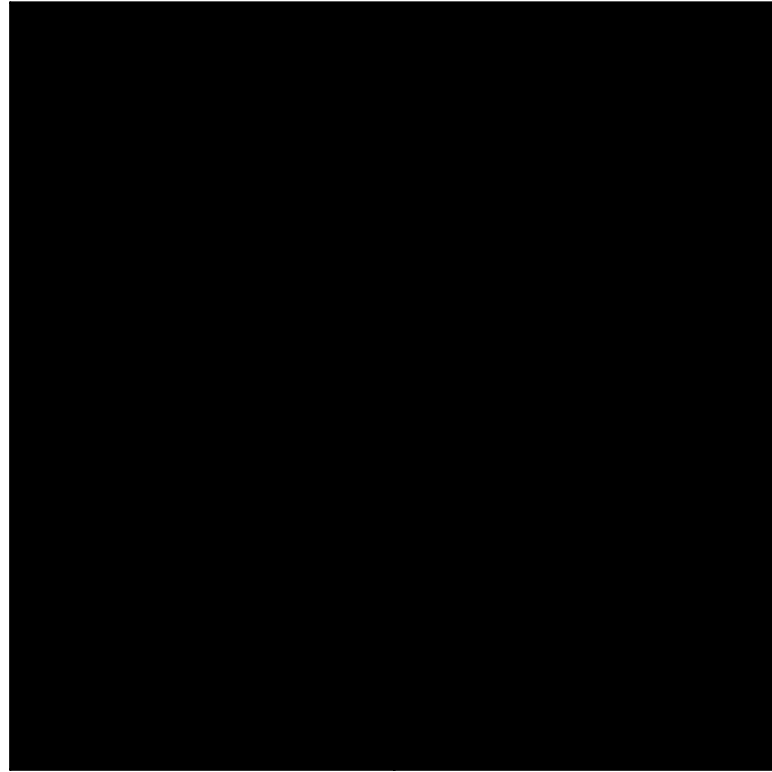


Composing New Abstractions From Object Fragments

Adrian Kuhn and Oscar Nierstrasz
University of Bern, Switzerland

Presented and published at VMIL 2008.



In objectland...

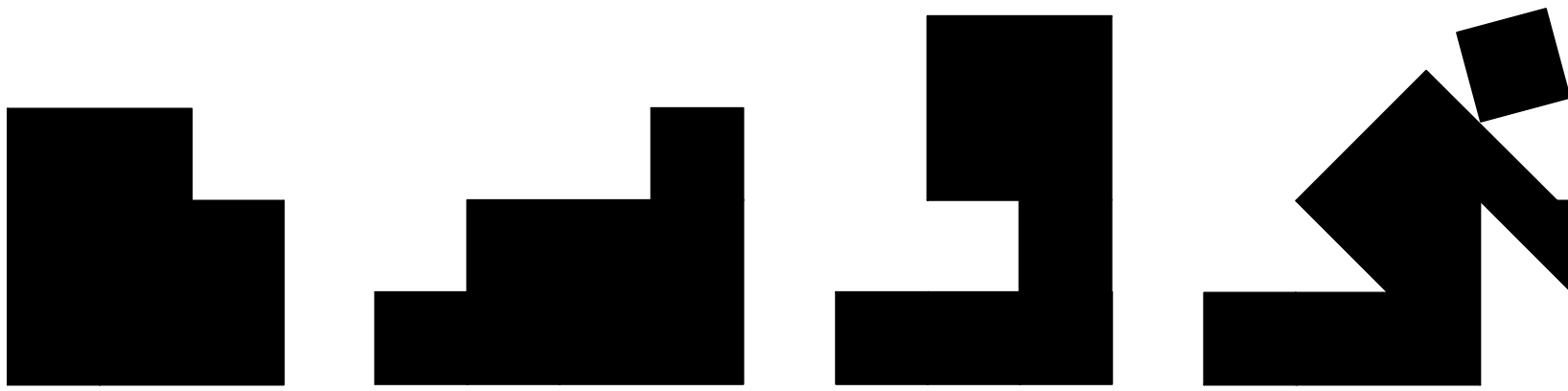


There are many ways to combine objects.

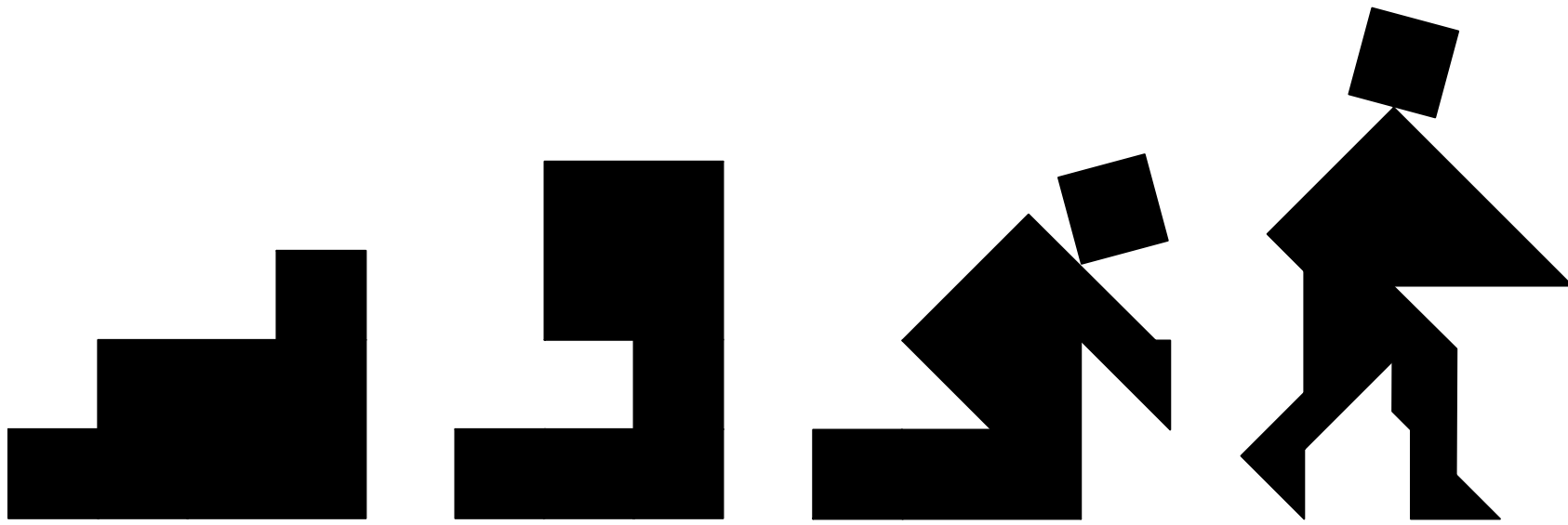


But sometimes, it's like Abbott's flatland...

