

# Module 18:

# "Memento"

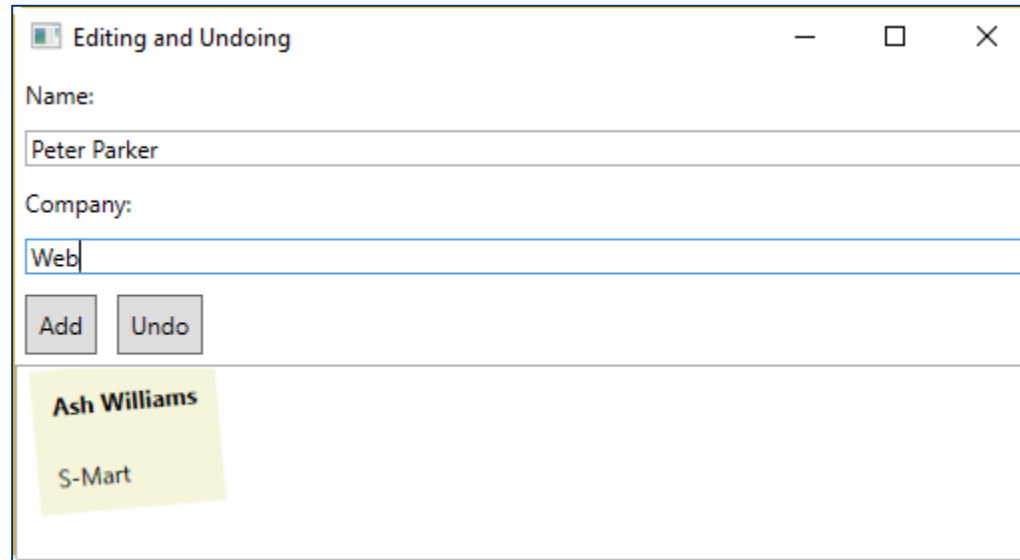


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# Agenda

- ▶ Introductory Example: Editing and Undoing
- ▶ Challenges
- ▶ Implementing the Memento Pattern
- ▶ Pattern: Memento
- ▶ Overview of Memento Pattern
- ▶ Reusability vs. Encapsulation

# Introductory Example: Editing and Undoing



A screenshot of a graphical user interface window titled "Editing and Undoing". The window contains a form with two text input fields. The first field, labeled "Name:", contains the text "Peter Parker". The second field, labeled "Company:", contains the text "Web". Below the input fields are two buttons: "Add" and "Undo". At the bottom of the window, there is a list of items displayed on a yellow sticky note background. The first item is "Ash Williams" and the second item is "S-Mart".

```
readonly struct Guest
{
    public string Name { get; }
    public string Company { get; }
}
```

