EE3250: Graphical User Interface Development

Group Project

Point of Sale System

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1 Introduction:

We propose the development of a comprehensive Point of Sale (POS) system specifically designed for fast food restaurants. This system aims to streamline operations, enhance efficiency, and improve the overall customer experience. The proposed solution will employ modern technologies, including WPF with MVVM architecture for the graphical user interface, SQLite database using the Code-First approach for data management, and xUnit along with FluentAssertions for rigorous unit testing. The system will cater to two types of users - administrators with extensive privileges and normal users responsible for day-to-day operations.

2 Technologies Used:

- WPF for GUI (With MVVM architecture)
- SQLite for database (With Code-First Approach)
- Use xUnit and Fluent Assertions

3 Additional Libraries and Packages:

- MVVM community toolkit by Microsoft
- Mahapps.metro.iconpacks
- Entity Framework Core and other libraries
- Live Charts

4 Scope of the System:

The POS system includes the following key functionalities:

- User Authentication: The system will provide a secure login screen to verify user credentials against the stored database password.
- User Management: Administrators will have the ability to create, read, update, and delete normal users. Normal users can log in with their credentials.
- Sales Operations: Normal users can perform sales operations, including adding products to customer orders, calculating total bills with sales tax, and generating invoices.
- Invoice Tracking: Normal users can view and track their invoice bills, allowing them to monitor their daily progress and analyze monthly working hours.
- Product Management: Administrators will have full control over products, including creating, updating, and deleting items. This will ensure efficient inventory management.
- Business Logic: The system will implement essential business logic, such as calculating sales tax and generating reports for financial analysis.

5 Application Overview:

This is the overview of our application. Here is a brief explain about how the application is working with the scope of the system and user interfaces.

- First, this application appears the login screen. After the login screen appear, the user has to input his/her username and password to login. Then the database of the system checks the username and the password. If they matched, after the user click the login button the user will be allowed to log into the system. The following Figure 5.1 shows the login screen user interface for the system.

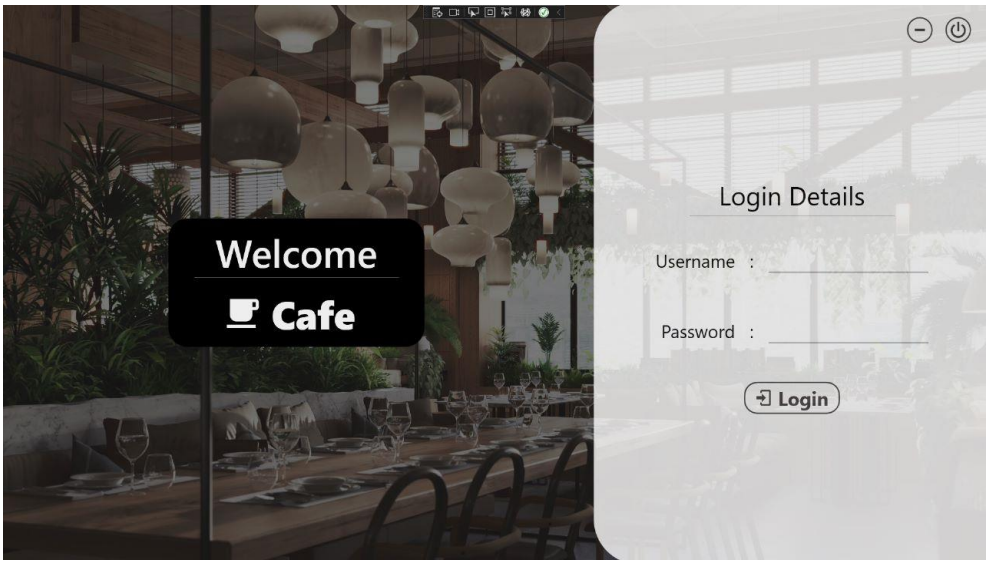

Figure 5.1: Login Screen of the POS system

- In the POS system, there are two types of users with different privileges. They are admin users and normal users. These two types of users have different abilities of manipulating the application as well as can perform different type of operations in this POS system.
- If an admin user logs into the system, he/she can see the following interface with more customizable settings with more descriptive information.

