

Function Equals

{true}

if $(x - y \neq 0)$
 $z := 0$

else

$z := 1$

$\{(x \neq y \wedge z = 0) \vee (x = y \wedge z = 1)\}$

{Apply 2-arm conditions}

2) $\{Q \wedge x - y = 0\}$
 $z := 1$

$\{(x \neq y \wedge z = 0) \vee (x = y \wedge z = 1)\}$
 {Assignment Axiom}

$Q = ((x \neq y \wedge z = 0) \vee (x = y \wedge z = 1)) [1/z]$

$Q = (x \neq y \wedge 1 = 0) \vee (x = y \wedge 1 = 1)$

$Q = \text{False} \vee \text{True}$

$Q = \text{True}$

{pre condition strengthening}

$\{Q \wedge x - y = 0\} \rightarrow \text{true}$

1) $\{P \wedge x - y \neq 0\}$
 $z := 0$

$\{(x \neq y \wedge z = 0) \vee (x = y \wedge z = 1)\}$

{assignment axiom}

$P = ((x \neq y \wedge z = 0) \vee (x = y \wedge z = 1)) [0/z]$

$P = (x \neq y \wedge 0 = 0) \vee (x = y \wedge 0 = 1)$

$P = \text{true} \vee \text{false}$

$P = \text{true}$

{precondition strengthening}

$P \wedge x - y \neq 0 \rightarrow \text{true}$

{pure logic}

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{QED}