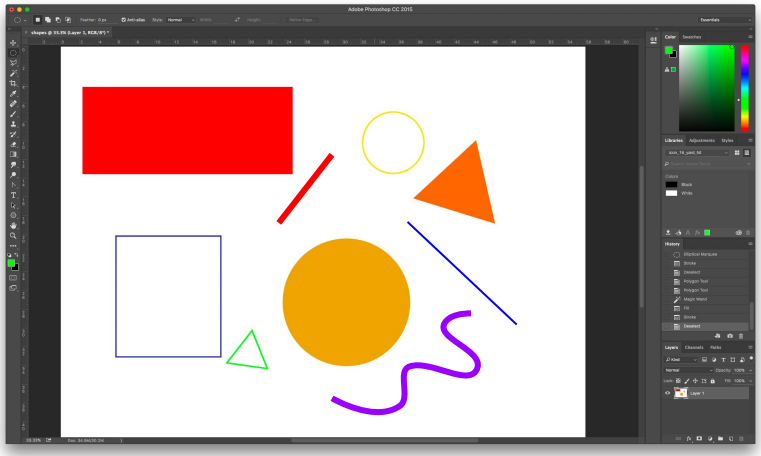
SWEN 262
Engineering of Software Subsystems

Memento Pattern

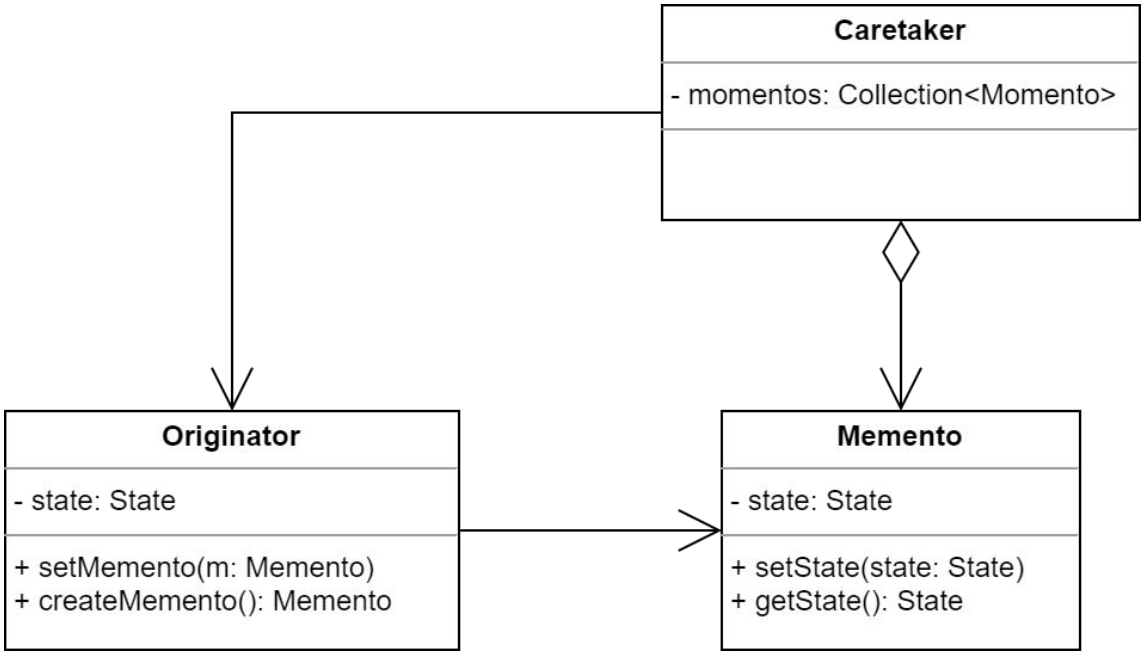
PhotoPaint Pro™

1. The PhotoPaint Pro™ program allows users to edit image files.
   a. *Images comprise state including height, width, and an array of pixels.*
2. A history of changes to the images must be maintained so that the user can revert to a previous version at any time.
   a. *An ordered collection of revisions must be stored.*
   b. *The user must be able to review all previous revisions sorted in reverse chronological order.*
   c. *The user may choose to restore a previous revision, at which point the pixels in the image will be restored to that point.*
3. At any time the system may free up memory by purging some number of the oldest revisions.
4. The revision history is not saved when the image and/or application are closed.



There are a number of different ways to design the system for tracking the toys manufactured by lots of different factories. Let's take a look at some of the options...

