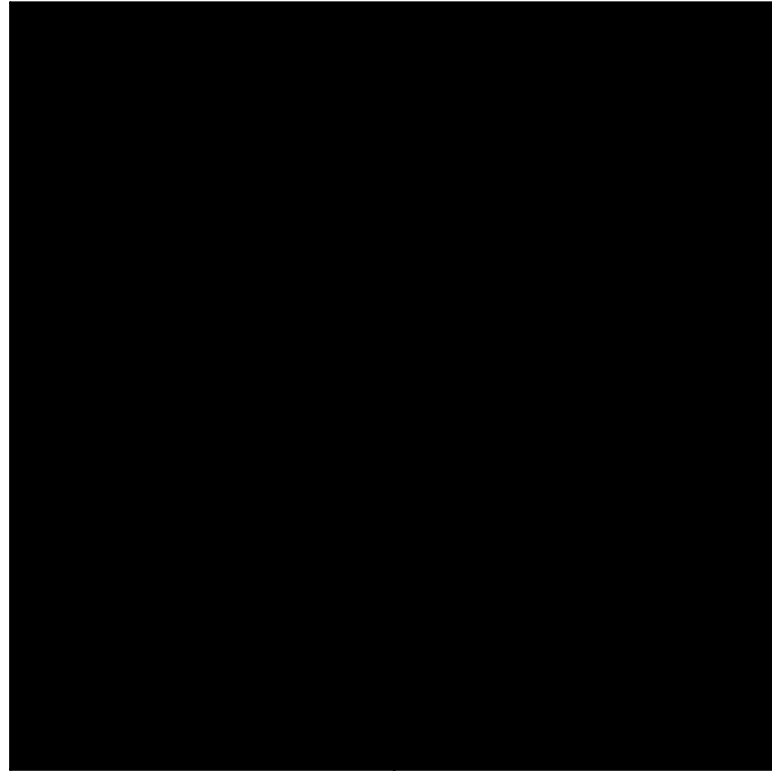


# Composing New Abstractions From Object Fragments

**Adrian Kuhn** and Oscar Nierstrasz  
University of Bern, Switzerland

Presented and published at VMIL 2008.



In objectland...

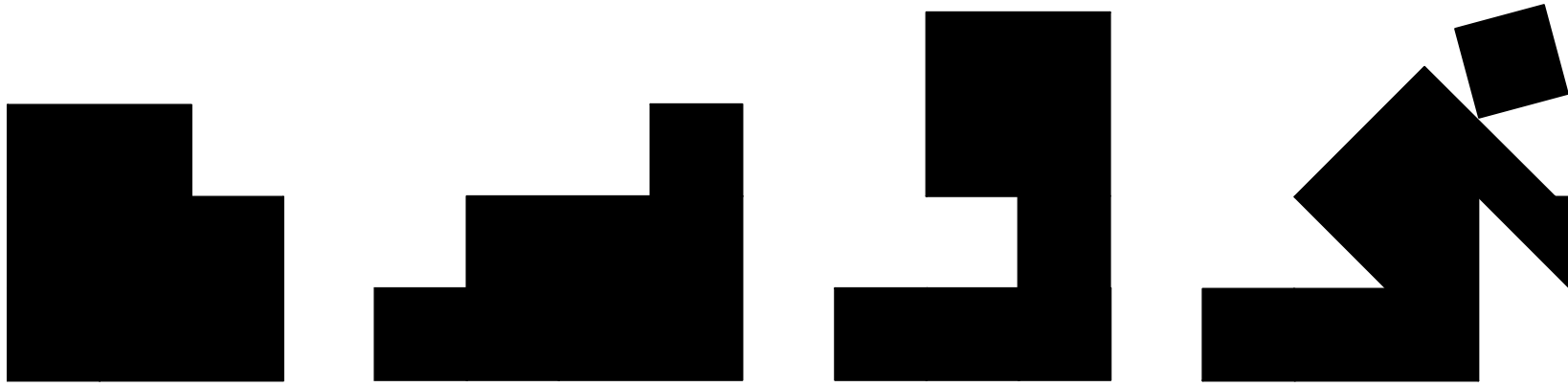


There are many ways to combine objects.



But sometimes, it's like Abbott's flatland...

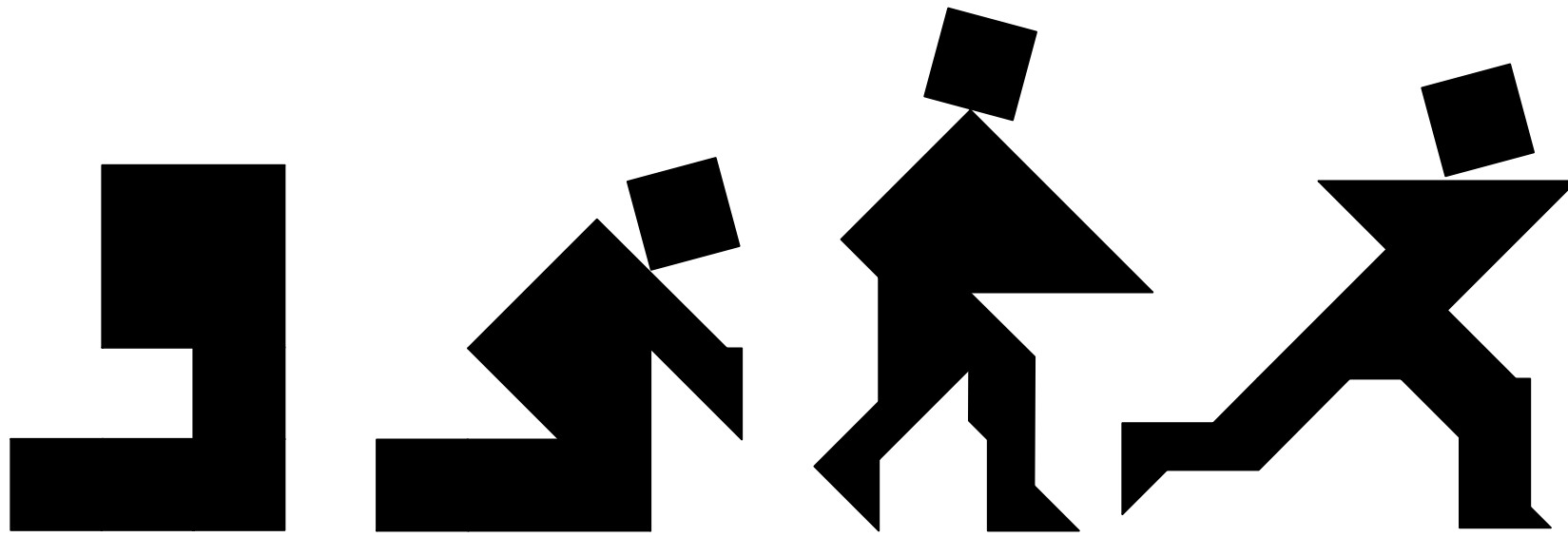
[Abbot 1884]



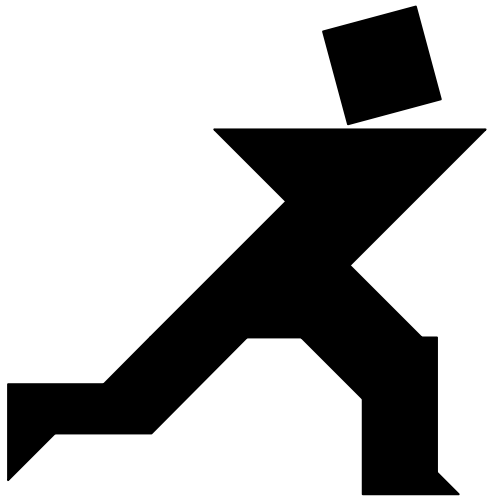
We just miss a dimension or two...



