

Софийски университет “Св. Климент
Охридски”
Факултет по математика и информатика

ПРОЕКТ
по Базис от знания,
летен семестър 2023/2024



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Тема: Заявки върху База от Знания за книги

1. Идея на проекта

Идеята на проекта е да се реализират заявки върху базата от знания за книги. Неговата цел ще бъде:

1. Да се изпробва инструмента GraphDB за манипулация върху собствена онтология
2. Да се употреби SPARQL за заявки
3. Да се представят интересни знания за книгите
4. Да се улесни намирането на книга по зададени критерии от потребител. Част от въпросите, които ще можем да задаваме върху онтологията с книги като потребители са:

1. За книгите:

- Кой книги са написани от даден автор?
- Кой са всички книги в даден жанр?
- Кой са новите книги за последните 6 месеца?

2. За авторите:

- Кой е написал дадена книга?
- Кой автори са писали в даден жанр?

3. За издателствата:

- Кой книги са издадени от конкретно издателство?
- Кой издателства са издавали книги в последните 3 години?
- Кой са най-популярните издателства в даден жанр?

4. За библиотеките и книжарниците:

- Кой книги са налични в конкретна библиотека?
- Къде мога да намеря определена книга в близост до мен?

5. За рейтингите:

- Кой са текущите книги с най-висок рейтинг?
- Кой автори имат най-висок рейтинг?

6. За преводите:

- Кой книги са преведени на даден език?

2. Елементи на онтологията

2.1. Класове

Address \sqsubseteq owl:Thing
Book \sqsubseteq owl:Thing
Building \sqsubseteq owl:Thing

Library \sqsubseteq Building
Publisher \sqsubseteq Building
Cover \sqsubseteq owl:Thing
Genre \sqsubseteq owl:Thing
Biograohy \sqsubseteq Genre
Children\'s \sqsubseteq Genre
Classic \sqsubseteq Genre
Comedy \sqsubseteq Genre
Comic \sqsubseteq Genre
Comic \sqsubseteq Genre
Comic \sqsubseteq Genre
Drama \sqsubseteq Genre
Fantasy \sqsubseteq Genre
Historical \sqsubseteq Genre
Horror \sqsubseteq Genre
Mystery \sqsubseteq Genre
Poetry \sqsubseteq Genre
Romance \sqsubseteq Genre
Science \sqsubseteq Genre
Person \sqsubseteq owl:Thing
Author \sqsubseteq Person

2.2. Свойства

2.2.1. Свойства на данните

Property	Domain	Range	Characteristics
hasStreet	Address	xsd:string	NonFunctional
hasEmail	Author	xsd:string	NonFunctional
hasISBN	Book	xsd:string	Functional
hasLanguage	Book	xsd:language	NonFunctional
hasName	Person	xsd:string	Functional
hasPagesCount	Book	xsd:integer	Functional
hasPrice	Book	xsd:decimal	NonFunctional

hasPublicationDate	Book	xsd:dateTime	Functional
hasRate	Book	xsd:decimal	Functional
hasTitle	Book	xsd:string	Functional

2.2.2. Свойства на обектите

Property	Domain	Range	Characteristics
hasCountry	Address	Country	Asymmetric and Irreflexive

hasCity	Address	City	Asymmetric and Irreflexive
hasAddress		g Address	Functional, Asymmetric and Irreflexive
hasAuthor	Book	Author	Asymmetric, Irreflexive and Inverse Of hasBook
hasBook	Author	Book	Asymmetric, Irreflexive and Inverse Of hasAuthor
hasCover	Book	Cover	Functional, Asymmetric and Irreflexive
hasBooks	Librar y	Book	Asymmetric and Irreflexive
hasPrequel	Book	Book	Transitive, Asymmetric and Irreflexive

hasPublisher	Book	Publisher	Functional, Asymmetric and Irreflexive
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hasSameAuthorLike	Book	Book	Symmetric and Reflexive
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2.2.3. Индивиди

