

Ontologies and the Semantic Web

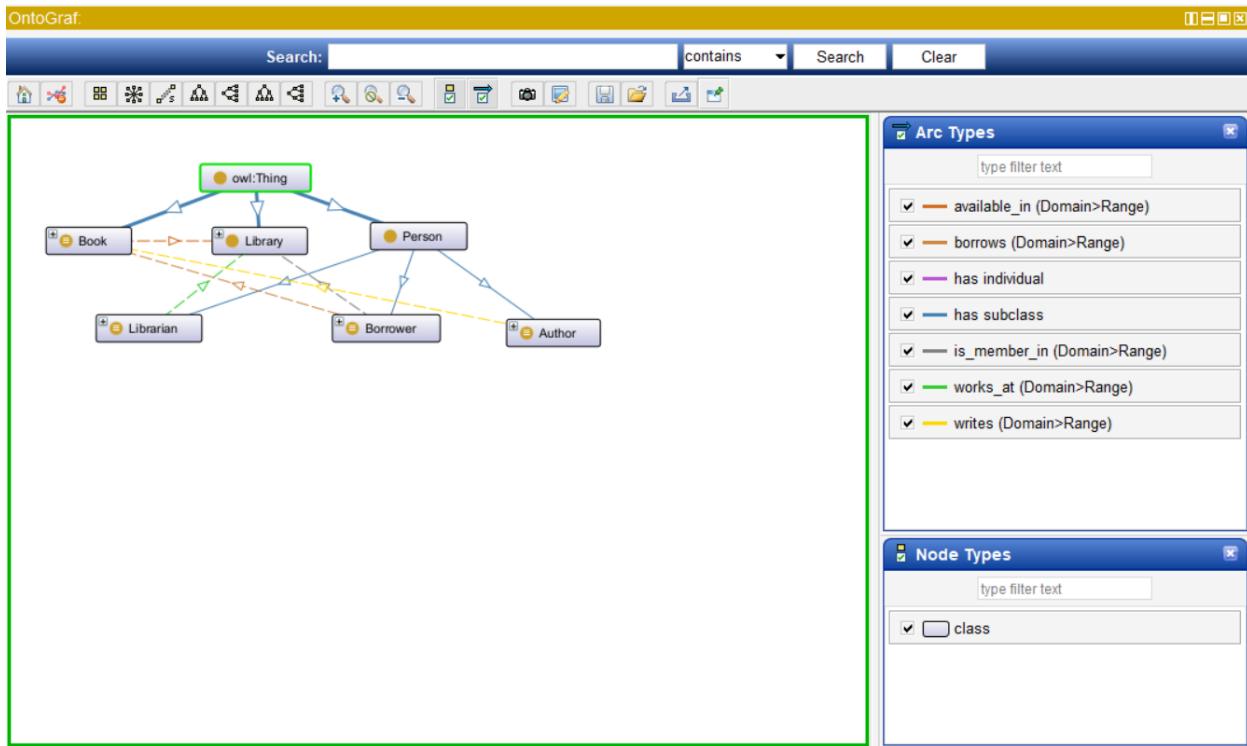
Course Project

Public Library Ontology

| | |
|----------------------------|---------|
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I. Ontology

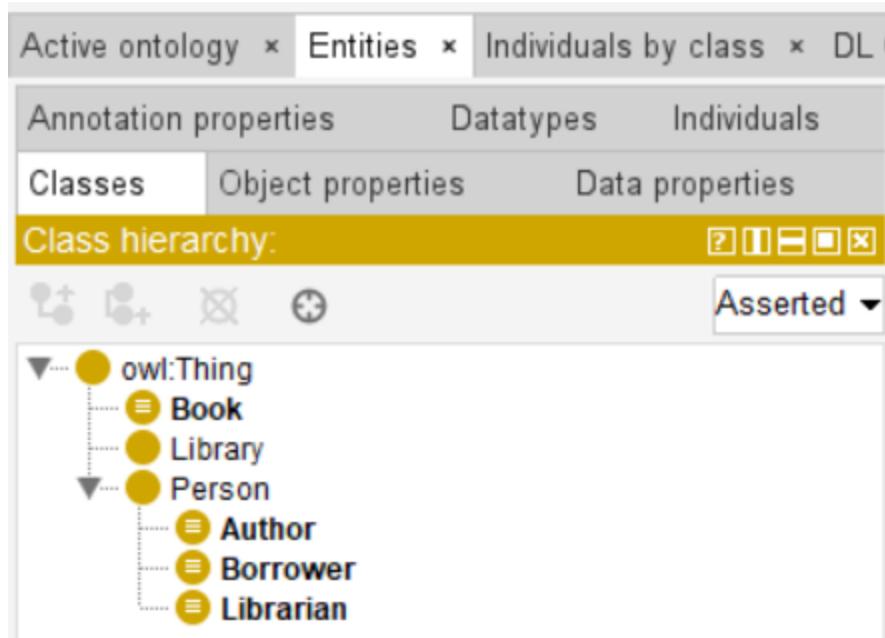
A public library is a library that is accessible by the general public and is usually funded from public sources. It has books, with their corresponding authors, members, and a librarian.



II. RDF

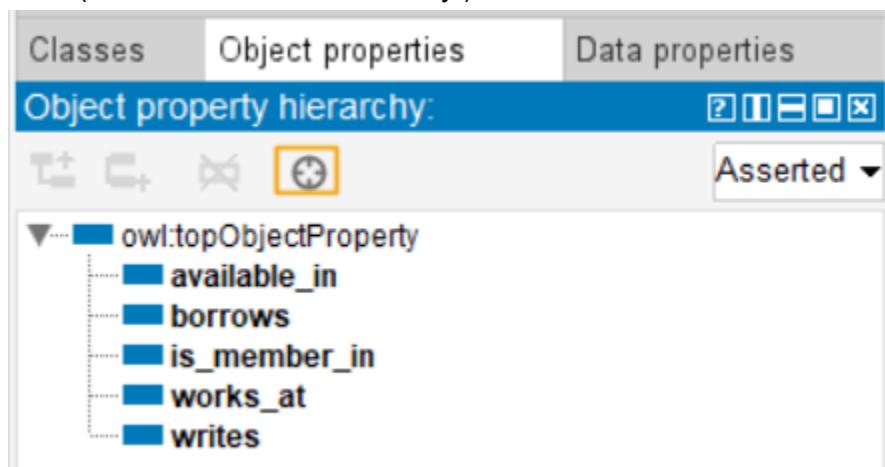
List of entities:

- Library
- Book
- Person
 - Author
 - Librarian
 - Library member / book borrower



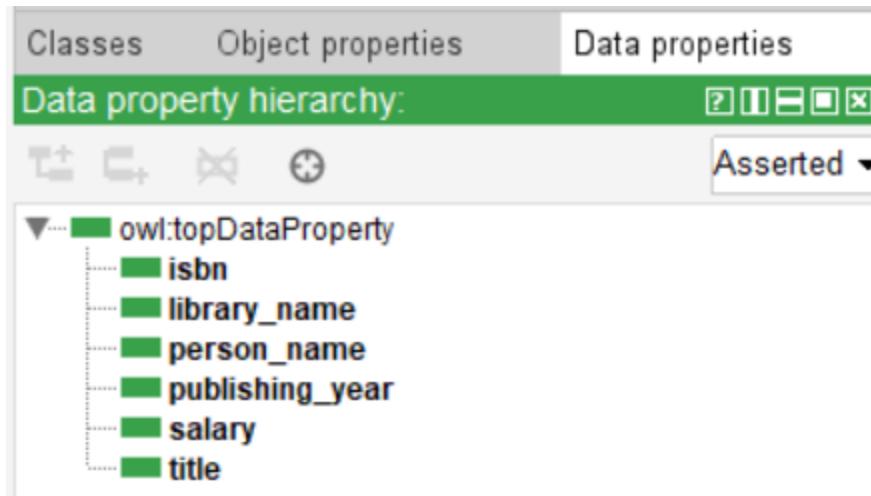
List of object properties:

- Member in (library member is member in a library)
- Writes (author writes book)
- Works at (librarian works at a library)
- Borrows (library member / book borrower borrows book)
- Available in (book is available in a library)



List of data properties:

- Library name
- Book title
- Person name
- Book isbn
- Librarian salary
- Publishing year



Constraints:

- Member can borrow up to 4 books
- Borrower is member in at least one library

Description: Borrower

Equivalent To +

- borrows max 4 Book
- is_member_in min 1 Library

- Author must write at least one book

Description: Author

Equivalent To +

- writes min 1 Book

- Librarian works at exactly one library

Description: Librarian

Equivalent To +

- works_at exactly 1 Library

- Book is available in at least one library

Description: Book

Equivalent To +

- available_in min 1 Library

III. Instances

Books:

| Description: Book | |
|-------------------|---|
| Instances | + |
| ◆ | Animal_Farm |
| ◆ | Crime_and_Punishment |
| ◆ | Franny_and_Zooey |
| ◆ | Go_Set_a_Watchman |
| ◆ | Harry_Potter_and_the_Philosophers_Stone |
| ◆ | Moby_Dick |
| ◆ | Nineteen_Eighty-Four |
| ◆ | Pride_and_Prejudice |
| ◆ | Sense_and_Sensibility |
| ◆ | Tender_Is_the_Night |
| ◆ | The_Adventures_of_Sherlock_Holmes |
| ◆ | TheBeautiful_and_Damned |
| ◆ | The_Catcher_in_the_Rye |
| ◆ | The_Da_Vinci_Code |
| ◆ | The_Girl_Who_Played_with_Fire |
| ◆ | The_Girl_with_the_Dragon_Tattoo |
| ◆ | The_Great_Gatsby |
| ◆ | The_Hobbit |
| ◆ | The_Hunger_Games |
| ◆ | The_Lord_of_the_Rings |
| ◆ | The_Lost_Symbol |
| ◆ | The_War_of_the_Worlds |
| ◆ | To_Kill_a_Mockingbird |

Authors:

Description: Author

SubClass Of (Anonymous Ancestor)

Instances 

- ◆ [Arthur_Conan_Doyle](#)
- ◆ [Dan_Brown](#)
- ◆ [F.Scott_Fitzgerald](#)
- ◆ [Fyodor_Dostoevsky](#)
- ◆ [George_Orwell](#)
- ◆ [H.G._Wells](#)
- ◆ [Harper_Lee](#)
- ◆ [Herman_Melville](#)
- ◆ [J.D._Salinger](#)
- ◆ [J.K._Rowling](#)
- ◆ [J.R.R._Tolkien](#)
- ◆ [Jane_Austen](#)
- ◆ [Stieg_Larsson](#)
- ◆ [Suzanne_Collins](#)

Libraries:

Instances 

- ◆ [Library_at_The_Dock](#)
- ◆ [The_Library_Club](#)
- ◆ [The_London_Library](#)

Borrowers:

| Description: Borrower | |
|-----------------------|--|
| Instances | |
| Adam_Wilson | |
| Ava_Davis | |
| Benjamin_Patel | |
| Caleb_Brown | |
| Charlotte_Singh | |
| Christopher_Nguyen | |
| Daniel_Lee | |
| David_Smith | |
| Dylan_Rodriguez | |
| Emily_Mitchell | |
| Ethan_Park | |
| Gabriel_Smith | |
| Grace_Wong | |
| Isaac_Johnson | |
| Isabella_Baker | |
| Julia_Martinez | |
| Leah_Anderson | |
| Lily_Chen | |
| Lucas_Wilson | |
| Madison_Harrison | |
| Mia_Lee | |
| Natalie_Martinez | |
| Nathan_Scott | |
| Olivia_Taylor | |
| Samuel_Kim | |
| Sophia_Kim | |
| Sophia_Nguyen | |
| Timothy_Nelson | |
| Victoria_Patel | |
| William_Hernandez | |

Librarians:

| | |
|-------------------|--|
| Instances | |
| Jasmine_Chen | |
| Matthew_Rodriguez | |
| Olivia_Kim | |

IV. SparQL Queries

1. Protégé

- 1.1. Search for all the authors and the titles of their books ordered by authors in ascending order.

