

Tecniche di Progettazione: Design Patterns

GoF: Memento

Memento

▶ Intent

- ▶ “Without violating encapsulation, capture and externalize an object’s internal state so that the object can be restored to this state later.”

▶ Motivation

- ▶ When we want to store off an object’s internal state without adding any complication to the object’s interface.
- ▶ Perhaps for an undo mechanism



Memento pattern

- ▶ **Memento:**

- ▶ a saved "snapshot" of the state of an object or objects for possible later use
- ▶ useful for:
 - ▶ writing an Undo / Redo operation
 - ▶ ensuring consistent state in a network
 - ▶ Persistency: save / load state between executions of program



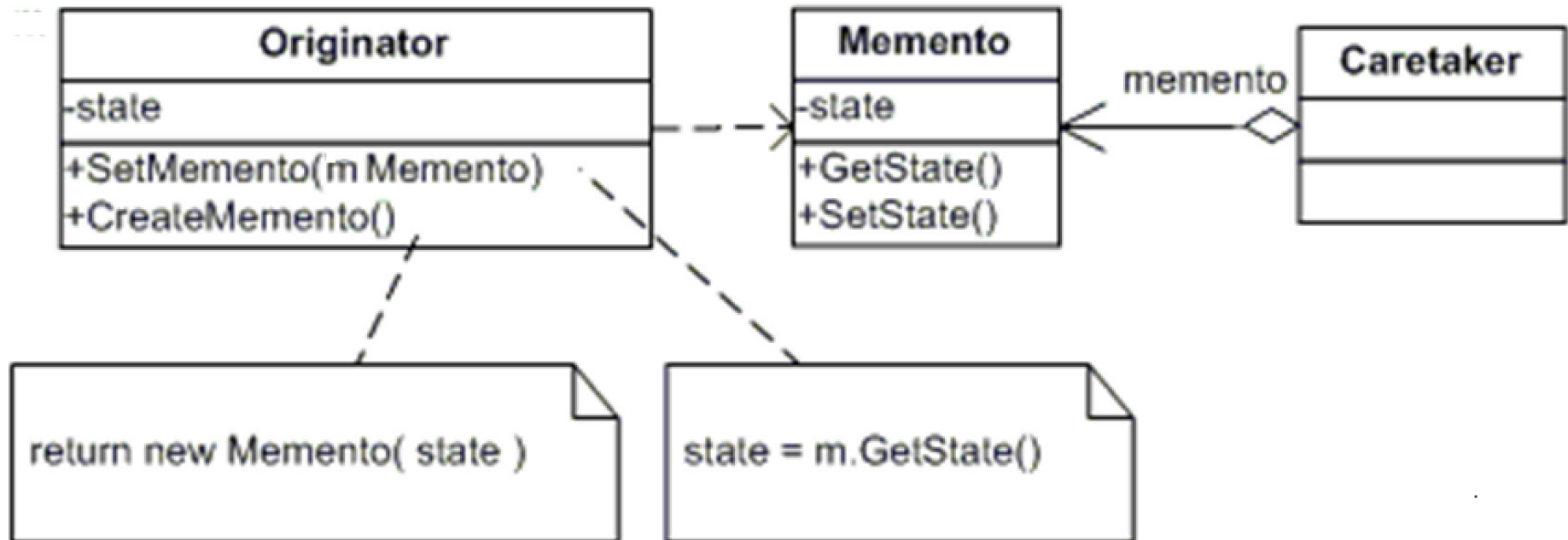
Applicability

- ▶ **Use this**

- ▶ When you want to save state on a hierarchy's elements.
- ▶ When the hierarchy's interface would be broken if implementation details were exposed.



