SWAD-Europe Deliverable 8.3: RDF Encoding of Multilingual Thesauri

Project name:
Semantic Web Advanced Development for Europe (SWAD-Europe)
Project Number:
IST-2001-34732
Workpackage name:
8. Thesaurus Research Prototype
Workpackage description:
☞http://www.w3.org/2001/sw/Europe/plan/workpackages/live/esw-wp-8.html
Deliverable title:
8.3: Thesaurus Multilingual Report
URI:
☞http://www.w3c.rl.ac.uk/SWAD/deliverables/8.3.html
Authors:
☞Alistair Miles, CCLRC, UK
☞Brian Matthews, CCLRC, UK
☞Michael Wilson, CCLRC, UK
Abstract:
This document is an introduction and guide to using SKOS-Core and SKOS-Mapping RDF schemas for encoding of multilingual thesauri. It gives recommendations for encoding different types of multilingual thesauri, where there are variations in structure and implied semantics.
Status:
Completed Report
Comments on this document are welcome and should be sent to ☞Alistair Miles or to the ☞public-esw-thes@w3.org list. An archive of this list is available at ☞http://lists.w3.org/Archives/Public/public-esw-thes/

Contents

---

1. Introduction [☞back to contents]

This document is an introduction to using the SKOS-Core [☞1] and SKOS-Mapping [☞3] schemas for the RDF encoding of multilingual thesauri.

Every multilingual thesaurus can be analysed as a set of component thesauri, one for each language covered.

Commonly, there are two scenarios:

In the first scenario, a multilingual thesaurus is defined where the conceptual structure of each of the language components is identical. I.e. the hierarchical and associative relationships are mirrored exactly. In this scenario, it is most convenie nt to define a single conceptual structure, and provide alternative labelling information for each of the languages covered. This is the *multilingual labelling* approach.

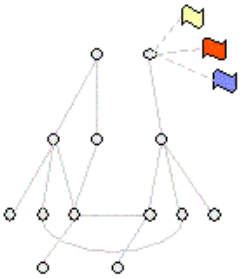
In the second scenario, there exist two independent monolingual thesauri, defined in different languages, but covering the same or similar subject domain. A mapping between the two thesauri is desired, so that for example the two may be used interchan geably for language independent browsing of collection metadata [see e.g. ☞12]. In this scenario, it is most convenient to model the conceptual structure of each thesaurus independently, and provide a complete, bidirectional mapping bet ween the two. This is the *interlingual mapping* approach.

Notably, there is also a third, hybrid scenario, in which a single authority is defining a multilingual thesaurus, but the separate language components do not have identical conceptual structures. This scenario is essentially identical to the second, if each language component is treated as an independent monolingual thesaurus. Therefore, this scenario is also best covered by the interlingual mapping approach.

2. Multilingual Labelling [☞back to contents]

This is the simplest treatment of a multilingual thesaurus. A single conceptual structure is defined. Each concept is given one descriptor label for each of the languages covered. Each concept may also be given any number of alternative labels from each of the languages covered.

Figure 1. Multilingual labelling



The SKOS-Core schema is used to generate an RDF encoding of this information (see also ☞SKOS-Core Guide [☞2]). To express the language of a label, add a language tag to t hat label (see also ☞RDF/XML Syntax Specification [☞13]).

For example ...

```
<rdf:RDF xmlns="http://www.w3c.rl.ac.uk/2003/11/21-skos-core#"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#">

        <Concept>
                <descriptor xml:lang="en">Sausages</descriptor>
                <altLabel xml:lang="en">Bangers</altLabel>
        </Concept>

</rdf:RDF>
```

