

# Description logic view: GFO-Abstract-Top-Ontology

## Classes

### Entity

Entity  $\equiv$  Item  $\sqcup$  Set

### Item

Item  $\sqsubseteq$  Entity

Item  $\sqsubseteq \neg(\exists \text{ has\_member Entity})$

Item  $\sqsubseteq \neg \text{ Set}$

### Set

Set  $\sqsubseteq$  Entity

Set  $\sqsubseteq \neg \text{ Item}$

## Thing

## Object properties

### **abstract<sub>has</sub>part**

$\text{[http://www.onto-med.de/ontologies/gfo.owlabstract\_part\_of > } \equiv < \text{http://www.onto-med.de/ontologies/gfo.owlab}$

TransitivePropertyabstract\_has\_part

$\exists \text{ abstract\_has\_part Thing } \sqsubseteq \text{ Item}$

$\top \sqsubseteq \forall \text{ abstract\_has\_part Item}$

### **abstract<sub>part</sub>of**

$\text{[http://www.onto-med.de/ontologies/gfo.owlabstract\_part\_of > } \equiv < \text{http://www.onto-med.de/ontologies/gfo.owlab}$

TransitivePropertyabstract\_part\_of

$\exists \text{ abstract\_part\_of Thing } \sqsubseteq \text{ Item}$

$\top \sqsubseteq \forall \text{ abstract\_part\_of Item}$

### **agent<sub>i</sub>n**

$\sqsubseteq \text{ participates\_in}$

$\sqsubseteq \text{ causes}$

$\text{[http://www.onto-med.de/ontologies/gfo.owlagent\_i\_n > } \equiv < \text{http://www.onto-med.de/ontologies/gfo.owlhas\_a\_gent}$

### **boundary<sub>of</sub>**

$\sqsubseteq \text{ depends\_on}$

$\text{[http://www.onto-med.de/ontologies/gfo.owlhas\_b\_oundary > } \equiv < \text{http://www.onto-med.de/ontologies/gfo.owlboun}$

**category**<sub>part\_of</sub> $\sqsubseteq$  abstract\_part\_of $\text{!http://www.onto-med.de/ontologies/gfo.owlhas\_category} > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owl}$ **category**<sub>inlayer</sub> $\sqsubseteq$  category\_part\_of $\text{!http://www.onto-med.de/ontologies/gfo.owlhas\_category} > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owlcate}$ **caused**<sub>by</sub> $\text{!http://www.onto-med.de/ontologies/gfo.owlcaused\_by} > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owlcauses}$ **causes** $\text{!http://www.onto-med.de/ontologies/gfo.owlcaused\_by} > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owlcauses}$ **constituent**<sub>part\_of</sub> $\sqsubseteq$  proper\_part\_of $\text{!http://www.onto-med.de/ontologies/gfo.owlconstituent\_part\_of} > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owl}$ **depends**<sub>on</sub> $\text{!http://www.onto-med.de/ontologies/gfo.owlnecessary\_for} > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owldepe}$  $\exists$  depends\_on Thing  $\sqsubseteq$  Item $\top \sqsubseteq \forall$  depends\_on Item**exists**<sub>at</sub> $\top \sqsubseteq \leq 1$  exists\_at Thing**framed**<sub>by</sub> $\sqsubseteq$  occupies $\text{!http://www.onto-med.de/ontologies/gfo.owlframes}_i \equiv \text{!http://www.onto-med.de/ontologies/gfo.owlframed}_by >^-$  $\top \sqsubseteq \leq 1$  framed\_by Thing**frames** $\text{!http://www.onto-med.de/ontologies/gfo.owlframes}_i \equiv \text{!http://www.onto-med.de/ontologies/gfo.owlframed}_by >^-$  $\top \sqsubseteq \leq 1$  frames Thing**function**<sub>determinant\_of</sub> $\text{!http://www.onto-med.de/ontologies/gfo.owlfunction\_determinant\_of} > \equiv < \text{http://www.onto-med.de/ontologies/g}$

**function<sub>o</sub>f**

`!http://www.onto-med.de/ontologies/gfo.owl#function_o_f > ≡ < http://www.onto-med.de/ontologies/gfo.owl#has_functio`

**functional<sub>i</sub>tem<sub>o</sub>f**

`⊆ function_determinant_of`

`!http://www.onto-med.de/ontologies/gfo.owl#has_functional_item_o_f > ≡ < http://www.onto-med.de/ontologies/gfo.owl#`

