Campus Smart Dining System

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Abstract

The Campus Smart Dining System is a web application designed to streamline meal ordering and cater to students' specific dietary needs and allergies. The app features a list of restaurants available on campus, with filters to show only those that meet the user's dietary restrictions. Once a restaurant and meal have been selected, the user can place their order through the app and choose to pay either through the app or during pickup. This system aims to provide a convenient and personalized dining experience for students, reducing the time and effort required to find suitable meals on campus. Additionally, the web app provides an efficient means for campus dining providers to manage orders and ensure that students' dietary needs are met.

Introduction

For many students, finding suitable meals on campus can be a time-consuming and frustrating experience. With a variety of dietary needs and preferences, it can be challenging to navigate the numerous dining options available on campus. To address this issue, the Campus Smart Dining System has been developed as a web application to provide a convenient and customizable meal ordering experience for students. The system features a user-friendly interface that allows students to filter restaurants and meals based on their specific dietary needs and allergies. By providing a personalized dining experience, the Campus Smart Dining System aims to reduce the time and effort required to find suitable meals on campus. Additionally, the system provides an efficient means for campus dining providers to manage orders and ensure that students' dietary needs are met. In this paper, we will discuss the features and benefits of the Campus Smart Dining System, as well as its potential impact on student satisfaction and campus dining services.

Goals

The primary goal of the Campus Smart Dining System web application is to provide a convenient and customizable meal ordering experience for students on campus. By allowing students to filter restaurants and meals based on their specific dietary needs and allergies, the system aims to simplify the process of finding suitable meals on campus. The system also aims to provide an efficient means for campus dining providers to manage orders and ensure that students' dietary needs are met. The ultimate goal is to enhance the dining experience for students, promote healthy eating habits, and increase overall satisfaction with campus dining services.

User Scenario

Jane, a student with a gluten allergy, is looking for a place to grab lunch on campus.

1. Jane logs into the Campus Smart Dining System web application on her smartphone.
2. She enters her dietary information, indicating that she has a gluten allergy.
3. The application shows her a list of restaurants available on campus that offer gluten-free options.
4. Jane selects a restaurant that offers a gluten-free sandwich option.
5. She customizes her sandwich by selecting her preferred toppings and sides.
6. She places her order through the app and chooses to pay through the app.
7. The app provides her with an estimated time for pickup.
8. Jane arrives at the restaurant and bypasses the line, going directly to the pickup area.
9. She shows her order confirmation on her phone to the staff member, who quickly retrieves her order.

10. Jane enjoys her customized, gluten-free sandwich and feels satisfied with the convenient and personalized dining experience provided by the Campus Smart Dining System.

Admin Scenario

Scenario 1: Updating the Menu According to Availability

The admin logs into the Campus Smart Dining System web application.

The admin navigates to the menu management section of the app.

The admin checks the inventory and availability of ingredients for each dish on the menu.

Based on availability, the admin updates the menu by removing items that cannot be offered and adding new items that are currently available.

The admin saves the updated menu, and it is immediately reflected on the app for users to see.

Scenario 2: Viewing Past and Current Orders

The admin logs into the Campus Smart Dining System web application.

The admin navigates to the orders management section of the app.

The admin can view the current orders that are being prepared by the kitchen staff and the estimated time of completion.

The admin can also view past orders and filter them by date, restaurant, or specific menu item.

The admin can view the order details, including the customer name, order items, and payment method.

If necessary, the admin can use this information to resolve any issues with the orders or to make improvements to the menu or service.