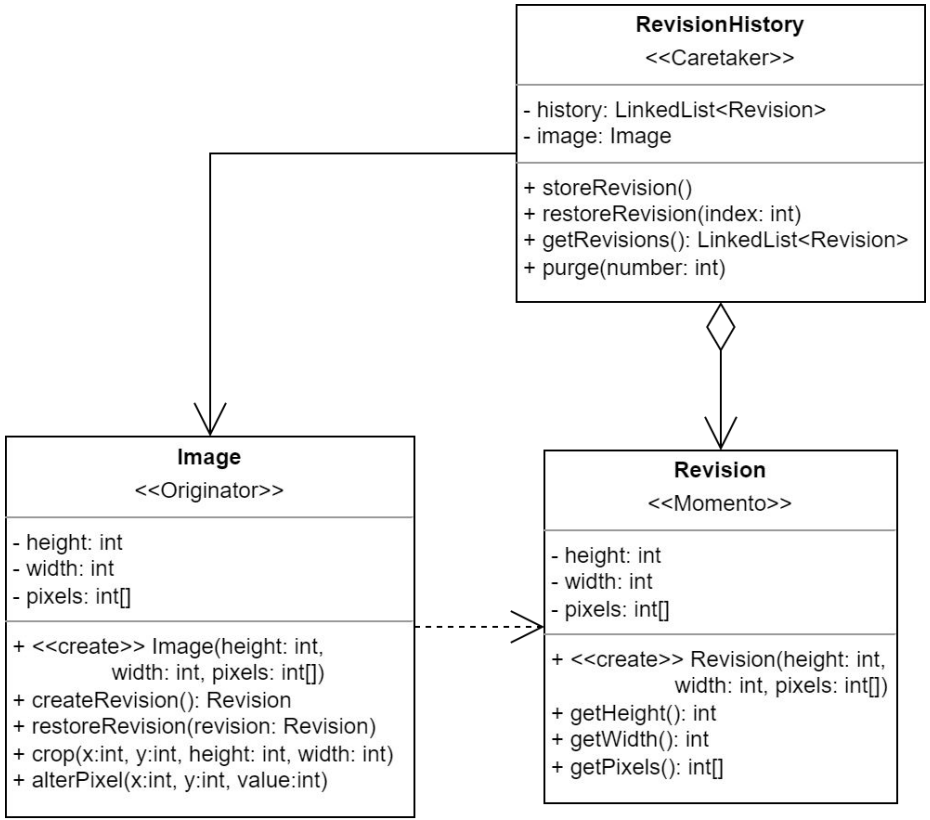
GoF Memento Structure

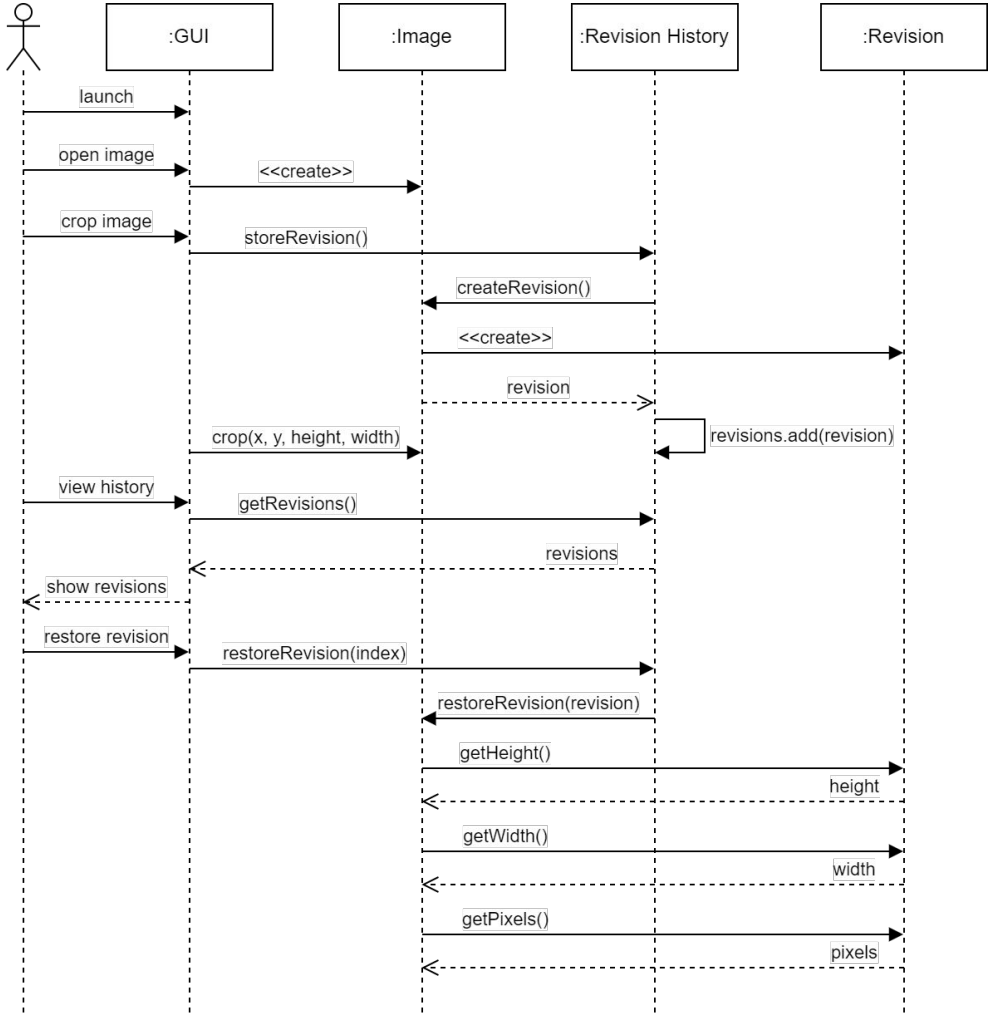


Without violating encapsulation, capture and externalize an object's internal state so that the object can be restored to this state later.

(Behavioral)

PhotoPaint Pro™ System Design





This diagram shows a user editing an image and then restoring it to the previous version.

GoF Pattern Card

Name: *PhotoPaint Pro™ System*		GoF Pattern: *Memento*
Participants		
Class	Role in Pattern	Participant's Contribution in the context of the application
Image	*Originator*	*An image in the application. It has a height, width, and an array of pixels. The image is responsible for creating revisions of its own state, and restoring its state to a previous revision.*
Revision	*Memento*	*Stores a snapshot of the state of an image. Can be used to restore the image to its previous state.*
Revision History	*Caretaker*	*Keeps a list of revision sorted in reverse chronological order. Can be used to restore a specific revision from the history.*

Memento

There are several *consequences* to implementing the memento pattern:

- *Encapsulation boundaries are preserved.*
- *The originator does not need to manage its own mementos.*
- *Consistency among products is promoted.*
- *Using mementos might be expensive if large amounts of information must be copied into each memento.*
- *There may be hidden costs (e.g. storage) for caring for mementos.*