Creational Pattern: Factory Method

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Coming Up

Describing the factory method pattern

Structure of the factory method pattern

Implementation

- Real-life sample: shopping cart discount service

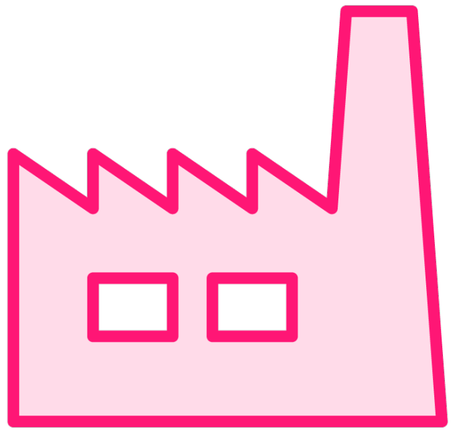
Coming Up

Use cases for this pattern

Pattern consequences

Related patterns

Describing the Factory Method Pattern

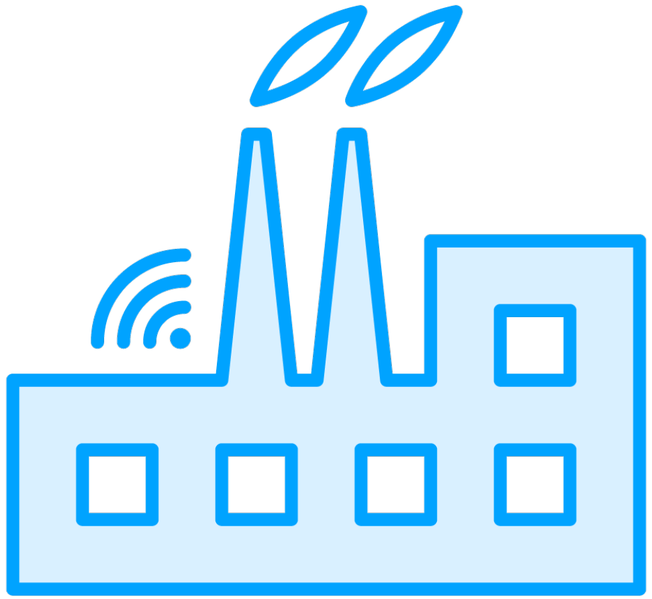


Creational

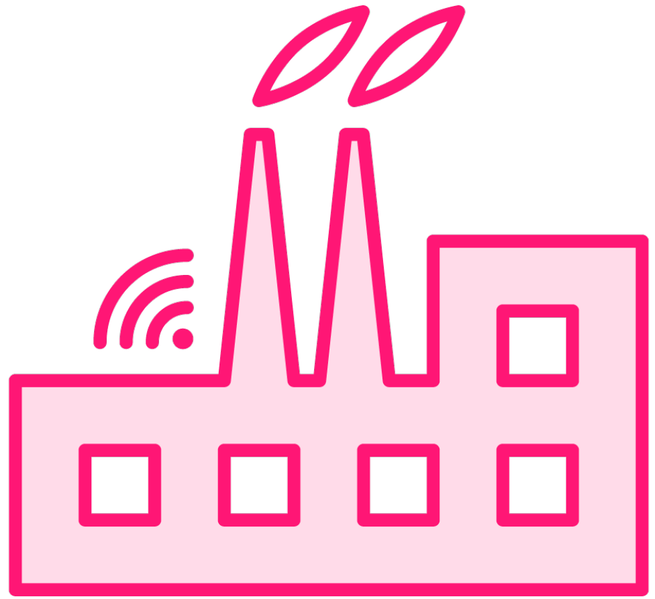
Structural

Behavioral

Describing the Factory Method Pattern