**goal<sub>o</sub>f**

`⊆ function_determinant_of`

`!http://www.onto-med.de/ontologies/gfo.owl#has_goal_o_f > ≡ < http://www.onto-med.de/ontologies/gfo.owl#goal_o_f >`

**has<sub>a</sub>gent**

`!http://www.onto-med.de/ontologies/gfo.owl#agent_n > ≡ < http://www.onto-med.de/ontologies/gfo.owl#has_agent`

**has<sub>b</sub>oundary**

`!http://www.onto-med.de/ontologies/gfo.owl#has_boundary > ≡ < http://www.onto-med.de/ontologies/gfo.owl#boundary >`  
`⊆ ≤ 1 has_boundary Thing`

**has<sub>c</sub>ategorial<sub>p</sub>art**

`⊆ abstract_has_part`

`!http://www.onto-med.de/ontologies/gfo.owl#has_categorial_part > ≡ < http://www.onto-med.de/ontologies/gfo.owl#`

**has<sub>c</sub>ategory**

`!http://www.onto-med.de/ontologies/gfo.owl#has_category > ≡ < http://www.onto-med.de/ontologies/gfo.owl#category >`

**has<sub>c</sub>onstituent<sub>p</sub>art**

`⊆ has_proper_part`

`!http://www.onto-med.de/ontologies/gfo.owl#constituent_part_o_f > ≡ < http://www.onto-med.de/ontologies/gfo.owl#`

**has<sub>f</sub>unction**

`!http://www.onto-med.de/ontologies/gfo.owl#function_o_f > ≡ < http://www.onto-med.de/ontologies/gfo.owl#has_functio`

**has<sub>f</sub>unction<sub>d</sub>eterminant**

`!http://www.onto-med.de/ontologies/gfo.owl#function_determinant_o_f > ≡ < http://www.onto-med.de/ontologies/gfo.owl#`

**has<sub>f</sub>unctional<sub>i</sub>tem**

`⊆ has_function_determinant`

`!http://www.onto-med.de/ontologies/gfo.owl#has_functional_item > ≡ < http://www.onto-med.de/ontologies/gfo.owl#`  
`⊆ ≤ 1 has_functional_item Thing`

### **has<sub>g</sub>oal**

⊆ has\_function\_determinant

!http://www.onto-med.de/ontologies/gfo.owlhas<sub>g</sub>oal > ≡ < http://www.onto-med.de/ontologies/gfo.owlgoal\_of >

### **has<sub>l</sub>eft<sub>t</sub>ime<sub>b</sub>oundary**

⊆ has\_time\_boundary

!http://www.onto-med.de/ontologies/gfo.owlhas<sub>l</sub>eft<sub>t</sub>ime<sub>b</sub>oundary > ≡ < http://www.onto-med.de/ontologies/gfo.owlleft\_time\_boundary >

⊤ ⊆ ≤ 1 has\_left\_time\_boundary Thing

### **has<sub>m</sub>ember**

!http://www.onto-med.de/ontologies/gfo.owlhas<sub>m</sub>ember > ≡ < http://www.onto-med.de/ontologies/gfo.owlmember >

∃ has\_member Thing ⊆ Set

⊤ ⊆ ∀ has\_member Entity

### **has<sub>p</sub>art**

⊆ abstract\_has\_part

!http://www.onto-med.de/ontologies/gfo.owlpart\_of > ≡ < http://www.onto-med.de/ontologies/gfo.owlhas\_part >

TransitivePropertyhas\_part

### **has<sub>p</sub>articipant**

!http://www.onto-med.de/ontologies/gfo.owlhas<sub>p</sub>participant > ≡ < http://www.onto-med.de/ontologies/gfo.owlparticipant >

### **has<sub>p</sub>roper<sub>p</sub>art**

⊆ has\_part

!http://www.onto-med.de/ontologies/gfo.owlproper<sub>p</sub>art\_of > ≡ < http://www.onto-med.de/ontologies/gfo.owlhas<sub>p</sub>proper\_part >

TransitivePropertyhas\_proper\_part

### **has<sub>r</sub>equirement**

⊆ has\_function\_determinant

!http://www.onto-med.de/ontologies/gfo.owlrequirement\_of > ≡ < http://www.onto-med.de/ontologies/gfo.owlhas<sub>r</sub>equirement >

