General Comments

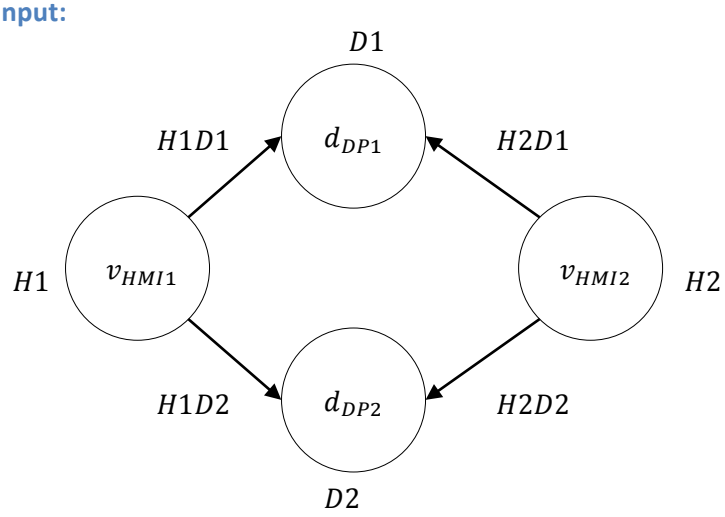
Note that some output objects bear the same name while being distinct, as is often the case in DSLTrans. Also note that output presence conditions remain unsimplified for the sake of clarity. In the following test cases, V, D, S, E refer to VirtualDevice, Distributable, SwcToEcuMapping, and ExecFrame respectively, all of which are classes in the GM->AUTOSAR example. DP, HMI, F refer to Display, HumanMachineInterface, and Frame respectively, all of which are names of objects in the GM input model. For ease of understanding, presence conditions are not named $F1, F2, \ldots$ but are rather based on the name of the object they are annotating.

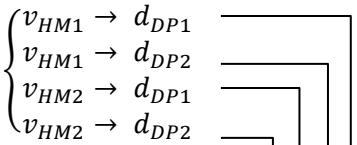
Simple_Example, Small Test Case

Rule:

$$\frac{V_x^{\forall} \rightarrow^{\exists} D_y^{\exists}}{S_x}$$

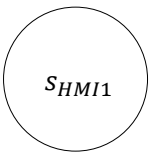
Input:



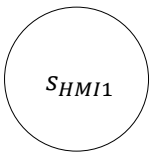


Expected Output:

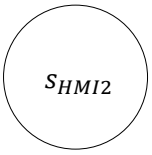
$(H1 \wedge D1 \wedge H1D1)$



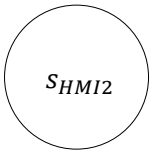
$(H1 \wedge D2 \wedge H1D2) \wedge \neg(H1 \wedge D1 \wedge H1D1)$

