$\mathbb{N} == \{n : \mathbb{Z} \mid n \geq 0\}$

$[\mathit{ValueSym}, \mathit{ActionSym}, \mathit{NormSym}]$

$\mathit{DeonticConcept} ::= \mathit{OBLIGATION} \mid \mathit{PROHIBITION} \mid \mathit{PERMISSION}$

Value

$\mathit{identifier} : \mathit{ValueSym}$
$\mathit{importance} : \mathbb{N}$

Action

$\mathit{identifier} : \mathit{ActionSym}$
$\mathit{subactions} : \mathbb{P}\, \mathit{Action}$
$\mathit{compositeactions} : \mathbb{P}\, \mathit{Action}$
$\mathit{promotes} : \mathbb{P}\, \mathit{Value}$
$\mathit{demotes} : \mathbb{P}\, \mathit{Value}$

$\mathit{self} \cap \mathit{subactions} = \emptyset$
$\mathit{self} \cap \mathit{compositeactions} = \emptyset$
$\mathit{promotes} \cap \mathit{demotes} = \emptyset$

Norm

$\mathit{identifier} : \mathit{NormSym}$
$\mathit{deonticconcept} : \mathit{DeonticConcept}$
$\mathit{action} : \mathit{Action}$

$\mathit{ASValue} : \mathit{Substitution} \to \mathit{Value} \to \mathit{Value}$

$\forall\, v1, v2 : \mathit{Value};\ s : \mathit{Substitution} \bullet \mathit{ASValue}\ s\ v1 = v2 \Leftrightarrow$
$\quad v1.\mathit{identifier} = v2.\mathit{identifier} \land$
$\quad v1.\mathit{importance} = v2.\mathit{importance} \land$

$$ASAction : Substitution \rightarrow Action \rightarrow Action$$

$$\begin{aligned}
&\forall a1, a2 : Action;\ s : Substitution \bullet ASAction\ s\ a1 = a2 \Leftrightarrow \\
&\quad a1.identifier = a2.identifier \land \\
&\quad (\forall subaction : a1.subactions \bullet \\
&\qquad a2.subactions = a2.subactions \cup \{ASAction\ s\ subaction\}) \land \\
&\quad (\forall compositeaction : a1.compositeactions \bullet \\
&\qquad a2.compositeactions = a2.compositeactions \cup \\
&\qquad \{ASAction\ s\ compositeaction\}) \land \\
&\quad (\forall promotedvalue : a1.promotes \bullet \\
&\qquad a2.promotes = a2.promotes \cup \{ASValue\ s\ promotedvalue\}) \land \\
&\quad (\forall demotedvalue : a1.demotes \bullet \\
&\qquad a2.demotes = a2.demotes \cup \{ASValue\ s\ demotedvalue\})
\end{aligned}$$

$$ASNorm : Substitution \rightarrow Norm \rightarrow Norm$$

$$\begin{aligned}
&\forall n1, n2 : Norm;\ s : Substitution \bullet ASNorm\ s\ n1 = n2 \Leftrightarrow \\
&\quad n1.identifier = n2.identifier \land \\
&\quad n1.deonticconcept = n2.deonticconcept \land \\
&\quad n1.action = ASActionsn2.action
\end{aligned}$$

$$unifyAction : (Action \times Action) \rightarrow Boolean$$

$$\begin{aligned}
&\forall a1, a2 : Action \bullet unifyAction(a1, a2) \Leftrightarrow \\
&\quad (\exists sub : Substitution \bullet ASAction\ sub\ a1 = ASAction\ sub\ a2)
\end{aligned}$$

$$checkActionsUnification : (Action \times Action) \rightarrow Boolean$$

$$\begin{aligned}
&\forall a1, a2 : Action \bullet checkActionsUnification(a1, a2) \Leftrightarrow \\
&\quad ((unifyAction(a1, a2)) \lor \\
&\quad (\exists subaction : a1.subactions \mid unifyAction(subaction, a2)) \lor \\
&\quad (\exists compositeaction : a1.compositeactions \mid \\
&\quad unifyAction(compositeaction, a2)))
\end{aligned}$$