List of Requirements

Services:

Displaying a list of restaurants available on campus

Filtering restaurants and meals based on student's diet and allergy information

Allowing students to place orders through the app

Allowing payment options through the app or during pickup

Constraints:

Students must have access to a smartphone or laptop with internet to use the system

Restaurants must be registered with the campus smart dining system

The system must have accurate information about the restaurants' menu items and ingredients

The system must have a secure payment gateway for payment transactions

The system must be able to handle a large number of orders during peak hours

Performance:

The app must provide a user-friendly interface

The system must provide accurate filtering of restaurants and meals based on student's dietary and allergy needs

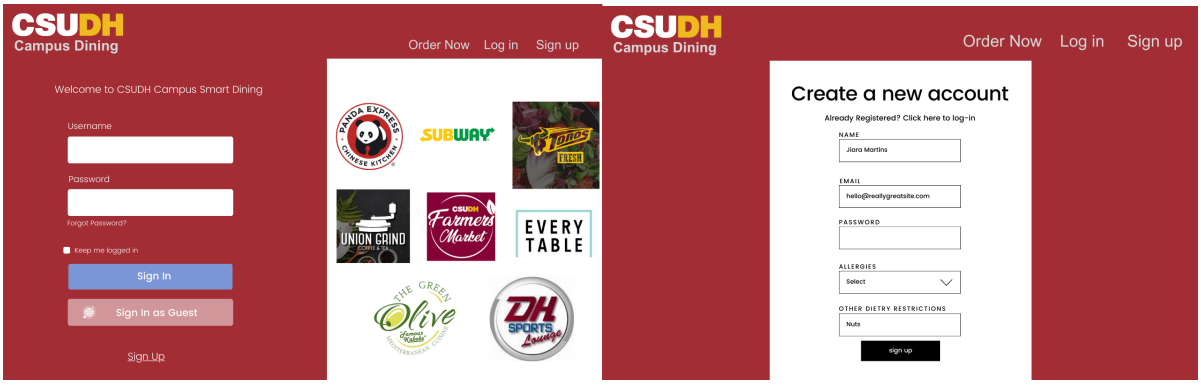
The system must ensure timely delivery of orders and accurate payment processing

The system must be available for dining hours except for maintenance or technical issues.

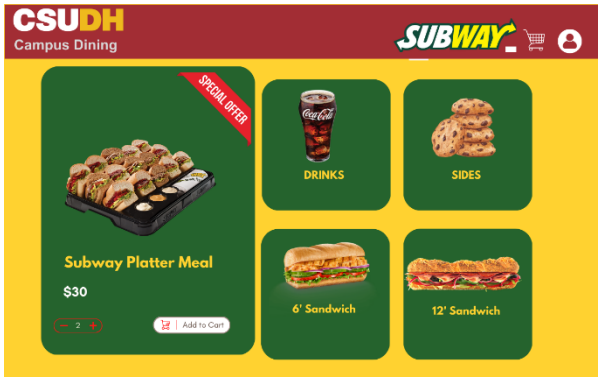
Prototypes

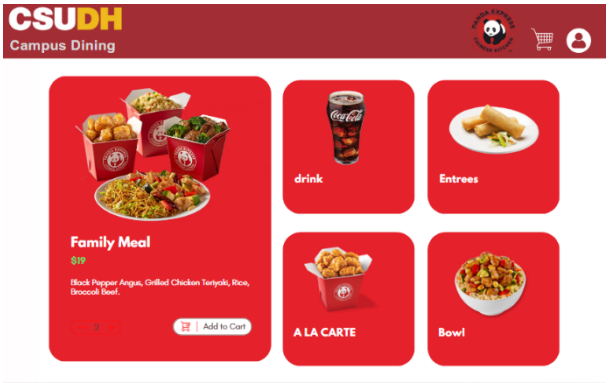
This is the page when the user sees the web application but have not signed in.

Contains the following elements: App logo, App name, Welcome Text, Features (Menus), Buttons (Login, Sign up, Order now)

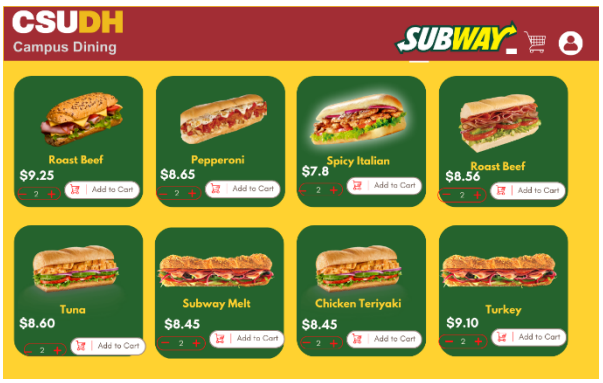


The login interface prototype Contains the following elements: App logo, App name, Form fields (username, password), Buttons (Login, Sign up, Sign as Guest)



