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ENGINEERING COLLEGE**

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Affiliated to ANNA UNIVERSITY, Chennai

QUICKBITE: RESTAURANT ORDERING SYSTEM

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BONAFIDE CERTIFICATE

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INTERNAL EXAMINER

EXTERNAL EXAMINER

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ABSTRACT

The Quickbite restaurant ordering system is an innovative digital platform designed to enhance the dining experience by allowing customers to order food in advance of their arrival. Accessible via various devices, Quickbite enables users to browse menus, customize orders, and make payments seamlessly. Upon placing an order, customers receive a QR code that contains details about their meal and bill amount, streamlining the process further. For restaurant staff, the system provides real-time order management and integration with kitchen display systems, improving operational efficiency and reducing errors. Additionally, Quickbite features analytical tools for tracking sales and managing inventory, facilitating data-driven decision-making. By automating the ordering process, Quickbite reduces wait times and improves service quality across dine-in, takeout, and delivery options. This versatile solution is adaptable to various restaurant formats, helping establishments stay competitive in a fast-evolving industry while fostering customer engagement and retention through integrated loyalty programs and marketing efforts. Overall, Quickbite aims to elevate customer satisfaction and enhance operational productivity, making it an invaluable asset for modern restaurants.

CHAPTER 1

INTRODUCTION

1.1 Introduction

The Quickbite Restaurant Ordering System (QROS) is an innovative digital platform designed to enhance the ordering experience in restaurants. By allowing customers to order food before arriving, QROS addresses common challenges such as long wait times and order inaccuracies. The system utilizes QR codes to provide users with their order details and bill amount, streamlining both the ordering and payment processes. Additionally, QROS integrates modern technologies to improve operational efficiency and provide valuable insights for restaurant management, ultimately elevating the overall dining experience.

1.2 Objective

The primary objective of the Quickbite Restaurant Ordering System (QROS) is to optimize the restaurant ordering process to improve both customer satisfaction and operational efficiency. This is achieved through:

Enhancing Customer Experience: By offering a user-friendly interface for browsing menus, placing orders, and tracking order status via QR codes, QROS significantly reduces wait times and enhances customer engagement.

Streamlining Operations: Automating order processing and payment handling minimizes manual errors and operational delays, allowing restaurant staff to allocate resources more effectively in both kitchen and service areas.

Providing Analytical Insights: By collecting and analyzing data on customer preferences and ordering patterns, QROS empowers restaurant management to make informed decisions regarding menu offerings, inventory management, and targeted marketing strategies.

1.3 Modules

The QROS is composed of several key modules, each targeting specific elements of the ordering process:

Order Management

Order Placement: Facilitates seamless order entry via mobile devices or web interfaces, allowing customers to place orders before arriving at the restaurant.

Order Tracking: Provides real-time updates on order status for both customers and kitchen staff, enhancing communication and transparency.

QR Code Generation: Generates unique QR codes containing order details and billing information, simplifying the payment process.

Menu Management

Dynamic Menu Display: ensuring customers have access to the latest offerings.

Customization Options: Enables customers to tailor their orders according to preferences and dietary restrictions, improving satisfaction.

Payment Processing

Multiple Payment Methods: Supports a variety of payment options, including credit/debit cards and mobile wallets, making transactions convenient for customers.

Secure Transactions: Ensures the secure handling of payment information through integration with reputable payment gateways.

Reporting and Analytics

Sales Reports: Generates detailed reports on sales performance, helping management analyze trends and make strategic decisions.

Customer Insights: Analyzes customer ordering behaviors to provide insights that inform marketing efforts and menu adjustments.

CHAPTER 2

SOFTWARE MODEL

2.1 AGILE MODEL

1. **Adaptability to Changing Requirements:** An online ordering system may require frequent updates to meet customer needs, adapt to trends, and add features like online payments, menu updates, or special promotions. Agile's iterative sprints allow for incremental changes, making it easier to adapt.
2. **Frequent User Feedback:** Agile's focus on continuous user involvement means that you can get feedback from potential users, restaurant owners, and other stakeholders during each sprint. This ensures that the system evolves based on real user needs.
3. **Rapid Deployment:** Agile encourages frequent releases, allowing you to deploy a Minimum Viable Product (MVP) with core functionalities and gradually build out new features. This approach helps get the product to market faster and adjust based on user interaction.
4. **Improved Collaboration:** If you're working with a team, Agile's structured communication and sprint planning enhance collaboration, making it easy to integrate inputs from different developers, designers, and testers.

CHAPTER 3

SURVEY OF TECHNOLOGIES

The Quickbite Restaurant Ordering System (ROS) streamlines the dining experience, allowing customers to order from a digital menu before arriving and facilitating efficient billing with a QR-based payment process. Below is a breakdown of the software components and architecture for Quickbite's ROS, which includes features for order management, data analytics, and a user-friendly interface.

3.1 Software Description

Component Description

Database Management - Uses SQLite to store menu details, orders, and payment statuses. Lightweight, self-contained, and easily integrates with Python.

Backend Logic - Developed with Python, which manages database operations, order processing, and component integration.

Frontend Interface - Tkinter is used for the restaurant's internal order management and staff interface, while the web-based pre-ordering system is built with a responsive web framework (such as Flask or Django for Python).

Payment Processing - Integrates with payment gateways (Stripe, PayPal) for secure transactions, utilizing QR codes for on-site payments.

Data Analytics - Tracks sales data, customer preferences, and order patterns to provide actionable insights and reports for management.

3.2 Languages and Frameworks

3.2.1 SQLite

SQLite is a reliable, file-based database management system integrated with Python's standard library. This serverless setup is ideal for Quickbite due to its simplicity and low resource requirements.

ACID Compliance: Ensures reliable transactions.

Cross-Platform: Works seamlessly across operating systems without additional configuration.

Usage in Quickbite: Database Connection: `sqlite3.connect('quickbite.db')`

Data Operations: SQL commands handle CRUD operations for menu items, orders, and customer details.

