

[*PLAYER*, *NAME*]*Team**players*: iseq *PLAYER**name*: *NAME**League**teams*: iseq *Team* $\forall i, j: 1 \dots \# \text{teams} \bullet (\text{teams } i) . \text{players} \cap (\text{teams } j) . \text{players} = \emptyset$ $\forall i, j: 1 \dots \# \text{teams} \bullet (\text{teams } i) . \text{name} = (\text{teams } j) . \text{name} \Leftrightarrow \text{teams } i = \text{teams } j$ *AddTeam* ΔLeague *team?*: *Team* $\forall i: 1 \dots \# \text{teams} \bullet (\text{teams } i) . \text{players} \cap \text{team?} . \text{players} = \emptyset \wedge \text{teams } i \neq \text{team?}$ $\text{teams}' = \text{teams} \hat{\ } \langle \text{team?} \rangle$ *DeleteTeam* ΔLeague *team?*: *Team* $\exists \text{pre}, \text{post}: \text{iseq } \text{Team} \mid \text{teams} = \text{pre} \hat{\ } \langle \text{team?} \rangle \hat{\ } \text{post} \bullet \text{teams}' = \text{pre} \hat{\ } \text{post}$ *DeletePlayer* ΔLeague *player?*: *PLAYER* $\exists t, n: \text{Team}; \text{tpre}, \text{tpost}: \text{iseq } \text{Team}; \text{ppre}, \text{ppost}: \text{iseq } \text{PLAYER}$ $\mid \text{teams} = \text{tpre} \hat{\ } \langle t \rangle \hat{\ } \text{tpost}$ $\wedge t . \text{players} = \text{ppre} \hat{\ } \langle \text{player?} \rangle \hat{\ } \text{ppost}$ $\wedge n . \text{name} = t . \text{name}$ $\wedge n . \text{players} = \text{ppre} \hat{\ } \text{ppost} \bullet \text{teams}' = \text{tpre} \hat{\ } \langle n \rangle \hat{\ } \text{tpost}$

GetPlayerCountForTeam

ΔLeague

teamname: NAME

count!: \mathbb{N}

$\exists i: 1 \dots \# \text{teams} \mid (\text{teams } i) . \text{name} = \text{teamname}$

• *count!* = $\# (\text{teams } i) . \text{players}$

GetPlayerCount

ΔLeague

count!: \mathbb{N}

count! = $\# \{ p: \text{PLAYER}; i: 1 \dots \# \text{teams} \mid \langle p \rangle \text{ in } (\text{teams } i) . \text{players} \bullet p \}$