:AddressBloomsbury rdf:type owl:NamedIndividual , :Address	Адресът на издателство Bloomsbury, без подробности за улица, град, държава
:AddressBulgarianNationalLibrary rdf:type owl:NamedIndividual , :Address ; :hasCity :Sofia ; :hasCountry :Bulgaria ; :hasStreet "Vasil Levski Blvd."	Адресът на Българската Национална Библиотека – улица, град, държава
:Bloomsbury rdf:type owl:NamedIndividual , :Publisher ; :hasAddress :AddressBloomsbury	Издателство Bloomsbury с адрес – обекта AddressBloomsbury
:Bulgaria rdf:type owl:NamedIndividual , :Country	Страна България
:EBook rdf:type owl:NamedIndividual	Електронна книга, прост индивид с цел да участва в Enumerated Class Cover
:Hardcover rdf:type owl:NamedIndividual	Твърда корица на книга, прост индивид с цел да участва в Enumerated Class Cover
:HarryPotter1 rdf:type owl:NamedIndividual , :Book , :Fantasy ; :hasAuthor :JKRowling ; :hasCover :Hardcover ; :hasPublisher :Bloomsbury ; :hasSameAuthorLike :HarryPotter2 ,	Книгата „Хари Потър и философският камък“ с описание – автор, корица, издателство, ISBN, език, брой страници, цена, дата на публикуване, оценка,

:HarryPotter3 ;	пълно заглавие
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:hasISBN "978-0590353427" ; :hasLanguage "English"@en ; :hasPagesCount 223 ; :hasPrice 9.66 ; :hasPublicationDate "1997-06-26"^^xsd:dateTime ; :hasRate 4.7 ; :hasTitle "Harry Potter and the Philosopher's Stone" .	
:HarryPotter2 rdf:type owl:NamedIndividual , :Book , :Fantasy ; :hasAuthor :JKRowling ; :hasCover :Hardcover ; :hasPrequel :HarryPotter1 ; :hasPublisher :Bloomsbury ; :hasSameAuthorLike :HarryPotter1 , :HarryPotter3 ; :hasISBN "0-7475-3849-2" ; :hasLanguage "English"@en ; :hasPagesCount 251 ; :hasPrice 37.99 ; :hasPublicationDate "1998-07-01"^^xsd:dateTime ; :hasRate 4.8 ; :hasTitle "Harry Potter and the Chamber of Secrets" .	Книгата „Хари Потър и Стаята на тайните“ с описание – автор, корица, издателство, ISBN, език, брой страници, цена, дата на публикуване, оценка, пълно заглавие