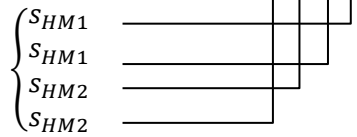


$(H2 \wedge D1 \wedge H2D1)$



$(H2 \wedge D2 \wedge H2D2) \wedge \neg(H2 \wedge D1 \wedge H2D1)$



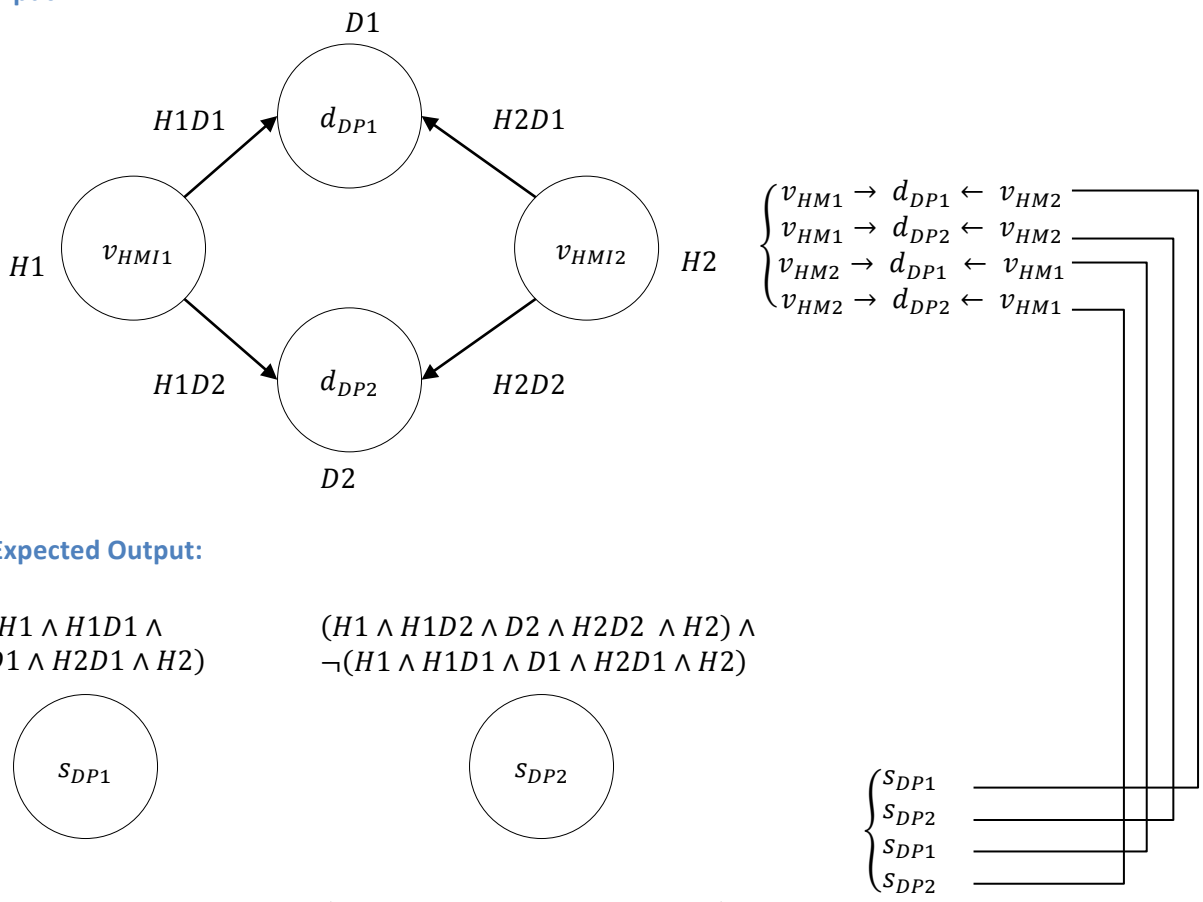


Simple_Example, Large Test Case

Rule:

$$\frac{V_x^{\forall} \rightarrow^{\exists} D_y^{\exists} \leftarrow^{\exists} V_z^{\forall}}{S_y}$$

Input:



Expected Output:

$(H1 \wedge H1D1 \wedge D1 \wedge H2D1 \wedge H2)$

s_{DP1}

$(H1 \wedge H1D2 \wedge D2 \wedge H2D2 \wedge H2) \wedge \neg(H1 \wedge H1D1 \wedge D1 \wedge H2D1 \wedge H2)$

s_{DP2}

$(H1 \wedge H1D1 \wedge D1 \wedge H2D1 \wedge H2)$

s_{DP1}

$(H1 \wedge H1D2 \wedge D2 \wedge H2D2 \wedge H2) \wedge \neg(H1 \wedge H1D1 \wedge D1 \wedge H2D1 \wedge H2)$

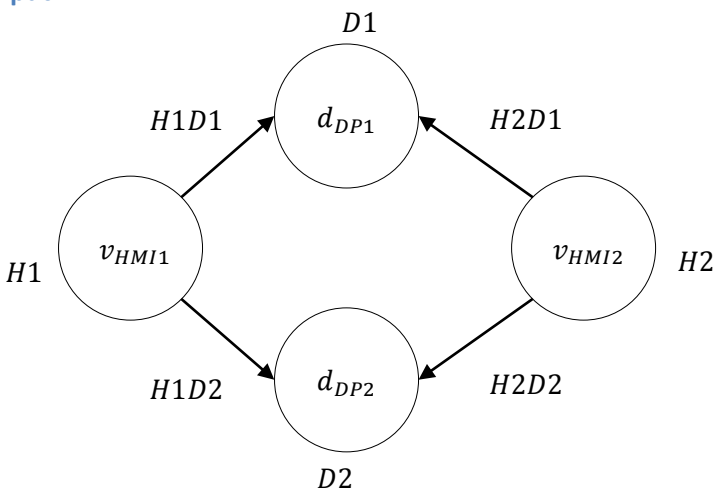
s_{DP2}

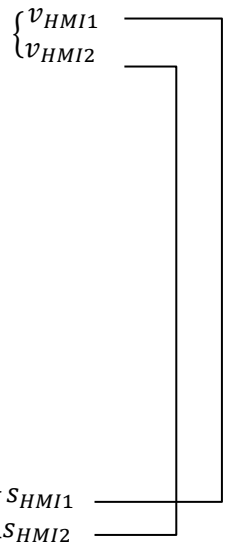
Simple_Example, NAC_Class Test Case

Rule:

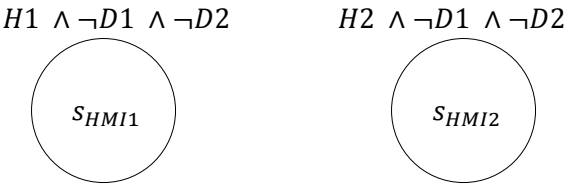
$$\frac{V_y^{\forall}, D}{S_y}$$

Input:





Expected Output:

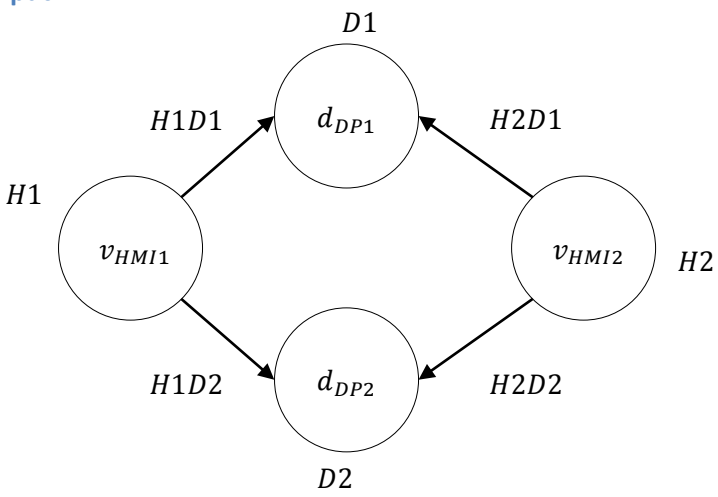


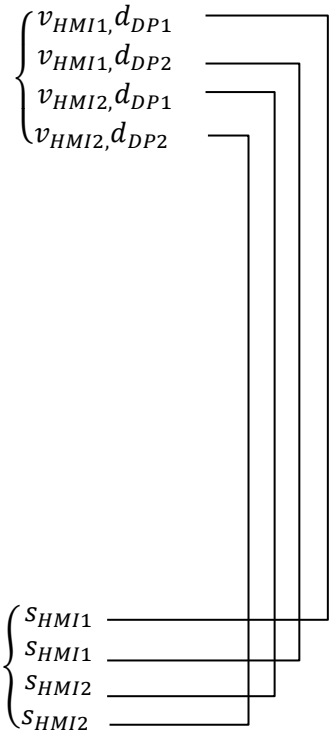
Simple_Example, NAC_Assoc Test Case

Rule:

$$\frac{V_y^{\forall} \rightarrow D_x^{\forall}}{S_y}$$

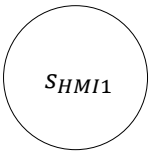
Input:



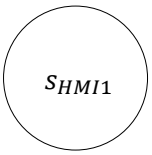


Expected Output:

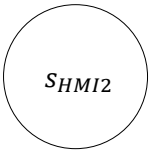
$H1 \wedge D1 \wedge \neg H1D1$



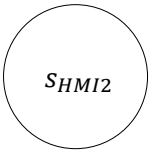
$H1 \wedge D2 \wedge \neg H1D2$



$H2 \wedge D1 \wedge \neg H2D1$



$H2 \wedge D2 \wedge \neg H2D2$

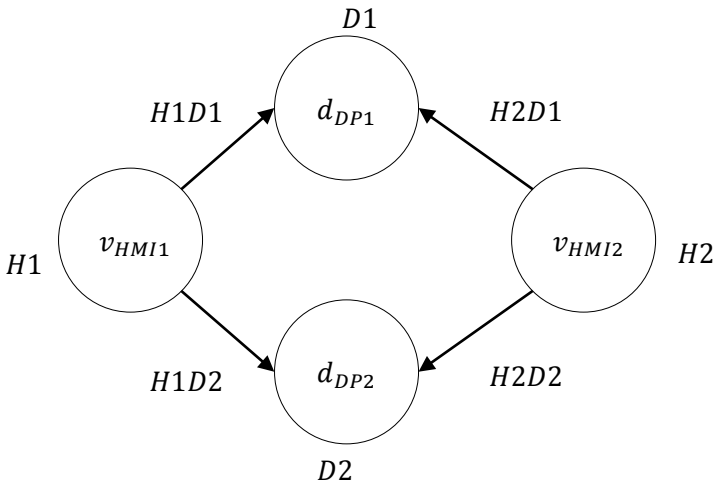


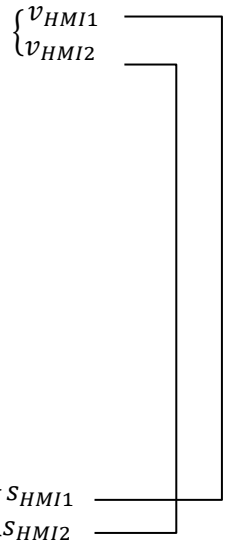
Simple_Example, NAC_Full Test Case

Rule:

$$\frac{V_y^{\forall} \rightarrow D}{S_y}$$

Input:





Expected Output:

$H1 \wedge \neg(H1D1 \wedge D1) \wedge \neg(H1D2 \wedge D2)$

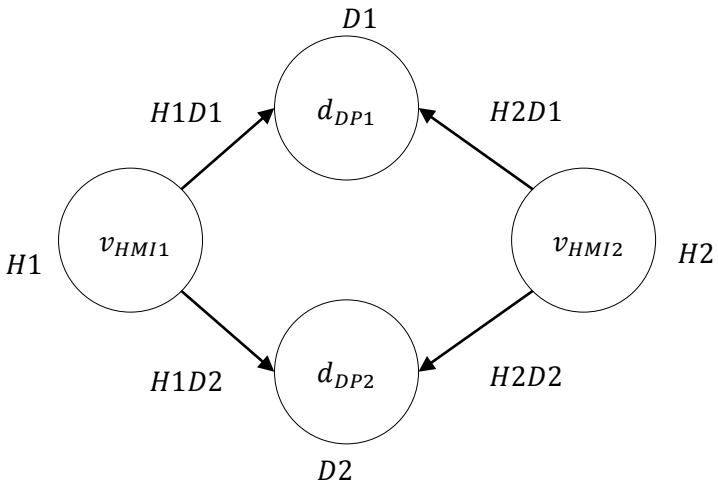
$H2 \wedge \neg(H2D1 \wedge D1) \wedge \neg(H2D2 \wedge D2)$