An example of a thesaurus that is well covered by the multilingual labelling approach is the HPMulti thesaurus [☞8]. An excerpt from this thesaurus, encoded in RDF using SKOS-Core, is provided below ...

```
<?xml version="1.0" encoding="UTF-8"?>
<rdf:RDF xmlns="http://www.w3c.rl.ac.uk/2003/11/21-skos-core#"
        xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
        xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
        xmlns:hpm="http://www.hpmulti.net#"
        xml:base="http://www.hpmulti.net">

<rdfs:Class rdf:ID="Concept">
        <rdfs:label>HPMulti Concept</rdfs:label>
        <rdfs:subClassOf rdf:about="&skos;Concept"/>
</rdfs:Class>

<hpm:Concept>
        <descriptor xml:lang="en">Abortion</descriptor>
        <descriptor xml:lang="fr">Avortement</descriptor>
        <descriptor xml:lang="da">Abort</descriptor>
        <descriptor xml:lang="ne">Abortus</descriptor>
        <descriptor xml:lang="fi">Abortti</descriptor>
        <descriptor xml:lang="ge">Schwangerschaftsabbruch</descriptor>
</hpm:Concept>

<hpm:Concept>
        <descriptor xml:lang="en">ADHD</descriptor>
        <altLabel xml:lang="en">Attention deficit and hyperactive disorder</altLabel>
        <altLabel xml:lang="en">Minimal braindamage</altLabel>
        <altLabel xml:lang="en">MBD</altLabel>
        <descriptor xml:lang="fr">Trouble de l'attention</descriptor>
        <descriptor xml:lang="da">DAMP/MBD</descriptor>
        <descriptor xml:lang="ne">ADHD</descriptor>
        <descriptor xml:lang="fi">Aktiivisuuden ja tarkkaavuuden häiriö</descriptor>
        <altLabel xml:lang="fi">MBD</altLabel>
        <descriptor xml:lang="ge">Minimale zerebrale Dysfunktion und Hyperaktivität</descriptor>
</hpm:Concept>

<hpm:Concept>
        <descriptor xml:lang="en">Advertising</descriptor>
        <altLabel xml:lang="en">Publicity</altLabel>
        <descriptor xml:lang="fr">Publicité</descriptor>
        <descriptor xml:lang="da">Annoncering</descriptor>
        <descriptor xml:lang="ne">Reclame</descriptor>
        <descriptor xml:lang="fi">Mainonta</descriptor>
        <descriptor xml:lang="ge">Werbung</descriptor>
</hpm:Concept>

<hpm:Concept>
        <descriptor xml:lang="en">Assisted conception</descriptor>
        <altLabel xml:lang="en">Artificial insemination</altLabel>
        <altLabel xml:lang="en">In vitro fertilization</altLabel>
        <descriptor xml:lang="fr">Conception assistée</descriptor>
        <descriptor xml:lang="da">Kunstig befrugtning</descriptor>
        <descriptor xml:lang="ne">Kunstmatige inseminatie</descriptor>
        <descriptor xml:lang="fi">Keinohedelmöitys</descriptor>
        <descriptor xml:lang="ge">Künstliche Befruchtung</descriptor>
</hpm:Concept>
```

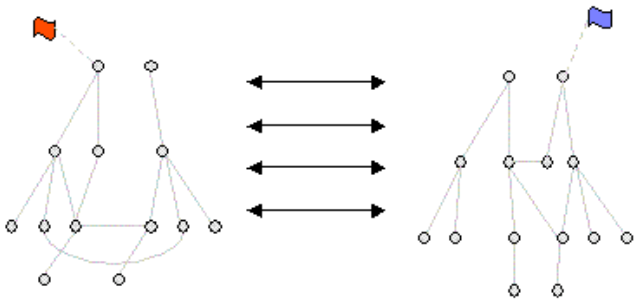
```
<hpm:Concept>
        <descriptor xml:lang="en">Menopause</descriptor>
        <descriptor xml:lang="fr">Ménopause</descriptor>
        <descriptor xml:lang="da">Menopause</descriptor>
        <descriptor xml:lang="ne">Menopauze</descriptor>
        <altLabel xml:lang="ne">Overgang</altLabel>
        <descriptor xml:lang="fi">Vaihdevuodet</descriptor>
        <altLabel xml:lang="fi">Menopaussi</altLabel>
        <descriptor xml:lang="ge">Menopause</descriptor>
</hpm:Concept>

</rdf:RDF>
```

3. Interlingual Mapping [☞back to contents]

In this treatment, a separate conceptual structure is defined for each language component. A complete, bidirectional mapping is then defined between each of the language components. The SKOS-Mapping RDF schema is used to express the mappings.

