

$z := 0; \text{ while } y \leq x \text{ do } (z := z + 1; x := x - y)$

$$\begin{array}{ll}
s = [x \mapsto 17y \mapsto 5] & \\
s_1 = [x \mapsto 3, y \mapsto 0] & b = y \leq x \\
s_2 = [x \mapsto 3, y \mapsto 3] & A = z := 0; B \\
s_3 = [x \mapsto 2, y \mapsto 3] & B = \text{while } b \text{ do } C \\
s_4 = [x \mapsto 2, y \mapsto 5] & C = \text{while } b \text{ do } D \\
s_5 = [x \mapsto 1, y \mapsto 5] & D = z := z + 1; E \\
s_6 = [x \mapsto 1, y \mapsto 6] & E = x := x - y \\
s_7 = [x \mapsto 0, y \mapsto 6] &
\end{array}$$

$$\text{[comp}_{\text{ns}}] \frac{\text{[ass}_{\text{ns}}] \frac{}{\langle x := 3, [] \rangle \rightarrow s} \quad \text{[comp}_{\text{ns}}] \frac{\text{[ass}_{\text{ns}}] \frac{}{\langle y := 0, s \rangle \rightarrow s_1} \quad T_1}{\langle B, s \rangle \rightarrow s_7}}{\langle A, [] \rangle \rightarrow s_7}$$

$$T_1 = \text{[while}_{\text{ns}}^{\text{tt}}] \frac{\text{[comp}_{\text{ns}}] \frac{\text{[ass}_{\text{ns}}] \frac{}{\langle y := y + x, s_1 \rangle \rightarrow s_2} \quad \text{[ass}_{\text{ns}}] \frac{}{\langle x := x - 1, s_2 \rangle \rightarrow s_3}}{\langle D, s_1 \rangle \rightarrow s_3} \quad T_2}{\langle C, s_1 \rangle \rightarrow s_7} \mathcal{B}[b]_{s_1} = \text{tt}$$

$$T_2 = \text{[while}_{\text{ns}}^{\text{tt}}] \frac{\text{[comp}_{\text{ns}}] \frac{\text{[ass}_{\text{ns}}] \frac{}{\langle y := y + x, s_3 \rangle \rightarrow s_4} \quad \text{[ass}_{\text{ns}}] \frac{}{\langle x := x - 1, s_4 \rangle \rightarrow s_5}}{\langle D, s_3 \rangle \rightarrow s_5} \quad T_3}{\langle C, s_3 \rangle \rightarrow s_7} \mathcal{B}[b]_{s_3} = \text{tt}$$

$$T_3 = \text{[while}_{\text{ns}}^{\text{tt}}] \frac{\text{[comp}_{\text{ns}}] \frac{\text{[ass}_{\text{ns}}] \frac{}{\langle y := y + x, s_5 \rangle \rightarrow s_6} \quad \text{[ass}_{\text{ns}}] \frac{}{\langle x := x - 1, s_6 \rangle \rightarrow s_7}}{\langle D, s_5 \rangle \rightarrow s_7} \quad T_4}{\langle C, s_5 \rangle \rightarrow s_7} \mathcal{B}[b]_{s_5} = \text{tt}$$

$$T_4 = \text{[while}_{\text{ns}}^{\text{ff}}] \frac{}{\langle C, s_7 \rangle \rightarrow s_7} \mathcal{B}[b]_{s_7} = \text{ff}$$