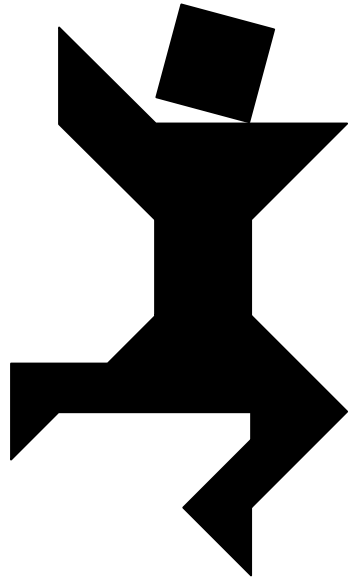
We would like to get up and walk, to...



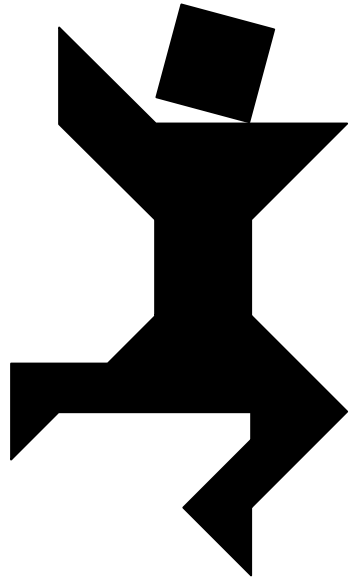
...to run and escape from object-land!



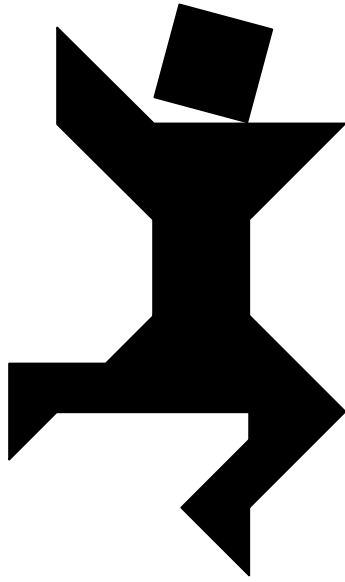
...



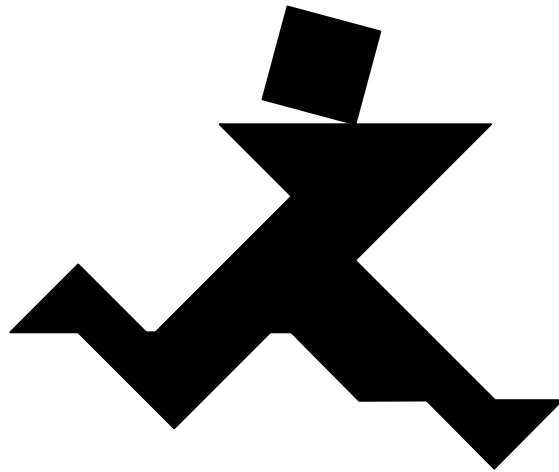
...



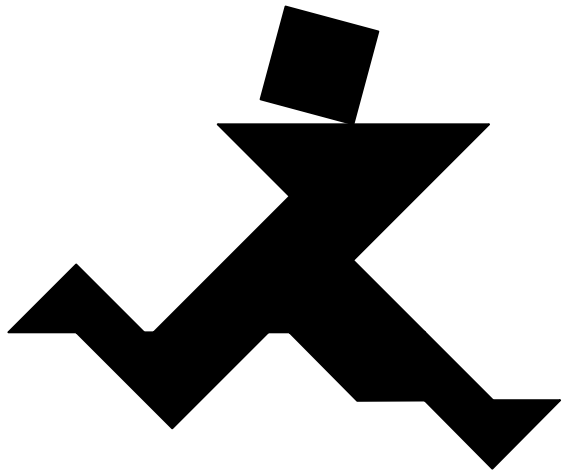
...



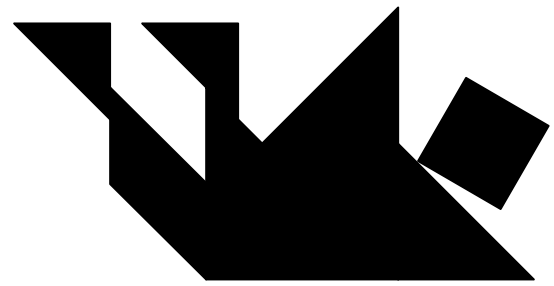
...



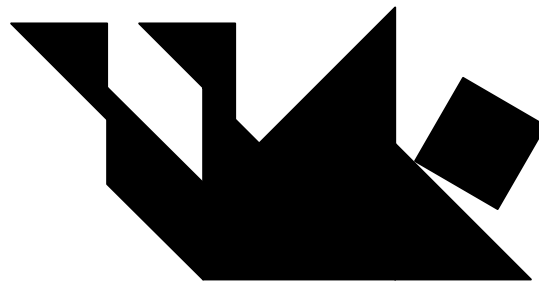
...



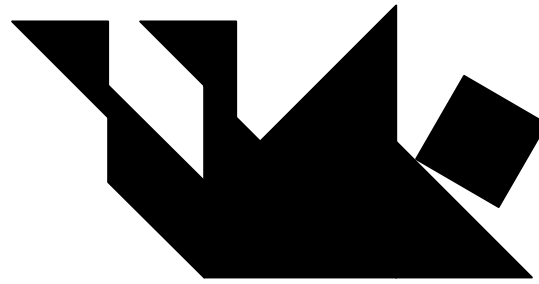
...



...

