Software Design Techniques and Mechanisms

Topic: Creational Design Patterns

Presenter: Drumea Vasile

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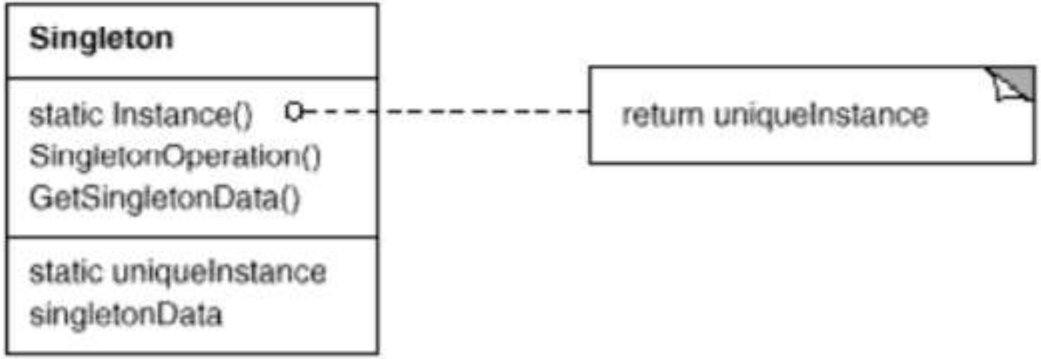
Overview

- The Creational Design Patterns are all about class instantiation.
- This group can be divided into 2 groups:
    - Class-Creation patterns (using inheritance)
    - Object-Creation patterns (using delegation)

Singleton Pattern

- A class that should have only one instance at any time.
- It contains static encapsulated instance.
- The constructor should be private.
- It must be made thread safe.

UML Diagram for Singleton



Singleton

static Instance()
SingletonOperation()
GetSingletonData()

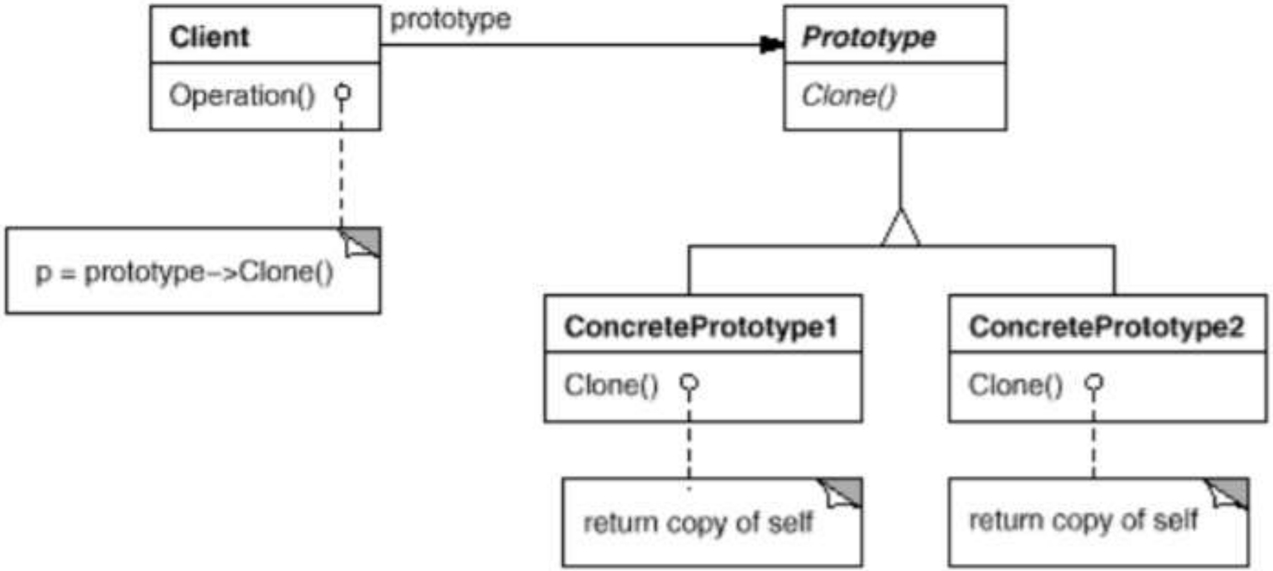
static uniqueInstance
singletonData

return uniqueInstance

Prototype Pattern

- Initialized instances of the classes that are meant to be cloned.
- A collection that caches the prototype objects.

