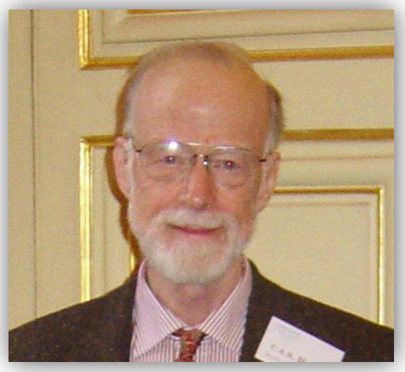
Null Object

Design Patterns

Motivating Example

"I call it my billion-dollar mistake.
It was the invention of the
null reference in 1965."

- Sir Hoare, QCON 2009



Sir Charles Antony Richard Hoare

- Inventor of Quicksort
- Turing Award Winner
- Microsoft Principal Researcher

Intent

- Rid program logic of null checks where possible
- Provide a non-functional object in place of a null reference
- Allow methods to be called on Null objects, unlike a null reference

Applicability

- When handling of null should be abstracted from the client

- When an object requires a collaborator

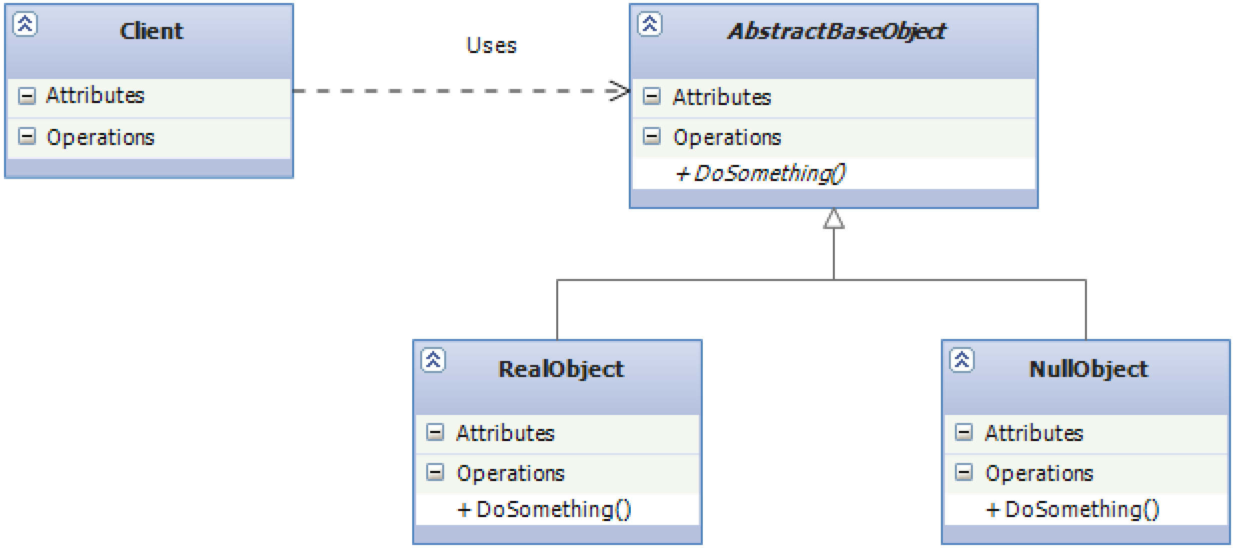
- Examples:
  - Implementing a Null Strategy object when we don’t want work to actually be done by the strategy executor

  - Implementing a Null Command object when we want the command executor to do nothing

Also Known As

- Stub
- Active Nothing
- Active Null
- Null Object may also be considered a special case of:
  - Strategy Pattern
  - Command Pattern
  - State Pattern
  - Others