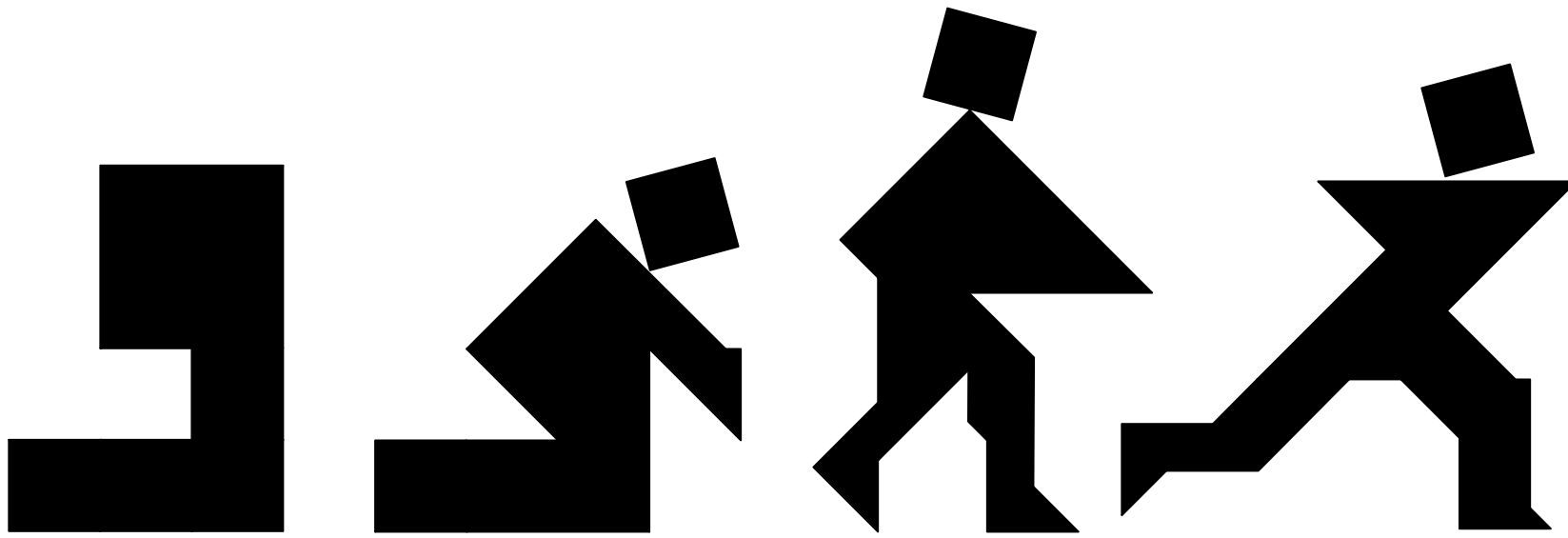
[Abbot 1884]



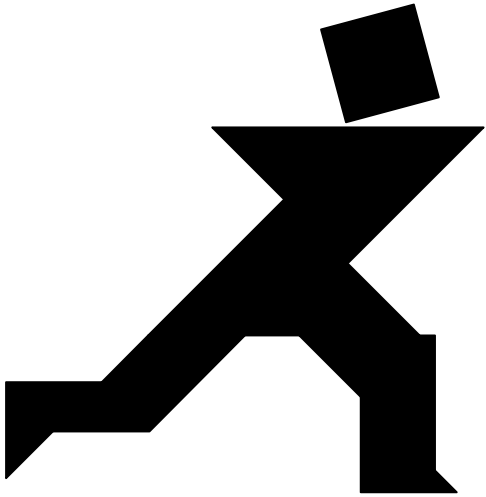
We just miss a dimension or two...



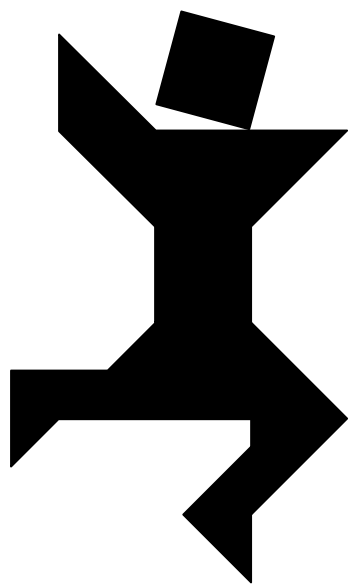
We would like to get up and walk, to...



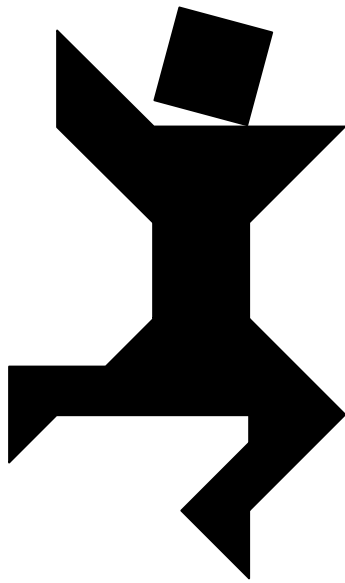
...to run and escape from object-land!



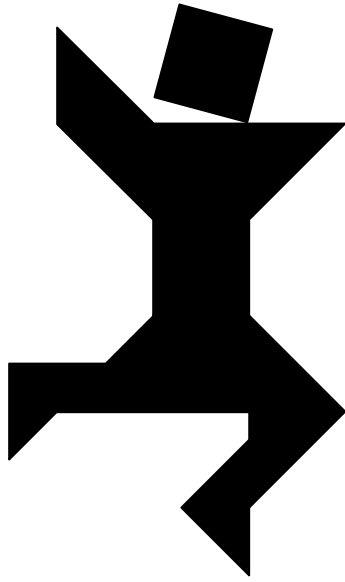
...



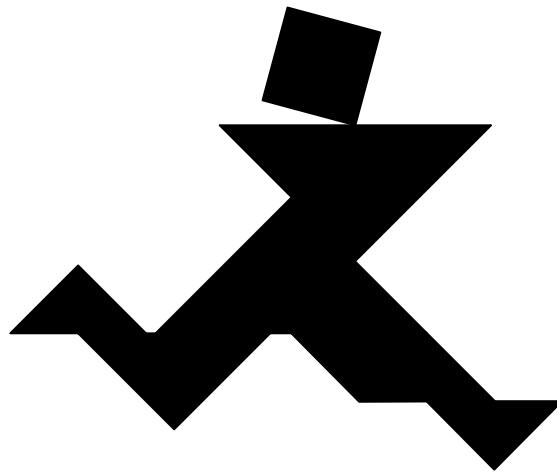
...



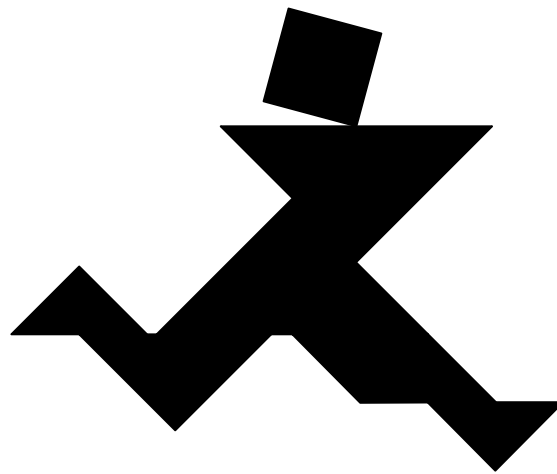
...



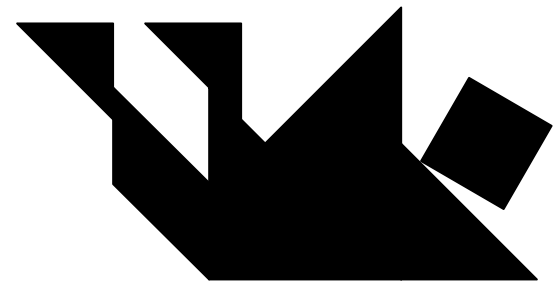
...



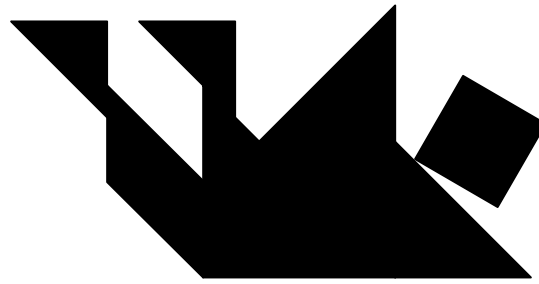
...



