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MACHINE scheduler_main
INCLUDES scheduler
PROMOTES delete, activate, swap
CONSTANTS
  time
PROPERTIES
  time  $\in PID \rightarrow \mathbf{NAT} \wedge$ 
  time =  $\{(process1 \mapsto 10),$ 
     $(process2 \mapsto 5),$ 
     $(process3 \mapsto 2),$ 
     $(process4 \mapsto 4),$ 
     $(process5 \mapsto 7)\}$ 
VARIABLES
  tic, waiting_time, execution_time, latency_time
INVARIANT
  tic  $\in \mathbf{NAT}$ 
   $\wedge$  waiting_time  $\in PID \rightarrow \mathbf{NAT}$ 
   $\wedge$  execution_time  $\in PID \rightarrow \mathbf{INT}$ 
   $\wedge$  latency_time  $\in PID \rightarrow \mathbf{NAT}$ 
INITIALISATION
  tic := 0 ||
  waiting_time :=  $PID \times \{0\}$  ||
  execution_time :=  $\emptyset$  ||
  latency_time :=  $PID \times \{0\}$ 
OPERATIONS
start(pp) =
  PRE pp  $\in PID$  THEN
    new(pp) || execution_time(pp) := time(pp)
  END ;
free(pp) =
  PRE pp  $\in active \wedge execution\_time(pp) = 0$  THEN
    execution_time := active  $\triangleleft execution\_time$ 
    || latency_time(pp) := 0
    || deactivate
  END ;
step =
  BEGIN
    tic := tic + 1
    || execution_time :=
      execution_time  $\triangleleft \{pp, ee \mid pp \in active \wedge ee = \mathbf{execution\_time}(pp) - 1\}$ 
    || waiting_time :=
      waiting_time  $\triangleleft \{pp, ee \mid pp : (waiting \cup ready) \wedge ee = \mathbf{waiting\_time}(pp) + 1\}$ 
    || latency_time :=
      latency_time  $\triangleleft \{pp, ee \mid pp \notin ((waiting \cup active) \cup ready) \wedge ee = \mathbf{latency\_time}(pp) + 1\}$ 
  END
END

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