

Ontologia

Jocurilor Olimpice

Cozma Laura-Elena
Manolache Andrei

Pagini Web Semantice



Aprilie, 2023

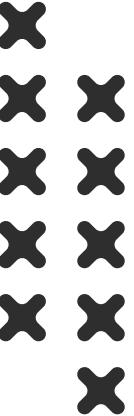


Cuprins

- **Introducere**
- **Tehnologii utilizate**
- **Clase definite**
- **Proprietăți obiect**
- **Proprietăți atribut**
- **Indivizi**
- **Interogări**
- **Concluzii**



Introducere



01

Ce reprezintă Semantica Web?

Semantica Web este o parte complementară a ceea ce numim World Wide Web, iar prin încorporarea metadatelor semantice în conținutul web, aceasta își propune să creeze un web care este mai eficient și mai semnificativ.

02

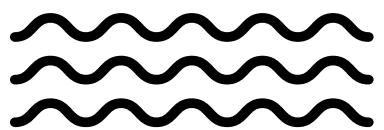
Ce este OWL?

Web Ontology Language (OWL) este un limbaj web semantic conceput pentru a reprezenta cunoștințe bogate și complexe despre obiecte, grupuri de obiecte sau relații între acestea.

03

Tema aleasă

Proiectul își propune să dezvolte ontologia Jocurilor Olimpice, prin care utilizatorii pot descoperi detalii despre o anumită ediție, sporturile jucate în timpul anumitor ediții, sportivii participanți, clasamentele și medaliile acordate.

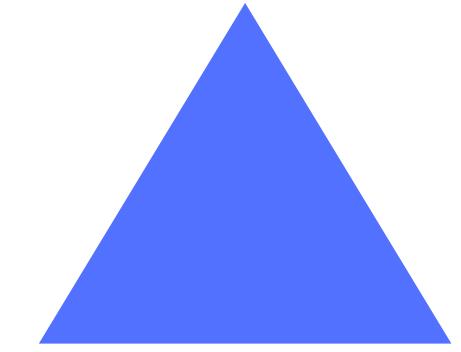


Tehnologii utilizate

Protégé

Protégé este un editor de ontologii open-source și o platformă de dezvoltare care este utilizată pe scară largă în domeniul semanticii web.

Este un instrument puternic pentru crearea, editarea și gestionarea ontologiilor și oferă o interfață ușor de utilizat pentru construirea și testarea modelelor de cunoștințe.



Hermit

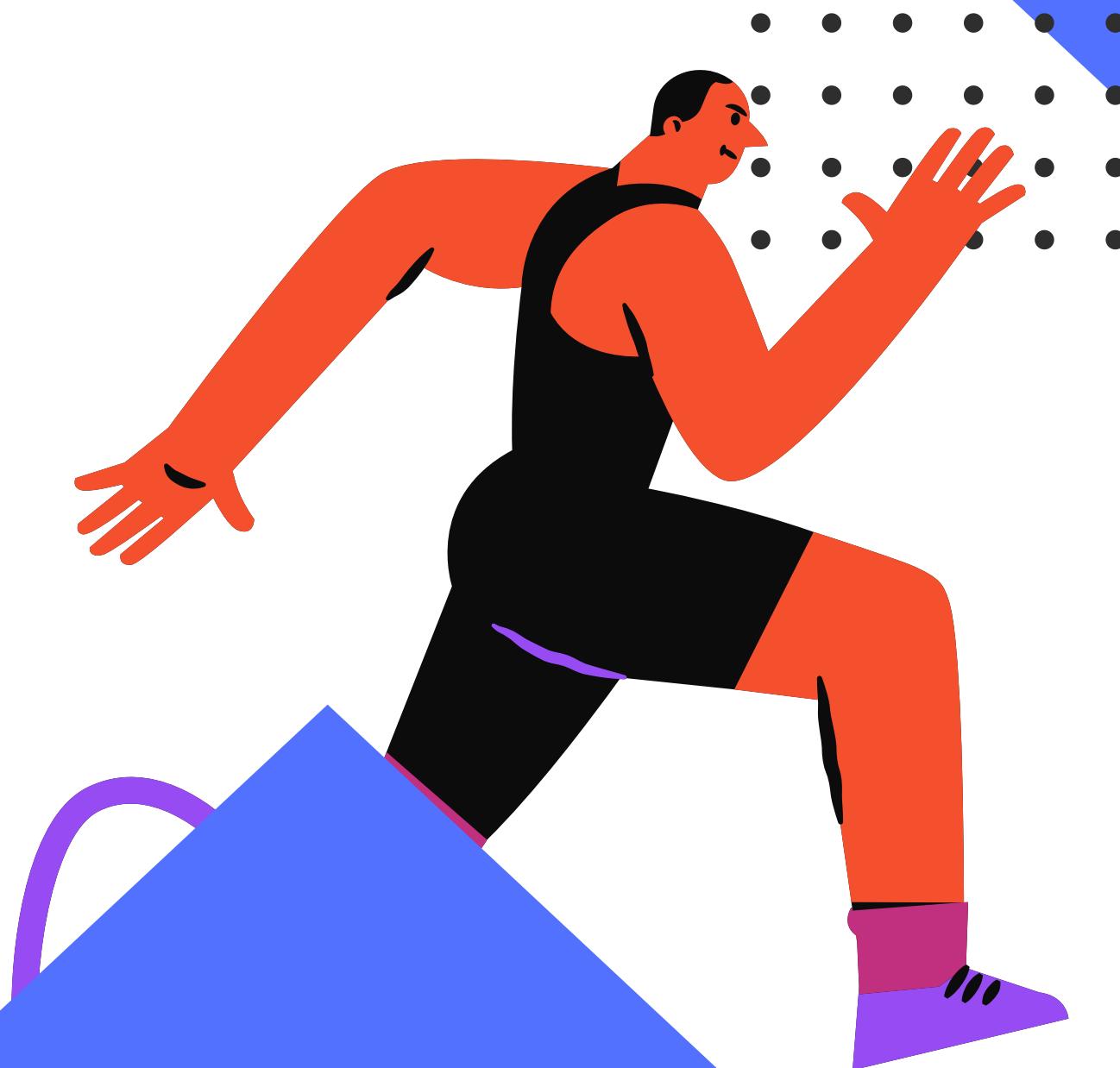
Hermit este un reasoner pentru ontologii scrise folosind limbajul Web Ontology Language.

