# Module 08: "Command"





### Agenda

- ▶ Introductory Example: Toggling Lights
- Challenges
- Implementing the Command Pattern
- Pattern: Command
- Overview of Command Pattern
- ▶ .NET Framework Example: WPF Commands
- Command Extensions and Variations



## Introductory Example: Moving Parts

```
Light light = new Light();

string input = Console.ReadLine();
if( input.ToLower() == "toggle" )
{
    light.Toggle();
}
```



#### Challenges

- How do we decouple the client from the actual light?
- What if we want to toggle more lights?
- What if we want to control other kinds of lights?
- What if we want to support timed controls?



#### Pattern: Command

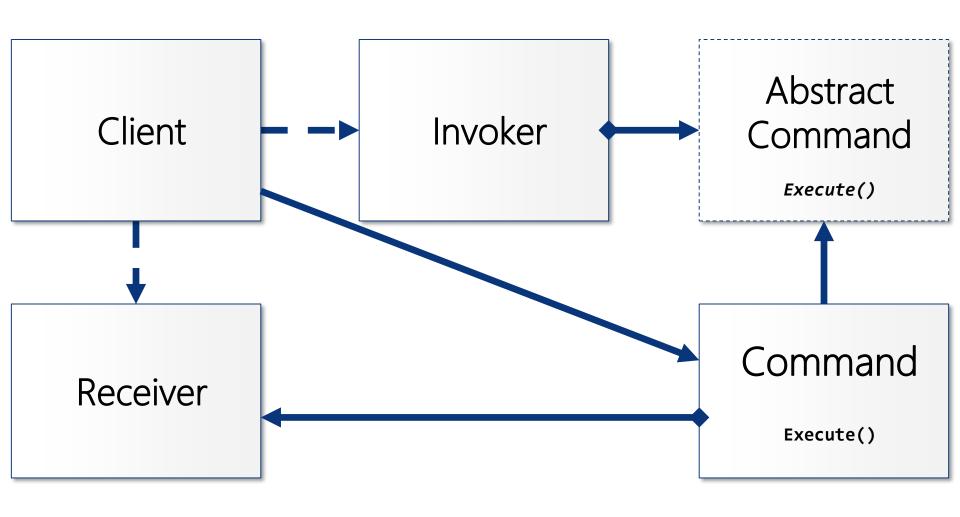
Encapsulate a request as an object, thereby letting you parameterize clients with different requests, queue or log requests, and support undoable operations.

#### Outline

- A class delegates a request to command object instead of implementing directly
- Decouples the invoker of a request from how it is executed.
- Origin: Gang of Four

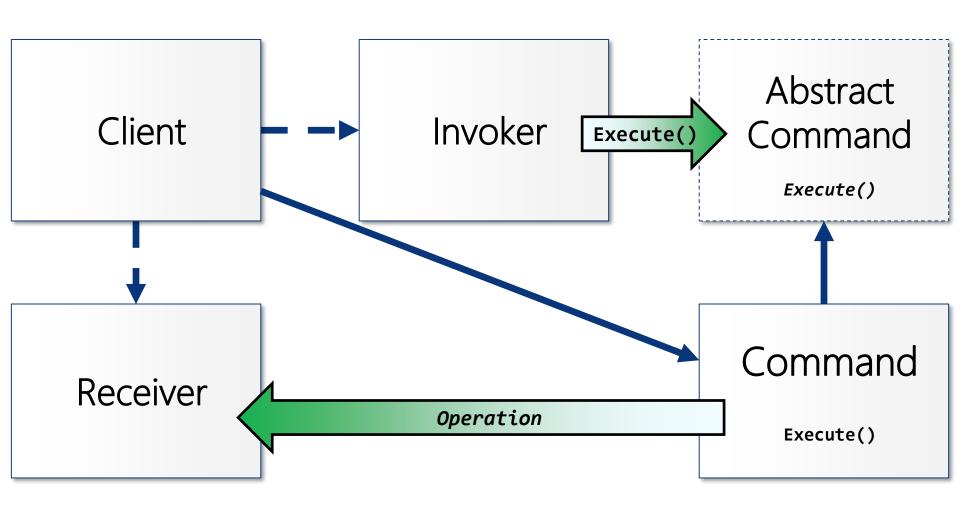


#### Overview of Command Pattern





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#### Overview of Command Pattern

- Client
  - Creates Command and Invoker and supplies Invoker with Command
- Abstract Command
  - Interface or abstract class defining general Execute() method
- Command
  - Concrete command class encapsulating action and parameter to Execute() at Receiver
- Invoker
  - Invokes Command without knowing contents of command object
- Receiver
  - Performs specified action when Invoker executes command object



### .NET Framework Example: WPF Commands

 Commands have already been built into Windows Presentation Foundation

```
<Button Command="{Binding AddCommand}">Add</Button>
<Button Command="{Binding UndoCommand}">Undo</Button>
```



#### Command Extensions and Variations

- Invocations often use parameters
  - These are stored within the Command object
- Commands are often constructed by factories
- ▶ Possible extensions to the **ICommand** interface
  - Validate()
  - Execute()
  - Undo()



