For what exact precondition and postcondition does the following assignment move integer variable \( x \) farther from zero?

\[(a)\quad x := x + 1\]

\(x := x + 1\) (the exact precondition for \( \text{abs } x' > \text{abs } x \) to be refined by \( x := x + 1 \))

\[\forall x': \text{abs } x' > \text{abs } x \iff (x := x + 1)\]

\[\forall x': \text{abs } x' > \text{abs } x \iff x' = x + 1\]

\[\text{abs } (x + 1) > \text{abs } x\]

\(x \not\equiv 0\)

\(x := \text{abs } (x + 1)\)

\(x := \text{abs } (x + 1)\) (the exact precondition for \( \text{abs } x' > \text{abs } x \) to be refined by \( x := \text{abs } (x + 1) \))

\[\forall x': \text{abs } x' > \text{abs } x \iff (x := \text{abs } (x + 1))\]

\[\forall x': \text{abs } x' > \text{abs } x \iff x' = \text{abs } (x + 1)\]

\[\text{abs } (x + 1) > \text{abs } x\]

\(x \not\equiv 0\)

\(x < 0\)

\(\Box\)

\[x := x^2\]

\(x := x^2\) (the exact precondition for \( \text{abs } x' > \text{abs } x \) to be refined by \( x := x^2 \))

\[\forall x: \text{int } \text{abs } x' > \text{abs } x \iff x' = x^2\] arithmetic: \(x^2 = (−x)^2\)

\[\forall x: \text{int } \text{abs } x' > \text{abs } x \iff x' = (\text{abs } x)^2\] change variable

\[\forall y: \text{abs } \text{int } \text{abs } x' > y \iff x' = y^2\] context

\[\forall y: \text{nat } \text{abs } (y^2) > y \iff x' = y^2\] arithmetic: \(y^2 \geq 0\)

\[\forall y: \text{nat } y^2 > y \iff x' = y^2\] domain split

\[\forall y: \text{nat } y^2 > y \iff x' = y^2\] one-point

\[\forall y: \text{nat } y^2 > y \iff x' = y^2\] and arithmetic

\[(\bot \iff x' = 0) \land (\bot \iff x' = 1) \land (\forall y: \text{nat } y^2 \iff x' = y^2)\]

\[x' \not\equiv 0 \land x' \not\equiv 1\]