Având în vedere un fișier OWL, Hermit poate determina dacă ontologia este sau nu consecventă, poate identifica relațiile de subsumare între clase și multe altele.

Dezvoltat de Universitatea din Oxford, Hermit se bazează pe reasoner-ul FaCT++.



Dezvoltarea ontologiei Jocurilor Olimpice



XXX

Clasile definite

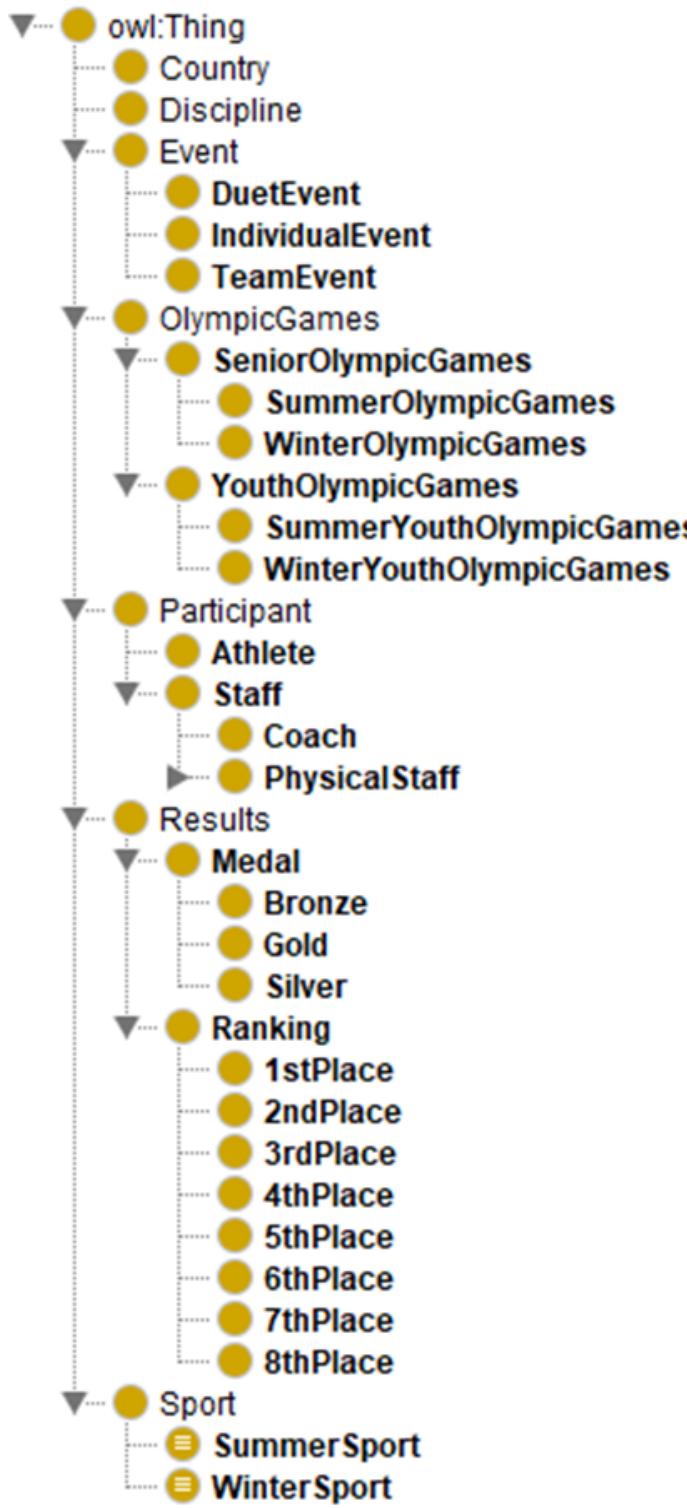
01 NIVELUL

- ▼ owl:Thing
- Country
- Discipline
- Event
- OlympicGames
- Participant
- Results
- Sport

