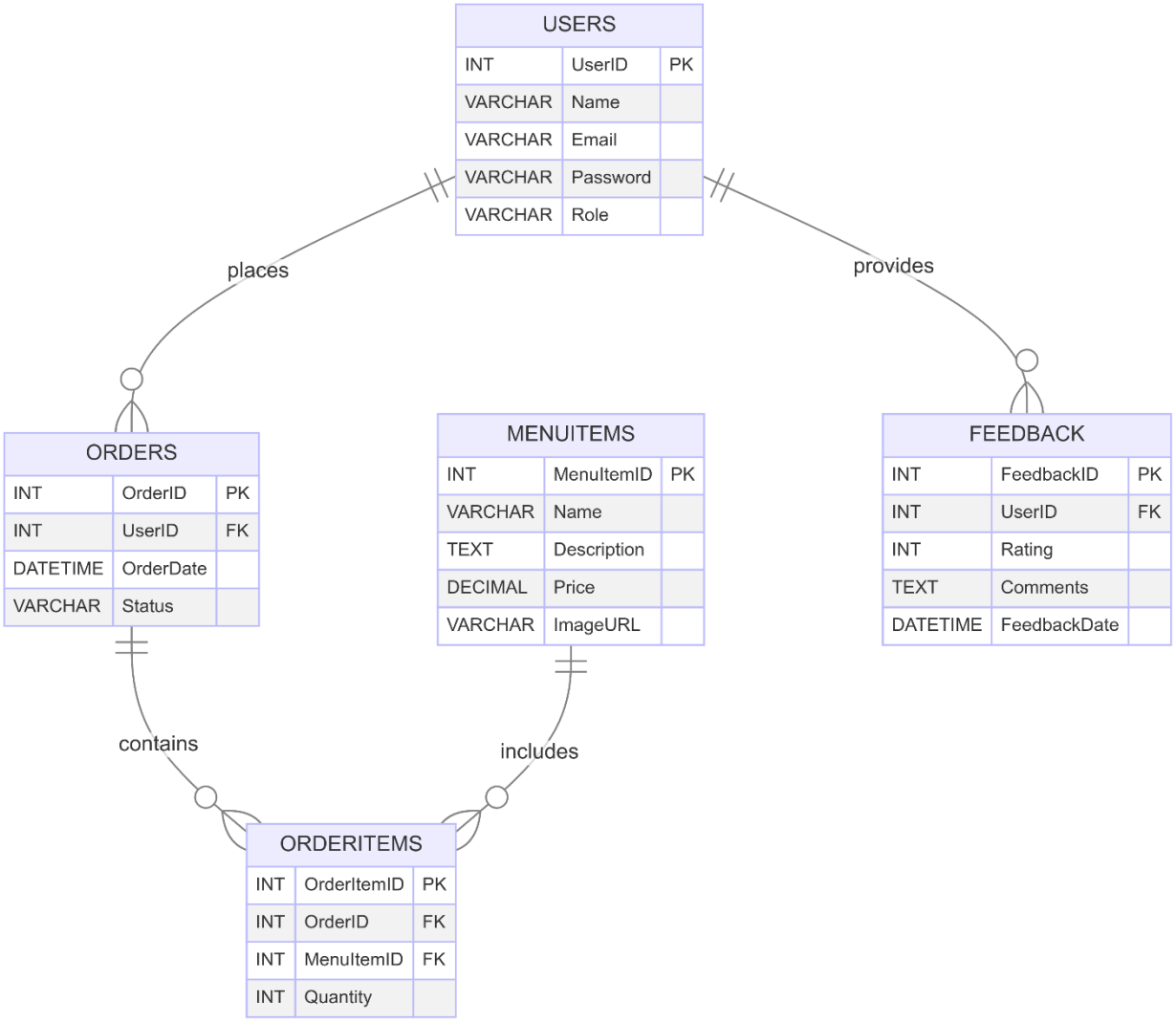


3. Database Schema

Description: The database schema provides a detailed structure, including tables, columns, data types, and relationships.

