

# Orbital Disease Ontology

## Knowledge Based Systems

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May 24, 2023

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# Competency questions - Interogari

- ① Care sunt bolile care au ca simptom X ?
- ② Care sunt simptomele bolii X ?
- ③ Ce boala apare in locatia X ?
- ④ Este X o boala ?
- ⑤ Este X un simptom ?
- ⑥ Este X o locatie a unei boli ?
- ⑦ Are X baza materiala in Y ?
- ⑧ Este X adiacent lui Y ?
- ⑨ Este X o subcategorie a bolii Y?
- ⑩ Are boala X o locatie determinata?

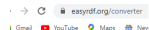
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# Reusing other ontologies

- Am folosit o ontologie cu tema asemanatoare cu cea dezvoltata de noi. Ontologia este preluata de pe site ul Bioportal (site asemnator cu Ontobee, dar am gasit ontologii mai usor de descarat in format owl ) fiind accesibila la linkul acesta : <https://bioportal.bioontology.org/ontologies/FNS-H/?p=classes&conceptid=http>
- Dupa descarcarea ontologiei in format owl am folosit site-ul acesta pentru a genera un rdf folosind EasyRdf converter si am salvat un fisier .rdf (selectati optiunea all files)  
(Exista posibilitatea sa se poata incarca direct in Prodege cu extensia owl.  
(Link catre Prodege: <https://protege.stanford.edu/> )

# Reusing other ontologies



## Output

Number of triples parsed: 3931

```
<?xml version="1.0" encoding="utf-8" ?>
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:owl="http://www.w3.org/2002/07/owl#"
  xmlns:dc11="http://purl.org/dc/elements/1.1/"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:ns0="http://purl.obolibrary.org/obo/"
  xmlns:ns1="https://www.fns-cloud.eu/">

  <owl:Ontology rdf:about="https://www.fns-cloud.eu/">
    <owl:versionIRI rdf:resource="https://www.fns-cloud.eu/FNS-H/1.2.0/">
    <owl:imports rdf:resource="http://purl.obolibrary.org/obo/omo/2020-06-08/omo.owl"/>
    <owl:imports rdf:resource="https://purl.org/fns-h/external/DOID"/>
    <owl:imports rdf:resource="https://purl.org/fns-h/external/EINVO"/>
    <owl:imports rdf:resource="https://purl.org/fns-h/external/OBIT"/>
    <owl:imports rdf:resource="https://purl.org/fns-h/external/QHS"/>
    <owl:imports rdf:resource="https://purl.org/fns-h/external/UBERON"/>
    <owl:imports rdf:resource="https://purl.org/fns-h/external/UO"/>
    <dc11:contributor>Aleksandra Shumkoska</dc11:contributor>
    <dc11:contributor>Anton Bivolarov</dc11:contributor>
    <dc11:contributor>Francesco Vitali</dc11:contributor>
    <dc11:contributor>Giovanni Bacci</dc11:contributor>
    <dc11:contributor>Pance Panov</dc11:contributor>
    <dc11:creator>Pance Panov (JSI)</dc11:creator>
    <dc11:date>30 NOV 2021</dc11:date>
    <dc11:description>Application module of FNS-W</dc11:description>

    <dc11:identifier>FNS_H</dc11:identifier>
    <dc11:language>English</dc11:language>
    <dc11:title>FNS-Harmony Ontology</dc11:title>
    <owl:priorVersion rdf:datatype="http://www.w3.org/2001/XMLSchema#decimal">1.1</owl:priorVersion>
    <owl:versionInfo rdf:datatype="http://www.w3.org/2001/XMLSchema#decimal">1.2</owl:versionInfo>
  </owl:Ontology>

  <owl:AnnotationProperty rdf:about="https://www.fns-cloud.eu/FNS-H_0000000067">
```

Figure: EasyRdf

In prodege am facut urmatoarele (poze se pot gasi la capitolul FRED):