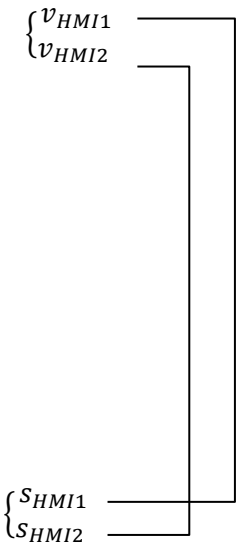
Simple_Example, NAC_Exist Test Case

Rule:

$$\frac{V_y^{\exists} \rightarrow D}{S_y}$$

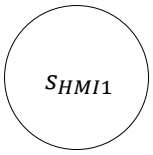
Input:



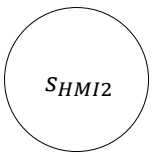


Expected Output:

$H1 \wedge \neg(H1D1 \wedge D1) \wedge \neg(H1D2 \wedge D2)$



$H2 \wedge \neg(H2D1 \wedge D1) \wedge \neg(H2D2 \wedge D2)$
$\wedge \neg\big(H1 \wedge \neg(H1D1 \wedge D1) \wedge \neg(H1D2 \wedge D2)\big)$

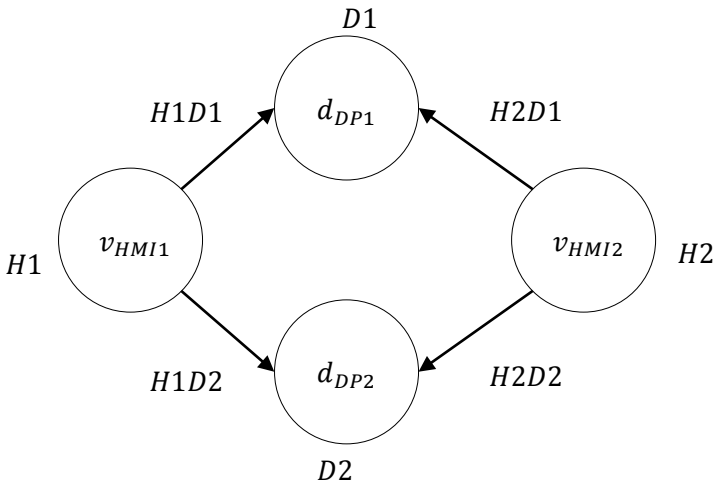


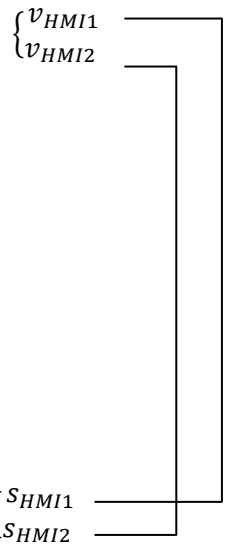
Simple_Example, NAC_Self Test Case

Rule:

$$\frac{V_y^{\forall}, V}{S_y}$$

Input:





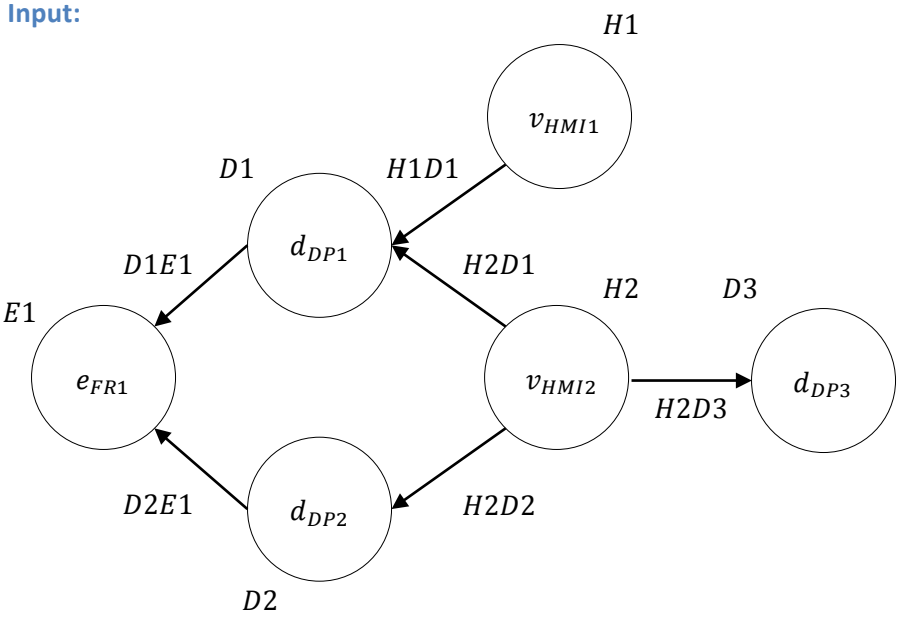
Expected Output:

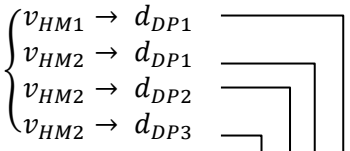
Complex Example, Small Test Case

Rule:

$$\frac{V_x^{\forall} \rightarrow^{\exists} D_y^{\exists}}{S_x}$$

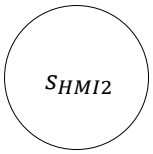
Input:



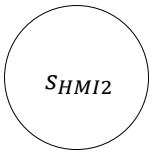


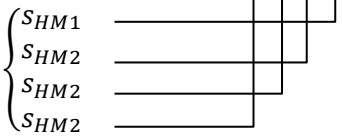
Expected Output:

$(H2 \wedge D1 \wedge H2D1)$

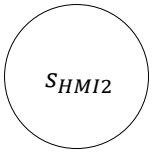


$(H2 \wedge D2 \wedge H2D2) \wedge \neg(H2 \wedge D1 \wedge H2D1)$

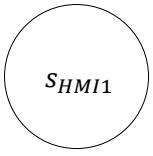




$(H2 \wedge D3 \wedge H2D3) \wedge \neg(H2 \wedge D2 \wedge H2D2) \wedge \neg(H2 \wedge D1 \wedge H2D1)$



