**E-library Semantic Search**

**1. Overview**

This ontology models an **E-Library system** to organize books, authors, publishers, and topics. It enables semantic relationships for:

* Tracking authorship and co-authorship.
* Managing publication metadata (ISBN, format, language).
* Defining hierarchical topic classifications.

**2. Class Hierarchy and Relationships**

**Class Descriptions**

* **Book**: Represents books.
* **Author**: Writers of books.
* **Publisher**: Organizations/individuals publishing works.
* **Format**: File/print formats (e.g., PDF).
* **Topic**: Hierarchical categories (e.g., "Artificial Intelligence" is a subtopic of "Computer Science").
* **Hierarchy**

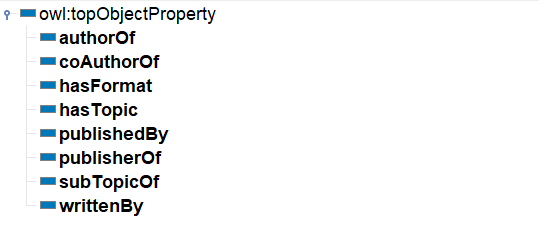
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**3. Properties**

**3.1 Object Properties**

|  |  |  |  |
| --- | --- | --- | --- |
| Property | Domain | Range | Description |
| authorOf | Author | Book | Author of a book/article. |
| coAuthorOf | Author | Author | Co-authorship between authors. |
| hasFormat | Book | Format | Format of the publication (e.g., PDF). |
| hasTopic | Book | Topic | Topic associated with the work. |
| publishedBy | Book | Publisher | Publisher of the work. |
| subTopicOf | Topic | Topic | Hierarchical relationship between topics. |
| writtenBy | Book | Author | Inverse of authorOf. |

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**3.2 Data Properties**

|  |  |  |  |
| --- | --- | --- | --- |
| Property | Domain | Range (XSD) | Description |
| ISBN | Book | integer | Unique identifier for books/articles. |
| language | Book | language | Language of the work (e.g., "english", "spanish"). |
| pageCount | Book | integer | Number of pages. |
| publicationYear | Book | dateTime | Publication date. |

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**4. Instances (Individuals)**

**Key Examples**

1. **1984** (Book)
   * hasTopic: Dystopian
   * writtenBy: George\_Orwell
   * publishedBy: Secker\_Warburg
   * ISBN: 9780451524935
2. **The\_Prophet** (Book)
   * hasFormat: Paperback
   * publishedBy: Kahlil\_Gibran.
3. **Knowledge\_Graphs\_101** (Book)
   * hasTopic: Knowledge\_Graph (subtopic of Artificial\_Intelligence).

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**5. Inferred Semantics and Rules**

**5.1 SWRL Rules**

**Rule 1: Topic Inheritance**

Inference: A book with subtopic Knowledge\_Graph automatically inherits Artificial\_Intelligence.

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**Rule 2: Author of Books**

Inference: A book with an author inferred as the author of that book automatically.

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**Rule 3: Publisher of Books**

Inference: A book published by a publisher inferred as the publisher of that book automatically.

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**Rule 4: CoAuthor of books**

Inference: Authors who have collaborated on the same book inferred as co-authors automatically.

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**5.2 SPARQL Queries**

**1. List Topics and Their Subtopics**

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Shows which topics are subtopics of broader topics.  
Example: "Artificial\_Intelligence" is a subtopic of "Computer\_Science".

**2. Get Book Details**

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Lists books with their ISBN, page count, and publication year.

**3. Find Books Published by MIT Press**

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Returns all books published by "MIT\_Press".  
Example: "Semantic\_Web\_Primer".

**4. Show All Book Formats**

**A close-up of a website

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**5. Books Tagged Under "Computer\_Science"**

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Finds books directly linked to the "Computer\_Science" topic.

**6. Visual Diagrams**

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A diagram of a network

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