OBSERVER

one-to-many dependency between subject and observers, so that when subject changes, the observers are notified and updated.

a way of notifying change to a number of classes

Questions

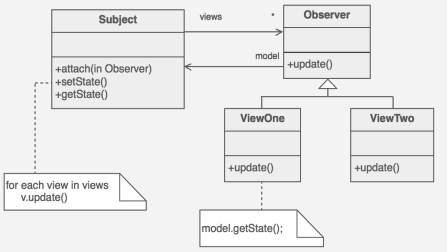
What is it?

> many objects need to be notified of changes in the state of one object

Where have I seen it before?

> RSS feeds or any pub/sub system you might have used/coded

Ok, this is cool. What do I need to implement it?



1. A Subject Abstract Class and an Observer Abstract Class
2. Concrete subject and observer class that implement above pattern.

The concrete subject registers its observers

Example

A **referee** (*concrete subject*) notifies all the **players** and **commentators** (*concrete observers*) about changes in the state of a Soccer match. Each **player** must be notifiable.

MEMENTO

provides the ability to restore an object to its previous state

a memento is like a magic cookie that encapsulates a checkpoint capability

Questions

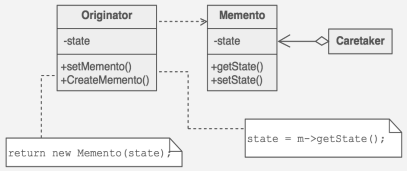
What problem does it solve?

> you want to save the state of an object so that you can restore it later.

Where have I seen it before?

> Git or any version control system for that matter. A memento makes rollbacks possible.

Ok, this is cool. What do I need to implement it?



1. An originator class (class that has a state that needs to be remembered)
2. A caretaker class (class that wants to modify the state of the originator)
3. A memento class that holds originator information that can't be modified by any other class. It is merely a container.

Example

A **programmer** (caretaker) asks for a copy (memento) of the **code** (originator) he/she is modifying. Later he/she decides he doesn't like the new state of the **code** so he restores it with the copy it still has.

INTERPRETER

Represent the grammar of a language with a hierarchical object-oriented design.

The language is usually a domain specific language.

Questions

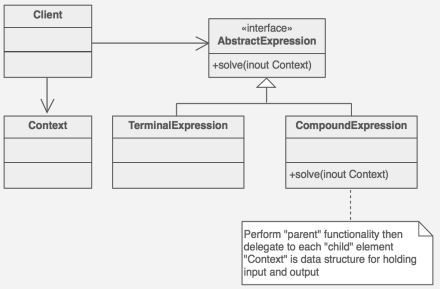
What problem does it solve?

> A language must be parsed and interpreted.

Where have I seen it before?

> Parsers

Ok, this is cool. What do I need to implement it?



1. A Context class that contains the input.
2. An AbstractExpression class, a composite object of terminals and non-terminals.
3. The client passes the context to the abstract expression, which calls the interpret() function on its children.

Example

A **roman numeral** (context) is converted into decimal notation by the **parser** (Abstract Expression).

Derivation: LIV => 50 + IV => 50 + (-1 + 5) => 50 + 4 => 54

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Advantages

Observer: minimal coupling; easy addition and removal of observers

Memento: it is an encapsulated copy so it avoids exposing its info; the storage burden is on the caretaker, not on originator

Interpreter: easy to change/extend/implement/evaluate a language

Disadvantages

Observer: Possible memory leak; Objects might need to work hard to deduce what changed in the subject.

Memento: Copy operation to a memento can be costly for the originator; Caretaker might have large storage costs.

Interpreter: Complex grammars are hard to maintain and debug.

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