3.2.2 Python with SQLite

Python, known for its readability and versatility, is central to Quickbite's backend operations.

Extensive Libraries: Uses `sqlite3` for database management, `tkinter` for the GUI, and potentially `Flask/Django` for web-based ordering.

Backend Logic: Python scripts handle order processing, database interactions, and integration with the QR-based payment system.

Example Usage in Quickbit

Database Operations: CRUD operations to manage menu items and orders

Order Management: Real-time updates to order statuses, including preparation, serving, and completed statuses.

3.2.3 Tkinter

Tkinter, a built-in Python GUI toolkit, offers a streamlined interface for Quickbite's on-site order management.

Built-in and Lightweight: No external installation is required.

Usage in Quickbite:

GUI Creation: Interface for staff to view and manage incoming orders.

Event Handling: Functions to handle user actions, such as updating order status or generating bills.

Real-Time Updates: Displays active orders and tracks their status.

Additional Components for Quickbite

3.3. Web-Based Pre-Ordering Interface

For pre-ordering, a mobile-friendly, web-based application displays the menu, allowing users to select items and customize their orders before arriving.

Framework: Flask or Django can serve as the backend for the web interface, which integrates with the SQLite database.

Frontend: A responsive HTML/CSS/JavaScript setup ensures a seamless experience across devices.

Integration with Tkinter Backend: Orders placed online are updated in the Tkinter-based staff interface for seamless order processing.

3.4 QR Code Payment System

After dining, customers can pay by scanning a QR code generated by the system. This code links to a secure payment gateway.

QR Code Generation: Python's qrcode library generates unique codes linked to each bill.

Payment Gateway: Integrates with Stripe or PayPal for secure, contactless payments.

Usage in Quickbite: Staff generate a QR code for each order, which customers can scan and complete payment directly from their mobile device.

3.5 Analytics and Reporting

The system gathers data on customer orders, preferences, and sales trends.

Data Analysis: Aggregates order history to analyze high-demand items, peak hours, and customer preferences.

Reports for Management: Generates reports on inventory usage, sales volume, and popular menu items, aiding in data-driven decisions.

CHAPTER 4

REQUIREMENTS AND ANALYSIS

4.1 Functional Requirements

User Registration and Login

User Accounts: Allow customers to register and log in securely on the Quickbite website or app.

User Roles: Customers, kitchen staff, and administrators with defined permissions.

Pre-Arrival Ordering System

Menu Browsing: Display an interactive menu with categories (e.g., appetizers, main course) and filter options.

Order Placement: Enable customers to select items, customize (e.g., toppings, instructions), specify quantities, and add them to a pre-arrival order.

Order Modifications: Allow users to adjust orders before submission.

Real-Time Order Updates

Order Confirmation: Display estimated preparation times and an order confirmation screen once the user completes an order.

Kitchen Notifications: Notify kitchen staff of new orders, updating with real-time status changes for seamless processing.

Order Tracking: Let users see their order status, from "In Progress" to "Ready for Pickup".

Billing and Payment with QR Code Generation

QR Code Billing: Generate a unique QR code at the end of the dining session for each table, which the customer scans to complete payment.

Flexible Payment Options: Support payments through credit/debit cards, mobile wallets, and direct bank transfers.

Order History and Analytics

Customer History: Customers can view past orders and re-order favorite items.

Administrative Reports: Enable administrators to access sales reports, popular items, peak hours, and inventory insights.

Non-Functional Requirements

Performance

The system should handle multiple users ordering and tracking their meals concurrently with minimal delay.

Database queries should be optimized for quick retrieval, especially during peak dining hours.

Scalability

Design the backend to support scaling horizontally, so it can handle increased numbers of orders and user sessions as the restaurant grows.

Usability

Ensure an intuitive, user-friendly interface that works smoothly on both desktop and mobile devices.

Offer a streamlined ordering process with clear visuals and navigation. Security

Encrypt sensitive information, including user credentials and payment details, with secure protocols like HTTPS and SSL/TLS.

Implement robust authentication and authorization for various user roles.

Protect against vulnerabilities such as SQL injection, cross-site scripting (XSS), and cross-site request forgery (CSRF).

Maintainability

Write modular, reusable code with extensive comments and documentation for ease of maintenance.

Implement comprehensive testing (unit, integration, and user acceptance tests) to ensure reliability.

System Components

Hardware Requirements

Server Components

Database Server: Use MySQL or PostgreSQL for data management, with a server equipped with an Intel Xeon or AMD Ryzen processor, 16 GB RAM, and a 500 GB SSD.

Web Server: Apache or Nginx to handle web traffic, coupled with an application server running Node.js, Django, or Spring Boot for business logic.

Operating System: Linux (Ubuntu or CentOS) for stability, or Windows Server for compatibility.

Client Devices

Tablets for Waitstaff: Android or iOS tablets with a quad-core processor, 2 GB RAM, and 7–10-inch screen for viewing orders.

POS Terminals: Terminals with Intel Core i3 processor, 4 GB RAM, and a 128 GB SSD, touchscreen, and support for peripherals like receipt printers and barcode scanners.

Network Components

Router and Switches: High-speed router with Quality of Service (QoS) for prioritizing traffic, and Gigabit Ethernet switches for reliable wired connections.

Wi-Fi Access Points: High-performance Wi-Fi access points to cover all areas, ensuring seamless connectivity

4.2 Software Requirements

Server Software

Database: MySQL or PostgreSQL for database management.

Web and Application Servers: Apache or Nginx for the web server; Node.js, Django, or Spring Boot for business logic.

Security: SSL/TLS certificates for secure data transmission.

Client Software

Website and Mobile App: Custom app for Android/iOS for order placement and viewing order history.

POS Software: Windows-based application to manage orders, payments, and inventory for in-store staff.

Security: UFW or Windows Firewall, and antivirus software for protection against cyber threats.

QR Code Generation and Payment Gateway Integration

Integrate a payment gateway like Stripe or PayPal for secure transactions.

Use a QR code library (such as qrcode in Python) to generate payment QR codes dynamically for each customer's bill.

