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MACHINE
  M_Plasticity_1
SEES
  C_Plasticity
VARIABLES
  MULTISETS
  LINKS
INVARIANTS
  inv1   :   MULTISETS ⊆ TYPES × ℕ × SYMBOLS × ℕ
  inv2   :   LINKS ⊆ TYPES × ℕ × TYPES × ℕ
EVENTS
  INITIALISATION   ≙
  STATUS
   ordinary
  BEGIN
   act1   :   MULTISETS ≔ {(S1 ↦ 1 ↦ a ↦ 2), (S1 ↦ 1 ↦ n2 ↦ 2), (S1 ↦ 1 ↦ n3 ↦ 2), (S3 ↦ 1 ↦ a ↦ 1) }
   act2   :   LINKS ≔ {(S1 ↦ 1 ↦ SA1 ↦ 1), (S1 ↦ 1 ↦ SA2 ↦ 1), (S2 ↦ 1 ↦ SA1 ↦ 1), (S2 ↦ 1 ↦ SA2 ↦ 1), (S3 ↦ 1 ↦ Environment ↦ 1)}
  END

  S1_R1   ≙
  STATUS
   ordinary
  ANY
   multiset
   link
   cell_no
  WHERE
   grd1   :   multiset ⊆ MULTISETS
   grd2   :   cell_no ∈ ℕ
   grd3   :   multiset(S1 ↦ cell_no ↦ a)=2
   grd4   :   multiset(S1 ↦ cell_no ↦ n2)=2
   grd5   :   multiset(S1 ↦ cell_no ↦ n3)=2
   grd6   :   link ⊆ LINKS
   grd7   :   link(S1 ↦ 1 ↦ S2)≠1
  THEN
              MULTISETS ≔ ( MULTISETS ∪
              {
              (S1 ↦ cell_no ↦  n2 ↦ (multiset(S1 ↦ cell_no ↦   n2) − 1))
              })
   act1   :   \
              {
              (S1 ↦ cell_no ↦ n2 ↦ (multiset(S1 ↦ cell_no ↦ n2)))
              }
   act2   :   LINKS ≔ LINKS ∪ {(S1 ↦ 1 ↦ S2 ↦ 1)}
  END

  S1_R2   ≙
  STATUS
   ordinary
  ANY
   multiset
   cell_no
   link
  WHERE
   grd1   :   multiset ⊆ MULTISETS
   grd2   :   cell_no ∈ ℕ
   grd3   :   multiset(S1 ↦ cell_no ↦ a)=2
   grd4   :   multiset(S1 ↦ cell_no ↦ n2)=2
   grd5   :   multiset(S1 ↦ cell_no ↦ n3)=2
   grd6   :   link ⊆ LINKS
   grd7   :   link(S1 ↦ 1 ↦ S2)≠1
  THEN
              MULTISETS ≔ ( MULTISETS ∪
              {
              (S1 ↦ cell_no ↦   n3 ↦ (multiset(S1 ↦ cell_no ↦   n3) − 1))
              })
   act1   :   \
              {
              (S1 ↦ cell_no ↦ n3 ↦ (multiset(S1 ↦ cell_no ↦ n3)))
              }
   act2   :   LINKS ≔ LINKS ∪ {(S1 ↦ 1 ↦ S3 ↦ 1)}
  END

  S1_R3   ≙
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STATUS
 ordinary
ANY
 multiset
 cell_no
 link
WHERE
 grd1   :   multiset ⊆ MULTISETS
 grd2   :   cell_no ∈ N
 grd3   :   multiset(S1 ↦ cell_no ↦ a)=1
 grd4   :   multiset(S1 ↦ cell_no ↦ n2)=2
 grd5   :   multiset(S1 ↦ cell_no ↦ n3)=2
 grd6   :   link ⊆ LINKS
 grd7   :   link(S1 ↦ 1 ↦ S2)=1
THEN
            MULTISETS ≔ ( MULTISETS ∪
            {
            (S1 ↦ cell_no ↦   a ↦ (multiset(S1 ↦ cell_no ↦ a) − 1))
            })
 act1   :   \
            {
            (S1 ↦ cell_no ↦  a ↦ (multiset(S1 ↦ cell_no ↦ a)))
            }
 act2   :   LINKS ≔ LINKS \ {(S1 ↦ 1 ↦ S2 ↦ 1)}
END

S1_R4   ≙
STATUS
 ordinary
ANY
 multiset
 cell_no
 link
WHERE
 grd1   :   multiset ⊆ MULTISETS
 grd2   :   cell_no ∈ N
 grd3   :   multiset(S1 ↦ cell_no ↦ a)=1
 grd4   :   multiset(S1 ↦ cell_no ↦ n2)=2
 grd5   :   multiset(S1 ↦ cell_no ↦ n3)=2
 grd7   :   link ⊆ LINKS
 grd6   :   link(S1 ↦ 1 ↦ S3)=1
THEN
            MULTISETS ≔ ( MULTISETS ∪
            {
            (S1 ↦ cell_no ↦   a ↦ (multiset(S1 ↦ cell_no ↦ a) − 1))
            })
 act1   :   \
            {
            (S1 ↦ cell_no ↦  a ↦ (multiset(S1 ↦ cell_no ↦ a)))
            }
 act2   :   LINKS ≔ LINKS \ {(S1 ↦ 1 ↦ S3 ↦ 1)}
END

