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1  ┌────────────────────────── MODULE RaceCondition ───────────────────────────┐
2  EXTENDS Naturals
3  CONSTANT N

6  --algorithm RaceCondition
7  variables total = 0;

9  process Proc ∈ 1 .. N
10 variable x
11 begin
12   read: x := total ;
13   inc: x := x + 1 ;
14   save: total := x ;
15 end process ;

17 end algorithm ;
19 BEGIN TRANSLATION
20 CONSTANT defaultInitValue
21 VARIABLES total, pc, x

23 vars ≜ ⟨total, pc, x⟩

25 ProcSet ≜ (1 .. N)

27 Init ≜ Global variables
28   ∧ total = 0
29   Process Proc
30   ∧ x = [self ∈ 1 .. N ↦ defaultInitValue]
31   ∧ pc = [self ∈ ProcSet ↦ "read"]

33 read(self) ≜ ∧ pc[self] = "read"
34               ∧ x' = [x EXCEPT ![self] = total]
35               ∧ pc' = [pc EXCEPT ![self] = "inc"]
36               ∧ total' = total

38 inc(self) ≜ ∧ pc[self] = "inc"
39               ∧ x' = [x EXCEPT ![self] = x[self] + 1]
40               ∧ pc' = [pc EXCEPT ![self] = "save"]
41               ∧ total' = total

43 save(self) ≜ ∧ pc[self] = "save"
44               ∧ total' = x[self]
45               ∧ pc' = [pc EXCEPT ![self] = "Done"]
46               ∧ x' = x

48 Proc(self) ≜ read(self) ∨ inc(self) ∨ save(self)

50 Next ≜ (∃ self ∈ 1 .. N : Proc(self))

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51         ∨ Disjunct to prevent deadlock on termination
52         ((∀ self ∈ ProcSet : pc[self] = "Done") ∧ UNCHANGED vars)
54 Spec ≜ Init ∧ □[Next]vars
56 Termination ≜ ◇(∀ self ∈ ProcSet : pc[self] = "Done")
58 END TRANSLATION
60 AlgoOK ≜ (∀ self ∈ ProcSet : pc[self] = "Done") ⇒ total = N
62 ┌──────────────────────────────────────────────────────────────────────────────────┐
    \* Modification History
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