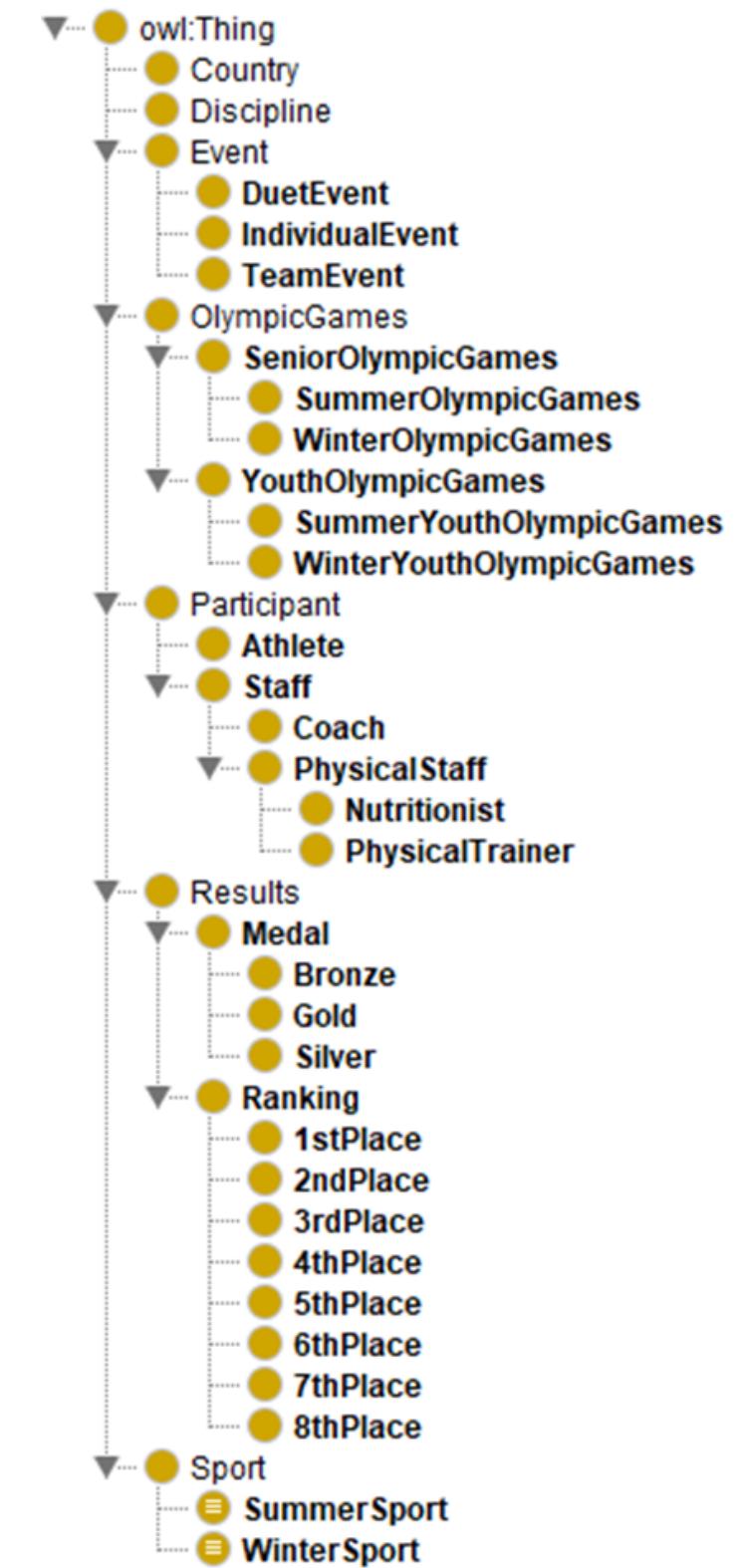
02 NIVELUL

- ▼ owl:Thing
 - Country
 - Discipline
 - Event
 - DuetEvent
 - IndividualEvent
 - TeamEvent
- OlympicGames
 - SeniorOlympicGames
 - YouthOlympicGames
- Participant
 - Athlete
 - Staff
- Results
 - Medal
 - Ranking
- Sport
 - SummerSport
 - WinterSport