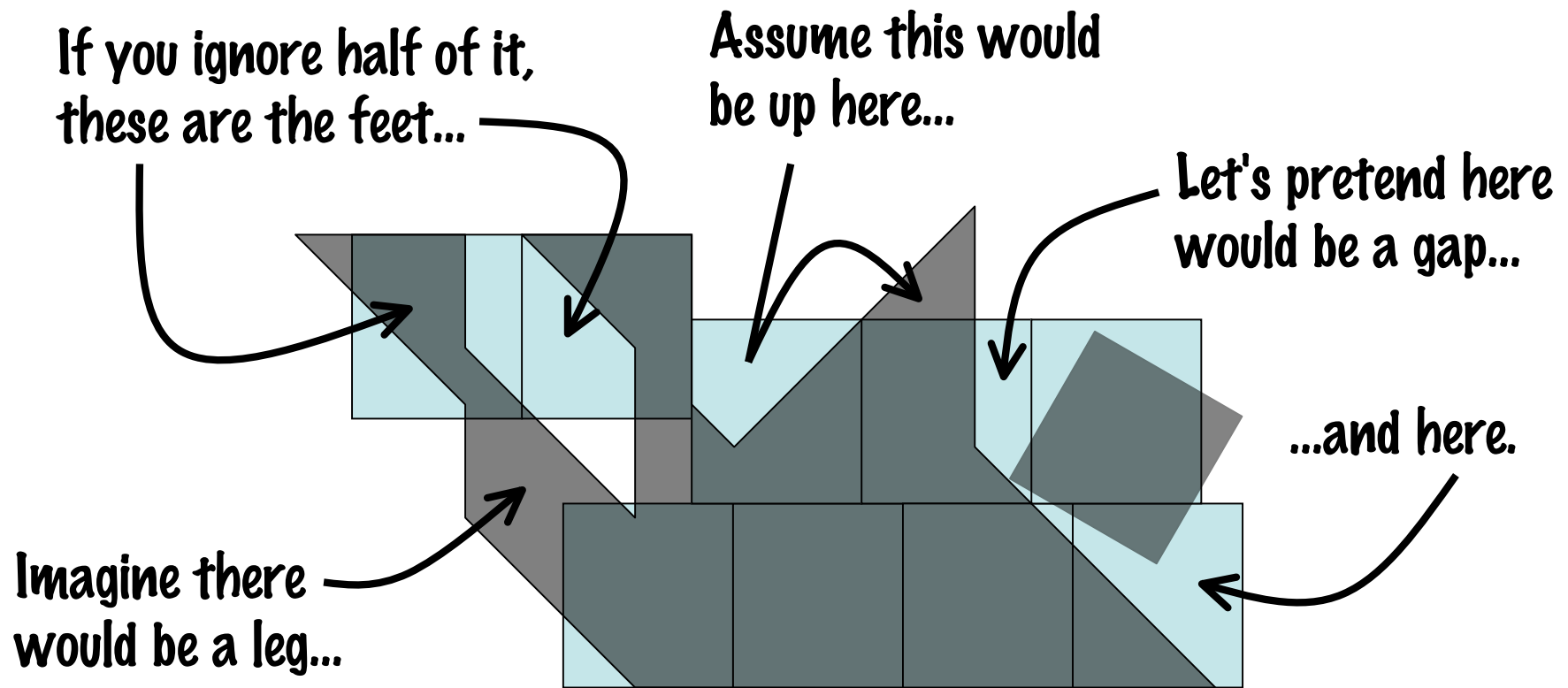


...



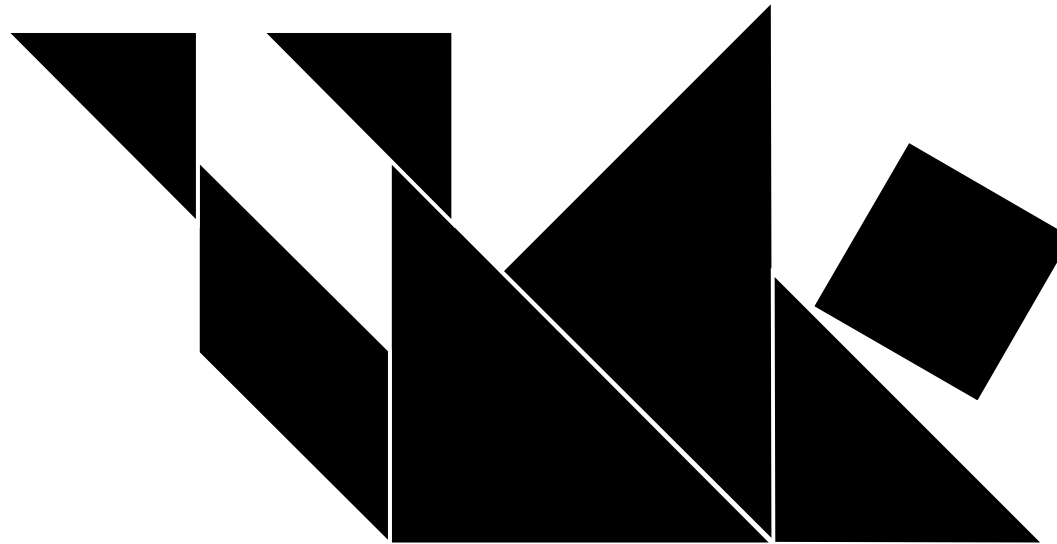
Fail.

Of course



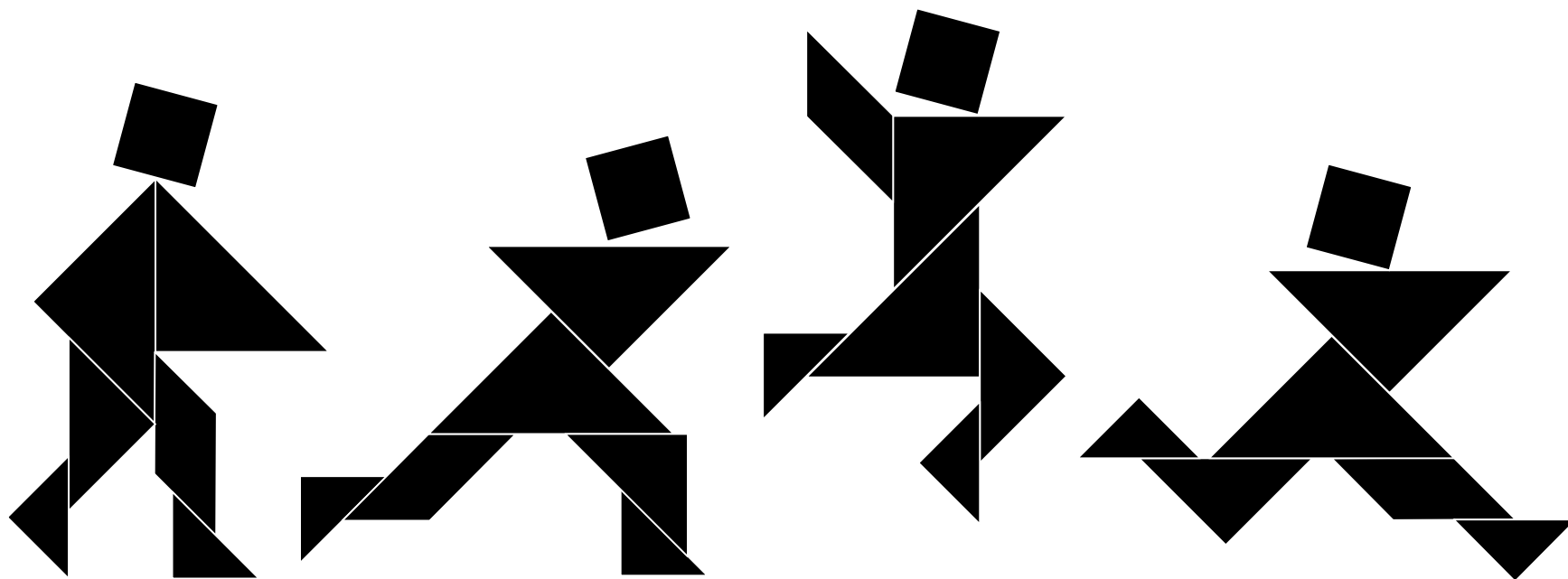
We can try to fix it with objects...

But, why not

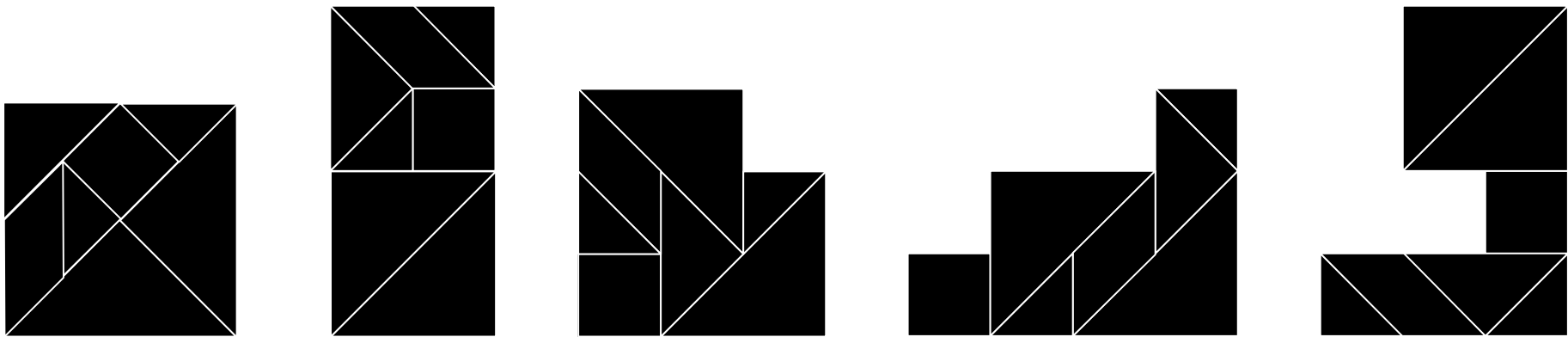


Compose it if from smaller part?