### **has<sub>r</sub>ight<sub>t</sub>ime<sub>b</sub>oundary**

⊆ has\_time\_boundary

!http://www.onto-med.de/ontologies/gfo.owlright<sub>t</sub>ime<sub>b</sub>oundary\_of > ≡ < http://www.onto-med.de/ontologies/gfo.owlright\_time\_boundary >

⊤ ⊆ ≤ 1 has\_right\_time\_boundary Thing

### **has<sub>s</sub>equences<sub>c</sub>onstituent**

!http://www.onto-med.de/ontologies/gfo.owlsequence<sub>c</sub>onstituent\_of > ≡ < http://www.onto-med.de/ontologies/gfo.owlhas<sub>s</sub>equences<sub>c</sub>onstituent >

**has<sub>s</sub>patial<sub>b</sub>oundary**

⊆ has\_boundary

⊥<sub>http://www.onto-med.de/ontologies/gfo.owl</sub>has<sub>s</sub>patial<sub>b</sub>oundary > ≡ < http://www.onto-med.de/ontologies/gfo.owl

**has<sub>t</sub>ime<sub>b</sub>oundary**

⊆ has\_boundary

⊥<sub>http://www.onto-med.de/ontologies/gfo.owl</sub>has<sub>t</sub>ime<sub>b</sub>oundary > ≡ < http://www.onto-med.de/ontologies/gfo.owl

**has<sub>t</sub>oken**

⊆ instance\_of

⊥<sub>http://www.onto-med.de/ontologies/gfo.owl</sub>has<sub>t</sub>oken > ≡ < http://www.onto-med.de/ontologies/gfo.owl

**has<sub>v</sub>alue**

⊥<sub>http://www.onto-med.de/ontologies/gfo.owl</sub>value\_of > ≡ < http://www.onto-med.de/ontologies/gfo.owl

**instance\_of**

⊥<sub>http://www.onto-med.de/ontologies/gfo.owl</sub>instantiated<sub>b</sub>y > ≡ < http://www.onto-med.de/ontologies/gfo.owl  
∃ instance\_of Thing ⊆ Entity

**instantiated<sub>b</sub>y**

⊥<sub>http://www.onto-med.de/ontologies/gfo.owl</sub>instantiated<sub>b</sub>y > ≡ < http://www.onto-med.de/ontologies/gfo.owl

**layer\_of**

⊥<sub>http://www.onto-med.de/ontologies/gfo.owl</sub>layer\_of > ≡ < http://www.onto-med.de/ontologies/gfo.owl

**left<sub>b</sub>oundary\_of**

⊥<sub>http://www.onto-med.de/ontologies/gfo.owl</sub>has<sub>l</sub>eft<sub>t</sub>ime<sub>b</sub>oundary > ≡ < http://www.onto-med.de/ontologies/gfo.owl  
⊤ ⊆ ≤ 1 left\_boundary\_of<sup>-</sup> Thing

**level\_of**

⊆ layer\_of

⊥<sub>http://www.onto-med.de/ontologies/gfo.owl</sub>level\_of > ≡ < http://www.onto-med.de/ontologies/gfo.owl

**member\_of**

⊥<sub>http://www.onto-med.de/ontologies/gfo.owl</sub>has<sub>m</sub>ember > ≡ < http://www.onto-med.de/ontologies/gfo.owl  
∃ member\_of Thing ⊆ Entity

⊤ ⊆ ∀ member\_of Set

**necessary\_for**

$\text{!http://www.onto-med.de/ontologies/gfo.owlnecessary\_for} > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owldepe}$   
 $\exists \text{ necessary\_for Thing} \sqsubseteq \text{Item}$   
 $\top \sqsubseteq \forall \text{ necessary\_for Item}$

**occupied\_by**

$\text{!http://www.onto-med.de/ontologies/gfo.owloccupies}_i \equiv \text{!http://www.onto-med.de/ontologies/gfo.owloccupied\_by} > ^-$   
 $\top \sqsubseteq \leq 1 \text{ occupied\_by}^- \text{ Thing}$

**occupies**

$\text{!http://www.onto-med.de/ontologies/gfo.owloccupies}_i \equiv \text{!http://www.onto-med.de/ontologies/gfo.owloccupied\_by} > ^-$   
 $\top \sqsubseteq \leq 1 \text{ occupies Thing}$