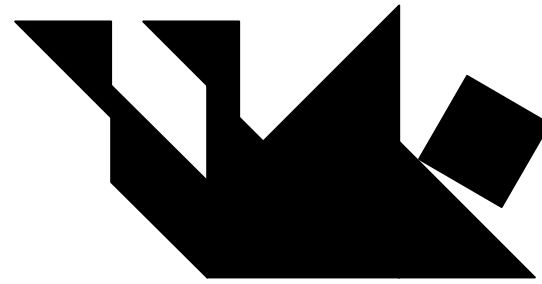
...



...

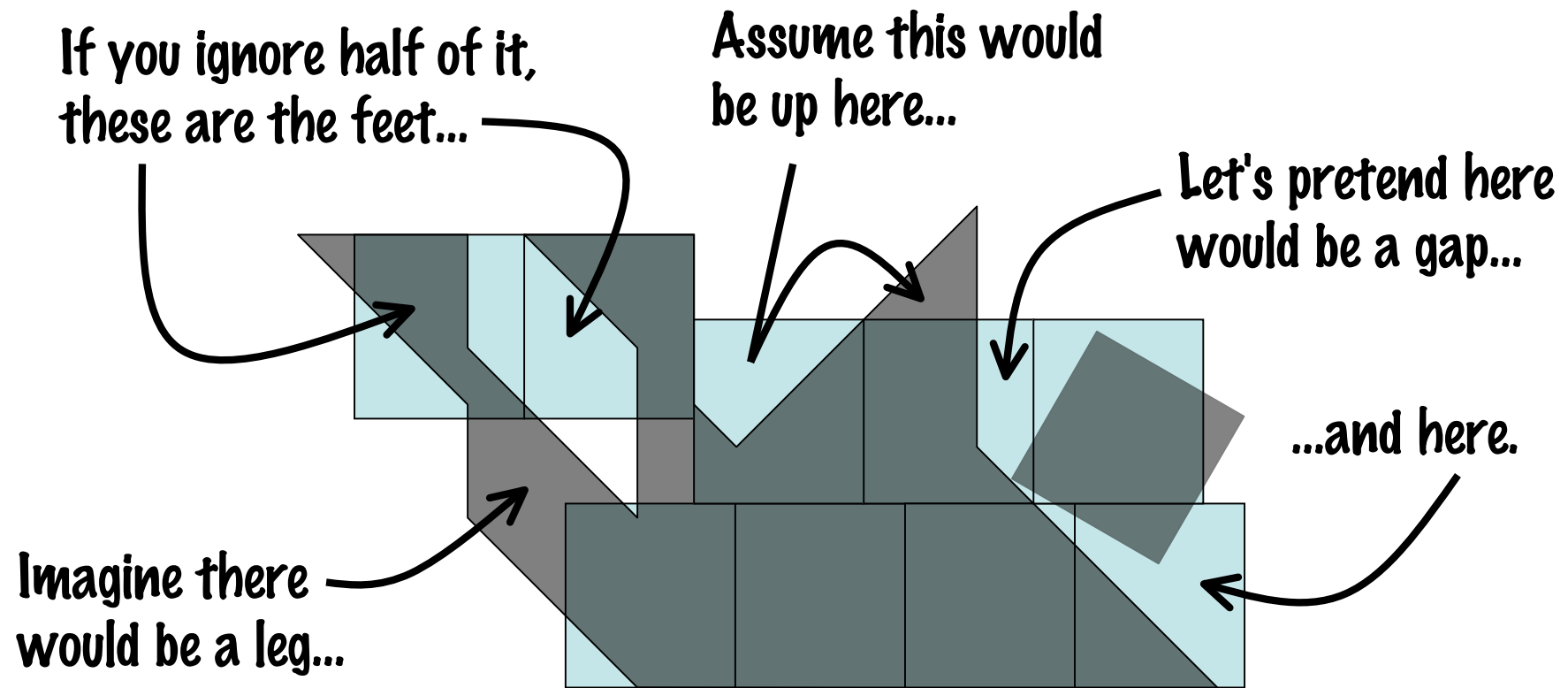


...



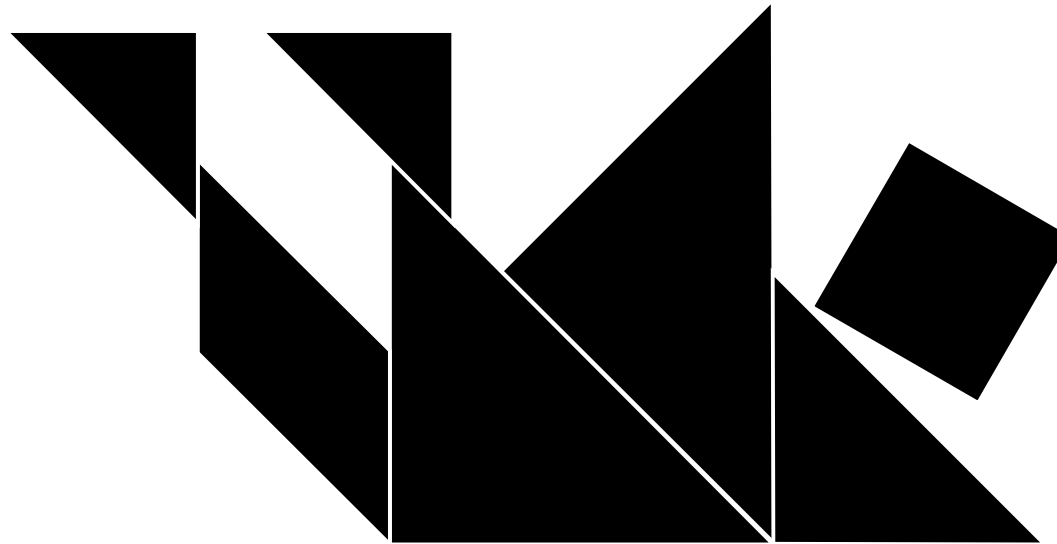
Fail.

Of course



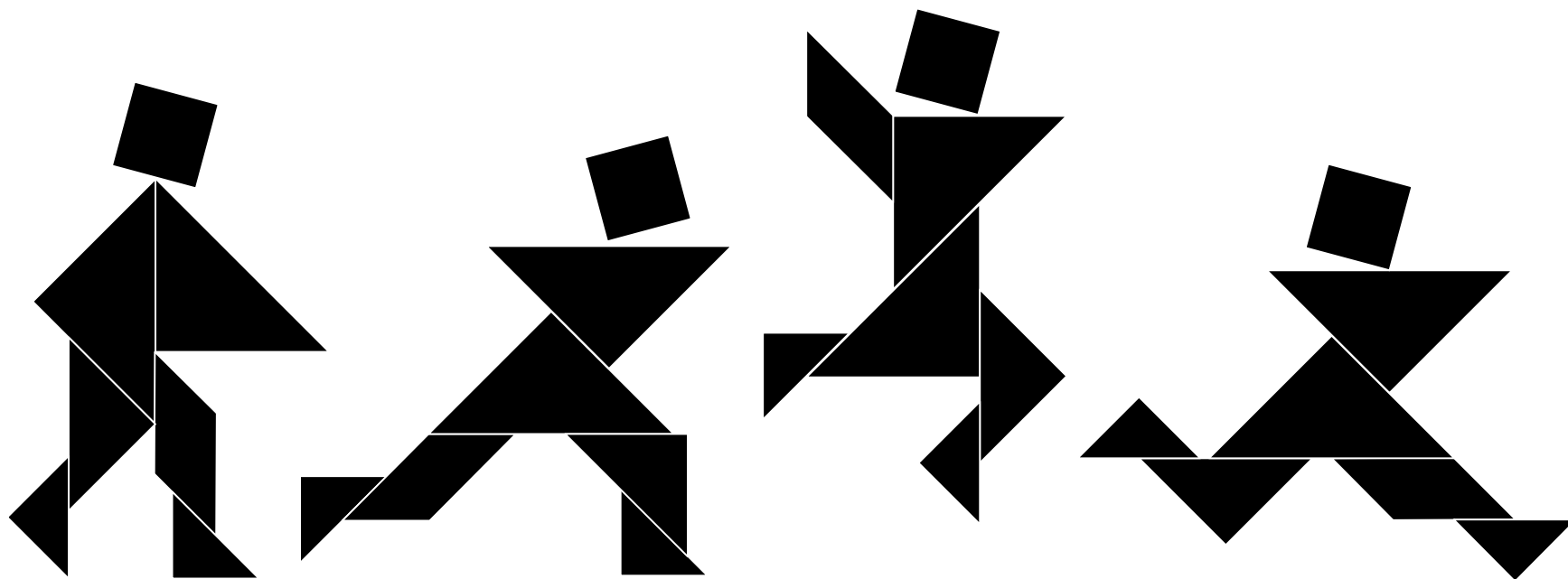
We can try to fix it with objects...