The screenshot shows the Snap SPARQL Query interface. The query is:

```
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX uni: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>
SELECT ?author_name ?book_title
WHERE {
    ?author a uni:Author.
    ?author uni:person_name ?author_name.
    ?author uni:writes ?book.
    ?book uni:title ?book_title.
}
ORDER BY ASC (?author_name)
```

The results table has two columns: ?author_name and ?book_title. The data is as follows:

| ?author_name | ?book_title |
|--------------------|-----------------------------------|
| Arthur Conan Doyle | The Adventures of Sherlock Holmes |
| Dan Brown | The Da Vinci Code |
| Dan Brown | The Lost Symbol |
| F.Scott Fitzgerald | Tender Is the Night |
| F.Scott Fitzgerald | The Great Gatsby |
| F.Scott Fitzgerald | The Beautiful and Damned |
| Fyodor Dostoevsky | Crime and Punishment |
| George Orwell | 1984 |
| George Orwell | Animal Farm |
| H.G. Wells | The War of the Worlds |
| Harper Lee | To Kill a Mockingbird |
| Harper Lee | Go Set a Watchman |
| Herman Melville | Moby-Dick |
| J.D. Salinger | The Catcher in the Rye |
| J.D. Salinger | Franny and Zooey |

23 results

Synchronising

Activate Windows
Go to Settings to activate Windows.

- 1.2. List the books available in a certain library.

The screenshot shows the Snap SPARQL Query interface. The query is:

```
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX uni: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>
SELECT DISTINCT ?book_title
WHERE {
    ?book a uni:Book.
    ?library a uni:Library.
    ?book uni:available_in ?library.
    ?library uni:library_name ?library_name.
    ?book uni:title ?book_title.
}
FILTER regex (?library_name, "Library at the Dock", "i")
```

The results table has one column: ?book_title. The data is as follows:

| ?book_title |
|--|
| 1984 |
| Crime and Punishment |
| The Girl with the Dragon Tattoo |
| The Hunger Games |
| Tender Is the Night |
| The War of the Worlds |
| The Hobbit |
| Harry Potter and the Philosopher's Stone |
| The Girl Who Played with Fire |
| The Catcher in the Rye |
| Go Set a Watchman |

11 results

Synchronising

- 1.3. Find all books with a certain title keyword (here, "Girl").

Snap SPARQL Query:

```

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX uri: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>

SELECT DISTINCT ?book_title
WHERE {
?book a uri:Book.
?book uri:title ?book_title.
?library a uri:Library.
?book uri:available_in ?library
FILTER REGEX (?book_title, "Girl" , "i").
}

```

| ?book_title |
|---------------------------------|
| The Girl with the Dragon Tattoo |
| The Girl Who Played with Fire |

2 results

Synchronising

1.4. Find all books whose ISBN end with certain numbers

Snap SPARQL Query:

```

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX uri: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>

SELECT ?book_title ?book_isbn
WHERE {
?book a uri:Book.
?book uri:title ?book_title.
?book uri:isbn ?book_isbn.
?library a uri:Library.
?book uri:available_in ?library
FILTER REGEX (?book_isbn, "4$" , "i").
}
ORDER BY ASC (?book_isbn)

```

| ?book_title | ?book_isbn |
|---------------------|----------------|
| Moby-Dick | 978-0143105954 |
| Tender Is the Night | 978-0684801544 |

2 results

Synchronising

1.5. Find all books borrowed by a certain borrower.

Snap SPARQL Query:

```

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX uri: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>

SELECT ?book_title
WHERE {
?borrower a uri:Borrower.
?borrower uri:borrowed ?book.
?book a uri:Book.
?book rdfs:title ?book_title.
?borrower rdfs:person_name ?borrower_name.
FILTER ( ?borrower_name = "Adam Wilson" )
}
ORDER BY ASC (?book_title)

```

| ?book_title |
|-----------------------------------|
| Animal Farm^^xsd:string |
| Pride and Prejudice^^xsd:string |
| Sense and Sensibility^^xsd:string |

3 results

Synchronising

Activate Windows
Go to Settings to activate Windows.

1.6. Find all borrowers who have borrowed a certain book.

Snap SPARQL Query:

```

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX uri: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>

SELECT ?borrower_name ?book_title
WHERE {
?borrower a uri:Borrower.
?borrower uri:borrowed ?book.
?book a uri:Book.
?book rdfs:title ?book_title.
?borrower rdfs:person_name ?borrower_name.
FILTER ( ?book_title = "1984" )
}


```

| ?borrower_name | ?book_title |
|----------------|-------------|
| Emily Mitchell | 1984 |

1.7. How many authors are there and how many books ?

```

Snap SPARQL Query:
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX uri: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>

SELECT ( COUNT(?book) AS ?book_count )
( COUNT(DISTINCT (?author)) AS ?author_count )
WHERE {
    ?author uri:writes ?book
}

```

| Execute | |
|-------------|---------------|
| ?book_count | ?author_count |
| 23 | 23 |

1.8. Which authors wrote how many books are available?

```

Snap SPARQL Query:
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX uri: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>

SELECT ?author_name (COUNT (?book) AS ?book_count)
WHERE {
    ?book a uri:Book.
    ?author a uri:Author.
    ?library a uri:Library.
    ?book uri:available_in ?library.
    ?author uri:writes ?book.
    ?author uri:person_name ?author_name.
}
GROUP BY ?author_name
ORDER BY DESC ( ?book_count ) |
```

| Execute | |
|--------------------|-------------|
| ?author_name | ?book_count |
| J.R.R.Tolkien | 4 |
| Harper Lee | 4 |
| Stieg Larsson | 4 |
| F.Scott Fitzgerald | 3 |
| Jane Austen | 3 |
| J.K. Rowling | 3 |
| H.G. Wells | 2 |
| Fyodor Dostoevsky | 2 |
| J.D. Salinger | 2 |
| George Orwell | 2 |
| Dan Brown | 2 |
| Arthur Conan Doyle | 1 |
| Suzanne Collins | 1 |
| Herman Melville | 1 |
| 14 results | |

1.9. Search for all books that are available in either
“Library_at_The_Dock” or “The_London_Library” or both.

Snap SPARQL Query:

```
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX uri: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>

SELECT DISTINCT ?book_title
WHERE{
{
    ?book a uri:Book.
    ?library a uri:Library.
    ?book uri:available_in ?library.
    ?library uri:library_name ?library_name.
    ?book uri:title ?book_title.
    FILTER (?library_name = "Library at the Dock" )
}
UNION
{
    ?book a uri:Book.
    ?library a uri:Library.
    ?book uri:available_in ?library.
    ?library uri:library_name ?library_name.
    ?book uri:title ?book_title.
    FILTER (?library_name = "The London Library")
}
}
```

| ?book_title |
|--|
| 1984 |
| Crime and Punishment |
| The Girl with the Dragon Tattoo |
| The Hunger Games |
| Tender Is the Night |
| The War of the Worlds |
| The Hobbit |
| Harry Potter and the Philosopher's Stone |
| The Girl Who Played with Fire |
| The Catcher in the Rye |
| Go Set a Watchman |
| The Beautiful and Damned |
| Moby-Dick |
| The Lord of the Rings |
| Pride and Prejudice |
| To Kill a Mockingbird |
| Sense and Sensibility |
| Animal Farm |
| The Lost Symbol |