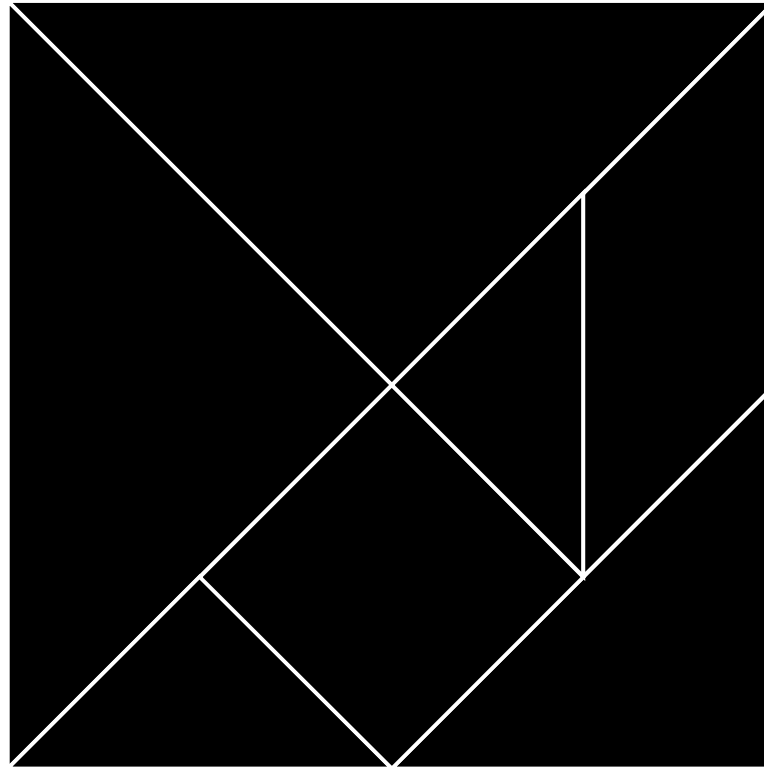
[Osher 2007]



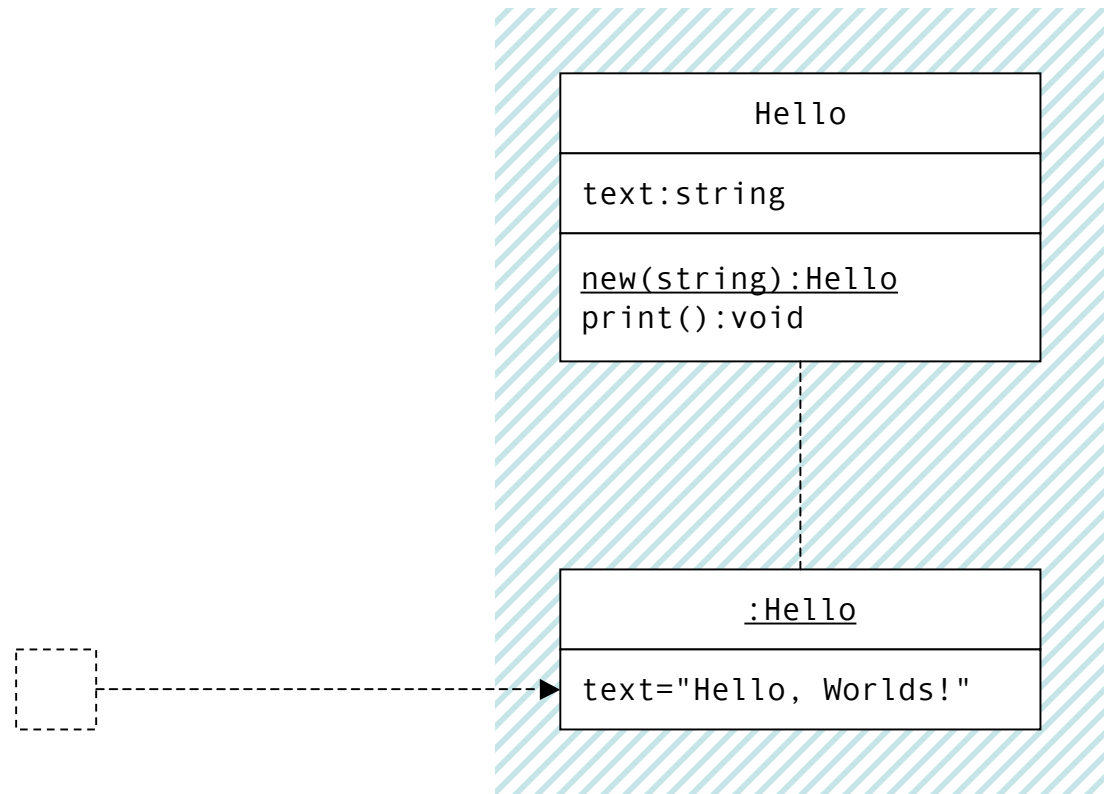
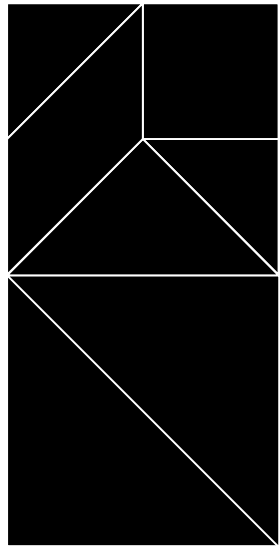
The same small parts...



