



Semantic Web – sprawozdanie 3

Resource Description Framework (RDF) in use

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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:lib="http://example.org/mylibrary#"
xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#">
  <rdf:Description rdf:about="http://helion.pl/mylibrary#javaee6">
    <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">
      Krzysztof Rychlicki-Kicior</dc:author>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">
      Java EE 6. Programowanie aplikacji WWW</dc:title>
  </rdf:Description>
  <rdf:Description rdf:about="http://helion.pl/mylibrary#ejb3">
    <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">
      Bill Burke</dc:author>
    <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">
      Richard Monson-Haefel</dc:author>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">
      Enterprise JavaBeans 3.0. Wydanie V</dc:title>
  </rdf:Description>
  <rdf:Description rdf:about="http://example.org/courses/6.001">
    <s:MyFavouriteBooks>
      <rdf:Bag>
        <rdf:li rdf:resource="http://helion.pl/mylibrary#MyFavouriteBooks/Pierwsza" />
        <rdf:li rdf:resource="http://helion.pl/mylibrary#MyFavouriteBooks/Druga" />
        <rdf:li rdf:resource="http://helion.pl/mylibrary#MyFavouriteBooks/Trzecia" />
      </rdf:Bag>
    </s:MyFavouriteBooks>
  </rdf:Description>
  <rdf:Description rdf:about="http://helion.pl/mylibrary#javaee6">
    <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">
      Krzysztof Rychlicki-Kicior</dc:author>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">
      Java EE 6. Programowanie aplikacji WWW</dc:title>
    <dc:date rdf:datatype="http://www.w3.org/2001/XMLSchema#date">
      2007-02-01</dc:date>
  </rdf:Description>
</rdf:RDF>
```

RDFSchema

```
<?xml version="1.0" encoding="utf-8"?>
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:lib="http://example.org/mylibrary#"
xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#">
  <rdfs:Class rdf:ID="Multimedia" />
  <rdfs:Class rdf:ID="CD">
    <rdfs:subClassOf rdf:resource="#Multimedia" />
    <rdfs:label>Music CD in the library</rdfs:label>
    <rdfs:comment>Class of all the Music CDs in the
    library.</rdfs:comment>
  </rdfs:Class>
  <rdfs:Class rdf:ID="Book">
    <rdfs:subClassOf rdf:resource="#Multimedia" />
    <rdfs:label>Book in the library</rdfs:label>
    <rdfs:comment>Class of all the Books in the
    library.</rdfs:comment>
  </rdfs:Class>
  <rdf:Description rdf:about="http://helion.pl/mylibrary#javaee6">
    <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">
    Krzysztof Rychlicki-Kicior</dc:author>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">
    Java EE 6. Programowanie aplikacji WWW</dc:title>
    <rdf:type rdf:resource="http://site.org/mylibrary#Book"/>
  </rdf:Description>
  <rdf:Description rdf:about="http://helion.pl/mylibrary#ejb3">
    <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">
    Bill Burke</dc:author>
    <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">
    Richard Monson-Haefel</dc:author>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">
    Enterprise JavaBeans 3.0. Wydanie V</dc:title>
    <rdf:type rdf:resource="http://site.org/mylibrary#Book"/>
  </rdf:Description>
  <rdf:Description rdf:about="http://example.org/courses/6.001">
    <s:MyFavouriteBooks>
      <rdf:Bag>
        <rdf:li rdf:resource="http://helion.pl/mylibrary#MyFavouriteBooks/Pierwsza" />
        <rdf:li rdf:resource="http://helion.pl/mylibrary#MyFavouriteBooks/Druga" />
        <rdf:li rdf:resource="http://helion.pl/mylibrary#MyFavouriteBooks/Trzecia" />
      </rdf:Bag>
    </s:MyFavouriteBooks>
  </rdf:Description>
```

```
<rdf:Description rdf:about="http://helion.pl/mylibrary#javaee6">
  <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">
    Krzysztof Rychlicki-Kicior</dc:author>
  <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">
    Java EE 6. Programowanie aplikacji WWW</dc:title>
  <dc:date rdf:datatype="http://www.w3.org/2001/XMLSchema#date">
    2007-02-01</dc:date>
    <rdf:type rdf:resource="http://site.org/mylibrary#Book"/>
</rdf:Description>
</rdf:RDF>
```

SPARQL – demo

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

Użyte słowniki semantyczne:

FOAF, Dublin Core, Project Vocabulary, OWL Web Ontology Language, Dublin Core Metadata Initiative Type

Słowniki semantyczne służą do opisywania i wyszukiwania części informacji w dokumentach rdf.

What do SELECT queries do?

Polecenie SELECT służy do wybrania (select) zadanych wartości z dokumentów rdf. Dane przekazane w odpowiedzi są stabelaryzowane.

What do CONSTRUCT queries do?

Adekwatnie do zapytania SELECT polecenie CONSTRUCT służy do pobierania informacji z dokumentów RDF z tą różnicą, że pobrane dane tworzą dokument rdf.

SPARQL queries – basics

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 ?mail
WHERE {
    ?x rdf:type foaf:Person .
    ?x foaf:name ?name .
    ?x foaf:mbox ?mail
}
```

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 ?mail ?page
WHERE {
    ?x rdf:type foaf:Person .
    ?x foaf:name ?name.
    ?x foaf:mbox ?mail .
    OPTIONAL {?x foaf:homepage ?page}
}
```

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

SPARQL queries – options

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(?name, "^K")
}
```

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

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 ?person
WHERE {
    ?person rdf:type foaf:Person;
    foaf:age ?age;
    foaf:name ?name.
    FILTER (xsd:decimal(?age) > 18 || regex(?name, '^K', 'i')).
}
```

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

```

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 ?mbox ?page
WHERE {
    ?x rdf:type foaf:Person .
    ?x foaf:name ?name .
    {?x foaf:mbox ?mbox
FILTER regex(?mbox, „.*student.agh.edu.pl$”) }
UNION
    {?x foaf:homepage ?page
FILTER regex(?page, „^http://student.agh.edu.pl.*”) }
}

```

Open Data Sets

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

- czas oczekiwania na odpowiedź, uzależniony od poziomu skomplikowania zapytania
- jedynie język SPARQL zapytań
- brak spójności danych (niespójny zbiór zgromadzonych ontologii)
- wymóg znajomości opisów atrybutów (dokumentacji zasobów)
- niespójne słownictwo