

G54FOP: Lecture 5

Operational Semantics II: Induction on Derivations

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Recap: Language Booleans (1)

$t \rightarrow$	true	terms:
	false	constant true
	if t then t else t	constant false
		conditional

$v \rightarrow$	true	values:
	false	constant true
		constant false

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Recap: Language Booleans (2)

if true then t_2 else t_3 $\rightarrow t_2$ (E-IFTRUE)

if false then t_2 else t_3 $\rightarrow t_3$ (E-IFFALSE)

$$\frac{t_1 \rightarrow t'_1}{\text{if } t_1 \text{ then } t_2 \text{ else } t_3 \rightarrow \text{if } t'_1 \text{ then } t_2 \text{ else } t_3} \quad (\text{E-IF})$$

Note:

- Computation rules: E-IFTRUE and E-IFFALSE
- Congruence rules: E-IF
- Values cannot be evaluated further.

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Extension: Small Expression Language

$t \rightarrow$		terms:
...	0	constant zero
	succ t	successor
	pred t	predecessor
	iszero t	zero test

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Extension: Small Expression Language

$v \rightarrow$ values:

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| nv numeric value

$nv \rightarrow$ numeric values:

| **0** zero value

| **succ** nv successor value



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