- ① Am incarcat ontologia .rdf
- ② Am selectat start reasoner
- ③ Am dat export
- ④ Am selectat clase si subclase
- ⑤ Am selectat locatia si am denumit fisierul Ontologie.owl
- ⑥ Am salvat in formatul owl/xml



# Reusing other ontologies

Am incarcat fisierul salvat cu owl/xml in racer: L-am salvat in OWL cu comanda (save-kb "Ontoreusing.owl" :syntax :owl) Dupa am adaugat continutul la ontologia noastra deja exista in owl  
Cum arata taxologia :

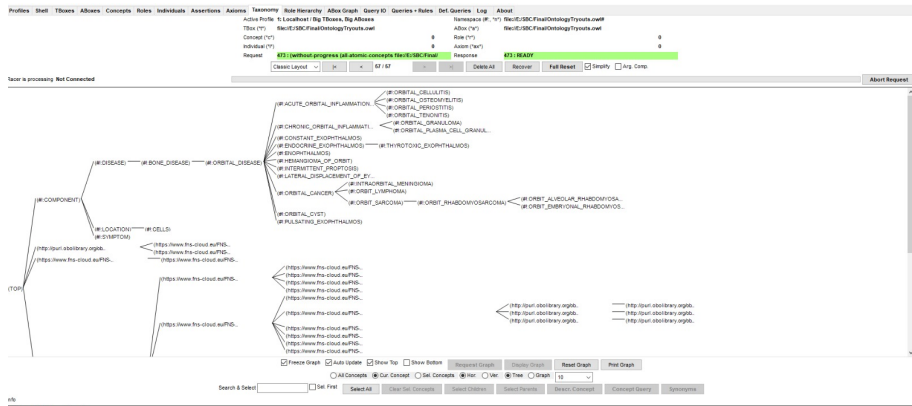


Figure: Ontology Reusing

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TBox (Terminology Box) se refera la partea din ontologie ce defineste concepte, subconceptele si relatiile dintre ele. Reprezinta knowledge despre terminologia ontologiei si este de obicei folosita pentru a reprezenta structurile ierarhice dintre concepte (clase si subclase) si axiomele ce le guverneaza. De asemenea, Tbox-urile definesc caracteristicile si proprietatile entitatilor si ce categorii share-uiesc. Exemple de concepte pentru ontologii medicale includ : PatientDisease si Symptom. In plus, Cancer poate fi considerat subconcept al conceptului mai broad Disease. De asemenea, in Tbox sunt incluse rolurile (roles) si regulile (rules). Mai jos am atasat taxonomia ontologiei noastre. Pentru a vizualiza taxonomia ontologiei tale, slecteaza load , incarca fiserul .racer , iar la tabul de Taxonomy selecteaza tree 10.

# Tboxes

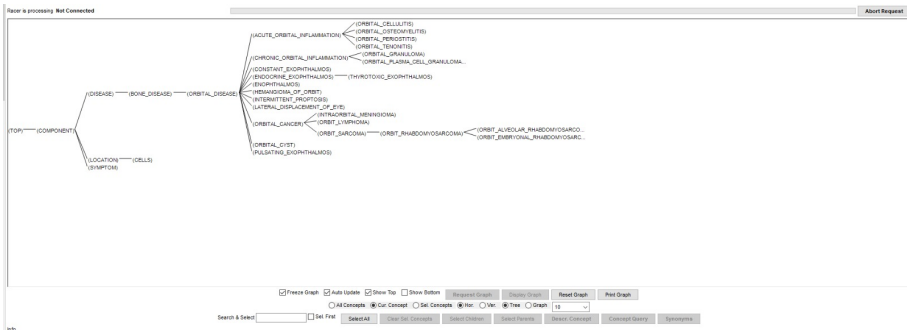


Figure: Tbox

```
(define-primitive-role has-symptom :domain Disease :range Symptom)
(define-primitive-role is-different :domain Disease :range Symptom)
(define-primitive-role has-location :domain Disease :range Location)
(define-primitive-role adjacent-to :domain Disease :range Location)
(define-primitive-role has-material-basis-in :domain Disease :range Cells)
```

