

Module 18: "Memento"

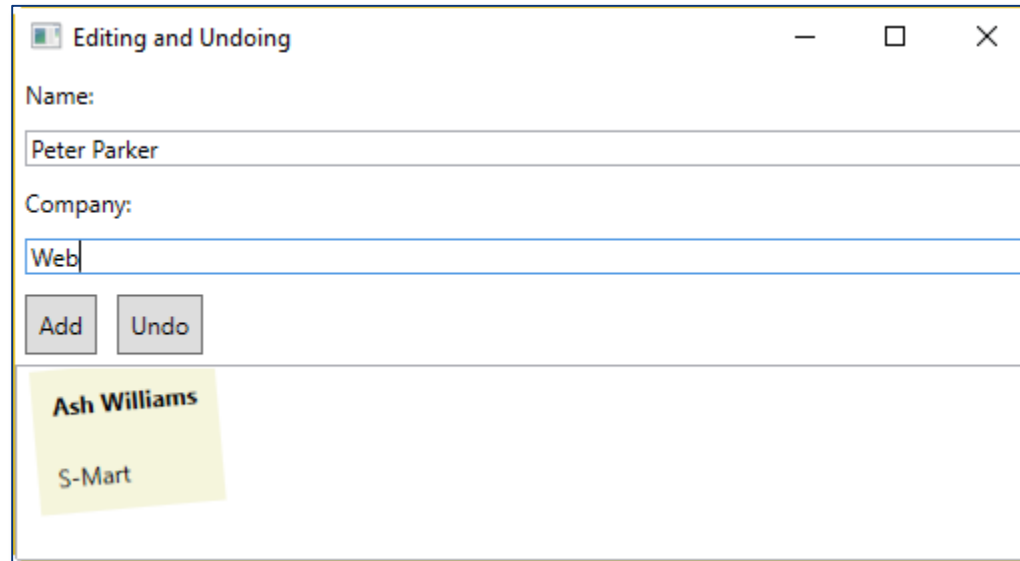


Agenda

- ▶ 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 GUI window titled "Editing and Undoing". The window contains a form with two text input fields: "Name:" with the value "Peter Parker" and "Company:" with the value "Web". Below the fields are two buttons: "Add" and "Undo". At the bottom of the window is a list of entries, currently showing "Ash Williams" and "S-Mart" on a yellow background.

```
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 can access the state when externalized...?

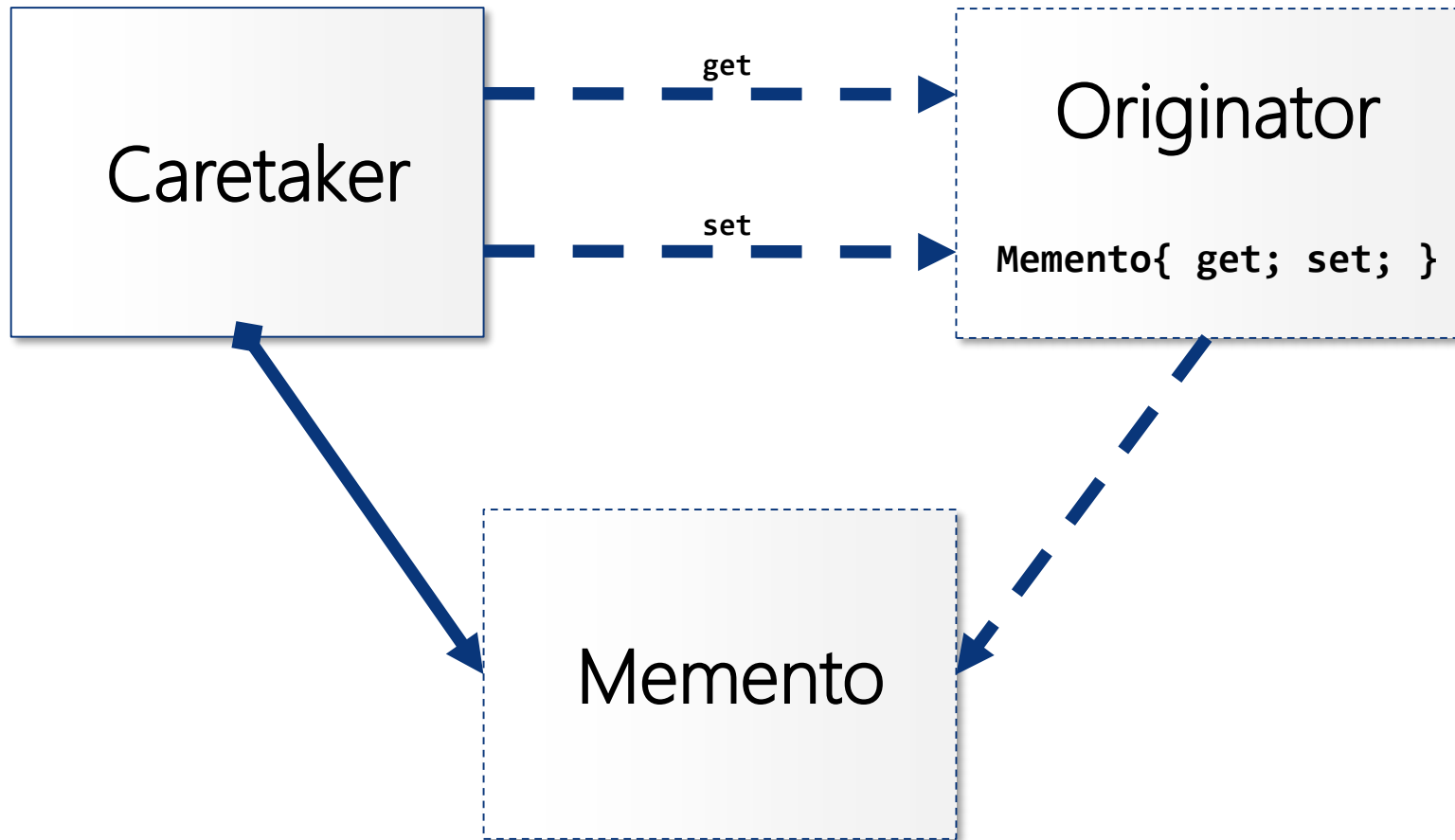


Pattern: Memento

- ▶ *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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