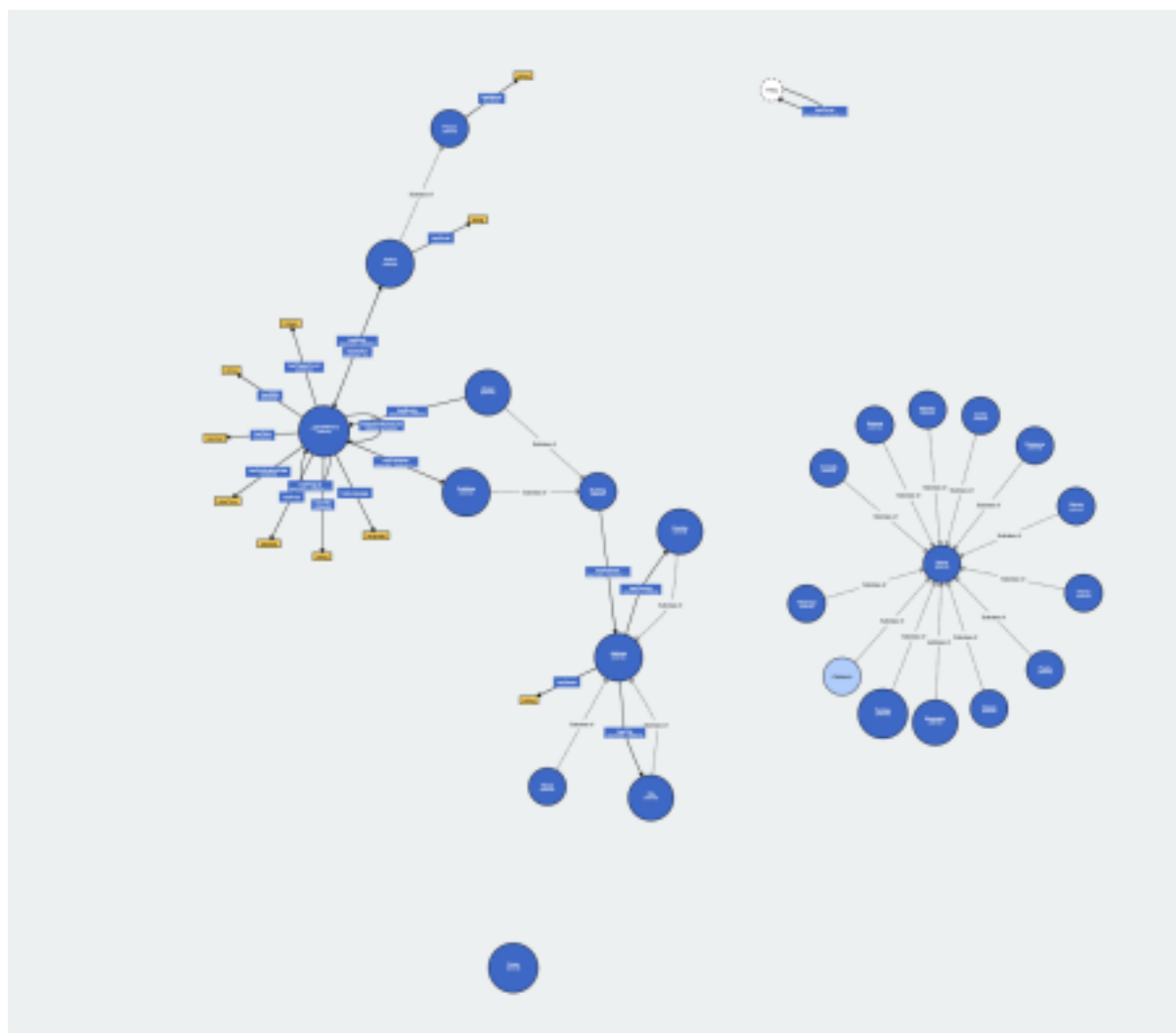
:HarryPotter3 rdf:type owl:NamedIndividual , :Book , :Fantasy ; :hasAuthor :JKRowling ; :hasCover :Hardcover ; :hasPrequel :HarryPotter2 ; :hasPublisher :Bloomsbury ; :hasSameAuthorLike :HarryPotter1 , :HarryPotter2 ; :hasISBN "0-7475-4215-5" ; :hasLanguage "English"@en ; :hasPagesCount 317 ; :hasPrice 9.66 ; :hasPublicationDate "1999-07- 08"^^xsd:dateTime ; :hasRate 4.7 ; :hasTitle "Harry Potter and the Prisoner of Azkaban"	Книгата „Хари Потър и затворникът от Азкабан“ с описание – автор, корица, издателство, ISBN, език, брой страници, цена, дата на публикуване, оценка, пълно заглавие
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:JKRowling rdf:type owl:NamedIndividual , :Author ; :hasBook :HarryPotter1 , :HarryPotter2 , :HarryPotter3 ; :hasEmail "info@jkrowling.com" ; :hasName "Joanne Rowling"	Авторката Джоан Роулинг с описание – кои са книгите, които е написала и ги има в нашата онтология, валиден емайл, пълно име
:NationalLibraryStStCyrilAndMethodius rdf:type owl:NamedIndividual , :Library ; :hasAddress :AddressBulgarianNationalLibrary ; :hasBooks :HarryPotter1 , :HarryPotter2 , :HarryPotter3	Национална библиотека „Св. Св. Кирил и Методий“ с описание – адрес, книги, които присъстват в нея и ги има в нашата онтология
:Paperback rdf:type owl:NamedIndividual	Мека корица на книга, прост индивид с цел да участва в Enumerated Class Cover
:Sofia rdf:type owl:NamedIndividual , :City	Град София