Figure: Roles

```
(implies Cells Location)

(implies Bone_disease Disease)
(implies Orbital_disease Bone_disease )
(implies Endocrine_exophthalmos Orbital_disease )

(implies Chronic_orbital_inflammation Orbital_disease)
(implies Acute_orbital_inflammation Orbital_disease)
(implies Orbital_cancer Orbital_disease)
(implies Orbit_sarcoma Orbital_cancer)
(implies Orbit_rhabdomyosarcoma Orbit_sarcoma )
```

Figure: Implies Concepts

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Abox contine informatii despre indivizi si attribute ale acestora .In general aici avem cuvinte cheie precum instance si related, attribute-filler, define-concrete-domain-attribute. La noi in ontologie indivizii sunt locatiile si simptomele ,iar toate bolile sunt definite ca si subconcepte ale conceptului disease.

Observatie: unii indivizi sunt considerati a fi si concepte de catre racer, apartinand ambelor categorii.



RacerPorter

Profiles Shell TBoxes ABoxes Concepts Roles Individuals Assertions Axioms Taxonomy Role Hierarchy ABox Graph Query ID Queries + Rules Def. Queries Log About

Active Profile 1: Localhost / Big TBoxes, Big ABoxes Namespace (#, "r") NIL

TBox ("r")	DEFAULT	ABox ("r")	DEFAULT
Concept ("c")	CONSTANT_EXOPHTHALMOS	3	0
Individual ("i")	0	Axiom ("ax")	0

Request 211 : (without-progress (all-individuals DEFAULT))... Response 211 : CACHE-RETRY

Classic Layout |< < 25 / 25 > >| Delete All Recover Full Reset ☒ Simplify ☐ Arg. Comp.

Racer is processing Not Connected

- ACUTE\_ORBITAL\_INFLAMMATION
- CELLS
- DISEASE
- DOUBLE\_VISION
- EXOPHTHALMOS
- EYE
- FEVER
- HEADACHE
- HEMANGIOMA\_OF\_ORBIT
- INFLAMMATION
- LOCATION
- LYMPHOCYTE
- LYMPHOID\_TISSUE
- LYMPHOMA
- ORBITAL\_CANCER
- ORBITAL\_CELLULITIS
- ORBITAL\_DISEASE
- ORBITAL\_PERIOSTITIS
- ORBITAL\_REGION
- ORBITAL\_TENONITIS
- ORBIT\_LYMPHOMA
- PTOSIS
- SYMPTOM
- TOP

Figure: Indivizi

(related Orbital\_cellulitis fever has-symptom)  
(related Orbital\_cellulitis ptosis has-symptom)  
(related Orbital\_cellulitis headache has-symptom)  
(related Orbital\_cellulitis double\_vision has-symptom)  
(related Orbital\_cellulitis inflammation has-symptom)  
(related Orbital\_cancer ptosis has-symptom)  
(related Orbital\_cancer exophthalmos has-symptom)  
(related Orbital\_tenonitis inflammation has-symptom)  
(related Orbital\_periostitis inflammation has-symptom)  
(related Acute\_orbital\_inflammation inflammation has-symptom)

(related Hemangioma\_of\_orbit orbital\_region has-location)  
(related Lymphoma lymphoid\_tissue has-location)

(related Orbital\_disease eye adjacent-to)

(related Orbit\_lymphoma lymphocyte has-material-basis-in)

Figure: Related

```
(instance fever Symptom)
(instance ptosis Symptom)
(instance headache Symptom)
(instance double_vision Symptom)
(instance inflammation Symptom)
(instance exophthalmos Symptom)

(instance orbital_region Location)
(instance lymphoid_tissue Location)
(instance eye Location)
(instance lymphocyte Cells)
```

