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MACHINE
   M36
SEES
   C35
VARIABLES
   MULTISETS
   LINKS
INVARIANTS
   inv1   :   MULTISETS ⊆ TYPES × ℕ × SYMBOLS × ℕ
   inv2   :   LINKS ⊆ TYPES × ℕ × TYPES × ℕ
EVENTS
   INITIALISATION   ≙
   STATUS
    ordinary
   BEGIN
    act1   :   MULTISETS ≔ {(t1 ↦ 1 ↦ a ↦ 2), (t1 ↦ 1 ↦ t_2 ↦ 1), (t1 ↦ 1 ↦ t_3 ↦ 1), (t1 ↦ 1 ↦ s ↦ 1), (t3 ↦ 1 ↦ a ↦ 1) }
    act2   :   LINKS ≔ {(t1 ↦ 1 ↦ t4 ↦ 1), (t1 ↦ 1 ↦ t5 ↦ 1), (t2 ↦ 1 ↦ t4 ↦ 1), (t2 ↦ 1 ↦ t5 ↦ 1), (t0 ↦ 1 ↦ t3 ↦ 1)}
   END

   T1_strateg1_R1   ≙
   STATUS
    ordinary
   ANY
    multiset
    cell_no
   WHERE
    grd1   :   multiset ⊆ MULTISETS
    grd2   :   cell_no ∈ ℕ
    grd3   :   multiset(t1 ↦ cell_no ↦ a)=2
    grd4   :   multiset(t1 ↦ cell_no ↦ t_3)>0
   THEN
               MULTISETS ≔ ( MULTISETS ∪
               {
               (t1 ↦ cell_no ↦   a ↦ (multiset(t1 ↦ cell_no ↦   a) − 1)),
               (t1 ↦ cell_no ↦ t_3 ↦ (multiset(t1 ↦ cell_no ↦ t_3) − 1))
               })
    act1   :
               \
               {
               (t1 ↦ cell_no ↦   a ↦ (multiset(t1 ↦ cell_no ↦   a))),
               (t1 ↦ cell_no ↦ t_3 ↦ (multiset(t1 ↦ cell_no ↦ t_3)))
               }
    act2   :   LINKS ≔ LINKS ∪ {(t1 ↦ 1 ↦ t2 ↦ 1)}
   END

   T1_strateg1_R2   ≙
   STATUS
    ordinary
   ANY
    multiset
    cell_no
   WHERE
    grd1   :   multiset ⊆ MULTISETS
    grd2   :   cell_no ∈ ℕ
    grd3   :   multiset(t1 ↦ cell_no ↦ a)=2
    grd4   :   multiset(t1 ↦ cell_no ↦ t_2)>0
   THEN
               MULTISETS ≔ ( MULTISETS ∪
               {
               (t1 ↦ cell_no ↦   a ↦ (multiset(t1 ↦ cell_no ↦   a) − 1)),
               (t1 ↦ cell_no ↦ t_2 ↦ (multiset(t1 ↦ cell_no ↦ t_2) − 1))
               })
    act1   :
               \
               {
               (t1 ↦ cell_no ↦   a ↦ (multiset(t1 ↦ cell_no ↦   a))),
               (t1 ↦ cell_no ↦ t_2 ↦ (multiset(t1 ↦ cell_no ↦ t_2)))
               }
    act2   :   LINKS ≔ LINKS ∪ {(t1 ↦ 1 ↦ t3 ↦ 1)}
   END

   T1_strateg2_R1   ≙
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STATUS
 ordinary
ANY
 multiset
 cell_no
 link
WHERE
 grd1   :   multiset ⊆ MULTISETS
 grd2   :   cell_no ∈ ℕ
 grd3   :   multiset(t1 ↦ cell_no ↦ s)=1
 grd4   :   multiset(t1 ↦ cell_no ↦ t_2)=1
 grd5   :   multiset(t1 ↦ cell_no ↦ t_3)=0
 grd6   :   link ⊆ LINKS
 grd7   :   link(t1 ↦ 1 ↦ t2)=1
THEN
            MULTISETS ≔ ( MULTISETS ∪
            {
            (t1 ↦ cell_no ↦   s ↦ (multiset(t1 ↦ cell_no ↦ s) − 1)),
            (t1 ↦ cell_no ↦ tt_3 ↦ 1),
 act1   :   (t2 ↦ 1 ↦ a ↦ 1)
            })
            \
            {
            (t1 ↦ cell_no ↦   s ↦ (multiset(t1 ↦ cell_no ↦ s)))
            }
END