Figure 2. Interlingual mapping



Interlingual mapping is considered to be a special case of inter-thesaurus mapping [☞5]. A more complete description and guide to the use of SKOS-Mapping may be found in the ☞SWAD-Europe report on inter-thesaurus mapping [☞4].

A situation that is well covered by the interlingual mapping approach is the combined use of the French Merimee thesaurus [☞9] and the English Art and Architecture Thesaurus [☞10]. These two thesauri have been define d by independent authorities, but are highly overlapping in their subject domain. A complete mapping has already been defined between these two thesauri [☞5]. An example of how these mappings could be expressed using the SKOS-Mapping sc hema is provided below ...

```
<?xml version="1.0" encoding="UTF-8"?>
<rdf:RDF xmlns="http://www.w3c.rl.ac.uk/2003/11/21-skos-core#"
        xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
        xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
        xmlns:map="http://www.w3c.rl.ac.uk/2003/11/21-skos-mapping#"
        xmlns:aat="http://www.getty.edu/research/conducting_research/vocabularies/aat/"
        xmlns:mer="http://www.culture.fr/documentation/merimee#">

<rdfs:Class rdf:about="http://www.culture.fr/documentation/merimee#Concept">
        <rdfs:label>Merimee Thesaurus Concept</rdfs:label>
        <rdfs:subClassOf rdf:resource="http://www.w3c.rl.ac.uk/2003/11/21-skos-core#Concept"/>
</rdfs:Class>

<rdfs:Class rdf:about="http://www.getty.edu/research/conducting_research/vocabularies/aat/Concept">
        <rdfs:label>AAT Concept</rdfs:label>
        <rdfs:subClassOf rdf:resource="http://www.w3c.rl.ac.uk/2003/11/21-skos-core#Concept"/>
</rdfs:Class>

<mer:Concept>
        <descriptor xml:lang="fr">Academie</descriptor>
        <map:exactMatch>
                <map:AND>
                        <map:memberList rdf:parseType="Collection">
                                <aat:Concept>
                                        <descriptor xml:lang="en">Academy</descriptor>
                                </aat:Concept>
                                <aat:Concept>
                                        <descriptor xml:lang="en">Buildings</descriptor>
                                </aat:Concept>
                        </map:memberList>
                </map:AND>
        </map:exactMatch>
</mer:Concept>

<mer:Concept>
        <descriptor xml:lang="fr">Aire de concassage</descriptor>
        <map:exactMatch>
                <map:AND>
                        <map:memberList rdf:parseType="Collection">
                                <aat:Concept>
                                        <descriptor xml:lang="en">Crushing</descriptor>
                                </aat:Concept>
                                <aat:Concept>
                                        <descriptor xml:lang="en">Floors</descriptor>
                                </aat:Concept>
                        </map:memberList>
```

```
        </map:exactMatch>
</mer:Concept>

<mer:Concept>
        <descriptor xml:lang="fr">Archeveche</descriptor>
        <map:exactMatch>
                <map:AND>
                        <map:memberList rdf:parseType="Collection">
                                <aat:Concept>
                                        <descriptor xml:lang="en">Bishop (prelate)</descriptor>
                                </aat:Concept>
                                <aat:Concept>
                                        <descriptor xml:lang="en">Palaces</descriptor>
                                </aat:Concept>
                        </map:memberList>
                </map:AND>
        </map:exactMatch>
        <map:narrowMatch>
                <map:AND>
                        <map:memberList rdf:parseType="Collection">
                                <aat:Concept>
                                        <descriptor xml:lang="en">Archbishop</descriptor>
                                </aat:Concept>
                                <aat:Concept>
                                        <descriptor xml:lang="en">Palaces</descriptor>
                                </aat:Concept>
                        </map:memberList>
                </map:AND>
        </map:narrowMatch>
</mer:Concept>

<mer:Concept>
        <descriptor xml:lang="fr">Ecole de danse</descriptor>
        <map:exactMatch>
                <map:OR>
                        <map:memberList rdf:parseType="Collection">
                                <map:AND>
                                        <map:memberList rdf:parseType="Collection">
                                                <aat:Concept>
                                                        <descriptor xml:lang="en">Ballet</descriptor>
                                                </aat:Concept>
                                                <aat:Concept>
                                                        <descriptor xml:lang="en">Schools</descriptor>
                                                </aat:Concept>
                                        </map:memberList>
                                </map:AND>
                                <map:AND>
                                        <map:memberList rdf:parseType="Collection">
                                                <aat:Concept>
                                                        <descriptor xml:lang="en">Dance</descriptor>
                                                </aat:Concept>
                                                <aat:Concept>
                                                        <descriptor xml:lang="en">Studios (work
spaces)</descriptor>
                                                </aat:Concept>
                                        </map:memberList>
                                </map:AND>
                        </map:memberList>
                </map:OR>
        </map:exactMatch>
</mer:Concept>

<mer:Concept>
        <descriptor xml:lang="fr">Etablissement conventuel</descriptor>
        <map:broadMatch>
                <map:AND>
                        <map:memberList rdf:parseType="Collection">
                                <aat:Concept>
                                        <descriptor xml:lang="en">Christian</descriptor>
                                </aat:Concept>
                                <aat:Concept>
                                        <descriptor xml:lang="en">Religious communities</descriptor>
                                </aat:Concept>
                        </map:memberList>
                </map:AND>
        </map:broadMatch>
</mer:Concept>

</rdf:RDF>
```

