

CASL and SOS

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Why CASL *and* SOS?

CASL benefits:

- ▶ a further use for it
- ▶ making it known to another community

SOS benefits:

- ▶ increased expressiveness
- ▶ unified framework for data and programming language specifications

Flavours of SOS

- ▶ Plotkin-style, small-step
- ▶ ‘Natural semantics’, big-step
- ▶ Transition system specifications
- ▶ Bi-algebraic
- ▶ Modular
- ▶ ...

Flavours of CASL

Plain CASL

- ▶ subsorts, partial operations, predicates, first-order, ...

CASL sublanguages

- ▶ many-sorted, total, algebraic, equational, ...

CASL extensions

- ▶ HASCASL, COCASL, CSP-CASL,
CASL-LTL, CASL-MDL, CASL4SOA, ...

Signatures

Plain CASL: (S, \leq, TF, PF, P)

- ▶ sorts, subsorts, total and partial functions, predicates

Plain transition system specifications: (TF, P)

- ▶ *unsorted terms and labels*
- ▶ *total term constructor functions*
- ▶ *labelled transition relations and predicates*

Signatures

CASL-SOS (*a sublanguage of plain CASL?*)

- ▶ abstract syntax: $\Sigma^L = (S^L, \leq^L, TFL, \emptyset, \emptyset)$
 - **datatype** declarations
 - **assoc, comm** attributes
 - extensible (when loose)
- ▶ auxiliary entities: $\Sigma^A = (S^A, \leq^A, TFA, PFA, PA)$
 - Σ^A extends Σ^L
- ▶ transition relations: $\Sigma^R = (S^A, \leq^A, TFA, PFA, PR)$
 - PR extends PA

Queries

Variables

- ▶ include in signatures?

Transition rules

- ▶ specify as Horn clauses?

Models

- ▶ free?
 - OK for positive rules
 - OK for undefined terms

I-MSOS example

$\text{Cmd} ::= \mathbf{cond}(\text{Exp}, \text{Cmd}, \text{Cmd})$

$\text{Cmd} \rightarrow \text{Cmd}'$

$\text{Exp} \rightarrow \text{Exp}'$

$\text{Exp} \rightarrow \text{Exp}'$

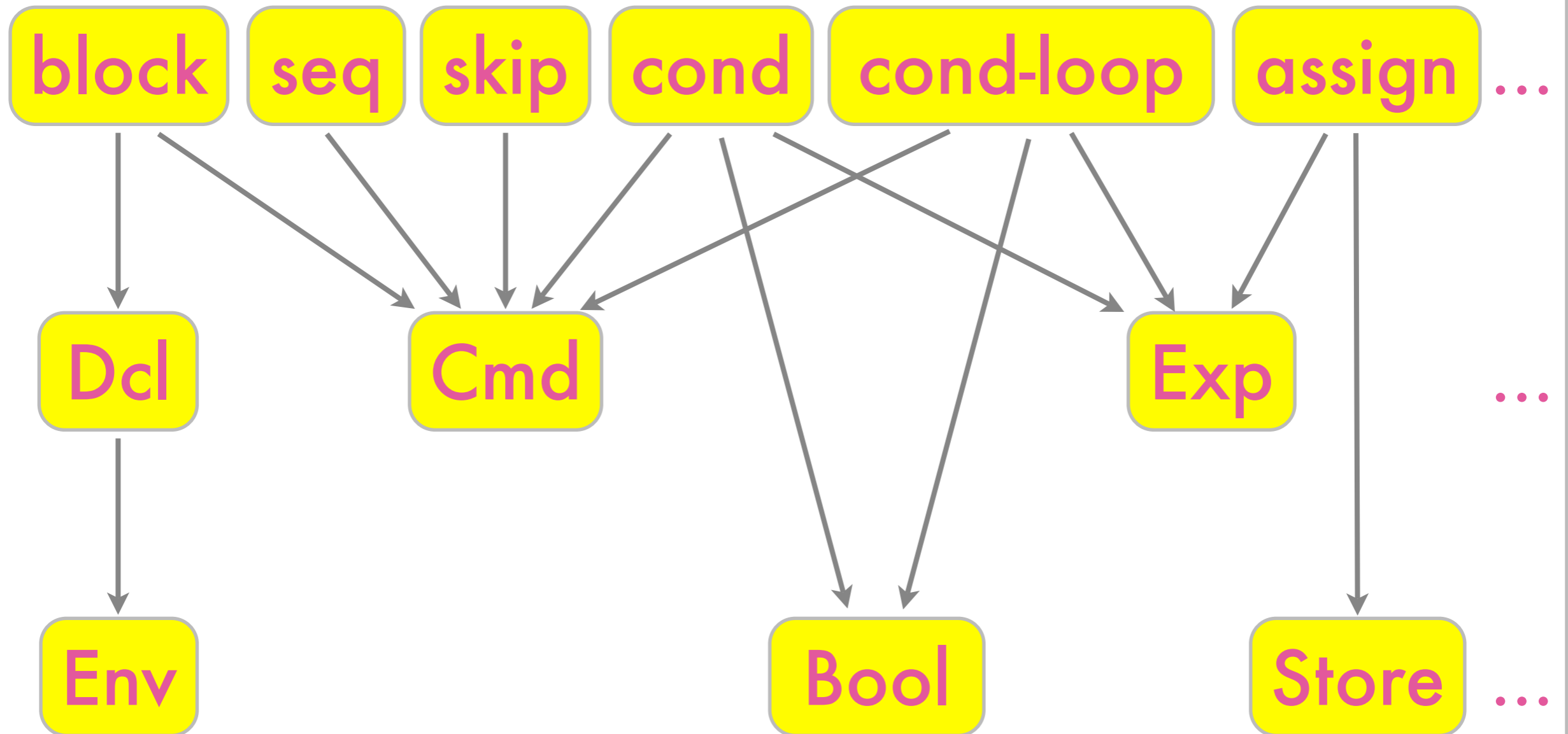
$\mathbf{cond}(\text{Exp}, \text{Cmd}_1, \text{Cmd}_2) \rightarrow \mathbf{cond}(\text{Exp}', \text{Cmd}_1, \text{Cmd}_2)$

$\mathbf{cond}(\text{true}, \text{Cmd}_1, \text{Cmd}_2) \rightarrow \text{Cmd}_1$

$\{ \text{Exp} ::= \mathbf{Bool} \}$

$\mathbf{cond}(\text{false}, \text{Cmd}_1, \text{Cmd}_2) \rightarrow \text{Cmd}_2$

Modular structure



envisaged online repository

Conclusion ?

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