T1_strateg2_R2   ≙
STATUS
 ordinary
ANY
 multiset
 cell_no
 link
WHERE
 grd1   :   multiset ⊆ MULTISETS
 grd2   :   cell_no ∈ ℕ
 grd3   :   multiset(t1 ↦ cell_no ↦ s)=1
 grd4   :   multiset(t1 ↦ cell_no ↦ t_3)=1
 grd5   :   multiset(t1 ↦ cell_no ↦ t_2)=0
 grd7   :   link ⊆ LINKS
 grd6   :   link(t1 ↦ 1 ↦ t3)=1
THEN
            MULTISETS ≔ ( MULTISETS ∪
            {
            (t1 ↦ cell_no ↦   s ↦ (multiset(t1 ↦ cell_no ↦ s) − 1)),
            (t1 ↦ cell_no ↦ tt_2 ↦ 1),
 act1   :   (t3 ↦ 1 ↦ a ↦ 1)
            })
            \
            {
            (t1 ↦ cell_no ↦   s ↦ (multiset(t1 ↦ cell_no ↦ s)))
            }
END

T1_strateg3_R1   ≙
STATUS
 ordinary
ANY
 multiset
 cell_no
WHERE
 grd1   :   multiset ⊆ MULTISETS
 grd2   :   cell_no ∈ ℕ
 grd3   :   multiset(t1 ↦ cell_no ↦ a)=1
 grd4   :   multiset(t1 ↦ cell_no ↦ s)=0
 grd5   :   multiset(t1 ↦ cell_no ↦ t_2)=1
 grd6   :   multiset(t1 ↦ cell_no ↦ t_3)=0
THEN
 act1   :   MULTISETS ≔ ( MULTISETS ∪
            {
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            (t1 ↦ cell_no ↦  a ↦ (multiset(t1 ↦ cell_no ↦ a) − 1))
            })
            \
            {
            (t1 ↦ cell_no ↦  a ↦ (multiset(t1 ↦ cell_no ↦ a)))
            }
 act2   :   LINKS ≔ LINKS \ {(t1 ↦ 1 ↦ t2 ↦ 1)}
END

T1_strateg3_R2   ≙
STATUS
 ordinary
ANY
 multiset
 cell_no
WHERE
 grd1   :   multiset ⊆ MULTISETS
 grd2   :   cell_no ∈ ℕ
 grd3   :   multiset(t1 ↦ cell_no ↦ a)=1
 grd4   :   multiset(t1 ↦ cell_no ↦ s)=0
 grd5   :   multiset(t1 ↦ cell_no ↦ t_3)=1
 grd6   :   multiset(t1 ↦ cell_no ↦ t_2)=0
THEN
            MULTISETS ≔ ( MULTISETS ∪
            {
            (t1 ↦ cell_no ↦  a ↦ (multiset(t1 ↦ cell_no ↦ a) − 1))
            })
 act1   :   \
            {
            (t1 ↦ cell_no ↦  a ↦ (multiset(t1 ↦ cell_no ↦ a)))
            }
 act2   :   LINKS ≔ LINKS \ {(t1 ↦ 1 ↦ t3 ↦ 1)}
END

T1_strateg4_R1   ≙
STATUS
 ordinary
ANY
 multiset
 cell_no
WHERE
 grd1   :   multiset ⊆ MULTISETS
 grd2   :   cell_no ∈ ℕ
 grd3   :   multiset(t1 ↦ cell_no ↦ a)=0
 grd4   :   multiset(t1 ↦ cell_no ↦ tt_2)>0
THEN
            MULTISETS ≔ ( MULTISETS ∪
            {
            (t1 ↦ cell_no ↦  tt_2 ↦ (multiset(t1 ↦ cell_no ↦ tt_2) − 1)),
            (t1 ↦ cell_no ↦  s ↦ 1),
 act1   :   (t1 ↦ cell_no ↦  t_2 ↦ 1)
            })
            \
            {
            (t1 ↦ cell_no ↦  tt_2 ↦ (multiset(t1 ↦ cell_no ↦ tt_2)))
            }
END