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## Interogari Nrql

- 1 Care sunt bolile care au ca simptom febra ?  
(retrieve (?x) (and (?x Disease) (?x fever has-symptom))) )
- 2 Care sunt bolile care au ca simptom dureri de cap ?  
(retrieve (?x) (and (?x Disease) (?x headache has-symptom))) )
- 3 Ce boala apare in tesutul limfoid?  
(retrieve (?x) (and (?x Disease) (?x lymphoid tissue has-location))) )
- 4 Care sunt bolile care au ca simptom durerile de cap ?  
(retrieve (?x) (and (?x Disease) (?x inflammation has-symptom))) )

## Interogari Racer

- 1 Care sunt bolile care au ca simptom febra ? (individual-fillers fever (inv has-symptom) )
- 2 Care sunt simptomele bolii orbital cellulitis ? (individual-fillers orbital cellulitis has-symptom )

## Evaluare ontologie

- 1 Cod pentru determinarea si evaluarea diferitilor factori ai ontologiei

### Examples

- (all-atomic-concepts)
- (all-individuals)
- (abox-consistent?)
- ((tbox-cyclic?))
- (tbox-coherent?)
- (realize-abox)
- (classify-tbox)
- (evaluate (length (all-individuals)))
- (evaluate (length (all-atomic-concepts)))
- (evaluate (length (all-roles)))

## Rezultate query-uri

```
[1] ? (RACER-READ-FILE "D:/Faculta/SBC/OrbitalDiseaseOntology.racer")
(FULL-RESET) --> :OKAY-FULL-RESET
(DISABLE-NRQL-WARNINGS) --> :OKAY-WARNINGS-DISABLED
Redundant definition ORBITAL_CANCER for ORBIT_LYMPHOMA ignored.
(RETRIEVE (?X) (AND (?X DISEASE) (?X FEVER HAS-SYMPТОМ))) --> (((?X ORBITAL_CELLULITIS)))
(INDIVIDUAL-FILLERS FEVER (INV HAS-SYMPТОМ)) --> (ORBITAL_CELLULITIS)
(INDIVIDUAL-FILLERS ORBITAL_CELLULITIS HAS-SYMPТОМ) --> (INFLAMMATION DOUBLE_VISION HEADACHE PTOSIS FEVER)
(RETRIEVE (?X) (AND (?X DISEASE) (?X HEADACHE HAS-SYMPТОМ))) --> (((?X ORBITAL_CELLULITIS)))
(RETRIEVE (?X) (AND (?X DISEASE) (?X LYMPHOID_TISSUE HAS-LOCATION))) --> (((?X LYMPHOMA)))
(RETRIEVE (?X) (AND (?X DISEASE) (?X INFLAMMATION HAS-SYMPТОМ))) --> (((?X ORBITAL_CELLULITIS)) ((?X ORBITAL_TENONITIS)) ((?X ORB
ITAL_PERIOSTITIS)) ((?X ACUTE_ORBITAL_INFLAMMATION)))
(ALL-ATOMIC-CONCEPTS) --> (TOP BOTTOM ORBITAL GRANULOMA CHRONIC_ORBITAL_INFLAMMATION ORBITAL_PLASMA_CELL GRANULOMA ORBIT_SARCOMA
ENDOCRINE_EXOPHTHALMOS BONE_DISEASE ORBIT_EMBRYONAL_RHABDOMYOSARCOMA THYROTOXIC_EXOPHTHALMOS HEMANGIOMA_OF_ORBIT ORBIT_RHABDOMYOS
ARCOMA LATERAL_DISPLACEMENT_OF_EYE ORBIT_ALVEOLAR_RHABDOMYOSARCOMA CONSTANT_EXOPHTHALMOS ORBIT_LYMPHOMA SYMPTOM ENOPHTHALMOS ORBI
TAL_CANCER PULSATING_EXOPHTHALMOS LOCATION INTRAORBITAL_MENINGIOMA DISEASE ORBITAL_CYST ORBITAL_PERIOSTITIS ORBITAL_DISEASE ORBIT
AL_OSTEOMYELITIS INTERMITTENT_PROPTOSIS ORBITAL_TENONITIS CELLS COMPONENT ACUTE_ORBITAL_INFLAMMATION ORBITAL_CELLULITIS)
(ALL-INDIVIDUALS) --> (ORBIT_LYMPHOMA LYMPHOCYTE ORBITAL_DISEASE EYE LYMPHOMA LYMPHOID_TISSUE HEMANGIOMA_OF_ORBIT ORBITAL_REGION
ACUTE_ORBITAL_INFLAMMATION INFLAMMATION ORBITAL_PERIOSTITIS ORBITAL_TENONITIS ORBITAL_CANCER EXOPHTHALMOS PTOSIS ORBITAL_CELLULIT
IS DOUBLE_VISION HEADACHE FEVER CELLS LOCATION TOP SYMPTOM DISEASE)
(ABOX-CONSISTENT?) --> T
(TBOX-CYCLIC?) --> NIL
(TBOX-COHERENT?) --> T
(EVALUATE (LENGTH (ALL-INDIVIDUALS))) --> 24
(EVALUATE (LENGTH (ALL-ATOMIC-CONCEPTS))) --> 33
(EVALUATE (LENGTH (ALL-ROLES))) --> 18
(EVALUATE (LENGTH (ALL-RULES))) --> 0

[1] > :OKAY
```

