Tecniche di Progettazione: Design Patterns

GoF: Memento

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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
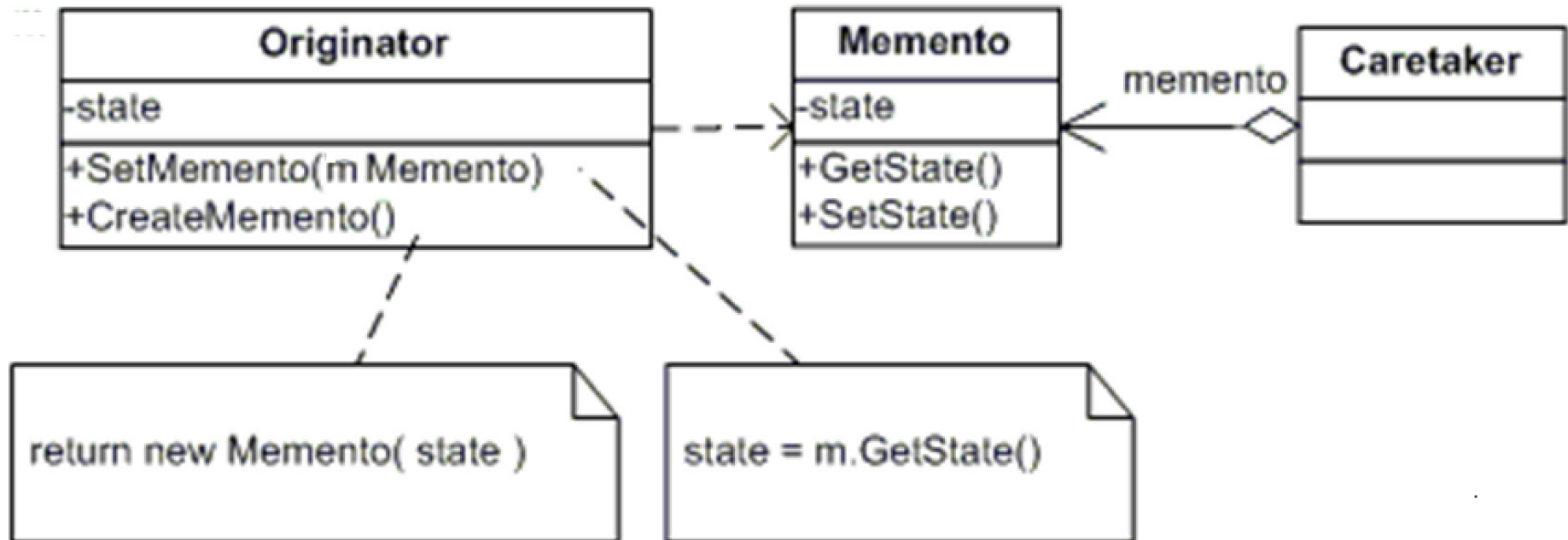   - Persistency: save / load state between executions of program

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**
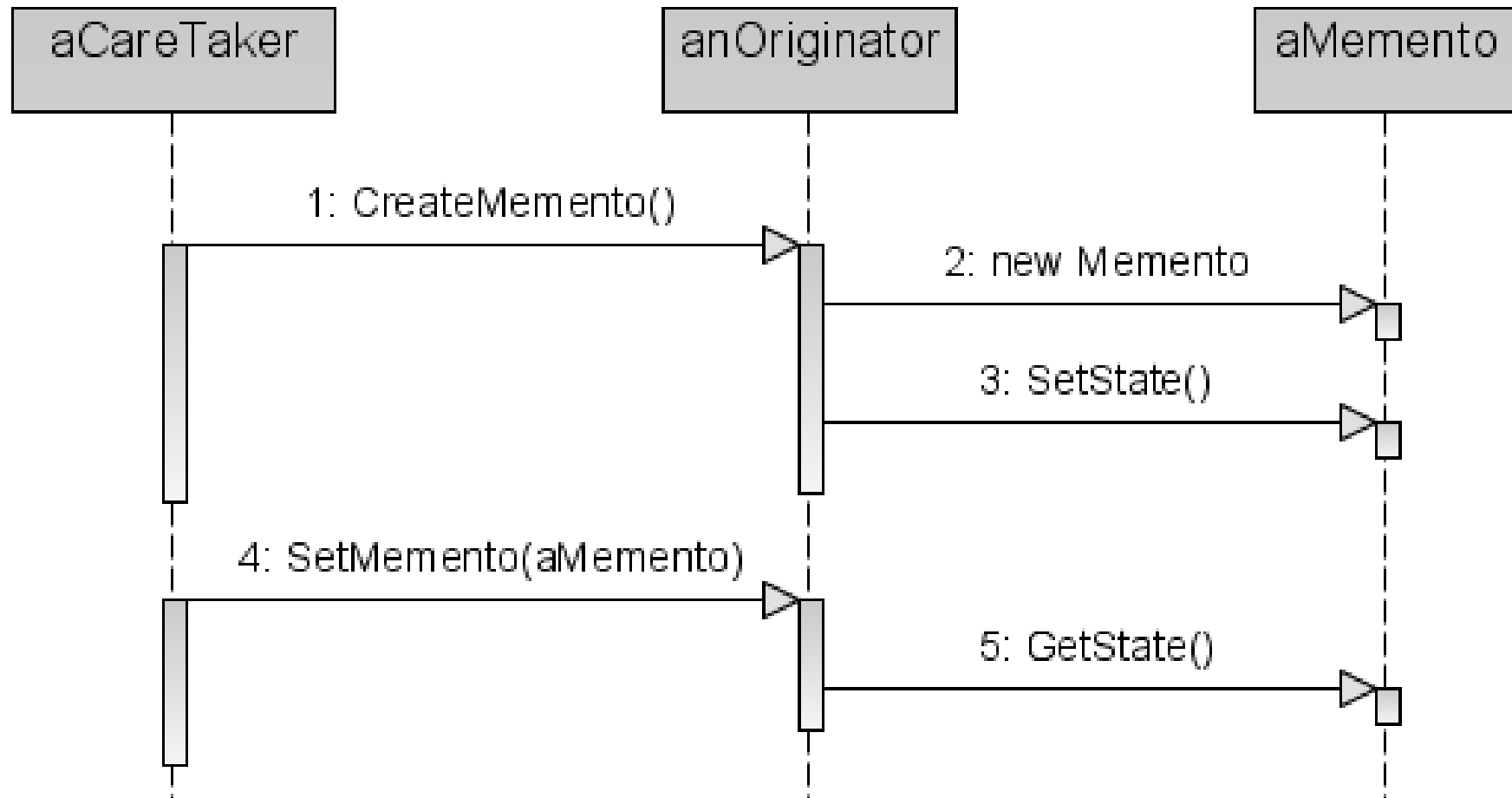
  ▸ stores the state of the Originator

▸ **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.
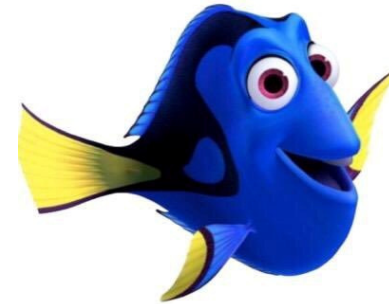
Homework

- Change the 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!)

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