Tables:

1. **Users**
    - UserID: INT, Primary Key
    - Name: VARCHAR(100)
    - Email: VARCHAR(100)
    - Password: VARCHAR(100)
    - Role: ENUM('Student', 'Staff', 'Admin')
2. **MenuItems**
    - MenuItemID: INT, Primary Key
    - Name: VARCHAR(100)
    - Description: TEXT
    - Price: DECIMAL(5,2)
    - ImageURL: VARCHAR(255)
3. **Orders**
    - OrderID: INT, Primary Key
    - UserID: INT, Foreign Key
    - OrderDate: DATETIME
    - Status: ENUM('Pending', 'Ready', 'Completed', 'Cancelled')
4. **OrderItems**
    - OrderItemID: INT, Primary Key
    - OrderID: INT, Foreign Key
    - MenuItemID: INT, Foreign Key
    - Quantity: INT
5. **Feedback**
    - FeedbackID: INT, Primary Key
    - UserID: INT, Foreign Key
    - Rating: INT
    - Comments: TEXT
    - FeedbackDate: DATETIME



6.

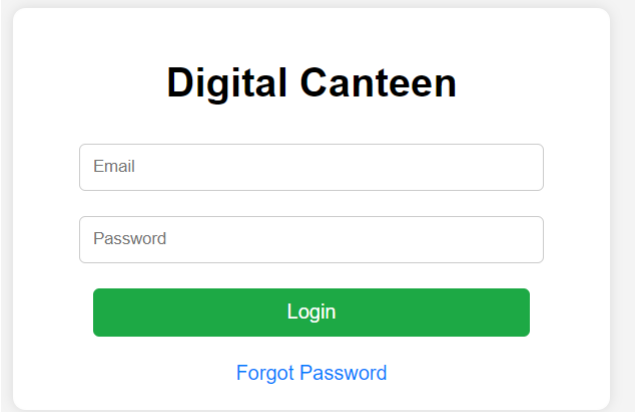
ERD DIAGRAM CREATED WITH MERMAID https://www.mermaidchart.com/

See Appendix for Instructions:

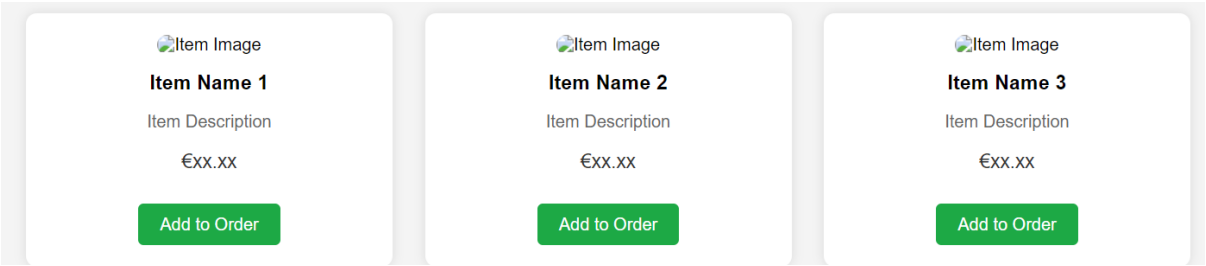
4. User Interface Designs

Description: The user interface (UI) designs visually represent the system's key screens and user interactions.

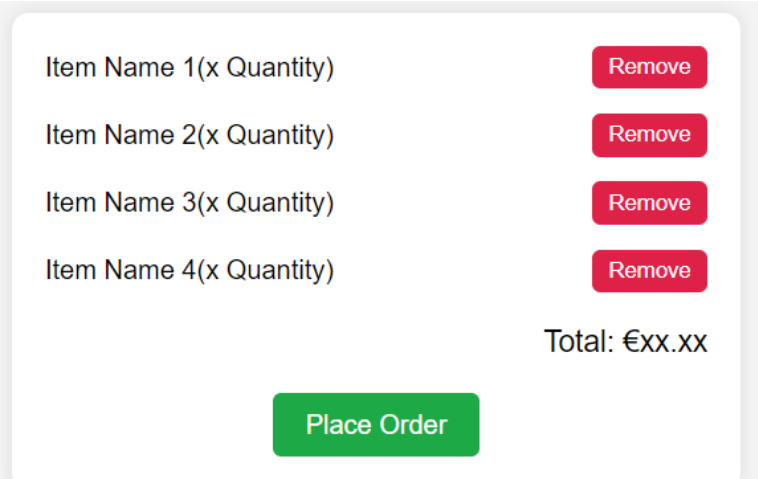
Screens:

1. **Login Screen**
    - Fields: Email, Password
    - Actions: Login, Forgot Password
    - 