Figure: Rezultate query



Ontology design patterns sunt soluții de modelare care rezolvă diverse probleme în proiectarea ontologiei. Există șase tipuri de astfel de modele: structurale, corespondență, conținut, raționament, prezentare și lexico-sintactice. În ontologia noastră, am folosit două patternuri structurale un pattern de conținut și unul de prezentare :

N-ary relation design pattern. Pentru conceptul de Disease am definit urmatoarele relatii.

- (define-primitive-role has-symptom :domain Disease :range Symptom)
- (define-primitive-role has-location :domain Disease :range Location)
- (define-primitive-role adjacent-to :domain Disease :range Location)
- (define-primitive-role has-material-basis-in :domain Disease :range Cells)

Partition design pattern. Pentru demonstrarea acestui pattern am considerat un concept numit Component care este impartit in subconcepte diferite intre ele care compun ontologia noastra (Disease, Symptom, Location).

- (equivalent Component (or Disease Symptom Location))
- (disjoint Disease Symptom Location)

PartOf design pattern. Pentru demonstrarea acestui pattern am considerat entitatea Component si am definit partile ei componente.

- (define-primitive-role subNodeOf :transitive t :inverse superNodeOf)
- (define-primitive-role directSubNodeOf :parent subNodeOf)
- (related Disease top directSubNodeOf)
- (related Symptom top directSubNodeOf)
- (related Location top directSubNodeOf)

- 1 Pentru realizarea acestui pattern, am incercat sa respectam anumite conventii de scriere pentru a realiza un cod cat mai usor de citit indiferent de expertiza celui care vizualizeaza. Rolurile si instantele existente incep cu litera mica, iar conceptele cu litera mare. In cazul in care acestea sunt compuse din mai multe cuvinte aceste sunt separate printr-o linie, in cazul rolurilor, si printr-un underline in cazul conceptelor si instantelor pentru a fi mai usor de citit.