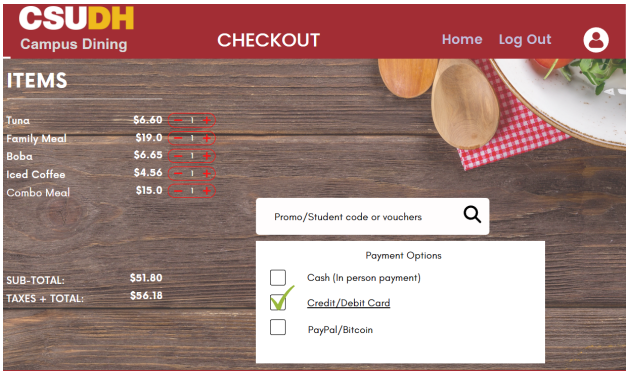


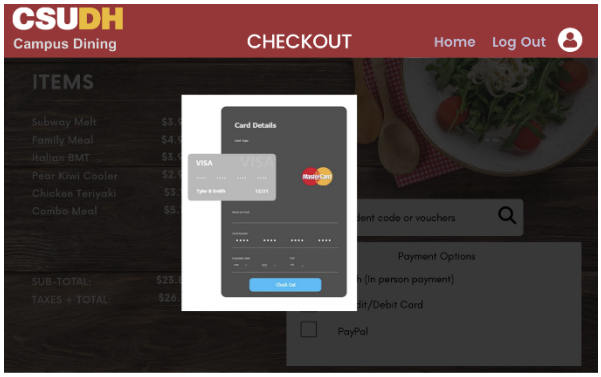
The above prototype interface represents the different meal categories of the restaurants such as sides, drinks etc.. The categorization of meals into different sections like sides, drinks, main dishes, desserts, etc. in a restaurant's User Interface (UI) is essential for several reasons. This helps in organizing the menu in a structured manner. This makes it easier for users to navigate and understand the available options. It reduces the amount of time users spend scrolling through the entire menu. a well-categorized UI is visually pleasing and can add to the overall appeal of the app



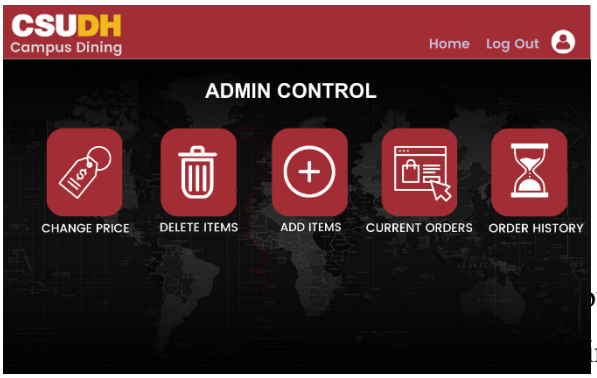
Contains the following elements: App logo, App name, Restaurant Header (Restaurant Logo, name, theme), Menu section (Category headers: Main courses, Sides, Drinks).

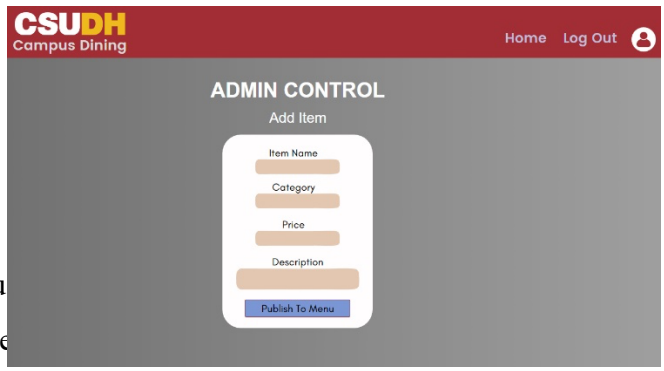
Each menu of the dining application to match the theme colors of the restaurant which provide a more immersive and brand-consistent experience for your users. Here are some general steps to customize the UI. We Identified the primary and secondary colors used in the restaurant's branding. The primary color used in the brand's logo is the background color of the page, while secondary colors menu icons. We used these colors consistently throughout the web app.