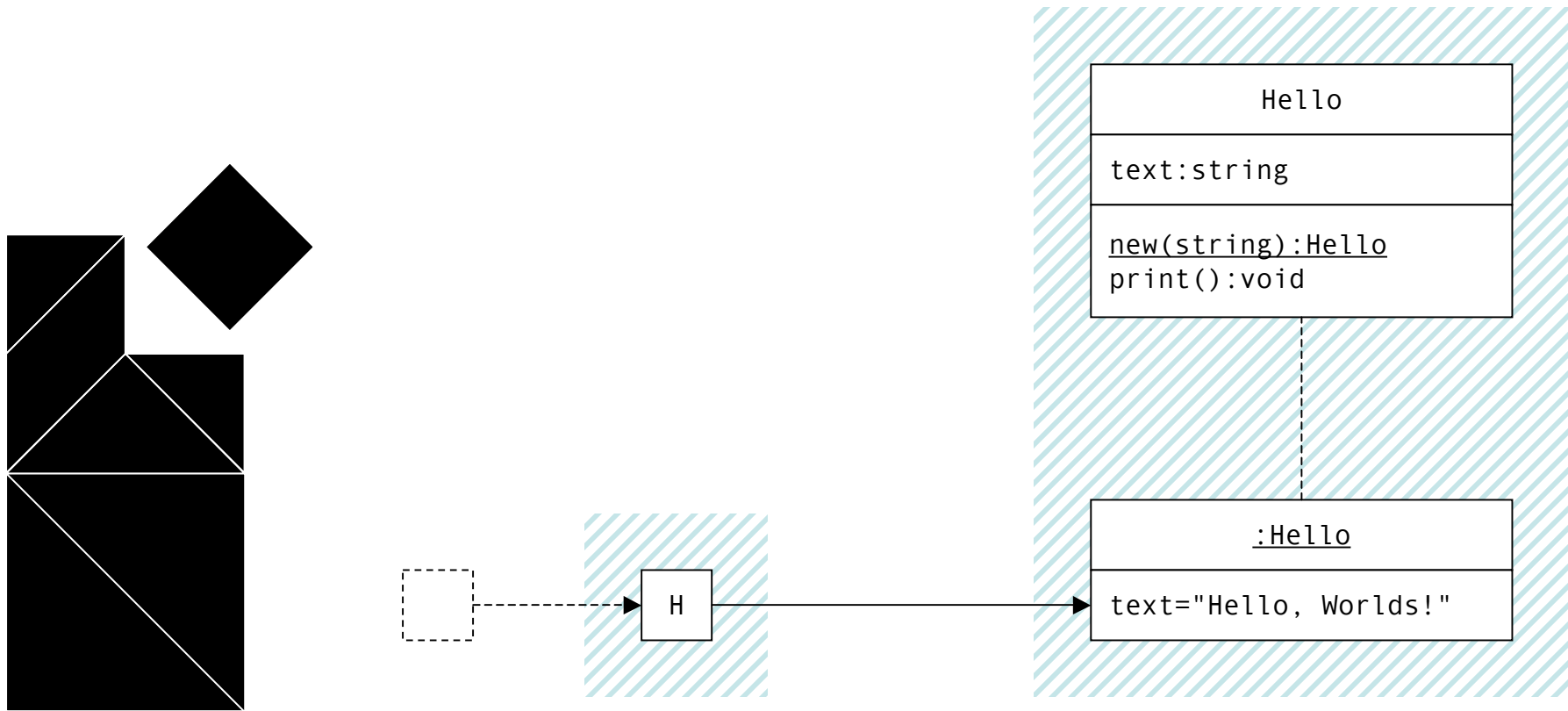
...from which objects are built?



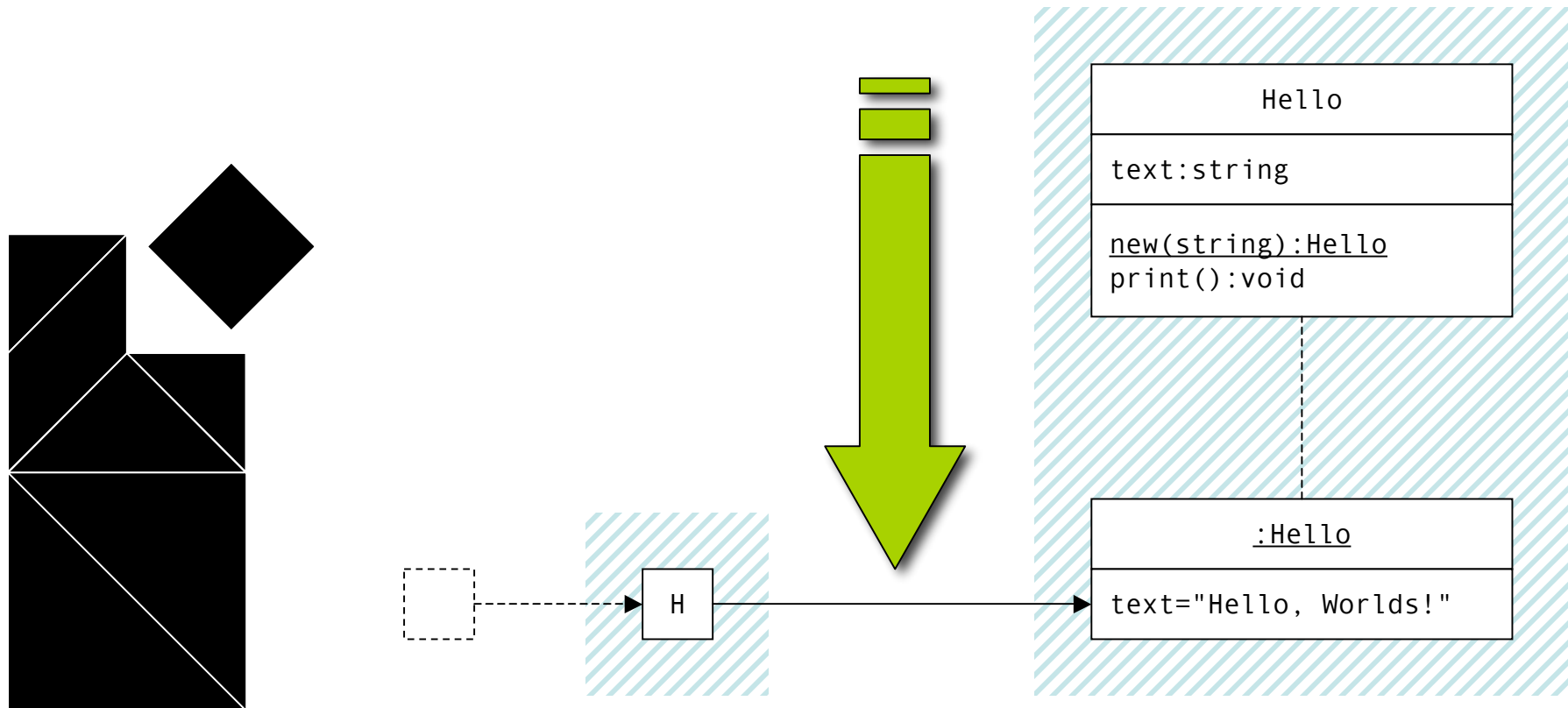
In fragmentland...



...objects are not monolithic.

