

# Resource Description Framework (RDF) in use

## 1 Semantic vocabularies: Dublin Core

```
<?xml version="1.0" encoding="UTF-8"?>
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:dc="http://purl.org/dc/elements/1.1/"
  xmlns="http://student.agh.edu.pl/jpabin/mylibrary#">
  <rdf:Description rdf:about="http://student.agh.edu.pl/jpabin/mylibrary#cd-lacuna_coil_1">
    <dc:artist rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Lacuna Coil</
dc:artist>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Unleashed
Memories</dc:title>
  </rdf:Description>
  <rdf:Description rdf:about="http://student.agh.edu.pl/jpabin/mylibrary#cd-summoning_1">
    <dc:artist rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Summoning</
dc:artist>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Dol Guldur</dc:title>
  </rdf:Description>
  <rdf:Description rdf:about="http://student.agh.edu.pl/jpabin/mylibrary#book-
piesn_lodu_i_ognia_1">
    <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">George R. R.
Martin</dc:author>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Gra o Tron</
dc:title>
  </rdf:Description>
  <rdf:Description rdf:about="http://student.agh.edu.pl/jpabin/mylibrary#book-
piesn_lodu_i_ognia_2">
    <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">George R. R.
Martin</dc:author>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Starcie krolow</
dc:title>
  </rdf:Description>
  <rdf:Description rdf:about="http://student.agh.edu.pl/jpabin/mylibrary#book-
piesn_lodu_i_ognia_3">
    <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">George R. R.
Martin</dc:author>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Nawalnica mieczy</
dc:title>
  </rdf:Description>
```

```

<rdf:Description rdf:about="http://student.agh.edu.pl/jpabin/mylibrary#dvd-movie_1">
  <dc:director rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Hunter
Richards</dc:director>
  <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">London</dc:title>
</rdf:Description>
<rdf:Description rdf:about="http://student.agh.edu.pl/jpabin/mylibrary#dvd-movie_2">
  <dc:actors rdf:parseType="Collection">
<rdf:Description>
  <dc:actor rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Krol Julian</
dc:actor>
  <dc:actor rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Maurice</dc:actor>
  <dc:actor rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Mort</dc:actor>
  <dc:actor rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Rico</dc:actor>
  </rdf:Description>
  </dc:actors>
  <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Pingwiny z
Madagaskaru</dc:title>
</rdf:Description>

<rdf:Description rdf:about="http://student.agh.edu.pl/jpabin/mylibrary#">
  <dc:MyFavouriteBooks>
  <rdf:Bag>
  <rdf:li rdf:resource="http://student.agh.edu.pl/jpabin/mylibrary#book-
piesn_lodu_i_ognia_3"/>
  <rdf:li rdf:resource="http://student.agh.edu.pl/jpabin/mylibrary#book-
piesn_lodu_i_ognia_1"/>
  </rdf:Bag>
  </dc:MyFavouriteBooks>
</rdf:Description>

</rdf:RDF>

```

## 2 RDFSchema

```

<?xml version="1.0" encoding="UTF-8"?>
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:dc="http://purl.org/dc/elements/1.1/"
  xmlns="http://student.agh.edu.pl/jpabin/mylibrary#">

  <rdfs:Class rdf:ID="Multimedialtem" />
  <rdfs:Class rdf:ID="MusicCD">

