Facade Design Pattern

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It is a structural design pattern

- Provides a simplified interface to a set of interfaces in a subsystem
- Making it easier to use and reducing dependencies between the client code and the subsystem’s component

It acts as a high-level interface that hides the complexities of the subsystem and provides a unified interface for the client

Key components for the Facade design pattern:

- Facade: This is the main entry point for the client code and provides a simplified interface to the subsystem. It delegates client requests to the appropriate objects within the subsystem
- Subsystem: These are the classes that represent the various components of the subsystem. They contain the implementation details but are accessed through the facade

Example: a complex subsystem for handling different aspects of a computer system, such as the CPU, memory, and hard drive.

```
//Subsystem Classes
class CPU{
  void start(){
    System.out.println("CPU is starting");
  }

  void shutdown(){
    System.out.println("CPU is shutting down");
  }
}


class Memory{
  void load(){
    System.out.println("Memory is loading data");
  }
  void unload(){
    System.out.println("Memory is unloading data");
  }


class HardDrive{
  void readData(){
    System.out.println("Hard Drive is reading data");
  }
  void writeData(){
    System.out.println("Hard Drive is writing data");
  }
}


//Facade
class ComputerFacade{
  private CPU cpu;
  private Memory memory;
  private HardDrive hardDrive;

  public ComputerFacade(){
    this.cpu = new CPU();
    this.memory = new Memory();
    this.hardDrive = new HardDrive();
  }
// Simplified methods for the client
    public void startComputer() {
        cpu.start();
        memory.load();
        hardDrive.readData();
```

```
        System.out.println("Computer is started and ready to use");
    }

    public void shutdownComputer() {
        cpu.shutdown();
        memory.unload();
        hardDrive.writeData();
        System.out.println("Computer is shut down");
    }
}

// Client Code
public class Client {
    public static void main(String[] args) {
        // Using the Facade to start and shut down the computer
        ComputerFacade computerFacade = new ComputerFacade();
        computerFacade.startComputer();

        // Other client code
        // ...

        computerFacade.shutdownComputer();
    }
}
```