ABSTRACT

This project outlines the development of a food ordering system using Python, emphasizing Object-Oriented Programming (OOP) principles for better modularity, maintainability, and scalability. The system manages the process of placing, managing, and processing food orders in a restaurant setting.

Key OOP Concepts Applied:

1. **Classes and Objects**:
    - **Menu**: Manages the restaurant's food items.
    - **Order**: Captures details of customer orders.
    - **Customer**: Stores customer information and order history.
    - **Restaurant**: Integrates menu, orders, and customers, overseeing the system's operations.
2. **Inheritance**:
    - Specialized subclasses for different food categories (e.g., Appetizers, main course) inherit from a base Food Items class.
3. **Encapsulation**:
    - Protects data within classes, ensuring data integrity by restricting direct access to certain attributes.
4. **Polymorphism**:
    - Allows methods to be overridden in subclasses, providing specific implementations (e.g., pricing rules).
5. **Abstraction**:
    - Simplifies user interaction by hiding complex processes within class methods, such as total cost calculation.

System Workflow:

1. **Menu Management**:
    - The restaurant updates the menu by managing food items through the Food Items subclasses.
2. **Order Placement**:
    - Customers place orders via an interface interacting with the `Order` class, which calculates the total cost.
3. **Order Processing**:
    - The system updates order statuses and records customer information and order history.
4. **Reporting and Analytics**:
    - Generates reports on sales, popular items, and customer preferences via methods in the `Restaurant` class.

Conclusion:

Utilizing OOP principles, the food ordering system is modular, flexible, and maintainable. Classes and objects ensure a clear structure and separation of concerns, while encapsulation, inheritance, and polymorphism provide data protection, code reuse, and method specialization. This approach demonstrates the effective use of Python and OOP in building a practical software solution for a restaurant.