

## Notations

We use  $\overline{\cdot}_2$  to push a continuation on the continuation stack of the topmost fiber, without modifyin the effect handler:

$$\kappa \overline{\cdot}_2 (\langle \kappa s, \eta \rangle \overline{\cdot} \mu s) = \langle \kappa \overline{\cdot} \kappa s, \eta \rangle \overline{\cdot} \mu s$$

## Computations

$$\begin{aligned} \llbracket V W \rrbracket &= \overline{\lambda}_{\kappa s}. \llbracket V \rrbracket @ \llbracket W \rrbracket @ \downarrow \kappa s \\ \llbracket \text{absurd } V \rrbracket &= \overline{\lambda}_{\kappa s}. \text{absurd } \llbracket V \rrbracket \\ \llbracket \text{return } V \rrbracket &= \overline{\lambda}_{\langle \kappa \overline{\cdot} \kappa s, \eta \rangle \overline{\cdot} \mu s}. \kappa @ \llbracket V \rrbracket @ \downarrow (\langle \kappa s, \eta \rangle \overline{\cdot} \mu s) \\ \llbracket \text{let } x \leftarrow M \text{ in } N \rrbracket &= \overline{\lambda}_{\langle \kappa \overline{\cdot} \kappa s, \eta \rangle \overline{\cdot} \mu s}. \\ &\quad \llbracket M \rrbracket @ \left( \langle \langle \overline{\lambda}_x \kappa s. \llbracket N \rrbracket @ (\kappa \overline{\cdot}_2 \uparrow \kappa s) \rangle \overline{\cdot} \kappa s, \eta \rangle \overline{\cdot} \mu s \right) \\ \llbracket \text{perform } V \rrbracket &= \overline{\lambda}_{\langle \kappa \overline{\cdot} \kappa s, \eta \rangle \overline{\cdot} \mu s}. \eta @ \llbracket V \rrbracket @ [\langle \downarrow \kappa s, \eta \rangle] @ \downarrow \mu s \\ \llbracket \text{handle } M \text{ with } \{H_v, H_x, H_f\} \rrbracket &= \overline{\lambda}_{\mu s}. \llbracket M \rrbracket @ (\langle \llbracket H_v \rrbracket \overline{\cdot} \llbracket H_x \rrbracket \overline{\cdot} [], \llbracket H_f \rrbracket \rangle \overline{\cdot} \mu s) \end{aligned}$$

where

$$\begin{aligned} H_v : \quad \llbracket \text{return } x \mapsto N \rrbracket &= \overline{\lambda}_x \kappa s. \text{let } (kf \overline{\cdot} \kappa s') = \kappa s \text{ in} \\ &\quad \llbracket N \rrbracket @ \uparrow \kappa s' \\ H_f : \quad \llbracket p r \mapsto N \rrbracket &= \overline{\lambda}_p s \kappa s. \text{let } r = \text{fun } s \text{ in} \\ &\quad \llbracket N_e \rrbracket @ \uparrow \kappa s \\ H_x : \quad \llbracket e \mapsto N \rrbracket &= \overline{\lambda}_e \kappa s. \llbracket N \rrbracket @ \uparrow \kappa s \end{aligned}$$

$$\begin{aligned} \llbracket \text{raise } V \rrbracket &= \overline{\lambda}_{\langle \kappa \overline{\cdot} \chi \overline{\cdot} \kappa s \rangle \overline{\cdot} \mu s}. \chi @ \llbracket V \rrbracket @ (\langle \downarrow \kappa s, \eta \rangle \overline{\cdot} \mu s) \\ \llbracket \text{try } M \text{ with } H \rrbracket &= \overline{\lambda}_{\langle \kappa s, \eta \rangle \overline{\cdot} \mu s}. \llbracket M \rrbracket @ (\langle K_{\text{ret}} \overline{\cdot} \llbracket H \rrbracket \overline{\cdot} \kappa s, \eta \rangle \overline{\cdot} \mu s) \end{aligned}$$

where

$$\begin{aligned} K_{\text{ret}} &= \overline{\lambda}_x \kappa s. \text{let } \langle kx \overline{\cdot} k \overline{\cdot} \kappa s', \eta \rangle \overline{\cdot} ms = \kappa s \text{ in} \\ &\quad k @ x @ (\langle \kappa s', \eta \rangle \overline{\cdot} ms) \\ \llbracket e \mapsto N \rrbracket &= \overline{\lambda}_e \kappa s. \llbracket N \rrbracket @ \uparrow \kappa s \end{aligned}$$

*Note:* In the setting of js\_of\_ocaml,  $K_{\text{ret}}$  is not strictly necessary, as the source language has explicit POPTRAP statements: we could either push a dummy continuation and have POPTRAP pop it (but we need to push something for the stack to look as expected to the rest

of the translation), or push  $K_{\text{ret}}$  and have POPTRAP simply return through it. Currently, I'm doing both, but it is superfluous.

### Top level program

$$\top \llbracket M \rrbracket = \llbracket M \rrbracket @ \overline{((\lambda x \text{ ks. } x) :: (\lambda z \text{ ks. } \text{absurd } z) :: \uparrow[]), (\lambda z \text{ ks. } \text{absurd } z) :: \uparrow[]}$$