Module 20:
"State"

Agenda

▸ Introductory Example: Setting a Timer
▸ Challenges
▸ Implementing the State Pattern
▸ Pattern: State
▸ Overview of State Pattern

Introductory Example: Setting a Timer

```csharp
switch (_state)
{
    case StateKind.Normal:
        return (ConsoleColor.Gray, DateTime.Now.ToShortTimeString());
    case StateKind.SetHours:
        return (ConsoleColor.Red, $"{_timerHours,2}");
    case StateKind.SetMinutes:
        return (ConsoleColor.Red, $"{_timerHours,2}:{_timerMinutes,2}");
    case StateKind.Completed:
        return (ConsoleColor.Green, _timerSet?.ToShortTimeString());
    default:
        throw new NotImplementedException($"State {_state} not expected");
}
```

Timer Setup Display

Timer 21:24 **<< >> OK**

Timer 21 << >> OK

Timer 23:00 << >> OK

Timer 23:57 << >> OK

Timer 21:24 **<< >> OK**

Challenges

- Extensibility problem when adding more states
- Highly repetitive code
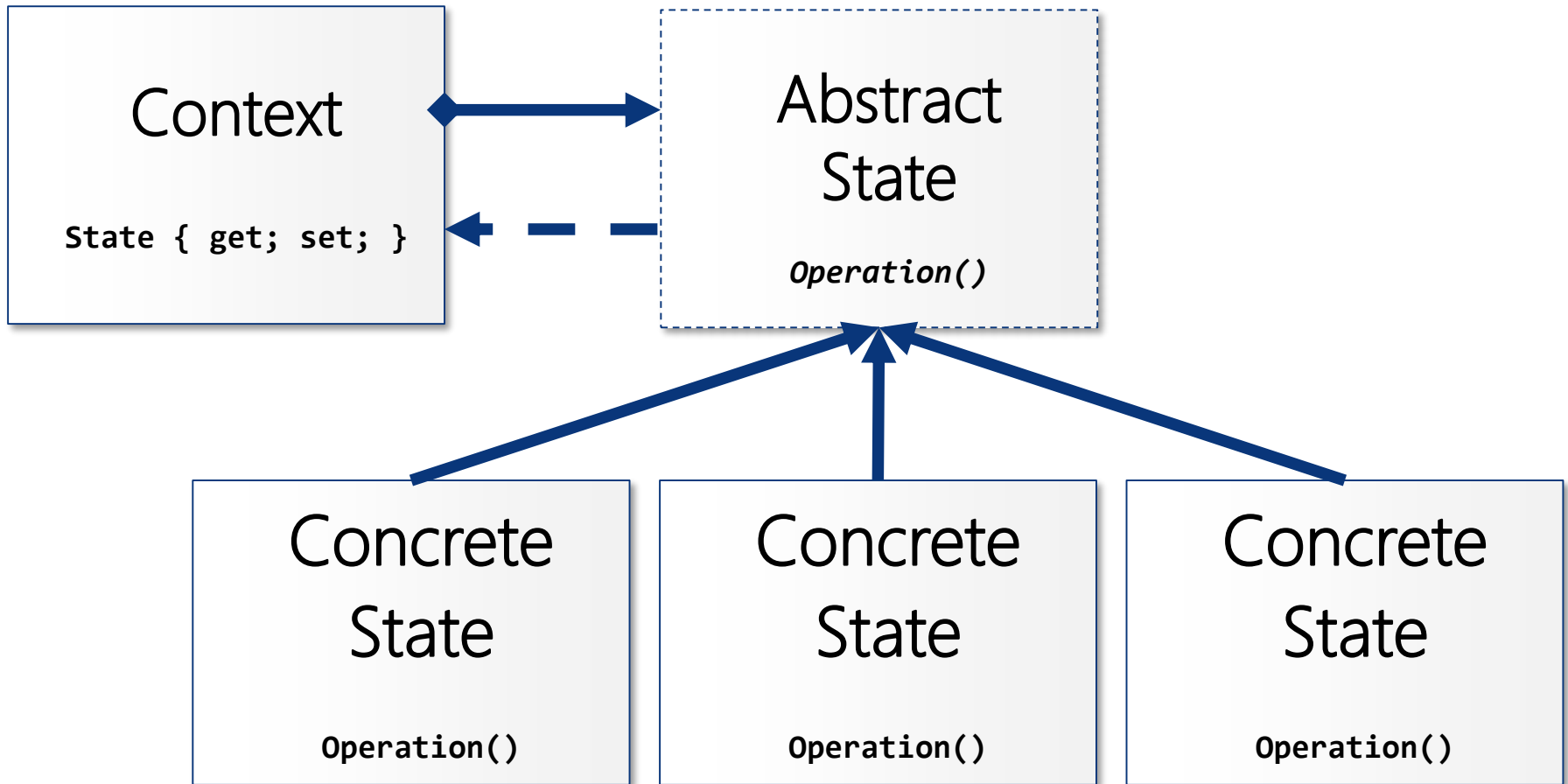- Multiple responsibilities mixed
- Almost impossible to unit test

Pattern: State

▸ *Allow an object to alter its behavior when its internal state changes. The object will appear to change its class.*

▸ Purpose
  - Encapsulate logic of distinct states into separate classes
  - Owner class will act a as proxy to state objects
  - Make program maintainable (and testable!)

▸ Origin: Gang of Four

Overview of State Pattern

Context
State { get; set; }

Abstract State
Operation()

Concrete State	Concrete State	Concrete State
Operation()	**Operation()**	**Operation()**

Overview of State Pattern

▸ Context
  - Main class accepting requests
  - Has no state-specific behavior
  - Refers to the Abstract State interface (or abstract base class)

▸ Abstract State
  - Interface or abstract class defining state behavior interface
  - Might contain common state functionality or helpers, including `State` property or method

▸ Concrete States
  - Each concrete state class contains state-specific behavior relating to the particular individual state

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