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Aamir Shabbir Pare

Problem Solving Programming

Design Patterns

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Overview

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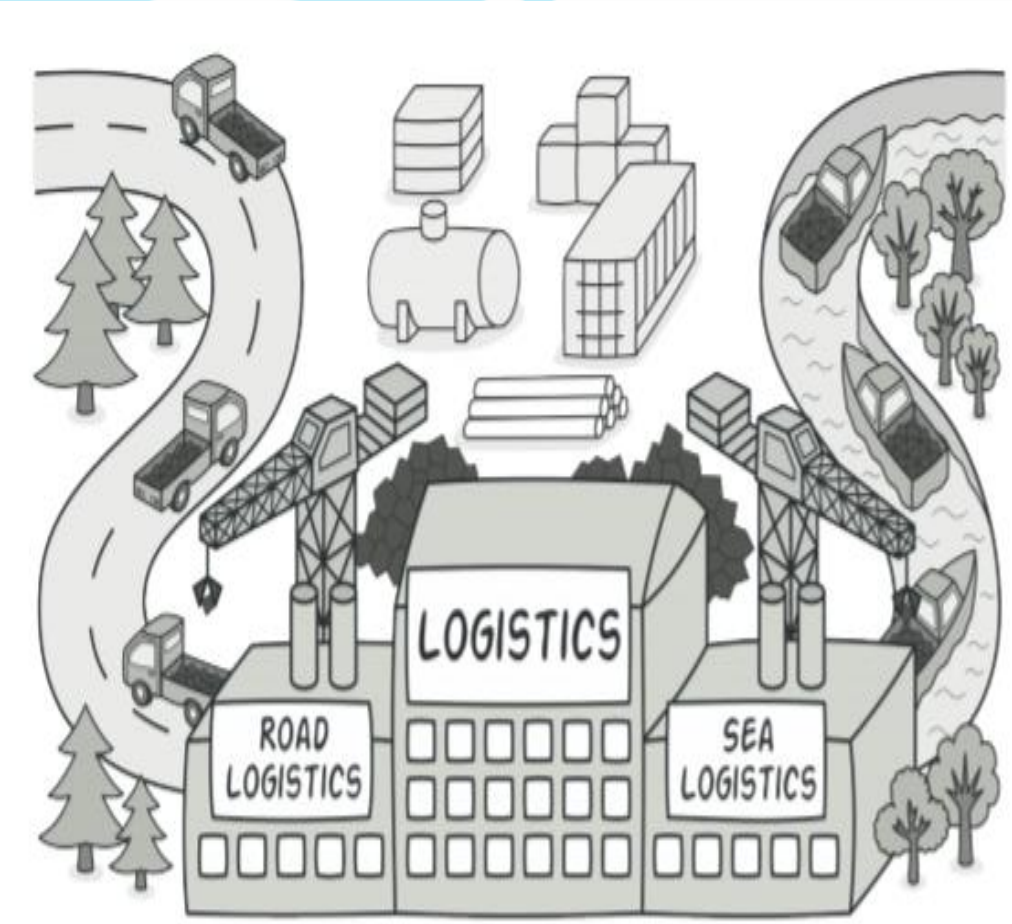
Factory Method Pattern

- Factory Method is a creational design pattern that provides an interface for creating objects in a superclass, but allows subclasses to alter the type of objects that will be created.
- Factory method design pattern abstract the process of object creation and allows the object to be created at run-time when it is required.
- Most frequently used pattern.