But, why not

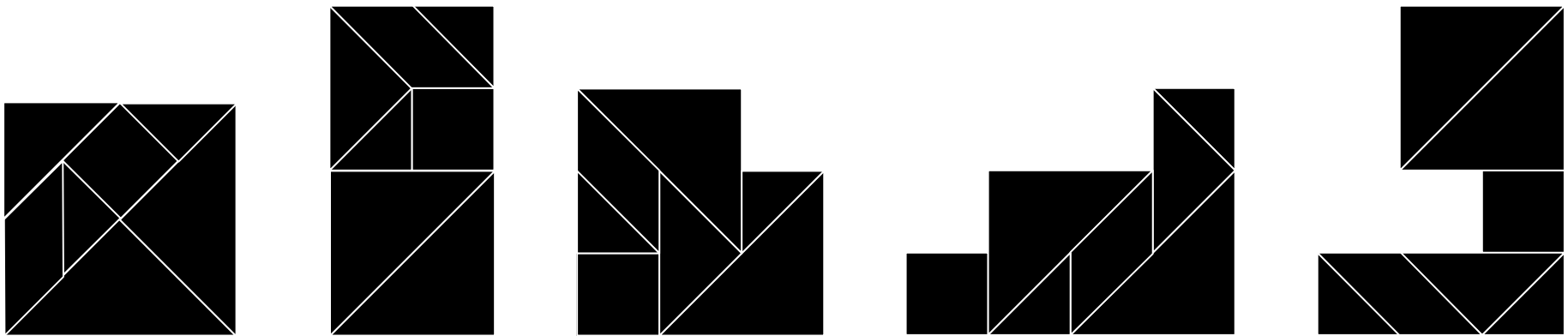


Compose it if from smaller part?

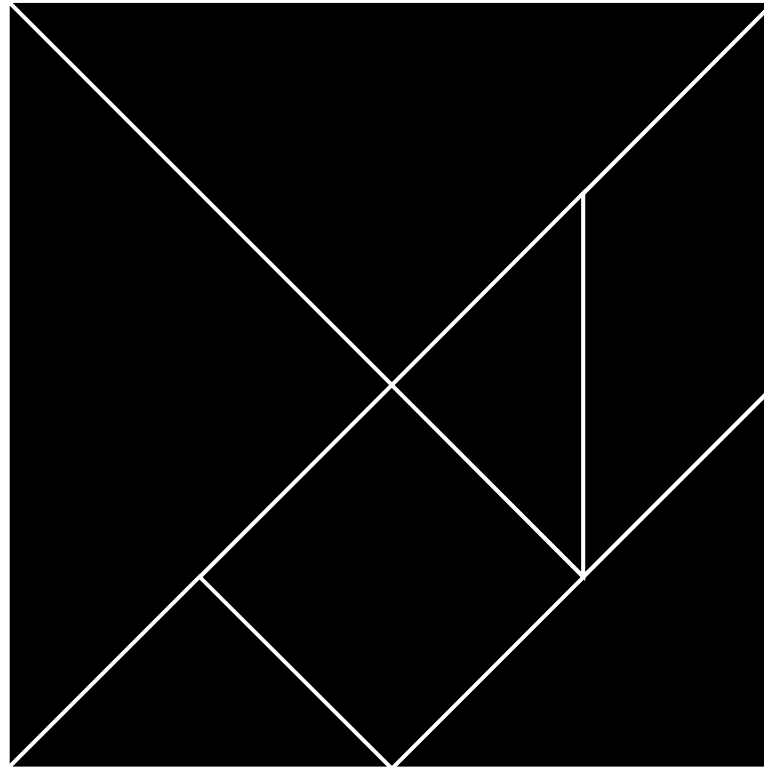
[Ossher 2007]



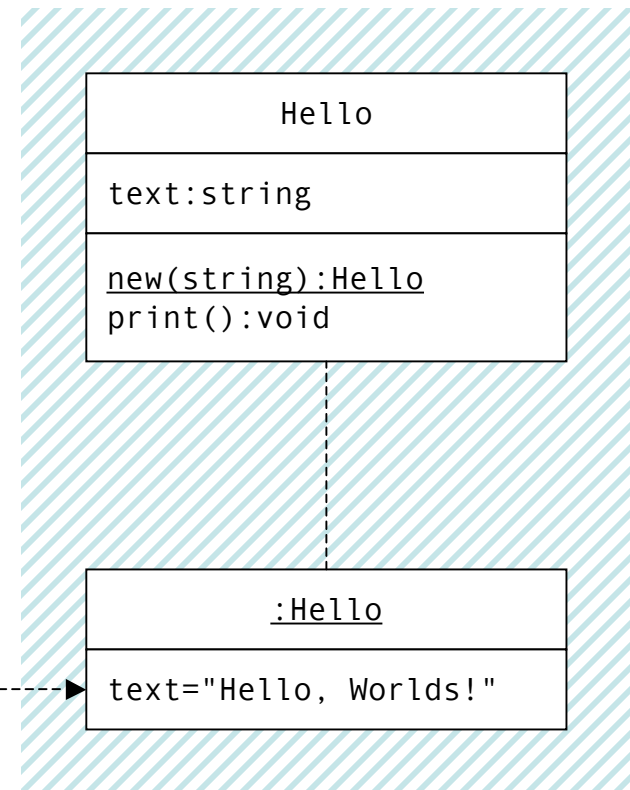
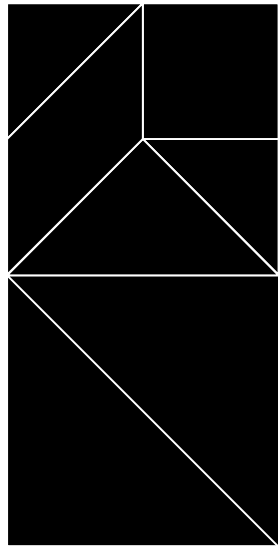
The same small parts...