```

```

    <rdfs:subClassOf rdf:resource="#Multimedialtem"/>
    <rdfs:label>Music Compact Discs class</rdfs:label>
    <rdfs:comment>Class of all the CDs in my library.</rdfs:comment>
</rdfs:Class>

<rdfs:Class rdf:ID="DVDMovie">
    <rdfs:subClassOf rdf:resource="#Multimedialtem"/>
    <rdfs:label>Digital Video Discs class</rdfs:label>
    <rdfs:comment>Class of all the DVDs in my library.</rdfs:comment>
</rdfs:Class>

<rdfs:Class rdf:ID="Book">
    <rdfs:subClassOf rdf:resource="#Multimedialtem"/>
    <rdfs:label>Books class</rdfs:label>
    <rdfs:comment>Class of all books in my library.</rdfs:comment>
</rdfs:Class>

<rdf:Description rdf:about="http://student.agh.edu.pl/jpabin/mylibrary#cd-lacuna_coil_1">
    <dc:artist rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Lacuna Coil</
dc:artist>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Unleashed
Memories</dc:title>
    <rdf:type rdf:resource="http://student.agh.edu.pl/jpabin/mylibrary#MusicCD"/>
</rdf:Description>
<rdf:Description rdf:about="http://student.agh.edu.pl/jpabin/mylibrary#cd-summoning_1">
    <dc:artist rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Summoning</
dc:artist>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Dol Guldur</dc:title>
    <rdf:type rdf:resource="http://student.agh.edu.pl/jpabin/mylibrary#MusicCD"/>
</rdf:Description>
<rdf:Description rdf:about="http://student.agh.edu.pl/jpabin/mylibrary#book-
piesn_lodu_i_ognia_1">
    <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">George R. R.
Martin</dc:author>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Gra o Tron</
dc:title>
    <rdf:type rdf:resource="http://student.agh.edu.pl/jpabin/mylibrary#Book"/>
</rdf:Description>
<rdf:Description rdf:about="http://student.agh.edu.pl/jpabin/mylibrary#book-
piesn_lodu_i_ognia_2">
    <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">George R. R.
Martin</dc:author>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Starcie krolow</
dc:title>
    <rdf:type rdf:resource="http://student.agh.edu.pl/jpabin/mylibrary#Book"/>
</rdf:Description>
<rdf:Description rdf:about="http://student.agh.edu.pl/jpabin/mylibrary#book-
piesn_lodu_i_ognia_3">
    <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">George R. R.
Martin</dc:author>

```

```

    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Nawalnica mieczy</
dc:title>
    <rdf:type rdf:resource="http://student.agh.edu.pl/jpabin/mylibrary#Book"/>
  </rdf:Description>

  <rdf:Description rdf:about="http://student.agh.edu.pl/jpabin/mylibrary#dvd-movie_1">
    <dc:director rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Hunter
Richards</dc:director>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">London</dc:title>
    <rdf:type rdf:resource="http://student.agh.edu.pl/jpabin/mylibrary#DVDMovie"/>
  </rdf:Description>
  <rdf:Description rdf:about="http://student.agh.edu.pl/jpabin/mylibrary#dvd-movie_2">
    <dc:actors rdf:parseType="Collection">
  </rdf:Description>
    <dc:actor rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Krol Julian</
dc:actor>
    <dc:actor rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Maurice</dc:actor>
    <dc:actor rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Mort</dc:actor>
    <dc:actor rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Rico</dc:actor>
    <rdf:type rdf:resource="http://student.agh.edu.pl/jpabin/mylibrary#DVDMovie"/>
  </rdf:Description>
  </dc:actors>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Pingwiny z
Madagaskaru</dc:title>
  </rdf:Description>

  <rdf:Description rdf:about="http://student.agh.edu.pl/jpabin/mylibrary#">
    <dc:MyFavouriteBooks>
  <rdf:Bag>
    <rdf:li rdf:resource="http://student.agh.edu.pl/jpabin/mylibrary#book-
piesn_lodu_i_ognia_3"/>
    <rdf:li rdf:resource="http://student.agh.edu.pl/jpabin/mylibrary#book-
piesn_lodu_i_ognia_1"/>
  </rdf:Bag>
    </dc:MyFavouriteBooks>
  </rdf:Description>

</rdf:RDF>

```

### 3 SPARQL - demo

#### 3.1

FOAF - (Friend Of A Friend),

- służy do reprezentacji danych personalnych konkretnych osób (wizytówki sieciowe) oraz powiązań między nimi

Dublin Core

- opisuje elementy metadanych (język, źródło, autor, opis itp), celem jest efektywne i szybkie

przeszukiwanie zasobów elektronicznych

SIOC

- format opisujący społeczności, ich członków, zainteresowanie itp.

