Trivial

$s := x := e \mid s_1 ; s_2 \mid \text{if}(e)\{s_1\}\text{else}\{s_2\}$

$\mid \text{while}(e)\{s\} \mid \text{skip}$

$\mid \text{assume}(e) \mid \text{assert}(e)$

$\mid x := \text{symb}()$

$\mid x := f(e_1, \ldots, e_n) \mid \text{return } e$

$e := n \mid x \mid e_1 \oplus e_2 \mid \ominus e$

$\text{func} := \text{function } \underset{s}{\text{fname}}(x_1, \ldots, x_n)\{$

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$\text{prog} := \overline{\text{func}}$

Semantics Coverage | — Big-step
— Small-step

outcome

$\rho : Var \to \mathbb{N}$

$\sigma ::= \cdot \mid Ass \mid AsmF \mid Ret(n)$

Big-step $\langle S, \rho \rangle \Downarrow \rho', \sigma$

$\langle skip, \rho \rangle \Downarrow \rho, \cdot$

$\langle x := e, \rho \rangle \Downarrow \rho[x \mapsto [\![e]\!]\rho], \cdot$

$$\frac{\langle S_1, \rho \rangle \Downarrow \rho_1, \cdot \quad \langle S_2, \rho_1 \rangle \Downarrow \rho_2, \sigma}{\langle S_1; S_2, \rho \rangle \Downarrow \rho_2, \sigma}$$

$$\frac{[\![e]\!]\rho = 0 \quad \langle S_2, \rho \rangle \Downarrow \rho_2, \sigma}{\langle if(e)\{S_1\}else\{S_2\}, \rho \rangle \Downarrow \rho_2, \sigma}$$

$$\frac{\langle S_1, \rho \rangle \Downarrow \rho_1, \sigma \quad \sigma \neq \cdot}{\langle S_1; S_2, \rho \rangle \Downarrow \rho_1, \sigma}$$

$$\frac{[\![e]\!]\rho = n \neq 0}{\langle assume(e), \rho \rangle \Downarrow \rho, \cdot}$$

$$\frac{[\![e]\!]\rho = 0}{\langle assume(e), \rho \rangle \Downarrow \rho, AsmF}$$

$$\frac{\langle if(e)\{S; while(e)\{S\}\}else\{skip\}, \rho \rangle \Downarrow \rho', \sigma}{\langle while(e)\{S\}, \rho \rangle \Downarrow \rho', \sigma}$$

$$\frac{[\![c]\!]_\rho = n}{\text{return } c, \rho \Downarrow \rho, \text{Ret}(n)}$$

$$\frac{[\![e_i]\!]_\rho = n_i \;\Big|_{i=1}^{k} \qquad \text{body}(f) = s_b \qquad \text{params}(f) = [x_1, \ldots, x_k] \qquad \rho' = [x_i \mapsto n_i]_{i=1}^{k} \qquad \langle s_b, \rho' \rangle \Downarrow \rho'', \text{Ret}(n)}{x := f(e_1, \ldots, e_k), \rho \Downarrow \rho[x \mapsto n], \bullet}$$

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(mus casos ...)

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let interpret (sto : Sto.t) (s : Stmt.t) : Out.t =
  let f = interpret sto n
  match s with
  | Seq (s1, s2) ⇒
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$| \; Seq\,(s_1, s_2) \Rightarrow$

$$\frac{\langle s_1, \rho\rangle \Downarrow (r_1, \bullet) \qquad \langle s_2, r_1\rangle \Downarrow \rho_2, \sigma}{\langle s_1; s_2, \rho\rangle \Downarrow \rho_2, \sigma}$$

$$\frac{\langle s_1, \rho\rangle \Downarrow (r_1, \sigma) \qquad \sigma \neq \bullet}{\langle s_1; s_2, \rho\rangle \Downarrow \rho_1, \sigma}$$

let out1 = f s_1 in

match at1 with

$| \; Cut \Rightarrow f\ s_2$

$| \; \_ \Rightarrow at_2$