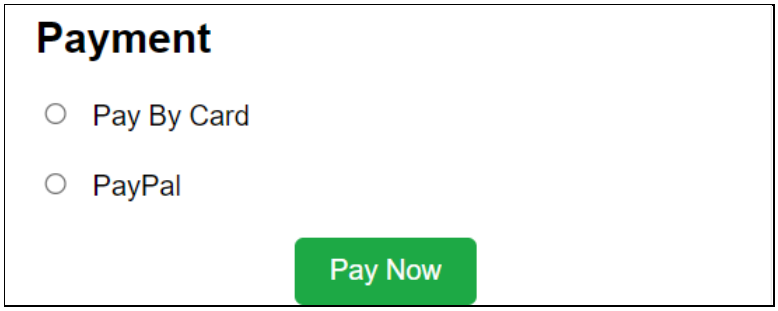
2. **Menu Screen**
    - Displays: Menu items with images, descriptions, and prices
    - Actions: Add to Order, View Details

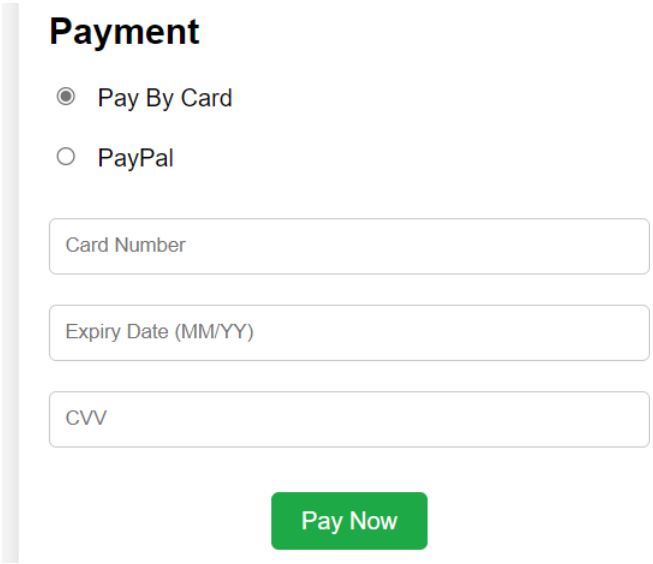


3. **Order Screen**
    - Displays: Current order items, total price
    - Actions: Place Order, Remove Item

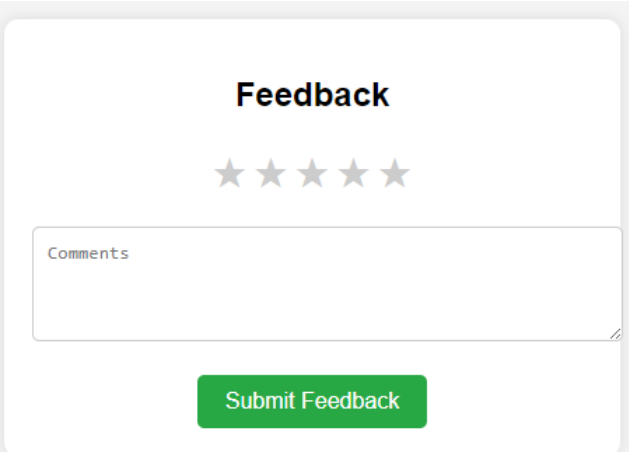


4. **Payment Screen**
    - Fields: Payment Method, Card Details (if applicable)
    - Actions: Pay Now, Cancel





5. **Feedback Screen**
    - Fields: Rating, Comments
    - Actions: Submit Feedback, View Previous Feedback



Conclusion

This detailed system design documentation outlines the requirements and logical and physical designs for the new digital canteen system. By following this comprehensive plan, Fresh Insight Technology aims to deliver a robust, user-friendly, and secure solution that meets the needs of the college's students and staff. The next step is to proceed with the development phase, ensuring all design specifications are accurately implemented.

Prepared by:
[Your Name]
Software Development Manager
Fresh Insight Technology

Appendix Creating ERD Image from Mermaid Code:

You can use the provided Mermaid code to create an ERD image using various online tools and IDEs that support Mermaid syntax. Here are a few options:

Online Tools

1. **Mermaid Live Editor**: (https://www.mermaidchart.com/)
    - Go to Mermaid Live Editor.
    - Paste the code into the editor.
    - The diagram will render automatically, and you can download the image or copy the generated code.
2. **Web-based Markdown Editors**:
    - Many online Markdown editors support Mermaid diagrams. Examples include StackEdit and Markdown Live Preview.