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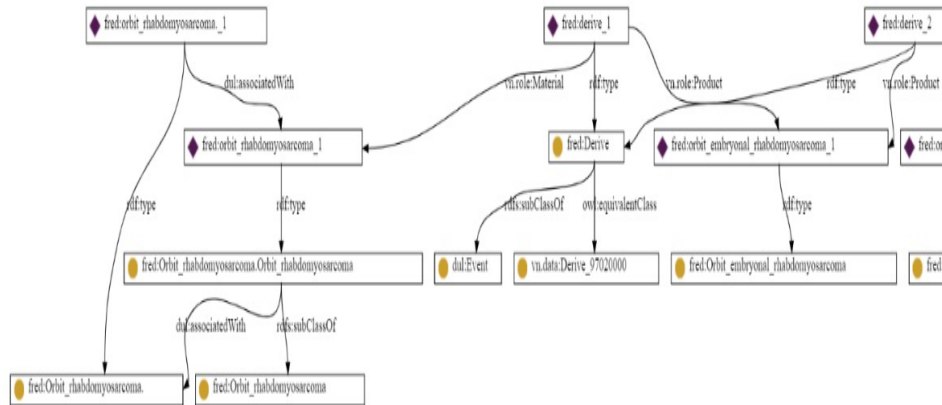
## Step 1: Despre Fred

Prin intermediul FRED, utilizatorii pot defini clase, proprietăți și relații între entități, precum și reguli și constrângeri pentru a modela cunoștințele specifice domeniului în care este folosită ontologia. Acesta oferă o interfață intuitivă și ușor de utilizat, care permite utilizatorilor să creeze ontologii fără a avea nevoie de cunoștințe avansate în programare sau în limbajul de interogare a ontologiilor, cum ar fi SPARQL.

FRED tool pune la dispoziție și funcționalități pentru gestionarea ontologiilor, inclusiv importul și exportul de ontologii în diferite formate standard, precum RDF sau OWL. De asemenea, oferă facilități de vizualizare și explorare a ontologiilor create, ajutând utilizatorii să înțeleagă și să verifice structura și conținutul ontologiei lor.

## Step 1: Translating the myth in DL using Fred

- 1 Accesați <http://wit.istc.cnr.it/stlab-tools/fred/demo/>
- 2 Obțineți reprezentarea grafică a sentence-ului si salvați-o ca nume.png
- 3 Obțineți formalizarea textului în sintaxa turtle si salvați-o ca nume.ttl



## Step 2: Protege

OntologyID(Anonymous-28) : [E:\SBC\Final\Fred.ttl]

File Edit View Reasoner Tools Refactor Window Help

OntologyID(Anonymous-28)

File Edit View Reasoner Tools Refactor Window Help

File Edit View Reasoner Tools Refactor Window Help

File Edit View Reasoner Tools Refactor Window Help

File Edit View Reasoner Tools Refactor Window Help

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File Edit View Reasoner Tools Refactor Window Help

File Edit View Reasoner Tools Refactor Window Help



## Step 2: Protege

The screenshot displays the Protege ontology editor interface. The title bar indicates the file path: `OntologyID(Anonymous-Z8) : [E:\SBC\Final\Fred.ttl]`. The menu bar includes **File**, **Edit**, **View**, **Reasoner**, **Tools**, **Refactor**, **Window**, and **Help**. The **Reasoner** menu is open, showing options: **Start reasoner**, **Syn...** (with a tooltip: "Reasoner already running. Re-initialization not required"), **Stop reasoner**, **Explain inconsistent ontology**, and **Configure...**. The **Configure...** option is selected, revealing a list of reasoners: **ELK 0.5.0** (selected), **HermiT 1.4.3.456**, and **None**. The left sidebar contains tabs for **Active ontology**, **Ontology header**, **Ontology**, **Ontology Version**, and **Annotations**. The main workspace shows a query editor with the text `es/myontology`. The right sidebar, titled **Ontology metrics**, lists various metrics under three categories: **Metrics** (Axiom, Logical axiom count, Declaration axioms count, Class count, Object property count, Data property count, Individual count, Annotation Property count), **Class axioms** (SubClassOf, EquivalentClasses, DisjointClasses, GCI count, Hidden GCI Count), and **Object property axioms** (SubObjectPropertyOf, EquivalentObjectProperties, InverseObjectProperties, DisjointObjectProperties, FunctionalObjectProperty, InverseFunctionalObjectProperty, TransitiveObjectProperty). The bottom status bar shows **Ontology imports**, **Ontology Prefixes**, and **General class axioms**.