03 NIVELUL

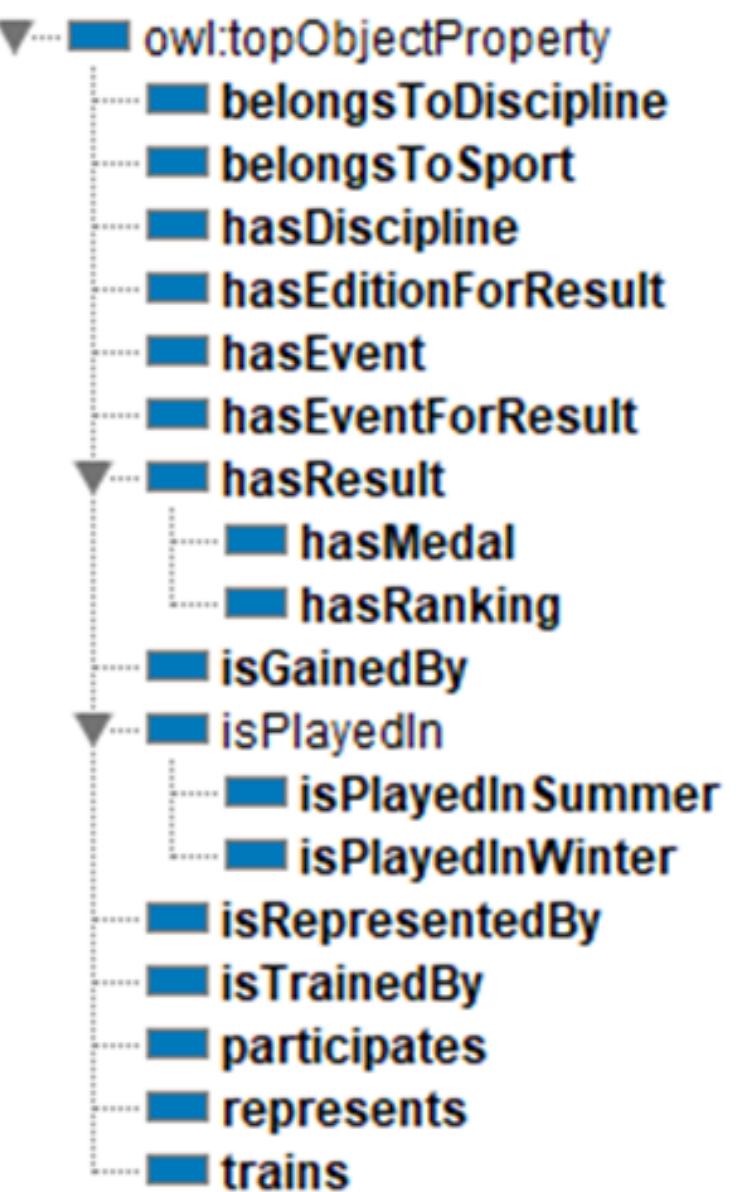


04 NIVELUL



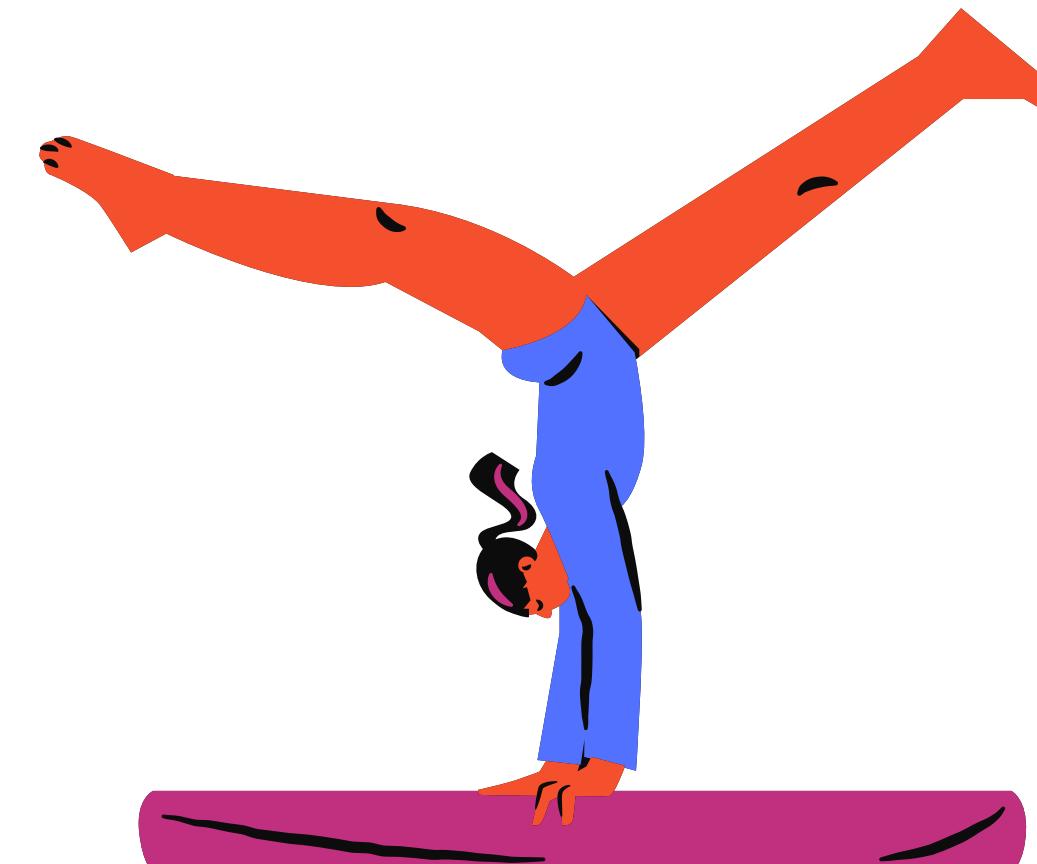
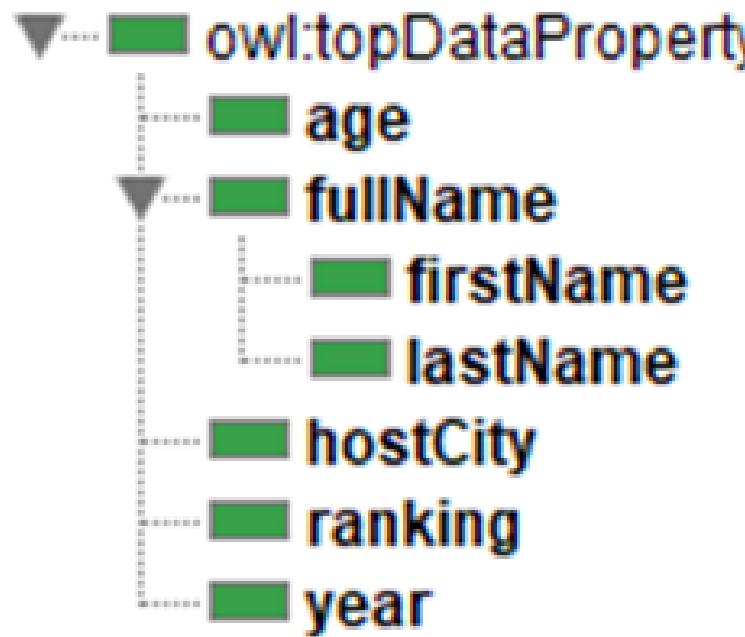
Proprietăți obiect

- Proprietățile obiect au fost create cu scopul de a crea relații între clase și, ulterior, între indivizi



Proprietăți atribut | | | |

- Proprietățile atribut au fost definite cu scopul de a adăuga caracteristici specifice fiecărei clase.
- Clasa OlympicGames - *year*, anul în care s-a desfășurat, și *hostCity*, orașul gazdă.
- Clasa Participant - *age* și *fullName*, vârsta și numele persoanei
- Clasa Result - *ranking*, locul în clasament



Indivizii

Summer Sport

Description: SummerSport

Equivalent To +

- {Aquatics , BaseballAndSoftball , Basketball , CanoeingKayaking , Cycling , Equestrian , Gymnastics , Wrestling}

SubClass Of +

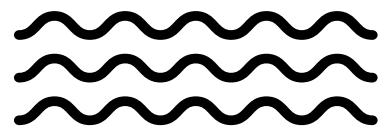
- Sport

General class axioms +

SubClass Of (Anonymous Ancestor)

Instances +

- Aquatics
- BaseballAndSoftball
- Basketball
- CanoeingKayaking
- Cycling
- Equestrian
- Gymnastics
- Wrestling



Winter Sport

Description: WinterSport

Equivalent To +

- {Bobsleigh , Skating , Skiing}

SubClass Of +

- Sport

General class axioms +

SubClass Of (Anonymous Ancestor)

Instances +

- Bobsleigh
- Skating
- Skiing

Target for Key +



Discipline

Description: Discipline

Equivalent To

General class axioms

SubClass Of (Anonymous Ancestor)

Instances

- ◆ ArtisticGymnastics
- ◆ ArtisticSwimming
- ◆ Diving
- ◆ FigureSkating
- ◆ Football
- ◆ Handball
- ◆ RythmicGymnastics
- ◆ SpeedSkating
- ◆ Swimming
- ◆ Tennis