**on\_layer**

$\text{!http://www.onto-med.de/ontologies/gfo.owllayer\_of} > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owlon\_layer}$

**on\_level**

$\sqsubseteq \text{on\_layer}$   
 $\text{!http://www.onto-med.de/ontologies/gfo.owllevel\_of} > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owlon\_level}$

**on\_stratum**

$\sqsubseteq \text{on\_layer}$   
 $\text{!http://www.onto-med.de/ontologies/gfo.owlon\_stratum} > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owlstratum}$

**part\_of**

$\sqsubseteq \text{abstract\_part\_of}$   
 $\text{!http://www.onto-med.de/ontologies/gfo.owlpart\_of} > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owlhas\_part} >$   
 $\text{TransitivePropertypart\_of}$

**participates\_in**

$\text{!http://www.onto-med.de/ontologies/gfo.owlhas\_participant} > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owlpa}$

**plays\_role**

$\exists \text{ plays\_role Thing} \sqsubseteq \text{Thing}$

**projection\_of**

$\text{!http://www.onto-med.de/ontologies/gfo.owlprojection\_of} > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owlproj}$   
 $\top \sqsubseteq \leq 1 \text{ projection\_of}^- \text{ Thing}$

**projects<sub>t</sub>o**

$\text{!http://www.onto-med.de/ontologies/gfo.owlprojection}_o f > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owlproj}$

$\top \sqsubseteq \leq 1 \text{ projects\_to Thing}$

**proper<sub>p</sub>art<sub>o</sub>f**

$\sqsubseteq \text{ part\_of}$

$\text{!http://www.onto-med.de/ontologies/gfo.owlproper}_p \text{art}_o f > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owlhas}_p$

$\text{TransitivePropertyproper\_part\_of}$

**realized<sub>b</sub>y**

$\text{!http://www.onto-med.de/ontologies/gfo.owlrealizes}_i \equiv \text{!http://www.onto-med.de/ontologies/gfo.owlrealized}_b y >^-$

**realizes**

$\text{!http://www.onto-med.de/ontologies/gfo.owlrealizes}_i \equiv \text{!http://www.onto-med.de/ontologies/gfo.owlrealized}_b y >^-$

**requirement<sub>o</sub>f**

$\sqsubseteq \text{ function\_determinant\_of}$

$\text{!http://www.onto-med.de/ontologies/gfo.owlrequirement}_o f > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owlhas}$

**right<sub>b</sub>oundary<sub>o</sub>f**

$\text{!http://www.onto-med.de/ontologies/gfo.owlright}_b \text{oundary}_o f > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owlh}$

$\top \sqsubseteq \leq 1 \text{ right\_boundary\_of}^- \text{ Thing}$

**role<sub>o</sub>f****sequence<sub>c</sub>onstituent<sub>o</sub>f**

$\sqsubseteq \text{ part\_of}$

$\text{!http://www.onto-med.de/ontologies/gfo.owlsequence}_c \text{onstituent}_o f > \equiv < \text{http://www.onto-med.de/ontologies/gf}$

**spatial<sub>b</sub>oundary<sub>o</sub>f**

$\sqsubseteq \text{ boundary\_of}$

$\text{!http://www.onto-med.de/ontologies/gfo.owlhas}_s \text{patial}_b \text{oundary}_o f > \equiv < \text{http://www.onto-med.de/ontologies/gfo.o}$

**stratum<sub>o</sub>f**

$\sqsubseteq \text{ layer\_of}$

$\text{!http://www.onto-med.de/ontologies/gfo.owlon}_s \text{tratum} > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owlstratu}$

**time<sub>b</sub>oundary<sub>o</sub>f**

$\sqsubseteq \text{ boundary\_of}$

$\text{!http://www.onto-med.de/ontologies/gfo.owlhas}_t \text{ime}_b \text{oundary}_o f > \equiv < \text{http://www.onto-med.de/ontologies/gfo.owl}$

**token<sub>of</sub>**

`!http://www.onto-med.de/ontologies/gfo.owlhastoken > ≡ < http://www.onto-med.de/ontologies/gfo.owltokenof`

**value<sub>of</sub>**

`!http://www.onto-med.de/ontologies/gfo.owlvalueof > ≡ < http://www.onto-med.de/ontologies/gfo.owlhasvalue`

## Data properties

### Individuals

**empty<sub>set</sub>**

`empty_set : Set`

### Datatypes

**PlainLiteral**

**string**