19 results

Synchronising

1.10. List all the members in a certain library

```

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX uri: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>

SELECT DISTINCT ?member_name
WHERE {
    ?borrower a uri:Borrower.
    ?borrower uri:borrows ?book.
    ?borrower uri:person_name ?member_name.
    ?borrower uri:is_member_in ?library.
    ?library uri:library_name ?library_name
    FILTER (?library_name = "The London Library")
}
ORDER BY ASC (?member_name)

```

Execute

| ?member_name |
|------------------|
| Adam Wilson |
| David Smith |
| Dylan Rodriguez |
| Grace Wong |
| Isaac Johnson |
| Julia Martinez |
| Madison Harrison |
| Nathan Scott |
| Sophia Kim |
| Vicotria Patel |
| 10 results |

Synchronising

1.11. List the members that borrowed a certain book “pride and prejudice”, who are not a member in a certain library “The_London_Library”

```

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX uri: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>
SELECT ?member_name ?library_name
WHERE {
    ?borrower a uri:Borrower.
    ?borrower uri:borrows ?book.
    ?borrower uri:person_name ?member_name.
    ?borrower uri:is_member_in ?library.
    ?library uri:library_name ?library_name.
    ?book uri:title ?book_title.
    FILTER (?book_title = "Pride and Prejudice")
    MINUS {?library uri:library_name "The London Library".}
}

```

Execute

| ?member_name | ?library_name |
|------------------|------------------|
| Charlotte Singh | The Library Club |
| Natalie Martinez | The Library Club |

1.12. List all the libraries in the system

Snap SPARQL Query:

```

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX uri: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>
SELECT ?library_name
WHERE {
    ?library a uri:Library.
    ?library uri:library_name ?library_name
}
ORDER BY ASC (?library_name)

```

Execute

| ?library_name |
|---------------------|
| Library at the Dock |
| The Library Club |
| The London Library |

1.13. List the authors with their books ordered by the authors' Last names.

Snap SPARQL Query:

```

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX uri: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>
SELECT DISTINCT ?author_name ?book_title ?author_last_name
WHERE {
    ?author a uri:Author.
    ?book a uri:Book.
    ?author uri:writes ?book.
    ?book urititle ?book_title.
    ?author uriperson_name ?author_name
    BIND(strafter(str(?author_name), " ") AS ?author_last_name)
    FILTER(BOUND(?author_last_name))
}
ORDER BY ASC (?author_last_name)


```

Execute

| ?author_name | ?book_title | ?author_last_name |
|--------------------|-----------------------------------|-------------------|
| Jane Austen | Pride and Prejudice | Austen |
| Jane Austen | Sense and Sensibility | Austen |
| Dan Brown | The Da Vinci Code | Brown |
| Dan Brown | The Lost Symbol | Brown |
| Suzanne Collins | The Hunger Games | Collins |
| Arthur Conan Doyle | The Adventures of Sherlock Holmes | Conan Doyle |
| Fyodor Dostoevsky | Crime and Punishment | Dostoevsky |
| F Scott Fitzgerald | The Great Gatsby | Fitzgerald |
| F Scott Fitzgerald | The Beautiful and Damned | Fitzgerald |
| F Scott Fitzgerald | Tender Is the Night | Fitzgerald |
| Stieg Larsson | The Girl with the Dragon Tattoo | Larsson |
| Stieg Larsson | The Girl Who Played with Fire | Larsson |
| Harper Lee | To Kill a Mockingbird | Lee |

23 results

Synchronising

| ?author_name | ?book_title | ?author_last_name |
|--|--|-------------------|
| Stieg Larsson | The Girl with the Dragon Tattoo | Larsson |
| Stieg Larsson | The Girl Who Played with Fire | Larsson |
| Harper Lee | To Kill a Mockingbird | Lee |
| Harper Lee | Go Set a Watchman | Lee |
| Herman Melville | Moby-Dick | Melville |
| George Orwell | 1984 | Orwell |
| George Orwell | Animal Farm | Orwell |
| J.K. Rowling | Harry Potter and the Philosopher's Stone | Rowling |
| J.D. Salinger | The Catcher in the Rye | Salinger |
| J.D. Salinger | Franny and Zooey | Salinger |
| J.R.R. Tolkien^^xsd:string | The Lord of the Rings | Tolkien |
| J.R.R. Tolkien^^xsd:string | The Hobbit | Tolkien |
| H.G. Wells | The War of the Worlds | Wells |
| 23 results | | |
| <input type="checkbox"/> Synchronising | | |

1.14. Retrieve all librarians, which library they work at, and their salaries.

Snap SPARQL Query:

```

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX uri: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>

SELECT ?librarian_name ?salary ?library
WHERE
{
    ?librarian a uri:Librarian.
    ?library a uri:Library.
    ?librarian rdfs:person_name ?librarian_name.
    ?librarian uri:works_at ?library.
    ?librarian uri:salary ?salary.
}
ORDER BY ASC (?salary)

```

Execute

| ?librarian_name | ?salary | ?library |
|-------------------------------|---------|--|
| Matthew Rodriguez^^xsd:string | 45000.0 | <https://dbpedia.org/page/Library_at_The_Dock> |
| Olivia Kim^^xsd:string | 47500.0 | <https://dbpedia.org/page/The_London_Library> |
| Jasmine Chen^^xsd:string | 50000.0 | <https://dbpedia.org/page/The_Library_Club> |

Activate Windows
Go to Settings to activate Windows.

3 results

Synchronising

2. Jena

2.1. Search for all the authors whose names start with “J” and if available, their books have “and” in the books’ titles or start with “the”.

