Tecniche di Progettazione: Design Patterns

GoF: Memento

Design patterns, Laura Semini, Università di Pisa, Dipartimento di Informatica.

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

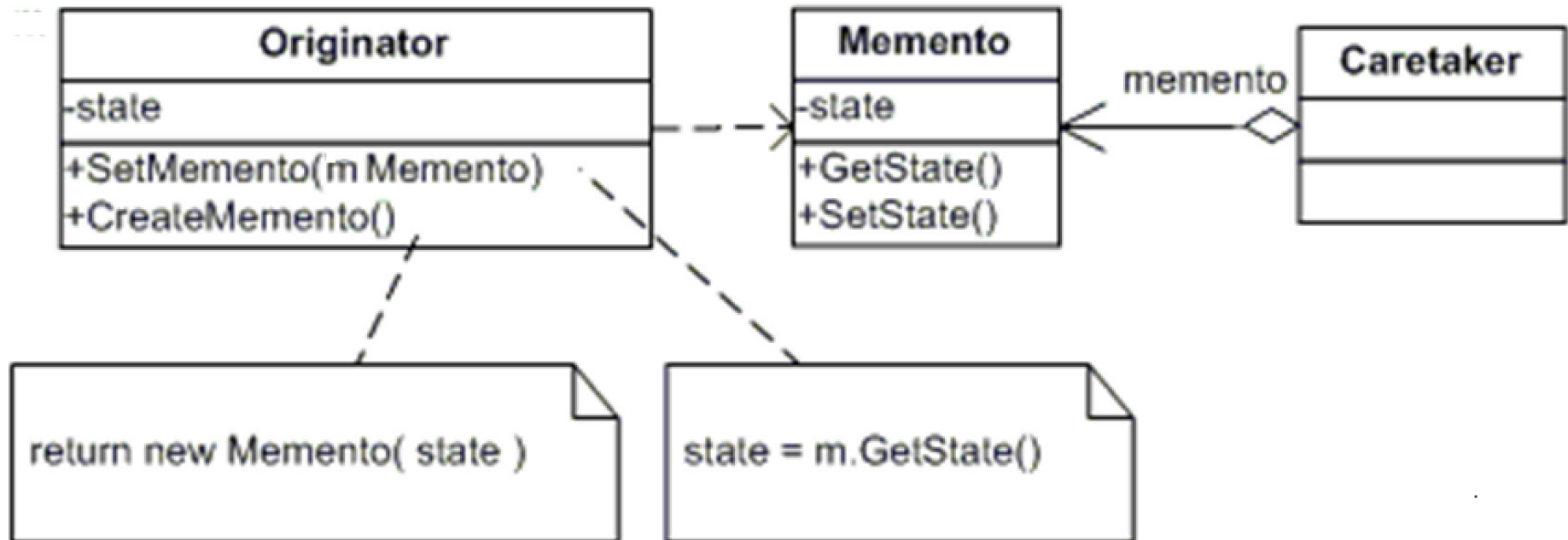   ▸ Persistency: save / load state between executions of program

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**
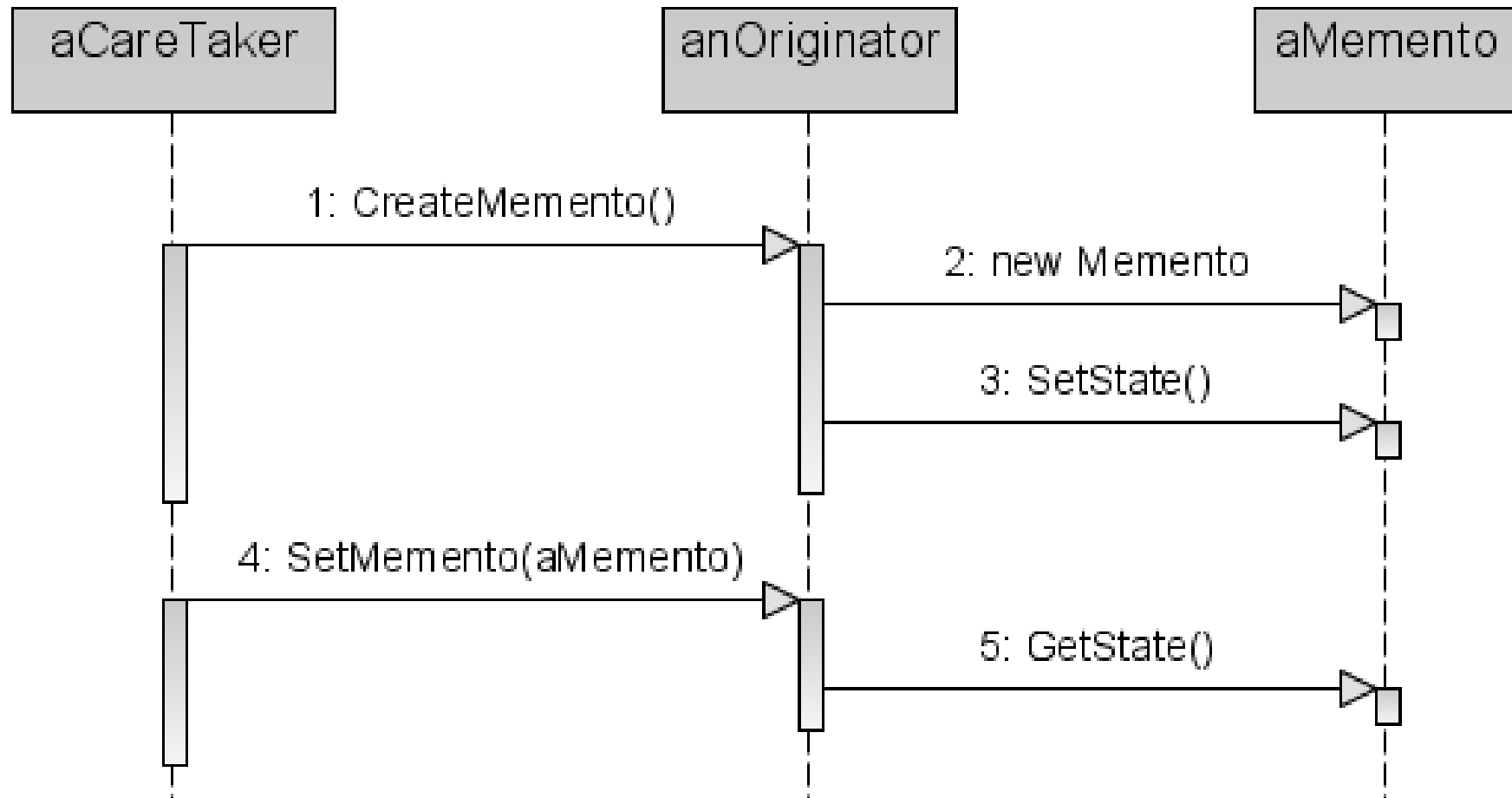
 ▶ stores the state of the Originator

▶ **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

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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.
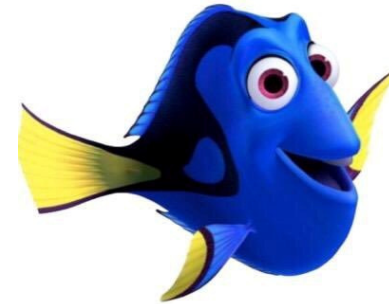
Homework

▸ Change the calculator (a new one) example using memento instead of undo to restore an old state.