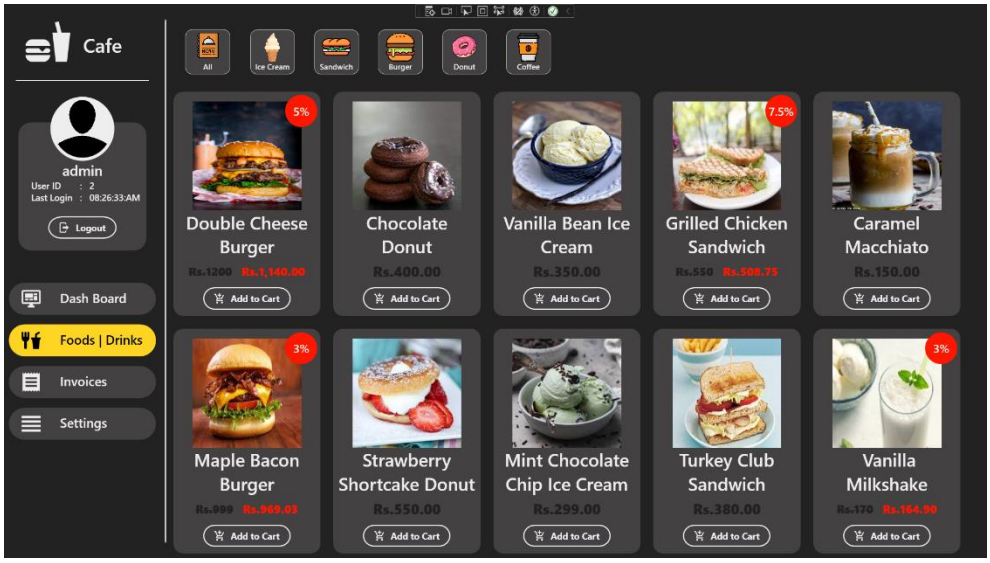

Figure 5.2: Application's main view when admin user logs in

- In this application, only the admin user has the privilege to create, delete, or update each entity within the system. This includes managing users, products, and categories (Figure 5.3). On the other hand, normal users can update their personal information independently, ensuring their profiles are up to date. It is important to note that admin users do not have the capability to place orders like normal users. This restriction ensures that the functionality of the system is not compromised. By maintaining this hierarchy of user roles and permissions, the application ensures proper access control and preserves the integrity of the system's operations. If normal user login to this system, he/she can see the following interface.

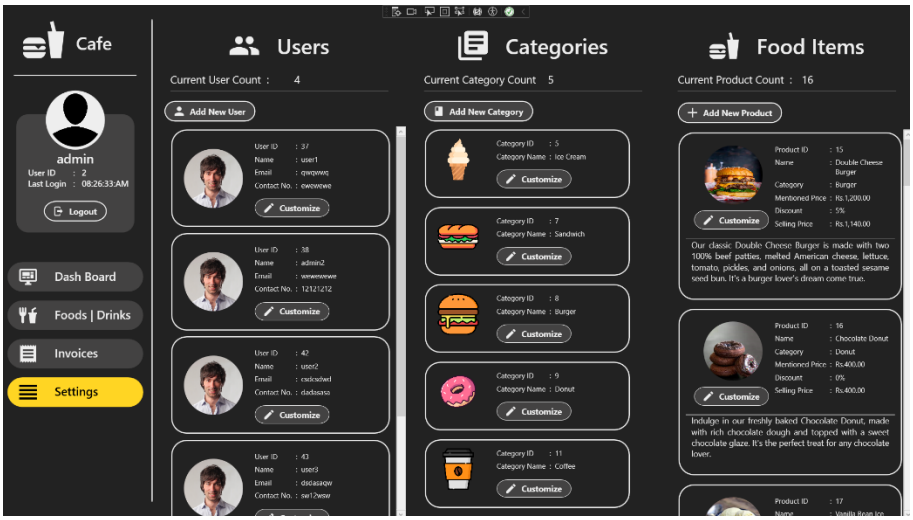

Figure 5.3: Admin's setting for maintaining each entity

- Normal users in the system have the ability to place orders and handle tasks related to their own orders, such as managing balances and accessing invoice bill details. However, they do not possess the authority to create, delete, or modify details of other users within the system. These restrictions have been implemented to ensure the security and convenience of the business. By limiting the scope of their actions to their own orders only, the system maintains data integrity and prevents unauthorized access or modifications. This approach enhances the overall system security and promotes efficient business operations.

Following figures, the process of placing customer's order.

