Essence of Dispatch

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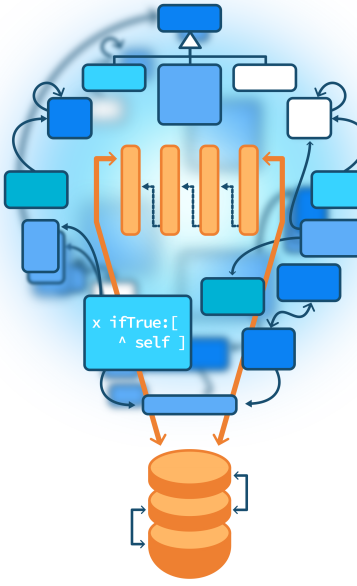
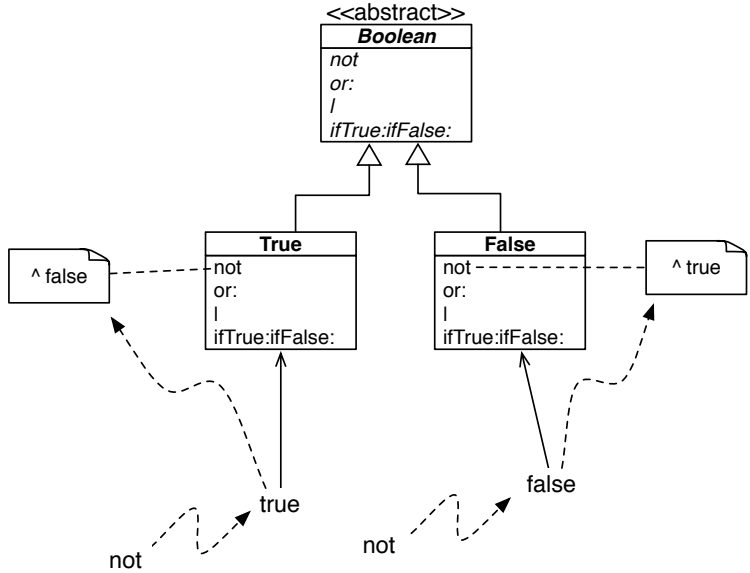


Pharo

http://www.pharo.org

Remember: Implementing not in two methods



Ok so what?

- You will probably never implement Booleans in the future
- So, is it **really** useful?
- What are the lessons to learn?
- What are the properties of the solution?

Imagine having more than two classes

MicAbstractBlock
- MicAbstractAnnotatedBlock
  - MicAnnotatedBlock
- MicContinuousMarkedBlock
  - MicCommentBlock
  - MicQuoteBlock
  - MicTableBlock
- MicIntermediateBlock
- MicListBlock
  - MicOrderedListBlock
  - MicUnorderedListBlock
- MicListItemBlock
- MicParagraphBlock
  - MacParagraphBlock
  - MacRawParagraphBlock
- MicRootBlock
- MicSectionBlock

- MicSingleLineBlock
  - MicAnchorBlock
  - MicHeaderBlock
  - MicHorizontalLineBlock
- MicStartStopMarkupBlock
  - MicEnvironmentBlock
  - ...
  - MicMetaDataBlock
  - MicSameStartStopMarkupBlock
    - MicCodeBlock
    - MicMathBlock
      - MicMathBlockExtensionForTest
      - MicMultilineComment

Imagine just a method that have one condition for each of such cases!

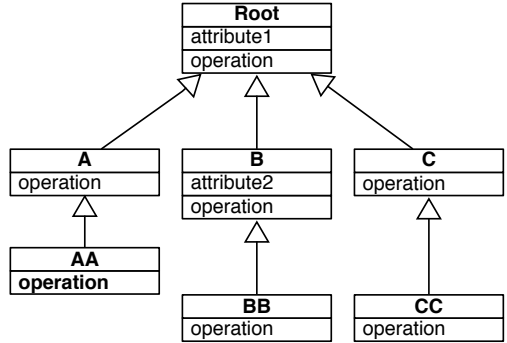
A message send is an open conditional

Sending a message

- selects the **right** method to execute based on the class of the receiver
- can be seen as a condition **without explicit ifs**
- is a dynamic choice

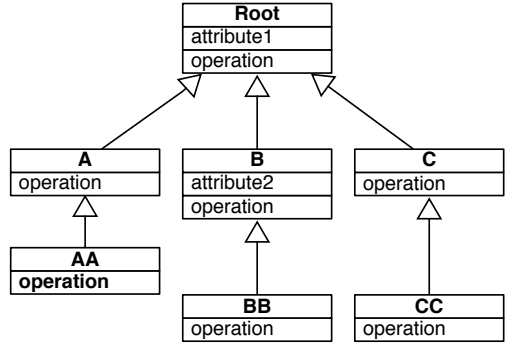
Select the right method

```
aCollection := {a . bb . c}.
...
aCollection do: [ :e |
   e operation]
```