## Step 2: Protege

OntologyID(Anonymous-28) : [E:\SBC\Final\Fred.ttl]

File Edit View Reasoner Tools Refactor Window Help

- New... Ctrl-N
- Open... Ctrl-O
- Open from URL... Ctrl+Shift-O
- Open recent
- Save Ctrl-S
- Save as... Ctrl+Shift-S
- Gather ontologies... Ctrl+Shift-G
- Export inferred axioms as ontology...**
- Reload Exports inferred axioms as an ontology Ctrl-R
- Edit ontology catalog file...
- Loaded ontology sources...
- Check for plugins...
- Close window Ctrl-W
- Preferences...
- Exit

Query x

gies/myontology

Ontology metrics:

**Metrics**

- Axiom**
  - Logical axiom count
  - Declaration axioms count
  - Class count
  - Object property count
  - Data property count
  - Individual count
  - Annotation Property count
- Class axioms**
  - SubClassOf
  - EquivalentClasses
  - DisjointClasses
  - GCI count
  - Hidden GCI Count
- Object property axioms**
  - SubObjectPropertyOf
  - EquivalentObjectProperties
  - InverseObjectProperties
  - DisjointObjectProperties
  - FunctionalObjectProperty
  - InverseFunctionalObjectProperty
  - TransitiveObjectProperty

Ontology imports | Ontology Prefixes | General class axioms

Imported ontologies:

## Step 2: Protege

Export inferred axioms as ontology

### Select axioms to export

This wizard will merge inferred and asserted information from ontologies active ontology into one ontology. Please select the kinds of inferred axioms to export.

- ☒ Subclasses
- ☒ Equivalent classes
- ☐ Sub object properties
- ☐ Sub data properties
- ☐ Equivalent object properties
- ☐ Equivalent data properties
- ☐ Object property characteristics
- ☐ Data property characteristics
- ☐ Inverse object properties
- ☐ Class assertions (individual types)
- ☐ Property assertions (property values)
- ☐ Disjoint classes

## Step 2: Protege

Export inferred axioms as ontology

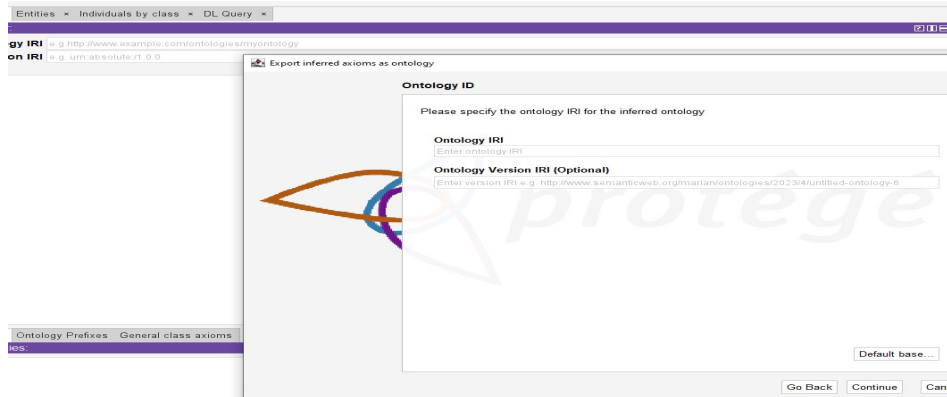
### Include asserted axioms

Please decide which asserted information you wish to include in the export. If you include asserted logical axioms then all logical axioms in the ontology will be exported, including the inferred logical axioms that were selected on the previous page.

