

Mini C++ Projects Combining Design Patterns

1. Turn-Based RPG Battle System

Patterns: Factory, Strategy, Command, Observer, State

Create a battle simulator with different character types (warrior, mage, enemy), actions (attack, defend), and battle flow.

- Factory to create characters
- Strategy for attack behavior
- Command to encapsulate actions
- Observer to update battle log/UI
- State for battle phases (player turn, enemy turn)

2. Quiz Engine with Plugin System

Patterns: Factory, Strategy, Template Method, Observer

Console app to run quizzes with multiple question types (MCQ, true/false, input).

- Factory for question creation
- Strategy for scoring algorithms
- Template Method for question lifecycle
- Observer to notify score changes

3. File System Simulation

Patterns: Composite, Iterator, Visitor, Command

Simulate a file system with directories and files. Include features like listing, moving, deleting, and analyzing.

- Composite for files/folders
- Iterator for file traversal
- Visitor for operations (e.g., size calculation, printing)
- Command for actions like delete/move

4. Shopping Cart System

Patterns: Factory, Strategy, Decorator, Observer, Composite

A mini e-commerce engine where you can add products, apply discounts, and checkout.

- Factory for product creation
- Decorator for promotions
- Observer for UI/price updates
- Strategy for pricing algorithms
- Composite for bundled products

5. Chatbot with Intent Handling

Patterns: Chain of Responsibility, Strategy, Command, Factory

Basic chatbot that processes different types of input and responds accordingly.

- Chain of Responsibility for intent matching
- Factory for creating intent handlers
- Command for executing responses/actions
- Strategy for language tone or reply formatting