Factory method



Abstract factory

Factory Method

The intent of the factory method pattern is to define an interface for creating an object, but to let subclasses decide which class to instantiate. Factory method lets a class defer instantiation to subclasses.

```
var codeDiscountService = new CodeDiscountService(Guid.NewGuid());
var discount = codeDiscountService.DiscountPercentage;

// or

var countryDiscountService = new CountryDiscountService("BE");
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Describing the Factory Method Pattern

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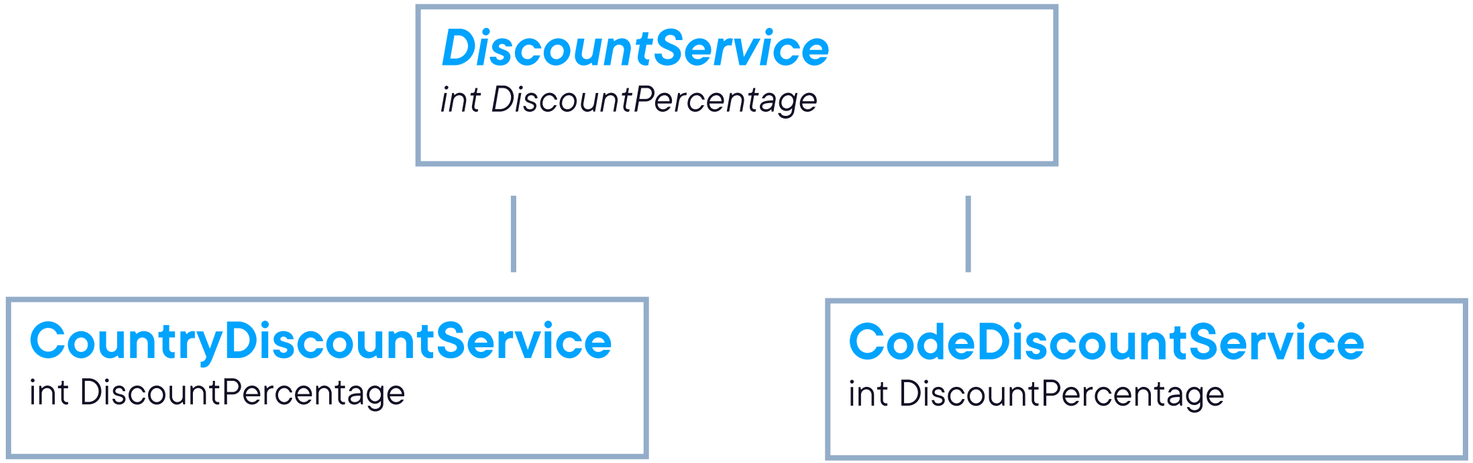
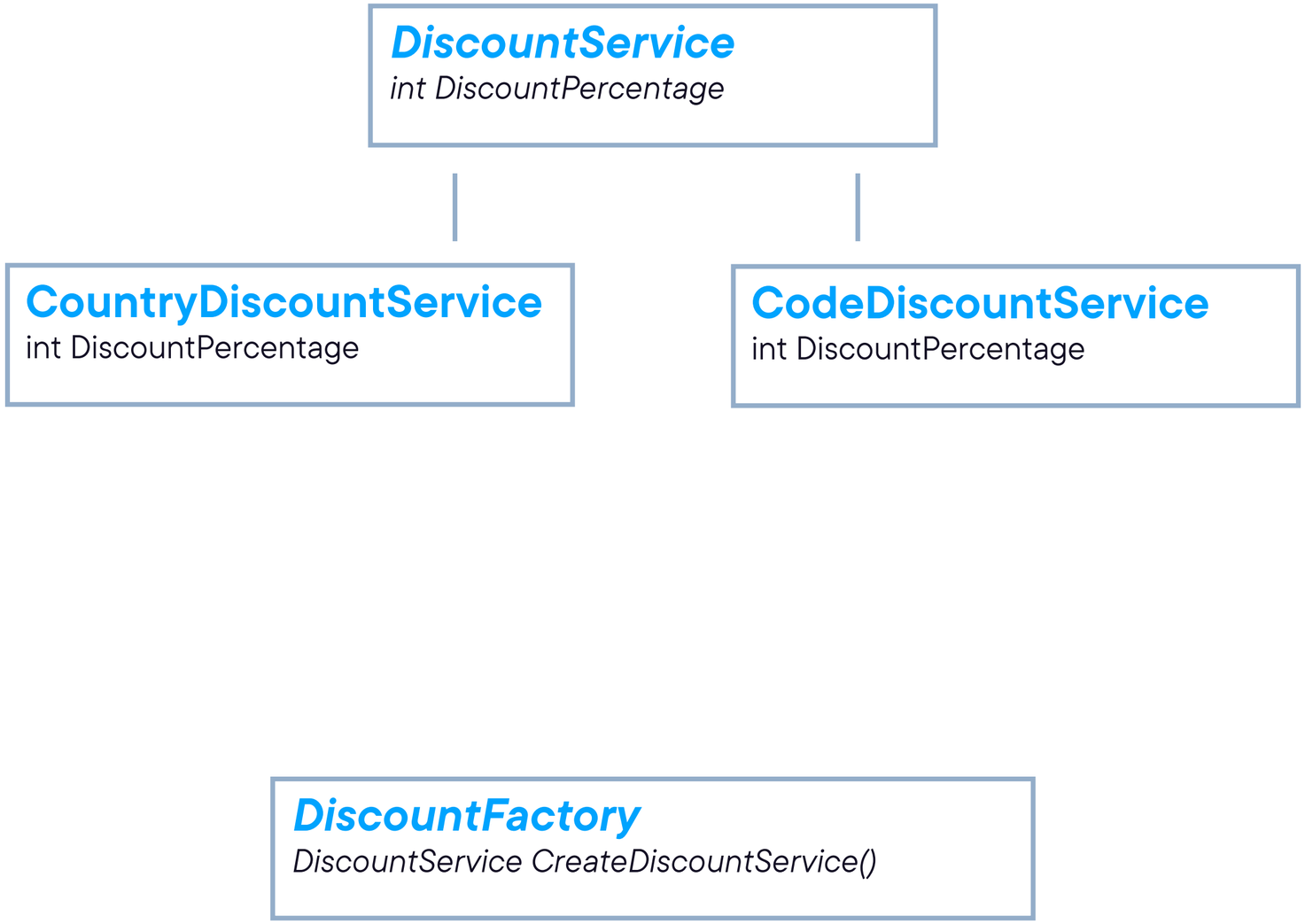
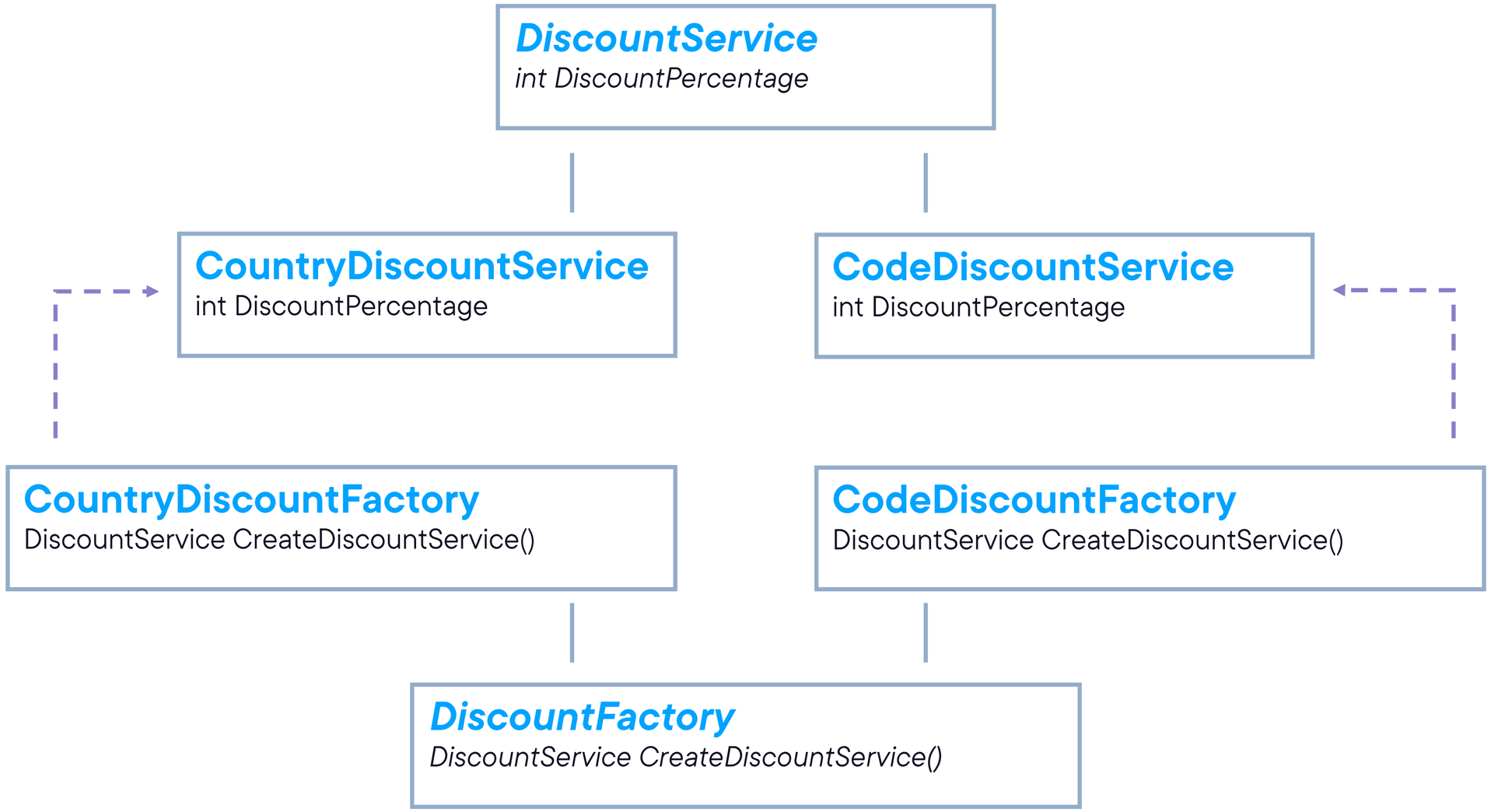


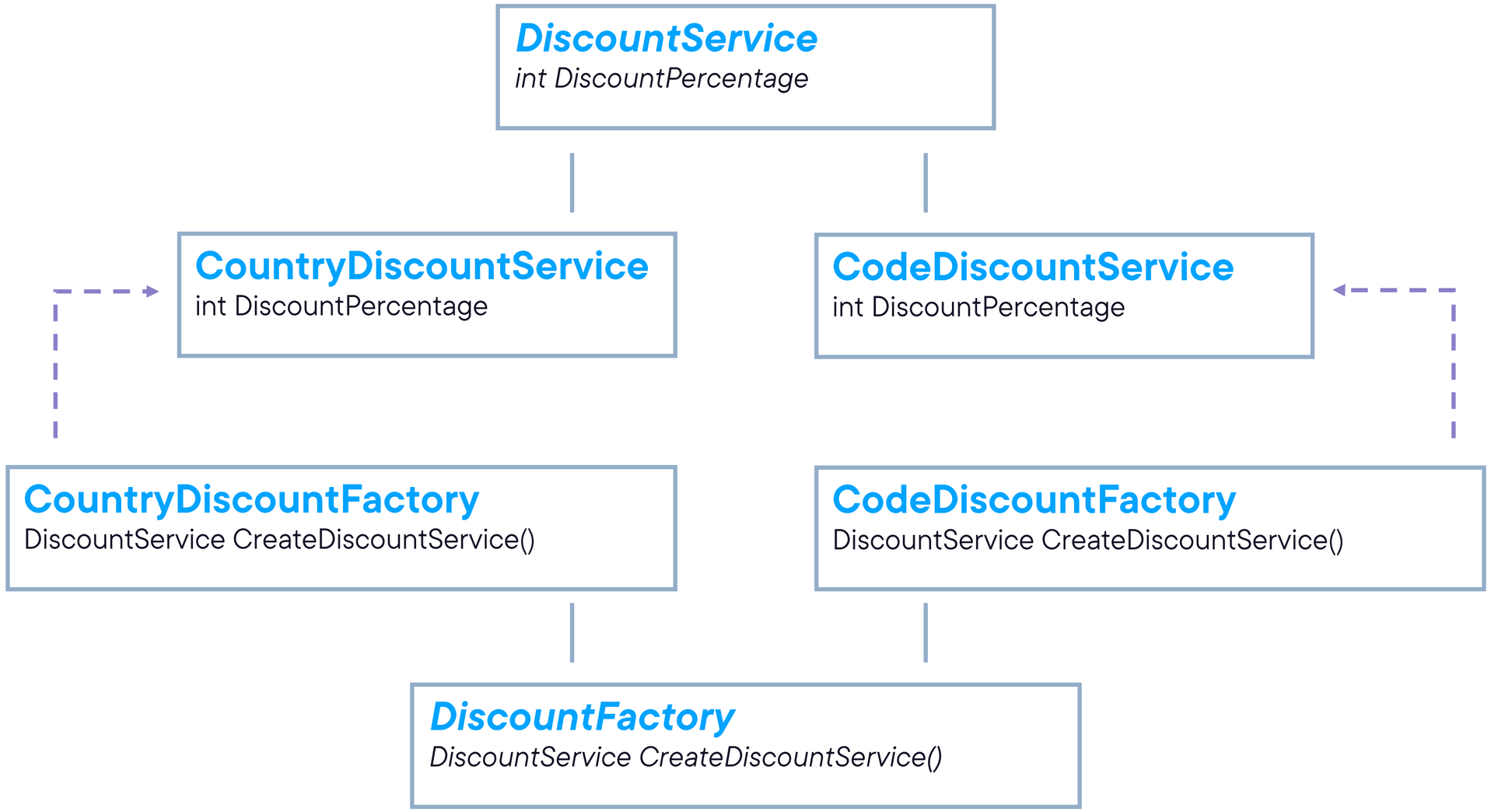
Describing the Factory Method Pattern



Describing the Factory Method Pattern



Factory Method Pattern Structure



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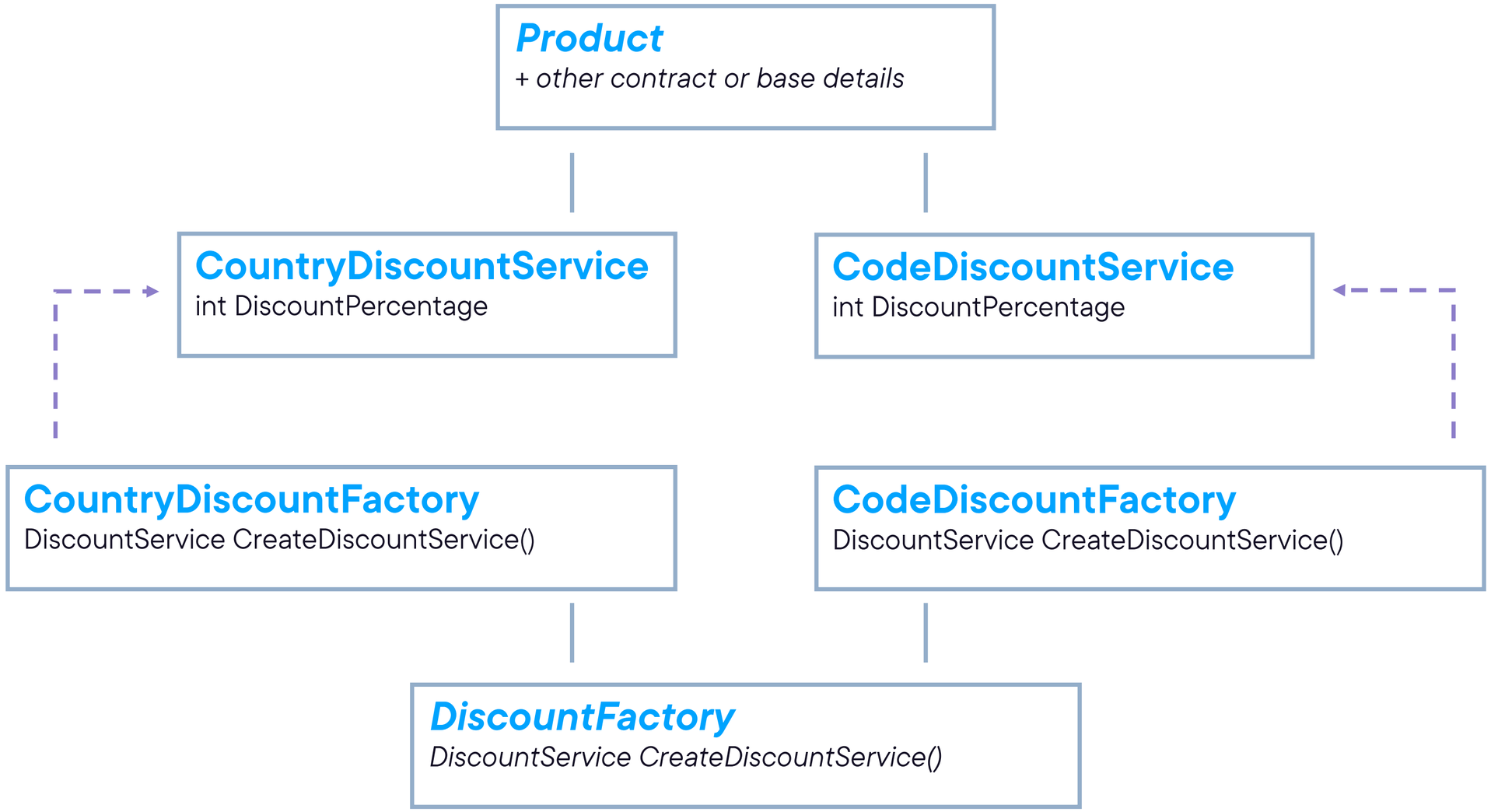
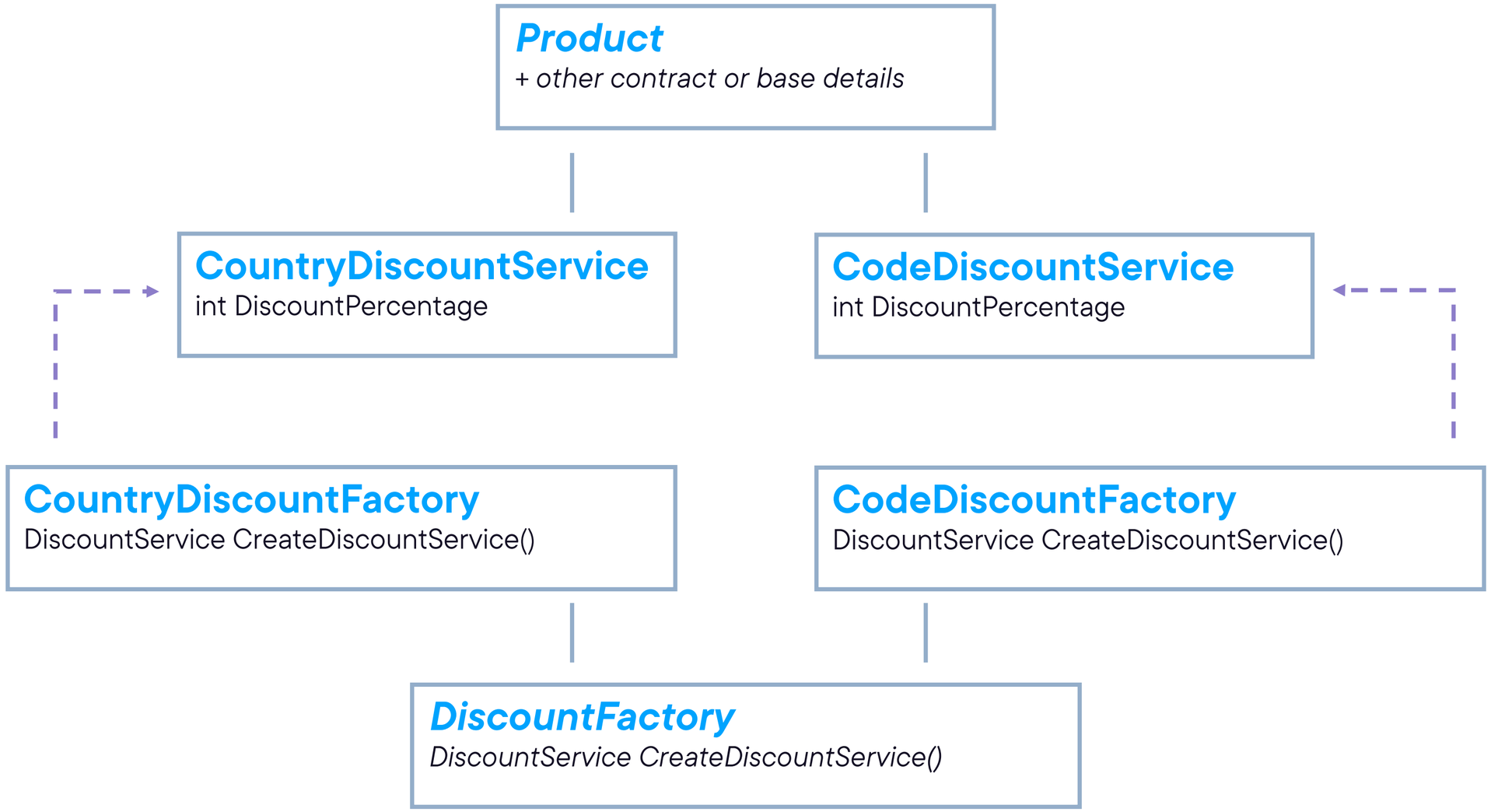


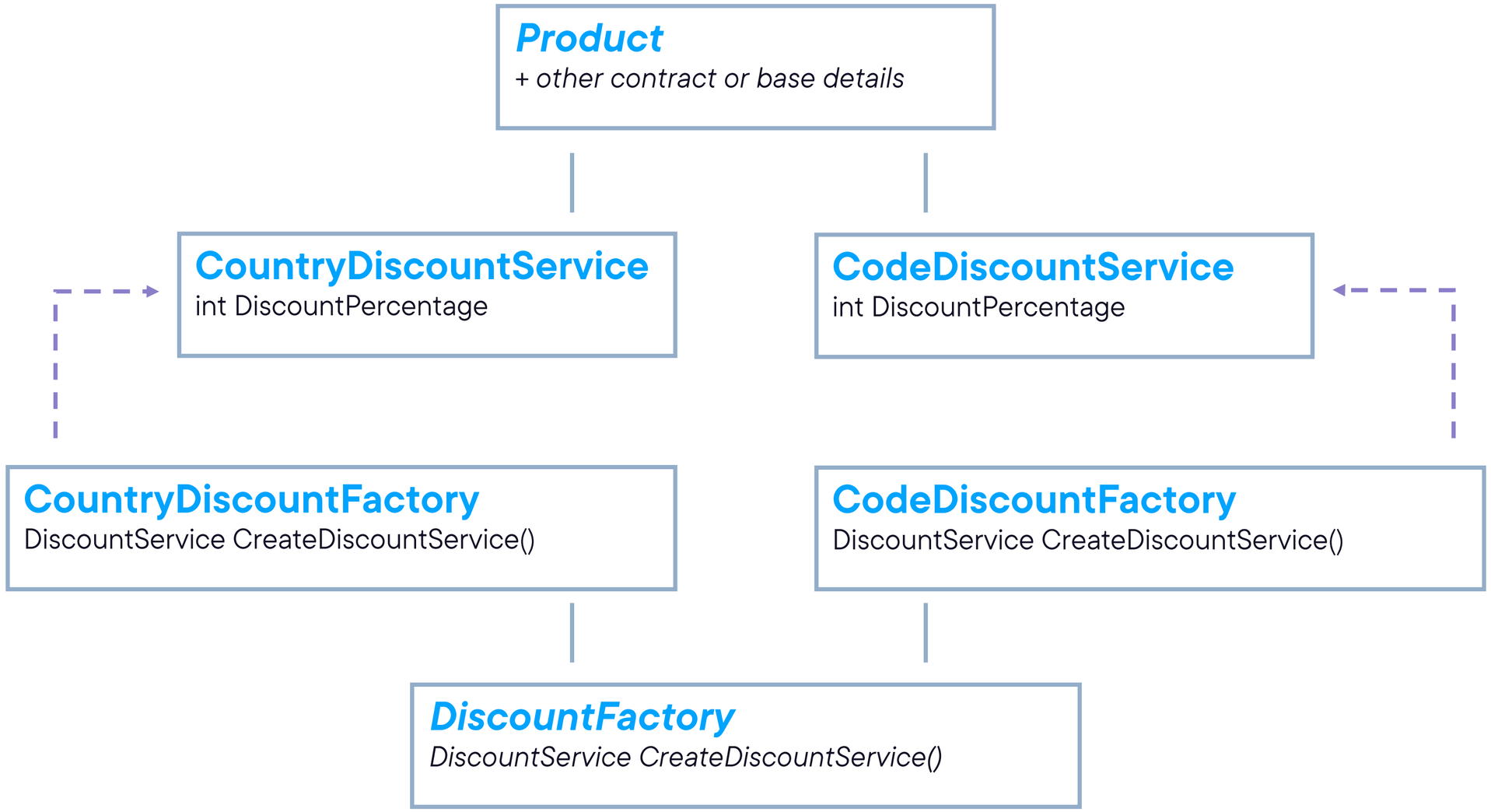
`Product` defines the interface of objects that the factory method creates