S1_R5   ≙
STATUS
 ordinary
ANY
 multiset
 cell_no
WHERE
 grd1   :   multiset ⊆ MULTISETS
 grd2   :   cell_no ∈ N
 grd3   :   multiset(S1 ↦ cell_no ↦ a)=2
 grd4   :   multiset(S1 ↦ cell_no ↦ n2)=1
THEN
            MULTISETS ≔ ( MULTISETS ∪
            {
            (S1 ↦ cell_no ↦   a ↦ (multiset(S1 ↦ cell_no ↦ a) − 1)),
            (S2 ↦ cell_no ↦   a ↦ (multiset(S2 ↦ cell_no ↦ a) + 1)),
            (S1 ↦ cell_no ↦   n2 ↦ 2)
            })
 act1   :   \
            {
            (S1 ↦ cell_no ↦  a ↦ (multiset(S1 ↦ cell_no ↦ a))),
            (S2 ↦ cell_no ↦  a ↦ (multiset(S2 ↦ cell_no ↦ a))),
            (S1 ↦ cell_no ↦   n2 ↦ 1)
            }
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END

S1_R6   ≙
STATUS
 ordinary
ANY
 multiset
 cell_no
WHERE
 grd1   :   multiset ⊆ MULTISETS
 grd2   :   cell_no ∈ ℕ
 grd3   :   multiset(S1 ↦ cell_no ↦ a)=2
 grd4   :   multiset(S1 ↦ cell_no ↦ n3)=1
THEN
            MULTISETS ≔ ( MULTISETS ∪
            {
            (S1 ↦ cell_no ↦   a ↦ (multiset(S1 ↦ cell_no ↦ a) − 1)),
            (S3 ↦ cell_no ↦   a ↦ (multiset(S3 ↦ cell_no ↦ a) + 1)),
            (S1 ↦ cell_no ↦   n3 ↦ 2)
            })
 act1   :   \
            {
            (S1 ↦ cell_no ↦  a ↦ (multiset(S1 ↦ cell_no ↦ a))),
            (S3 ↦ cell_no ↦  a ↦ (multiset(S3 ↦ cell_no ↦ a))),
            (S1 ↦ cell_no ↦   n3 ↦ 1)
            }
END

S2   ≙
STATUS
 ordinary
ANY
 multiset
 cell_no
WHERE
 grd1   :   multiset ⊆ MULTISETS
 grd2   :   cell_no ∈ ℕ
 grd3   :   multiset(S2 ↦ cell_no ↦ a)=1
THEN
            MULTISETS ≔ ( MULTISETS ∪
            {
            (S2 ↦ cell_no ↦  a ↦ (multiset(S2 ↦ cell_no ↦ a) − 1)),
            (SA1 ↦ cell_no ↦  a ↦ 1),
            (SA2 ↦ cell_no ↦  a ↦ 1)
 act1   :   })
            \
            {
            (S2 ↦ cell_no ↦  a ↦ (multiset(S2 ↦ cell_no ↦ a)))
            }
END

S3   ≙
STATUS
 ordinary
ANY
 multiset
 cell_no
WHERE
 grd1   :   multiset ⊆ MULTISETS
 grd2   :   cell_no ∈ ℕ
 grd3   :   multiset(S3 ↦ cell_no ↦ a)=1
THEN
            MULTISETS ≔ ( MULTISETS ∪
            {
            (S3 ↦ cell_no ↦  a ↦ (multiset(S3 ↦ cell_no ↦ a) − 1)),
            (Environment ↦ cell_no ↦  a ↦ 1)
 act1   :   })
            \
            {
            (S3 ↦ cell_no ↦  a ↦ (multiset(S3 ↦ cell_no ↦ a)))
            }
END

SA1   ≙
STATUS
 ordinary
ANY
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```
  multiset
  cell_no
WHERE
  grd1   :   multiset ⊆ MULTISETS
  grd2   :   cell_no ∈ N
  grd3   :   multiset(SA1 ↦ cell_no ↦ a)=1
THEN
             MULTISETS ≔ ( MULTISETS ∪
             {
             (SA1 ↦ cell_no ↦  a ↦ (multiset(SA1 ↦ cell_no ↦ a) − 1)),
             (S1 ↦ cell_no ↦  a ↦ 1)
  act1   :   })
             \
             {
             (SA1 ↦ cell_no ↦  a ↦ (multiset(SA1 ↦ cell_no ↦ a)))
             }
END

SA2   ≙
STATUS
  ordinary
ANY
  multiset
  cell_no
WHERE
  grd1   :   multiset ⊆ MULTISETS
  grd2   :   cell_no ∈ N
  grd3   :   multiset(SA2 ↦ cell_no ↦ a)=1
THEN
             MULTISETS ≔ ( MULTISETS ∪
             {
             (SA2 ↦ cell_no ↦  a ↦ (multiset(SA2 ↦ cell_no ↦ a) − 1)),
             (S1  ↦ cell_no ↦  a ↦ 1)
  act1   :   })
             \
             {
             (SA2 ↦ cell_no ↦  a ↦ (multiset(SA2 ↦ cell_no ↦ a)))
             }
END

END
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