Development and Deployment Tools

Version Control and CI/CD

Git for source code management, with repositories hosted on GitHub or GitLab.

Jenkins or GitHub Actions for automated testing and deployment pipelines.

Containerization and Orchestration

Docker for containerization to run services consistently across environments. Kubernetes for orchestrating containerized applications in a clustered environment. Monitoring and Logging

Prometheus and Grafana for monitoring system health and resource usage.

ELK Stack (Elasticsearch, Logstash, Kibana) for centralized logging and log analysis.

Backup and Recovery

Regular database backups with tools like mysqldump or pg_dump, stored securely on cloud storage or external drives for data protection.

User Training and Documentation

Training Programs

Provide hands-on training sessions for waitstaff, administrators, and kitchen staff to familiarize them with Quickbite.

Develop a training module for customer-facing features to assist users in placing and tracking orders on their own devices.

4.3 Documentation

User Manuals for customer, kitchen staff, and administrators with step-by-step guides.

Technical Documentation detailing system architecture, APIs, and integrations for developers and IT support.

SQL Training Documentation with exercises on queries, joins, indexing, and optimization practices for administrators who manage the database.

This specification ensures that Quickbite will be efficient, secure, and highly usable for a streamlined ordering experience from start to finish. It enables customers to view menus, place orders, and make secure payments with a final QR code—offering convenience and efficiency for both customers and restaurant staff.

CHAPTER - 5

5. ARCHITECTURE DIAGRAM:

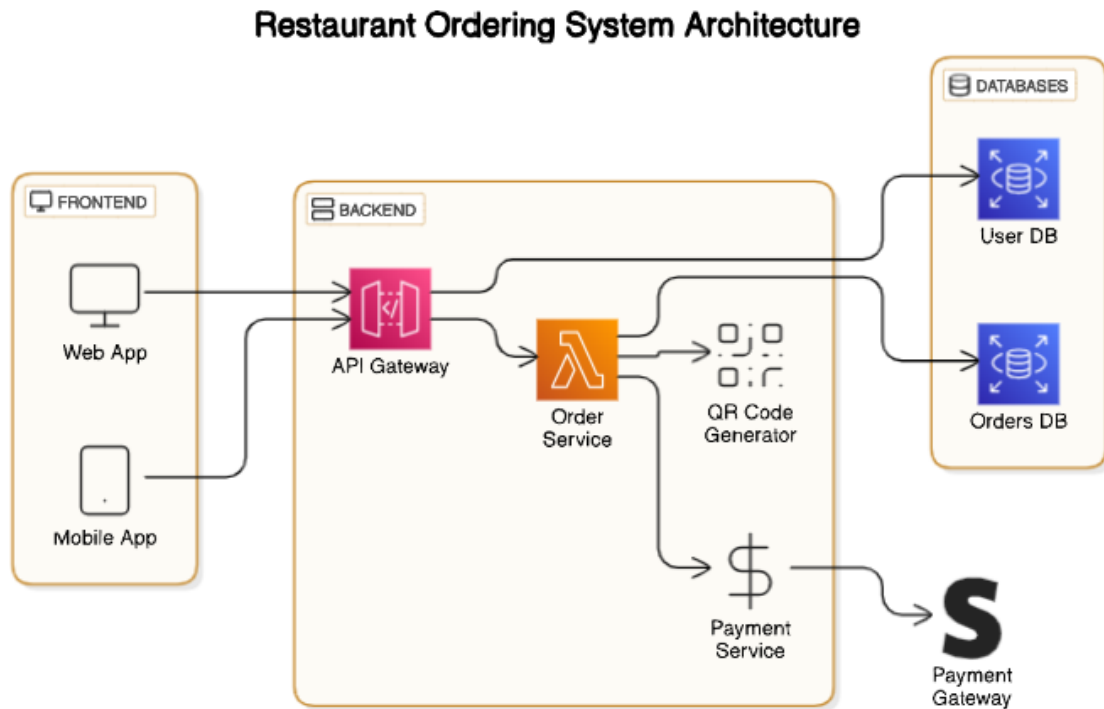


FIG 5.1 - ARCHITECTURE DIAGRAM FOR RESTAURANT ORDERING SYSTEM

Architecture Diagram for Restaurant Ordering System

Overview

Quickbite Restaurant Ordering System was built to enable online orders through web and mobile applications. It includes a frontend interface that communicates with the backend service layer and a database layer to handle order and user information. Additionally, it has a payment gateway and QR code generation service to ease the ordering and payment process.

1. Frontend Layer

Complete-Website App: A web-based application that enables the customer to view the menu, order meals, and manage their account.

Mobile App: An app that is capable of performing the same functions as its web counterpart, optimized for mobile devices.

The frontend is a primary interface, with which users interact with the system, supporting web and mobile environments.

2. Backend Layer

API Gateway: It is an entry point for all requests from the front end. It applies routing to dispatch the requests to appropriate back-end services and, thus, it provides a secured and scaled way to communicate.

Order Service: Satisfy all order services through the placement of orders, order updates, and status. It will place an order by passing the processed data to the database and payment service.

Payment Service: Handles secure transactions through integration with a third-party payment gateway.

QR Code Generator: Generates a QR code for orders that can be used for tracking, confirming order pickup, or in-store validation.

3. Database Layer

Database of Orders: This database keeps track of all customer orders and includes data like items, quantities, status, and timestamps.

User Database: Stores user information such as personal information, user preferences, and authentication information. The database is responsible for managing users' accounts and sessions.

The database layer provides data persistence, enabling the storage and recuperation of orders and user data across sessions.

4. Payment Gateway

The payment gateway works with the payment service to facilitate secure payment.