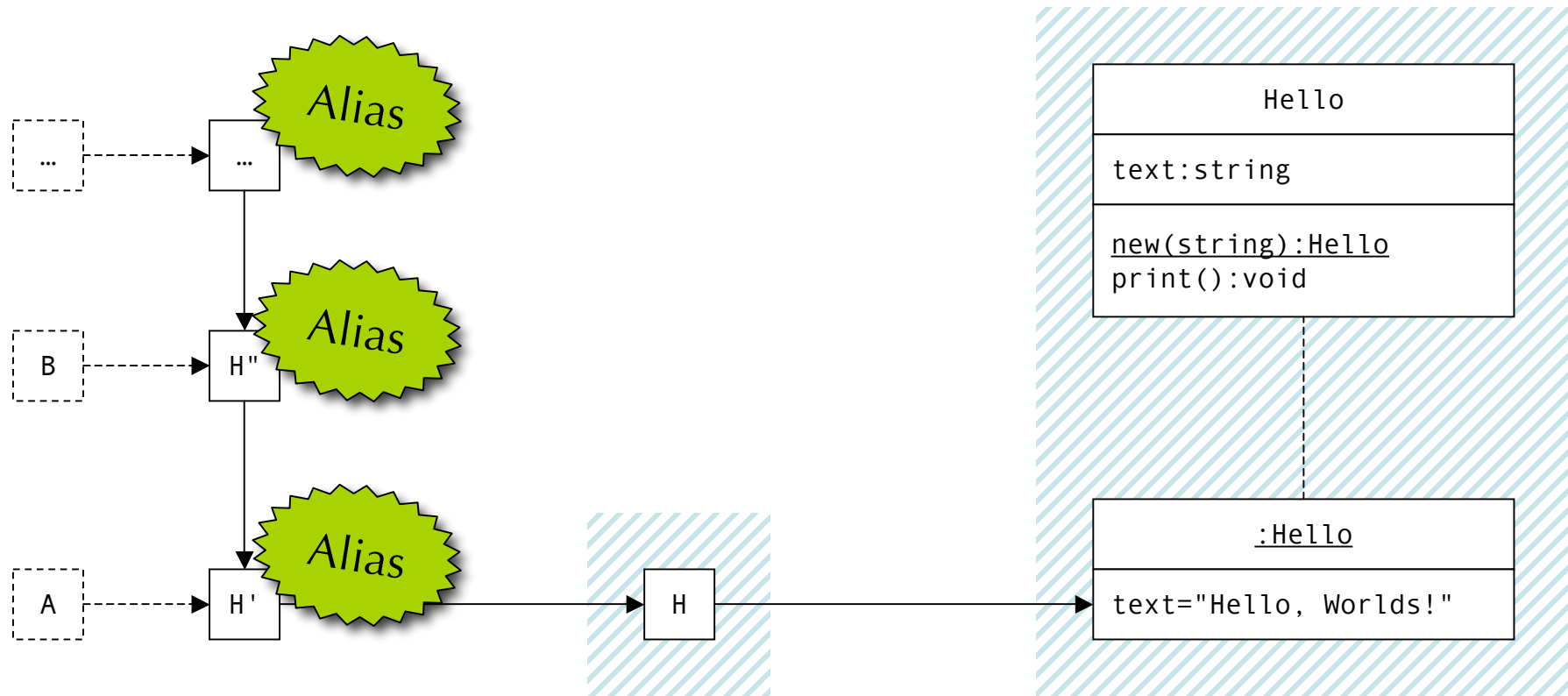


First, separate head from body.

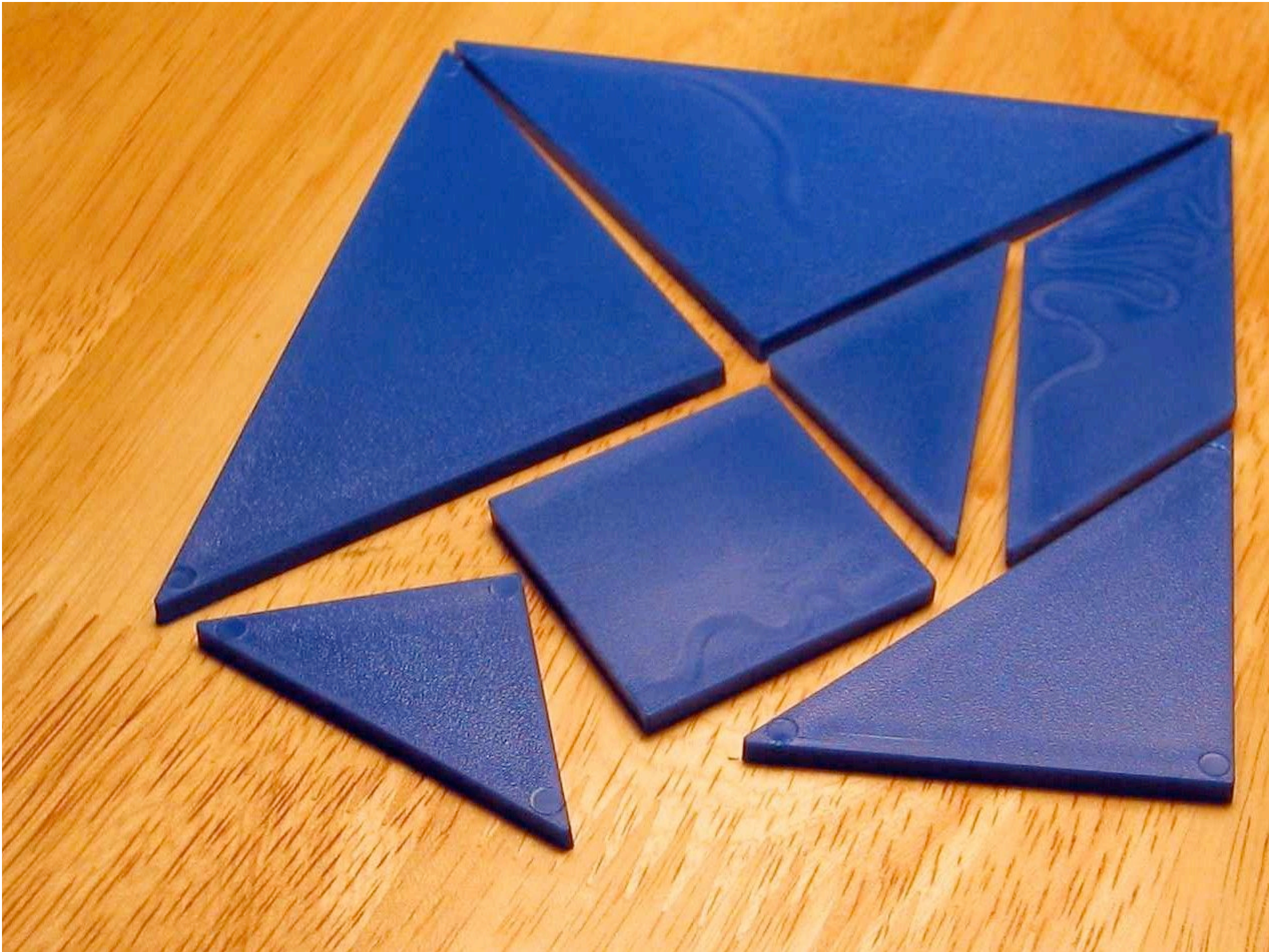


Allows us to inject new behavior...

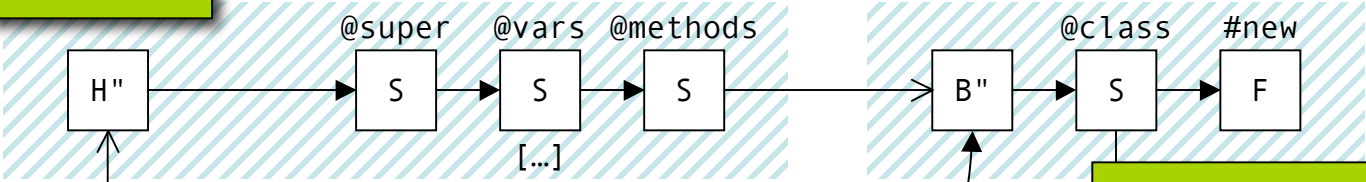
[Haupt and Schippers 2007]



Allows us to keep track of references...

