Contents

MACHINE Collect

VARIABLES

coins

oddcoins

INVARIANTS

inv_1: $coins \subseteq \mathbb{N}$

inv_2: $finite(coins)$

inv_3: $oddcoins \subseteq \mathbb{N}$

inv_4: $oddcoins \subseteq coins$

EVENTS

Initialisation

begin

init_1: $coins := \varnothing$

init_2: $oddcoins := \varnothing$

end

Event add ⟨ordinary⟩ $\widehat{=}$

any

c

where

grd_1: $c \in \mathbb{N}$

then

act_1: $coins := coins \cup \{c\}$

end

Event collectOddCoins ⟨ordinary⟩ $\widehat{=}$

when

grd_1: $coins \neq \varnothing$

then

act_1: $oddcoins := \{x \cdot x \in coins \wedge (x mod 2) = 1 | x\}$

end

END

MACHINE Collect1
REFINES Collect
VARIABLES

coins
oddcoins
collecting
tobechecked
checked
collected

INVARIANTS

inv1_1: $collecting \in BOOL$
inv1_2: $tobechecked \subseteq \mathbb{N}$
inv1_3: $finite(tobechecked)$
inv1_4: $tobechecked \subseteq coins$
inv1_5: $collected \subseteq \mathbb{N}$
inv1_6: $finite(collected)$
inv1_7: $collected \subseteq coins$
inv1_8: $\forall x \cdot x \in collected \Rightarrow x mod 2 = 1$
inv1_9: $checked \subseteq \mathbb{N}$
inv1_10: $checked \subseteq coins$
inv1_11: $collecting = TRUE \Rightarrow tobechecked \cup checked = coins$
inv1_12: $collected \subseteq checked$
inv1_13: $\forall x \cdot x \in checked \wedge x mod 2 = 1 \Rightarrow x \in collected$

VARIANT

$tobechecked$

EVENTS

Initialisation ⟨extended⟩

begin

init_1: $coins := \varnothing$
init_2: $oddcoins := \varnothing$
init1_1: $collecting := FALSE$
init1_2: $tobechecked := \varnothing$
init1_3: $collected := \varnothing$
init1_4: $checked := \varnothing$

end

Event add ⟨ordinary⟩ $\widehat{=}$
extends add

any

c

where

grd_1: $c \in \mathbb{N}$
grd1_1: $collecting = FALSE$

then

act_1: $coins := coins \cup \{c\}$

end

Event startCollecting ⟨ordinary⟩ $\widehat{=}$

when

grd1_1: $collecting = FALSE$
grd1_2: $coins \neq \varnothing$

then

act1_1: $collecting := TRUE$
act1_2: $tobechecked := coins$
act1_3: $checked := \varnothing$
act1_4: $collected := \varnothing$

end

Event ignoreSingleEvenCoin ⟨convergent⟩ $\widehat{=}$

any

c

where

grd1_1: $collecting = TRUE$

grd1_2: $tobechecked \neq \varnothing$

grd1_3: $c \in tobechecked$

grd1_4: $(cmod2) = 0$

then

act1_1: $tobechecked := tobechecked \setminus \{c\}$

act1_2: $checked := checked \cup \{c\}$

end

Event collectSingleOddCoin ⟨convergent⟩ $\widehat{=}$

any

c

where

grd1_1: $collecting = TRUE$

grd1_2: $tobechecked \neq \varnothing$

grd1_3: $c \in tobechecked$

grd1_4: $(cmod2) = 1$

gtd1_5: $c \in coins$

then

act1_1: $tobechecked := tobechecked \setminus \{c\}$

act1_2: $checked := checked \cup \{c\}$

act1_3: $collected := collected \cup \{c\}$

end

Event collectOddCoins ⟨ordinary⟩ $\widehat{=}$

refines collectOddCoins

when

grd1_1: $collecting = TRUE$

grd1_2: $coins \neq \varnothing$

grd1_3: $tobechecked = \varnothing$

thm1_1: ⟨theorem⟩ $checked = coins$

Nice to show that we have checked all coins

then

act1_1: $oddcoins := collected$

act1_2: $collecting := FALSE$

end

END