5.2 DATA FLOW DIAGRAM:

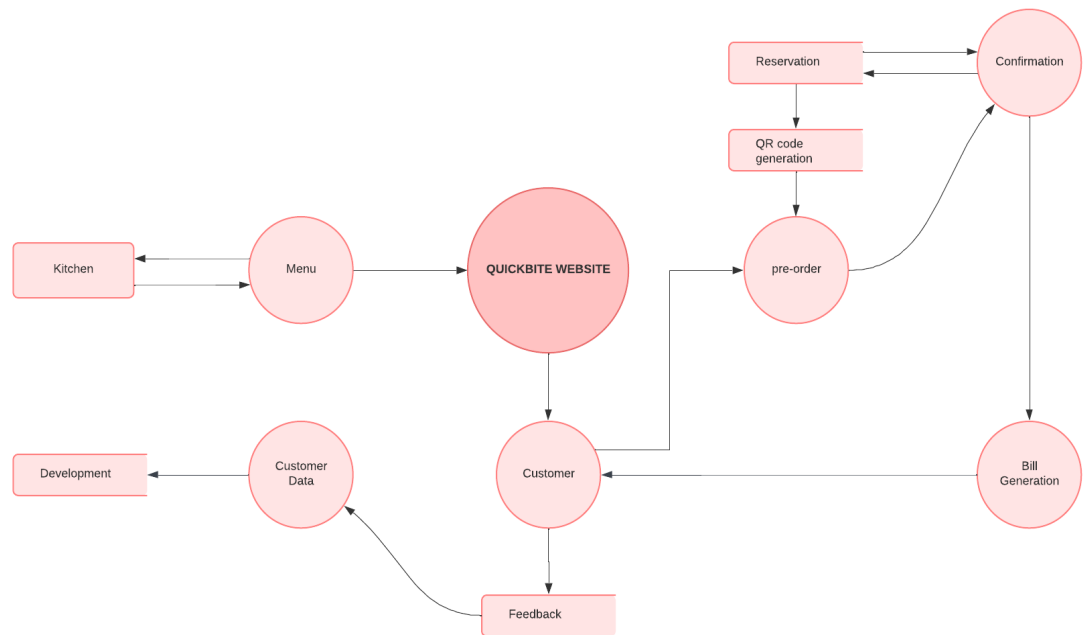


FIG 5.2 DATA FLOW DIAGRAM FOR RESTAURANT ORDERING SYSTEM

Data Flow Diagram for Restaurant Ordering System

Overview

The Quickbite website system is designed to handle a streamlined customer ordering experience for a restaurant. It supports functions like reservation, pre-ordering, and feedback, and it integrates with essential back-office components, such as menu management, billing, and kitchen operations.

1. Customer Interaction

Quickbite Website: Serves as the main customer interface for browsing the menu, placing orders, making reservations, and providing feedback.

Customer: The central user of the system who interacts with different components to complete their dining experience.

The website enables seamless navigation and interaction with other system components, offering an intuitive customer experience.

2. Reservation and Pre-Order Process

Reservation: Allows customers to reserve a table in advance, which initiates the pre-order process.

QR Code Generation: Once a reservation is confirmed, a QR code is generated for identification and efficient order processing.

Pre-order: Customers can place pre-orders, linking them to their reservations and allowing for timely preparation.

These components ensure that customers have a smooth reservation and ordering experience, reducing wait times and improving service efficiency.

3. Order Confirmation and Billing

Confirmation: After a reservation or pre-order, the customer receives a confirmation, ensuring they are aware of their order status.

Bill Generation: Following order confirmation, the system generates the bill, which will be presented to the customer after their dining experience.

This part of the system facilitates the transition from order to payment, ensuring a clear and concise flow for the customer.

4. Menu and Kitchen Operations

Menu: Contains all items available for ordering and is dynamically updated to reflect real-time availability.

Kitchen: Receives orders directly from the menu, allowing chefs to prepare dishes based on customer choices.

By linking the menu with the kitchen, the system ensures that customer orders are efficiently communicated to the back-end staff.

5. Customer Data and Development

Customer Data: Stores relevant data about customer preferences, past orders, and personal information to enhance the ordering experience.

Development: In charge of system improvements, updates, and incorporating feedback to refine the customer experience.

This section supports ongoing system development and personalizes the customer experience by leveraging stored data.

6. Feedback Collection

Feedback: Collects customer input on their dining experience, which is used to improve services and address any issues.

The feedback mechanism provides valuable insights into customer satisfaction and areas for improvement.

This architecture provides an integrated approach to managing restaurant orders, from reservations to feedback collection, ensuring that customers have a seamless and satisfying experience with the Quickbite website.

CHAPTER 6

PROGRAM CODE

```
import tkinter as tk
from tkinter import messagebox
import qrcode
from PIL import Image, ImageTk
import datetime

def get_menu():
    current_hour = datetime.datetime.now().hour
    if current_hour < 12:
        return {
            "Main Dishes": {
                "Idli": 30.00,
                "Dosa": 40.00,
                "Masala Dosa": 50.00,
                "Upma": 35.00,
                "Pongal": 40.00,
                "Vada": 20.00,
            },
            "Side Dishes": {
                "3 varieties of Chutney": 0.00,
                "Sambar": 0.00,
                "Vadacurry": 0.00,
                "Tea": 15.00,
                "Coffee": 20.00,
            }
        }
    elif current_hour < 16:
        return {
```



```

    "Main Dishes": {
        "Sambar Rice": 60.00,
        "Fried Rice": 70.00,
        "Curd Rice": 50.00,
        "Parotta with Curry": 80.00,
        "Chicken Biryani": 230.00,
        "Mutton Biryani": 250.00,
        "Fish Biryani": 190.00,
        "Vegetable Biryani": 120.00,
        "Pulao": 80.00,
    },
    "Side Dishes": {
        "Raita": 0.00,
        "Papad": 0.00,
        "Salad": 0.00,
        "Pickle": 0.00,
        "Paneer Butter Masala": 150.00,
        "Chicken Butter Masala": 225.00,
        "Kadai Chicken": 180.00,
        "Chicken Chettinadu Gravy": 175.00,
        "Mutton Chukka": 180.00,
    }
}

elif current_hour < 19:
    return {
        "Main Dishes": {
            "Samosa": 15.00,
            "Pani Puri": 10.00,
            "Bhaji": 20.00,
            "Bhelpuri": 25.00,
        },

