

[*STUDENT*]

<i>maxPlayers</i> : $\mathbb{N}$	
<i>maxPlayers</i> = 20	
<i>ClubState</i>	
<i>badminton</i> : $\mathbb{P} \text{STUDENT}$	
<i>hall</i> : $\mathbb{P} \text{STUDENT}$	
<i>hall</i> $\subseteq$ <i>badminton</i>	
$\# \text{hall} \leq \text{maxPlayers}$	
<i>InitClubState</i>	
<i>ClubState'</i>	
<i>badminton'</i> = {}	
<i>hall'</i> = {}	
<i>AddMember</i>	
$\Delta \text{ClubState}$	
<i>newMember?</i> : <i>STUDENT</i>	
<i>newMember</i> $\notin$ <i>badminton</i>	
<i>badminton'</i> = <i>badminton</i> $\cup$ { <i>newMember?</i> }	
<i>hall'</i> = <i>hall</i>	
<i>RemoveMember</i>	
$\Delta \text{ClubState}$	
<i>member?</i> : <i>STUDENT</i>	
<i>member?</i> $\in$ <i>badminton</i>	
<i>badminton'</i> = <i>badminton</i> $\setminus$ { <i>member?</i> }	
<i>hall'</i> = <i>hall</i> $\setminus$ { <i>member?</i> }	
<i>EnterHall</i>	
$\Delta \text{ClubState}$	
<i>enterer?</i> : <i>STUDENT</i>	
<i>enterer?</i> $\in$ <i>badminton</i>	
<i>enterer?</i> $\notin$ <i>hall</i>	
$\# \text{hall} < \text{maxPlayers}$	
<i>hall'</i> = <i>hall</i> $\cup$ { <i>enterer?</i> }	
<i>badminton'</i> = <i>badminton</i>	

<i>LeaveHall</i>
$\Delta ClubState$
$leaver? : STUDENT$
$leaver? \in hall$
$hall' = hall \setminus \{leaver?\}$
$badminton' = badminton$

$MESSAGE ::= success \mid isMember \mid notMember \mid hallFull \mid inHall \mid notInHall$

$SuccessMessage \hat{=} [outcome! : MESSAGE \mid outcome! = success]$

<i>IsMember</i>
$\exists ClubState$
$newMember? : STUDENT$
$outcome! : MESSAGE$
$newMember? \in badminton$
$outcome! = isMember$

<i>NotMember</i>
$\exists ClubState$
$member? : STUDENT$
$outcome! : MESSAGE$
$member? \notin badminton$
$outcome! = notMember$

<i>AlreadyInHall</i>
$\exists ClubState$
$enterer? : STUDENT$
$outcome! : MESSAGE$
$enterer? \in hall$
$outcome! = inHall$

<i>HallFull</i>
$\exists ClubState$
$outcome! : MESSAGE$
$\#hall = maxPlayers$
$outcome! = hallFull$

<i>NotInHall</i>
$\exists ClubState$
<i>leaver?</i> : <i>STUDENT</i>
<i>outcome!</i> : <i>MESSAGE</i>
<i>leaver?</i> $\notin$ <i>hall</i>
<i>outcome!</i> = <i>notInHall</i>

*TotalAddMember*  $\hat{=}$  (*AddMember*  $\wedge$  *SuccessMessage*)  $\vee$  *IsMember*

*TotalRemoveMember*  $\hat{=}$  (*RemoveMember*  $\wedge$  *SuccessMessage*)  $\vee$  *NotMember*

*TotalEnterHall*  $\hat{=}$  (*EnterHall*  $\wedge$  *SuccessMessage*)  $\vee$  *NotMember*  $\vee$  *AlreadyInHall*  $\vee$  *HallFull*

*TotalLeaveHall*  $\hat{=}$  (*LeaveHall*  $\wedge$  *SuccessMessage*)  $\vee$  *NotInHall*