The design for the checkout page for a web application should be easy to navigate this plays a critical role in the user's experience. It's essential to provide multiple payment options for user convenience, like credit/debit card, PayPal, Google Pay, Apple Pay, etc.



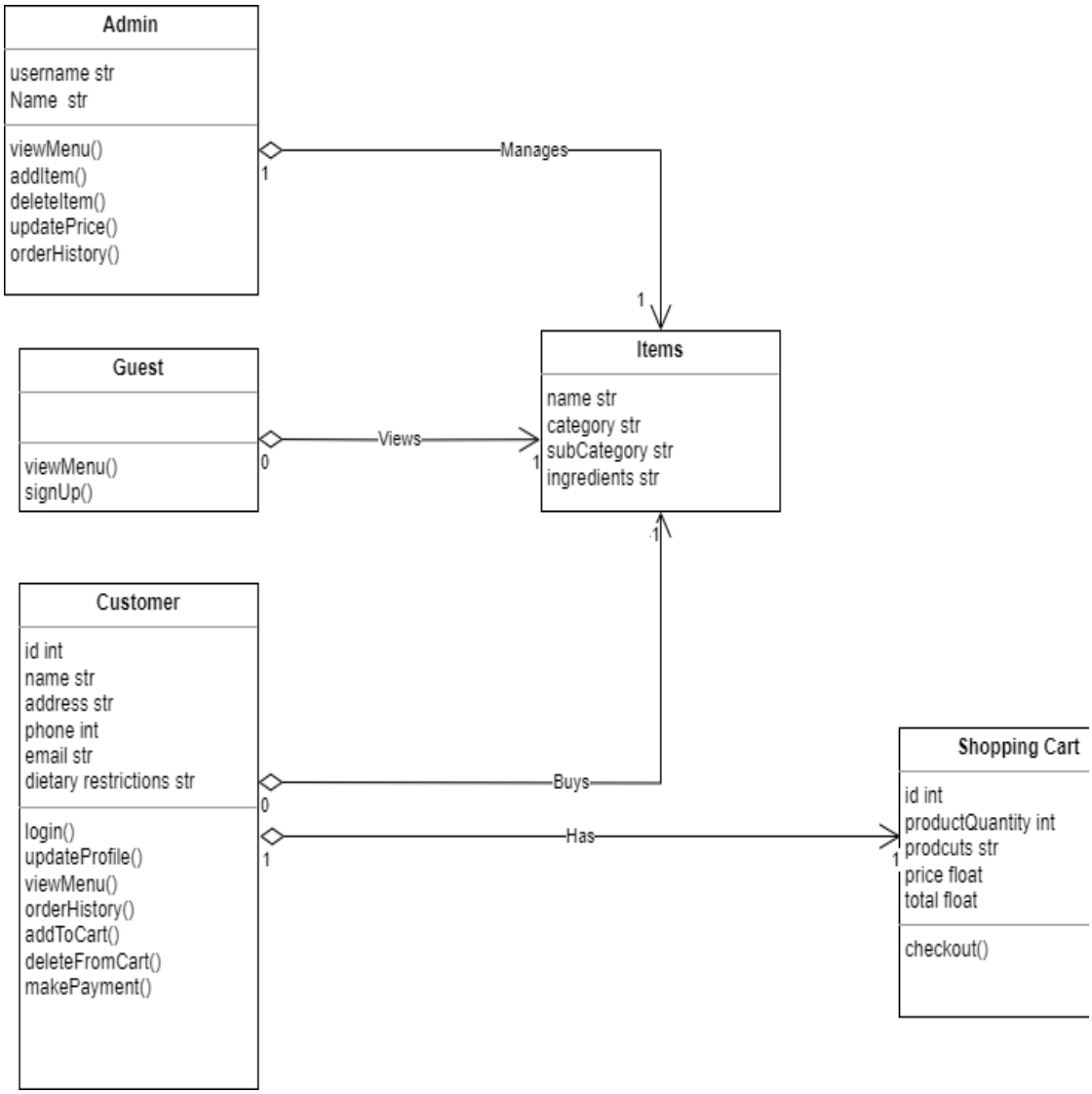


- The ability to add, remove, or edit meals.