REV -

- format służący do recenzowania i oceniania

PRJ

- format do opisu projektów

RSS 1.0

- słownik służący do opisu zmian na stronach

**3.2**

SELECT

- zapytanie pobiera dane i ich powiązania i przedstawia wynik w formie tabeli

**3.3**

CONSTRUCT

- zapytanie to tworzy graf RDF z pobranych informacji według wyspecyfikowanego szablonu

## **4 SPARQL queries - basics**

### **4.1 Friends who have name and e-mail defined**

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

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
```

```
SELECT DISTINCT ?name
```

```
WHERE {
```

```
?x rdf:type foaf:Person .
```

```
?x foaf:name ?name .
```

```
?x foaf:mbox_sha1sum ?mbox
```

```
}
```

### **4.2 Friends who have name and e-mail defined and optional homepage**

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

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
```

```
SELECT DISTINCT ?name
```

```
WHERE {
```

```
?x rdf:type foaf:Person .
```

```
?x foaf:name ?name .
```

```
?x foaf:mbox_sha1sum ?mbox .
```

```
OPTIONAL {?x foaf:homepage ?homepage}
```

```
}
```

#### **4.3 Friends who have name and e-mail defined and optional homepage, sorted by name descending**

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
SELECT DISTINCT ?name
WHERE {
  ?x rdf:type foaf:Person .
  ?x foaf:name ?name .
  ?x foaf:mbox_sha1sum ?mbox .
  OPTIONAL {?x foaf:homepage ?homepage}
}
ORDER BY DESC(?name)
```

### **5 SPARQL queries - options**

#### **5.1 People whose name starts with 'K'**

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
SELECT DISTINCT ?name
WHERE {
  ?x rdf:type foaf:Person .
  ?x foaf:name ?name .
  Filter regex(str(?name), "^K")
}
}
```

#### **5.2 People who are older than 18 years old**

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
SELECT DISTINCT ?name
WHERE {
  ?x rdf:type foaf:Person ;
  ?x foaf:name ?name ;
  ?x foaf:age ?age .
  Filter (?age > 18)
}
}
```

#### **5.3 People whose name starts with 'K' or are older than 18 years old, make search caseinsensitive**

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
SELECT DISTINCT ?name
WHERE {
  ?x rdf:type foaf:Person ;
```

```
?x foaf:name ?name ;
?x foaf:age ?age .
FILTER (regex(str(?name), "^K", "i") || ?age > 18)

}
```

#### **5.4 People having e-mails on student.agh.edu.pl server**

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
SELECT DISTINCT ?name
WHERE {
?x rdf:type foaf:Person ;
?x foaf:mbox ?mbox ;
?x foaf:name ?name .
FILTER regex(str(?mbox), "@student.agh.edu.pl$")

}
```

#### **5.5 Name of people, who have homepage or e-mail on student.agh.edu.pl server**

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
SELECT DISTINCT ?name
WHERE {
?x rdf:type foaf:Person ;
?x foaf:name ?name ;
?x foaf:mbox ?mbox ;
?x foaf:homepage ?homepage .
FILTER (regex(str(?mbox), "@student.agh.edu.pl$") || regex(str(?homepage), "^http://
student.agh.edu.pl"))

}
```

## **6 Open Data Sets**

**What are the main limitations of using (querying for information) the RDF datasets such as DBpedia or MusicBrainz?**

- długi czas oczekiwania na wykonanie zapytania w szczególności dla zapytań, które są złożone
- rozmiar RDF oraz przestrzenne rozproszenie serwerów zwiększają czas oczekiwania
- konieczność posługiwania się SPARQL co dla większości użytkowników może być wadą dyskwalifikującą