SPARQL Endpoint /library.owl/query Content Type (SELECT) JSON Content Type (GRAPH) Turtle

```
1- PREFIX owl: <http://www.w3.org/2002/07/owl#>
2- PREFIX rdfs: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
3- PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
4- PREFIX url: <http://www.semanticweb.org/mouh/ontologies/2023/3/untitled-ontology-3#>
5- SELECT DISTINCT ?author_name ?book_title
6- WHERE {
7-   ?author a url:Author .
8-   ?author a url:Book .
9-   ?author url:writes ?book .
10-  ?book url:person_name ?author_name
11-  FILTER REGEX (?author_name, "J", "i")
12-  OPTIONAL {
13-    ?author url:writes ?book .
14-    ?book url:title ?book_title }
```

Table Response 7 results in 0.062 seconds

| author_name | book_title |
|------------------|--|
| 1 J.D. Salinger | The Catcher in the Rye |
| 2 J.D. Salinger | Franny and Zooey |
| 3 J.K. Rowling | Harry Potter and the Philosopher's Stone |
| 4 J.R.R. Tolkien | The Hobbit |
| 5 J.R.R. Tolkien | The Lord of the Rings |
| 6 Jane Austen | Pride and Prejudice |
| 7 Jane Austen | Sense and Sensibility |

Showing 1 to 7 of 7 entries

SPARQL Endpoint /library.owl/query Content Type (SELECT) JSON Content Type (GRAPH) Turtle

```
11- FILTER REGEX (?author_name, "J", "i")
12- OPTIONAL {
13-   ?author url:writes ?book .
14-   ?book url:title ?book_title
15-   FILTER REGEX (?book_title, "and", "i")
16- }
17- OPTIONAL {
18-   ?author url:writes ?book .
19-   ?book url:title ?book_title
20-   FILTER REGEX (?book_title, "the", "i")
21- }
22- }
23- 
```

Table Response 7 results in 0.062 seconds

| author_name | book_title |
|------------------|--|
| 1 J.D. Salinger | The Catcher in the Rye |
| 2 J.D. Salinger | Franny and Zooey |
| 3 J.K. Rowling | Harry Potter and the Philosopher's Stone |
| 4 J.R.R. Tolkien | The Hobbit |
| 5 J.R.R. Tolkien | The Lord of the Rings |
| 6 Jane Austen | Pride and Prejudice |
| 7 Jane Austen | Sense and Sensibility |

Showing 1 to 7 of 7 entries

2.2. Find authors who wrote more than 2 books that are available.

SPARQL Endpoint Content Type (SELECT)

/library_ont/query JSON

```

1 PREFIX uri: <http://www.semanticweb.org/mnouh/ontologies/2023/3/united-ontology-3#>
2 SELECT ?author_name (COUNT(?book) AS ?num_books)
3 WHERE {
4   ?author a uri:Author.
5   ?book a uri:Book.
6   ?library a uri:Library.
7   ?author uri:writes ?book.
8   ?book uri:title ?book_title.
9   ?book uri:available_in ?library.
10  ?author uri:person_name ?author_name.
11 }
12 GROUP BY ?author_name
13 HAVING (?num_books >= 2)

```

Table Response 11 results in 0.386 seconds

| author_name | num_books |
|--------------------|-----------|
| Dan Brown | 2 |
| J.R.R. Tolkien | 4 |
| Jane Austen | 3 |
| F.Scott Fitzgerald | 3 |
| Fyodor Dostoevsky | 2 |
| George Orwell | 2 |
| Stieg Larsson | 4 |
| H.G. Wells | 2 |
| Harper Lee | 4 |
| J.K. Rowling | 3 |
| J.D. Salinger | 2 |

Showing 1 to 11 of 11 entries

2.3. Find borrowers who borrowed more than 1 book.

SPARQL Endpoint Content Type (SELECT)

/library_ont/query Content Type (GRAPH)

```

1 PREFIX owl: <http://www.w3.org/2002/07/owl#>
2 PREFIX rdfs: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
3 PREFIX rdf: <http://www.w3.org/2000/01/rdf-schema#>
4 PREFIX uril: <http://www.semanticweb.org/mnouh/ontologies/2023/3/united-ontology-3#>
5 SELECT ?borrower_name (COUNT(?book) AS ?num_books)
6 WHERE {
7   ?borrower a uril:borrower.
8   ?book a uril:book.
9   ?library a uril:library.
10  ?borrower uril:borrows ?book.
11  ?book uril:title ?book_title.
12  ?book uril:available_in ?library.
13  ?borrower uril:person_name ?borrower_name
14 }
15 GROUP BY ?borrower_name
16 HAVING (?num_books >= 2)

```

Table Response 23 results in 0.139 seconds

| borrower_name | num_books |
|------------------|-----------|
| Nathan Scott | 3 |
| Natalie Martinez | 2 |
| Mia Lee | 2 |
| Samuel Kim | 2 |
| Isabella Baker | 2 |
| Lily Chen | 2 |
| Celine Brown | 3 |
| Leah Anderson | 2 |

Table Response 23 results in 0.139 seconds

| borrower_name | num_books |
|--------------------|-----------|
| Nathan Scott | 3 |
| Natalie Martinez | 2 |
| Mia Lee | 2 |
| Samuel Kim | 2 |
| Isabella Baker | 2 |
| Lily Chen | 2 |
| Caleb Brown | 3 |
| Leah Anderson | 2 |
| Olivia Taylor | 2 |
| David Smith | 3 |
| Adam Wilson | 4 |
| Julia Martinez | 3 |
| Ethan Park | 2 |
| Timothy Nelson | 2 |
| Christopher Nguyen | 4 |
| Ava Davis | 3 |
| Daniel Lee | 2 |
| Madison Harrison | 2 |
| Charlotte Singh | 2 |
| Sophia Kim | 2 |
| Lucas Wilson | 4 |
| Benjamin Patel | 4 |
| Emily Mitchell | 3 |

Showing 1 to 23 of 23 entries < 1 >

2.4. Retrieve the titles of all books that are available in libraries other than "The_Library_Club" and if available starts with "the".

