1. Project Overview:

This project is dedicated to providing a foundational framework for coffee shop and restaurant operators to embrace. As online ordering becomes increasingly trendy, a growing number of businesses in the foodservice industry are shifting from traditional paper menus to digital alternatives. There is a eagerness among these establishments to transform their business models, and my project endeavors to offer a system that facilitates this transition. The proposed framework is designed to assist staff in populating a digital menu, including various categories, items, and prices, and in generating QR codes automatically. These codes can be printed and made available on tables for easy ordering. This not only enhances customer convenience but also furnishes a platform for staff and managers to gather and analyze transactional data. The system will provide General and Limited Access Views (GAV and LAV) for managers to audit the database and predict customer preferences for future menu development. Moreover, it will create a database to store order information and another for inventory management, with the consumed ingredients being synchronized with stock levels for efficient updates.

The target audience for this innovative solution comprises forward-thinking restaurateurs and café owners who recognize the potential of digital transformation to streamline their operations and enrich customer experiences. It is aimed particularly at those seeking to reduce paper waste, optimize staff efficiency, and harness data analytics for strategic decision-making. The purpose of the platform is to streamline the dining experience for both customers and businesses. Customers will benefit from an enhanced ordering process, featuring a thoughtfully designed user interface that makes menu navigation and selection a pleasure. On the flip side, restaurant owners will enjoy real-time feedback and the ability to monitor customer responses and order statuses promptly through the platform. This dual convenience aims to foster a more engaging and efficient interaction, elevating the standard for service in the food industry by harmonizing aesthetic appeal with functional excellence.

The application will be established on web-based platform, using the CodeIgniter MVC and Bootstrap to make sure that the architecture is secure and stable.It will use MySQL to handle the database system,which will make sure the consistency and integrity of the system.And I will focus on developing the UI of the system on current stage.

2. Key Features:

Each of the following features is designed user-friendly:

User-Friendly Customer Interface: A clean, clear UI that allows customers to easily browse the menu, select items, customize orders (e.g., food preferences, dietary restrictions,even their mood), and complete transactions within a few taps.

Restaurant Dashboard:The order and storage conditions should be updated in a central dashboard.The staff would get to know the status of the order timely.And the manager can check the storage conditions to prepare for the purchasing plan.

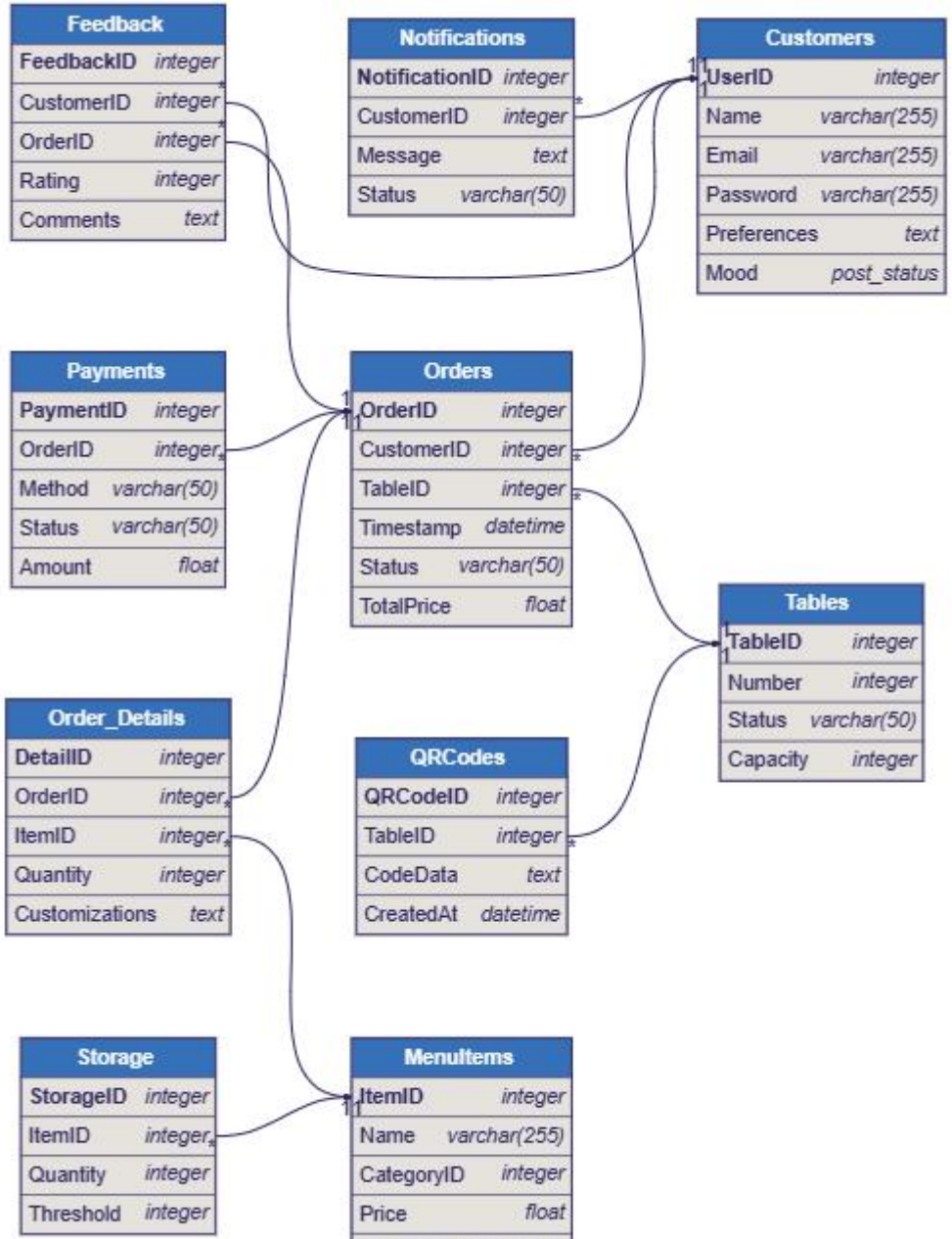
Menu Management:An easy-to-use menu editor that allows restaurant staff to update item descriptions, prices, and availability in real-time, as well as feature daily specials.