- ☐ Include annotations
- ☐ Include asserted logical axioms

09:22

## Step 2: Protege



## Step 2: Protege

Export inferred axioms as ontology

### Physical Location

Please specify the file path that points to the location where your ontology is stored on a location in the 'recent locations' list to automatically select that location.

E:\SBC\Final\Fred.owl

RecentLocations

## Step 2: Protege

Export inferred axioms as ontology

### Ontology Format

Please select the format in which the ontology will be saved (by default

Note that the Manchester OWL Syntax does not support all OWL constraints (annotations of undeclared entities) and the Latex format cannot be reloaded)

OWL/XML Syntax

## Step 3: Simplify the ontology

- 1 Am incarcat fisierul salvat cu owl/xml in racer
- 2 L-am salvat in OWL cu comanda (save-kb "fred.owl" :syntax :owl)
- 3 Dupa am adaugat continutul la ontologia noastra deja existenta in owl



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## Pasul 1: Traducerea în DL folosind Fred

- 1 Accesați <http://wit.istc.cnr.it/stlab-tools/fred/demo/>
- 2 Obțineți reprezentarea grafică a sentence-ului si salvați-o ca nume.png
- 3 Obțineți formalizarea textului în sintaxa turtle si salvați-o ca nume.ttl

## Pasul 2: Protege

- ① Am incarcat ontologia .ttl
- ② Am selectat start reasoner
- ③ Am dat export
- ④ Am selectat clase si subclase
- ⑤ Am selectat locatia si am denumit fisierul Ontologie.owl
- ⑥ Am salvat in OWL/XML

## Pasul 3: Online tool

Am pus formatul RDF/XML in :

[http://attempto.ifi.uzh.ch/site/docs/owl\\_to\\_ace.html](http://attempto.ifi.uzh.ch/site/docs/owl_to_ace.html) si a generat varianta finala in natural language:

```
Every LymphocyteOrbital is an Orbital.
Every LymphocyteOrbital is an Orbital.
Every LymphocyteOrbitalCancer is an OrbitalCancer.
Every Material is a Quality.
Every MaterialBasis is a Basis.
Every Orbit is a Quality.
Every OrbitAlveolar is an Alveolar.
Every OrbitAlveolarRhabdomyosarcoma is an Alveolar_rhabdomyosarcoma.
Every OrbitAlveolarRhabdomyosarcoma is an AlveolarRhabdomyosarcoma.
Every OrbitEmbryonalRhabdomyosarcoma is an Embryonal_rhabdomyosarcoma.
Every OrbitEmbryonalRhabdomyosarcoma is an EmbryonalRhabdomyosarcoma.
Every OrbitLymphoma is a Lymphoma.
Every OrbitLymphoma is a Lymphoma.
Every OrbitRhabdomyosarcoma is a Rhabdomyosarcoma.
Every OrbitRhabdomyosarcoma is a Rhabdomyosarcoma.
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Every OrbitRhabdomyosarcoma.Orbit is a Rhabdomyosarcoma.Orbit.
Every OrbitRhabdomyosarcoma.OrbitRhabdomyosarcoma is a Rhabdomyosarcoma.Orbit.
Every OrbitSarcoma is a Sarcoma.
Every Orbital is a Quality.
Every OrbitalCancer is a Cancer.
Every OrbitalCancer is a Cancer.
Every OrbitalMeningioma is a Meningioma.
Every OrbitalMeningioma is a Meningioma.
Every Rhabdomyosarcoma.Orbit is an Orbit_(anatomy).
Every Rhabdomyosarcoma.Orbit is an Orbit.
Every Rhabdomyosarcoma.Orbit is an Orbital.
Every Rhabdomyosarcoma.OrbitRhabdomyosarcoma is an OrbitRhabdomyosarcoma.
Every SymptomExophthalmo is an Exophthalmo.
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