# Module 3.1: "Null Object"





### Agenda

- Introductory Example: Animal Sounds
- Challenges
- Pattern: Null Object
- Implementing the Null Object Pattern
- Overview of Null Object
- Null Object in Unit Testing



## Introductory Example: Animals Sounds

```
class AnimalFactory : IAnimalFactory
{
    public IAnimal Create( string description )
        if (_animalTypes.TryGetValue(processedDescription,
             out Type animalType))
            return Activator.CreateInstance(animalType) as IAnimal;
        return null;
                                              interface IAnimal
                                                  string Name { get; }
                                                  void MakeSound();
```



### Challenges

- C# has specialized syntax for null-checks, but could we relieve the client of that burden?
- What if a component needs an object to compile and run, but during unit tests that object should be "inactive"?



#### Pattern: Null Object

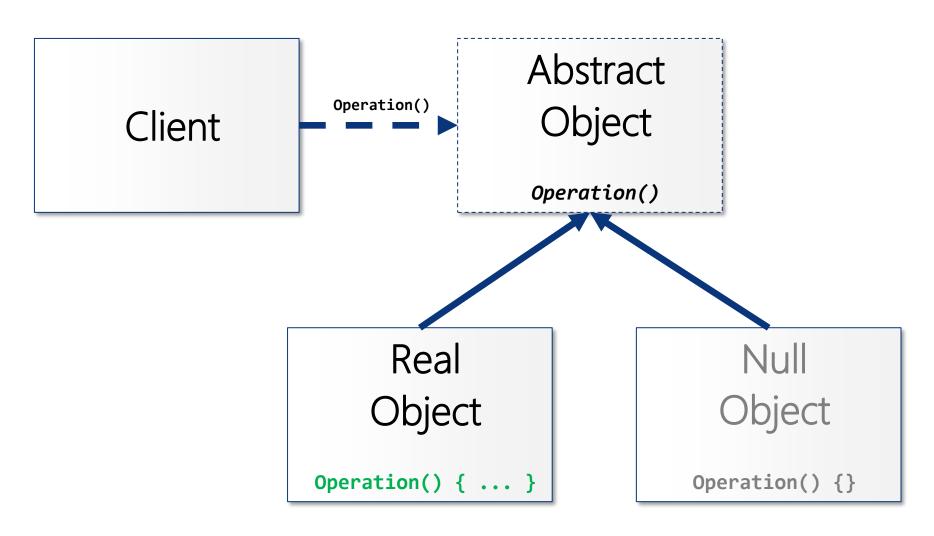
Provide an object as a surrogate for the lack of an object of a given type. The Null Object provides intelligent "donothing" behavior, hiding the details from its collaborators.

#### Outline

- Abstract the handling of null references away from the client
- Create an object with do-nothing behavior in a welldefined interface expected by the client
- Origin: Bobby Woolf (1998)



#### Overview of Null Object Pattern





#### Overview of Null Object Pattern

- Client
  - Needs a collaborator exposing Operation()
- Abstract Object
  - Interface or abstract class specifying the abstract Operation()
- Real Object
  - Concrete class implementing the Abstract Object interface
  - Supplied appropriate behavior in Operation() used by Client
- Null Object
  - Concrete class implementing the Abstract Object interface
  - Can be substituted for Real Object in the context of Client
  - Implements the Operation() to do nothing / neutral behavior
  - The exact neutral behavior depends on what Client expects



#### Null Object in Unit Testing

- Null Objects are extremely useful in unit testing
  - "mock", "stub", ...

```
private class NullLogger : ILogger
{
    public void Enter( string callerMemberName ) { }
    public void Error( string message ) { }
    public void Error( Exception exception ) { }
    public void Exit( string callerMemberName = null ) { }
    public void Info( string message ) { }
    public void Info( Exception exception ) { }
}
```

Null objects and factories can be set up in [TestInitialize]



