# Essence of Dispatch

## Let the receiver decide

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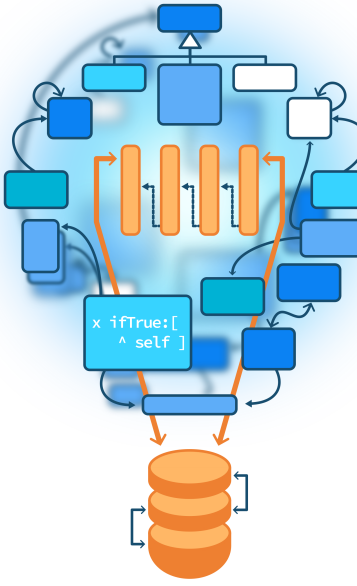
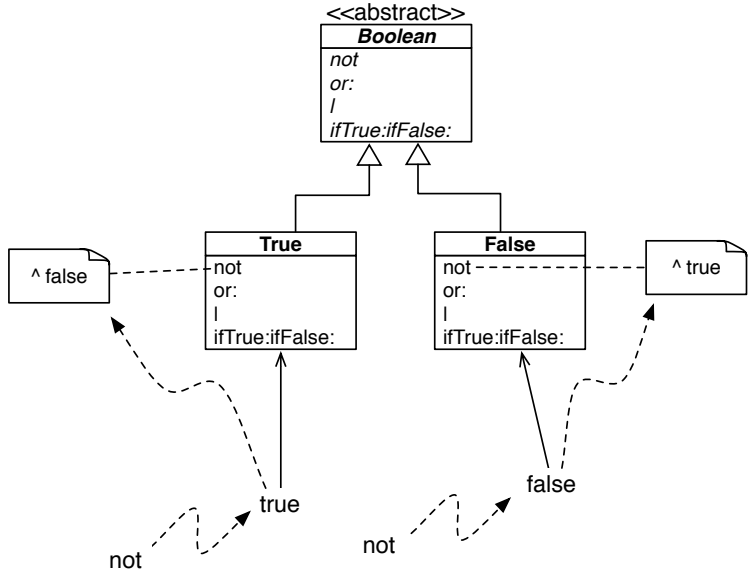



Pharo

# Remember: Implementing not in two methods



# What is the point?

- 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
  - MicListBlock
    - MicOrderedListBlock
    - MicUnorderedListBlock
  - MicParagraphBlock
    - MacParagraphBlock
    - MacRawParagraphBlock
  - MicRootBlock
  - MicSectionBlock

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

Imagine a method that has one condition for each of these cases!

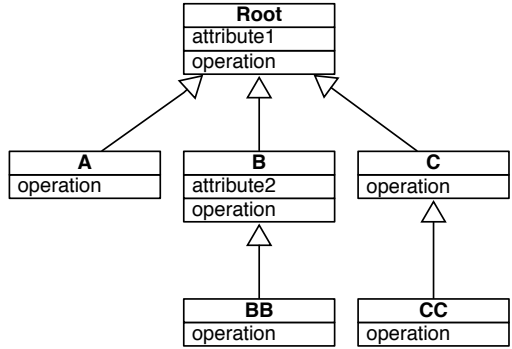
# A message send is an open conditional

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

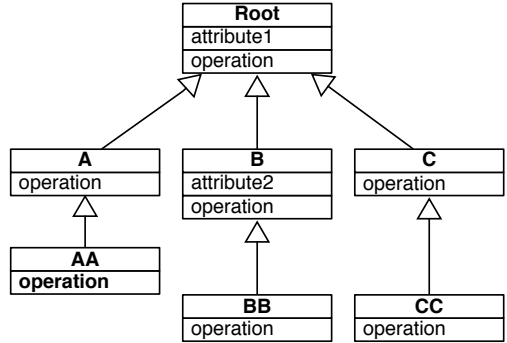
# Select the right method

```
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]
```

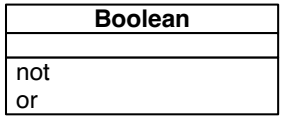


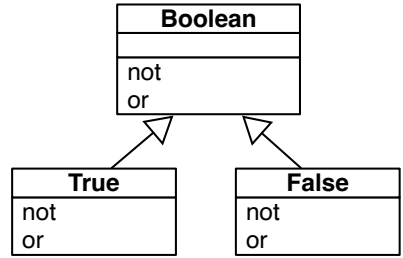
# Sending a message is making a choice

- 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!

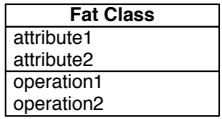


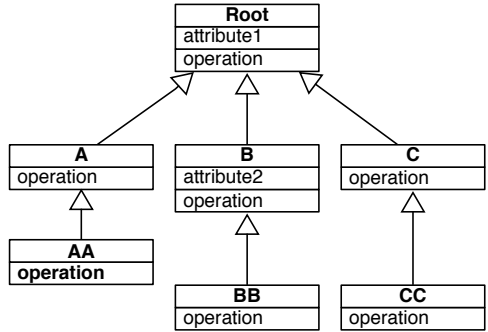



# Classes play case distinct choices

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

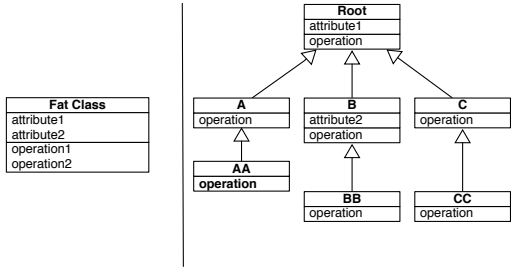
# One class vs. a hierarchy



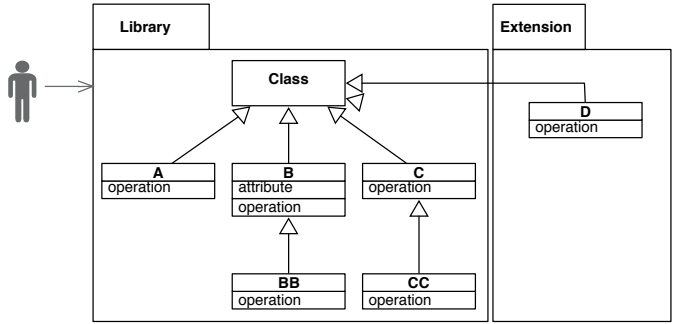



# Class hierarchy supports dynamic dispatch

- 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

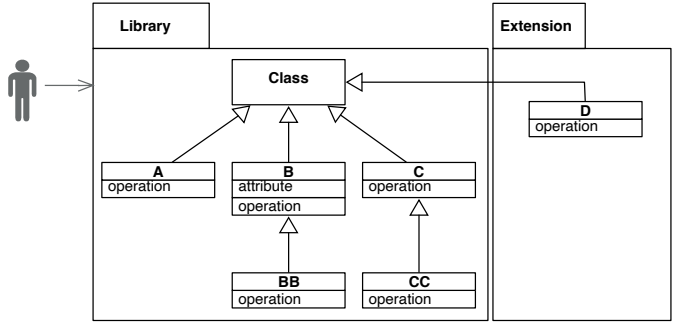


# Message dispatch supports modularity




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
- Method 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

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# Advanced Object-Oriented Design and Development with Pharo

A course by
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