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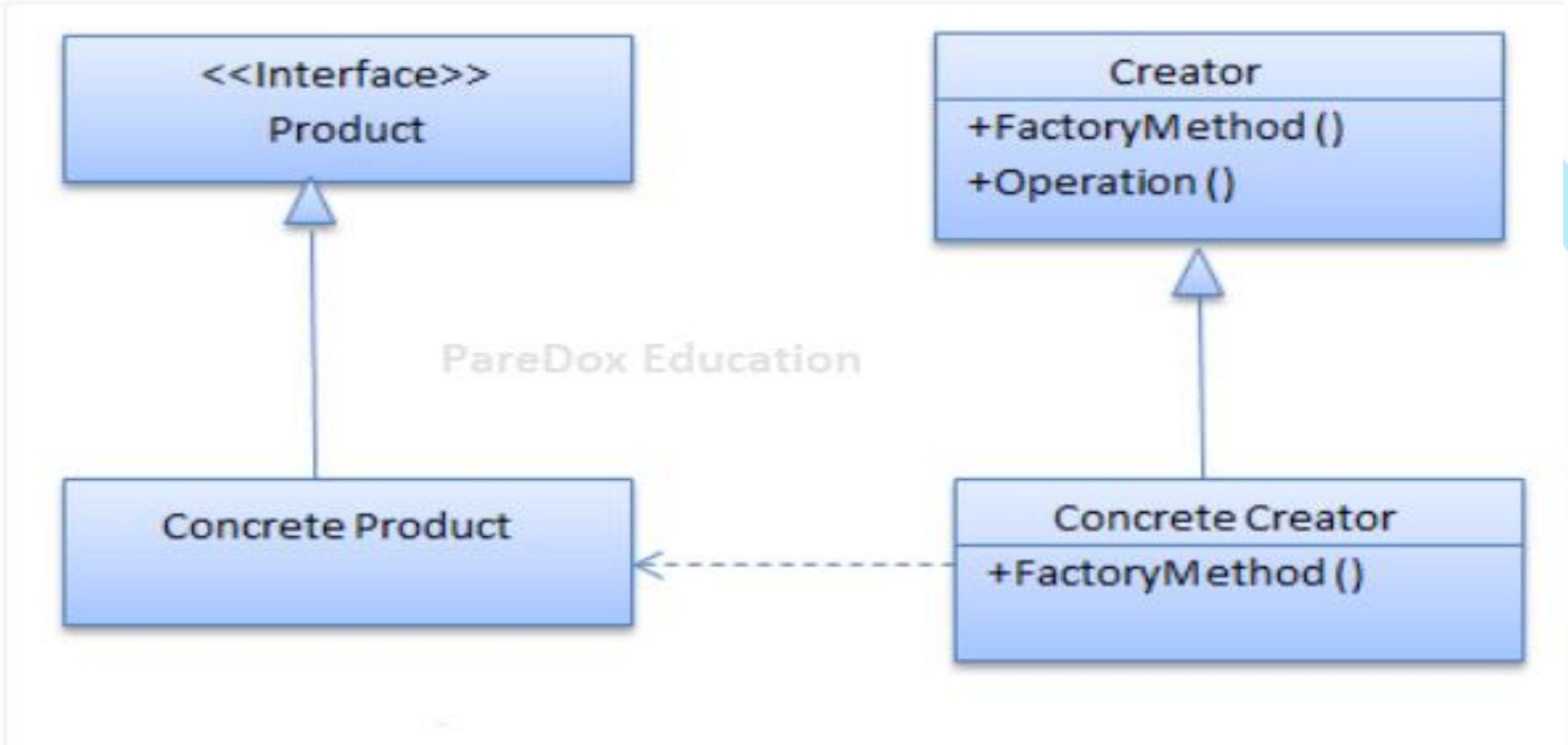
UML Diagram and Implementation