$(H1 \wedge D1 \wedge H1D1)$

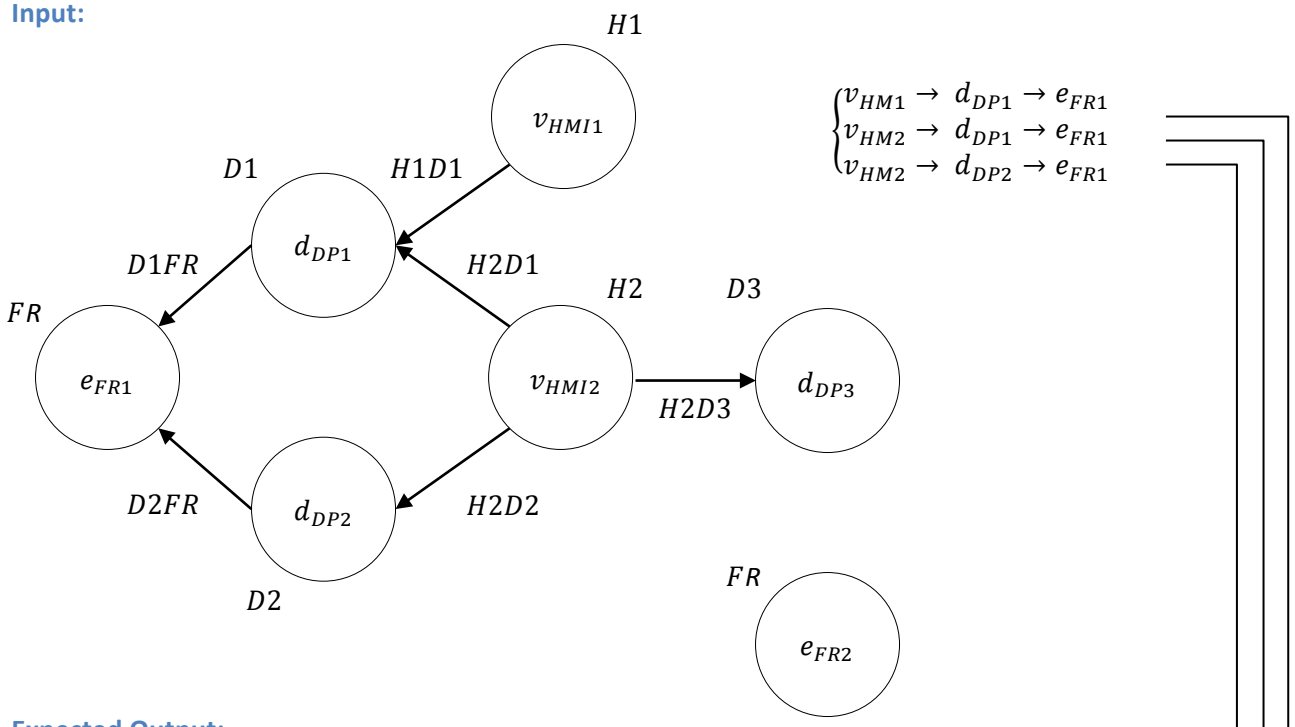


Complex Example, Large Test Case

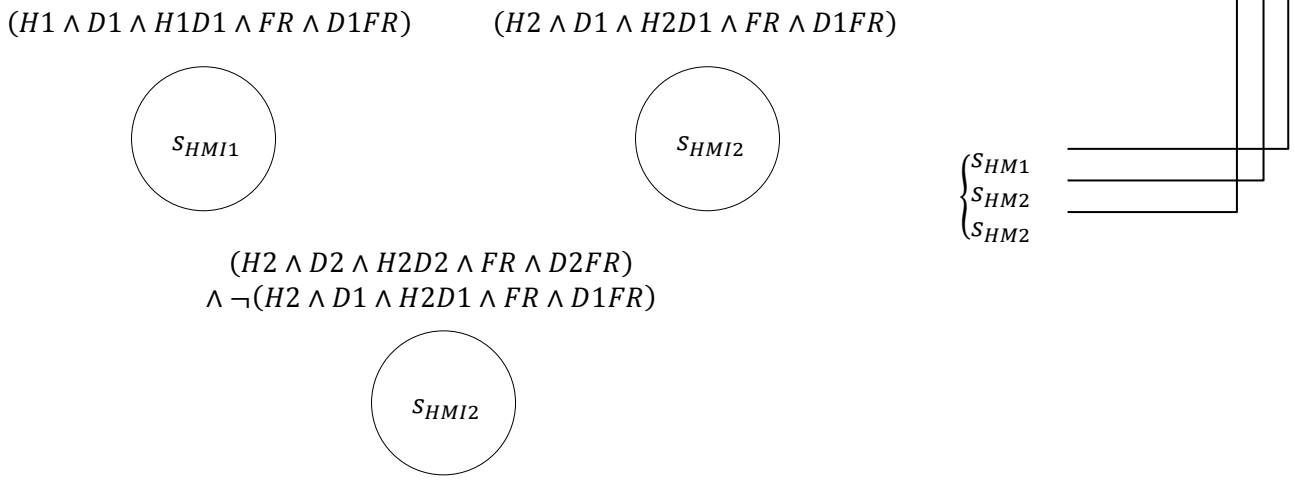
Rule:

$$\frac{V_x^{\forall} \rightarrow^{\exists} D_y^{\exists} \rightarrow^{\exists} E_z^{\exists}}{S_x}$$

Input:



Expected Output:

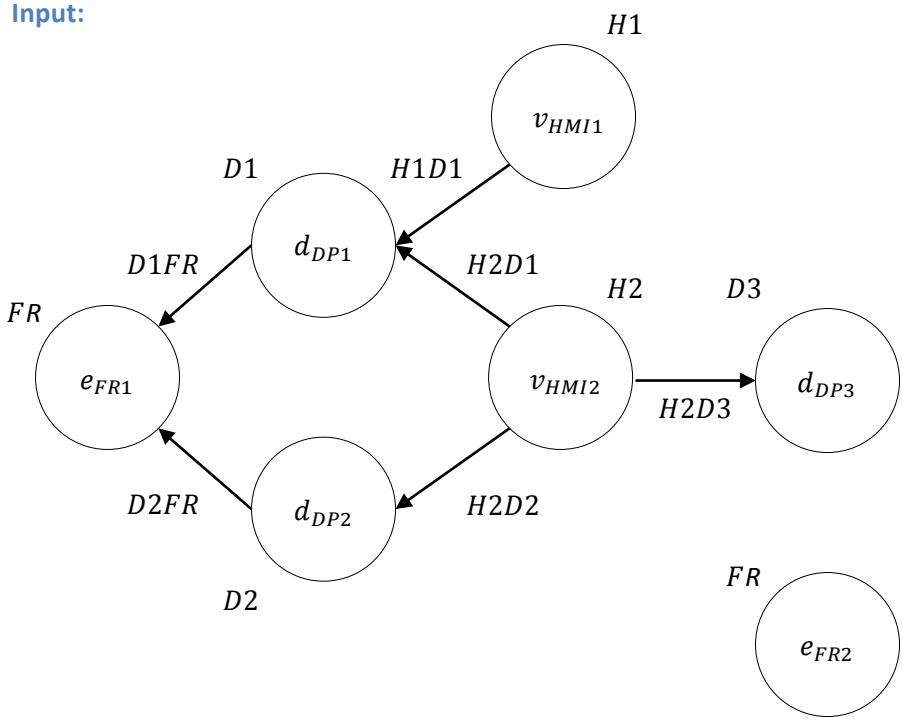


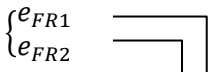
Complex Example, All_Exist Test Case

Rule:

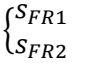
$$\frac{E_x^{\exists}}{S_x}$$

Input:





Expected Output:

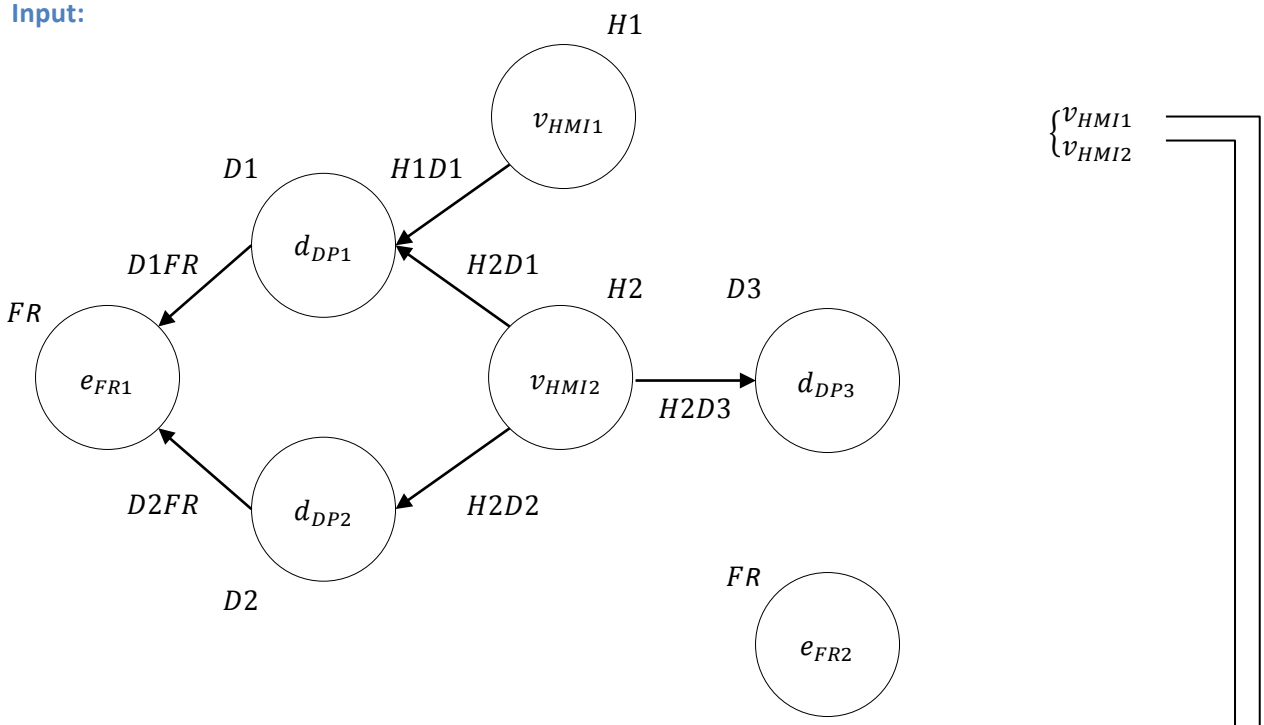


Complex Example, NAC_Full Test Case

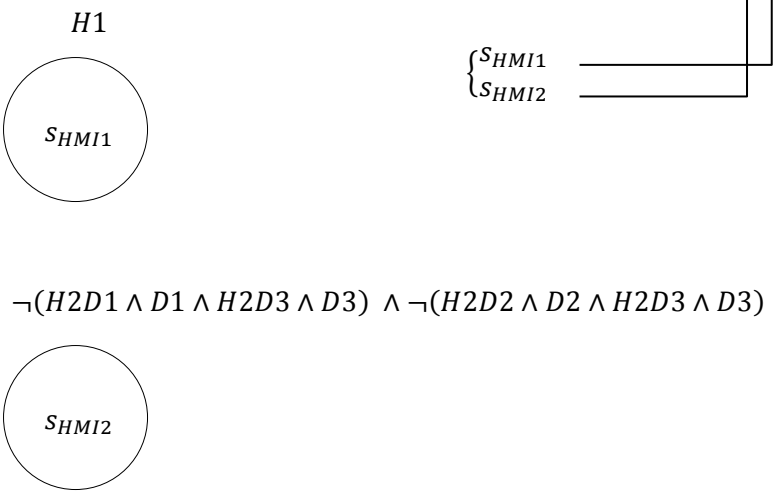
Rule:

$$\frac{D \longleftarrow V_x^{\forall} \longrightarrow D}{S_x}$$

Input:



Expected Output:



$$\mathrm{H2} \wedge \neg(H2D1 \wedge D1 \wedge H2D2 \wedge D2) \wedge \neg(H2D1 \wedge D1 \wedge H2D3 \wedge D3) \wedge \neg(H2D2 \wedge D2 \wedge H2D3 \wedge D3)$$

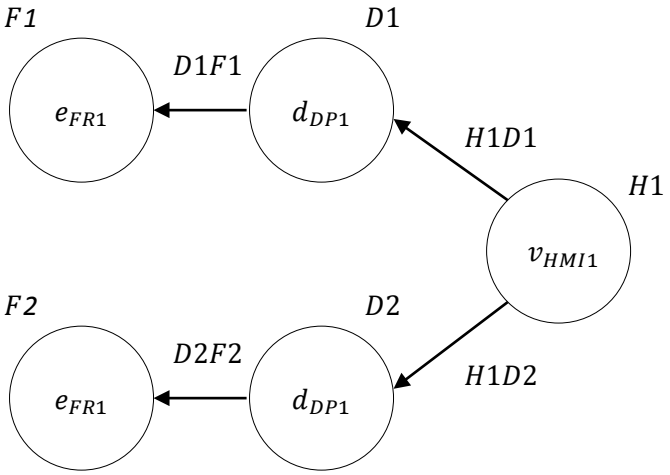
Contained Example, positive_indirect Test Case

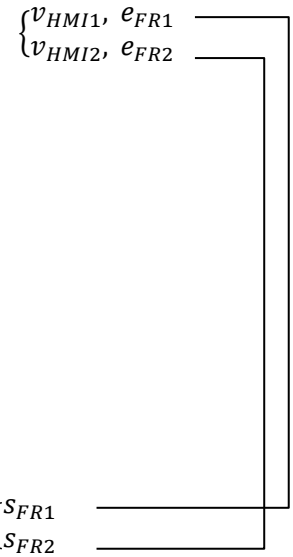
All associations in this example are containment associations. The GM metamodel for this test case was modified in order to express this.