:SteveJobs rdf:type owl:NamedIndividual , :Biography , :Book ; :hasAuthor :WalterIsaacson ; :hasPublisher <http://www.semanticweb.org/fnadezhda/ontologies /2024/0/book_ontology#Simon&Schuster> ; :hasISBN "1-4516-4853-7" ; :hasLanguage "English"@en ; :hasPagesCount "630"^^xsd:int ; :hasPrice 23.29 ; :hasPublicationDate "2011-10- 24"^^xsd:dateTime ; :hasRate 4.7 ; :hasTitle "Steve Jobs by Walter Isaacson"	Книгата за биографията на Стив Джобс с описание – автор, издателство, ISBN, език, брой страници, цена, дата на публикуване, оценка, пълно заглавие
:WalterIsaacson rdf:type owl:NamedIndividual , :Author ; :hasBook :SteveJobs ; :hasEmail "wisaacson@gmail.com" ; :hasName "Walter Isaacson"	Авторът Уолтър Айзъксън с описание – кои са книгите, които е написала и ги има в нашата онтология, валиден емайл, пълно име
<http://www.semanticweb.org/fnadezhda/ontologies /2024/0/book_ontology#Simon&Schuster> rdf:type owl:NamedIndividual ,	Издателство Simon & Schuster

:Publisher	
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Визуализация:



4. Примери за извършени заявки

4.1 Логически изводи (4 заявки)





4.1.1 Заявка без логически извод (към класовете)

Тази заявка ще върне всички подкласове на класа Жанр (Genre).

Бележка: Резултат без “reasoning”:

no reasoning × ⊕

```
1 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
2 PREFIX : <http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology/>
3
4 SELECT ?genre WHERE {
5   ?genre rdfs:subClassOf :Genre .
6 }
7
8
9
10
11
```



Include inferred data in results: OFF



Run

keyboard shortcuts

Filter query results Compact view ☐ Hide row numbers ☐

Showing results from 0 to 13 of 13. Query took 0.1s, moments ago.

	genre
1	http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology#Children's
2	:Biography
3	:Classic
4	:Comedy
5	:Comic
6	:Drama
7	:Fantasy
8	:Historical
9	:Horror
10	:Mystery
11	:Poetry
12	:Romance
13	:Science

4.1.2 Заявка с логически извод (към класовете)

Тази заявка ще върне всички подкласове на класа Жанр (Genre).






Бележка: Резултат с “reasoning”:

reasoning × ⊕

```

1 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
2 PREFIX : <http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology/>
3
4 SELECT ?genre WHERE {
5   ?genre rdfs:subClassOf :Genre .
6 }
7
8
9
10
11

```

Run

keyboard shortcuts

Filter query results Compact view ☐ Hide row numbers ☐ Showing results from 0 to 13 of 13. Query took 0.1s, moments ago.

	genre
1	http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology#Childrens
2	:Biography
3	:Classic
4	:Comedy
5	:Comic
6	:Drama
7	:Fantasy
8	:Historical
9	:Horror
10	:Mystery
11	:Poetry
12	:Romance
13	:Science

Понеже няма такива, се връщат същите.

4.1.3 Заявка без логически извод (към класовете)

Тази заявка ще върне всички индивиди, които са директно отбелязани като Book:

no logical inference (to cla... × ⊕

```

1 prefix onto:<http://www.ontotext.com/>
2 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
3 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
4 prefix :<http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology/>
5
6 SELECT ?book WHERE {
7   ?book rdf:type :Book .
8 }

```

Filter query results Compact view ☐ Hide row numbers ☐ Showing results from 0 to 4 of 4. Query took 0.1s, moments ago.

	book
1	books:HarryPotter1
2	books:HarryPotter2
3	books:HarryPotter3
4	books:SteveJobs

4.1.4 Заявка с логически извод (към класовете)

С включен логически извод, тази заявка ще върне и индивидите, които са наследници на Book:

with logical inference (to t... × ⊕

```
1 ▾ prefix onto:<http://www.ontotext.com/>
2 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
3 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
4 prefix :<http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology/>
5
6 ▾ SELECT ?book WHERE {
7     ?book rdf:type/rdfs:subClassOf* :Book .
8 }
9
```

Filter query results Compact view ☐ Hide row numbers ☐ Showing results from 0 to 4 of 4. Query took 0.1s, moments ago.

	book	
1	books:HarryPotter1	
2	books:HarryPotter2	
3	books:HarryPotter3	
4	books:SteveJobs	

Понеже няма такива, се връщат същите.