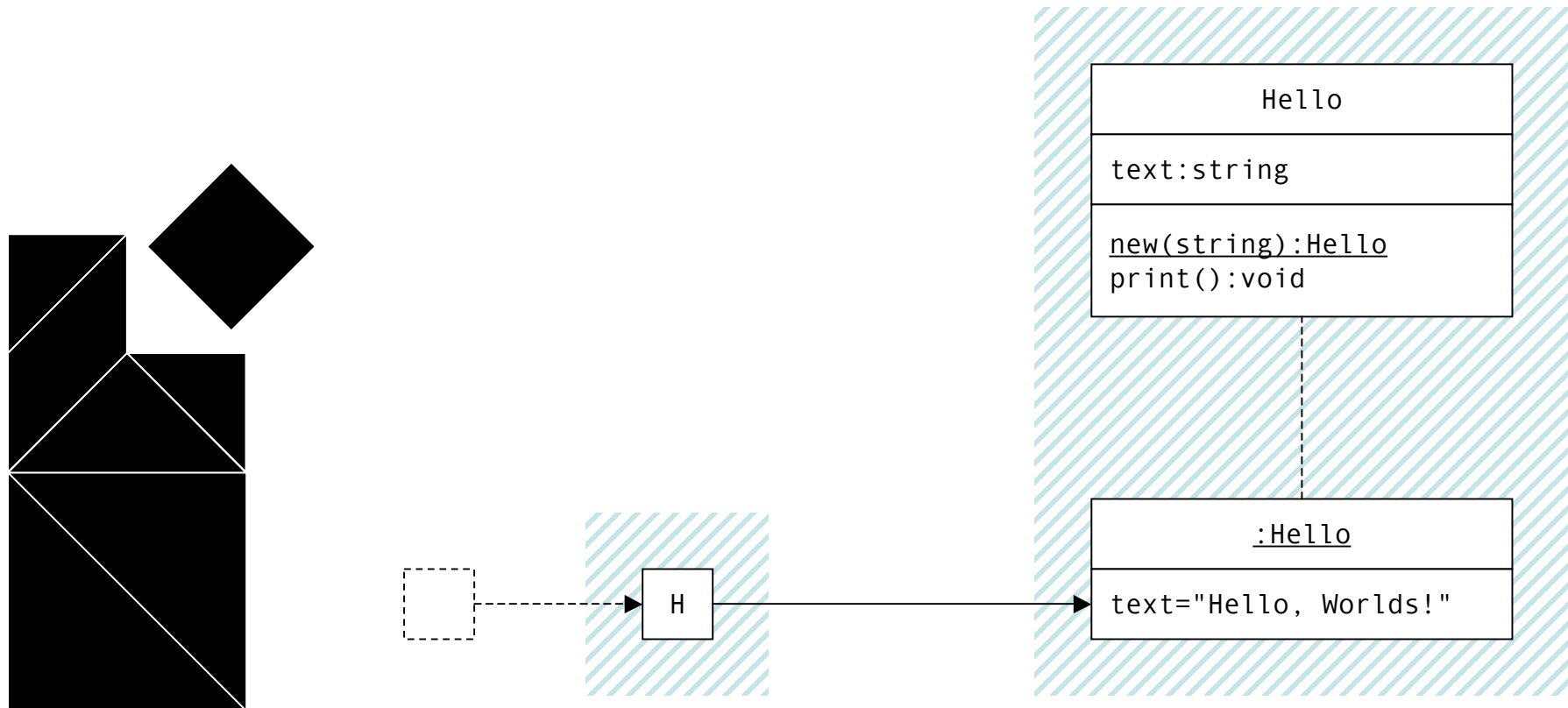
...from which objects are built?



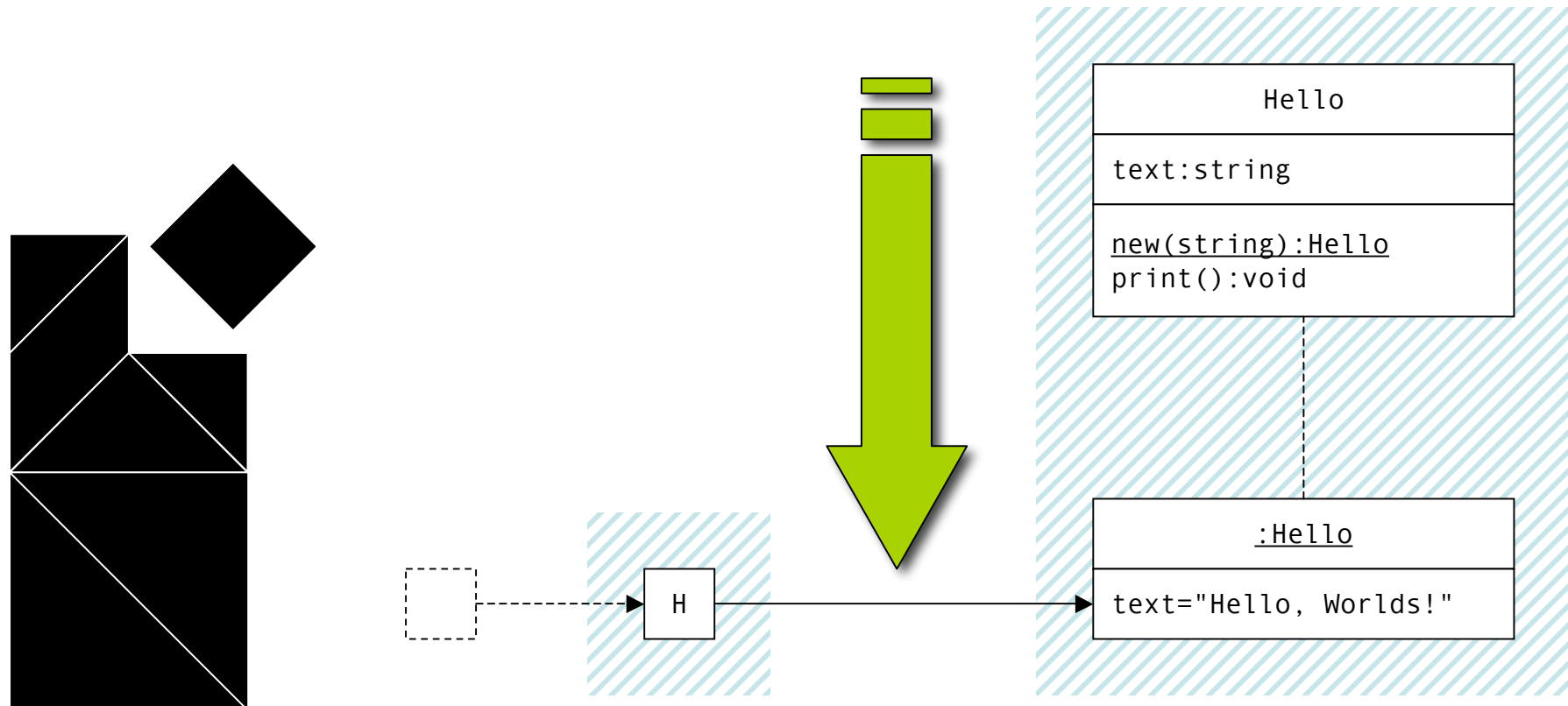
In fragmentland...



...objects are not monolithic.