Note that language tags should still be attached to the labels, even though every concept has only labels from one language.

4. Summary and Conclusions [☞back to contents]

The SKOS-Core [☞1] and SKOS-Mapping [☞3] vocabularies may be used to achieve the RDF encoding of multilingual thesauri. The style and nature of this encoding is consistent with current standards and best pracitse in t he construction and use of multilingual thesauri [☞5] [☞6] [☞7] [☞11].

When approaching the task of generating an RDF encoding for a multilingual thesaurus, it should first be considered whether the *multlingual labelling* approach, or the *interlingual mapping* approach is most suitable. If the thesaurus e ssentially describes a sinlge, coherent conceptual structure, then the multilingual labelling approach is

recommended. If each language component of the thesaurus defines a unique conceptual structure, then the interlingual mapping approach is recommende d. It is worth bearing in mind that, if a complete interlingual mapping has not already been defined for your target thesuari, to generate such a mapping from scratch is a labour-intensive task.

This document should be accompanied by ☞SWAD-Europe Deliverable 8.4, which gives a fuller guide to the generation, use and encoding of interthesaurus mappings.

References [☞back to contents]

[1] **SKOS-Core RDF Schema**
☞http://www.w3c.rl.ac.uk/2003/11/21-skos-core
[2] Miles, A.J., Matthews, B.M., Wilson, M.J., **SKOS-Core Guide** (SWAD-Europe Deliverable 8.1, version 0.4)
☞http://www.w3c.rl.ac.uk/SWAD/deliverables/8.1.html
[3] **SKOS-Mapping RDF Schema**
☞http://www.w3c.rl.ac.uk/2003/11/21-skos-mapping
[4] Miles, A.J., Matthews, B.M., Wilson, M.J., **SKOS-Mapping: RDF Vocabulary Extension for Inter-Thesaurus Mapping** (SWAD-Europe Deliverable 8.4, version 0.1)
☞http://www.w3c.rl.ac.uk/SWAD/deliverables/8.4.html
[5] Doerr, M. (2001) **Semantic Problems of Thesaurus Mapping**, *Journal of Digital Information*, volume 1 issue 8.
☞http://jodi.ecs.soton.ac.uk/Articles/v01/i08/Doerr/
[6] Kokkelink, S., Schwanzl, R. (2002) **Expressing Qualified Dublin Core in RDF/XML**.
☞http://dublincore.org/documents/dcq-rdf-xml/
[7] Shiri, A. (2002) **Investigation of problems and issues in integrating and mapping thesauri and classification schemes** (HILT Project Report).
☞http://hilt.cdlr.strath.ac.uk/hilt2web/Reports/HILt_LITRev%201a.doc
[8] **HPMulti: The European multilingual thesaurus on health promotion in 12 languages**.
☞http://www.hpmulti.net/
[9] **Merimee Thesaurus**.
