

EXTENDS *Integers*, *gcd*

CONSTANTS M, N

ASSUME $\wedge M \in \text{Nat} \setminus \{0\}$
 $\wedge N \in \text{Nat} \setminus \{0\}$

```

*****
--algorithm Euclid{
  variables  $x = M, y = N$ ;
  {
    while (  $x \neq y$  ) {
      if (  $x < y$  ) {  $y := y - x$  }
      else      {  $x := x - y$  }
    }
  }
}
*****

```

BEGIN TRANSLATION

VARIABLES x, y, pc

$vars \triangleq \langle x, y, pc \rangle$

$Init \triangleq$ Global variables
 $\wedge x = M$
 $\wedge y = N$
 $\wedge pc = \text{"Lbl_1"}$

$Lbl_1 \triangleq$ $\wedge pc = \text{"Lbl_1"}$
 \wedge IF $x \neq y$
 THEN \wedge IF $x < y$
 THEN $\wedge y' = y - x$
 $\wedge x' = x$
 ELSE $\wedge x' = x - y$
 $\wedge y' = y$
 $\wedge pc' = \text{"Lbl_1"}$
 ELSE $\wedge pc' = \text{"Done"}$
 \wedge UNCHANGED $\langle x, y \rangle$

$Next \triangleq Lbl_1$
 \vee Disjunct to prevent deadlock on termination
 $(pc = \text{"Done"} \wedge \text{UNCHANGED } vars)$

$Spec \triangleq Init \wedge \square[Next]_{vars}$

$Termination \triangleq \Diamond(pc = \text{"Done"})$

END TRANSLATION

\ * Modification History
\ * Last modified *Thu Nov 06 12:35:13 PST 2014* by *Chris.Nott*
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