4.2 Структура на онтологията (2 заявки)

4.2.1 Йерархия на класовете

Тази заявка ще покаже йерархията на класовете в онтологията:

Class Hierarchy × ⊕

```
1 ▾ prefix onto:<http://www.ontotext.com/>
2 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
3 prefix :<http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology/>
4
5 ▾ SELECT ?class ?subClass WHERE {
6     ?subClass rdfs:subClassOf ?class .
7 }
```

Table	Raw response	Pivot Table	Google Chart	Download as
Filter query results	Compact view	Hide row numbers	Showing results from 0 to 47 of 47. Query took 0.1s, moments ago.	
	class	subClass		
1	rdfs:Literal	rdfs:Literal		
2	xsd:integer	rdfs:Literal		
3	rdfs:Container	rdf:Alt		
4	rdfs:Container	rdf:Bag		
5	rdfs:Container	rdf:Seq		
6	rdf:Property	rdfs:ContainerMembershipProperty		
7	rdfs:Literal	rdf:XMLLiteral		
8	rdf:XMLLiteral	rdf:XMLLiteral		
9	xsd:integer	rdf:XMLLiteral		
10	rdfs:Class	rdfs:Datatype		
11	xsd:nonNegativeInteger	xsd:nonNegativeInteger		
12	xsd:string	xsd:string		
13	rdfs:Literal	xsd:integer		
14	xsd:integer	xsd:integer		
15	:Person	:Author		
16	:Building	:Library		
17	:Address	:City		
18	:City	:City		
19	:_node5	:City		
19	:_node5	:City		
20	:Address	:Country		
21	:Country	:Country		
22	:_node7	:Country		
23	:Cover	:Cover		
24	:_node9	:Cover		
25	:Building	:Publisher		
26	:Genre	http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology#Childrens		
27	:Genre	:Biography		
28	:Address	:_node5		
29	:City	:_node5		
30	:_node5	:_node5		
31	:Genre	:Classic		
32	:Genre	:Comedy		
33	:Genre	:Comic		
34	:Address	:_node7		
35	:Country	:_node7		
36	:_node7	:_node7		
37	:Cover	:_node9		
38	:_node9	:_node9		
39	:Genre	:Drama		
40	:Genre	:Fantasy		
41	:Genre	:Historical		
42	:Genre	:Horror		
42	:Genre	:Horror		
43	:Genre	:Mystery		
44	:Genre	:Poetry		
45	:Genre	:Romance		
46	:Genre	:Science		
47	:Address	:Street		

4.2.2 Йерархия на обектните свойства

Тази заявка ще покаже йерархията на обектните свойства в онтологията:

Hierarchy of object proper...

⊕

1
2
3
4
5
6
7
8

```

prefix onto:<http://www.ontotext.com/>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
prefix :<http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology/>

SELECT ?property ?subProperty WHERE {
  ?subProperty rdfs:subPropertyOf ?property .
}
```

Filter query results
Compact view
☐ Hide row numbers

Showing results from 0 to 41 of 41. Query took 0.1s, moments ago.

