

E-Machine

Values:

$$V ::= n \mid b \mid (\text{fun } x(y) \text{ is } e)[E]$$

Frames:

$$\begin{aligned} f &::= \text{Op1}(\text{op}, e, E) & (\text{op}(\square, e)[E]) \\ & \mid \text{Op2}(\text{op}, V) & (\text{op}(V, \square)) \\ & \mid \text{If}(e_1, e_2, E) & (\text{if}(\square, e_1, e_2)[E]) \\ & \mid \text{App1}(e, E) & (\text{apply}(\square, e)[E]) \\ & \mid \text{App2}(V) & (\text{apply}(V, \square)) \end{aligned}$$

Stacks:

$$K ::= \text{nil} \mid f::K$$

States:

$$s ::= \text{In}(K, E, e) \mid \text{Out}(K, V)$$

Rules:

$$\begin{aligned} (EM1) \quad & \text{In}(K, E, x) \mapsto_C \text{Out}(K, E(x)) \\ (EM2) \quad & \text{In}(K, E, n) \mapsto_C \text{Out}(K, n) \\ (EM3) \quad & \text{In}(K, E, b) \mapsto_C \text{Out}(K, b) \\ (EM4) \quad & \text{In}(K, E, \text{fun } x(y) \text{ is } e) \mapsto_C \text{Out}(K, (\text{fun } x(y) \text{ is } e)[E]) \\ \\ (EM5) \quad & \text{In}(K, E, \text{op}(e_1, e_2)) \mapsto_C \text{In}(\text{Op1}(e_2, E)::K, E, e_1) \\ (EM6) \quad & \text{In}(K, E, \text{if}(e_1, e_2, e_3)) \mapsto_C \text{In}(\text{If}(e_2, e_3, E)::K, E, e_1) \\ (EM7) \quad & \text{In}(K, E, \text{apply}(e_1, e_2)) \mapsto_C \text{In}(\text{App1}(e_2, E)::K, E, e_1) \\ \\ (EM8) \quad & \text{Out}(\text{Op1}(\text{op}, e_2, E)::K, V_1) \mapsto_C \text{In}(\text{Op2}(\text{op}, V_1)::K, E, e_2) \\ (EM9) \quad & \text{Out}(\text{Op2}(\text{op}, V_1)::K, V_2) \mapsto_C \text{Out}(K, M(\text{op})(V_1, V_2)) \\ (EM10) \quad & \text{Out}(\text{If}(e_1, e_2, E)::K, \text{true}) \mapsto_C \text{In}(K, E, e_1) \\ (EM11) \quad & \text{Out}(\text{If}(e_1, e_2, E)::K, \text{false}) \mapsto_C \text{In}(K, E, e_2) \\ (EM12) \quad & \text{Out}(\text{App1}(e_2, E)::K, V_1) \mapsto_C \text{In}(\text{App2}(V_1)::K, E, e_2) \\ (EM13) \quad & \text{Out}(\text{App2}((\text{fun } x(y) \text{ is } e)[E])::K, V_2) \mapsto_C \text{In}(K, E[f \mapsto V_1][x \mapsto V_2], e) \end{aligned}$$