Contents

CONTEXT Meeting_c0

SETS

     ALLOWED_PARTICIPANTS

CONSTANTS

     student_limit

     lecturer_limit

AXIOMS

     `axm1`: $student\_limit = 45$

     `axm2`: $lecturer\_limit = 5$

     `axm3`: $finite(ALLOWED\_PARTICIPANTS)$

END

CONTEXT Meeting_c1
EXTENDS Meeting_c0
SETS
     ROLES
CONSTANTS
     Student
     Lecturer
     Administrator
     Banned
     admin_limit
AXIOMS
     axm1: $partition(ROLES, \{Student\}, \{Lecturer\}, \{Administrator\}, \{Banned\})$
     axm2: $admin\_limit = 10$
END

MACHINE Meeting_m0

SEES Meeting_c0

VARIABLES

> students
>
> lecturers

INVARIANTS

> inv1: $students \subseteq ALLOWED\_PARTICIPANTS$
>
> inv2: $lecturers \subseteq ALLOWED\_PARTICIPANTS$
>
> inv3: $card(students) \leq student\_limit$
>
> inv4: $card(lecturers) \leq lecturer\_limit$

EVENTS

Initialisation

> **begin**
>
> > act1: $students := \varnothing$
> >
> > act2: $lecturers := \varnothing$
>
> **end**

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

> **any**
>
> > student_id
>
> **where**
>
> > grd1: $student\_id \in ALLOWED\_PARTICIPANTS$
> >
> > grd2: $card(students) < student\_limit$
>
> **then**
>
> > act1: $students := students \cup \{student\_id\}$
>
> **end**

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

> **any**
>
> > lecturer_id
>
> **where**
>
> > grd1: $lecturer\_id \in ALLOWED\_PARTICIPANTS$
> >
> > grd2: $card(lecturers) < lecturer\_limit$
>
> **then**
>
> > act1: $lecturers := lecturers \cup \{lecturer\_id\}$
>
> **end**

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

> **any**
>
> > participant_id
>
> **where**
>
> > grd1: $participant\_id \in ALLOWED\_PARTICIPANTS$
>
> **then**
>
> > act1: $students := students \setminus \{participant\_id\}$
> >
> > act2: $lecturers := lecturers \setminus \{participant\_id\}$
>
> **end**

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

> **any**

         student_id

    where

         grd1: $student\_id \in students$

    then

         act1: $students := students \setminus \{student\_id\}$

    end

END

MACHINE Meeting_m1

REFINES Meeting_m0

SEES Meeting_c1

VARIABLES

   students

   lecturers

   administrators

   banned

   participants

INVARIANTS

   `inv1`: $administrators \subseteq ALLOWED\_PARTICIPANTS$

   `inv2`: $banned \subseteq ALLOWED\_PARTICIPANTS$

   `inv3`: $participants \in ALLOWED\_PARTICIPANTS \leftrightarrow ROLES$

   `inv4`: $card(administrators) \leq admin\_limit$

EVENTS

Initialisation ⟨extended⟩

  begin

    `act1`: $students := \varnothing$

    `act2`: $lecturers := \varnothing$

    `act3`: $administrators := \varnothing$

    `act4`: $banned := \varnothing$

    `act5`: $participants := \varnothing$

  end

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

extends ADD_STUDENT

  any

    $student\_id$

  where

    `grd1`: $student\_id \in ALLOWED\_PARTICIPANTS$

    `grd2`: $card(students) < student\_limit$

    `grd3`: $\{Banned\} \nsubseteq participants[\{student\_id\}]$

  then

    `act1`: $students := students \cup \{student\_id\}$

    `act2`: $participants := participants \cup \{student\_id \mapsto Student\}$

  end

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

extends ADD_LECTURER

  any

    $lecturer\_id$

  where

    `grd1`: $lecturer\_id \in ALLOWED\_PARTICIPANTS$

    `grd2`: $card(lecturers) < lecturer\_limit$

  then

    `act1`: $lecturers := lecturers \cup \{lecturer\_id\}$

    `act2`: $participants := participants \cup \{lecturer\_id \mapsto Lecturer\}$

end

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

extends REMOVE_PARTICIPANT

    any

        participant_id

    where

        grd1: $participant\_id \in ALLOWED\_PARTICIPANTS$

    then

        act1: $students := students \setminus \{participant\_id\}$

        act2: $lecturers := lecturers \setminus \{participant\_id\}$

        act3: $administrators := administrators \setminus \{participant\_id\}$

        act4: $participants := \{participant\_id\} \lhd participants$

    end

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

extends BAN_STUDENT

    any

        student_id

        admin_id

    where

        grd1: $student\_id \in students$

        grd2: $admin\_id \in administrators$

    then

        act1: $students := students \setminus \{student\_id\}$

        act2: $banned := banned \cup \{student\_id\}$

        act3: $participants := participants \cup \{student\_id \mapsto Banned\}$

    end

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

    any

        admin_id

    where

        grd1: $admin\_id \in ALLOWED\_PARTICIPANTS$

        grd2: $card(administrators) < admin\_limit$

    then

        act1: $administrators := administrators \cup \{admin\_id\}$

        act2: $participants := participants \cup \{admin\_id \mapsto Administrator\}$

    end

END