Evenimente individuale

Description: IndividualEvent

Equivalent To

SubClass Of

Event

General class axioms

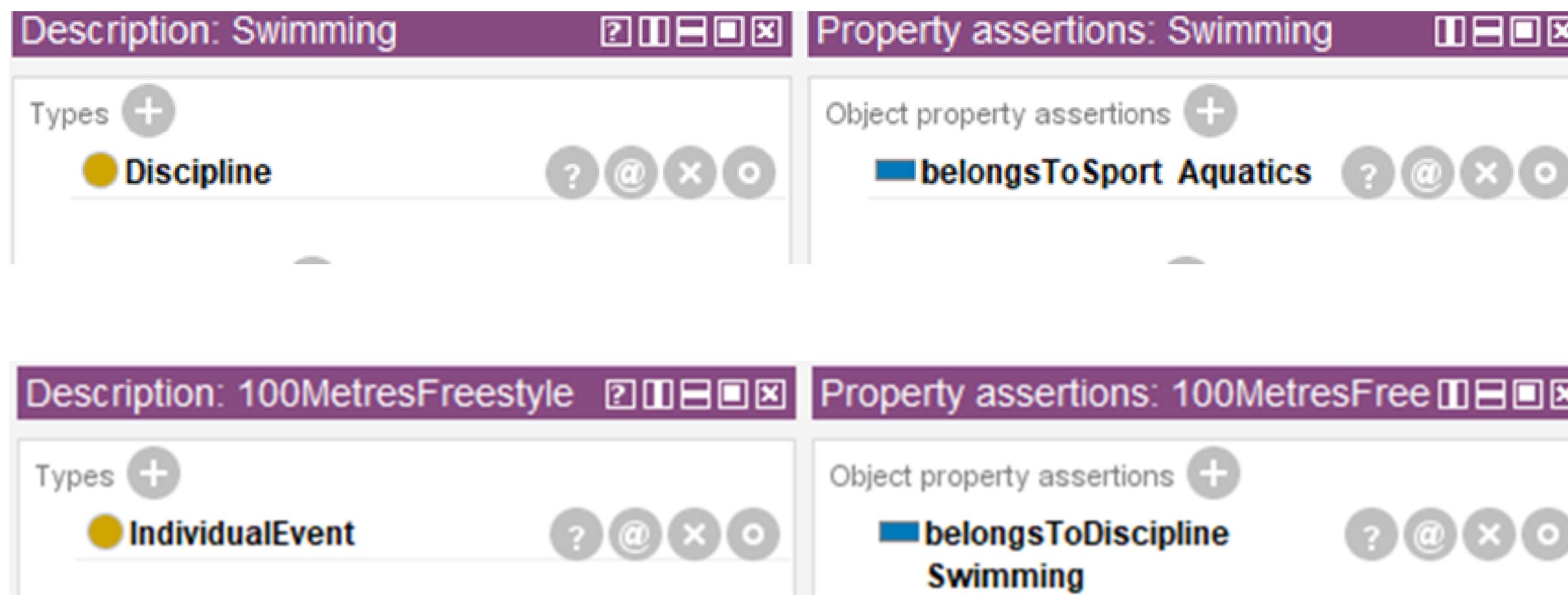
SubClass Of (Anonymous Ancestor)

Instances

- ◆ 100MetresFly
- ◆ 100MetresFreestyle
- ◆ 4x100MetresFreestyle
- ◆ 50MetresFreestyle
- ◆ Ladies Single
- ◆ Men Single
- ◆ MenSingleTennis
- ◆ WomenBalanceBeam
- ◆ WomenFloor
- ◆ WomenVault

Definirea relațiilor între indivizi

Aquatics -> Swimming -> 100MetresFreestyle



Alte exemple de indivizi

Description: GoldLadiesFigureSkating2018 ? ⓘ ⓘ ⓘ ⓘ ⓘ Property assertions: GoldLadiesFigureSkating2018

Types +

Gold

Same Individual As +

Different Individuals +

Object property assertions +

- hasEditionForResult PyeongChang2018
- isGainedBy AlinaZagitova
- hasEventForResult Ladies Single

Data property assertions +

- ranking "1"^^xsd:positiveInteger

Description: CaelebDressel ? ⓘ ⓘ ⓘ ⓘ ⓘ Property assertions: CaelebDressel
na/ontologies/2023/2/OlympicGames#Beijing2022

Types +

Athlete

Same Individual As +

Different Individuals +

Object property assertions +

- hasMedal Gold100Freestyle2020
- hasMedal Gold4x100MetresFreestyle2016
- hasMedal Gold100MetresFly2020
- participates Tokyo2020
- hasMedal Gold50Freestyle2020
- hasMedal Gold4x100MetresFreestyle2020
- represents United States
- participates RioDeJaneiro2016

Data property assertions +

- fullName "Caeleb Dressel"
- age "26"^^xsd:positiveInteger
- lastName "Dressel"
- firstName "Caeleb"

