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**CONTEXT** iDiv\_C0

**CONSTANTS**

b

c

**AXIOMS**

axm1:  $c > 0$

We cannot divide by zero

axm2:  $b \in \mathbb{N}$

axm3:  $c \in \mathbb{N}$

This is unnecessary, as it is implied by  $c > 0$

**END**

**MACHINE** iDiv\_M0

**SEES** iDiv\_C0

**VARIABLES**

a The quotient

r The remainder

**INVARIANTS**

inv1:  $a \in \mathbb{N}$

inv2:  $r \in \mathbb{N}$

inv3:  $b = a * c + r$

**EVENTS**

**Initialisation**

**begin**

act1:  $a := 0$

act2:  $r := b$

**end**

**Event** Progress  $\langle \text{ordinary} \rangle \hat{=}$

**when**

grd1:  $r \geq c$

Give one step in the division

**then**

act1:  $r := r - c$

act2:  $a := a + 1$

**end**

**Event** Finish  $\langle \text{ordinary} \rangle \hat{=}$

**when**

grd1:  $r < c$

Finish/grd1  $\wedge$  inv3  $\Rightarrow$  Postcondition

**then**

*skip*

**end**

**END**