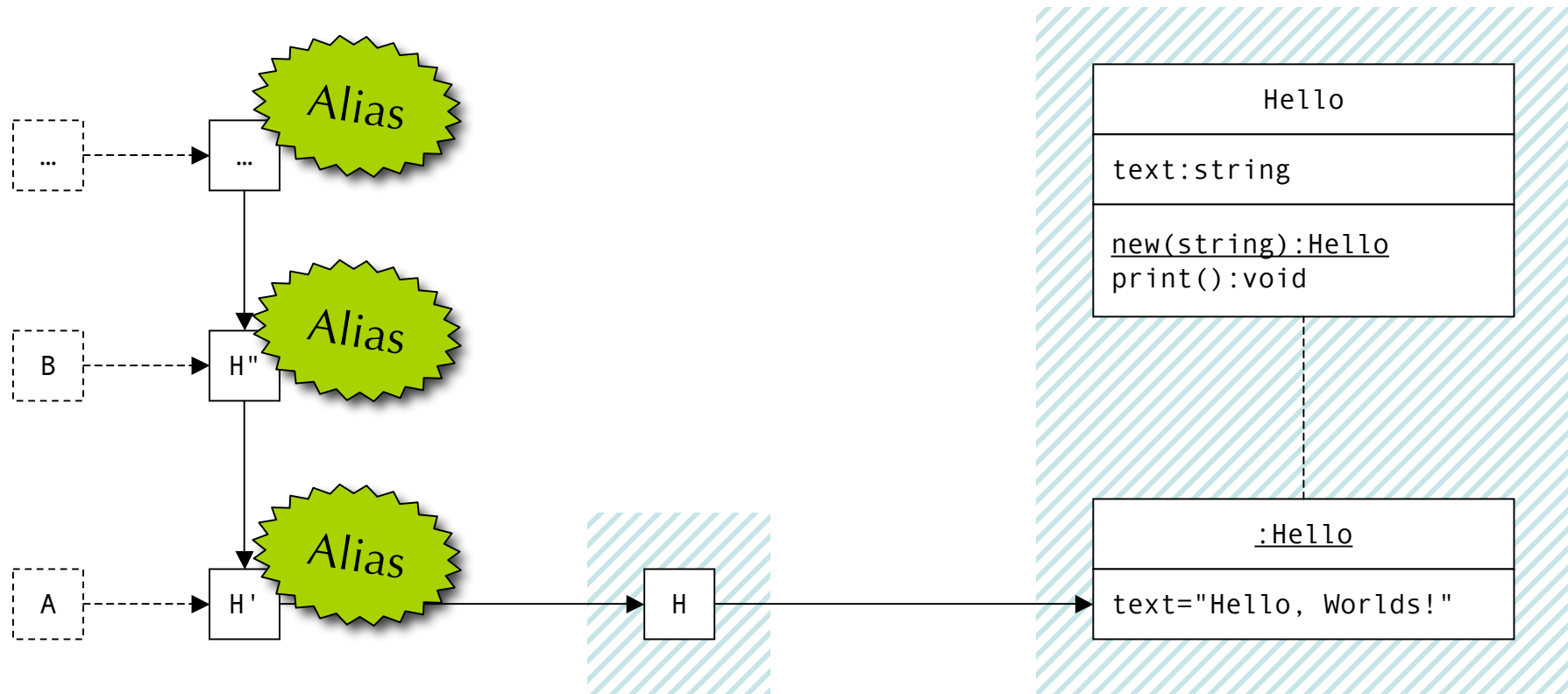


First, separate head from body.

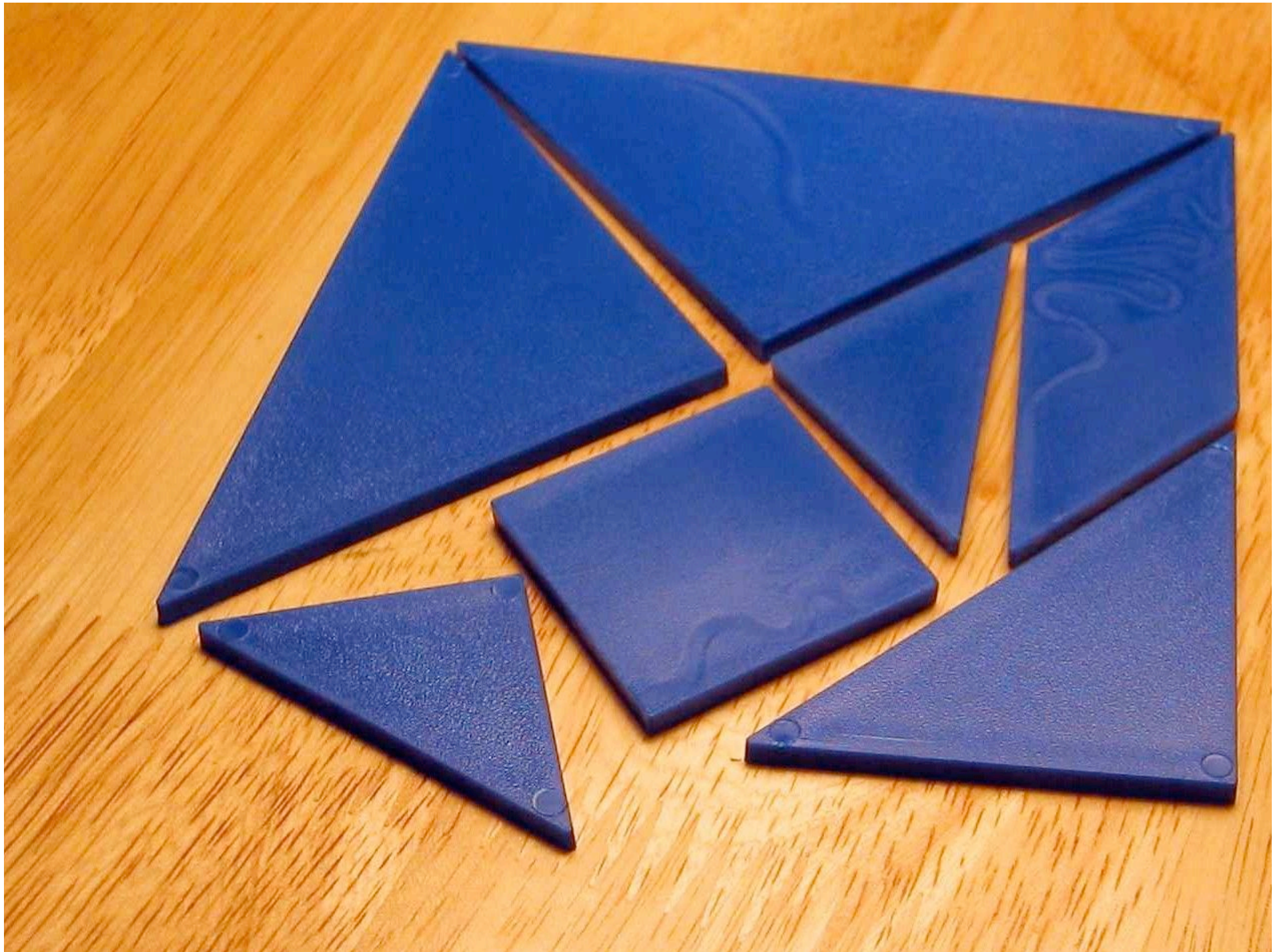


Allows us to inject new behavior...

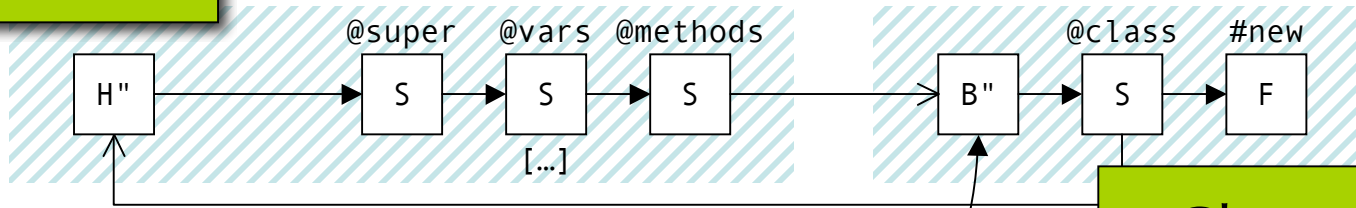
[Haupt and Schippers 2007]



Allows us to keep track of references...