But dynamically: new objects can be chosen

```
aCollection := {a . bb . c . aa}.
...
aCollection do: [ :e |
   e operation]
```

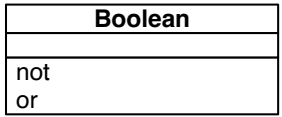


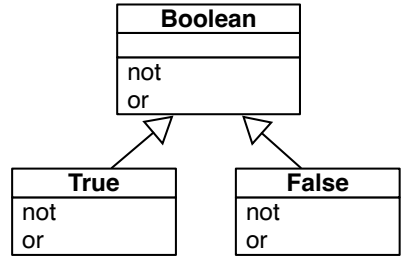
Sending a message is making a choice

- Message sending is a **choice** operator
- Each time you send a message, the execution engine **selects the right method** depending on the class of the receiver
- So, the next question is:
  - **How do we express choices**?

How do we express choices?

- Could we have the same solution for not with a **single** Boolean class?
- No! we would have conditionals in the not and or methods!

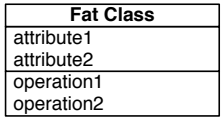


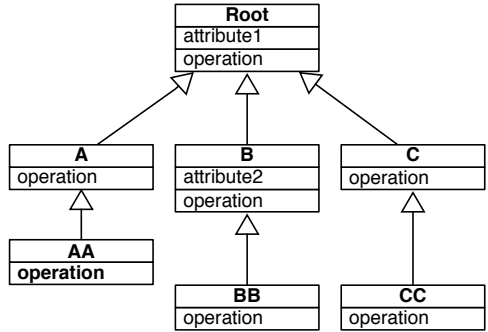


Classes play case distinct choices

- To activate the choice operator we must have **choices**
- A **class** represents a choice (a case)

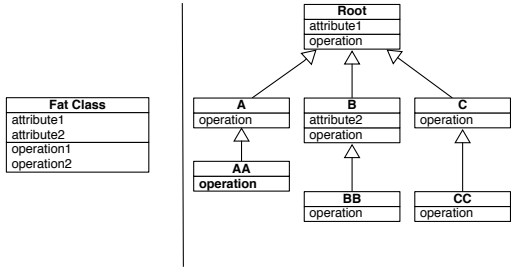
One class vs. a hierarchy



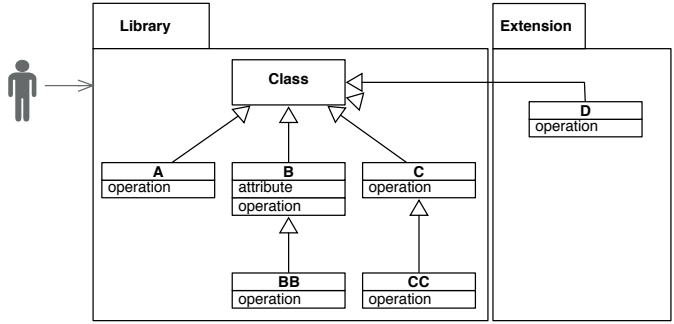


Class hierarchy supports dynamic dispatch

- More **modular**
- No need to introduce **complex** conditions
- A hierarchy provides a way to **specialize** behavior
- No need to **recompile existing** methods
- You only focus on one class at a time

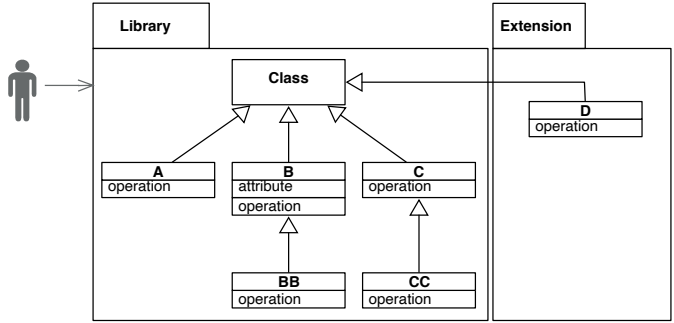


Message dispatch supports modularity



- We can package different classes into different packages (better modularity)

Limit impact of changes



- If a client receives instances of D (in addition to classes of first package), its code does not have to change
- merthod operation of D instances will be executed naturally

Message send is powerful

- Message sends are supporting **choices**
- The execution engine acts as a conditional switch: Use it!
- Classes act as "cases/choices"
- But with messages, the case statement is **extensible**:
  - adding new classes without breaking client code

Let the receiver decide

- Sending a message lets the receiver decide
- Client does not have to decide
- Client code is more declarative: **give orders**
- Different receivers may be substituted dynamically

Summary: a cornerstone of OOP

- Avoid conditionals (see AntiIfCampaign)
- Use objects and messages whenever you can
- Let the receiver decide: **Do not ask, tell**
- Class hierarchy supports for dynamic dispatch

Produced as part of the course on http://www.fun-mooc.fr

Advanced Object-Oriented Design and Development with Pharo

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