Factory Method Pattern Structure



`ConcreteProduct` implements the `Product` interface

Factory Method Pattern Structure



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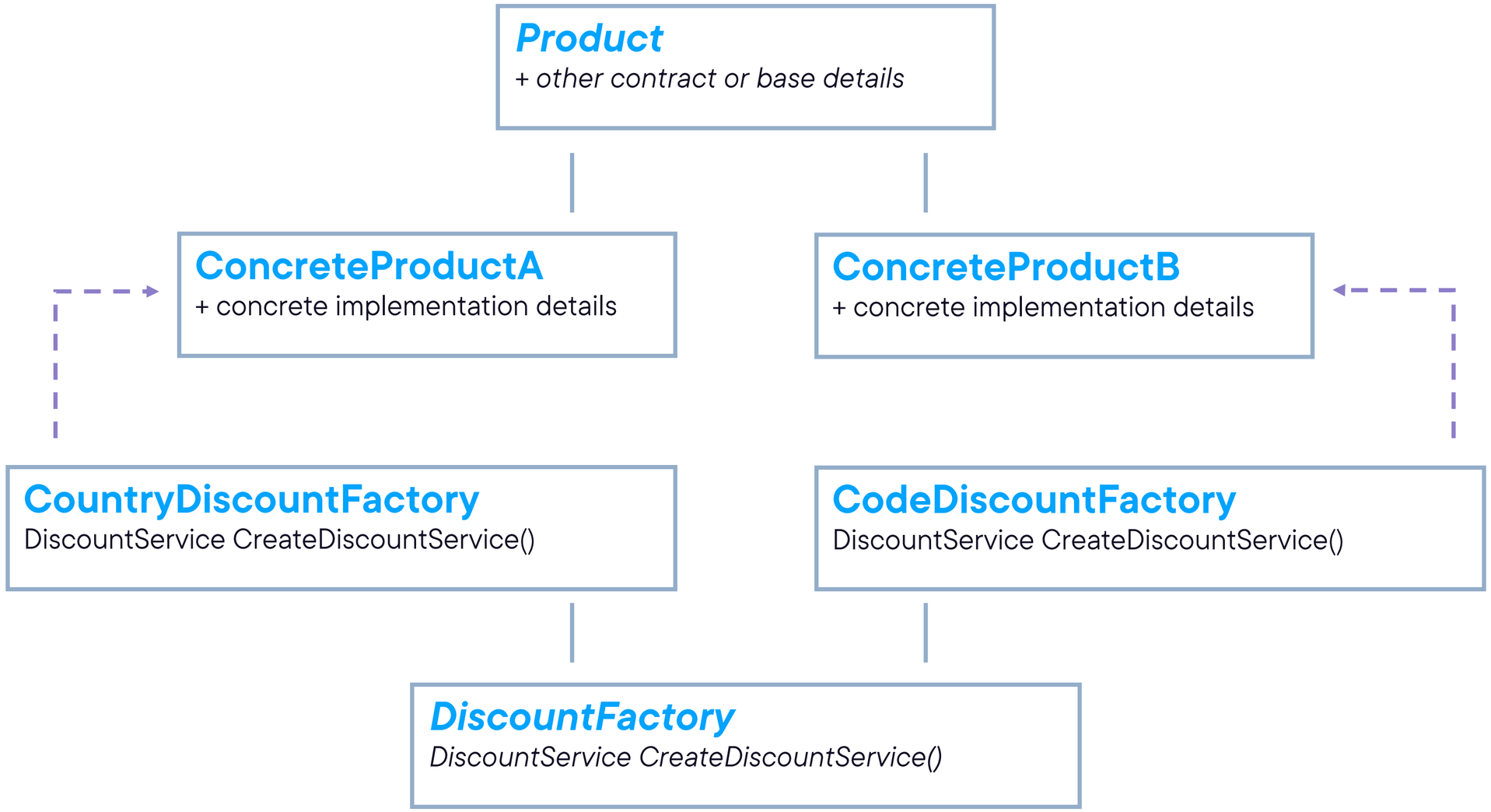
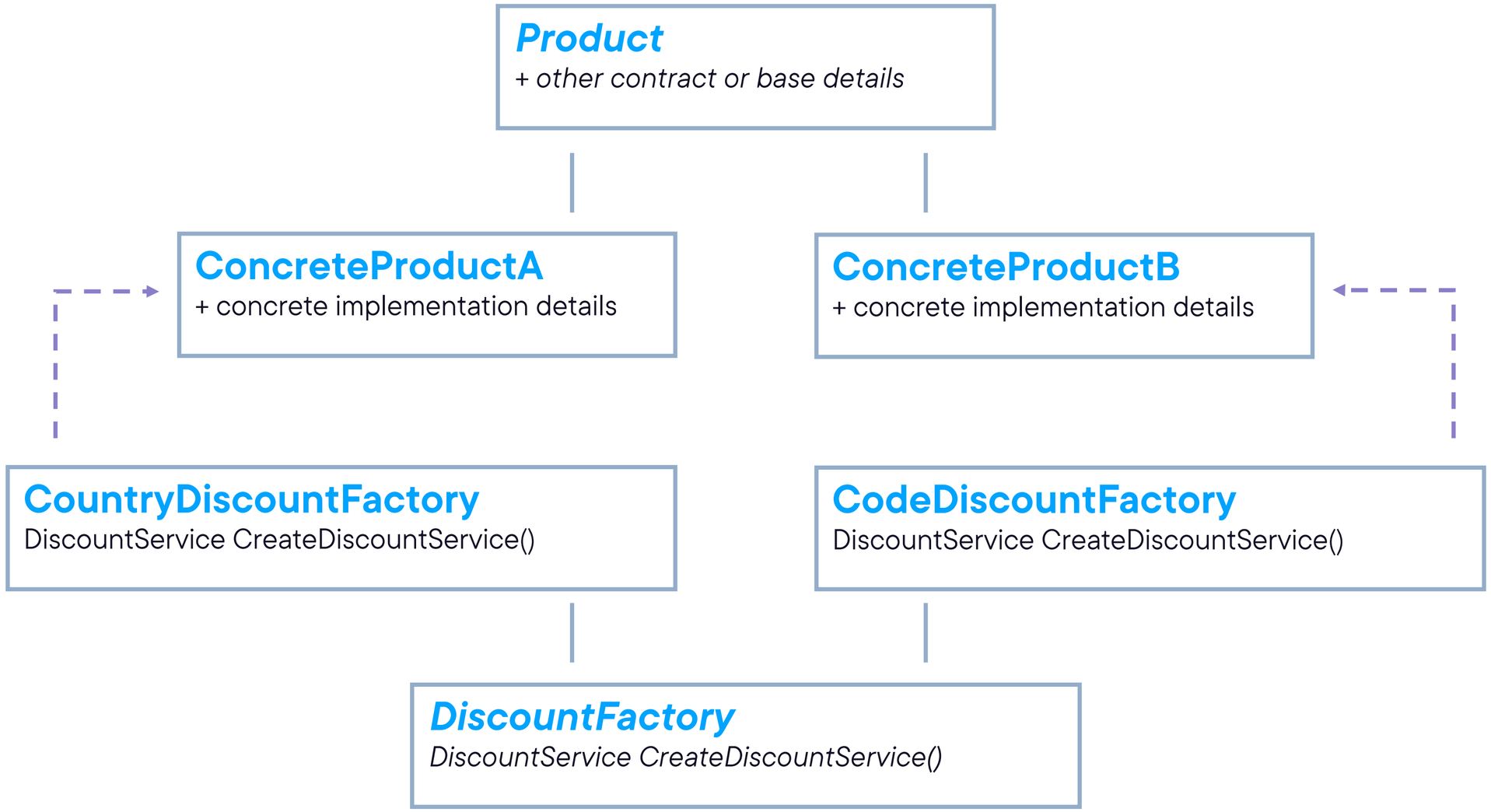
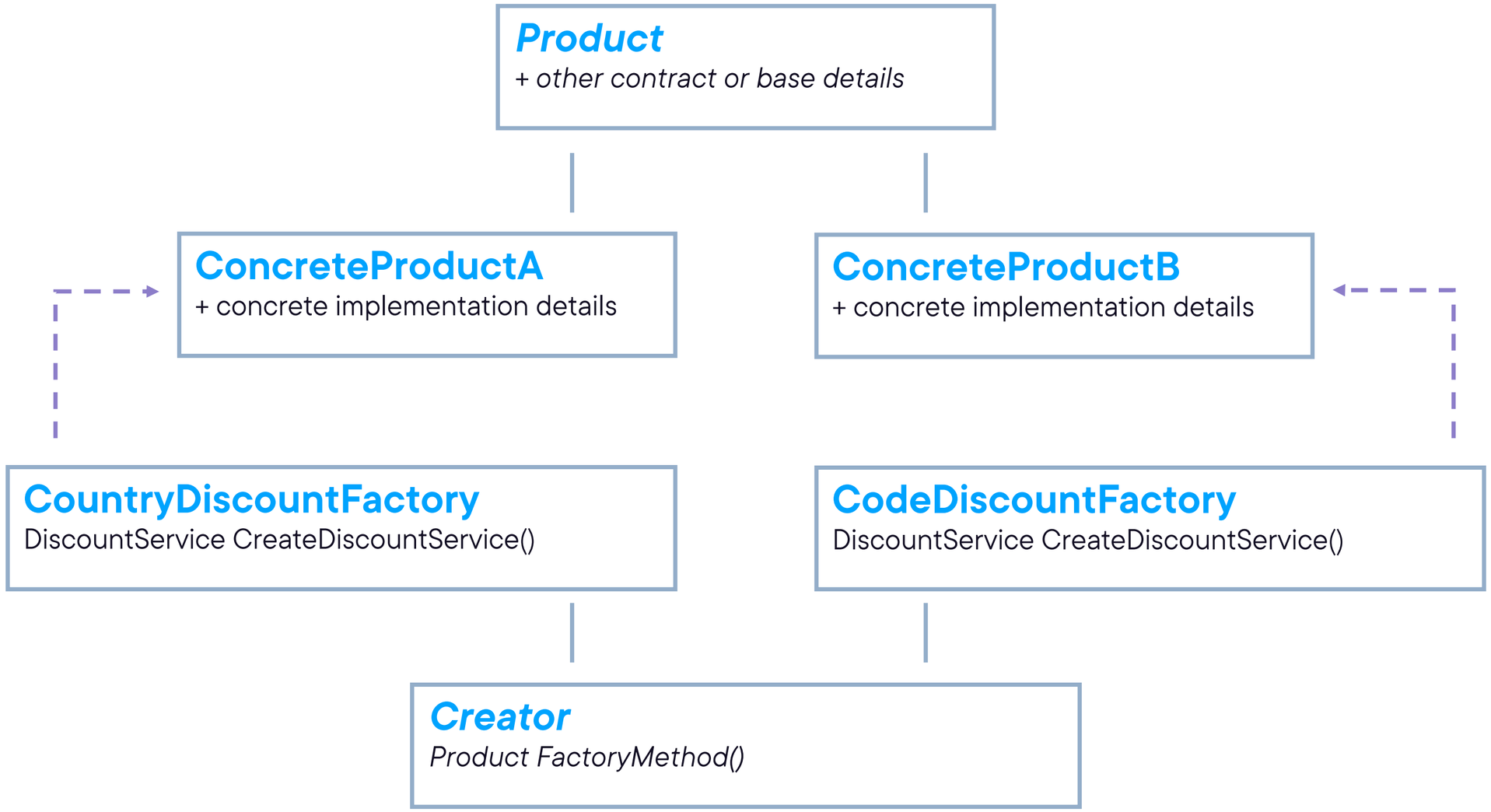


The `Creator` declares the factory method, which must return a `Product`

Factory Method Pattern Structure

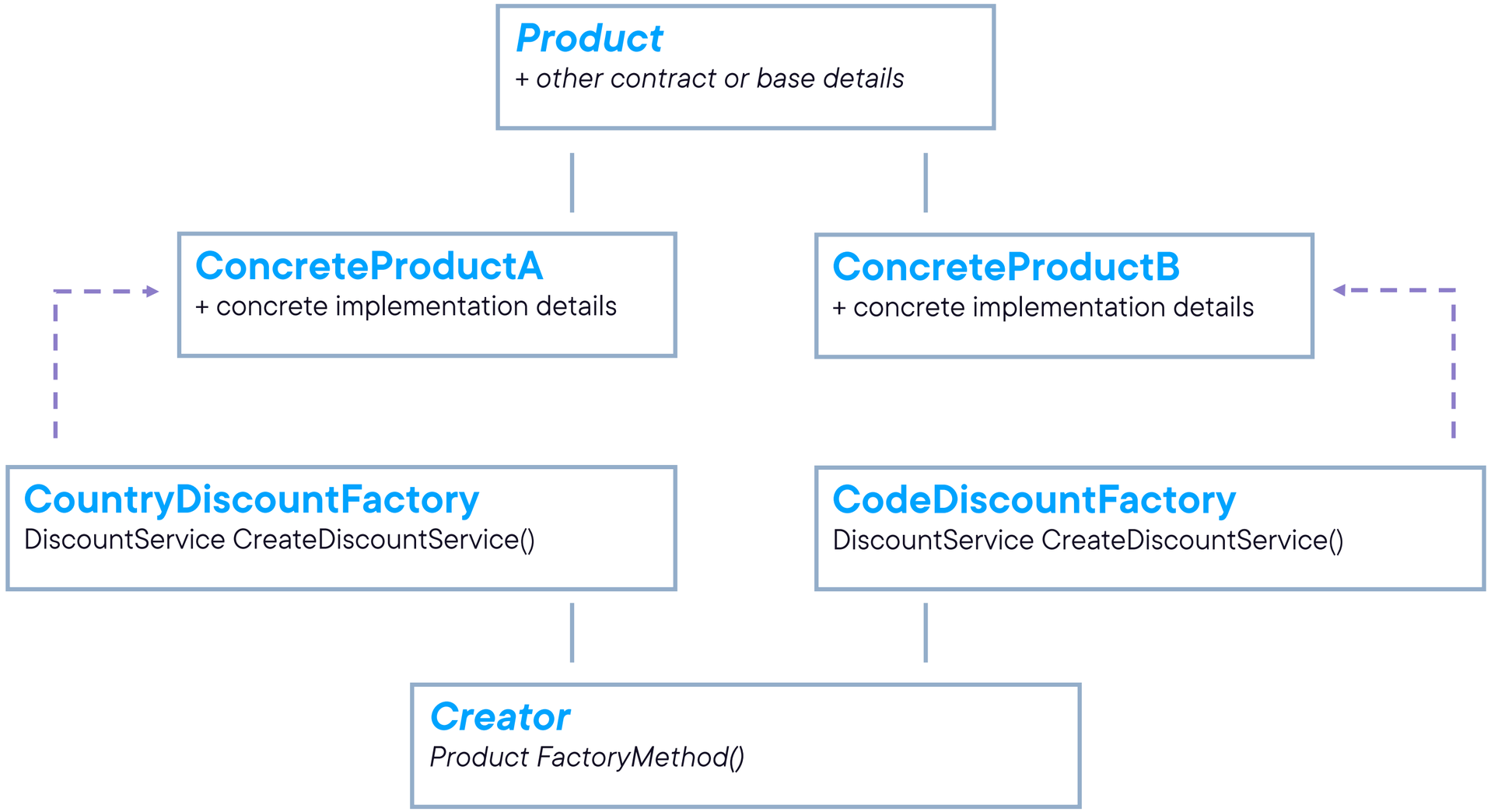


Factory Method Pattern Structure

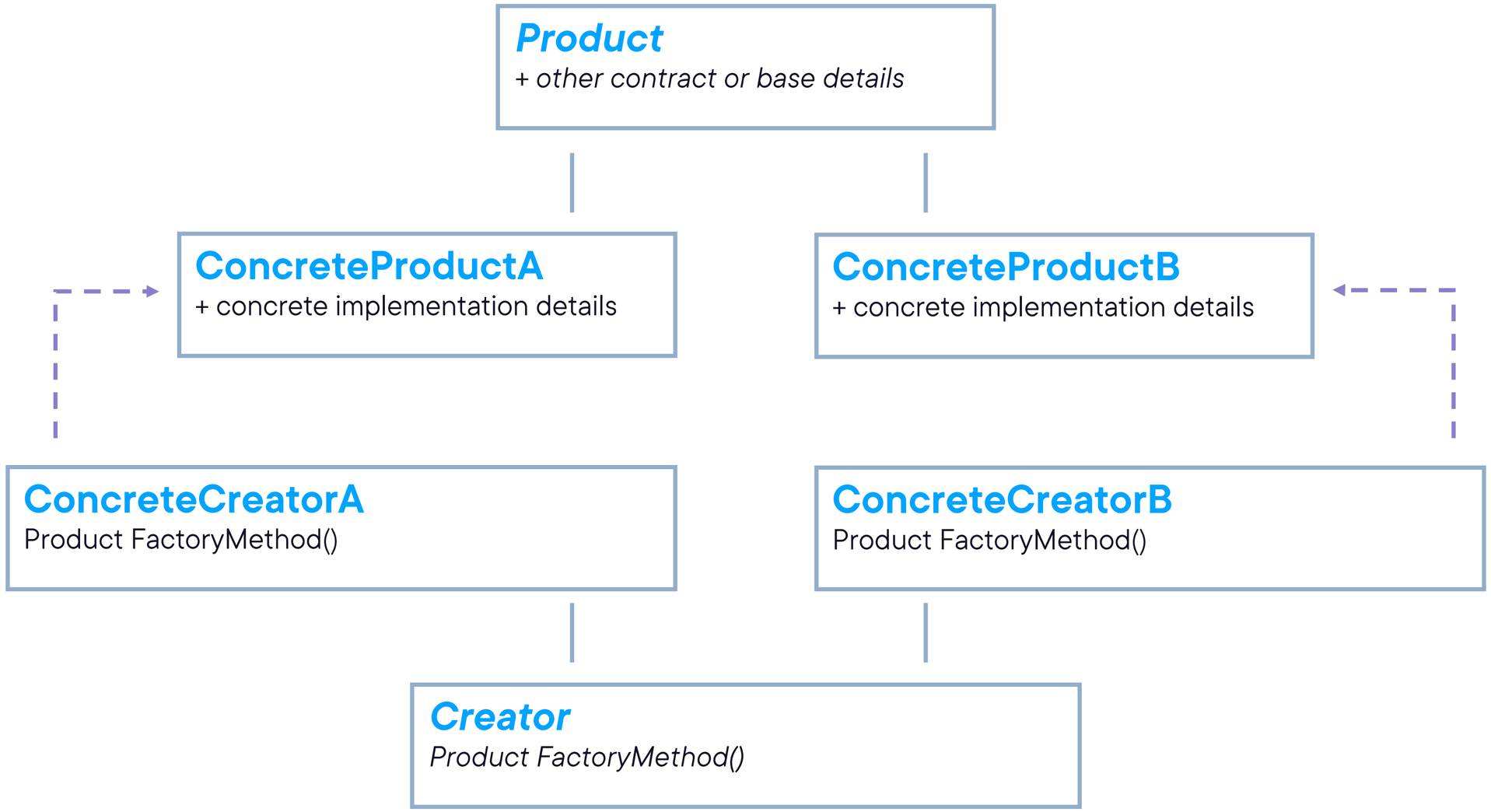