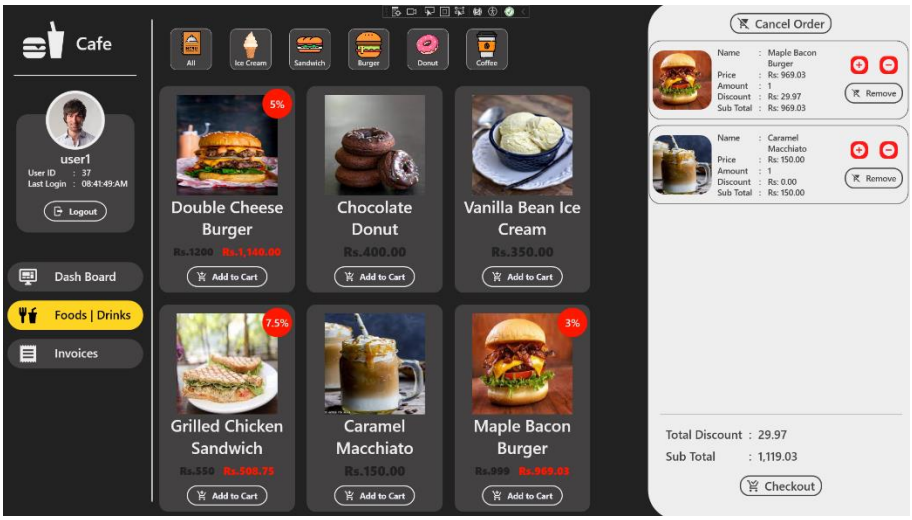

Figure 5.4: Placing order according to the customer's satisfactions

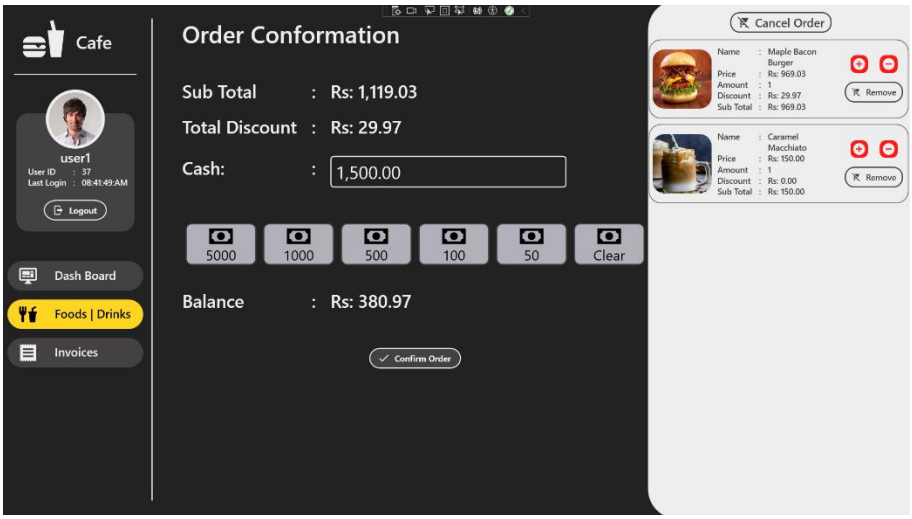

Figure 5.5: Conforming the order by exchanging with cash

- Once a normal user creates an order, they are required to confirm the order by clicking the "Confirm Order" button as depicted in Figure 5.5. Upon confirmation, the system will update the invoices tab Figure 5.6, reflecting the newly confirmed order. Additionally, this functionality allows users to check if customers wish to return their order at a later stage. By providing this feature, the system ensures that orders are accurately recorded and facilitates efficient management of the invoicing process.

Figure 5.6: Figure of the invoices tab

- Within the invoices tab, users can access a comprehensive list of all the order details they have made, presented as invoices. If a user wishes to locate a specific order, they can easily search for it by entering the invoice ID, prompting the system to apply the relevant filters and display the desired order.

- On the other hand, when an admin user navigates to their invoices tab, they will be presented with a complete overview of all the orders made by normal users in the business. This enables admin users to access and analyze detailed information regarding each order. By leveraging this data, admin users can make informed and critical decisions to drive the business forward. The availability of such comprehensive order details empowers admin users to gain valuable insights and leverage them effectively.

- A significant challenge faced by many businesses is the lack of a reliable system to store and analyze statistical data pertaining to business owners and employees. This limitation adversely affects their ability to track and enhance their performance. To address this issue, our application includes a dedicated statistics section under the dashboard tab for both owners and employees.
- In the admin user's dashboard (Figure 5.7), restaurant owners can not only access their personal details but also view comprehensive statistics related to all normal users. These statistics encompass vital information such as work hours and sales details of individual users for a specific month. By leveraging these statistics, the business administration can make informed decisions, identify trends, and devise strategies to optimize overall performance. The inclusion of such robust statistical capabilities empowers owners and administrators to gain valuable insights and drive the growth and success of their business.

Figure 5.7: Figure of admin's dashboard

- Within the normal user's dashboard (Figure 5.8), restaurant employees have the ability to edit their personal details. Additionally, they can access detailed information regarding their work hours for the current month. Moreover, employees can conveniently view their last login time and date, as well as the total number of invoices they have generated.