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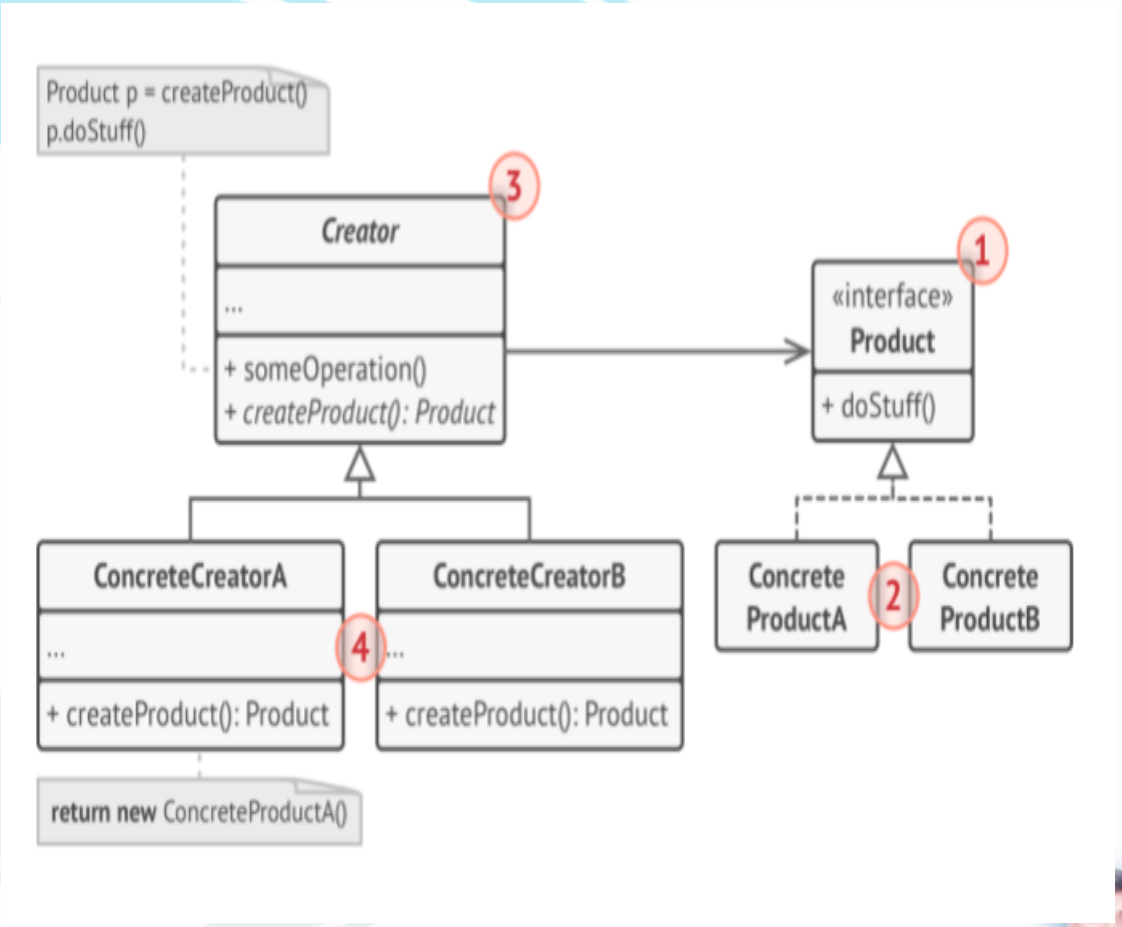
Participants of Factory Method

Classes and objects participating in this pattern are:

1. Product
   - Interface for creating the objects.
2. ConcreteProduct
   - Class which implements the Product interface.
3. Creator
   - Abstract class that declares the factory method, returns an object of type Product.
4. ConcreteCreator
   - Class which implements the Creator class and overrides the factory method to return an instance of a ConcreteProduct.



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Implementation Code

```
public interface Product { }
1 reference
public class ConcreteProductA : Product { }
1 reference
public class ConcreteProductB : Product { }
2 references
public abstract class Creator
{
    3 references
    public abstract Product FactoryMethod(string type);
}

1 reference
public class ConcreteCreator : Creator
{
    3 references
    public override Product FactoryMethod(string type)
    {
        switch (type)
        {
            case "A":
                return new ConcreteProductA();
            case "B":
                return new ConcreteProductB();
            default:
                throw new ArgumentException("Invalid type", type);

        }
    }
}
```