- A real-time view of incoming orders, with details about the customer, what they ordered, the total cost, and their delivery/pickup info.
- Admin should also be able to update order statuses and view order history.

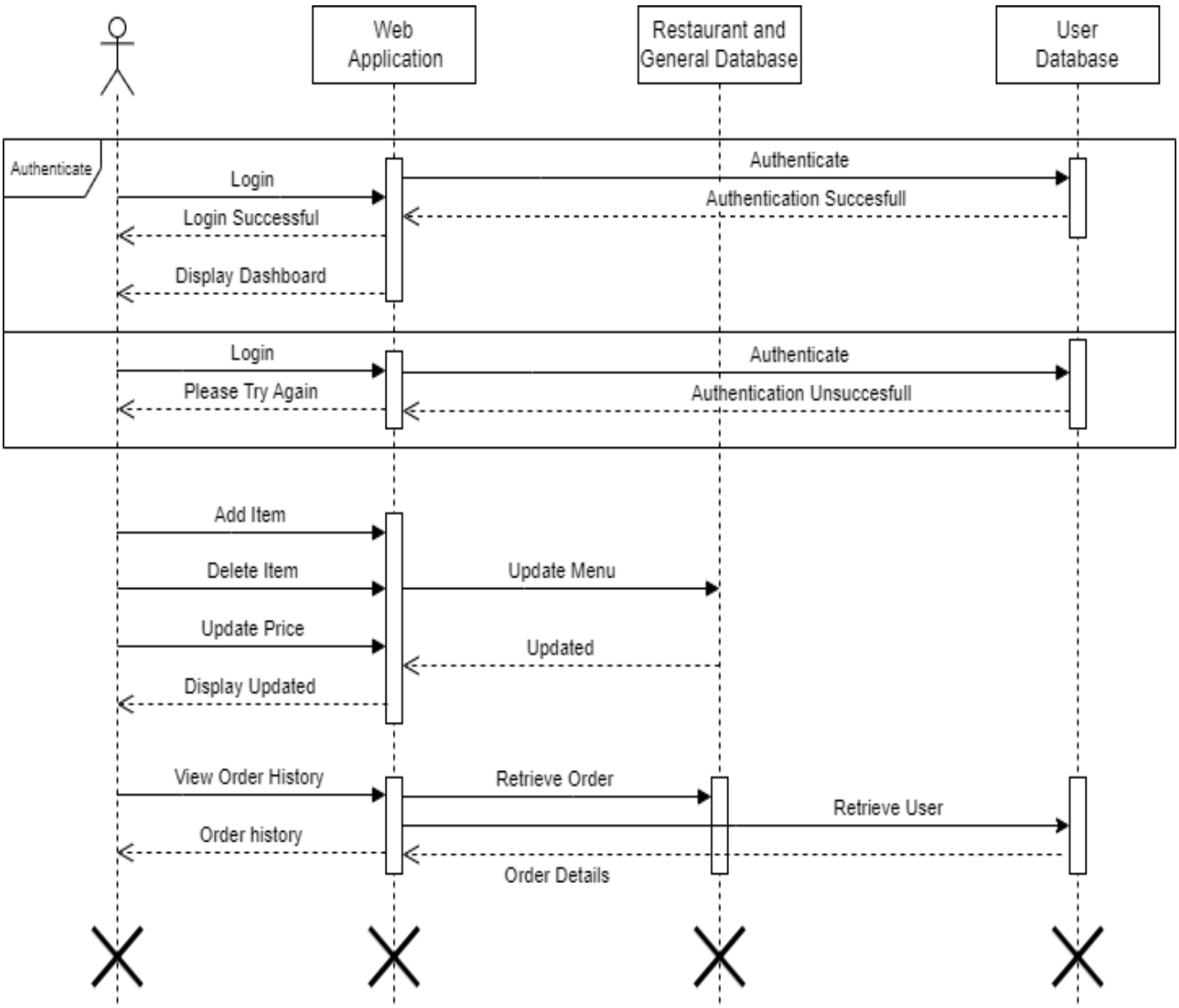
The above following prototypes can be seen by visiting the live webpage