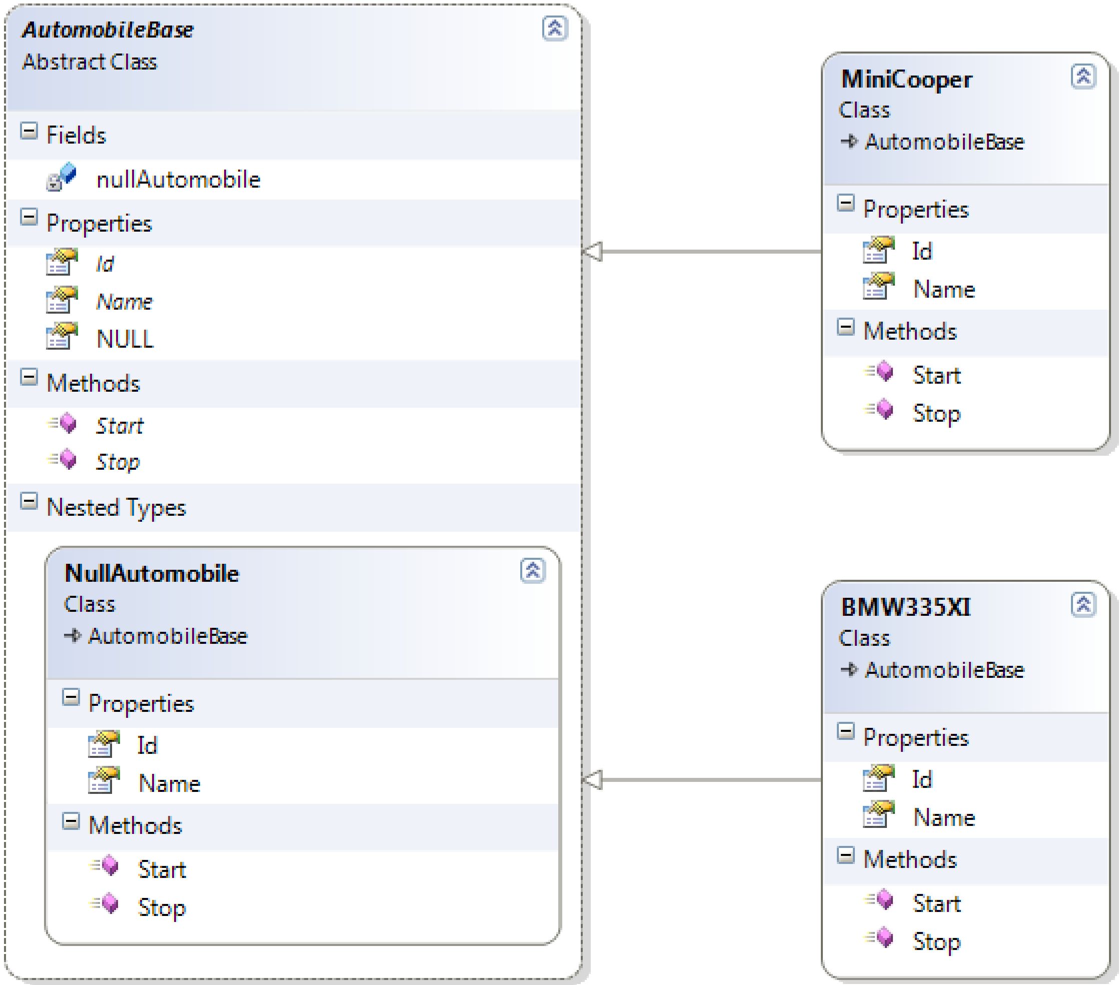
Structure


Client
Attributes
Operations
Uses
AbstractBaseObject
Attributes
Operations
+DoSomething()
RealObject
Attributes
Operations
+DoSomething()
NullObject
Attributes
Operations
+DoSomething()

Consequences

- Code is cleaner and more concise
- Fewer null checks needed
- Less branching in the code means lower complexity
- Callers don’t need to care whether they have a NullObject or a RealObject
- Unless developers are aware the NullObject implementation exists, they may still do null checks

Implementation Example



Implementation Notes

- **NullObject is often a singleton**
  - No behavior or state to vary over instances
  - Multiple instances would be identical anyway

- Do nothing code in NullObject is centralized for all callers

- Can be difficult to implement if all callers don’t agree on “do nothing behavior”

- Sometimes, caller code DOES need to know it has a NullObject

Related Patterns

- Singleton
- Strategy
- Command

Summary

- NullObject stands in for RealObject
- An alternative to null checking
- Other patterns can benefit from NullObject implementations