☞http://www.culture.gouv.fr/documentation/thesarch/pres.htm
[10] **Art & Architecture Thesaurus** (2000) The J. Paul Getty Trust.
☞http://www.getty.edu/research/conducting_research/vocabularies/aat/
[11] ISO (1985) ISO 5964:1985 Documentation - **Guidelines for the establishment and development of multilingual thesauri**. (61 p.)
[12] **LIMBER: Language Independent Metadata Browsing of European Resources**.
☞http://www.limber.rl.ac.uk/
[13] Beckett, D., McBride, B. (2003) **RDF/XML Syntax Specification (Revised)**.
☞http://www.w3.org/TR/rdf-syntax-grammar/

Appendix I - SKOS-Core RDF Schema [☞back to contents]

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE rdfs [
        <!ENTITY rdf "http://www.w3.org/1999/02/22-rdf-syntax-ns#">
        <!ENTITY rdfs "http://www.w3.org/2000/01/rdf-schema#">
        <!ENTITY dc "http://purl.org/dc/elements/1.1/">
        <!ENTITY dct "http://purl.org/dc/terms/">
]>
<rdf:RDF xmlns:rdf="&rdf;" xmlns:rdfs="&rdfs;" xmlns:dc="&dc;"
xmlns:dct="&dct;"
xml:base="http://www.w3c.rl.ac.uk/2003/11/21-skos-core">
        <!-- Description of this schema -->
        <rdf:Description rdf:about="">
                <dc:title>SKOS RDF Vocabulary</dc:title>
                <dc:description>An RDF vocabulary for defining simple conceptual
 schemes such as thesauri, taxonomies and classification schemes.  This
 is a pure RDF schema version.  Features such as transitivity of
 properties and equivalence with properties from
  other schema are described in the comments.  These will be formally
 specified in a later OWL version of this schema.</dc:description>
                <dc:author>Alistair Miles</dc:author>
                <rdfs:seeAlso rdf:resource="http://www.w3c.rl.ac.uk/SWAD/deliverables/8.1.html"/>
                <dct:modified>2003-11-21</dct:modified>
        </rdf:Description>
        <!-- Fundamental classes -->
        <rdfs:Class rdf:ID="Concept">
                <rdfs:label>Concept</rdfs:label>
                <rdfs:comment>Use this class to indicate that a node may be
 considered to be an abstract concept that is part of some conceptual
 scheme such as a thesaurus.</rdfs:comment>
        </rdfs:Class>
        <rdfs:Class rdf:ID="Facet">
                <rdfs:label>Facet</rdfs:label>
                <rdfs:subClassOf rdf:resource="#Concept"/>
                <rdfs:comment>Facets provide a means of organising concepts
 along orthogonal dimensions.  A facet is treated as a concept.  A facet
 may have member concepts.  A concept may be a member of only one
```

