

# Description logic view: GFO-basic-EL

## Classes

### Abstract

Abstract  $\sqsubseteq$  Individual  
Abstract  $\sqsubseteq \neg$  Space\_time  
Abstract  $\sqsubseteq \neg$  Concrete

### Amount\_of\_substrate

Amount\_of\_substrate  $\sqsubseteq$  Presential

### Category

Category  $\sqsubseteq \neg$  Individual

### Change

Change  $\sqsubseteq$  Occurrent  
Change  $\sqsubseteq \neg$  Event  
Change  $\sqsubseteq \neg$  History

### Chronoid

Chronoid  $\sqsubseteq$  Temporal\_region

### Concept

Concept  $\sqsubseteq$  Category  
Concept  $\sqsubseteq \neg$  Universal  
Concept  $\sqsubseteq \neg$  Symbol\_structure

### Concrete

Concrete  $\sqsubseteq$  Individual  
Concrete  $\sqsubseteq \neg$  Space\_time  
Concrete  $\sqsubseteq \neg$  Abstract

### Continuous\_change

Continuous\_change  $\sqsubseteq$  Change  
Continuous\_change  $\sqsubseteq \neg$  Discrete\_change

### Continuous\_process

Continuous\_process  $\sqsubseteq$  Process

### **Discrete<sub>change</sub>**

Discrete\_change  $\sqsubseteq$  Change

Discrete\_change  $\sqsubseteq \neg$  Continuous\_change

### **Discrete<sub>process</sub>**

Discrete\_process  $\sqsubseteq$  Process

### **Entity**

Entity  $\equiv$  Thing

### **Event**

Event  $\sqsubseteq$  Occurrent

Event  $\sqsubseteq \neg$  History

Event  $\sqsubseteq \neg$  Change

### **History**

History  $\sqsubseteq$  Occurrent

History  $\sqsubseteq \neg$  Event

History  $\sqsubseteq \neg$  Change

### **Individual**

Individual  $\sqsubseteq \neg$  Category

### **Left<sub>time</sub>boundary**

Left\_time\_boundary  $\equiv$  Time\_boundary  $\sqcap \exists$  left\_boundary\_of Chronoid

Left\_time\_boundary  $\sqsubseteq$  Time\_boundary

Left\_time\_boundary  $\sqsubseteq \neg$  Right\_time\_boundary

### **Line**

Line  $\equiv \exists$  spatial\_boundary\_of Surface

Line  $\sqsubseteq$  Spatial\_boundary

### **Material<sub>boundary</sub>**

Material\_boundary  $\sqsubseteq \exists$  depends\_on Material\_object

Material\_boundary  $\sqsubseteq$  Presential

Material\_boundary  $\sqsubseteq \exists$  framed\_by Spatial\_boundary

Material\_boundary  $\sqsubseteq \neg$  Material\_object

### **Material<sub>object</sub>**

Material\_object  $\sqsubseteq$  Presential  
Material\_object  $\sqsubseteq \exists$  framed\_by Topoid  
Material\_object  $\sqsubseteq \neg$  Material\_boundary

### **Occurrent**

Occurrent  $\sqsubseteq$  Processual\_Structure  
Occurrent  $\sqsubseteq \neg$  Process

### **Perpetuant**

Perpetuant  $\sqsubseteq$  Concrete

### **Point**

Point  $\equiv \exists$  spatial\_boundary\_of Line  
Point  $\sqsubseteq$  Spatial\_boundary

### **Presential**

Presential  $\sqsubseteq$  Concrete  
Presential  $\sqsubseteq \exists$  exists\_at Time\_boundary  
Presential  $\sqsubseteq \neg$  Processual\_Structure

### **Process**

Process  $\sqsubseteq \exists$  projects\_to Temporal\_region  
Process  $\sqsubseteq$  Processual\_Structure  
Process  $\sqsubseteq \neg$  Occurrent

### **Processual<sub>structure</sub>**

Processual\_Structure  $\sqsubseteq$  Concrete  
Processual\_Structure  $\sqsubseteq \neg$  Presential

### **Processual<sub>role</sub>**

Processual\_role  $\sqsubseteq \exists$  role\_of Process  
Processual\_role  $\sqsubseteq$  Process  
Processual\_role  $\sqsubseteq$  Role  
Processual\_role  $\sqsubseteq \neg$  Social\_role  
Processual\_role  $\sqsubseteq \neg$  Relational\_role

