SE Lab-3

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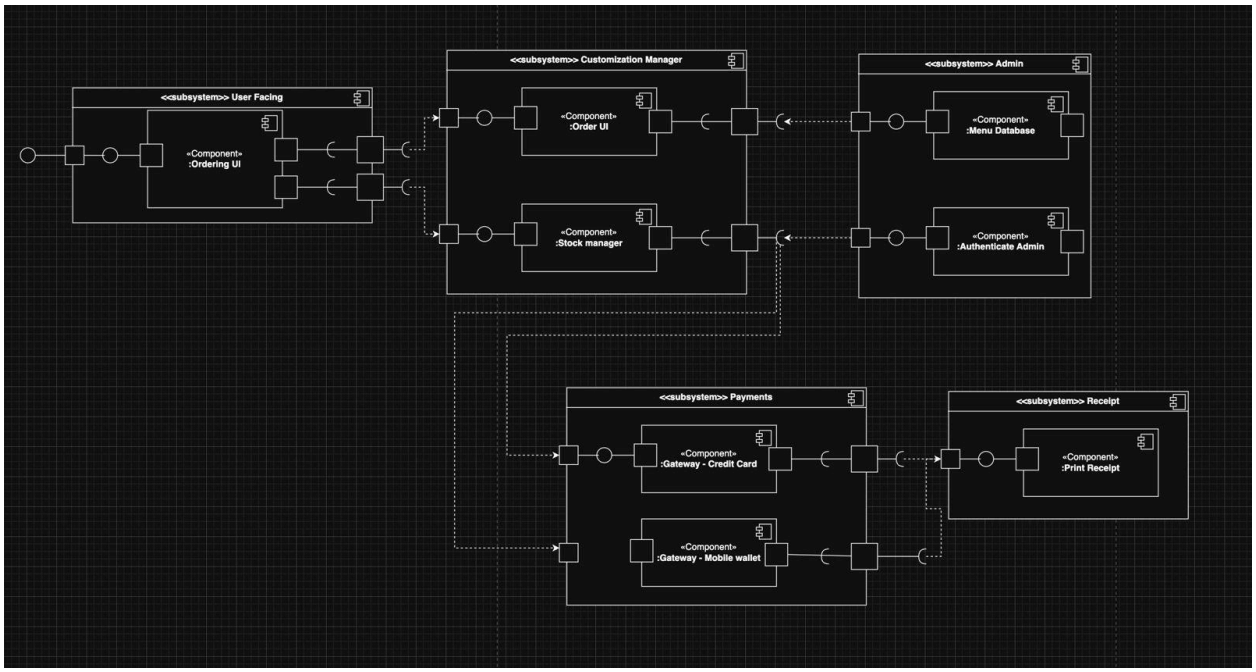

Component Diagram Justification

The proposed component diagram for the coffee kiosk system organizes the solution into **five subsystems**, each with a well-defined set of responsibilities. This modular approach ensures maintainability, security, scalability, and efficient system performance.

1. User Facing Subsystem

The User Facing subsystem contains the **Ordering UI**, which manages all customer interactions. It enables users to browse the available menu, select products, customize orders, and initiate the payment process. By keeping customer interaction isolated within this component, the design ensures that future improvements to the user experience can be made without affecting backend logic or payment handling.

2. Customization Manager Subsystem

The Customization Manager includes the **Order UI** and the **Stock Manager**. These components handle the validation of orders, check product availability, and manage customization requests.

Acting as an intermediary, this subsystem connects the Ordering UI with administrative data and inventory control. This separation ensures that customer-facing processes remain responsive while inventory and order logic are handled in the background.

3. Admin Subsystem

The Admin subsystem contains the **Menu Database** and the **Authenticate Admin** components. These are used exclusively by authorized staff to update menu options, configure pricing, and manage system security. Restricting administrative functions to a dedicated subsystem enhances security by limiting access to sensitive configuration data and ensuring that only authenticated administrators can make changes.

4. Payments Subsystem

The Payments subsystem provides two components: **Gateway – Credit Card** and **Gateway – Mobile Wallet**. These components process financial transactions securely and are completely isolated from the rest of the system. By confining sensitive payment logic within its own subsystem, the design reduces the attack surface and makes it easier to comply with financial security standards. This modularity also supports extensibility, allowing new payment methods (e.g., UPI, biometric payments) to be integrated without requiring changes to other parts of the system.

5. Receipt Subsystem

The Receipt subsystem contains the **Print Receipt** component, which finalizes the customer transaction. Once payment is successfully processed, this component generates a physical receipt, ensuring a smooth and complete order lifecycle for customers.

Advantages of the Design

- **Separation of Concerns**: Each subsystem has a clearly defined role, which simplifies maintenance and reduces the likelihood of errors spreading across the system.

- **Security**: Sensitive payment operations are confined to the Payments subsystem, while administrative functions are restricted to the Admin subsystem.

- **Maintainability**: Updates to menu options, inventory rules, or payment methods can be implemented within their respective subsystems without impacting unrelated areas.

- **Performance**: Direct communication between Ordering, Customization, and Payment subsystems ensures orders are processed quickly, meeting the non-functional requirement of completing transactions within 60 seconds.

- **Scalability**: The architecture can be extended to support multiple kiosks, centralized inventory control, or even mobile ordering applications without requiring a redesign.