

# LAB 3: Resource Description Framework (RDF) in use

## 1 Semantic vocabularies: Dublin Core

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE rdf:RDF PUBLIC "-//DUBLIN CORE//DCMES DTD 2002/07/31//EN"
  "http://dublincore.org/documents/2002/07/31/dcmes-xml/dcmes-xml-dtd.dtd">
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:dc="http://kosobudzki.rosa.org/mylibrary#">

  <rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#book-agent">
    <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Gretkowska Manuela</dc:author>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Agent</dc:title>
    <dc:publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2012-05-09</dc:publicationDate>
  </rdf:Description>
  <rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#book-stazystka">
    <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Alford Mimi</dc:author>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Stazystka</dc:title>
    <dc:publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2012-05-09</dc:publicationDate>
  </rdf:Description>
  <rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrar#book-uczen">
    <dc:authors rdf:parseType="Collection">
      <rdf:Description>
        <rdf:first rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Rosenfeld-Hans</rdf:first>
        <rdf:rest>
          <rdf:Description>
            <rdf:first rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Hjorth-
Michael</rdf:first>
            <rdf:rest rdf:resource="http://www.w3.org/1999/02/22-rdfsyntax-ns#nil" />
          </rdf:Description>
        </rdf:rest>
      </rdf:Description>
    </dc:authors>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Uczen</dc:title>
    <dc:publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2012-02-04</dc:publicationDate>
  </rdf:Description>
  <rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#book-kwiat-sniegu">
    <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">See Lisa</dc:author>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Kwiat sniegu i sekretny wachlarz</dc:title>
    <dc:publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2005-09-06</dc:publicationDate>
  </rdf:Description>
  <rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#book-zastygle-zycie">
    <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Wahlberg Karin</dc:author>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Zastygle zycie</dc:title>
    <dc:publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2011-11-09</dc:publicationDate>
  </rdf:Description>
  <rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#book-dziewczeta">
    <dc:author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">See Lisa</dc:author>
    <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Dziewczeta z Szanghaju</dc:title>
    <dc:publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2010-02-24</dc:publicationDate>
  </rdf:Description>
  <rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#cd-luxtorpeda">
    <dc:artist rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Luxtorpeda</dc:artist>
```

```

<dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Robaki</dc:title>
  <dc:publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2012-05-09</dc:publicationDate>
</rdf:Description>
<rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#cd-zbacowanie">
  <dc:artist rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Zbacowanie</dc:artist>
  <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Future Folk</dc:title>
  <dc:publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2012-05-06</dc:publicationDate>
</rdf:Description>
<rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#cd-death-magnetic">
  <dc:artist rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Metallica</dc:artist>
  <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Death Magnetic</dc:title>
  <dc:publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2008-10-03</dc:publicationDate>
</rdf:Description>
<rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#cd-master-of-puppets">
  <dc:artist rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Metallica</dc:artist>
  <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Master of Puppets</dc:title>
  <dc:publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">1989-09-01</dc:publicationDate>
</rdf:Description>
<rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#cd-kim-nowak">
  <dc:artist rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Kim Nowak</dc:artist>
  <dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Kim Nowak</dc:title>
  <dc:publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2010-05-14</dc:publicationDate>
</rdf:Description>

<rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#myfavourite-books">
  <MyFavouriteBooks>
    <rdf:Bag>
      <rdf:li rdf:resource="http://kosobudzki.rosa.org/mylibrary#book-agent"/>
      <rdf:li rdf:resource="http://kosobudzki.rosa.org/mylibrary#book-stazystka"/>
    </rdf:Bag>
  </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#"
  xml:base="http://kosobudzki.rosa.org/mylibrary#">

  <rdfs:Class rdf:ID="MultimediaItem" />
  <rdfs:Class rdf:ID="MusicCD">
    <rdfs:subClassOf rdf:resource="#MultimediaItem"/>
    <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="Book">
    <rdfs:subClassOf rdf:resource="#MultimediaItem"/>
  </rdfs:Class>

  <rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#book-agent">
    <author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Gretkowska Manuela</author>
    <title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Agent</title>
    <publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2012-05-09</publicationDate>
    <rdf:type rdf:resource="http://kosobudzki.rosa.org/mylibrary#Book"/>
  </rdf:Description>

```

