$$\dfrac{\dfrac{}{\langle z := 0, s\rangle \to s\,[x \to 17, y \to 5, z \to 0]}\,[ass_1] \qquad (1)}{\langle z := 0;\ \text{while } y \leq x \text{ do } z := z + 1; x := x - y \text{ end}, s\rangle \to s\,[x \to 2, y \to 5, z \to 3]}\,[comp]$$

$$\dfrac{\dfrac{\dfrac{\dfrac{}{\langle z := z + 1, s\,[x \to 17, y \to 5, z \to 0]\rangle \to s\,[x \to 17, y \to 5, z \to 1]}\,[ass_1] \quad \dfrac{}{\langle x := x - y, s\,[x \to 17, y \to 5, z \to 1]\rangle \to s\,[x \to 12, y \to 5, z \to 1]}\,[ass_1]}{\langle z := z + 1; x := x - y, s\,[x \to 17, y \to 5, z \to 0]\rangle \to s\,[x \to 12, y \to 5, z \to 1]}\,[comp] \qquad (2)}{\langle\ \text{while } y \leq x \text{ do } z := z + 1; x := x - y \text{ end}, s\,[x \to 17, y \to 5, z \to 0]\rangle \to s\,[x \to 2, y \to 5, z \to 3]}\,[while_1]}{(1)}$$

$$\dfrac{\dfrac{\dfrac{\dfrac{}{\langle z := z + 1, s\,[x \to 12, y \to 5, z \to 1]\rangle \to s\,[x \to 12, y \to 5, z \to 2]}\,[ass_1] \quad \dfrac{}{\langle x := x - y, s\,[x \to 12, y \to 5, z \to 2]\rangle \to s\,[x \to 7, y \to 5, z \to 2]}\,[ass_1]}{\langle z := z + 1; x := x - y, s\,[x \to 12, y \to 5, z \to 1]\rangle \to s\,[x \to 7, y \to 5, z \to 2]}\,[comp] \qquad (3)}{\langle\ \text{while } y \leq x \text{ do } z := z + 1; x := x - y \text{ end}, s\,[x \to 12, y \to 5, z \to 1]\rangle \to s\,[x \to 2, y \to 5, z \to 3]}\,[while_1]}{(2)}$$

$$\dfrac{\dfrac{\dfrac{\dfrac{}{\langle z := z + 1, s\,[x \to 7, y \to 5, z \to 2]\rangle \to s\,[x \to 7, y \to 5, z \to 3]}\,[ass_1] \quad \dfrac{}{\langle x := x - y, s\,[x \to 7, y \to 5, z \to 3]\rangle \to s\,[x \to 2, y \to 5, z \to 3]}\,[ass_1]}{\langle z := z + 1; x := x - y, s\,[x \to 7, y \to 5, z \to 2]\rangle \to s\,[x \to 2, y \to 5, z \to 3]}\,[comp] \qquad (4)}{\langle\ \text{while } y \leq x \text{ do } z := z + 1; x := x - y \text{ end}, s\,[x \to 12, y \to 5, z \to 2]\rangle \to s\,[x \to 2, y \to 5, z \to 3]}\,[while_1]}{(3)}$$

$$\dfrac{\dfrac{}{\langle\ \text{while } y \leq x \text{ do } z := z + 1; x := x - y \text{ end}, s\,[x \to 2, y \to 5, z \to 3]\rangle \to s\,[x \to 2, y \to 5, z \to 3]}\,[while_2]}{(4)}$$