SPARQL Endpoint /library.owl/query Content Type (SELECT) Content Type (GRAPH)

```

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX wri: <http://www.semanticweb.org/mehdi/ontologies/2023/3/united-ontology#>
SELECT book_title ?library_name
WHERE {
    ?book a wri:Book .
    ?book rdfs:library ?library .
    ?book wri:availableIn ?library .
    ?book wri:title ?book_title .
    ?library wri:libraryName ?library_name .
    FILTER (?library_name != "The Library Club")
    OPTIONAL {
        FILTER REGEX (?book_title , "the", "i")
    }
}

```

Table Response 23 results in 0.142 seconds

| book_title | library_name |
|--|---------------------|
| Crime and Punishment | Library at the Dock |
| Crime and Punishment | The London Library |
| The Lost Symbol | The London Library |
| Tender Is the Night | Library at the Dock |
| The Beautiful and Damned | The London Library |
| 1984 | Library at the Dock |
| Animal Farm | The London Library |
| The War of the Worlds | Library at the Dock |
| To Kill a Mockingbird | The London Library |
| Go Set a Watchman | Library at the Dock |
| Go Set a Watchman | The London Library |
| Harry Potter and the Philosopher's Stone | Library at the Dock |
| Harry Potter and the Philosopher's Stone | The London Library |
| Moby-Dick | Library at the Dock |
| The Catcher in the Rye | The London Library |
| The Hobbit | Library at the Dock |
| The Lord of the Rings | The London Library |
| Pride and Prejudice | The London Library |
| Sense and Sensibility | The London Library |

| book_title | library_name |
|--|---------------------|
| Crime and Punishment | Library at the Dock |
| Crime and Punishment | The London Library |
| The Lost Symbol | The London Library |
| Tender Is the Night | Library at the Dock |
| The Beautiful and Damned | The London Library |
| 1984 | Library at the Dock |
| Animal Farm | The London Library |
| The War of the Worlds | Library at the Dock |
| To Kill a Mockingbird | The London Library |
| Go Set a Watchman | Library at the Dock |
| Go Set a Watchman | The London Library |
| Harry Potter and the Philosopher's Stone | Library at the Dock |
| Harry Potter and the Philosopher's Stone | The London Library |
| Moby-Dick | The London Library |
| The Catcher in the Rye | Library at the Dock |
| The Hobbit | The London Library |
| The Lord of the Rings | Library at the Dock |
| Pride and Prejudice | The London Library |
| Sense and Sensibility | Library at the Dock |
| The Girl with the Dragon Tattoo | The London Library |
| The Girl Who Played with Fire | Library at the Dock |
| The Girl Who Played with Fire | The London Library |
| The Hunger Games | Library at the Dock |

Showing 1 to 23 of 23 entries

2.5. ASK Query, is there an author with a book?

SPARQL Endpoint
Content Type
(SELECT)
Content Type
(GRAPH)

JSON
Turtle

```

1 v PREFIX owl: <http://www.w3.org/2002/07/owl#>
2 v PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
3 v PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
4 v PREFIX uri: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>
5 v ASK
6 v WHERE {
7 v   ?author a uri:Author.
8 v   ?book a uri:Book.
9 v   ?author uri:person_name ?author_name.
10 v  ?author uri:writes ?book.
11 v }
12 v
13 v

```

Press CTRL - <spacebar> to autocomplete

Table
Response
Response in 0.08 seconds

✓ True

2.6. Ask Query, is there a borrower with a book?

SPARQL Endpoint Content Type Content Type
/library_ont/query (SELECT) (GRAPH)
JSON Turtle

```
1 PREFIX owl: <http://www.w3.org/2002/07/owl#>
2 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
3 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
4 PREFIX uri: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>
5 ASK
6 WHERE {
7   ?borrower a uri:Borrower.
8   ?book a uri:Book.
9   ?borrower uri:borrows ?book.
10  ?book uri:available_in ?library.
11  ?book uri:title ?book_title.
12  ?library uri:library_name ?library_name
13 }
```

Press CTRL - <spacebar> to autocomplete

Table Response Response in 0.022 seconds ✓ True

2.7. ASK Query, is there a book available in the library ?

SPARQL Endpoint Content Type Content Type
/library_ont/query (SELECT) (GRAPH)
JSON Turtle

```
1 PREFIX owl: <http://www.w3.org/2002/07/owl#>
2 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
3 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
4 PREFIX uri: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>
5 ASK
6 WHERE {
7   ?book a uri:Book.
8   ?library a uri:Library.
9   ?book uri:available_in ?library.
10  ?book uri:title ?book_title .
11  ?library uri:library_name ?library_name.
12  }
```

Table Response Response in 0.02 seconds ✓ True

2.8. ASK QUERY, is there an author who borrowed a book?

SPARQL Endpoint: /library_ont/query

```

PREFIX rdfs: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX uri: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>

ASK
WHERE {
    ?author a uri:Author .
    ?book a uri:Book .
    ?author uri:borrows ?book .
}

```

Content Type (SELECT): JSON

Content Type (GRAPH): Turtle

Table Response Response in 0.044 seconds

x False

2.9. DESCRIBE QUERY, show all books available with their authors.

SPARQL Endpoint: /library_ont/query

```

PREFIX rdfs: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX uri: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#>
DESCRIBE Author Book
WHERE {
    ?author a uri:Author .
    ?book a uri:Book .
    ?author rdfs:label ?author_name .
    ?book rdfs:label ?book_name .
    ?author uri:borrows ?book .
}