	property	subProperty
1	rdfs:type	rdfs:type
2	rdfs:subPropertyOf	rdfs:subPropertyOf
3	rdfs:subClassOf	rdfs:subClassOf
4	rdfs:domain	rdfs:domain
5	rdfs:range	rdfs:range
6	rdfs:subPropertyOf	owl:equivalentProperty
7	rdfs:subClassOf	owl:equivalentClass
8	owl:equivalentClass	owl:equivalentClass
9	http://proton.semanticweb.org/protonsys#transitiveOver	http://proton.semanticweb.org/protonsys#transitiveOver
10	owl:inverseOf	owl:inverseOf
11	rdf:first	rdf:first
12	rdf:rest	rdf:rest
13	rdfs:comment	rdfs:comment
14	rdfs:label	rdfs:label
15	rdfs:seeAlso	rdfs:isDefinedBy
16	.hasAddress	.hasAddress
17	.hasAuthor	.hasAuthor
18	.hasBook	.hasBook
19	.hasBooks	.hasBooks
20	.hasAddress	.hasCity
19	.hasBooks	.hasBooks
20	.hasAddress	.hasCity
21	.hasCity	.hasCity
22	.hasAddress	.hasCountry
23	.hasCountry	.hasCountry
24	.hasBook	.hasCover
25	.hasCover	.hasCover
26	owl:onProperty	owl:onProperty
27	owl:someValuesFrom	owl:someValuesFrom
28	.hasPrequel	.hasPrequel
29	.hasPublisher	.hasPublisher
30	.hasSameAuthorLike	.hasSameAuthorLike
31	.hasEmail	.hasEmail
32	.hasISBN	.hasISBN
33	.hasLanguage	.hasLanguage
34	.hasName	.hasName
35	.hasPagesCount	.hasPagesCount
36	.hasPrice	.hasPrice
37	.hasPublicationDate	.hasPublicationDate
38	.hasRate	.hasRate
39	.hasStreet	.hasStreet
40	.hasTitle	.hasTitle
41	owl:oneOf	owl:oneOf

4.3 Заявки към данните (4 заявки)

4.3.1 Вземане на всички книги

All books × ⊕

```

1 prefix onto:<http://www.ontotext.com/>
2 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
3 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
4 prefix :<http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology/>
5
6 SELECT ?book WHERE {
7   ?book rdf:type :Book .
8 }
9
10

```

Filter query results Compact view ☐ Hide row numbers ☐

Showing results from 0 to 4 of 4. Query took 0.1s, moments ago.

	book
1	books:HarryPotter1
2	books:HarryPotter2
3	books:HarryPotter3
4	books:SteveJobs

4.3.2 Вземане на всички автори и техните книги

All authors and their books × ⊕

```

1 prefix onto:<http://www.ontotext.com/>
2 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
3 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
4 prefix :<http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology/>
5
6 SELECT ?author ?book WHERE {
7   ?author rdf:type :Author .
8   ?author :hasBook ?book .
9 }

```

Filter query results Compact view ☐ Hide row numbers ☐

Showing results from 0 to 4 of 4. Query took 0.1s, moments ago.

	author	book
1	.JKRowling	books:HarryPotter1
2	.JKRowling	books:HarryPotter2
3	.JKRowling	books:HarryPotter3
4	.WalterIsaacson	books:SteveJobs

4.3.3 Извличане на всички книги и техните цени

all books and their prices

1 PREFIX : <http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology/>

2 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

3

4 SELECT ?bookTitle ?price

5 WHERE {

6 ?book rdf:type :Book ;

7 :hasTitle ?bookTitle ;

8 :hasPrice ?price .

9 }

10

11

12

Run

keyboard shortcuts

Filter query results

Compact view ☐ Hide row numbers ☐

Showing results from 0 to 4 of 4. Query took 0.1s, moments ago.

	bookTitle	price
1	"Harry Potter and the Philosopher's Stone"	"9.66"xsd:decimal
2	"Harry Potter and the Chamber of Secrets"	"37.99"xsd:decimal
3	"Harry Potter and the Prisoner of Azkaban"	"9.66"xsd:decimal
4	"Steve Jobs by Walter Isaacson"	"23.29"xsd:decimal

4.3.4 Извличане на всички книги и жанровете, към които принадлежат

books and the genres they...

1 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>

2 PREFIX : <http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology/>

3 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

4

5 SELECT ?bookTitle ?genre

6 WHERE {

7 ?book rdf:type :Book ;

8 :hasTitle ?bookTitle ;

9 rdf:type ?genre .

10 ?genre rdfs:subClassOf :Genre .

