Module 20:
"State"

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Agenda

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

Introductory Example: Setting a Timer

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```
switch (_state)
{
    case StateKind.Normal:
        return (ConsoleColor.Gray, DateTime.Now.ToShortTimeString());
    case StateKind.SetHours:
        return (ConsoleColor.Red, $"{_timerHours:00}");
    case StateKind.SetMinutes:
        return (ConsoleColor.Red, $"{_timerHours:00}:{_timerMinutes:00}");
    case StateKind.Completed:
        return (ConsoleColor.Green, _timerSet?.ToShortTimeString());
    default:
        throw new NotImplementedException($"State {_state} not expected");
}
```

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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

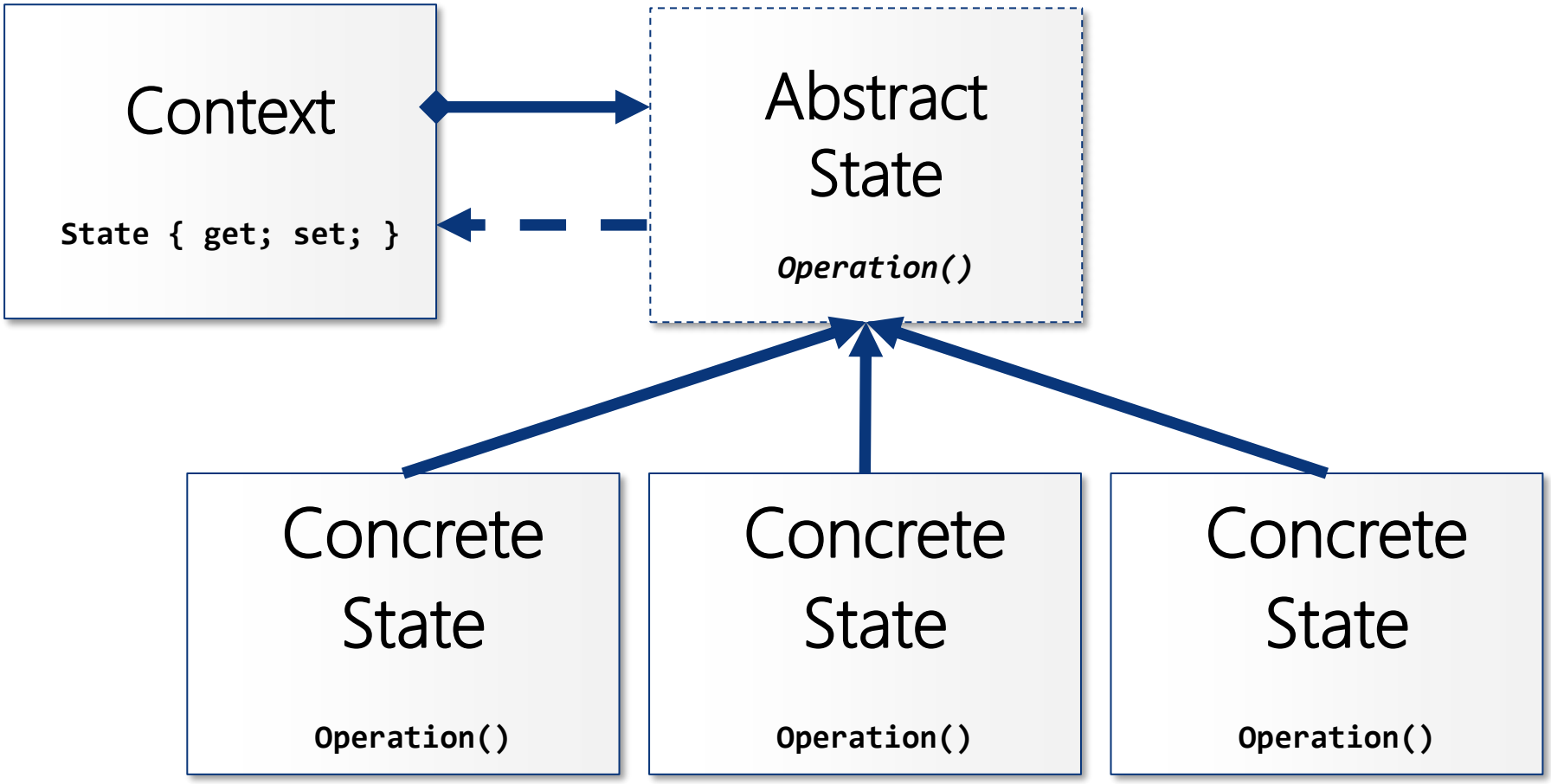
Pattern: State

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

- Outline
  - 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



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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