Module 02: "Abstract Factory"





Agenda

- Introductory Example: Devices for New Employees
- Challenges
- Implementing the Abstract Factory Pattern
- Pattern: Abstract Factory
- Overview of Abstract Factory
- Variations and Related Patterns



Introductory Example: Devices for New Employees

```
class Iphone7
{
    public int MemoryGb { get; }
    ...
}
```

```
class Ipad
{
   public string Version { get; }
   public double ScreenSize { get; }
   ...
}
```

```
Iphone7 phone = new Iphone7(32);
phone.Call("+45 12345678");

Ipad tablet = new Ipad("Air 3", 9.7);
tablet.PowerOn();
tablet.PowerOff();
```



Challenges

- How do we isolate clients from concrete classes and rely only on general interfaces (or general classes)?
- We don't want the New Employee Enrollment or other HR processes to require change whenever a new edition of a device emerges!
- How do we ensure that clients create object correctly?
- What if the company decides to change it's device vendor?



Pattern: Abstract Factory

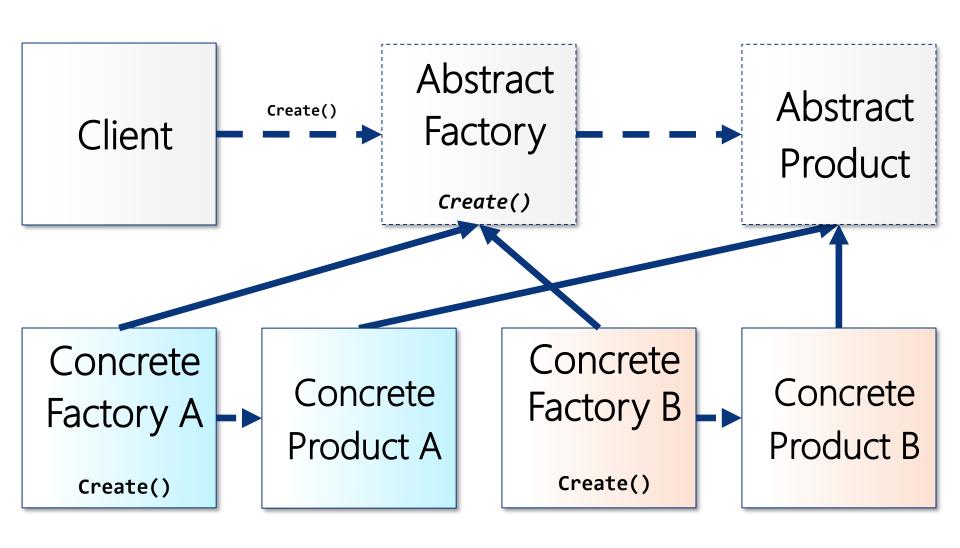
 Provide an interface for creating families of related or dependent objects without specifying their concrete classes.

Outline

- Encapsulate object creation in a factory object.
- Define an interface (abstract factory) for creating objects
- Implement that interface in concrete classes
- Classes do not instantiate objects directly but delegate object creation to factory
- Origin: Gang of Four



Overview of Abstract Factory Pattern





Overview of Abstract Factory Pattern

- Client
 - Only depends upon Abstract Factory and Abstract Product
- Abstract Factory
 - Interface for object creation operations such as abstract Create()
- Concrete Factory
 - Concrete class implementing the Abstract Factory interface for creating Concrete Product objects in **Create()**
- Abstract Product
 - Interface or abstract class specifying a generalized product (or products)
- Concrete Product
 - Concrete class implementing the Abstract Product interface



Variations and Related Patterns

- ▶ Each factory can created any number of products
 - CreateXxx()
 - CreateYyy()

Create()

- can optionally be supplied a product context parameter
- can make use of the Builder Pattern
- description parameter or type name might be employed
 - See Lab 04.2
- Abstract Factory Pattern
 - Is often confused or combined with Factory Method Pattern