11 }

12

Run

keyboard shortcuts

Filter query results

Compact view ☐ Hide row numbers ☐

Showing results from 0 to 4 of 4. Query took 0.1s, moments ago.

	bookTitle	genre
1	"Harry Potter and the Philosopher's Stone"	:Fantasy
2	"Harry Potter and the Chamber of Secrets"	:Fantasy
3	"Harry Potter and the Prisoner of Azkaban"	:Fantasy
4	"Steve Jobs by Walter Isaacson"	:Biography

4.4 Операции с множества (2 заявки)

4.4.1 Вземане на всички книги и автори (обединение)

Union
X
⊕

```

1 prefix onto:<http://www.ontotext.com/>
2 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
3 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
4 prefix :<http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology/>
5
6 SELECT ?entity WHERE {
7   { ?entity rdf:type :Book . }
8   UNION
9   { ?entity rdf:type :Author . }
10 }
11

```

Filter query results
Compact view
Hide row numbers
Showing results from 0 to 6 of 6. Query took 0.1s, moments ago.

	entity
1	books:HarryPotter1
2	books:HarryPotter2
3	books:HarryPotter3
4	books:SteveJobs
5	:JKRowling
6	:WalterIsaacson

4.4.2 Вземане на книги, които са от определен жанр и с повече от 300 страници (сечение)

Section
X
⊕

```

1 prefix onto:<http://www.ontotext.com/>
2 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
3 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
4 prefix :<http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology/>
5
6 SELECT ?book ?title ?pages
7 WHERE {
8   ?book rdf:type :Book ;
9         :hasTitle ?title ;
10        :hasPagesCount ?pages ;
11        rdf:type :Fantasy .
12   FILTER (?pages > 300)
13 }

```

Filter query results
Compact view
Hide row numbers
Showing results from 0 to 1 of 1. Query took 0.1s, moments ago.

	book	title	pages
1	books:HarryPotter3	"Harry Potter and the Prisoner of Azkaban"	"317" ^{^^xsd:integer}

В посочената заявка по-горе, всички условия са комбинирани заедно и изискват едновременното изпълнение на няколко критерия, което представлява сечението.

4.5 Сложни въпроси чрез FILTER (3 заявки)

4.5.1 Вземане на книги, публикувани след определена дата и с висок рейтинг

Filter × ⊕

1 ▼ prefix onto:<http://www.ontotext.com/>

2 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>

3 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

4 prefix :<http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology/>

5

6 PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>

7 ▼ SELECT ?book WHERE {

8 ?book rdf:type :Book .

9 ?book :hasPublicationDate ?date .

10 ?book :hasRate ?rate .

11 FILTER(?date > "2000-01-01T00:00:00"^^xsd:dateTime && ?rate > 4.5)

12 }

13

Filter query results Compact view ☐ Hide row numbers ☐

Showing results from 0 to 1 of 1. Query took 0.1s, moments ago.

	book
1	books:SteveJobs

4.5.2 Извличане на книги, които имат цена в определен диапазон и са написани от автор, чието име започва с определена буква

SPARQL Query & Update ?

books with a price in a spe... × ⊕

2 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>

3 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

4 PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>

5 prefix :<http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology/>

6 SELECT ?title ?price ?authorName

7 ▼ WHERE {

8 ?book rdf:type :Book ;

9 :hasTitle ?title ;

10 :hasPrice ?price ;

11 :hasAuthor ?author .

12 ?author :hasName ?authorName .

13 FILTER (?price ≥ 20 && ?price ≤ 50)

14 FILTER (STRSTARTS(?authorName, "J"))

15 }

Filter query results Compact view ☐ Hide row numbers ☐

Showing results from 0 to 1 of 1. Query took 0.1s, moments ago.

	title	price	authorName
1	"Harry Potter and the Chamber of Secrets"	"37.99"^^xsd:decimal	"Joanne Rowling"

4.5.3 Вземане на информация за книги с определен брой страници

Books with a certain numb... X ⊕

```
1 prefix onto:<http://www.ontotext.com/>
2 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
3 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
4 prefix :<http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology/>
5
6 SELECT ?book ?pages WHERE {
7   ?book rdfs:type :Book .
8   ?book :hasPagesCount ?pages .
9   FILTER(?pages > 300)
10 }
```

Filter query results Compact view Hide row numbers Showing results from 0 to 2 of 2. Query took 0.1s, moments ago.

	book	pages
1	books:HarryPotter3	*317**xsd:integer
2	books:SteveJobs	*630**xsd:int

4.6 Създаване на нови променливи чрез BIND (3 заявки)