### **Property**

Property  $\sqsubseteq$  Individual  
Property  $\sqsubseteq \neg$  Relator

### **Relational<sub>r,ole</sub>**

Relational\_role  $\sqsubseteq$  Property  
Relational\_role  $\sqsubseteq \exists$  played\_by Entity  
Relational\_role  $\sqsubseteq \exists$  role\_of Relator  
Relational\_role  $\sqsubseteq$  Role  
Relational\_role  $\sqsubseteq \neg$  Social\_role  
Relational\_role  $\sqsubseteq \neg$  Processual\_role

### **Relator**

Relator  $\sqsubseteq$  Individual  
Relator  $\sqsubseteq \neg$  Property

### **Right<sub>time,oundary</sub>**

Right\_time\_boundary  $\equiv$  Time\_boundary  $\sqcap \exists$  right\_boundary\_of Chronoid  
Right\_time\_boundary  $\sqsubseteq$  Time\_boundary  
Right\_time\_boundary  $\sqsubseteq \neg$  Left\_time\_boundary

### **Role**

Role  $\sqsubseteq$  Individual

### **Social<sub>r,ole</sub>**

Social\_role  $\sqsubseteq$  Role  
Social\_role  $\sqsubseteq \neg$  Relational\_role  
Social\_role  $\sqsubseteq \neg$  Processual\_role

### **Space**

Space  $\sqsubseteq$  Space\_time  
Space  $\sqsubseteq \neg$  Time

### **Space<sub>time</sub>**

Space\_time  $\sqsubseteq$  Individual  
Space\_time  $\sqsubseteq \neg$  Abstract  
Space\_time  $\sqsubseteq \neg$  Concrete

### **Spatial<sub>oundary</sub>**

Spatial\_boundary  $\equiv \exists$  spatial\_boundary\_of Space  
Spatial\_boundary  $\sqsubseteq$  Space  
Spatial\_boundary  $\sqsubseteq \neg$  Spatial\_region

### **Spatial<sub>r</sub>egion**

Spatial\_region  $\sqsubseteq$  Space

Spatial\_region  $\sqsubseteq \neg$  Spatial\_boundary

### **State**

State  $\sqsubseteq$  Process

### **Surface**

Surface  $\equiv \exists$  spatial\_boundary\_of Topoid

Surface  $\sqsubseteq$  Spatial\_boundary

### **Symbol<sub>s</sub>tructure**

Symbol\_structure  $\sqsubseteq$  Category

Symbol\_structure  $\sqsubseteq \neg$  Concept

Symbol\_structure  $\sqsubseteq \neg$  Universal

### **Temporal<sub>r</sub>egion**

Temporal\_region  $\sqsubseteq$  Time

Temporal\_region  $\sqsubseteq \neg$  Time\_boundary

### **Thing**

Thing  $\equiv$  Entity

### **Time**

Time  $\sqsubseteq$  Space\_time

Time  $\sqsubseteq \neg$  Space

### **Time<sub>b</sub>oundary**

Time\_boundary  $\equiv \exists$  time\_boundary\_of Temporal\_region

Time\_boundary  $\sqsubseteq$  Time

Time\_boundary  $\sqsubseteq \neg$  Temporal\_region

### **Topoid**

Topoid  $\sqsubseteq$  Spatial\_region

### **Universal**

Universal  $\sqsubseteq$  Category

Universal  $\sqsubseteq \neg$  Concept

Universal  $\sqsubseteq \neg$  Symbol\_structure

## Object properties

**abstract<sub>has\_part</sub>**

**abstract<sub>part\_of</sub>**

TransitivePropertyabstract\_part\_of

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

$\sqsubseteq$  depends\_on

**coincides<sub>with</sub>**

**depends<sub>on</sub>**

TransitivePropertydepends\_on

**exhibits**

$\exists$  exhibits Thing  $\sqsubseteq$  Perpetuant

$\top \sqsubseteq \forall$  exhibits Presential

**exists<sub>at</sub>**

$\exists$  exists\_at Thing  $\sqsubseteq$  Presential

$\top \sqsubseteq \forall$  exists\_at Time\_boundary

**framed<sub>by</sub>**

$\exists$  framed\_by Thing  $\sqsubseteq$  Presential

$\top \sqsubseteq \forall$  framed\_by Space

**frames**

$\exists$  frames Thing  $\sqsubseteq$  Space

$\top \sqsubseteq \forall$  frames Presential

**has<sub>boundary</sub>**

$\sqsubseteq$  necessary\_for

**has<sub>left\_time\_boundary</sub>**

$\sqsubseteq$  has\_time\_boundary

$\top \sqsubseteq \forall$  has.left.time\_boundary Left.time\_boundary

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

$\sqsubseteq$  abstract\_has\_part  
TransitivePropertyhas\_part

**has<sub>p</sub>participant**

$\exists$  has\_participant Thing  $\sqsubseteq$  Processual\_Structure

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

$\sqsubseteq$  has\_part  
TransitivePropertyhas\_proper\_part

**has<sub>p</sub>roperty**

$\exists$  has\_property Thing  $\sqsubseteq$  Entity  
 $\top \sqsubseteq \forall$  has\_property Property

