Some Visitor advanced points

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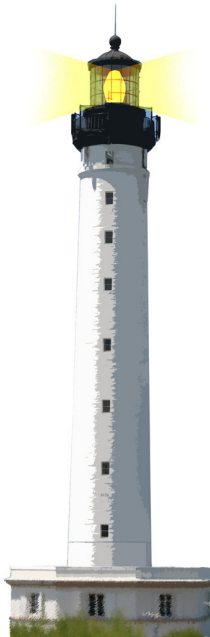


Pharo

Goals

Let us chew a bit more Visitor

- What about navigation control
- About better hooks
- Not shortcutting double dispatch

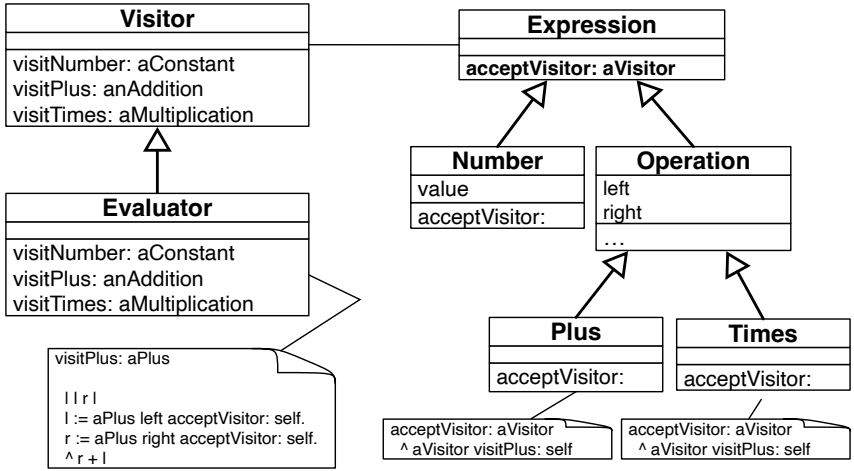
Controlling the traversal

A visitor embeds a structure traversal

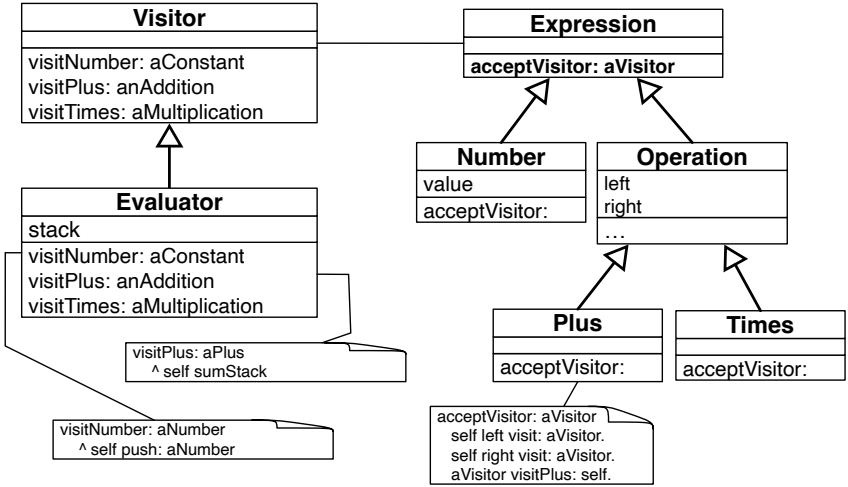
- There are different places where the traversal can be implemented:
  - in the visitors
  - in the items themselves

Usually the visitor is under control but may be the domain logic is more important.

Visitor in control



Items in control



Visitor vs. class extension

- **Even** if a language such Pharo supports class extension: defining methods on a class from another package than the class package),
- Using a Visitor is better because:
  - Each Visitor **encapsulates a complex operation**
  - Each Visitor has its **own** state

A basic trolling point

Some people may tell you that Visitor is not OO because Visitor externalizes behavior out of objects.

- Yes operations applied on objects are defined outside the objects.
- Are you ready to lose
  - **clear separation** of operation related state from the domain object?
  - **package multiple** behaviors **separately**?
  - **define incrementally** new operations?
- If you have a lot of orthogonal treatments, then better separate them

VisitMethods encode a context

- The granularity of visit methods has an impact on the hooks they offer
- **visit*** methods can be used to provide context

Example: visitTemporariesNode: vs. visitNode:

Compare

```
RBProgramNodeVisitor >> visitSequenceNode: aSequenceNode
  aSequenceNode temporaries do: [:each | self visitNode: each ].
  aSequenceNode statements do: [ :each | self visitNode: each ]
```

vs.

```
RBProgramNodeVisitor >> visitSequenceNode: aSequenceNode
  self visitTemporaryNodes: aSequenceNode temporaries.
  aSequenceNode statements do: [ :each | self visitNode: each ]
```

- visitTemporaryNodes: encodes the fact that it is only invoked on temporaries
- No need to guess by looking at parent or other information

Short cutting double dispatch

Compare:

```
RBProgramNodeVisitor >> visitSequenceNode: aSequenceNode
  self visitTemporaryNodes: aSequenceNode temporaries.
  aSequenceNode statements do: [ :each | self visitNode: each ]
RBProgramNodeVisitor >> visitVariable: aNode
  ^ aNode
```

vs.

```
RBProgramNodeVisitor >> visitSequenceNode: aSequenceNode
  self visitTemporaryNodes: aSequenceNode temporaries.
  aSequenceNode statements do: [ :each | self visitVariable: each ]
```

In the second version, the use of visitVariable: aNode

- short cuts the double dispatch
- Cuts the possibility of letting **any object participates** by telling the visitor how to handle it

Building generic Visitors can be difficult

- Should we return always a result?
- Should collect the values on collection?

There is no definitive solution

- Often the solution is to have an abstract visitor and to redefine most of the logic per families of tasks

Should we promote collections as domain nodes?

- When we iterate on a collection (e.g. of nodes), the collection is not part of the composite domain
- Should we turn such a collection into a domain element?
- It depends of the domain
- and if there is the benefit

[Type] Do not use overloaded ==visit== methods

As a summary, overloading does not really work in Java and you will have to explicitly cast your visitor or use getClass everywhere.

- Better define method visitNumber(), visitPlus(), visitTimes()
- than visit()
- Static type may prevent subclass redefinitions to be invoked

Trust an expert :)

Conclusion

- Visitor can be tricky to master
  - use accept/visit vocabulary to really help you
- Visitor is powerful for complex structure operations

A course by

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