Rule:

$$\frac{V - - \rightarrow E_x^{\forall}}{S_x}$$

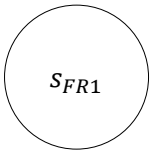
Input:



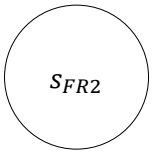


Expected Output:

$H1 \wedge H1D1 \wedge D1 \wedge D1F1 \wedge F1$



$H1 \wedge H1D2 \wedge D2 \wedge D2F2 \wedge F2$



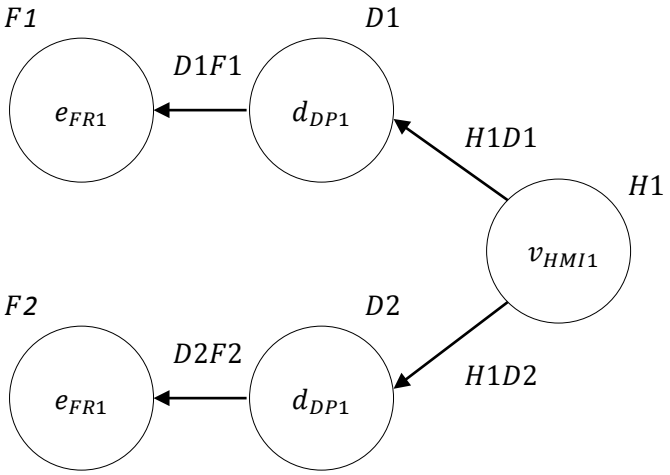
Contained Example, negative_indirect Test Case

All associations in this example are containment associations. The GM metamodel for this test case was modified in order to express this.

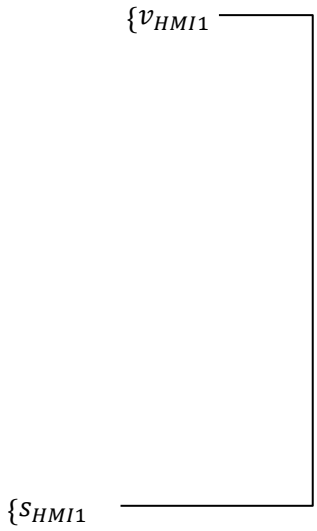
Rule:

$$\frac{V_x^{\forall} - - \rightarrow E}{S_x}$$

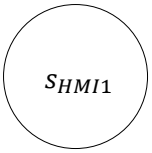
Input:



Expected Output:



$$\mathrm{H1} \wedge \neg(H1D1 \wedge D1 \wedge D1F1 \wedge F1) \ \wedge \ \neg(H1D2 \wedge D2 \wedge D2F2 \wedge F2)$$



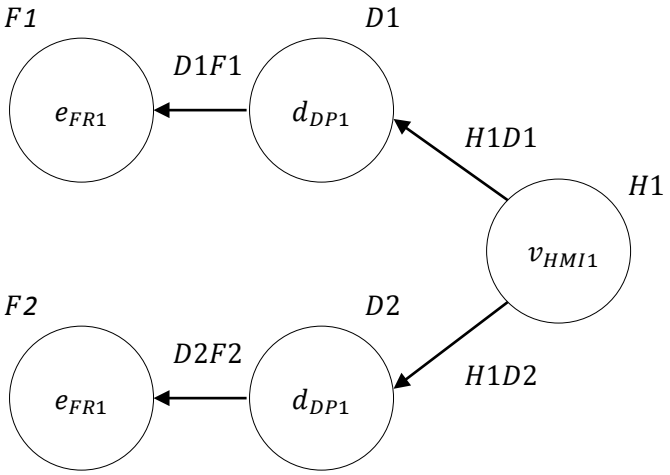
Contained Example, double_negative Test Case

All associations in this example are containment associations. The GM metamodel for this test case was modified in order to express this.

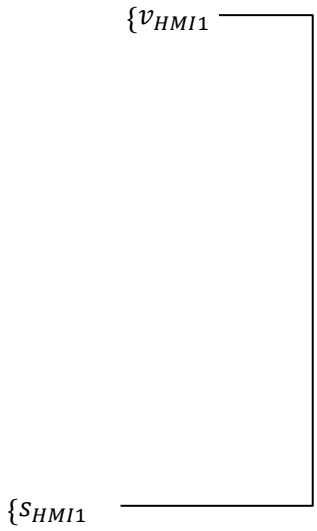
Rule:

$$\frac{E \leftarrow - - V_x^{\forall} - - \rightarrow E}{S_x}$$

Input:



Expected Output:



$$\mathrm{H1} \wedge \neg(H1D1 \wedge D1 \wedge D1F1 \wedge F1 \wedge H1D2 \wedge D2 \wedge D2F2 \wedge F2)$$