Lista completă a indivizilor

- 100MetresFly
- 100MetresFreestyle
- 4thLadiesFigure Skating2022
- 4x100MetresFreestyle
- 50MetresFreestyle
- AdrienVonfeld
- AlinaZagitova
- AnnaShcherbakova
- Aquatics
- ArtisticGymnastics
- Artistic Swimming
- Atena2004
- BaseballAndSoftball
- Basketball
- Beijing2008
- Beijing2022
- Bobsleigh
- Brisbane2032
- BronzePairsFigure Skating2018
- BronzeWomenBalanceBeam2020
- BuenosAires2018
- CaelebDressel
- Canada
- CanoeingKayaking
- CatalinaPonor

- China
- Cycling
- DianaBulimar
- DianaChelaru
- Diving
- Equestrian
- EricRadford
- EteriTutberidze
- FenLi
- Figure Skating
- Football
- France
- GabriellaPapadakis
- Gangwon2024
- Gold100Freestyle2020
- Gold100MetresFly2020
- Gold4x100MetresFreestyle2016
- Gold4x100MetresFreestyle2020
- Gold50Freestyle2020
- GoldBalanceBeam2004
- GoldBalanceBeam2020
- GoldIceDanceFigure Skating2018
- GoldIceDanceFigure Skating2022
- GoldLadiesFigure Skating2018
- GoldLadiesFigure Skating2022

- GoldWomenBalanceBeam2012
- GoldWomenFloor2008
- GoldWomenVault2012
- GuanChenchen
- GuillaumeCizeron
- Gymnastics
- Handball
- IceDance
- Italy
- KamilaValieva
- Ladies Single
- LarisaLordache
- London2012
- LosAngeles2028
- LucianNicoleescu
- Lusanne2018
- MeaganDuhamel
- MenDoublesTennis
- MenFootball
- Men Single
- Men SingleTennis
- MichaelSpence
- MilanoCortina2026
- MyKaylaSkinner
- NatalyaKolesnikova

- PairSkating
- Paris2024
- PatriceLauzon
- PavelTsatsouline
- PyeongChang2018
- RioDeJaneiro2016
- RomainHaguenauer
- Romania
- Russia
- RythmDance
- RhythmicGymnastics
- SamuelChouinard
- Sandralzbasa
- ScottMoir
- SilverIceDanceFigure Skating2018
- SilverWomenBeam2020
- SilverWomenFloor2012
- SilverWomenVault2012
- SimoneBiles
- Skating
- Skiing
- SpeedSkating
- Swimming
- TangXijing
- Tennis

- TessaVirtue
- Tokyo2020
- United States
- WomenBalanceBeam
- WomenFloor
- WomenFootball
- WomenVault
- Wrestling

Interrogări

1. Atleții care reprezintă Romania și au participat la cel puțin o olimpiadă începând cu anul 2008.

Query (class expression)

```
Athlete and represents value Romania and participates some (OlympicGames and year some xsd:integer [>= 2008])
```

Query results

Instances (5 of 5)

◆ CatalinaPonor	?
◆ DianaBulimar	?
◆ DianaChelaru	?
◆ Larisalordache	?
◆ Sandralzbasa	?

2. Participanții (Atleți și Staff tehnic) care au participat la Jocurile Olimpice Atena2004, Beijing2008 și Tokyo2020.

Query (class expression)

Participant **and** participates **some** {Atena2004, Beijing2008, Tokyo2020}

Execute **Add to ontology**

Query results

Instances (5 of 5)

◆ CaelebDressel	?
◆ CatalinaPonor	?
◆ Larisalordache	?
◆ Sandralzbasa	?
◆ SimoneBiles	?

3. Țările care au câștigat cel puțin o medalie de aur

Query (class expression)

```
Country and isRepresentedBy some (Athlete and hasMedal some (Medal and ranking value 1))
```

Execute **Add to ontology**

Query results

Instances (5 of 5)

◆ Canada	?
◆ France	?
◆ Romania	?
◆ Russia	?
◆ United States	?

• • • •
• • • •
• • • •
• • • •

• • • • • • • • • •

4. Atleții din Franța care au câștigat cel puțin 2 medalii la Jocurile Olimpice din 2018

Athlete **and** hasMedal **min** 2 **and** represents **value** France **and** participates **some** (OlympicGames **and** year **value** 2018)

Execute **Add to ontology**

Query results

Instances (2 of 2)

- ◆ GabriellaPapadakis
- ◆ GuillaumeCizeron

?

?

