

Memento DP

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Problem

- A game has many levels.
 - We want a facility so that the user can store the current state of the game.
 - The user can later on start from the saved state of the game.
 - In general, we need "undo" or "rollback" kind of operations.



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Serialization is built in Java and C#.

Serialization has security issues.

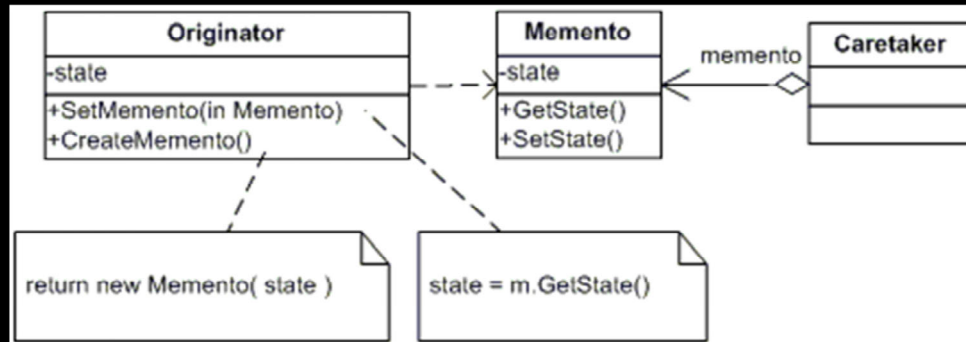
Prefer to use library like "Protocol Buffers" instead of serialization in Java and C#.

For C++, a library like boost can be used.

Code example with C++ boost library present.

Memento

- The caretaker is responsible for memento's safekeeping. It never operates on or examines the contents of memento.



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Use memento when

A snapshot of object's state must be saved so that it can be restored to that state later and

A direct interface to the obtaining the state would expose implementation details and break the object's encapsulation.

Consequences:

It simplifies the code for Originator.

It provides easy to implement undo / recovery capability.

In Java, this DP is easy. Serialization can be used to save a system's state.

Keeping the saved state external from the key object helps to maintain cohesion.

Saving and Restoring states can be time consuming unless carefully designed.

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It captures and externalizes an object's internal state so that the object can be restored to that state later.

It does not violate encapsulation

A memento is an object that stores a snapshot of the internal state of another object – memento's originator.

The Originator creates a memento for its current internal state.

Memento

- How does it differ from Command Design Pattern?



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Command and Memento act as magic tokens to be passed around and invoked at a later time.

In Command, the token represents a request; in Memento, it represents the internal state of an object at a particular time.

Polymorphism is important to Command, but not to Memento.

Command can use Memento to maintain the state required for an undo operation.

Serialization is built-in Java and C#. For C++, a library like protocol buffers from google can be used.