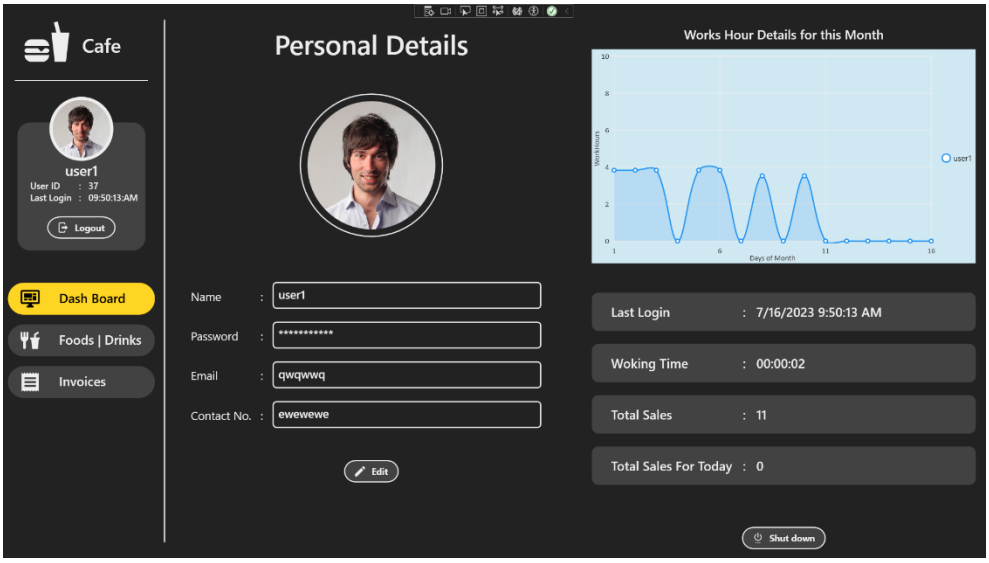

Figure 5.8:Figure of normal user's dashboard

- Under the Settings tab shows under the Figure 5.9, which is exclusively accessible to admin users, the system provides comprehensive CRUD (Create, Read, Update, Delete) operations for each entity, including products, categories, and users.

Admin users have the privilege to perform the following actions:

- Products: They can create new products, retrieve information about existing products, update product details such as name, price, or quantity, and delete products that are no longer required.
- Categories: Admin users can create new categories to organize products, view existing categories, update category names or properties, and delete categories if needed.
- Users: They have the authority to create new users within the system, retrieve user information, update user details like username or password, and delete user accounts if necessary.

The Settings tab provides admin users with complete control over managing these entities, allowing them to effectively configure and maintain the system based on the business requirements.

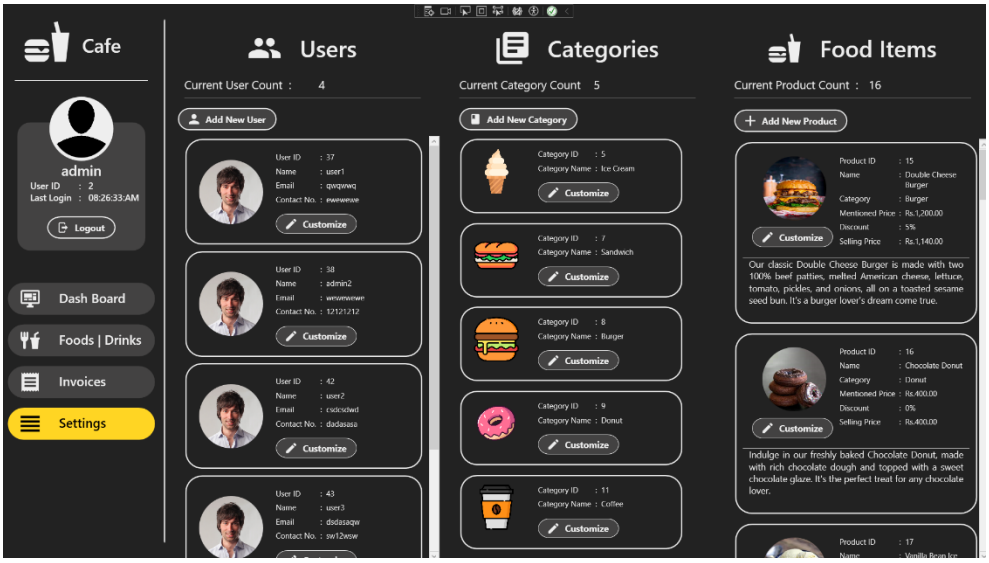

Figure 5.9: Setting panel which manipulate the CRUD operations for each entity

6 Project Timeline:

Week 1	Project initialize, requirement analysis of the existing POS systems, and UI design.
Week 2	Define the entity that need for this project and develop each model and unit tests.
Week 3	Development of CRUD operations for products and users and implement the login screen.
Week 4	Enhance the business logic for calculating total bill and generating invoices.
Week 5	Creation of daily progress reports and invoice tracking features.
Week 6	Modify the user interfaces to get more attractive look and Bug fixing.
Week 7	Final polishing, documentation, and preparation for the final demonstration.