• • •
• • •
• • •
• • •

• • • • • • • • • •

5. Următoarele ediții ale Jocurilor Olimpice pentru seniori ce urmează să se desfășoare

Query (class expression)

```
SeniorOlympicGames and year some xsd:integer [>= 2023]
```

Execute **Add to ontology**

Query results

Instances (4 of 4)

- ◆ Brisbane2032
- ◆ LosAngeles2028
- ◆ MilanoCortina2026
- ◆ Paris2024

• • • •

6. Sportiva din Russia care are cel putin 17 ani si a castigat aurul in 2022 la disciplina Figure Skating

Query (class expression)

```
Athlete and represents value Russia and hasMedal value GoldLadiesFigureSkating2022 and age some xsd:integer [>= 17]
```

Query results

Instances (1 of 1)

Anna Shcherbakova

• • • • • • • • • •

7. Atleții din Franța și Canada care au fost medaliati la disciplina Figure Skating

Query (class expression)

```
Athlete and hasResult some (Results and ranking some {1,2,3}) and represents some {France, Canada} and hasResult some (Results and hasEventForResult some (Event and belongsToDiscipline value FigureSkating))
```

Execute **Add to ontology**

Query results

Instances (6 of 6)

EricRadford	?
GabriellaPapadakis	?
GuillaumeCizeron	?
MeaganDuhamel	?
ScottMoir	?
TessaVirtue	?

• • • •

8. Atletii care la Jocurile Olimpice Tokyo2020 au castigat medalii de aur sau de argint

Query (class expression)

```
Athlete and participates some (OlympicGames and year some {2016,2018, 2020}) and hasMedal some (Medal and ranking some xsd:positiveInteger [<= 2])
```

Execute Add to ontology

Query results

Instances (3 of 3)

- CaelebDressel
- ScottMoir
- TessaVirtue



9. Medaliiile castigate de Caeleb Dressel

Query (class expression)

```
Medal and isGainedBy some (Athlete and fullName value "Caeleb Dressel")
```

Execute **Add to ontology**

Query results

Instances (5 of 5)

◆ Gold100Freestyle2020	?
◆ Gold100MetresFly2020	?
◆ Gold4x100MetresFreestyle2016	?
◆ Gold4x100MetresFreestyle2020	?
◆ Gold50Freestyle2020	?

• • •
• • •
• • •
• • •

• • • • • • • • • •

10. Evenimentele care au mai mult de 2 participanti de la disciplinele FigureSkating sau Football

Query (class expression)

```
(DuetEvent or TeamEvent) and belongsToDiscipline some {FigureSkating, Football}
```

Execute **Add to ontology**

Query results

Instances (4 of 4)

IceDance	?
MenFootball	?
PairSkating	?
WomenFootball	?

• • •
• • •
• • •
• • •

11. Țările ai căror atleți sunt antrenați de un PhysicalTrainer cu varsta mai mica de 40 de ani

Query (class expression)

```
Country and isRepresentedBy some (Athlete and isTrainedBy some (PhysicalTrainer and age some xsd:positiveInteger [<= 40]))
```

Execute Add to ontology

Query results

Instances (4 of 4)

France	?
Romania	?
Russia	?
United States	?

• • • • • • • • • •

12. Antrenorii care se ocupa de atleți ce reprezinta doar Canada si Franta

Query (class expression)

Coach **and** trains **some** (Athlete **and** represents **some** {Canada, France})

Execute **Add to ontology**

Query results

Instances (3 of 3)

- PatriceLauzon
- RomainHaguenauer
- SamuelChouinard

• • • •

• • • • • • • • • •

13. Jocurile Olimpice care s-au desfășurat în perioada 2006-2024

Query (class expression)

```
OlympicGames and (year some xsd:integer[>=2006]) and (year some xsd:integer[<= 2024])
```

Execute **Add to ontology**

Query results

Instances (10 of 10)

Beijing2008	?
Beijing2022	?
BuenosAires2018	?
Gangwon2024	?
London2012	?
Lusanne2018	?
Paris2024	?
PyeongChang2018	?
RioDeJaneiro2016	?
Tokyo2020	?



14. Țările care au medalii la Gimnastică Artistică

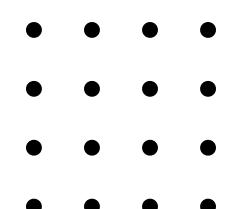
Query (class expression)

```
Country and isRepresentedBy some (Athlete and hasResult some (Results and hasEventForResult  
some (Event and belongsToDiscipline value ArtisticGymnastics)))
```

Query results

Instances (3 of 3)

◆ China	?
◆ Romania	?
◆ United States	?



Concluzii



Ontologiile ajuta la partajarea informației între oameni și sisteme informatice

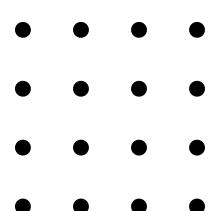


Acstea ajută la formalizarea ideilor, ontologiile oferind robustește informațiilor



Pot fi analizate și se pot obține noi informații prin prelucrarea lor cu ajutorul reasoner-ului

X
X
X
X



Multumim!