T1_strateg4_R2   ≙
STATUS
 ordinary
ANY
 multiset
 cell_no
WHERE
 grd1   :   multiset ⊆ MULTISETS
 grd2   :   cell_no ∈ ℕ
 grd3   :   multiset(t1 ↦ cell_no ↦ a)=0
 grd4   :   multiset(t1 ↦ cell_no ↦ tt_3)=1
THEN
 act1   :   MULTISETS ≔ ( MULTISETS ∪
            {
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            (t1 ↦ cell_no ↦  tt_3 ↦ (multiset(t1 ↦ cell_no ↦ tt_3) − 1)),
            (t1 ↦ cell_no ↦  s ↦ 1),
            (t1 ↦ cell_no ↦  t_3 ↦ 1)
            })
            \
            {
            (t1 ↦ cell_no ↦  tt_3 ↦ (multiset(t1 ↦ cell_no ↦ tt_3)))
            }
END

T2   ≙
STATUS
 ordinary
ANY
 multiset
 cell_no
WHERE
 grd1   :   multiset ⊆ MULTISETS
 grd2   :   cell_no ∈ ℕ
 grd3   :   multiset(t2 ↦ cell_no ↦ a)=1
THEN
            MULTISETS ≔ ( MULTISETS ∪
            {
            (t2 ↦ cell_no ↦  a ↦ (multiset(t2 ↦ cell_no ↦ a) − 1)),
            (t4 ↦ cell_no ↦  a ↦ 1),
            (t5 ↦ cell_no ↦  a ↦ 1)
 act1   :   })
            \
            {
            (t2 ↦ cell_no ↦  a ↦ (multiset(t2 ↦ cell_no ↦ a)))
            }
END

T3_R1   ≙
STATUS
 ordinary
ANY
 multiset
 cell_no
WHERE
 grd1   :   multiset ⊆ MULTISETS
 grd2   :   cell_no ∈ ℕ
 grd3   :   multiset(t3 ↦ cell_no ↦ a)=1
THEN
            MULTISETS ≔ ( MULTISETS ∪
            {
            (t3 ↦ cell_no ↦  a ↦ (multiset(t3 ↦ cell_no ↦ a) − 1)),
            (t0 ↦ cell_no ↦  a ↦ 1)
 act1   :   })
            \
            {
            (t3 ↦ cell_no ↦  a ↦ (multiset(t3 ↦ cell_no ↦ a)))
            }
END

T4   ≙
STATUS
 ordinary
ANY
 multiset
 cell_no
WHERE
 grd1   :   multiset ⊆ MULTISETS
 grd2   :   cell_no ∈ ℕ
 grd3   :   multiset(t4 ↦ cell_no ↦ a)=1
THEN
 act1   :   MULTISETS ≔ ( MULTISETS ∪
            {
            (t4 ↦ cell_no ↦  a ↦ (multiset(t4 ↦ cell_no ↦ a) − 1)),
            (t1 ↦ cell_no ↦  a ↦ 1)
            })
            \
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                {
                (t4 ↦ cell_no ↦  a ↦ (multiset(t4 ↦ cell_no ↦ a)))
                }
    END

    T5   ≙
    STATUS
     ordinary
    ANY
     multiset
     cell_no
    WHERE
     grd1   :   multiset ⊆ MULTISETS
     grd2   :   cell_no ∈ ℕ
     grd3   :   multiset(t5 ↦ cell_no ↦ a)=1
    THEN
                MULTISETS ≔ ( MULTISETS ∪
                {
                (t5 ↦ cell_no ↦  a ↦ (multiset(t5 ↦ cell_no ↦ a) − 1)),
                (t1 ↦ cell_no ↦  a ↦ 1)
     act1   :   })
                \
                {
                (t5 ↦ cell_no ↦  a ↦ (multiset(t5 ↦ cell_no ↦ a)))
                }
    END

END
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