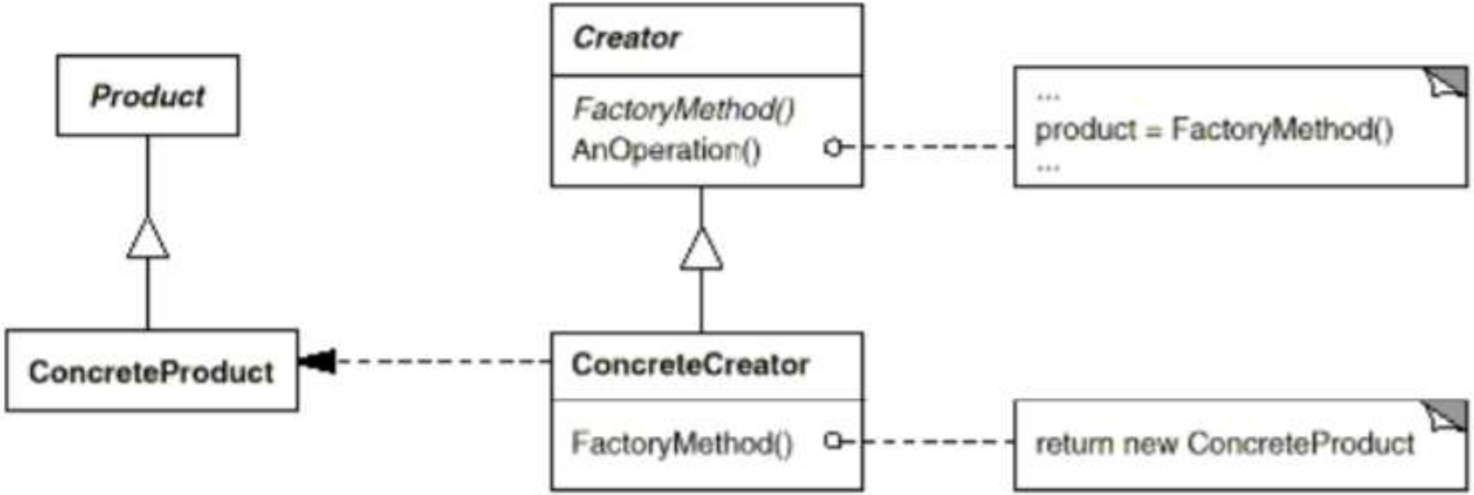
UML Diagram for Prototype



Factory Method Pattern

- Creates an instance out of several related derived classes.
- It is usually used together with other creational design patterns.