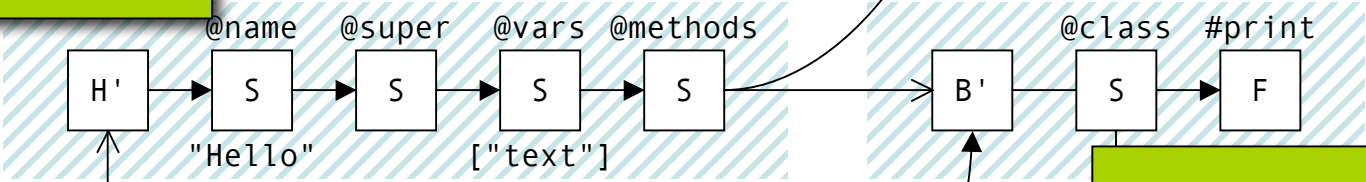


# Metaclass



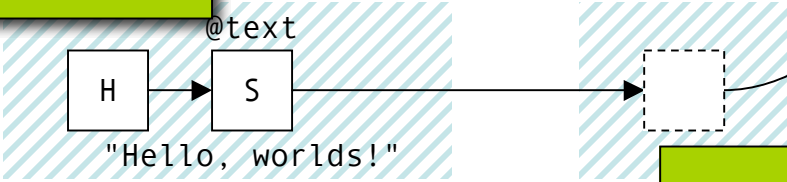
# Class methods

# Class

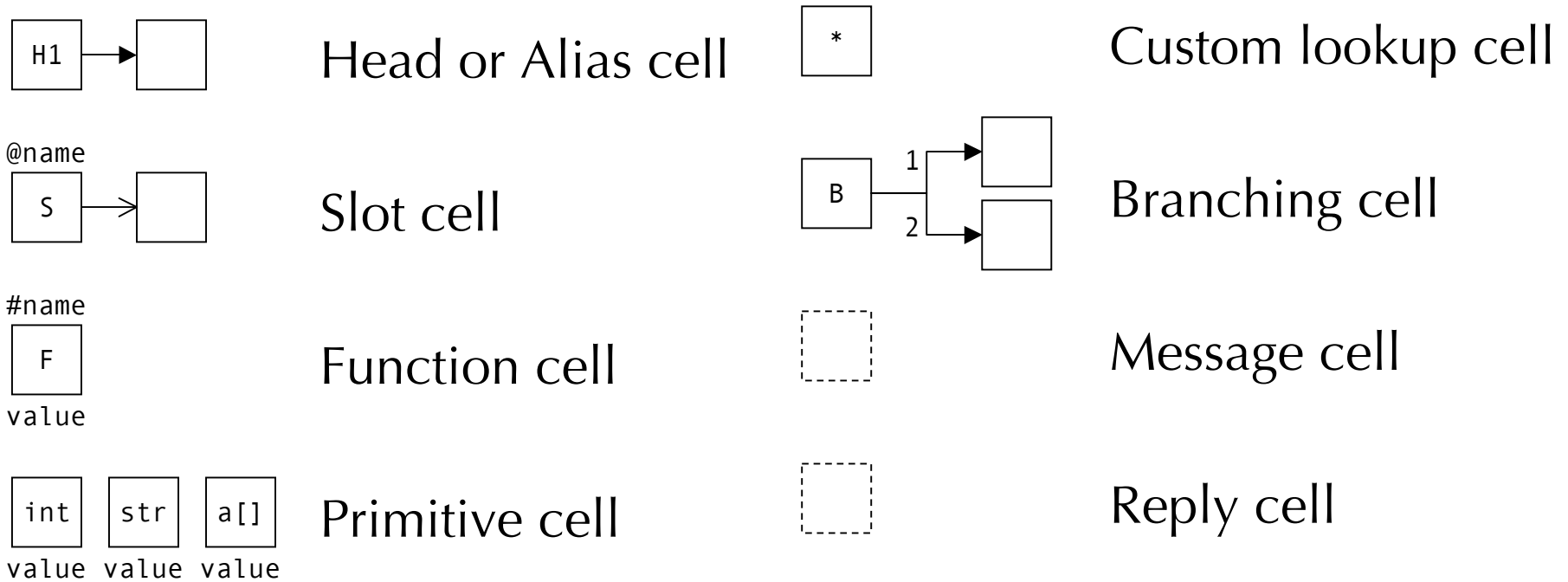


# Instance methods

# Instance



# Instance-specific methods



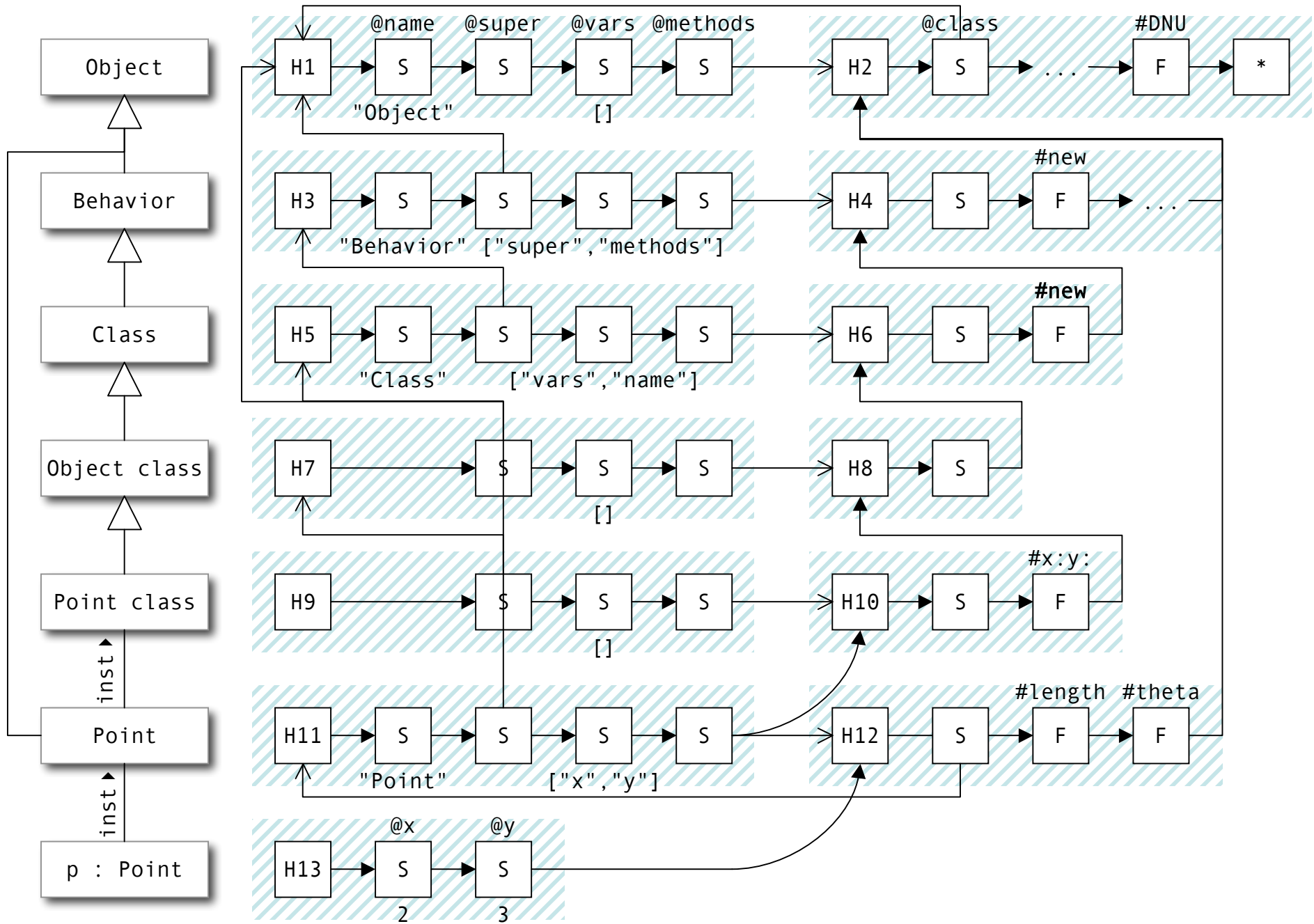
# Cell Types and Notation

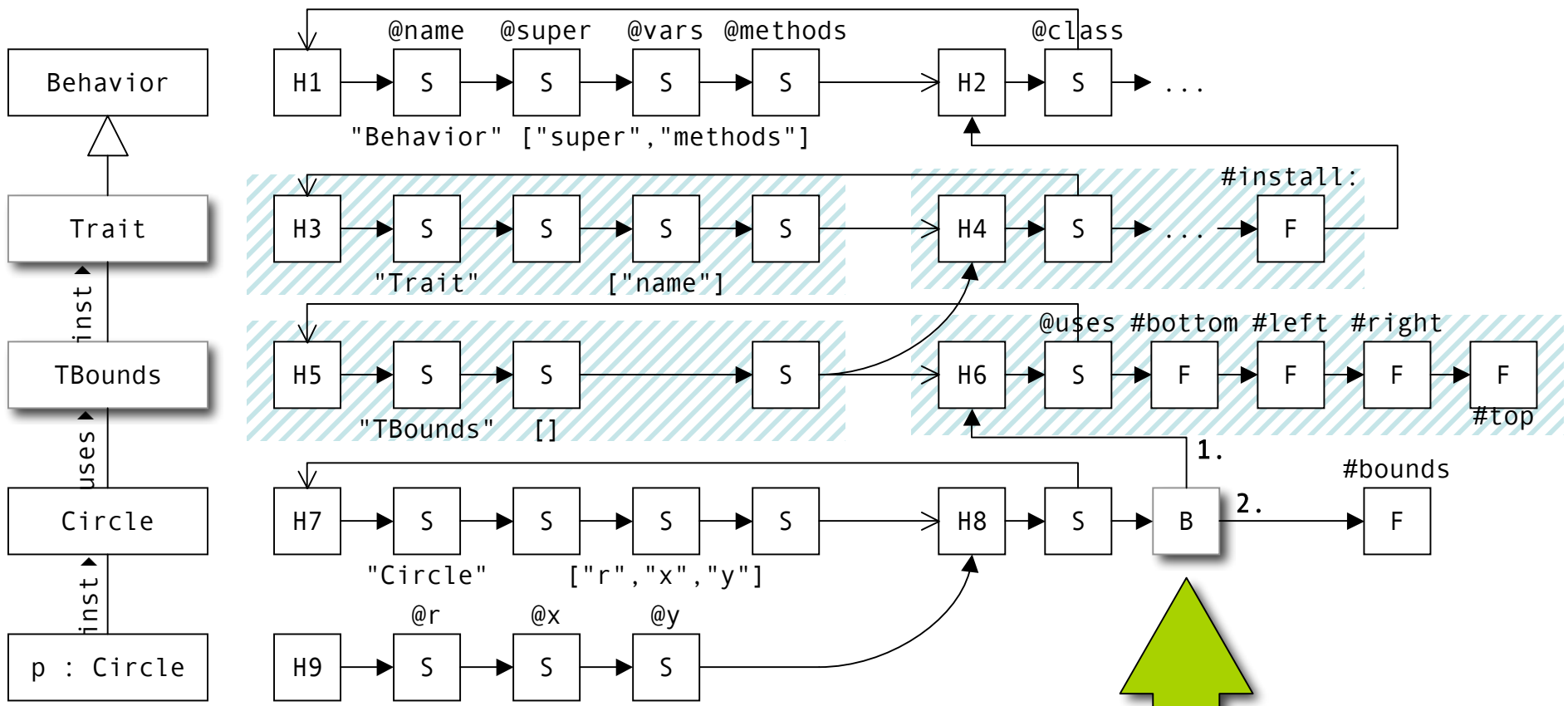
- Each cell consists of:
  - A local lookup function
  - A pointer to next cell
  - An optional payload
- Lookup works as follows:
  - Delegation based, message based