$$\mathit{checkNormValueMainConflicts} : (\mathit{Norm} \times \mathit{Action}) \rightarrow \mathit{Boolean}$$

$$\begin{array}{l}
\forall\, n : \mathit{Norm};\ a : \mathit{Action} \bullet \mathit{checkNormValueMainConflicts}(n, a) \Leftrightarrow \\
\quad (((n.\mathit{deonticconcept} = \mathit{OBLIGATION}) \wedge \\
\qquad (\exists\, \mathit{demotedvalue} : a.\mathit{demotes} \mid \mathit{demotedvalue}.\mathit{importance} > 0)) \\
\quad \vee ((n.\mathit{deonticconcept} = \mathit{PROHIBITION}) \wedge \\
\qquad (\exists\, \mathit{promotedvalue} : a.\mathit{promotes} \mid \mathit{promotedvalue}.\mathit{importance} > 0)))
\end{array}$$

$$\mathit{checkNormValueAllConflicts} : (\mathit{Norm} \times \mathit{Action}) \rightarrow \mathit{Boolean}$$

$$\begin{array}{l}
\forall\, n : \mathit{Norm};\ a : \mathit{Action} \mid \mathit{checkActionsUnification}(a, n.\mathit{action}) \bullet \\
\quad \mathbf{if}\ a.\mathit{subactions} \neq \emptyset\ \mathbf{then} \\
\qquad \mathbf{if}\ ((n.\mathit{deonticconcept} = \mathit{OBLIGATION} \wedge \\
\qquad (\forall\, \mathit{subaction} : a.\mathit{subactions} \mid \mathit{checkNormValueAllConflicts}(n, \mathit{subaction}))) \\
\qquad \vee\ (n.\mathit{deonticconcept} = \mathit{PROHIBITION} \wedge \\
\qquad (\exists\, \mathit{subaction} : a.\mathit{subactions} \mid \mathit{checkNormValueAllConflicts}(n, \mathit{subaction})))) \\
\qquad \mathbf{then}\ \mathit{checkNormValueAllConflicts}(n, a) = \mathit{true} \\
\qquad \mathbf{else}\ \mathit{checkNormValueAllConflicts}(n, a) = \mathit{false} \\
\quad \mathbf{else\ if}\ a.\mathit{compositeactions} \neq \emptyset\ \mathbf{then} \\
\qquad \mathbf{if}\ \mathit{checkNormValueMainConflicts}(n, a) \\
\qquad \mathbf{then}\ \mathit{checkNormValueAllConflicts}(n, a) = \mathit{true} \\
\qquad \mathbf{else\ if}\ ((n.\mathit{deonticconcept} = \mathit{OBLIGATION} \wedge \\
\qquad\quad (\exists\, \mathit{compositeaction} : a.\mathit{compositeactions} \mid \\
\qquad\quad \mathit{checkNormValueAllConflicts}(n, \mathit{compositeaction}))) \\
\qquad\quad \vee\ (n.\mathit{deonticconcept} = \mathit{PROHIBITION} \wedge \\
\qquad\quad (\forall\, \mathit{compositeaction} : a.\mathit{compositeactions} \mid \\
\qquad\quad \mathit{checkNormValueAllConflicts}(n, \mathit{compositeaction})))) \\
\qquad \mathbf{then}\ \mathit{checkNormValueAllConflicts}(n, a) = \mathit{true} \\
\qquad \mathbf{else}\ \mathit{checkNormValueAllConflicts}(n, a) = \mathit{false} \\
\quad \mathbf{else}\ \mathit{checkNormValueAllConflicts}(n, a) = \mathit{checkNormValueMainConflicts}(n, a)
\end{array}$$