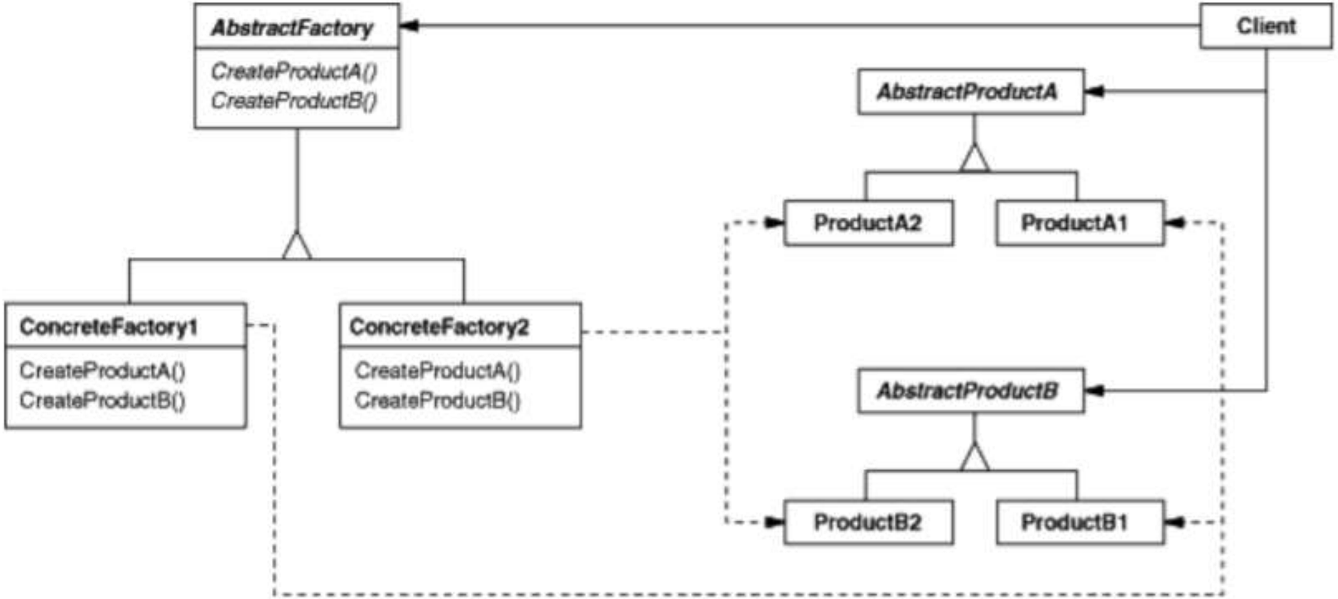
UML Diagram for Factory Method



Abstract Factory Pattern

- Provides an interface for creating families of related objects without specifying the concrete object.
- It defines Factory Methods for each type of product.

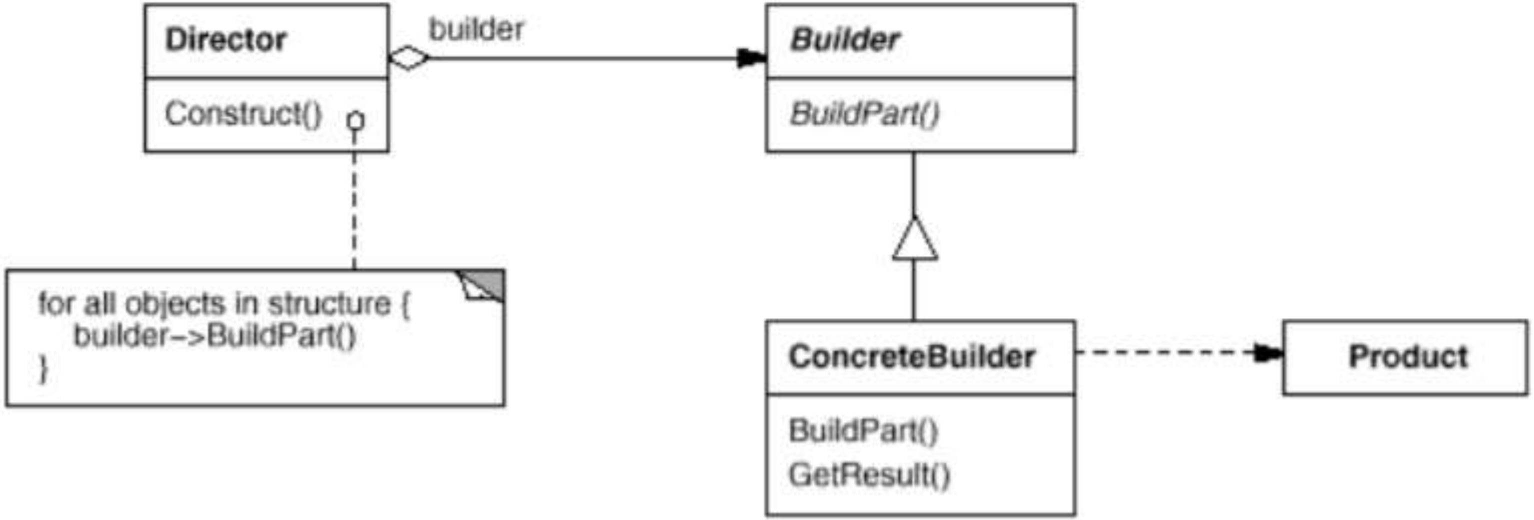
UML Diagram for Abstract Factory



Builder

- Separates object construction from its representation so that the same construction process could create different representations.

UML Diagram for Builder



References

1. https://sourcemaking.com/design_patterns/creational_patterns
2. The “Gang of four”, 1994, *Design Patterns: Elements of Reusable Object-Oriented Software*
3. P.S. All the diagrams are from [2].

Thanks for your attention!

Questions?