```

Content Type (SELECT): JSON

Content Type (GRAPH): Turtle

Table Response 215 results in 0.041 seconds

| subject | predicate | object |
|--|---|---|
| http://dbpedia.org/page/Suzanne_Collins | http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#person_name | Suzanne Collins |
| http://dbpedia.org/page/Suzanne_Collins | http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#writes | http://dbpedia.org/page/The_Hunger_Games |
| http://dbpedia.org/page/Suzanne_Collins | http://www.w3.org/1999/02/22-rdf-syntax-ns#type | http://www.w3.org/2000/01/owl#NamedIndividual |
| http://dbpedia.org/page/Suzanne_Collins | http://www.w3.org/1999/02/22-rdf-syntax-ns#type | http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#Author |
| http://dbpedia.org/page/J.R.R._Tolkien | http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#person_name | J.R.R. Tolkien |
| http://dbpedia.org/page/J.R.R._Tolkien | http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#writes | http://dbpedia.org/page/The_Lord_of_the_Rings |
| http://dbpedia.org/page/J.R.R._Tolkien | http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#writes | http://dbpedia.org/page/The_Hobbit |
| http://dbpedia.org/page/J.R.R._Tolkien | http://www.w3.org/1999/02/22-rdf-syntax-ns#type | http://www.w3.org/2000/01/owl#NamedIndividual |
| http://dbpedia.org/page/J.R.R._Tolkien | http://www.w3.org/1999/02/22-rdf-syntax-ns#type | http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#Author |
| http://dbpedia.org/page/The_Beautiful_and_Damned | http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#type | The Beautiful and Damned |
| http://dbpedia.org/page/The_Beautiful_and_Damned | http://www.w3.org/1999/02/22-rdf-syntax-ns#type | 1922 |
| http://dbpedia.org/page/The_Beautiful_and_Damned | http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#published_year | 678-0743273565 |
| http://dbpedia.org/page/The_Beautiful_and_Damned | http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#isbn | https://dbpedia.org/page/The_London_Library |
| http://dbpedia.org/page/The_Beautiful_and_Damned | http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#available_in | http://www.w3.org/2000/01/owl#NamedIndividual |
| http://dbpedia.org/page/The_Beautiful_and_Damned | http://www.w3.org/1999/02/22-rdf-syntax-ns#type | http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#Book |
| http://dbpedia.org/page/Stieg_Larsson | http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#person_name | Stieg Larsson |
| http://dbpedia.org/page/Stieg_Larsson | http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#writes | https://dbpedia.org/page/The_Girl_Who_Payed_with_Fire |
| http://dbpedia.org/page/Stieg_Larsson | http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#writes | https://dbpedia.org/page/The_Girl_With_the_Dragon_Tattoo |
| http://dbpedia.org/page/Fyodor_Dostoevsky | http://www.w3.org/1999/02/22-rdf-syntax-ns#type | Fyodor Dostoevsky |
| http://dbpedia.org/page/Fyodor_Dostoevsky | http://www.semanticweb.org/mnouh/ontologies/2023/3/untitled-ontology-3#person_name | http://dbpedia.org/page/Crime_and_Punishment |

2.10. DESCRIBE QUERY, show all the borrowers with their books.

SPARQL Endpoint: /library_ont/query

Content Type (SELECT): JSON

```

1 PREFIX owl: <http://www.w3.org/2002/07/owl#>
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 murl: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#>
5 DESCRIBE ?borrower ?book
6 WHERE {
7   ?borrower a murl:Borrower .
8   ?book a murl:Book .
9   ?borrower murl:person_name ?borrower_name .
10  ?borrower murl:borrows ?book .
11  ?book murl:title ?book_title .
12 }
13

```

Content Type (GRAPH): Turtle

Table Response: 311 results in 0.03 seconds

| subject | predicate | object |
|---|---|---|
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Mia_Lee | http://www.w3.org/1999/02/22-rdf-syntax-ns#type | http://www.w3.org/2002/07/owlNamedIndividual |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Mia_Lee | http://www.w3.org/1999/02/22-rdf-syntax-ns#type | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Borrower |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Mia_Lee | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#borrows | http://dbpedia.org/page/The_Hobbit |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Mia_Lee | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#u1_member_in | http://dbpedia.org/page/Library_at_The_Dock |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Mia_Lee | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#person_name | Mia Lee |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Nathan_Scott | http://www.w3.org/1999/02/22-rdf-syntax-ns#type | http://www.w3.org/2002/07/owlNamedIndividual |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Nathan_Scott | http://www.w3.org/1999/02/22-rdf-syntax-ns#type | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Borrower |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Nathan_Scott | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#borrows | http://dbpedia.org/page/Harry_Potter_and_the_Philosopher_Stone |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Nathan_Scott | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#u1_member_in | http://dbpedia.org/page/The_London_Library |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Nathan_Scott | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#person_name | Nathan Scott |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Samuel_Kim | http://www.w3.org/1999/02/22-rdf-syntax-ns#type | http://www.w3.org/2002/07/owlNamedIndividual |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Samuel_Kim | http://www.w3.org/1999/02/22-rdf-syntax-ns#type | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Borrower |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Samuel_Kim | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#borrows | http://dbpedia.org/page/The_Way_of_the_Words |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Samuel_Kim | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#u1_member_in | http://dbpedia.org/page/Library_at_The_Dock |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Samuel_Kim | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#person_name | Samuel Kim |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#XIII_A_Modigliani | http://www.w3.org/1999/02/22-rdf-syntax-ns#type | http://www.w3.org/2002/07/owlNamedIndividual |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#XIII_A_Modigliani | http://www.w3.org/1999/02/22-rdf-syntax-ns#type | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Borrower |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#XIII_A_Modigliani | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#borrows | http://dbpedia.org/page/The_Uncle_Cuba |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#XIII_A_Modigliani | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#u1_member_in | http://dbpedia.org/page/The_Uncle_Cuba |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#XIII_A_Modigliani | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#person_name | XIII_A_Modigliani |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Isabella_Baker | http://www.w3.org/1999/02/22-rdf-syntax-ns#type | http://www.w3.org/2002/07/owlNamedIndividual |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Isabella_Baker | http://www.w3.org/1999/02/22-rdf-syntax-ns#type | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Borrower |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Isabella_Baker | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#borrows | http://dbpedia.org/page/The_Way_of_the_Words |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Isabella_Baker | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#u1_member_in | http://dbpedia.org/page/Library_at_The_Dock |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Isabella_Baker | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#person_name | Isabella Baker |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Nineteen_Eighty_Four | http://www.w3.org/1999/02/22-rdf-syntax-ns#type | http://www.w3.org/2002/07/owlNamedIndividual |

2.11. CONSTRUCT QUERY, create new RDF triples for authors and their books.

SPARQL Endpoint: /library_ont/query

Content Type (SELECT): JSON

```

1 PREFIX owl: <http://www.w3.org/2002/07/owl#>
2 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
3 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
4 PREFIX murl: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#>
5 CONSTRUCT {?author uri:writes ?book.}
6 WHERE {
7   ?author a owl:Author .
8   ?author rdfs:person_name ?author_name .
9   ?book rdfs:title ?book_title .
10 } LIMIT 10
11
12