```

```

        "Side Dishes": {
            "Tea": 15.00,
            "Coffee": 20.00,
            "Chutney": 0.00,
        }
    }
else:
    return {
        "Main Dishes": {
            "Naan": 25.00,
            "Butter Naan": 25.00,
            "Vegetable Biryani": 100.00,
            "Chole Bhature": 80.00,
            "Parotta": 25.00,
            "Egg Curry": 120.00,
            "Fish Curry": 180.00,
        },
        "Side Dishes": {
            "Kadai Chicken": 180.00,
            "Chicken Chettinadu Gravy": 175.00,
            "Mutton Chukka": 180.00,
            "Paneer Butter Masala": 150.00,
            "Chicken Butter Masala": 225.00,
            "Gulab Jamun": 0.00,
            "Raita": 0.00,
            "Salad": 0.00,
        }
    }

```

```

class FoodOrderingApp:
    def __init__(self, master):

```

```

self.master = master

master.title("Quickbite Food Menu")

master.geometry("400x600")

master.config(bg="#f0f8ff")

title_label = tk.Label(master, text="Quickbite Food Menu", font=("Helvetica", 18,
"bold"), bg="#f0f8ff", fg="#333")

title_label.pack(pady=10)

self.label = tk.Label(master, text="Select your food and quantity:",
font=("Helvetica", 14), bg="#f0f8ff")

self.label.pack(pady=5)

self.menu = get_menu()

self.selected_foods = []

self.menu_frame = tk.Frame(master, bg="#f0f8ff")

self.menu_frame.pack(pady=10)

self.food_vars = { }

for category, items in self.menu.items():

    category_label = tk.Label(self.menu_frame, text=category, font=("Helvetica", 16,
"bold"), bg="#f0f8ff", fg="#006400")

    category_label.pack(pady=5)

    for food, price in items.items():

        food_frame = tk.Frame(self.menu_frame, bg="#f0f8ff")

        food_frame.pack(anchor=tk.W, pady=2)

        var = tk.BooleanVar()

        quantity_var = tk.IntVar(value=1)

        self.food_vars[food] = (var, price, quantity_var)

        check_button = tk.Checkbutton(food_frame, text=f"{food} - ₹{price:.2f}" if
price > 0 else f"{food} (Free)", variable=var, bg="#f0f8ff", font=("Helvetica", 12))

        check_button.pack(side=tk.LEFT)

        quantity_entry = tk.Entry(food_frame, textvariable=quantity_var, width=5,
font=("Helvetica", 12))

        quantity_entry.pack(side=tk.LEFT, padx=5)

self.proceed_button = tk.Button(master, text="Proceed",

```

```

command=self.proceed_order, font=("Helvetica", 14), bg="#4CAF50", fg="white")

self.proceed_button.pack(pady=20)

def proceed_order(self):

    self.selected_foods = [food for food, (var, price, qty) in self.food_vars.items() if
var.get()]

    if not self.selected_foods:

        messagebox.showwarning("No Selection", "Please select at least one food item.")

        return

    order_details = "\n".join([

        f"{food} - ₹{self.food_vars[food][1] * self.food_vars[food][2].get():.2f} (Qty:
{self.food_vars[food][2].get()})"

        if self.food_vars[food][1] > 0 else f"{food} (Free)"

        for food in self.selected_foods

    ])

    total_price = sum([self.food_vars[food][1] * self.food_vars[food][2].get() for food
in self.selected_foods if self.food_vars[food][1] > 0])

    order_summary = f"Order:\n{order_details}\n\nTotal: ₹{total_price:.2f}"

    self.generate_qr_code(order_summary)

def generate_qr_code(self, order_details):

    qr = qrcode.QRCode(

        version=1,

        error_correction=qrcode.constants.ERROR_CORRECT_L,

        box_size=10,

        border=4,

    )

    qr.add_data(order_details)

    qr.make(fit=True)

    img = qr.make_image(fill='black', back_color='white')

    img.save("qr_code.png")

```

```

        self.show_qr_code()
def show_qr_code(self):
    qr_window = tk.Toplevel(self.master)
    qr_window.title("Your QR Code")
    qr_image = Image.open("qr_code.png")
    qr_photo = ImageTk.PhotoImage(qr_image)
    qr_label = tk.Label(qr_window, image=qr_photo)
    qr_label.image = qr_photo
    qr_label.pack()
    done_button = tk.Button(qr_window, text="Done", command=qr_window.destroy,
font=("Helvetica", 12), bg="#4CAF50", fg="white")
    done_button.pack(pady=10
) if __name__ == "__main__":
    root = tk.Tk()
    app = FoodOrderingApp(root)
    root.mainloop()

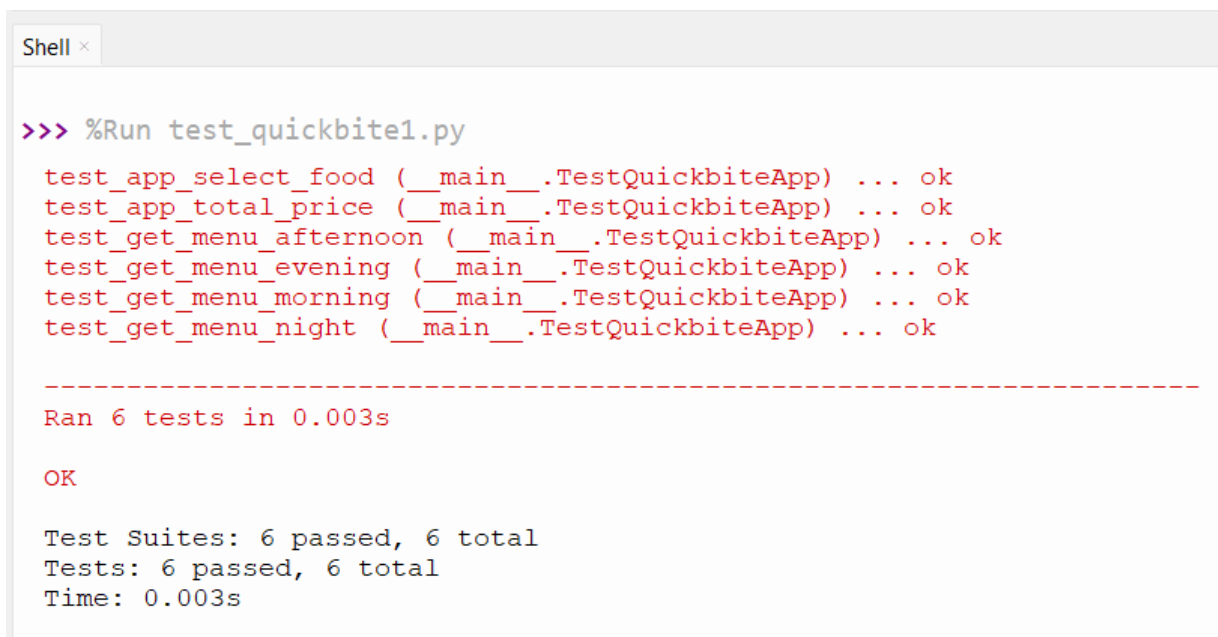
```

