
ACROPOLIS INSTITUTE OF TECHNOLOGY & RESEARCH

Department of Computer Science & Engineering (Data Science)

Synopsis

on

CampusBytes: Smart Token Canteen System

1. INTRODUCTION

1.1 Overview

CampusBytes is a token-based digital food ordering system designed specifically for college canteens to streamline the food ordering process and enhance the overall dining experience. The system digitizes the entire workflow from menu browsing to food pickup, eliminating long queues, reducing order misplacements, and optimizing resource allocation. It includes a user-friendly interface for students, a kitchen management system for staff, and comprehensive analytics for administrators.

The platform operates on a token-based approach where students can browse the menu, place orders, make digital payments, and receive a unique token number. This token serves as an identifier for their order, allowing them to track its status in real-time and collect their food when ready without unnecessary waiting.

1.2 Purpose

The primary purpose of CampusBytes is to solve the common challenges faced in college canteens, including:

- 1. Queue Reduction:** Minimize long waiting lines during peak hours by allowing pre-ordering and scheduled pickups.

2. Order Accuracy: Eliminate miscommunication and order mixups between students and canteen staff.

3. Resource Optimization: Enable better planning and resource allocation for canteen staff based on order forecasting.

4. Payment Efficiency: Streamline payment processes through digital transactions, reducing cash handling and associated errors.

5. Time Management: Help students manage their limited break times more effectively by reducing wait times.

6. Enhanced User Experience: Provide a modern, technology-driven approach to campus dining that meets student expectations.

The system aims to create a win-win situation for all stakeholders: students benefit from faster service and better food quality, canteen staff can operate more efficiently, and the institution benefits from improved student satisfaction and reduced operational issues.

2. LITERATURE SURVEY

2.1 Existing Problem

Current college canteen systems face several challenges that impact efficiency and user satisfaction:

1. RESTROFUN: Canteen Automation System: The RESTROFUN system has certain limitations and challenges that need to be addressed for improved efficiency and usability.

1. **Lack of Digital Payment Integration:** The system does not explicitly mention integration with UPI, credit/debit cards, or e-wallets, which are widely used for cashless transactions.

2. Lack of Pre-Order Option: The system focuses only on instant order placement, without allowing customers to reserve tables or schedule orders in advance.

2. Canteen Automation System: The Canteen Automation System has several limitations that need to be addressed for future improvements.

1.Limited to Registered Users: Only students and faculty members with a valid login can access the system. Visitors and guests cannot place orders, limiting usability in open cafeterias.

2.Security Risks: The system stores user credentials and payment details, which could be vulnerable to cyber threats if not properly secured.Data breaches or unauthorized access could lead to financial losses or privacy violations.

3. QR-based Canteen Management System: While the QR-based Canteen Management System improves efficiency and convenience, it also has some limitations and challenges that need to be addressed.

1. QR Code-Related Issues: If a customer loses or damages their QR code, they won't be able to log in or order food until the admin regenerates it. Scanning issues due to low camera quality or poor lighting may also lead to login failures.

Some more problems that other platform face are :

4. Order Tracking Limitations: Students have no visibility into the status of their orders, leading to confusion, repeated inquiries to staff, and occasional disputes.

5. Resource Allocation Challenges: Without data on ordering patterns, canteens struggle to appropriately staff shifts and prepare food quantities, resulting in either wastage or shortages.

6. Limited Feedback Mechanisms: Traditional systems lack structured ways to collect and analyze customer feedback, hindering continuous improvement.

Existing approaches to address these issues include:

1. Manual Token Systems: Physical tokens given after payment, which are inefficient and prone to loss

2. Buzzer Systems: Electronic notification devices that alert customers when orders are ready, but require hardware investment and maintenance

3. Basic POS Systems: Focus primarily on payment processing rather than the entire ordering experience

2.2 Proposed Solution

CampusBytes offers a comprehensive solution tailored specifically for college environments:

1. Integrated Digital Platform: A full-stack application with a responsive frontend using HTML/CSS/JavaScript and robust backend using Java Spring Boot and MySQL database.

2. Token-Based Order Management: Generation of unique alphanumeric tokens (e.g., CB20240223001) for each order with synchronization mechanisms to handle concurrent orders.

3. Multi-Channel Access: Both web and mobile-optimized interfaces ensuring accessibility across devices without requiring specialized hardware.

4. Real-Time Tracking: WebSocket implementation for live order status updates, eliminating uncertainty and reducing staff interruptions.

5. Digital Payment Integration: Secure payment processing with wallet functionality, transaction history, and automated reconciliation.

6. Queue Management Algorithm: FCFS (First-Come-First-Served) system with optimization for high-volume periods and special handling for scheduled orders.

7. Kitchen Display System: Staff interface for managing order preparation, with visual cues for priority and timing.

The solution is distinguished by its focus on the specific needs of educational institutions, scalability to handle varying loads, and integration capabilities with existing systems.