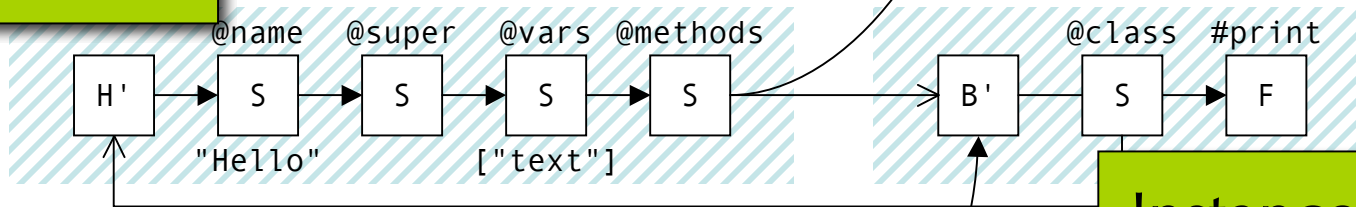


Metaclass



Class methods

Class

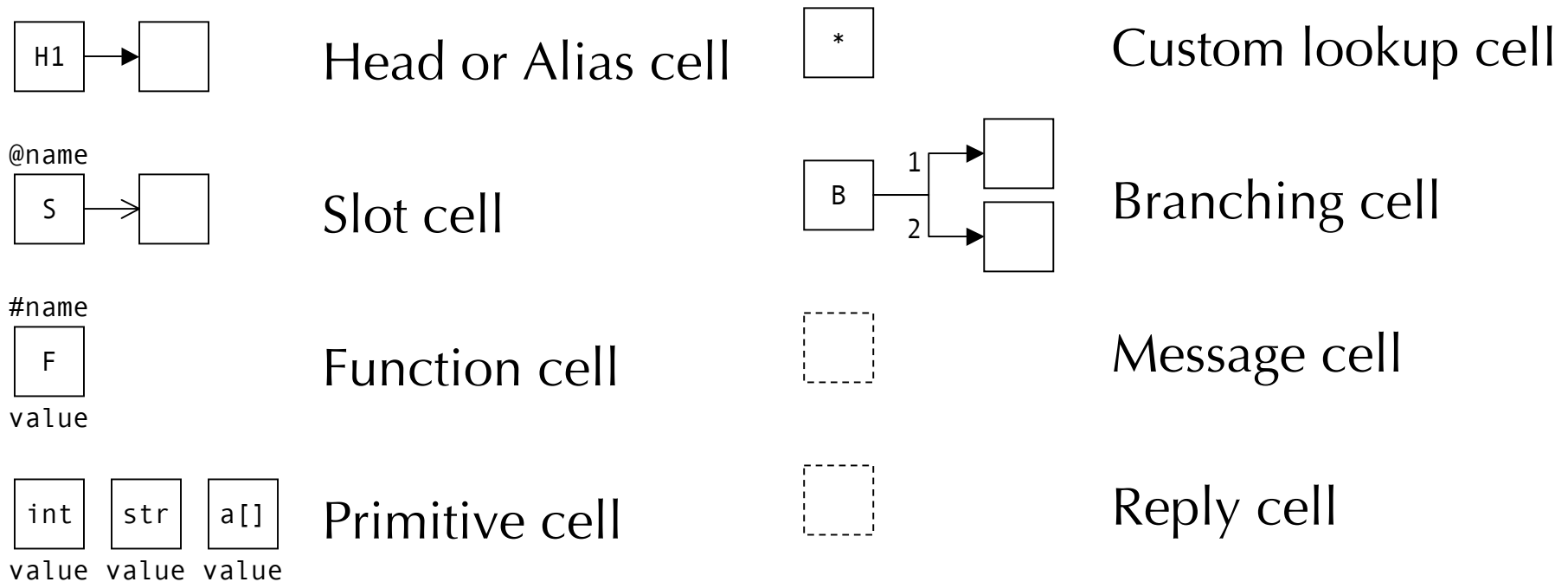


Instance methods

Instance



Instance-specific methods



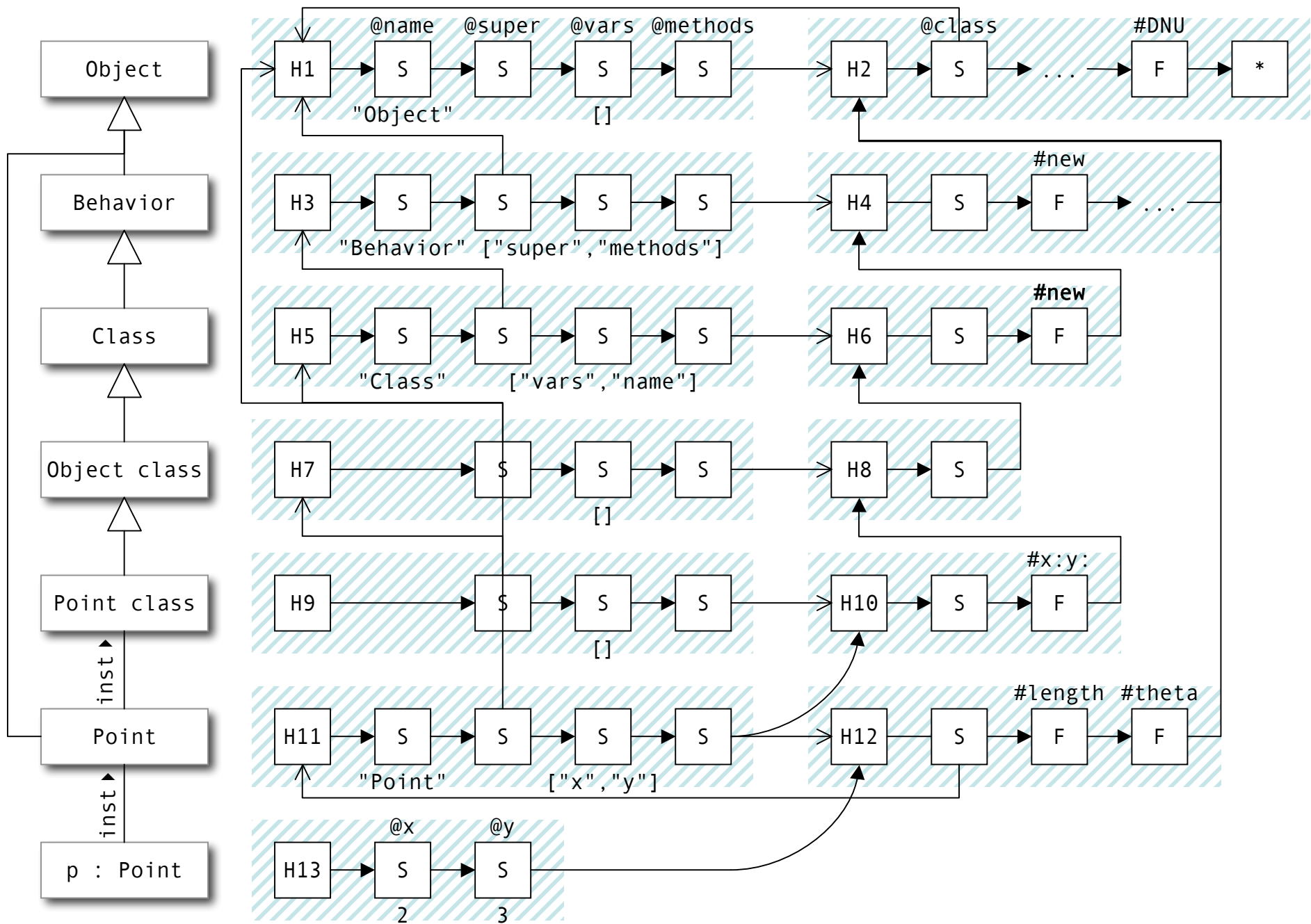
Cell Types and Notation

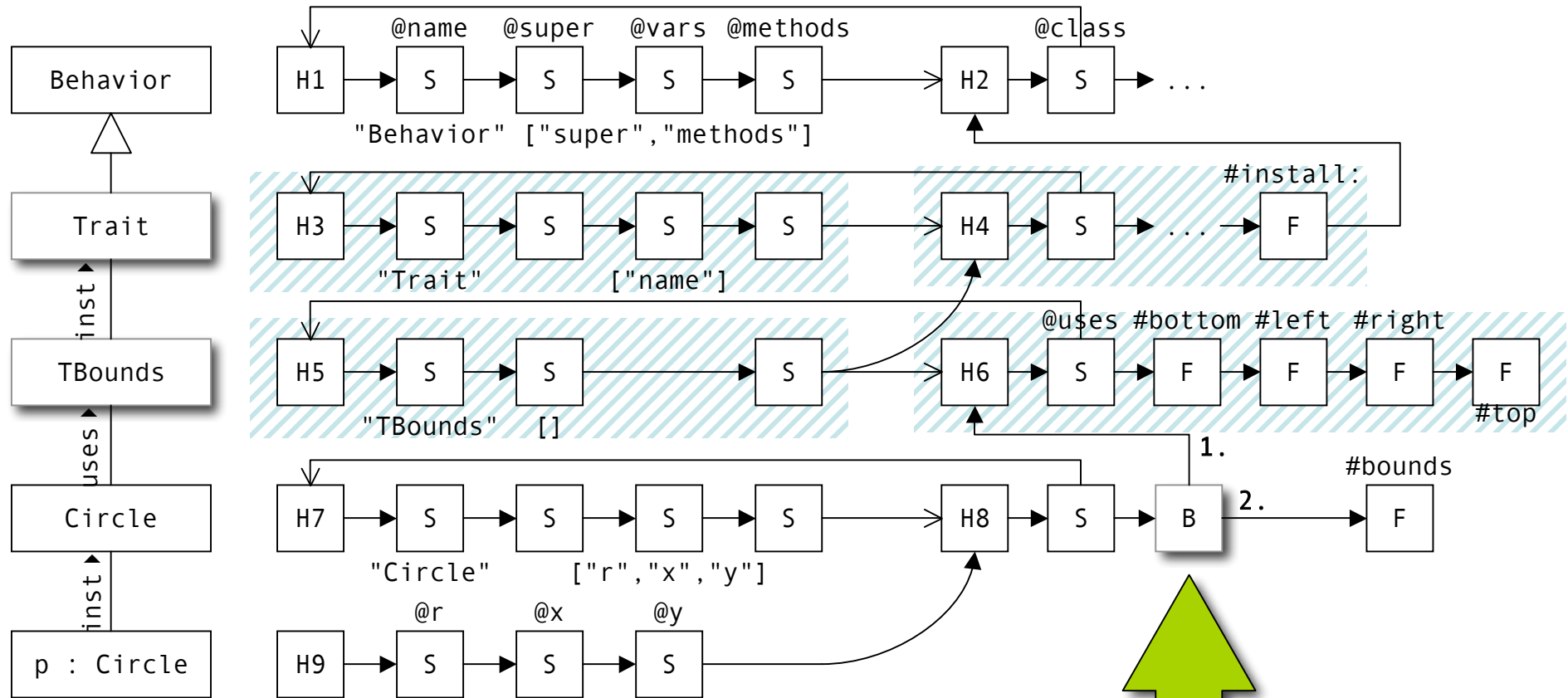
- Each cell consists of:
 - A local lookup function
 - A pointer to next cell
 - An optional payload