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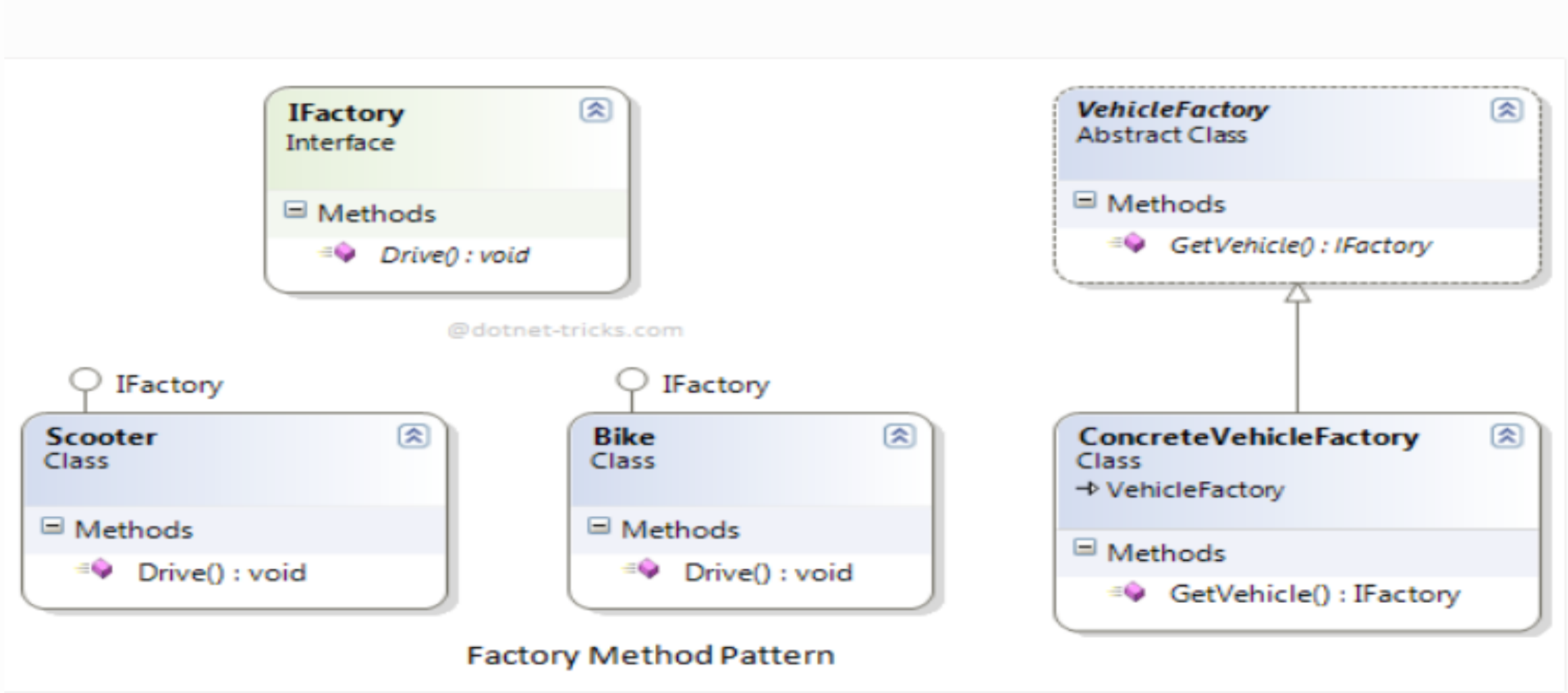
Factory Method Example



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When to use Factory Method

1. Subclasses figure out what objects should be created.
2. Parent class allows later instantiation to subclasses means the creation of an object is done when it is required.
3. The process of objects created is required to centralize within the application.
4. A class (creator) will not know what classes it will be required to create.

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Real World Use Case - 1

- COMSATS University Examination
  - Semester Examination Evaluation Contents
    - Assignments
    - Quizzes
    - Sessionals
    - Final Term
- Creating an Examination
  - Fall 2020
  - Spring 2020

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Real World Use Case - 2

- Page Based Document
  - Report : Contains pages related to a specific report.
  - Resume : Contains pages related to resume only.
  - Financial : Contains pages related to financial information.
  - Property : Contains pages related to property.

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