

AGH
University of Science and Technology in Krakow
Faculty of Electrical Engineering, Automatics, Computer Science and
Electronics
DEPARTMENT OF AUTOMATICS



Podstawy Inżynierii Wiedzy
Introduction to the Semantic Web

Raport Lab2

Piotr Szypuła, Kacper Ząber

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="http://sem.pl/mylibrary#"
  xmlns:dc="http://purl.org/dc/elements/1.1/">
  <rdf:Description rdf:about="http://sem.pl/mylibrary#book-semwebprimer">
    <dc:author>Grigoris Antoniou</dc:author>
    <dc:author>Frank van Harmelen</dc:author>
    <dc:title>A Semantic Web Primer</dc:title>
  </rdf:Description>
  <rdf:Description rdf:about="http://sem.pl/mylibrary#cd-opeth_damnation">
    <dc:artist>Opeth</dc:artist>
    <dc:title>Damnation</dc:title>
  </rdf:Description>
  <rdf:Description rdf:about="http://sem.pl/mylibrary#MyFavouriteBooks">
    <MyFavouriteBooks>
      <rdf:Bag>
        <rdf:li rdf:resource="http://sem.pl/mylibrary#MyFavouriteBooks/
Wiedzmin"/>
        <rdf:li rdf:resource="http://sem.pl/mylibrary#MyFavouriteBooks/
Narrenturn"/>
        <rdf:li rdf:resource="http://sem.pl/mylibrary#MyFavouriteBooks/
Kłamca"/>
      </rdf:Bag>
    </MyFavouriteBooks>
  </rdf:Description>
  <rdf:Description rdf:about="http://sem.pl/mylibrary#book/Introduction_To_Algorithms">
    <dc:authors rdf:parseType="Collection">
      <rdf:Description rdf:about="http://sem.pl/authors/Thomas_H.Cormen"/>
      <rdf:Description rdf:about="http://sem.pl/authors/Charles_E.Leiserson"/>
      <rdf:Description rdf:about="http://sem.pl/authors/Ronald_L.Rivest"/>
      <rdf:Description rdf:about="http://sem.pl/authors/Clifford_Stein"/>
    </dc:authors>
    <title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Introduction To
Algorithms</title>
    <publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2001-01-
01</publicationDate>
  </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#"
  xml:base="http://sem.pl/mylibrary#">

  <rdfs:Class rdf:ID="Multimedialtem" />
  <rdfs:Class rdf:ID="Book">
    <rdfs:subClassOf rdf:resource="#Multimedialtem"/>
    <rdfs:author>Author of a book</rdfs:author>
    <rdfs:title>Title of a book</rdfs:title>
  </rdfs:Class>

  <rdf:Description rdf:about="http://sem.pl/mylibrary#book-semwebprimer">
    <author>Grigoris Antoniou</author>
    <title>A Semantic Web Primer</title>
    <rdfs:type rdf:resource="http://http://sem.pl/mylibrary#Book"/>
  </rdf:Description>

</rdf:RDF>
```

3 SPARQL - demo

Q: What semantic vocabularies are used in the queries? What are they for?

A: Semantic vocabularies hosted by Talis Platform. They are used for searching for specific pieces of information in rdf documents.

Q: What do SELECT queries do?

A: They select values from rdf documents, and present them in form of a table.

Q: What do CONSTRUCT queries do?

A: They select values from rdf documents, and present them in form of a rdf document.

4 SPARQL queries - basics

Q: friends who have name and e-mail defined:

A:

```
SELECT DISTINCT ?name ?email
WHERE
{
    ?x rdf:type foaf:Person;
    foaf:name ?name;
    foaf:mbox ?mail
}
```

Q: friends who have name and e-mail defined and optional homepage:

A:

```
SELECT DISTINCT ?name ?email ?homepage
WHERE
{
    ?x rdf:type foaf:Person;
    foaf:name ?name;
    foaf:mbox ?mail.
    OPTIONAL { ?x foaf:homepage ?homepage }
}
```

Q: friends who have name and e-mail defined and optional homepage, sorted by name descending:

A:

```
SELECT DISTINCT ?name ?email ?homepage
WHERE
{
    ?x rdf:type foaf:Person;
    foaf:name ?name;
    foaf:mbox ?mail.
    OPTIONAL { ?x foaf:homepage ?homepage }
}
ORDER BY DESC (?name)
```

5 SPARQL queries - options

Q: people whose name starts with 'K':

```
A:
    SELECT DISTINCT ?x
    WHERE
    {
        ?x rdf:type foaf:Person;
        foaf:name ?name.
        FILTER regex(?name, "^K")
    }
```

Q: people who are older than 18 years old:

```
A:
    SELECT DISTINCT ?x
    WHERE
    {
        ?x rdf:type foaf:Person;
        foaf:age ?age.
        FILTER ?age > 18
    }
```

Q: people whose name starts with 'K' or are older than 18 years old, make search caseinsensitive:

```
A:
    SELECT DISTINCT ?x
    WHERE
    {
        ?x rdf:type foaf:Person;
        foaf:name ?name;
        foaf:age ?age.
        FILTER regex(?name, "^K", "i") || (?age > 18)
    }
```

Q: people having e-mails on student.agh.edu.pl server:

```
A:
    SELECT DISTINCT ?x
    WHERE
    {
        ?x rdf:type foaf:Person;
        foaf:mbox ?mbox.
        FILTER regex(?mbox, "student\\.agh\\.edu\\.pl$")
    }
```

Q: name of people, who have homepage or e-mail on student.agh.edu.pl server

```
A:
    SELECT DISTINCT ?name
```

```
WHERE
{
    ?x rdf:type foaf:Person;
    foaf:name ?name;
    foaf:homepage ?homepage;
    foaf:mbox ?mbox.
    FILTER regex(?homepage, "^http://student\.agh\.edu\.pl") || regex(?mbox,
    "student\.agh\.edu\.pl$")
}
```

6 Open Data Sets

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

A: The bigger the dataset of rdf documents the longer it takes to process the query. Time necessary to process query depends also on how complicated it is. Since DBpedia has huge collection of rdf documents searching it might take really long time. Also we have to remember that those documents are held in different places all over the Internet, so speed of such search depends on speed and delays of internet connection.