4.6.1 Вземане на заглавия на книги и създаване на нова променлива за първа дума от заглавието

BIND X ⊕

```
1 prefix onto:<http://www.ontotext.com/>
2 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
3 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
4 prefix :<http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology/>
5
6 SELECT ?book ?title ?firstWord WHERE {
7   ?book rdfs:type :Book .
8   ?book :hasTitle ?title .
9   BIND(STRBEFORE(?title, " ") AS ?firstWord)
10 }
11
12
```

Filter query results Compact view Hide row numbers Showing results from 0 to 4 of 4. Query took 0.1s, moments ago.

	book	title	firstWord
1	books:HarryPotter1	"Harry Potter and the Philosopher's Stone"	"Harry"
2	books:HarryPotter2	"Harry Potter and the Chamber of Secrets"	"Harry"
3	books:HarryPotter3	"Harry Potter and the Prisoner of Azkaban"	"Harry"
4	books:SteveJobs	"Steve Jobs by Walter Isaacson"	"Steve"

4.6.2 Извличане на книги, които имат определена цена, и създаване на нови променливи за закръглена цена и цена в различна валута (примерно в евро, като приемем, че 1 лева = 0.51 евро)

books with a fixed price an... X +

```
1 prefix onto:<http://www.ontotext.com/>
2 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
3 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
4 PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
5 prefix :<http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology/>
6 SELECT ?title ?price ?roundedPrice ?priceInEuro
7 WHERE {
8   ?book rdf:type :Book ;
9         :hasTitle ?title ;
10        :hasPrice ?price .
11   BIND(ROUND(?price) AS ?roundedPrice)
12   BIND(?price * 0.51 AS ?priceInEuro)
13 }
```

Filter query results Compact view Hide row numbers Showing results from 0 to 4 of 4. Query took 0.1s, moments ago.

	title	price	roundedPrice	priceInEuro
1	"Harry Potter and the Philosopher's Stone"	"9.66"	"10"	"4.9266"
2	"Harry Potter and the Chamber of Secrets"	"37.99"	"38"	"19.3749"
3	"Harry Potter and the Prisoner of Azkaban"	"9.66"	"10"	"4.9266"
4	"Steve Jobs by Walter Isaacson"	"23.29"	"23"	"11.8779"

4.6.3 Извличане на книги и създаване на нови променливи за годината на публикуване и възраст на книгата (броя на години от публикуването до текущата година)

books and create new vari... X +

```
1 PREFIX : <http://www.semanticweb.org/fnadezhda/ontologies/2024/0/book_ontology/>
2 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
3 PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
4
5 SELECT ?title ?publicationDate ?publicationYear ?age
6 WHERE {
7   ?book rdf:type :Book ;
8         :hasTitle ?title ;
9         :hasPublicationDate ?publicationDate .
10   BIND(YEAR(?publicationDate) AS ?publicationYear)
11   BIND(YEAR(NOW()) - ?publicationYear AS ?age)
12 }
13
14
```

Run keyboard shortcuts

Filter query results Compact view Hide row numbers Showing results from 0 to 4 of 4. Query took 0.1s, moments ago.

	title	publicationDate	publicationYear	age
1	"Harry Potter and the Philosopher's Stone"	"1997-06-26"	"1997"	"27"
2	"Harry Potter and the Chamber of Secrets"	"1998-07-01"	"1998"	"26"
3	"Harry Potter and the Prisoner of Azkaban"	"1999-07-08"	"1999"	"25"
4	"Steve Jobs by Walter Isaacson"	"2011-10-24"	"2011"	"13"

5. Използвани технологии

- Проектът е имплементиран чрез GraphDB и SPARQL
- За визуализиране схемата на онтологията е използван инструментът WebVOWL:

<http://vowl.visualdataweb.org/webvowl-old/webvowl-old.html#file=onto.Owl>

6. Бъдещо развитие

За употребата на онтологията:

- Добавяне на допълните заявки

За онтологията:

- Добавяне на още класове – например клас читатели
- Добавяне на още индивиди - книги, автори, библиотеки и издателства

7. Външни източници

о Документация на GraphDB:

<https://graphdb.ontotext.com/documentation/standard/index.html>