Notifications System : QRCodes would generate automatically and can be printed out and paste on each table.Customers would scan the code and surf the menu to make their orders.To keep customers informed about their order status.They can check the statement of their food and easily get contact with the staff.

Reports and Analytics:Order history and timestamps will be maintained, and revenue will be calculated for investors to review. These functions will offer advanced reporting capabilities, enabling businesses to discern sales trends, peak ordering times, and customer preferences, thereby facilitating informed strategic decision-making.

3. UI/UX Design HTML Mockups

4. Database Design: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Rating integer
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Status varchar(50)
Capacity integer
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OrderID integer
ItemID integer
Quantity integer
Customizations text
QRCodes
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ItemID integer
Quantity integer
Threshold integer
MenuItems
ItemID integer
Name varchar(255)
CategoryID integer
Price float

5. Technology Research

Choice of Charting library

Feature	Matplotlib	Seaborn
Data access and preprocessing	It does not interact directly with the database. I need to use a library in Python, such as pandas or SQLAlchemy, to query MySQL, read the data into the Python environment, and then visualize it with Matplotlib.And Matplotlib does not provide data preprocessing or analysis tools.	It does not interact directly just like Matplotlib. It needs to use library like panda to write in the data from the form of sql.But it has some advantages in data preprocessing as it works better with pandas DataFrame to process the data and generate statistical charts.
Chart type and customization	It provides a wide choice of chart types and a high degree of customization.It Can make a variety of complex charts,and can	It is based on Matplotlib , it makes the generation of charts easier, especially statistical charts. Its API design

	customize the style of the chart.	is more advanced, allowing the same visualizations to be done with less code. However, some design should need to go back to Matplotlib for some highly customized requirements.
Performance and efficiency	For large data sets, the code may need to be optimized for more efficient plotting.	It can be slower than Matplotlib when working with large data sets, especially when calculating statistics.
Visual statistical support	As a drawing library, Matplotlib itself does not contain statistics. I need to do the statistical analysis manually and then plot the results with Matplotlib.	But Seaborn Provides built-in statistical capabilities to calculate common statistics directly from data sets and visualize them.

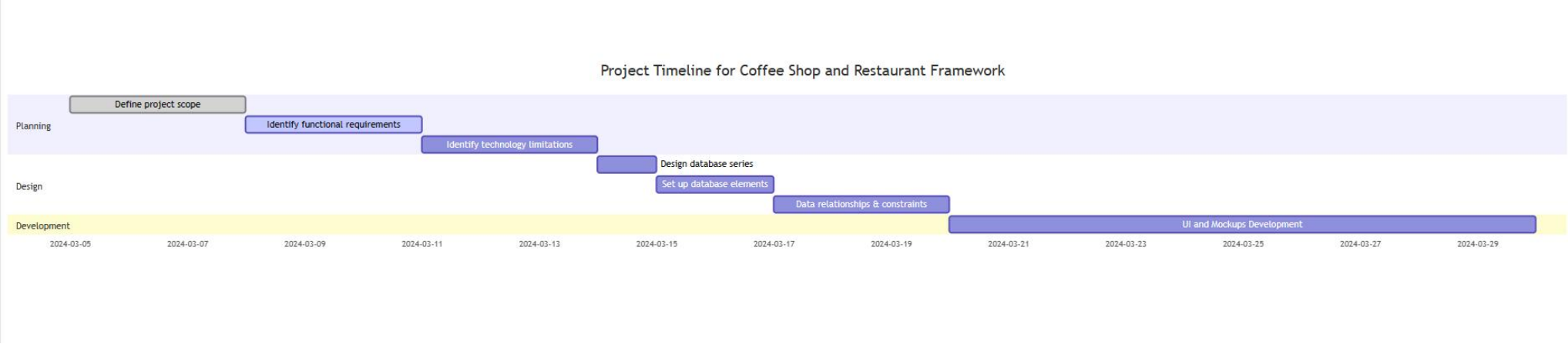
Since I need to plot the distribution of the orders on their names and quantity.And even do some analysis on their ordering time which would do great help on predicting the trend of sales.In this case ,considering Seaborn offers a range of built-in statistical plotting capabilities, which makes it ideal for advanced reporting. It computes and plots a variety of statistics such as mean, median and confidence intervals directly from data sets, making it ideal for analyzing sales trends and customer preferences. When I need to calculate and display revenue trends or identify peak ordering times, Seaborn's linear regression model and time series support make trend analysis simple and intuitive.

6. Timeline

Planning (1-2 weeks): I initially thought about choosing to make up a project by my own thoughts.But I found it really hard to think of a mature project for commercial use.So I chose the first project,trying to make a framework for cafes and restaurants.Then I follow the following steps below to design my project: Define project scope Identify functional requirements Identify technology limitation.

Design (2 weeks): I tried to think of designing a series of databases for my framework.Setting up the elements in the database is the hardest thing to archive.Determine data relationships and integrity constraints also cost me a lot of time. Finally I finished up the databases and improved the stability and logistics of the framework.

Development (2 weeks): Making up the UI for my pages and try to make a concise draft for Mockups.



7.References