```
        </rdfs:Class>
        <!-- Basic properties of concepts -->
        <rdf:Property rdf:ID="prefLabel">
                <rdfs:label>preferred-label</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="&rdfs;label"/>
                <rdfs:comment>Use this property to indicate a literal which is
 the preferred label for a resource.  If a resource has this property,
 all other rdfs:label properties are considered to be the 'alternative'
 (i.e. non-preferred) labels.</rdfs:comme nt>
        </rdf:Property>
        <rdf:Property rdf:ID="descriptor">
                <rdfs:label>descriptor</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="#prefLabel"/>
                <rdfs:subPropertyOf rdf:resource="&rdf;value"/>
                <rdfs:domain rdf:resource="#Concept"/>
                <rdfs:comment>A 'descriptor' is a label that uniquely identifies
 a concept within a conceptual scheme.  A descriptor must be
 unambiguous.  Examples of good descriptors are 'Orange (fruit)' and
  'Java programming language'.   Examples of poor descriptors are
'Orange' and 'Java'.  </rdfs:comment>
        </rdf:Property>
        <rdf:Property rdf:ID="externalID">
                <rdfs:label>external-identifier</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="&rdf;value"/>
                <rdfs:domain rdf:resource="#Concept"/>
                <rdfs:comment>An 'externalID' is any non-lexical identifying
 code that is used to uniquely identify a concept within a conceptual
 scheme.</rdfs:comment>
        </rdf:Property>
        <rdf:Property rdf:ID="semanticRelation">
                <rdfs:label>semantic-relation</rdfs:label>
                <rdfs:domain rdf:resource="#Concept"/>
                <rdfs:range rdf:resource="#Concept"/>
                <rdfs:comment>This property is the super-property of all
 properties used to make statements about how concepts relate to each
 other.  </rdfs:comment>
        </rdf:Property>
        <!-- Generic semantic relation properties -->
        <rdf:Property rdf:ID="broader">
                <rdfs:label>has-broader-concept</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="#semanticRelation"/>
                <rdfs:comment>This property carries very weak semantics.  It may
 be used to state that the object is in some way more general in meaning
 than the subject.  Essentially it provides a means of organising
 concepts into hierarchical structures, without being restrictive about
 the exact semantic implications of the hierarchical structure itself.
 Extend this property to create properties that carry stronger semantics,
 but may be reduced to a hierarchical structure for simple visual
  displays.  This property may be considered to be
transitive.</rdfs:comment>
        </rdf:Property>
        <rdf:Property rdf:ID="narrower">
                <rdfs:label>has-narrower-concept</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="#semanticRelation"/>
                <rdfs:comment>This property should be considered to be the
 inverse of the 'broader' property.</rdfs:comment>
        </rdf:Property>
        <rdf:Property rdf:ID="related">
                <rdfs:label>has-related-concept</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="#semanticRelation"/>
                <rdfs:comment>This property carries very weak semantics.  It may
 be used to state that that the object is in some way related to the
 subject, and the nature of that relationship is NOT to be treated as
 hierarchical.  Extend this property to create
  properties with stronger semantics, but may still be reduced to an
 associative structure for simple visual display.  This property should
 be considered to be symmetric. </rdfs:comment>
        </rdf:Property>
        <!-- Semantic relation property extensions -->
        <rdf:Property rdf:ID="inFacet">
                <rdfs:label>member-of-facet</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="#broader"/>
                <rdfs:range rdf:resource="#Facet"/>
                <rdfs:comment>This property indicates that a concept is a member
 of a facet.  A concept may have only one inFacet property.  This
 property is a sub-property of the 'broader' property.  Thus faceted
  conceptual structures may be reduced to simple hierarchical displays by
applications that do not comprehend facets.</rdfs:comment>
        </rdf:Property>
        <rdf:Property rdf:ID="broaderInstantive">
                <rdfs:label>instance-of</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="#broader"/>
                <rdfs:comment>An extension of the 'broader' property to specify
 the instantiation relationship between two concepts.  This property is
 semantically equivalent to the 'rdf:type' property. </rdfs:comment>
        </rdf:Property>
        <rdf:Property rdf:ID="narrowerInstantive">
                <rdfs:label>has-instance</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="#narrower"/>
                <rdfs:comment>An extension of the 'narrower' property to specify
 the instantiation relationship between two concepts.  This property
 should be considered the inverse of 'broaderInstantive'.
</rdfs:comment>
        </rdf:Property>
        <rdf:Property rdf:ID="broaderGeneric">
                <rdfs:label>sub-class-of</rdfs:label>
```