Structure



Participants

- ▶ **Memento**

- ▶ stores the state of the Originator

- ▶ **Originator**

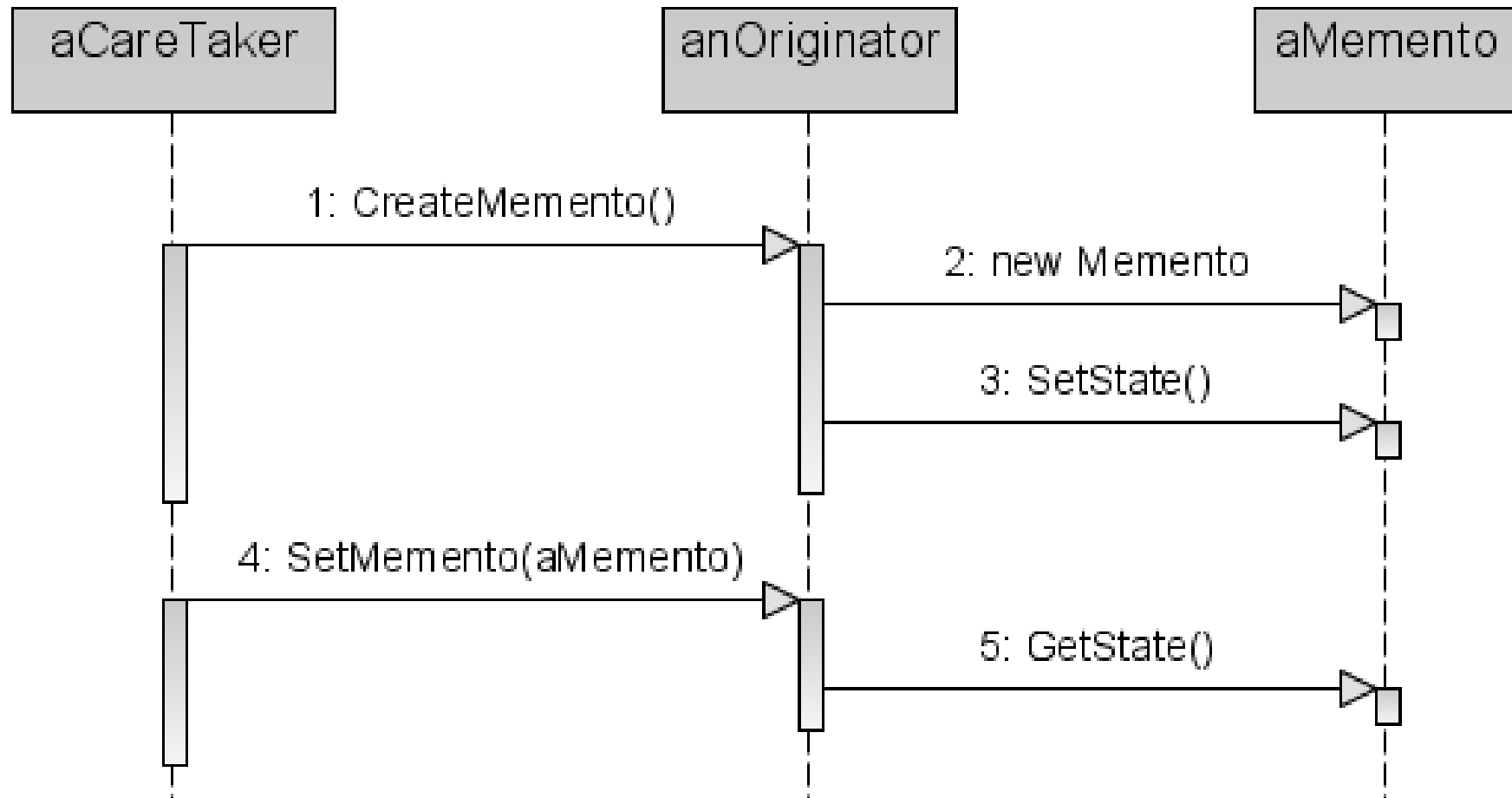
- ▶ Creates the memento
- ▶ “Uses the memento to restore its internal state”

- ▶ **CareTaker**

- ▶ Keeps track of the Memento
- ▶ Never invokes the Memento’s methods
- ▶ Never accesses Memento’s state



Collaboration



Collaboration

- ▶ Caretaker requests a memento from an Originator.
- ▶ Originator passes back memento.
- ▶ Originator uses it to restore state.



Consequences (good)

- ▶ “Preserves Encapsulation Boundaries”
- ▶ “It simplifies Originator”



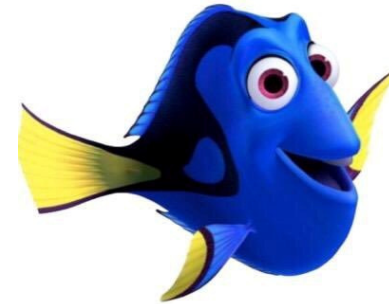
Consequences (bad)

- ▶ Might be expensive
- ▶ Difficulty defining interfaces to keep Originator encapsulated
- ▶ Hidden costs in caring for mementos
 - ▶ Caretaker could have to keep track of a lot of information for the memento



Storing Incremental Changes

- ▶ If storing state happens incrementally, then we can just record the changes of what's happened in a new memento object.
- ▶ This helps with memory difficulties.



Homework

- ▶ Change the code written to decorate (using the factories) the Christmas tree:
 - ▶ Create a memento every time you change the layer.
 - ▶ Undecorate the tree using the mementos (no need to box decorations!)