

Operational Semantics of Impcore

Assume

- $- \in \text{dom } \phi_0$

and

- $\phi_0(-) = \text{PRIM}(-)$

$$\frac{\frac{\frac{x \notin \text{dom } \{ \} \quad x \in \text{dom } \{x \mapsto 2\} \quad \{x \mapsto 2\}(x) = 2}{\langle \text{VAR}(x), \{x \mapsto 2\}, \phi_0, \{ \} \rangle \Downarrow \langle 2, \{x \mapsto 2\}, \phi_0, \{ \} \rangle} \text{(GLOBALVAR)} \quad \frac{\langle \text{LITERAL}(1), \{x \mapsto 2\}, \phi_0, \{ \} \rangle \Downarrow \langle 1, \{x \mapsto 2\}, \phi_0, \{ \} \rangle} \text{(LITERAL)} \quad 2 - 1 = 1}{\langle \text{APPLY}(-, \text{VAR}(x), \text{LITERAL}(1)), \{x \mapsto 2\}, \phi_0, \{ \} \rangle \Downarrow \langle 1, \{x \mapsto 1\}, \phi_0, \{ \} \rangle} \text{(APPLYSUB)} \quad \frac{- \in \text{dom } \phi_0 \quad \phi_0(-) = \text{PRIM}(-)}{\langle \text{SET}(x, \text{APPLY}(-, \text{VAR}(x), \text{LITERAL}(1))), \{x \mapsto 2\}, \phi_0, \{ \} \rangle \Downarrow \langle 1, \{x \mapsto 1\}, \phi_0, \{ \} \rangle} \text{(GLOBALASSIGN)} \quad \frac{\frac{x \notin \text{dom } \{ \} \quad x \in \text{dom } \{x \mapsto 1\} \quad \{x \mapsto 1\}(x) = 1}{\langle \text{VAR}(x), \{x \mapsto 1\}, \phi_0, \{ \} \rangle \Downarrow \langle 1, \{x \mapsto 1\}, \phi_0, \{ \} \rangle} \text{(GLOBALVAR)} \quad \frac{\langle \text{LITERAL}(1), \{x \mapsto 1\}, \phi_0, \{ \} \rangle \Downarrow \langle 1, \{x \mapsto 1\}, \phi_0, \{ \} \rangle} \text{(LITERAL)} \quad 1 - 1 = 0}{\langle \text{APPLY}(-, \text{VAR}(x), \text{LITERAL}(1)), \{x \mapsto 1\}, \phi_0, \{ \} \rangle \Downarrow \langle 0, \{x \mapsto 0\}, \phi_0, \{ \} \rangle} \text{(APPLYSUB)} \quad \frac{- \in \text{dom } \phi_0 \quad \phi_0(-) = \text{PRIM}(-)}{\langle \text{SET}(x, \text{APPLY}(-, \text{VAR}(x), \text{LITERAL}(1))), \{x \mapsto 1\}, \phi_0, \{ \} \rangle \Downarrow \langle 0, \{x \mapsto 0\}, \phi_0, \{ \} \rangle} \text{(GLOBALASSIGN)} \quad \frac{\frac{x \notin \text{dom } \{ \} \quad x \in \text{dom } \{x \mapsto 0\} \quad \{x \mapsto 0\}(x) = 0}{\langle \text{VAR}(x), \{x \mapsto 0\}, \phi_0, \{ \} \rangle \Downarrow \langle 0, \{x \mapsto 0\}, \phi_0, \{ \} \rangle} \text{(GLOBALVAR)} \quad 0 = 0}{\langle \text{WHILE}(\text{VAR}(x), \text{SET}(x, \text{APPLY}(-, \text{VAR}(x), \text{LITERAL}(1))), \{x \mapsto 0\}, \phi_0, \{ \} \rangle \Downarrow \langle 0, \{x \mapsto 0\}, \phi_0, \{ \} \rangle} \text{(WHILEEND)} \quad \langle \text{WHILE}(\text{VAR}(x), \text{SET}(x, \text{APPLY}(-, \text{VAR}(x), \text{LITERAL}(1))), \{x \mapsto 2\}, \phi_0, \{ \} \rangle \Downarrow \langle 0, \{x \mapsto 0\}, \phi_0, \{ \} \rangle} \text{(WHILEITERATE)}$$