```
                <rdfs:comment>An extension of the 'broader' property to specify
 the class subsumption relationship between two concepts.  This property
 is semantically equivalent to the 'rdfs:subClassOf'
property.</rdfs:comment>
        </rdf:Property>
        <rdf:Property rdf:ID="narrowerGeneric">
                <rdfs:label>super-class-of</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="#narrower"/>
                <rdfs:comment>An extension of the 'narrower' property to specify
 the class subsumption relationship between two concepts.  This property
 should be considered the inverse of 'broaderGeneric'. </rdfs:comment>
        </rdf:Property>
        <rdf:Property rdf:ID="broaderPartitive">
                <rdfs:label>part-of</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="#broader"/>
                <rdfs:comment>An extension of the 'broader' property to specify
 a partitive relationship between two concepts.</rdfs:comment>
        </rdf:Property>
        <rdf:Property rdf:ID="narrowerPartitive">
                <rdfs:label>has-part</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="#narrower"/>
                <rdfs:comment>An extension of the 'narrower' property to specify
 a partitive relationship between two concepts.  This property should be
 considered to be the inverse of 'broaderPartitive'.</rdfs:comment>
        </rdf:Property>
        <!-- Scope and other notes -->
        <rdf:Property rdf:ID="scopeNote">
                <rdfs:label>scope-note</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="&rdfs;comment"/>
                <rdfs:comment>A scope note is a piece of text that in some way
 helps to further elucidate the intended meaning of a
concept.</rdfs:comment>
                <rdfs:domain rdf:resource="#Concept"/>
        </rdf:Property>
        <rdf:Property rdf:ID="generalNote">
                <rdfs:label>general-note</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="&rdfs;comment"/>
        </rdf:Property>
        <rdf:Property rdf:ID="hierarchyNote">
                <rdfs:label>hierarchy-note</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="&rdfs;comment"/>
                <rdfs:comment>A note on the hierarchical location of a
 concept.</rdfs:comment>
        </rdf:Property>
        <rdf:Property rdf:ID="editorNote">
                <rdfs:label>editor-note</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="&rdfs;comment"/>
        </rdf:Property>
        <rdf:Property rdf:ID="historyNote">
                <rdfs:label>history-note</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="&rdfs;comment"/>
                <rdfs:comment>A note providing information about the history of
 change of a concept.</rdfs:comment>
        </rdf:Property>
</rdf:RDF>
```

Appendix II - SKOS-Mapping RDF Schema [☞back to contents]

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE rdfs [
        <!ENTITY rdf "http://www.w3.org/1999/02/22-rdf-syntax-ns#">
        <!ENTITY rdfs "http://www.w3.org/2000/01/rdf-schema#">
        <!ENTITY dc "http://purl.org/dc/elements/1.1/">
        <!ENTITY dct "http://purl.org/dc/terms/">
]>
 <rdf:RDF xmlns:rdf="&rdf;" xmlns:rdfs="&rdfs;" xmlns:dc="&dc;"
 xmlns:dct="&dct;"
xml:base="http://www.w3c.rl.ac.uk/2003/11/21-skos-mapping">
        <!-- Description of this schema -->
        <rdf:Description rdf:about="">
                <dc:title>SKOS Mapping Vocabulary version 0.2</dc:title>
                <dc:description>This vocabulary allows you to express
 information about how statements made using concepts from some
 conceptual scheme may be transformed into statements with concepts from
  a different scheme.  So for example it can be used for automated query
transformation.  Or It could be used to create a virtual
 subject index for a collection in terms of an alternative classification
system.  </dc:description>
                <dc:author>Alistair Miles</dc:author>
                <rdfs:seeAlso rdf:resource="http://www.w3c.rl.ac.uk/SWAD/deliverables/8.4.html"/>
                <dct:modified>2003-12-04</dct:modified>
        </rdf:Description>
        <!-- Mapping relation properties -->
        <rdf:Property rdf:ID="mappingRelation">
                <rdf:label>has-match</rdf:label>