3. THEORETICAL ANALYSIS

3.1 Diagram

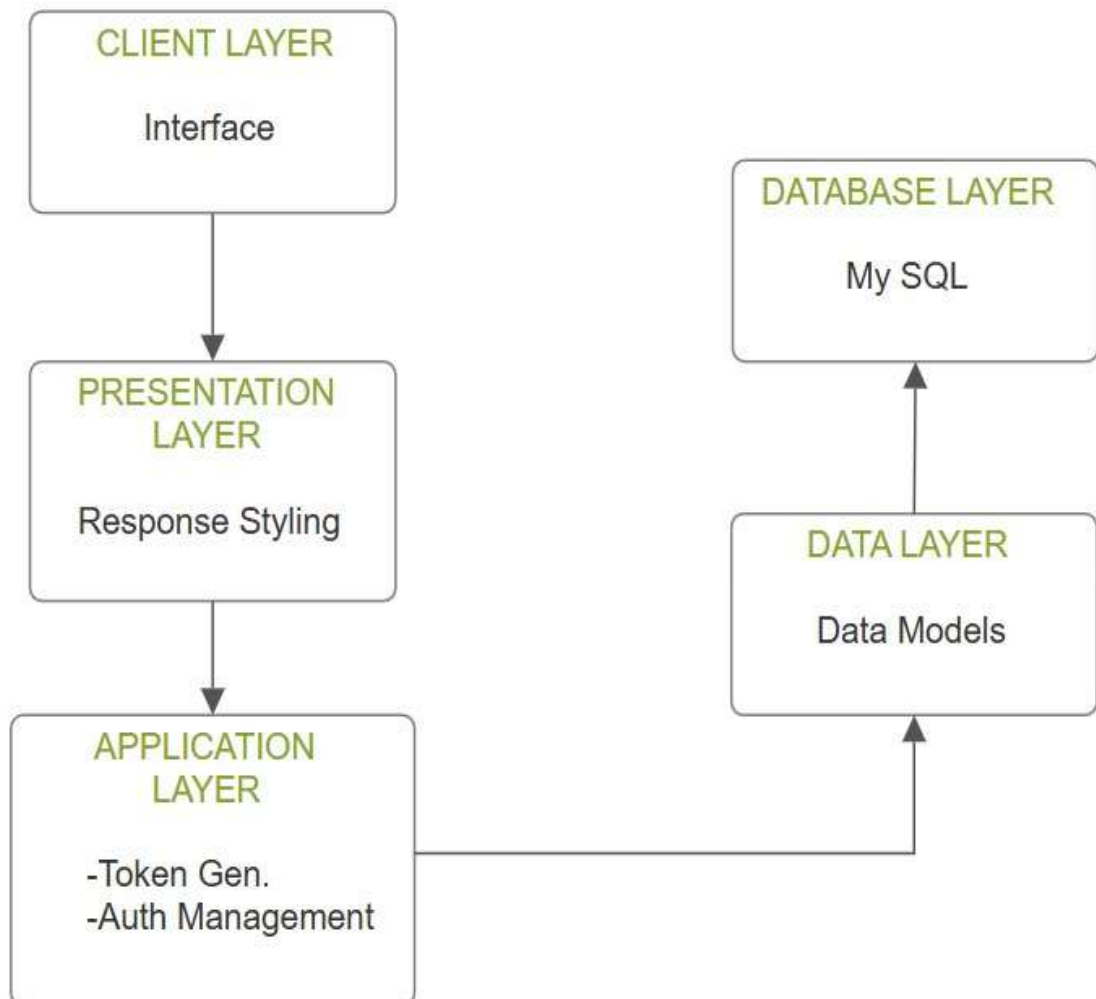


Fig.1 Diagram

Block Diagram Key Information Flows:

Student browses menu → Selects items → Adds to cart → Places order

Processes payment → System generates token → Notifies kitchen

Kitchen prepares food → Updates order status → Notifies student

Student collects food → Order marked complete → Data stored for analytics

3.2 Hardware/Software Design

3.2.1 Hardware Requirements:	
Processor	Intel Xeon or AMD Ryzen (4+ cores)
RAM	8GB
Storage	256GB
Client (Student Access)	Web browser
Kitchen Display	Monitor
Network Infrastructure	High-speed campus Wi-Fi coverage

3.2.2 Software Requirements:	
Development Environment	IDE (Eclipse, IntelliJ IDEA)
Framework	Spring Boot
Backend Technology	Java
Frontend Technologies	HTML / CSS, JavaScript
Database	MySQL

4.APPLICATIONS

1. Educational Institutions	School, College and university canteens
2. Corporate Environments	Office cafeterias and Corporate dining facilities
3. Healthcare Settings	Hospital cafeterias
4. Event Management	Conference, Campus events and festivals

5.REFERENCES

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Github ID:

<https://github.com/AnshikaBukhariya/CampusBytes>

Guided By:

Prof. Pawan Kumar Gupta

Group Members:

Anshika Bukhariya 0827CD221012

<https://github.com/AnshikaBukhariya>

Apoorv Betawadkar 0827CD221016

<https://github.com/Apoorv-0410>

Jay Chouksey 0827CD221038

<https://github.com/jaychouksey11>

Abhishek Mehto 0827CD233D01

<https://github.com/AbhishekMehto>