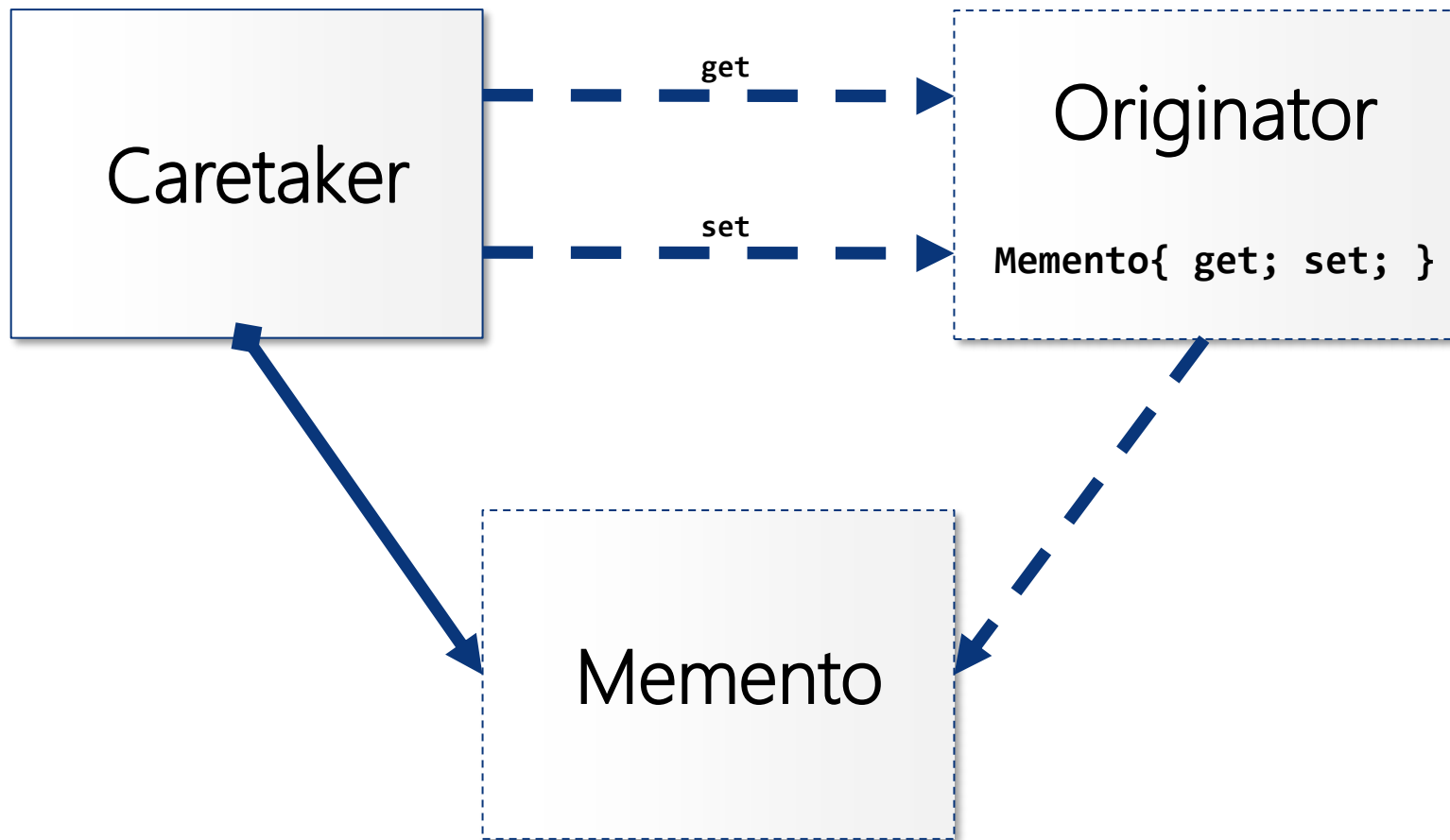
# Challenges

- ▶ How do we implement undo?
- ▶ How do we externally save the internal state?
- ▶ Is it possible to do so without breaking the encapsulation of the object, i.e. exposing internal state?
- ▶ And how do we ensure only the object itself can access the state when externalized...?

# Pattern: Memento

- ▶ *Without violating encapsulation, capture and externalize an object's internal state so that it can be restored to this state later.*
- ▶ Outline
  - Make object itself responsible for saving its internal state to a memento object.
  - Make object itself responsible for restoring its internal state from a memento object
- ▶ Origin: Gang of Four

# Overview of Memento Pattern



# Overview of Memento Pattern

- ▶ Caretaker
  - Concrete class controlling the create/restore of Originator state
  - Retrieves and sets Memento on Originator
- ▶ Originator
  - Concrete class containing state to be externalized
  - Implements a property exposing Memento object
- ▶ Memento
  - Interface (or occasionally concrete class) containing externalized version of Originator state

# Reusability vs. Encapsulation

- ▶ It is not hard to create a reusable setup for Memento
  - `IMemento<T>`
  - `Originator<T>`
  - ...
- ▶ But this allows everyone to "see" externalized state
- ▶ Consider creating an "anonymous" interface implemented by class internal to Originator

```
public interface IMemento
{
    object State { get; }
}
```





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