

*Manager*

*IdManager*:  $\mathbb{N}$

*Coordinator*

*IdCoordinator*:  $\mathbb{N}$

*Investigator*

*IdInvestigator*:  $\mathbb{N}$

*Controller*

*IdController*:  $\mathbb{N}$

*EO*

*sub\_Manager*:  $\mathbb{F}$  *Manager*

*sub\_Investigator*:  $\mathbb{F}$  *Investigator*

*sub\_Coordinator*:  $\mathbb{F}$  *Coordinator*

*sub\_Controller*:  $\mathbb{F}$  *Controller*

*ControllerToManager*: *Controller*  $\leftrightarrow$  *Manager*

*InvestigatorToManager*: *Investigator*  $\leftrightarrow$  *Manager*

*ManagerToInvestigator*: *Manager*  $\leftrightarrow$  *Investigator*

*ManagerToCoordinator*: *Manager*  $\leftrightarrow$  *Coordinator*

*CoordinatorToManager*: *Coordinator*  $\leftrightarrow$  *Manager*

$\text{dom } \textit{ControllerToManager} \subseteq \textit{sub\_Controller}$

$\wedge \text{ran } \textit{ControllerToManager} \subseteq \textit{sub\_Manager}$

$\text{dom } \textit{InvestigatorToManager} \subseteq \textit{sub\_Investigator}$

$\wedge \text{ran } \textit{InvestigatorToManager} \subseteq \textit{sub\_Manager}$

$\text{dom } \textit{ManagerToInvestigator} \subseteq \textit{sub\_Manager}$

$\wedge \text{ran } \textit{ManagerToInvestigator} \subseteq \textit{sub\_Investigator}$

$\text{dom } \textit{ManagerToCoordinator} \subseteq \textit{sub\_Manager}$

$\wedge \text{ran } \textit{ManagerToCoordinator} \subseteq \textit{sub\_Coordinator}$

$\text{dom } \textit{CoordinatorToManager} \subseteq \textit{sub\_Coordinator}$

$\wedge \text{ran } \textit{CoordinatorToManager} \subseteq \textit{sub\_Manager}$

$\# \textit{sub\_Manager} \leq 3 \wedge \# \textit{sub\_Manager} > 0$

$\forall x: \textit{sub\_Controller} \cdot \# (\textit{ControllerToManager} ( \{x\} )) = 1$

$\forall x: \textit{sub\_Manager} \cdot \# (\textit{ManagerToInvestigator} ( \{x\} )) \leq 5$

$\forall x: \textit{sub\_Manager} \cdot \# (\textit{ManagerToCoordinator} ( \{x\} )) \leq 5$

$\forall x: \textit{sub\_Coordinator} \cdot \# (\textit{CoordinatorToManager} ( \{x\} )) = 1$

$\forall x: \textit{sub\_Investigator} \cdot \# (\textit{InvestigatorToManager} ( \{x\} )) = 1$

*InsertInvestigator*

$\Delta \textit{EO}$

*i?*: *Investigator*

*m?*: *Manager*

$i? \notin \textit{sub\_Investigator}$

$m? \in \text{sub\_Manager}$   
 $\#(\text{ManagerToInvestigator}(\{m?\})) < 5$   
 $\text{sub\_Coordinator}' = \text{sub\_Coordinator}$   
 $\text{sub\_Manager}' = \text{sub\_Manager}$   
 $\text{sub\_Controller}' = \text{sub\_Controller}$   
 $\text{CoordinatorToManager}' = \text{CoordinatorToManager}$   
 $\text{InvestigatorToManager}' = \text{InvestigatorToManager}$   
 $\text{ControllerToManager}' = \text{ControllerToManager}$   
 $\text{ManagerToInvestigator}' = \text{ManagerToInvestigator} \cup \{(m?, i?)\}$   
 $\text{ManagerToCoordinator}' = \text{ManagerToCoordinator}$   
 $\text{sub\_Investigator}' = \text{sub\_Investigator} \cup \{i?\}$

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