

## MODELLING THE CONCEPTS OF BIBLIOGRAPHIC CATALOGUING CARDS USING XML SCHEMA LANGUAGE

Jovana Vidaković<sup>1</sup>, Miloš Racković<sup>1,2</sup>

**Abstract.** Reports in library information system involve bibliographic cataloguing cards. XML Schema for modelling the concepts of bibliographic cataloguing card is described. All concepts of the main bibliographic cataloguing card are shown. Analysis of the capability of XML Schema language for representing the concepts of all types of the bibliographic cataloguing cards is given too. Besides, the possibilities of XML Schema language for modelling punctuation of bibliographic cataloguing cards are considered.

*AMS Mathematics Subject Classification (2000):* 68P15, 68P05

*Key words and phrases:* XML Schema, modelling bibliographic cataloguing cards, bibliographic concepts

### 1. Introduction

The bibliographic cataloguing cards as one type of reports in the library information system have to satisfy certain standards [1]. First of all that is the ISBD standard (International Standard Bibliographic Description) which prescribes order and punctuation in the bibliographic description. Next is the ISO standard (International Standard Organization) for transliteration, language, standard number of monograph or serial publication, etc. It is necessary to enable introducing new types of reports in the library information system.

In [2], the visualization of bibliographic cataloguing cards using XSL program is considered. The XSL program for creating a card type is given. It is possible to make XSL programs for creating other types of cards in a similar way.

In [3], the XML Schema that describes the main unique cataloguing card for monographic publication is given. The Java programs that parse Schema and extract the tags which are going to be presented on the card are given too. In a similar way it is possible to make Schema documents for other types of cards. In this paper an idea for generating cataloguing cards is presented.

---

<sup>1</sup>University of Novi Sad, Faculty of Science and Mathematics, Department of Mathematics and Informatics, Trg D. Obradovića 4, 21000 Novi Sad, Serbia and Montenegro, e-mail: {jovana, rackovic}@im.ns.ac.yu

<sup>2</sup>The work is supported by the Ministry for Science, Technologies and Development of the Republic of Serbia (Project No 1875)

In this paper we describe the modelling of the bibliographic cataloguing cards using XML Schema language. Using two XML Schema documents we define the structure and content of the bibliographic cataloguing cards. A general XML Schema document that describes all concepts of all types of the cataloguing cards is made.

The description and content of a cataloguing card is made in XML Schema language. XML Schema language [4] is an XML language for describing the structure, content and validation of XML documents. It uses XML grammar, tools and technology. XML Schema language is used to define the XML Schema. The XML Schema is a collection of statements that define the data set structure and restrictions on that structure. It is more advanced than the DTD (Document Type Definition) because it gives more possibilities for choosing data types, there are global attributes and the possibility of reusing the definitions through references and inheritance.

An XML Schema document is formed using the XML Spy editor [Altova GmbH & Altova Inc]. This editor is very convenient for the work with XML documents because it has both text and graphic visualization of the XML documents. It also enables the validation of XML documents.

## 2. The concepts of bibliographic cataloguing card

The bibliographic cataloguing cards are types of bibliographic records [5]. The bibliographic description in the ISBD standard occurs as the cataloguing unit that is displayed on the cataloguing card. The ISBD standard defines the bibliographic data order and specific punctuation. This standard also includes data import from well defined sources.

The bibliographic data order defines the bibliographic description structure. Basic parts of a cataloguing unit are the *headword* and the *cataloguing description*. The headword is a set of words that defines the position of the cataloguing unit in the catalogue. The cataloguing description contains the data for identifying the publication. It is a complex structure and its most important parts are: the title, statement of responsibility, edition area, material (or type of publication) specific area, distribution area, note area, ISBN, UDC number.

Beside these basic elements a cataloguing card can contain the area of *call number*, headwords of auxiliary cataloguing units, *inventory number*, etc [6]. Each of these elements has its place on the cataloguing card. Since cataloguing units are created for all bibliographic record types, the appearance and layout of bibliographic description elements are different from type to type. In respect of the data contained and their size the cataloguing units are classified as main (for monographs, serial publications, articles, etc.), and auxiliary (accessory, by subject, by author, etc., and referring).

The concept comprises the headword and cataloguing description elements. The uniqueness of the content topic and common rules for language or punctuation are the concept characteristics. The most important basic concepts are:

*call number, headword, main description, remarks, tracing, ISBN and ISSN, UDC number, inventory number, etc.*

The cataloguing cards are created as the combination of these basic concepts. The punctuation and listing rules are defined for each concept.

### 3. The XML Schema for the cataloguing card concept description

In this paper two XML Schema documents are presented: first displays the description of all concepts that can be found on the cataloguing cards, while the second contains the list of concepts that forms the cataloguing card for monograph publications. The punctuation and the way of concept presentation are included in the first schema document. The way of processing of each concept is considered. It will be used in the cataloguing card processing and visualization. The rules for card processing are: *aggregation, or* and *and* [5].

The *aggregation* rule takes tuple in which the order of element is important. The elements are processed in a particular order respecting the indicators of appearance until there is the end of the tuple. The *or* rule means that the elements are processed in the order and the processing is finished when one element is successfully processed. The *and* rule takes the elements in the order and all elements have to be successfully processed.

