

4-1/ CC<sub>0</sub>

st = <e, E>

<False, E[if ~~□~~ e<sub>1</sub> e<sub>2</sub>]>  $\mapsto$  <e<sub>2</sub>, E>

E := ~~□~~ | if E e c | (v... E e...)

↓

↓

↓

Hole()

IfC(E, e, e)

AppC(List(v), E, List(~~□~~))

↓

AppC  $\rightarrow$  IfC  $\rightarrow$  AppC  $\rightarrow$  IfC ~~X~~ Hole

⇓

$\Rightarrow$  AppC  $\rightarrow$  IfC  $\rightarrow$  AppC  $\rightarrow$  Hole

Stack

4-2/  $k := k_{ret} \mid \text{if } e \text{ } k \mid \text{kapp } \vec{v} \vec{e} \ h$   
 $ck \quad st = \langle e, k \rangle$

inject  $e = \langle e, k_{ret} \rangle$

extract  $\langle v, k_{ret} \rangle = v$

<sup>1</sup>  $\langle \text{if } e_c \text{ } e_t \text{ } e_f, k \rangle \mapsto \langle e_c, \text{kif } e_t \text{ } e_f \ k \rangle$

<sup>2</sup>  $\langle \text{false}, \text{kif } e_t \text{ } e_f \ k \rangle \mapsto \langle e_f, k \rangle$

<sup>3</sup>  $\langle v, \text{kif } e_t \text{ } e_f \ k \rangle \mapsto \langle e_t, k \rangle$

<sup>4</sup>  $\langle e_0 \ e_m \dots, k \rangle \mapsto \langle e_0, \text{kapp } () \ (e_m \dots) \ k \rangle$

<sup>5</sup>  $\langle v_1, \text{kapp } (v_0 \dots) \ (e_0 \ e_m \dots) \ k \rangle$

$\mapsto \langle e_0, \text{kapp } (v_1 \ v_0 \dots) \ (e_m \dots) \ k \rangle$

<sup>6</sup>  $\langle v_n, \text{kapp } (v_0 \dots) \ () \ k \rangle \mapsto \langle \delta(\text{rev}(v_n \ v_0 \dots)), k \rangle$

4-3/ (+ 1 (x 2 3))  $\downarrow$  insert

< (+ 1 (x 2 3)) , kret  $\downarrow$  4

< +, kapp () (1 (x 2 3)) kret  $\downarrow$  5

< 1, kapp (+) ((x 2 3)) kret  $\downarrow$  5

< (x 2 3) , kapp (1 +) () kret  $\downarrow$  5

< x, kapp () (2 3) (kapp (1 +) () kret)  $\downarrow$  5

< 2, kapp (x) (3) (kapp (1 +) () kret)  $\downarrow$  5

< 3, kapp (2 x) () (kapp (1 +) () kret)  $\downarrow$  6

<  $\delta(x, 2, 3) = 6$  , kapp (1 +) () kret  $\downarrow$  6

<  $\delta(+, 1, 6) = 7$  , kret  $\downarrow$  extend

7

4-4/

The  $K$  component is like a stack  
where the values are either  
ifs or apps

$K = \text{Stack} < \text{Frames} >$

Frame = If F (e, e)  
| App ( $\vec{v}$ ,  $\vec{e}$ )

$K$  is called a "continuation"

4-5/ Novices think the stack is the  
PAST  
of a computation