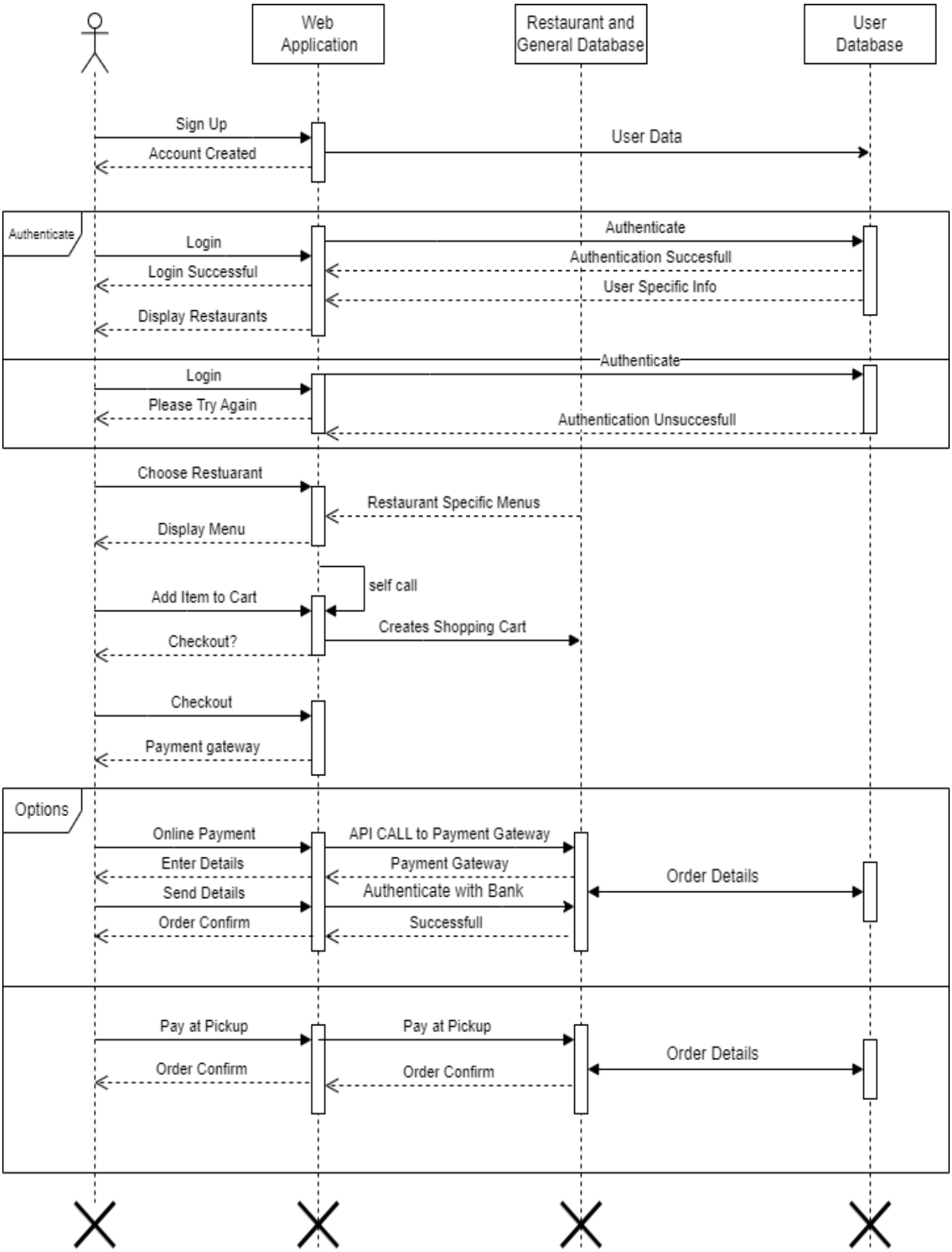
https://dailyzglass.my.canva.site/csudh-campus

