Restaurant Billing Management System Using C Programming

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Abstract:

This paper presents the design and development of a console-based Restaurant Billing Management System implemented in the C programming language. The project aims to streamline the ordering and billing processes in a restaurant, providing functionalities such as menu management, order handling, billing generation, and table tracking. Designed for simplicity and efficiency, the system offers a practical solution for restaurant staff to manage multiple tables simultaneously without requiring persistent storage. The project demonstrates foundational skills in structured programming, memory management, and real-time input handling.

Keywords: Restaurant management, C programming, billing system, menu handling, table tracking, console application

1. Introduction:

Restaurants often rely on manual processes for managing orders and generating bills, leading to inefficiencies and errors. This project addresses those issues by automating billing tasks through a user-friendly command-line interface. Implemented entirely in C, the system maintains in-memory data structures for real-time processing, enabling efficient table and order management for up to 50 tables.

2. Objectives:

- To design a menu-driven billing management system using C.

- To allow real-time addition of menu items and customer orders.

- To generate bills for individual tables with a total cost breakdown.

- To monitor the status of all active tables.

3. Methodology:

3.1 System Components:

- Menu Management: Allows admins to add/view food items. Each item has a unique ID, name, and price.

- Order Handling: Associates orders with tables. A table can have multiple orders with item ID and quantity.

- Billing Module: Computes the bill using quantity and price per item, presenting a readable format for printing.

- Table Tracking: Maintains table numbers, order status, and occupancy.

3.2 Data Structures:

- MenuItem struct: Represents an item in the menu.

- OrderItem struct: Captures item ID and quantity.

- Table struct: Maintains table number, list of orders, and occupancy status.

3.3 Flow of Execution:

1. The system initializes with predefined menu items.

2. User navigates a menu to:

    - Add new menu items

    - Place orders by specifying the table number, item ID, and quantity

    - Generate detailed bills

    - View all table statuses

3. Input validation and constraints ensure program stability.

3.4 Development Tools:

- Language: C (GCC compiler)

- IDE: Code::Blocks / VS Code

- Platform: Linux/Windows terminal

4. Results:

The implemented system allows users to:

- Seamlessly add and view menu items.

- Take multiple orders per table with quantity inputs.

- Print accurate, itemized bills.

- Track active and free tables effectively.

The system is robust for small to medium-sized restaurants, ensuring smooth restaurant operations.

5. Limitations:

- No persistent storage (all data is lost on program termination).

- No concurrency or multi-user access.

- Basic text-based UI without a graphical interface.

6. Future Enhancements:

- Integration with a database (e.g., SQLite or MySQL) for persistence.

- Addition of discounts, taxes, and service charges.

- Development of a graphical or web-based UI.

- Features like user login and role-based access.

7. Conclusion:

The Restaurant Billing Management System provides a foundational tool for managing food orders and billing in real-time. Despite its simplicity, it demonstrates the effective use of structured programming in C for building practical applications. It is an excellent base for further expansion into full-fledged POS systems.

8. References:

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