

Various judgments

$e \Downarrow v$ Expr. e evaluates to value v

$\Gamma \vdash e : A$ Under assumptions Γ , expr. e has type A

e free-variable-error e raises a free variable error

(See fig. 1)

Judgment form

reading

$e \Downarrow v$ ~~interp~~ interp

When is interp correct?

Completeness

if $e \Downarrow v$ then (interp e) returns v .

Soundness

if (interp e) returns v then $e \Downarrow v$.

What about free-variable-error?

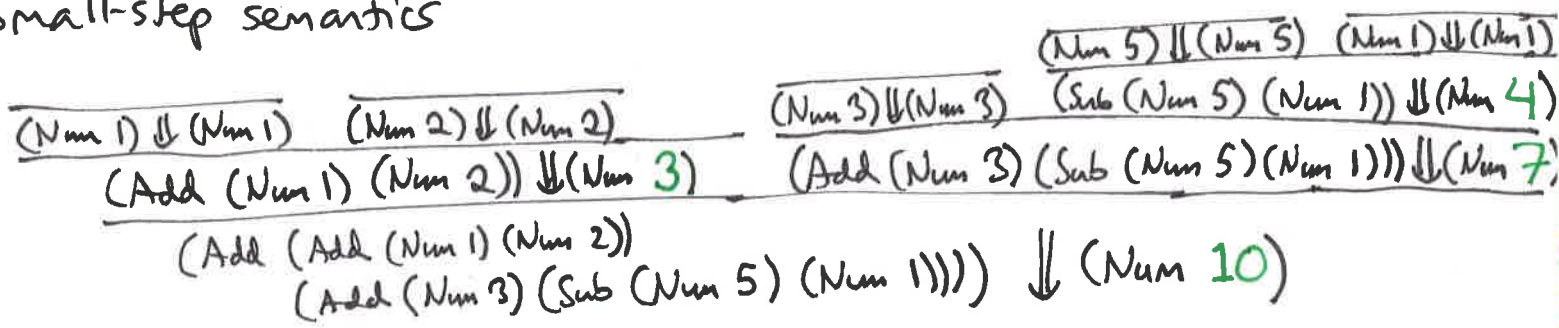
$(Id\ i)$ free-variable-error

(interp (Id 'i)) \rightarrow (error "...")

$(Add (Id 5) (Id i))$ free-variable-error

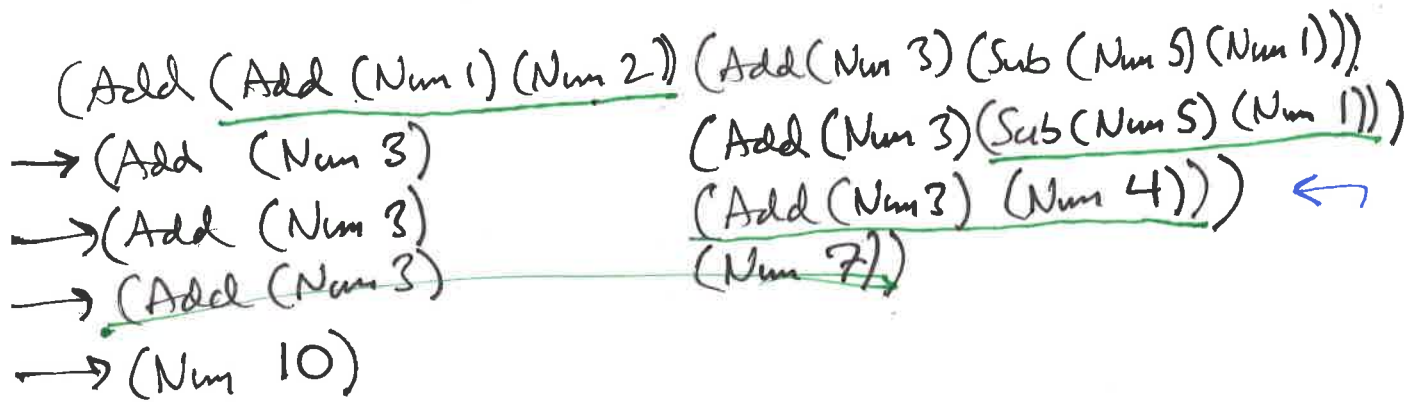
(interp (Add (Id 'i) (Id 'i))) \rightarrow (error "...")

Small-step semantics



$e \Downarrow v$ "The meaning of e is v ."
(what it evaluates to)

$e \longrightarrow e'$ "The meaning of e is what you get after one step of computation."
doing a "reduction" somewhere in e



$\text{Add (Num 3) (Add (Num 3) (Num 4))}$

