Monadic Interface

Monadic Unit

Wraps the input in a one-element block

wrap

Monadic unit is a natural transformation.
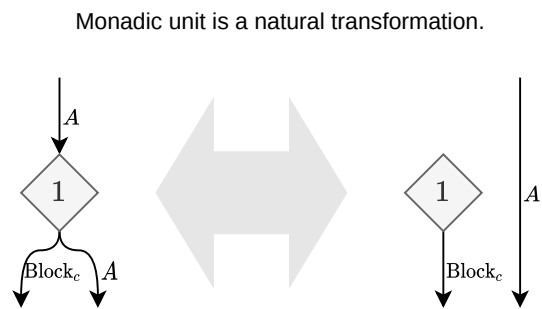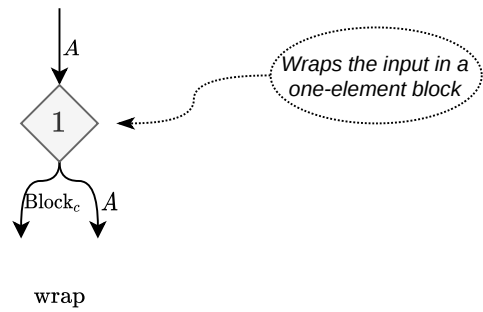
Indeed, for any $f : A \to B$,
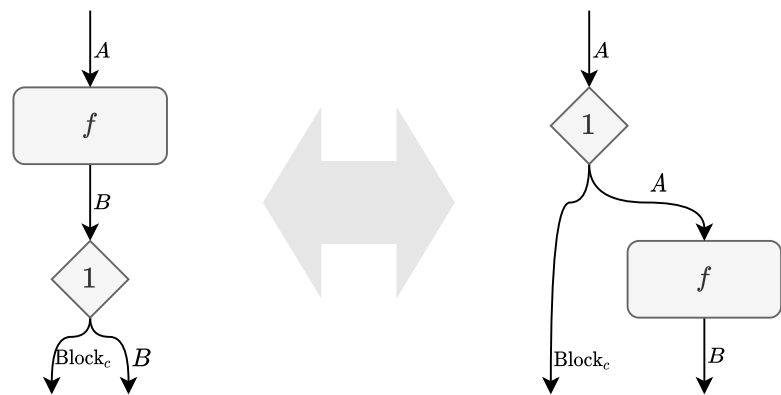
$$\mathrm{chain\_of}(f, \mathrm{wrap}) \equiv \mathrm{chain\_of}(\mathrm{wrap}, \mathrm{with\_elements}(f))$$

Using Monadic Unit

Monadic unit can adapt any regular transformation
to the monadic interface.

A

f

B

1

$Block_c$

A

1

f

$Block_c$

B

A

$Block_c$

B

Monadic Interface: Examples

Collections of database entities

Department attributes

Employee attributes

Block_c B A

DB

department — $\mathrm{Block}_{0:N}$ — Dept

employee — $\mathrm{Block}_{0:N}$ — Emp

Dept

employee — $\mathrm{Block}_{0:N}$ — Emp

name — $\mathrm{Block}_{1:1}$ — String

Emp

department — $\mathrm{Block}_{1:1}$ — Dept

name — $\mathrm{Block}_{1:1}$ — String

salary — $\mathrm{Block}_{1:1}$ — Int

manager — $\mathrm{Block}_{0:1}$ — Emp

subordinate — $\mathrm{Block}_{0:N}$ — Emp

Composition Challenge

Two monadic transformations
can be composed.

Dept

employee

$Block_{0:N}$ Emp

Emp

manager

$Block_{0:1}$ Emp

Dept

employee

Emp

manager

$Block_{0:N}$ $Block_{0:1}$ Emp
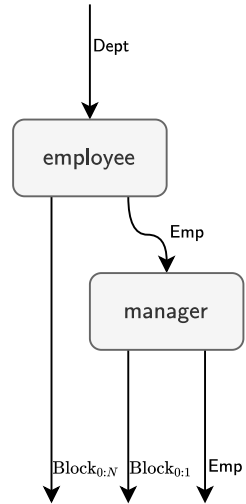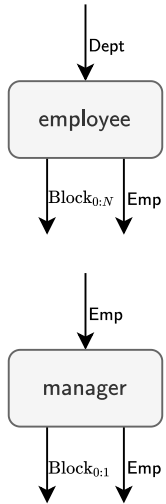
But the composition
does not satisfy
the monadic interface.

A

X

$Block_c$ B
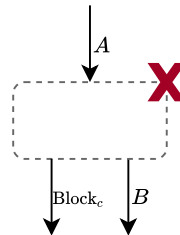
Monadic Multiplication

Block_{c_1} Block_{c_2} A

$*$

$\mathrm{Block}_{c_1 \sqcup c_2}$ A

Flattens nested blocks

flatten