                <rdfs:comment>The super-property of all properties expressing
 information about how to create mappings between concepts frmo different
conceptual schemes.</rdfs:comment>
        </rdf:Property>
        <rdf:Property rdf:ID="exactMatch">
                <rdfs:label>has-exact-match</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="#mappingRelation"/>
```

```
   of resources properly indexed against the first concept is identical
 to the set of resources properly indexed against the second.  Therefore
 the two concepts may be interchanged in queries and subject-based
indexes.</rdfs:comment>
        </rdf:Property>
        <rdf:Property rdf:ID="broadMatch">
                <rdfs:label>has-broad-match</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="#mappingRelation"/>
                <rdfs:comment>If 'concept A has-broad-match concept B' then the
 set of resources properly indexed against concept A is a subset of the
 set of resources properly indexed against concept B.</rdfs:comment>
        </rdf:Property>
        <rdf:Property rdf:ID="narrowMatch">
                <rdfs:label>has-narrow-match</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="#mappingRelation"/>
                <rdfs:comment>If 'concept A has-narrow-match concept B' then the
 set of resources properly indexed against concept A is a superset of the
 set of resources properly indexed against concept B.</rdfs:comment>
        </rdf:Property>
        <rdf:Property rdf:ID="majorMatch">
                <rdfs:label>has-major-match</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="#mappingRelation"/>
                <rdfs:comment>If 'concept A has-major-match concept B' then the
 set of resources properly indexed against concept A shares more than 50%
 of its members with the set of resources properly indexed against
concept B.</rdfs:comment>
        </rdf:Property>
        <rdf:Property rdf:ID="minorMatch">
                <rdfs:label>has-minor-match</rdfs:label>
                <rdfs:subPropertyOf rdf:resource="#mappingRelation"/>
                <rdfs:comment>If 'concept A has-minor-match concept B' then the
 set of resources properly indexed against concept A shares less than 50%
 but greater than 0 of its members with the set of resources properly
 indexed against concept B.</rdfs:comme nt>
        </rdf:Property>
        <!-- Combination constructs -->
        <rdfs:Class rdf:ID="CombinationConstruct">
                <rdfs:label>Concept-combination</rdfs:label>
        </rdfs:Class>
        <rdfs:Class rdf:ID="AND">
                <rdfs:label>AND</rdfs:label>
                <rdfs:subClassOf rdf:resource="#CombinationConstruct"/>
                <rdfs:comment>This class is a shorthand for an intersection-like
 construct.  So the statement 'concept A has-exact-match AND (concept B,
 concept C)' implies that the set of resources properly indexed against
 concept A is identical to the intersection of the sets properly indexed
against concepts B and C.  </rdfs:comment>
        </rdfs:Class>
        <rdfs:Class rdf:ID="OR">
                <rdfs:label>OR</rdfs:label>
                <rdfs:subClassOf rdf:resource="#CombinationConstruct"/>
                <rdfs:comment>This class is a shorthand for a union-like
 construct.  So the statement 'concept A has-exact-match OR (concept B,
 concept C)' implies that the set of resources properly indexed against
  concept A is identical to the union of the sets properly indexed against
concepts B and C.  </rdfs:comment>
        </rdfs:Class>
        <rdfs:Class rdf:ID="NOT">
                <rdfs:label>NOT</rdfs:label>
                <rdfs:subClassOf rdf:resource="#CombinationConstruct"/>
                <rdfs:comment>This class is a shorthand for a negation-like
 construct.  So the statement 'concept A has-exact-match AND (concept B,
 NOT (concept C))' implies that the set of resources properly indexed
 against concept A is identical to the intersection of the set properly
 indexed against concept B and the complement of the set properly indexed
against concept C.</rdfs:comment>
        </rdfs:Class>
        <rdf:Property rdf:ID="memberList">
                <rdfs:label>has-member</rdfs:label>
                <rdfs:domain rdf:resource="#CombinationConstruct"/>
        </rdf:Property>

</rdf:RDF>
```