The `ConcreteCreator` implements `Creator` and overrides the factory method to return an instance of `ConcreteProduct`

Factory Method Pattern Structure



Factory Method Pattern Structure



Demo

Implementing the factory method pattern

Use Cases for the Factory Method Pattern

When a class can't anticipate the class of objects it must create

When a class wants its subclasses to specify the objects it creates

When classes delegate responsibility to one of several helper subclasses, and you want to localize the knowledge of which helper subclass is the delegate

As a way to enable reusing of existing objects

Use Cases for the Factory Method Pattern

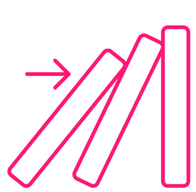
Exporting documents to different formats

Instantiating plugins in plugin system

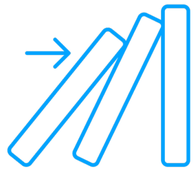
Generating mocks or test data

Abstracting data sources

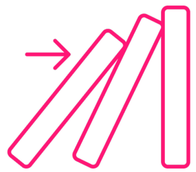
Pattern Consequences



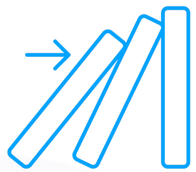
Factory methods eliminate the need to bind application-specific classes to your code



New types of products can be added without breaking client code: open/closed principle

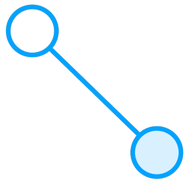


Creating products is moved to one specific place in your code, the creator: single responsibility principle

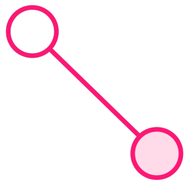


Clients might need to create subclasses of the creator class just to create a particular `ConcreteProduct` object

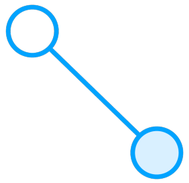
Related Patterns



Abstract Factory
Can be implemented as a singleton



Prototype
No subclassing is needed (not based on inheritance), but an initialize action on Product is often required



Template
Factory methods are often called from within template methods

Summary

Intent of the factory method pattern:

- To define an interface for creating an object, but to let subclasses decide which class to instantiate

Eliminates the need to bind application-specific classes to your code

Summary

Implementation:

- `Product` and `Creator` can be implemented as interface or (abstract) base class
- `ConcreteCreator` must implement a method to create a `ConcreteProduct`

Up Next:

Creational Pattern: Abstract Factory