INRIA

Strategy

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Strategy

Define a family of algorithms, encapsulate each in a separate class and define each class with the same interface so that they can be interchangeable.

Also Know as Policy

Strategy Intent

Define a family of algorithms, encapsulate each in a separate class and define each class with the same interface so that they can be interchangeable.

Motivation

Many algorithms exist for breaking a stream into lines. Hardwiring them into the classes that requires them has the following problems:

Clients get more complex
Different algorithms can be used at different times
Difficult to add new algorithms at run-time

Code Smells


```
Composition>>repair
    formatting == #Simple
        ifTrue: [ self formatWihtSimpleAlgo]
        ifFalse: [ formatting == #Tex
                    ifTrue: [self formatWithTex]

                ....]
```


Alternative

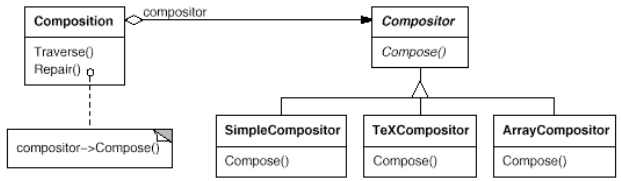

```
Composition>>repair
    | selector |
    selector := (‘formatWith, formatting) asSymbol.
    self perform: selector
```

Still your class gets complex...

Inheritance?

May not be the solution since:
- you have to create objects of the right class
- it is difficult to change the policy at run-time
- you can get an explosion of classes bloated with the use of a functionality and the functionalities.
- no clear identification of responsibility

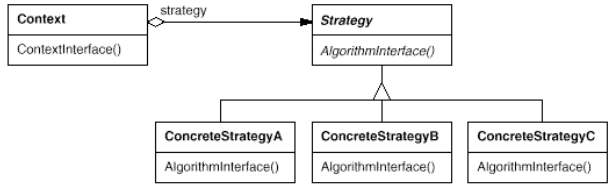
Strategy Solution



When

Many related classes differ only in their behavior
You have variants of an algorithm (space/time)
An algorithm uses data that the clients does not have to know

Structure




```
Composition>>repair
    formatter format: self
```


Participants

Strategy (Compositor)
- declares an interface common to all concrete strategies

Concrete Strategies
- implement algorithm

Context
- configure with concrete strategy
- maintains a reference to the concrete strategy
- may define an interface to let the strategy access data

Collaborations (i)

Strategy and Context interact to implement the chosen algorithm.

A context may pass all data required by the algorithm to the strategy when the algorithm is called

```
GraphVisualizer>>graphIt
    ....
    grapher plot: data using: graphPane pen
```

Context passes itself as argument

Also know as self-delegation...

```
GraphVisualizer>>graphIt
    grapher plotFor: self

BartChartGrapher>>plotFor: aGraphVisualizer
    |data|
    data := aGraphVisualizer data
    ....
```


BackPointer


```
Grapher class>>for: aGraphVisualizer
   ^ self new graphVisualizer: aGraphVisualizer

BartChartGrapher>>plot
  ...
  graphVisualizer data..
  graphVisualizer pen
```

Grapher (Strategy) points directly to GraphVisualizer (Context), so sharing strategy between different context

Collaboration (ii)

"A context forwards requests from its clients to its strategy. Clients usually create and pass a ConcreteStrategy object to the context; thereafter, clients interact with the context exclusively." GOF

Not sure that the client has to choose...

Consequences

Define a family of pluggable algorithms
Eliminates conditional statements
Clients can choose between several implementations
Clients must be aware of the different strategies
Increase the number of objects
Communication overhead between client and strategies
Weaken encapsulation of the client

Domain-Specific Objects as Strategies

Strategies do not have to be limited to one single algorithm
They may represent domain specific knowledge

Mortgage
- FixedRateMortgage
- OneYear...

Known Uses

ImageRenderer in VW: "a technique to render an image using a limited palette"
ImageRenderer
- NearestPaint
- OrderedDither
- ErrorDiffusion

View-Controller
a view instance uses a controller object to handle and respond to user input via mouse or keyboard.