Creational Patterns

Abstract Factory

Definition: Interface to create families of related or dependent objects without specify their concrete classes
Aspects that Vary: Families of product objects
Participants: AbstractFactory, ConcreteFactory, AbstractProduct, ConcreteProduct

Builder

Definition: Separate the construction of a complex object from its representation
Aspects that Vary: How a composite object gets created
Participants: Builder, ConcreteBuilder, Director, Product

Factory Method

Definition: Define an interface for creating an object and let subclasses decide which class to instantiate
Aspects that Vary: Subclass of object that is instantiated
Participants: Creator, ConcreteCreator, Product, ConcreteProduct

Prototype

Definition: Specify the kinds of objects to create using a prototypical instance
Aspects that Vary: Class of object that is instantiated
Participants: Prototype, ConcretePrototype

Singleton

Definition: Ensure a class only has one instance
Aspects that Vary: The single instance of a class
Participants: Singleton

Structural Patterns

Adapter

Definition: Convert the interface of a class into another interface clients expect
Aspects that Vary: Interface to an object
Participants: Target, Adapter, Adaptee

Bridge

Definition: Decouple an abstraction from its implementation so they can vary independently
Aspects that Vary: Implementation of an object
Participants: Abstraction, RefinedAbstraction, Implementor, ConcreteImplementor

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Composite

Definition: Lets clients treat individual objects and compositions of objects uniformly
Aspects that Vary: Structure and composition of an object
Participants: Component, Leaf, Composite

Decorator

Definition: Attach additional responsibilities to an object dynamically
Aspects that Vary: Responsibilities of an object without subclassing
Participants: Component, ConcreteComponent, Decorator, ConcreteDecorator

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Facade

Definition: Provide a unified interface to a set of interfaces in a subsystem
Aspects that Vary: Interface to a subsystem
Participants: Facade, Subsystem classes

Flyweight

Definition: Use sharing to support large numbers of objects efficiently
Aspects that Vary: Storage costs of objects
Participants: Flyweight, ConcreteFlyweight, NonSharedConcreteFlyweight, FlyweightFactory

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Proxy

Definition: An object functioning as an interface to something else
Aspects that Vary: How an object is accessed
Participants: Subject, RealSubject, Proxy

Behavioral Patterns

Chain of Responsibility

Definition: Command pass through processing objects until one handle it
Aspects that Vary: Object that can process a request
Participants: Handler, ConcreteHandler

Command

Definition: Encapsulate a request as an object to perform an action or trigger an event at a later time
Aspects that Vary: When and how a request is processed
Participants: Command, ConcreteCommand, Invoker, Receiver

Interpreter

Definition: Define a representation for the grammar of a given language along with an interpreter that uses the representation to interpret sentences in the language
Aspects that Vary: Grammar and interpretation of a language
Participants: AbstractExpression, TerminalExpression, NonterminalExpression, Context

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Iterator

Definition: Provide a way to access the elements of an aggregate object sequentially without exposing its underlying representation
Aspects that Vary: How the elements of an aggregate are accessed
Participants: Iterator, ConcreteIterator, Aggregate, ConcreteAggregate

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Mediator

Definition: Define an object that encapsulates how a set of objects interact
Aspects that Vary: How and which objects interact with each other
Participants: Mediator, ConcreteMediator, Colleague, ConcreteColleague

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Memento

Definition: Expose the private internal state of an object so it can be restored later
Aspects that Vary: What private information is stored outside an object
Participants: Memento, Originator, Caretaker

Observer

Definition: The subject maintains a list of its observers and notifies them automatically when something changes by calling one of their methods
Aspects that Vary: How the dependent objects stay up to date
Participants: Subject, Observer, ConcreteSubject, ConcreteObserver

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State

Definition: Allow an object to alter its behavior when its internal state changes
Aspects that Vary: States of an object
Participants: Context, State, ConcreteState

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Strategy

Definition: Allow selecting an algorithm at runtime and which family of algorithms to use
Aspects that Vary: An algorithm
Participants: Strategy, ConcreteStrategy, Context

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Template Method

Definition: Method in an abstract class that defines the skeleton of an operation
Aspects that Vary: Steps of an algorithm
Participants: AbstractClass, ConcreteClass

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Visitor

Definition: Represent an operation to be performed on the elements of an object structure
Aspects that Vary: Operations that can be applied to objects without changing their classes
Participants: Visitor, ConcreteVisitor, Element, ConcreteElement, ObjectStructure

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