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

$\sqsubseteq$  has\_time\_boundary  
 $\top \sqsubseteq \forall$  has\_right\_time\_boundary Right\_time\_boundary

**has<sub>r</sub>ole**

$\sqsubseteq$  abstract\_has\_part  
 $\exists$  has\_role Thing  $\sqsubseteq$  Entity  
 $\top \sqsubseteq \forall$  has\_role Role

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

$\sqsubseteq$  has\_boundary  
 $\exists$  has\_spatial\_boundary Thing  $\sqsubseteq$  Space  
 $\top \sqsubseteq \forall$  has\_spatial\_boundary Spatial\_boundary

**has<sub>t</sub>emporal<sub>p</sub>art**

$\sqsubseteq$  has\_part

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

$\sqsubseteq$  has\_boundary  
 $\exists$  has\_time\_boundary Thing  $\sqsubseteq$  Temporal\_region  
 $\top \sqsubseteq \forall$  has\_time\_boundary Time\_boundary

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

⊆ instantiated\_by  
∃ has\_token Thing ⊆ Symbol\_structure  
⊆ ∃ has\_token Concrete

**instance<sub>o</sub>f**

∃ instance\_of Thing ⊆ Entity  
⊆ ∃ instance\_of Category

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

∃ instantiated\_by Thing ⊆ Category  
⊆ ∃ instantiated\_by Entity

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

⊆ time\_boundary\_of

**necessary<sub>f</sub>or**

TransitivePropertynecessary\_for

**occupied<sub>b</sub>y**

⊆ frames  
∃ occupied\_by Thing ⊆ Space  
⊆ ∃ occupied\_by Presential

**occupies**

⊆ framed\_by  
∃ occupies Thing ⊆ Presential  
⊆ ∃ occupies Space

**part<sub>o</sub>f**

⊆ abstract\_part\_of  
TransitivePropertypart\_of

**participates<sub>i</sub>n**

⊆ ∃ participates\_in Processual\_Structure

**played<sub>b</sub>y**

∃ played\_by Thing ⊆ Role  
⊆ ∃ played\_by Entity

**plays<sub>role</sub>**

$\exists$  plays\_role Thing  $\sqsubseteq$  Entity

$\top \sqsubseteq \forall$  plays\_role Role

**projection<sub>of</sub>**

$\exists$  projection\_of Thing  $\sqsubseteq$  Time

**projects<sub>to</sub>**

$\top \sqsubseteq \forall$  projects\_to Time

**proper<sub>part\_of</sub>**

$\sqsubseteq$  part\_of

TransitivePropertyproper\_part\_of

**property<sub>of</sub>**

$\exists$  property\_of Thing  $\sqsubseteq$  Property

**right<sub>boundary\_of</sub>**

$\sqsubseteq$  time\_boundary\_of

**role<sub>of</sub>**

$\sqsubseteq$  abstract\_part\_of

$\exists$  role\_of Thing  $\sqsubseteq$  Role

$\top \sqsubseteq \forall$  role\_of Entity

**spatial<sub>boundary\_of</sub>**

$\sqsubseteq$  boundary\_of

$\exists$  spatial\_boundary\_of Thing  $\sqsubseteq$  Spatial\_boundary

$\top \sqsubseteq \forall$  spatial\_boundary\_of Space

**temporal<sub>part\_of</sub>**

$\sqsubseteq$  part\_of

TransitivePropertytemporal\_part\_of

$\exists$  temporal\_part\_of Thing  $\sqsubseteq$  Time

**time<sub>boundary\_of</sub>**

$\sqsubseteq$  boundary\_of

$\exists$  time\_boundary\_of Thing  $\sqsubseteq$  Time\_boundary

$\top \sqsubseteq \forall$  time\_boundary\_of Temporal\_region

**token\_of**

$\sqsubseteq$  instance\_of  
 $\exists$  token\_of Thing  $\sqsubseteq$  Concrete  
 $\top \sqsubseteq \forall$  token\_of Symbol\_structure

**Data properties**

**Individuals**

**Datatypes**

**string**