  - If local lookup fails, then delegate to next cell

## The CELL Model in a Nutshell

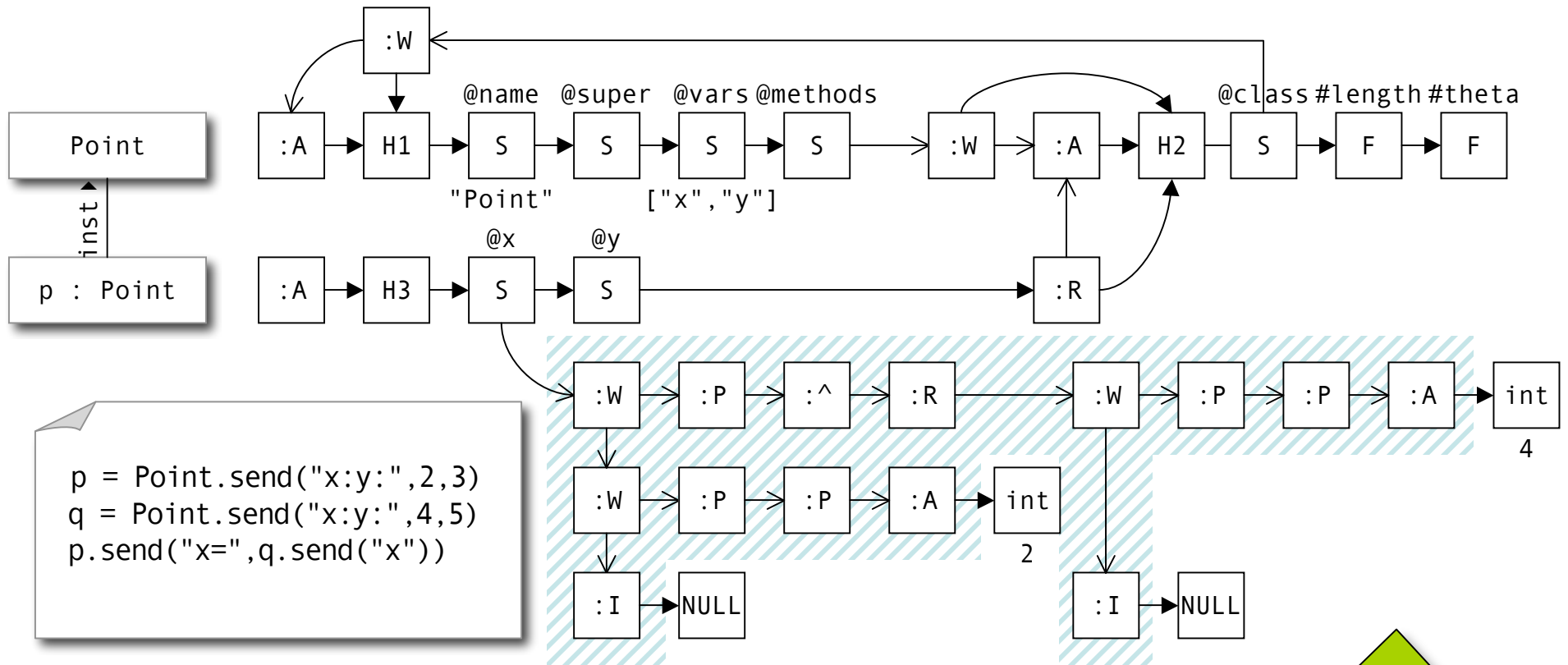
# CELLTALK

Smalltalk made of Cells





# CELLTALK + Traits



Changes to CELLTALK

- Instance creation
- Method install

# CELLTALK + Aliases

- List of cell types
  - Limited or extensible?
- How to model supersends?
  - A resend is not a supersend
- Performance?
  - Current prototypes in Java and Python
- Formalization

## Open Issues and Questions

<http://smallwiki.unibe.ch/cells>

