MACHINE m1

REFINES m0

SEES c0

VARIABLES

    wait

    process

    clk

    t1

    t2

    t3

INVARIANTS

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

    inv2: $t1 \in PROCESS \nrightarrow \mathbb{N}$

    inv3: $t2 \in PROCESS \nrightarrow \mathbb{N}$

    inv4: $finite(wait)$

    inv5: $t3 \in PROCESS \nrightarrow \mathbb{N}$

    inv6: $\forall p \cdot (p \in wait \wedge p \in dom(t1)) \Rightarrow clk - t1(p) \leq ddl1$

    inv8: $\forall p \cdot (p \in dom(t1) \wedge p \in dom(t2) \wedge t2(p) \geq t1(p)) \Rightarrow t2(p) - t1(p) \leq ddl1$
        deadline(t1,t2,ddl1)

    inv13: $\forall p \cdot (p \in process \wedge p \in dom(t1)) \Rightarrow clk - t1(p) \leq ddl3$

    inv14: $\forall p \cdot (p \in dom(t1) \wedge p \in dom(t3) \wedge t3(p) \geq t1(p)) \Rightarrow t3(p) - t1(p) \leq ddl3$
        deadline(t1,t3,ddl3)

    inv10: $\forall p \cdot p \in dom(t1) \Rightarrow 0 \leq t1(p) \wedge t1(p) \leq clk$

    inv11: $\forall p \cdot p \in dom(t2) \Rightarrow 0 \leq t2(p) \wedge t2(p) \leq clk$

    inv12: $\forall p \cdot p \in dom(t3) \Rightarrow 0 \leq t3(p) \wedge t3(p) \leq clk$

    inv15: $\forall p \cdot (p \in process \wedge p \in dom(t1)) \Rightarrow p \in dom(t2) \wedge t2(p) \geq t1(p)$

EVENTS

Initialisation ⟨extended⟩

    begin

        act1: $wait := \varnothing$

        act2: $process := \varnothing$

        act3: $clk := 0$

        act4: $t1 := \varnothing$

        act5: $t2 := \varnothing$

        act6: $t3 := \varnothing$

    end

Event wish ⟨ordinary⟩ $\widehat{=}$

extends wish

    any

        pro

    where

        grd1: $pro \in PROCESS \setminus wait$

        grd2: $pro \in PROCESS \setminus process$

    then

        act1: $wait := wait \cup \{pro\}$

        act2: $t1(pro) := clk$

    end

Event enter ⟨ordinary⟩ $\widehat{=}$

extends enter

    any

        pro

    where

        grd1: $pro \in wait$

        grd2: $card(process) = 0$

    then

    act1: $wait := wait \setminus \{pro\}$
    act2: $process := process \cup \{pro\}$
    act3: $t2(pro) := clk$
  end
Event leave $\langle$ordinary$\rangle$ $\widehat{=}$
extends leave
  any
    pro
  where
    grd1: $pro \in process$
  then
    act1: $process := process \setminus \{pro\}$
    act3: $t3(pro) := clk$
  end
Event tick $\langle$ordinary$\rangle$ $\widehat{=}$
  when
    grd2: $\forall p \cdot (p \in wait \wedge p \in dom(t1)) \Rightarrow clk + 1 - t1(p) \leq ddl1$
    grd3: $\forall p \cdot (p \in process \wedge p \in dom(t1)) \Rightarrow clk + 1 - t1(p) \leq ddl3$
  then
    act1: $clk := clk + 1$
  end
END