```

Content Type (GRAPH): Turtle

Table Response: 10 results in 0.144 seconds

| subject | predicate | object |
|--|---|---|
| http://dbpedia.org/page/Arthur_Conan_Doyle | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#writes | http://dbpedia.org/page/Moby_Dick |
| http://dbpedia.org/page/Arthur_Conan_Doyle | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#writes | http://dbpedia.org/page/The_Girl_with_the_Dragon_Tattoo |
| http://dbpedia.org/page/Arthur_Conan_Doyle | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#writes | http://dbpedia.org/page/Harry_Potter_and_the_Philosophers_Stone |
| http://dbpedia.org/page/Arthur_Conan_Doyle | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#writes | http://dbpedia.org/page/The_Adventures_of_Sherlock_Holmes |
| http://dbpedia.org/page/Arthur_Conan_Doyle | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#writes | http://dbpedia.org/page/The_Great_Gatsby |
| http://dbpedia.org/page/Arthur_Conan_Doyle | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#writes | http://dbpedia.org/page/Crime_and_Punishment |
| http://dbpedia.org/page/Arthur_Conan_Doyle | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#writes | http://dbpedia.org/page/The_Da_Vinci_Code |
| http://dbpedia.org/page/Arthur_Conan_Doyle | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#writes | http://dbpedia.org/page/Pride_and_Prejudice |
| http://dbpedia.org/page/Arthur_Conan_Doyle | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#writes | http://dbpedia.org/page/The_Catcher_in_the_Rye |
| http://dbpedia.org/page/Arthur_Conan_Doyle | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#writes | http://dbpedia.org/page/Nineteen_Eighty_Four |

Showing 1 to 10 of 10 entries

2.12. CONSTRUCT QUERY, create new RDF triples for borrowers and their borrowed books .

SPARQL Endpoint: /library_cont/query

Content Type (SELECT): JSON

Content Type (GRAPH): Turtle

```

1 PREFIX owl: <http://www.w3.org/2002/07/owl#>
2 PREFIX rdfs: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
3 PREFIX rdf: <http://www.w3.org/2000/01/rdf-schema#>
4 PREFIX url: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#>
5 CONSTRUCT {borrower url:borrowes ?book}
6 WHERE {
7 ?book a url:Book,
8 ?borrower a url:Borrower,
9 ?borrower url:person_name ?borrower_name,
10 ?book url:title ?book_title.
11 } LIMIT 10
12
13

```

Table Response 10 results in 0.022 seconds

| subject | predicate | object |
|---|--|---|
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Ava_Davis | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#borrows | http://dbpedia.org/page/The_Adventures_of_Sherlock_Holmes |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Adam_Wilson | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#borrows | http://dbpedia.org/page/The_Adventures_of_Sherlock_Holmes |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Charlotte_Singh | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#borrows | http://dbpedia.org/page/The_Adventures_of_Sherlock_Holmes |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Christopher_Nguyen | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#borrows | http://dbpedia.org/page/The_Adventures_of_Sherlock_Holmes |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Daniel_Lee | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#borrows | http://dbpedia.org/page/The_Adventures_of_Sherlock_Holmes |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Dylan_Rodriguez | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#borrows | http://dbpedia.org/page/The_Adventures_of_Sherlock_Holmes |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Emily_Mitchell | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#borrows | http://dbpedia.org/page/The_Adventures_of_Sherlock_Holmes |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Benjamin_Patel | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#borrows | http://dbpedia.org/page/The_Adventures_of_Sherlock_Holmes |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Caleb_Brown | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#borrows | http://dbpedia.org/page/The_Adventures_of_Sherlock_Holmes |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#David_Smith | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#borrows | http://dbpedia.org/page/The_Adventures_of_Sherlock_Holmes |

Showing 1 to 10 of 10 entries

2.13. CONSTRUCT QUERY, create a new RDF triples with borrowers that are members in the Library.

SPARQL Endpoint: /library_cont/query

Content Type (SELECT): JSON

Content Type (GRAPH): Turtle

```

2 PREFIX rdfs: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
3 PREFIX rdf: <http://www.w3.org/2000/01/rdf-schema#>
4 PREFIX url: <http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#>
5 CONSTRUCT {?borrower url:member_in ?library.}
6
7 WHERE {
8 ?borrower a url:Borrower,
9 ?library a url:Library,
10 ?borrower url:person_name ?borrower_name,
11 ?library url:library_name ?library_name,
12 } LIMIT 10
13
14

```

Table Response 10 results in 0.023 seconds

| subject | predicate | object |
|---|--|--|
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Adam_Wilson | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#member_in | https://dbpedia.org/page/The_Library_Club |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Adam_Wilson | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#member_in | https://dbpedia.org/page/The_London_Library |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Adam_Wilson | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#member_in | https://dbpedia.org/page/Library_at_The_Dock |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Ava_Davis | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#member_in | https://dbpedia.org/page/The_Library_Club |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Ava_Davis | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#member_in | https://dbpedia.org/page/The_London_Library |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Ava_Davis | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#member_in | https://dbpedia.org/page/Library_at_The_Dock |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Benjamin_Patel | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#member_in | https://dbpedia.org/page/The_Library_Club |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Benjamin_Patel | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#member_in | https://dbpedia.org/page/The_London_Library |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Benjamin_Patel | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#member_in | https://dbpedia.org/page/Library_at_The_Dock |
| http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#Caleb_Brown | http://www.semanticweb.org/mnouh/ontologies/2023/3/untilted-ontology-3#member_in | https://dbpedia.org/page/Library_at_The_Dock |

Showing 1 to 10 of 10 entries

V. Front End

1.0 Index page where the user writes their query.

Sparql Query

Enter Sparql Query:

```
SELECT ?borrower_name (COUNT(?book) AS ?num_books)
WHERE {
?borrower a uri:Borrower.
?book a uri:Book.
?library a uri:Library.
?borrower uri:borrows ?book.
?book uri:title ?book_title.
?book uri:available_in ?library.
?borrower uri:person_name ?borrower_name
}
GROUP BY ?borrower_name
HAVING (?num_books >= 2)
ORDER BY ASC (?num_books)
```

Execute

2.0 Results page showing that the query was sent as a parameter for the end point

Query result

| borrower_name | num_books |
|--------------------|-----------|
| Charlotte Singh | 2 |
| Daniel Lee | 2 |
| Ethan Park | 2 |
| Isabella Baker | 2 |
| Leah Anderson | 2 |
| Lily Chen | 2 |
| Madison Harrison | 2 |
| Mia Lee | 2 |
| Natalie Martinez | 2 |
| Olivia Taylor | 2 |
| Samuel Kim | 2 |
| Sophia Kim | 2 |
| Timothy Nelson | 2 |
| Ava Davis | 3 |
| Caleb Brown | 3 |
| David Smith | 3 |
| Emily Mitchell | 3 |
| Julia Martinez | 3 |
| Nathan Scott | 3 |
| Adam Wilson | 4 |
| Benjamin Patel | 4 |
| Christopher Nguyen | 4 |
| Lucas Wilson | 4 |