UML Class Diagram



UML Sequence Diagram


Web Application
Restaurant and General Database
User Database
Authenticate
Login
Authenticate
Authentication Succesfull
Login Successful
Display Dashboard
Login
Authenticate
Please Try Again
Authentication Unsuccesfull
Add Item
Delete Item
Update Menu
Update Price
Updated
Display Updated
View Order History
Retrieve Order
Retrieve User
Order history
Order Details


Web Application
Restaurant and General Database
User Database
Sign Up
Account Created
User Data
Authenticate
Login
Login Successful
Display Restaurants
Authenticate
Authentication Succesfull
User Specific Info
Login
Please Try Again
Authenticate
Authentication Unsuccesfull
Choose Restuarant
Display Menu
Restaurant Specific Menus
Add Item to Cart
Checkout?
self call
Creates Shopping Cart
Checkout
Payment gateway
Options
Online Payment
Enter Details
Send Details
Order Confirm
API CALL to Payment Gateway
Payment Gateway
Authenticate with Bank
Successfull
Order Details
Pay at Pickup
Order Confirm
Pay at Pickup
Order Confirm
Order Details

Future Improvements

Upgrade to SaaS:

Upgrading the Campus Smart Dining System to a Software as a Service (SaaS) model would allow the web application to be hosted on a cloud-based platform. This would offer several benefits, including increased scalability, enhanced security, and improved accessibility. With a SaaS model, the system could be easily customized and updated to meet the evolving needs of the campus dining services. Additionally, SaaS could reduce the burden on campus IT staff to maintain the system and free up resources for other tasks.

Machine Learning for Recommendation System:

Machine learning (ML) could be used to develop a recommendation system that suggests restaurants and menu items based on a user's dining preferences and history. The recommendation system could leverage data on user interactions with the app, such as ratings and reviews, to make personalized suggestions. This could help users discover new restaurants and menu items that align with their dietary needs and preferences, ultimately enhancing their dining experience.

Integration of Augmented Reality (AR) in the Application.

Integrating Augmented Reality (AR) into a campus dining application can create an immersive and interactive experience for users.

- Menu: Users could use AR to visualize menu items in 3D before ordering. They can see the portion size, ingredients, and presentation, which can help them make more

informed decisions.

- Table Selection: The application should provide the cafeteria map in Locker Student Union to enable users to reserve tables, view the availability of tables, and select a table by using the app. Once the table is selected, by integrating an GEO AR application (3rd party application) to allow the user to use their smartphones to provide 3D location-based to provide a waypoint towards a customer's table.

The AR development platform that can be used are Unity, Apple's ARKit for iOS, or Google's ARCore for Android.

Additional Payment Methods:

In addition to the current payment options, the Campus Smart Dining System could integrate with popular mobile payment services such as Venmo, Apple Pay, and Google Pay. This would offer more convenience for users who prefer to pay with these methods and would streamline the payment process. The system could also implement a rewards program that incentivizes users to make purchases through the app, such as earning points that can be redeemed for discounts or free meals.

Delivery Service:

Offering a delivery service would provide a more flexible and convenient dining experience for students, especially those with busy schedules or who are unable to visit the dining locations in person. The Campus Smart Dining System could hire students for delivery hence increasing

student employment as well. Users could place their orders through the app and select a delivery option, with the estimated time of delivery provided in real-time. This would expand the reach of the system and offer a more comprehensive dining solution for the campus community.