```

<rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#book-stazystka">
  <author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Alford Mimi</author>
  <title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Stazystka</title>
    <publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2012-05-09</publicationDate>
    <rdf:type rdf:resource="http://kosobudzki.rosa.org/mylibrary#Book"/>
</rdf:Description>
<rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrar#book-uczen">
  <authors rdf:parseType="Collection">
    <rdf:Description>
      <rdf:first      rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Rosenfeld-
Hans</rdf:first>
      <rdf:rest>
        <rdf:Description>
          <rdf:first
rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Hjorth-Michael</rdf:first>
          <rdf:rest      rdf:resource="http://www.w3.org/1999/02/22-rdfsyntax-
ns#nil" />
        </rdf:Description>
      </rdf:rest>
    </rdf:Description>
  </authors>
  <title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Uczen</title>
  <rdf:type rdf:resource="http://kosobudzki.rosa.org/mylibrary#Book"/>
  <publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2012-02-04</publicationDate>
</rdf:Description>
<rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#book-kwiat-sniegu">
  <author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">See Lisa</author>
  <title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Kwiat sniegu i sekretny wachlarz</title>
    <publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2005-09-06</publicationDate>
    <rdf:type rdf:resource="http://kosobudzki.rosa.org/mylibrary#Book"/>
</rdf:Description>
<rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#book-zastygłe-zycie">
  <author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Wahlberg Karin</author>
  <title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Zastygłe zycie</title>
    <publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2011-11-09</publicationDate>
    <rdf:type rdf:resource="http://kosobudzki.rosa.org/mylibrary#Book"/>
</rdf:Description>
<rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#book-dziewczeta">
  <author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">See Lisa</author>
  <title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Dziewczeta z Szanghaju</title>
    <publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2010-02-24</publicationDate>
    <rdf:type rdf:resource="http://kosobudzki.rosa.org/mylibrary#Book"/>
</rdf:Description>
<rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#cd-luxtorpeda">
  <artist rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Luxtorpeda</artist>
  <title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Robaki</title>
    <publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2012-05-09</publicationDate>
    <rdf:type rdf:resource="http://kosobudzki.rosa.org/mylibrary#MusicCD"/>
</rdf:Description>
<rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#cd-zbacowanie">
  <artist rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Zbacowanie</artist>
  <title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Future Folk</title>
    <publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2012-05-06</publicationDate>
    <rdf:type rdf:resource="http://kosobudzki.rosa.org/mylibrary#MusicCD"/>
</rdf:Description>
<rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#cd-death-magnetic">
  <artist rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Metallica</artist>

```

```

<title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Death Magnetic</title>
  <publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2008-10-03</publicationDate>
<rdf:type rdf:resource="http://kosobudzki.rosa.org/mylibrary#MusicCD"/>
</rdf:Description>
<rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#cd-master-of-puppets">
  <artist rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Metallica</artist>
  <title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Master of Puppets</title>
  <publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">1989-09-01</publicationDate>
  <rdf:type rdf:resource="http://kosobudzki.rosa.org/mylibrary#MusicCD"/>
</rdf:Description>
<rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#cd-kim-nowak">
  <artist rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Kim Nowak</artist>
  <title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Kim Nowak</title>
  <publicationDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2010-05-14</publicationDate>
  <rdf:type rdf:resource="http://kosobudzki.rosa.org/mylibrary#MusicCD"/>
</rdf:Description>

<rdf:Description rdf:about="http://kosobudzki.rosa.org/mylibrary#myfavourite-books">
  <MyFavouriteBooks>
    <rdf:Bag>
      <rdf:li rdf:resource="http://kosobudzki.rosa.org/mylibrary#book-agent"/>
      <rdf:li rdf:resource="http://kosobudzki.rosa.org/mylibrary#book-stazystka"/>
    </rdf:Bag>
  </MyFavouriteBooks>
</rdf:Description>
</rdf:RDF>

```

### 3 SPARQL – demo

1. *What semantic vocabularies are used in the queries? What are they for?*

FOAF, Dublin Core, Project Vocabulary, OWL Web Ontology Language, Dublin Core Metadata Initiative Type, SIOC Vocabulary itd. Zastosowano je aby wyszukiwać określone informacje w dokumentach PDF.

2. *What do SELECT queries do?*

Wyciąga dane i zwraca je w postaci tabeli.

Fragment wyniku użycia klauzuli SELECT:

```

"book": { "type": "uri" , "value": "http://example.org/book/book1" } ,
"title": { "type": "literal" , "value": "Harry Potter and the Philosopher's Stone" }

```

3. *What do CONSTRUCT queries do?*

Wyciąga dane i zwraca je w postaci dokumentu RDF.

Fragment wyniku użycia klauzuli CONSTRUCT:

```

<rdf:Description rdf:about="http://example.org/book/book7">
  <dc:title>Harry Potter and the Deathly Hallows</dc:title>
</rdf:Description>

```

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

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

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

## 5 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 ?name ?age
WHERE {
```

```

?x rdf:type foaf:Person .
?x foaf:name ?name .
?x foaf:age ?age.
FILTER(?age > '18')
}
LIMIT 10

```

*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 ?age
WHERE {
  ?x rdf:type foaf:Person ;
  {
    ?x foaf:age ?age
    FILTER (?age > '18')
  }
  UNION
  {
    ?x foaf:name ?name
    FILTER 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
WHERE {
  ?x rdf:type foaf:Person .
  ?x foaf:name ?name .
  ?x 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 ?homepage
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 ?homepage
    FILTER regex(?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 wynik zapytania.