CHAPTER 7

TESTING

7.1 UNIT TESTING

Unit testing is a software testing method where individual components, or "units," of a program are tested independently to ensure that each one functions correctly. Typically focused on small, isolated parts of code, such as functions or methods, unit tests help identify issues early in development, making it easier to locate and fix bugs. By running these tests, developers can verify that each unit performs as expected with various inputs, producing accurate outputs. Unit testing often uses frameworks like JUnit (for Java), NUnit (for .NET), or PyTest (for Python) to automate and simplify the process, which not only improves code quality but also enables rapid feedback for continuous integration. This approach ultimately helps to build a reliable codebase, as units are validated individually before integration, minimizing the risk of system-wide errors.



```
Shell x

>>> %Run test_quickbite1.py

test_app_select_food (__main__.TestQuickbiteApp) ... ok
test_app_total_price (__main__.TestQuickbiteApp) ... ok
test_get_menu_afternoon (__main__.TestQuickbiteApp) ... ok
test_get_menu_evening (__main__.TestQuickbiteApp) ... ok
test_get_menu_morning (__main__.TestQuickbiteApp) ... ok
test_get_menu_night (__main__.TestQuickbiteApp) ... ok

-----
Ran 6 tests in 0.003s

OK

Test Suites: 6 passed, 6 total
Tests: 6 passed, 6 total
Time: 0.003s
```

FIG 5.2 UNIT TESTING

CHAPTER 8

RESULTS AND DISCUSSION

8.1 DATABASE DESIGN:

Functional System Design and Testing:

The Quickbite restaurant ordering system was designed to replicate real-world restaurant operations. Core functionalities, including menu management, order processing, customer data handling, and order tracking, were thoroughly tested to ensure reliability. The system successfully simulated a typical restaurant setup, allowing for end-to-end testing of all features critical to real-world usage.

User Interface:

The web-based interface, developed using Python (with Flask as the primary framework), was designed to be intuitive and straightforward. Both customers and restaurant staff found it easy to navigate, requiring minimal training. This user-centered design helped reduce the learning curve, allowing staff to quickly become proficient in using the system.

Database Performance:

Quickbite's SQL database (using MySQL) efficiently handled data for orders, inventory, customers, and menu items. Database queries were optimized for fast data retrieval, ensuring quick response times even during high traffic. CRUD operations were handled seamlessly, allowing the system to manage high volumes of transactions smoothly.

Real-Time Updates:

The system offered real-time order and inventory status updates, enabling staff to monitor orders and ingredient availability instantly. This feature improved communication between front-of-house and kitchen teams, reducing wait times and enhancing operational flow. Orders updated dynamically, helping staff manage and fulfill orders efficiently during peak times.

Reporting and Analytics:

Quickbite generated detailed reports on sales trends, popular items, inventory usage, and customer behavior. These insights helped management make informed decisions on menu adjustments, stock replenishments, and marketing strategies. Analytics also provided valuable data to aid in understanding customer preferences and optimizing restaurant performance.

Data Integrity and Security:

Data integrity was maintained through SQL transactions and constraints to ensure accurate records. Security protocols, including user authentication and role-based access control, were implemented to protect sensitive data. These measures effectively safeguarded customer information and restricted access to authorized personnel only.

Scalability and Performance:

The Quickbite system was designed with scalability in mind, allowing for future module additions and features. Performance testing showed it could handle high transaction volumes without significant delays, ensuring reliability during peak hours. Scalability enables the system to grow alongside the restaurant's operational needs.

Challenges and Solutions:

One challenge was integrating Quickbite with existing restaurant software, which was resolved by creating custom APIs to facilitate data exchange. Data synchronization during high traffic periods also posed difficulties; this was addressed through database indexing and query optimization, improving system responsiveness.

Future Enhancements:

Based on feedback, planned enhancements include mobile ordering, advanced analytics, and AI-driven recommendations for personalized customer experiences. These improvements aim to enhance Quickbite's functionality, positioning it as a comprehensive solution for modern restaurant operations.