- Lookup works as follows:
 - Delegation based, message based
 - If local lookup fails, then delegate to next cell

The CELL Model in a Nutshell

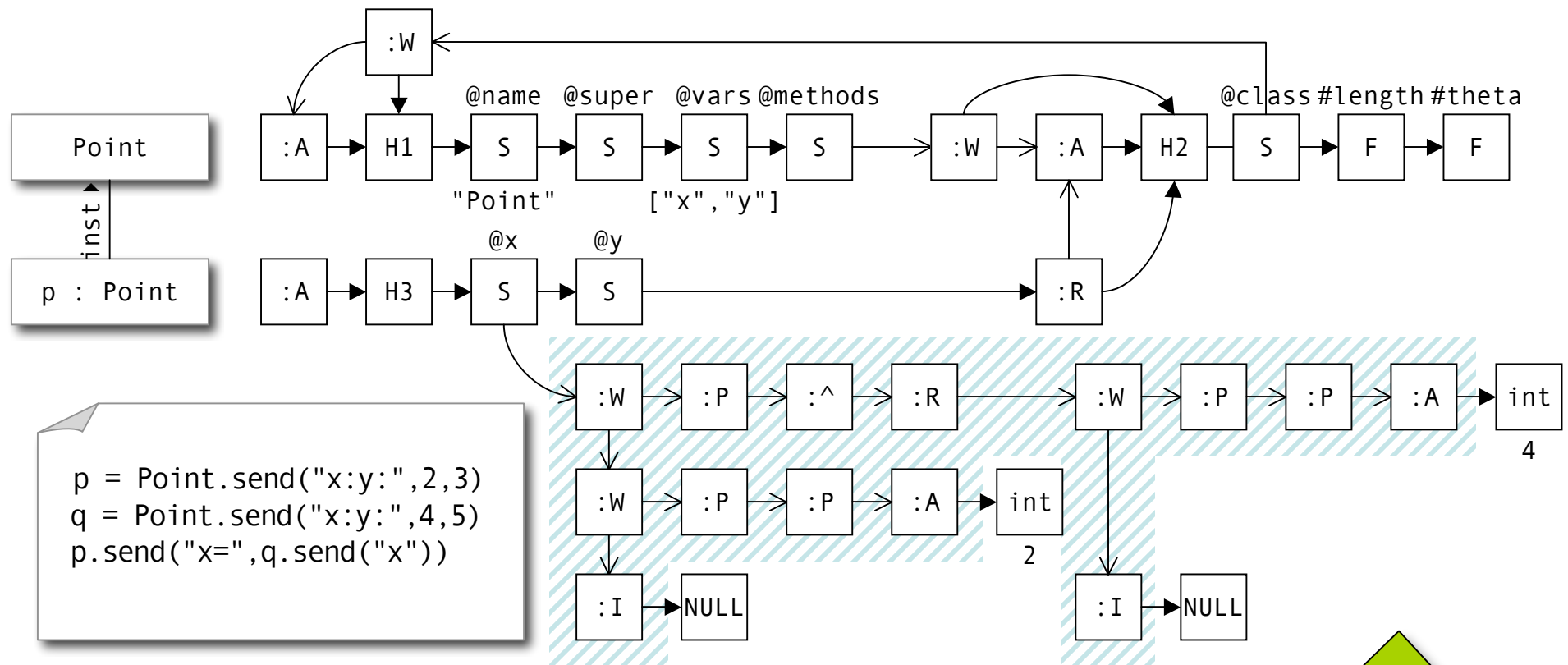
CELLTALK

Smalltalk made of Cells





CELLTALK + Traits



CELLTALK + Aliases

Changes to CELLTALK

- Instance creation
- Method install

- 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>

