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

Editing and Undoing	_	\times
Name:		
Peter Parker		
Company:		
Web		
Add Undo		
Ash Williams		
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

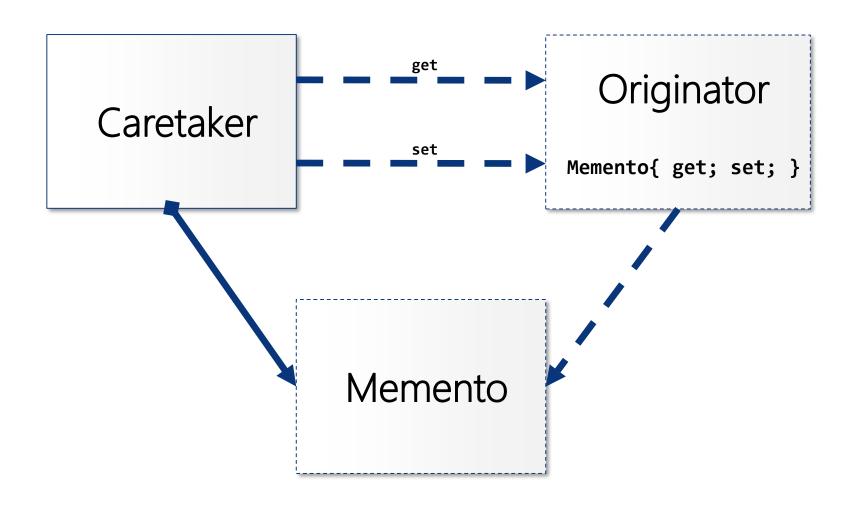
 Without violating encapsulation, capture and externalize an object's internal state so that it can be restored to this state later.

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; }
}
```