8.2 OUTPUT:



FIG 8.1: QR CODE

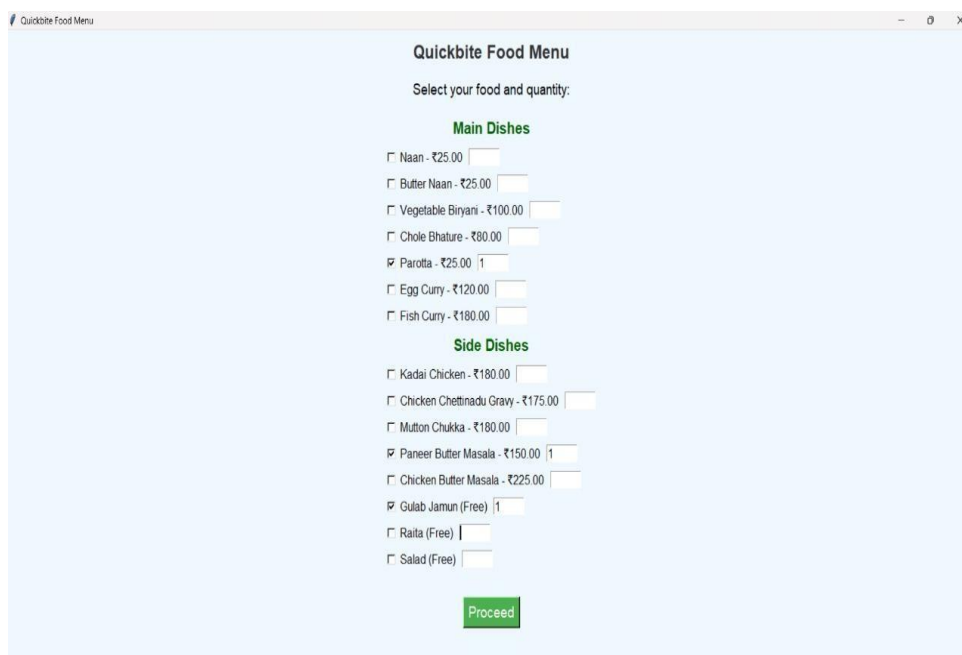


FIG 8.2: QUICKBITE FOOD MENU

Result



QR code details:

Order:

Parotta - ₹25.00 (Qty: 1)

Paneer Butter Masala - ₹150.00 (Qty: 1)

Gulab Jamun (Free)

