

[*PERSON*]

[*TITLE*]

<i>VideoShop</i>
$members : \mathbb{P} PERSON$ $rented : PERSON \leftrightarrow TITLE$ $stockLevel : TITLE \rightarrow \mathbb{N}_1$
$\text{dom } rented \subseteq members$ $\text{ran } rented \subseteq \text{dom } stockLevel$ $\forall t : \text{ran } rented \bullet \#(rented \triangleright \{t\}) \leq stockLevel t$

<i>InitVideoShop</i>
<i>VideoShop'</i>
$members' = \{\}$ $stockLevel' = \{\}$

<i>RentVideo</i>
$\Delta VideoShop$ $p? : PERSON$ $t? : TITLE$
$p? \in members$ $t? \in \text{dom } stockLevel$ $stockLevel t? > \#(rented \triangleright \{t?\})$ $p? \mapsto t? \notin rented$ $rented' = rented \cup \{p? \mapsto t?\}$ $stockLevel' = stockLevel$ $members' = members$

<i>ChangeStockLevel</i>
$\Delta VideoShop$ $t? : TITLE$ $change? : \mathbb{Z}$
$t? \in \text{dom } stockLevel$ $stockLevel t? + change? > 0$ $stockLevel t? + change? \geq (\#(rented \triangleright \{t?\}))$ $stockLevel' = stockLevel \oplus \{t? \mapsto stockLevel t? + change?\}$ $rented' = rented$ $members' = members$

<i>DeleteTitle</i>
$\Delta VideoShop$ $t? : TITLE$
$t? \notin \text{ran } \textit{rented}$ $t? \in \text{dom } \textit{stockLevel}$ $\textit{stockLevel}' = \{t?\} \triangleleft \textit{stockLevel}$ $\textit{members}' = \textit{members}$ $\textit{rented}' = \textit{rented}$

<i>TitlesOut</i>
$\Xi VideoShop$ $p? : PERSON$ $\textit{titles!} : \mathbb{P} \textit{TITLE}$
$p? \in \textit{members}$ $\textit{titles!} = \textit{rented}(\{p?\})$

<i>CopiesRentedOut</i>
$\Xi VideoShop$ $t? : TITLE$ $\textit{copiesOut!} : \mathbb{N}$
$t? \in \text{dom } \textit{stockLevel}$ $\textit{copiesOut!} = \#(\textit{rented} \triangleright \{t?\})$

<i>CopiesInShop</i>
$\textit{CopiesRentedOutcopiesIn!} : \mathbb{N}$
$t? \in \text{dom } \textit{stockLevel}$ $\textit{copiesIn!} = \textit{stockLevel } t? - \textit{copiesOut}$

$MESSAGE ::= \textit{success} \mid \textit{notMember} \mid \textit{notInStock} \mid \textit{allCopiesOut} \mid \textit{alreadyRented} \mid \textit{nonPosStockLevel} \mid \textit{tooManyCopies}$

<i>NotMember</i>
$\Xi VideoShop$ $p? : PERSON$ $\textit{outcome!} : MESSAGE$
$p? \notin \textit{members}$ $\textit{outcome!} = \textit{notMember}$

<i>NotInStock</i>
$\exists \text{VideoShop}$ $t? : \text{TITLE}$ $\text{outcome!} : \text{MESSAGE}$
$t? \notin \text{dom stockLevel}$ $\text{outcome!} = \text{notInStock}$

<i>AllCopiesOut</i>
$\exists \text{VideoShop}$ $t? : \text{TITLE}$ $\text{outcome!} : \text{MESSAGE}$
$\text{stockLevel } t? = \#(\text{rented} \triangleright \{t?\})$ $\text{outcome!} = \text{allCopiesOut}$

<i>AlreadyRented</i>
$\exists \text{VideoShop}$ $p? : \text{PERSON}$ $t? : \text{TITLE}$ $\text{outcome!} : \text{MESSAGE}$
$p? \mapsto t? \in \text{rented}$ $\text{outcome!} = \text{alreadyRented}$

<i>NonPosStockLevel</i>
$\exists \text{VideoShop}$ $t? : \text{TITLE}$ $\text{change?} : \mathbb{Z}$ $\text{outcome!} : \text{MESSAGE}$
$\text{stockLevel } t? + \text{change?} \leq 0$ $\text{outcome!} = \text{nonPosStockLevel}$

<i>TooManyRented</i>
$\exists \text{VideoShop}$ $t? : \text{TITLE}$ $\text{change?} : \mathbb{Z}$ $\text{outcome!} : \text{MESSAGE}$
$\text{stockLevel } t? + \text{change?} < \#(\text{rented} \triangleright \{t?\})$ $\text{outcome!} = \text{tooManyRented}$

<i>StillRented</i>	
$\exists \text{VideoShop}$	
$t? : \text{TITLE}$	
$\text{outcome!} : \text{MESSAGE}$	
$t? \in \text{ran } \text{rented}$	
$\text{outcome!} = \text{stillRented}$	