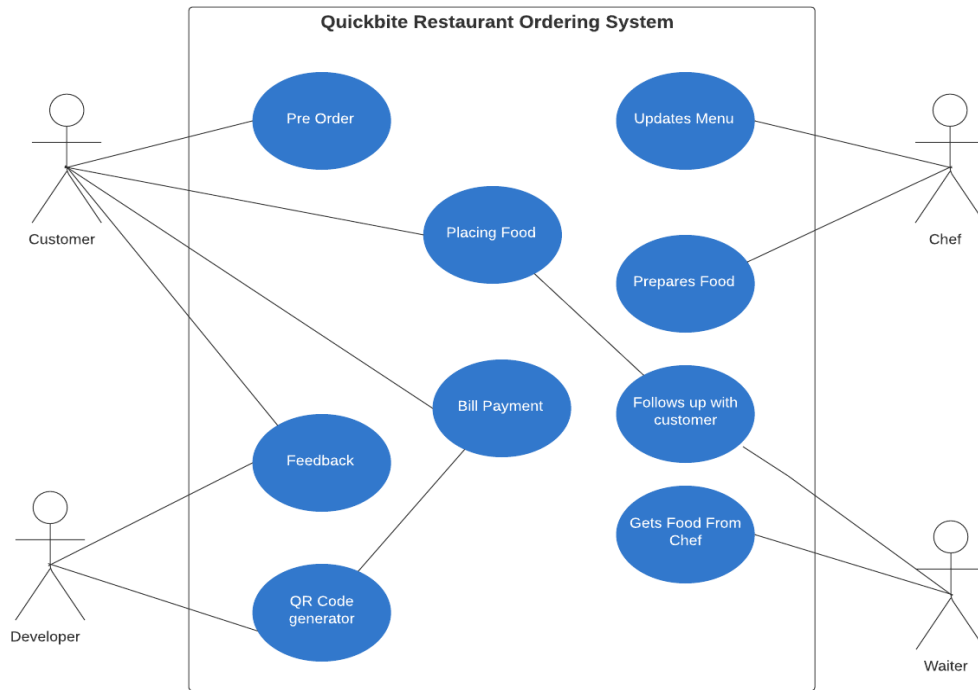
Total: ₹175.00

FIG 8.3: BILL PAYMENT

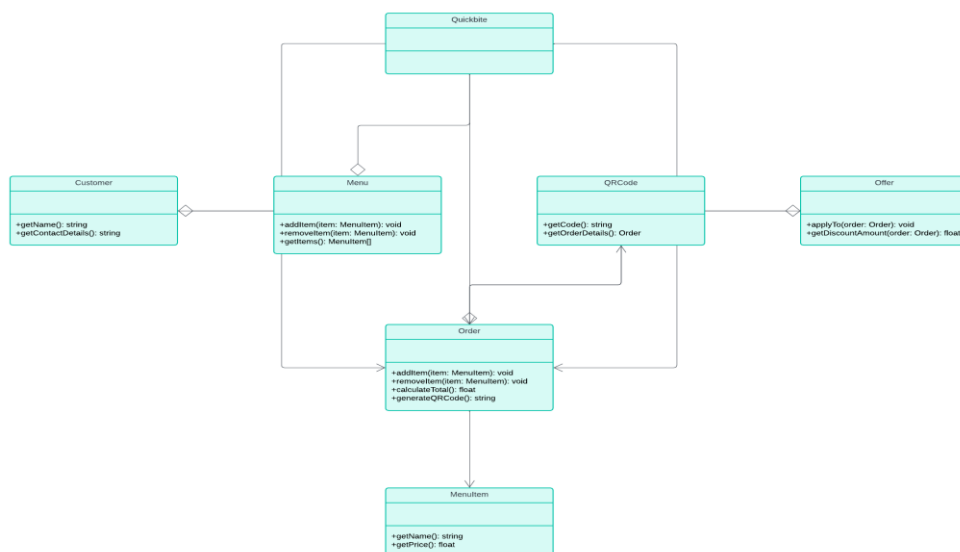
CHAPTER 9

UML DIAGRAMS

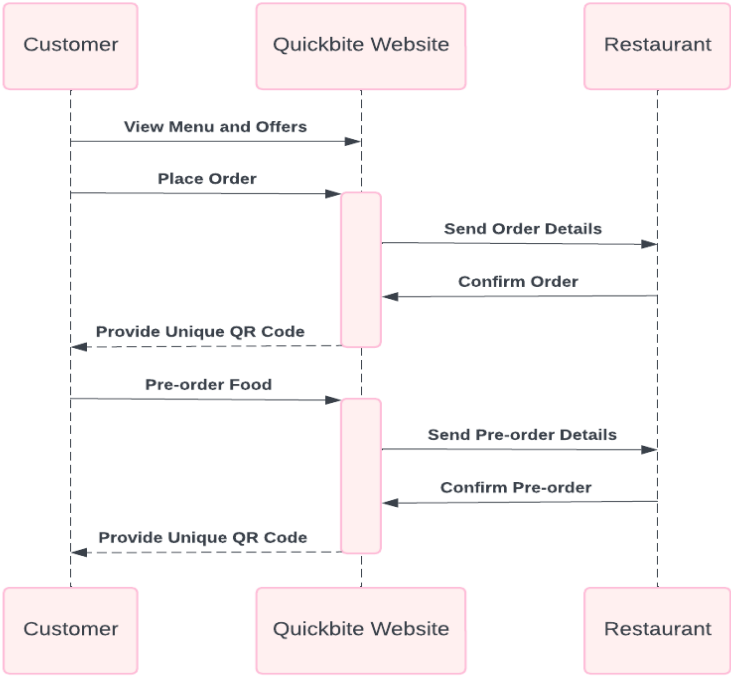
9.1 USE CASE DIAGRAM



9.2 CLASS DIAGRAM



9.3 SEQUENCE DIAGRAM



CHAPTER 10

FUTURE SCOPE

AI-Powered Personalized Recommendations: Quickbite can use AI to analyze customer order histories, time patterns, and preferences to offer personalized menu recommendations. This feature would enhance customer satisfaction by suggesting meals tailored to individual tastes. Moreover, AI could analyze popular items and recommend combinations that increase sales. Quickbite could improve user engagement by promoting new or seasonal items. This would generate revenue for Quickbite by matching individual tastes with specific menu offers. It promotes customer loyalty through consistent, tailored experience.

Real-Time Order Status and Updates: Quickbite can provide real-time update status for customers to understand the status of their preparation from preparation to readiness while being integrated with kitchen system updates. Customers will get expected completion times, which should enhance transparency and reduce felt wait times. This allows the staff to coordinate their workflow effectively by coordinating it with the times that the customers arrive. Monitoring of orders increases the enjoyment at the dining table, thus decreasing the probability of delay. This also helps increase satisfaction because uncertainty is eliminated for the patrons as well as the staff.

More functionality in QR Codes: The order and billing information that a QR code contains can be augmented using secure payment methods for quick payments. The customers would scan the QR code which will enable them to effect payment from their mobile phones directly. This can also include loyalty rewards, where customers gain points per visit. It makes the experience smooth by consolidating ordering, billing, and payment in one go. For restaurants, it streamlines payments and enhances user experience. User engagement is strengthened with QR-based interactions through simplified transactions.

Advanced Analytics for Restaurant Insights: Quickbite can develop a Advanced analytics dashboard where managers could monitor customer behavior, peak times, and popular items. Data-driven insights help improve staffing and inventory management in predicting busy periods. From the analysis of customer preference, restaurants can tailor promotion and adjust offerings effectively.

Marketing strategies and seasonal adjustments become possible through analytics. With this level of analysis, data-backed decision-making drives sustained growth. Advanced analytics enable Quickbite to adapt quickly to changing market demands.

Multi-Platform Accessibility and Integration: The multiple accessibility approach will help in reaching numerous platforms like smartphones, tablets, and voice assistants so that it is easily ordered hands-free using Alexa or Google Home. Accessing various devices helps meet the varying preferences of individuals to an easier experience on all devices. Smart technology integration makes it appealing to people using much high technology. The more accessible the multiple platform application is to busy customers at their pace. Extending Quickbite to more clients provides a better avenue in convenience and engagement with most customers.

Benefits and Impacts:

Enhanced Convenience: Quickbite allows customers to place orders before arriving at the restaurant, significantly reducing wait times and streamlining the dining experience. The QR code system for orders and bills further simplifies the process.

Increased Customer Engagement: By enabling users to browse menus and make informed decisions in advance, Quickbite fosters greater customer engagement, which can lead to increased satisfaction and loyalty.

Improved Operational Efficiency: The system enhances communication between kitchen and front-of-house staff, providing real-time updates on order statuses and ingredient availability, thus improving coordination and overall efficiency.

Data-Driven Insights: Quickbite collects valuable data that can be analyzed to gain insights into customer preferences and ordering patterns, informing menu adjustments and promotional strategies.

11. CONCLUSION:

Quickbite restaurant ordering system is an innovative order-takings system, implemented by using Python and SQL that allows the customer to conveniently pre-order their meal over the web. On the web platform, they will be able to make the choice of meals for them before arriving, hence getting ready on time once a customer orders their meals online. A customer would be provided with a QR code detailing their food order and amount on the bill once their meal is ordered, giving convenience to customers with good services.

The system is engineered to enhance the order's operational efficiency in real-time. It sends the orders into the kitchen automatically, which decreases time lag, and proper, timely food preparation leads to smooth workflow with waiting times decreased. Quickbite organizes and stores all order details with SQL's powerful data management capabilities in a structured manner that is secure, scalable, and reliable.

Besides performance enhancements, Quickbite also equips with comprehensive analytics and reporting. Restaurant managers will have actionable information regarding the best-selling items, timing of when people are ordering peak periods and revenue cycles-all these contribute to better planning for inventory management and other strategic aspects.

Moreover, the platform is built on a scale, meaning capabilities might easily be extended for any added functionality or supporting the changing nature of growth.

Utilizing the Power of Python at the application back end and SQL for the database management, Quickbite adapts modern database management with web usability designed to be easily made by providing a seamless experience for its customers. The QR code functionalities not only make payment easier but also provide an order in the most convenient and safest manner by creating an example of digital solution usage in the restaurant business.

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