The application of a certain rule depends on the field or subfield that should be displayed on the card. Only parts of the first document are given in the Schema Design view and the textual view. All figures are taken from an original software for work with the bibliographic cataloguing cards. The software is based on the YUMARC standard [7].

Figure 1 displays the XML Schema document appearance for description of all concepts in Schema Design view. This view, supported by XML Spy editor, is appropriate since it gives the visual interpretation of the tree structure which is the structure of XML documents.

The root element of this XML document is Concepts. It is the sequence of all other elements which are the concepts. In the Schema Design view it is displayed with a graphical symbol. The plus signs beside some concepts indicate that the concept is a complex element and that it consists of fields or subfields. The source matched to this figure will be described by the concept CallNumber.

The CallNumber concept consists of the contents of three subsubfields of the field **996**, the subfield **d**, or three subsubfields of the field **997**, subfield **d** [7], depending on the publication type. This concept is displayed as a choice (*choice* element) of two offered elements, field **996** subfield **d** or field **997** subfield **d**, each one having a sequence of elements i.e. subsubfields. The *choice* element has its own symbol in the figure. The processing rule is the rule *or*. Each subsubfield has its own punctuation and the indentation and language are defined for the whole concept.

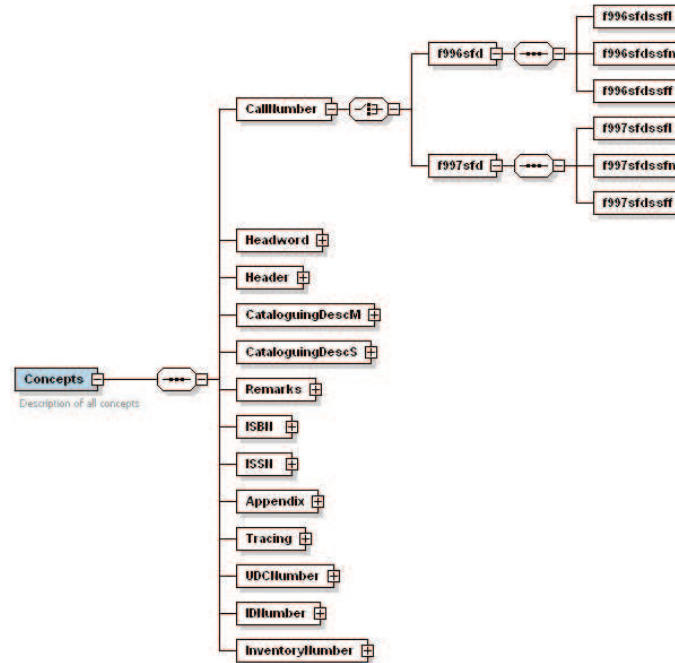


Figure 1: Description of all concepts

In Listing 1a a part of the XML Schema document is displayed. It is related to the call number of the bibliographic cataloguing card, field **996** subfield **d**. The contents of subsubfields **l**, **n** and **f** should be written on the card with the punctuation whose value is placed in the attribute *punctuation* in the elements that represent subsubfields. The processing rule is the rule *or*.

The *call number* is a choice of two subfields. The name of the first subfield that is displayed in this part of the source is **f996sfd**, which means *field 996 subfield d*. This subfield is the sequence of three subsubfields whose names are **f996sfdssf** (*subsubfield*), **f996sfdssfn** and **f996sfdssff**. Each subsubfield has its own attribute *punctuation* which is related to the punctuation that is placed before the subsubfield content on the card. The **f997sfd** element is formed in the same way.

In Listing 1b the *call number* concept attributes are displayed. These attributes are related to the indentation, the procession rule and the language containing their values in the attribute value. In this example indentation is *right* (other values of this attribute are *left* or certain number of spaces). The procession rule is the rule *or* and the value of this attribute depends on the way of concept processing. The language is the *language of cataloguing* which also depends on the concept.

```

<xsd:element name="CallNumber">
  <xsd:complexType>
    <xsd:choice>
      <xsd:element name="f996sfd">
        <xsd:complexType>
          <xsd:sequence>
            <xsd:element name="f996sfdssf1">
              <xsd:complexType>
                <xsd:attribute name="punctuation" type="xsd:string"/>
              </xsd:complexType>
            </xsd:element>
            <xsd:element name="f996sfdssfn">
              <xsd:complexType>
                <xsd:attribute name="punctuation" type="xsd:string"
value="-"/>
              </xsd:complexType>
            </xsd:element>
            <xsd:element name="f996sfdssff">
              <xsd:complexType>
                <xsd:attribute name="punctuation" type="xsd:string"
value="/"/>
              </xsd:complexType>
            </xsd:element>
          </xsd:sequence>
          <xsd:attribute name="processRule" type="xsd:string"
value="or"/>
        </xsd:complexType>
      </xsd:element>
    </xsd:choice>
  </xsd:element>
  .....

```

Listing 1a: Part of the concept CallNumber

```

<xsd:attribute name="indentation" type="xsd:string" value="right"/>
<xsd:attribute name="processRule" type="xsd:string" value="or"/>
<xsd:attribute name="language" type="xsd:string"
value="languageOfCataloguing"/>

```

Listing 1b: Part of the concept CallNumber

In Figure 2, the part of the document that is related to the cataloguing card *headword* is given in the Design Schema view. The *headword* is formed of one of the specified fields. Because of that the choice element is used. The processing rule is the rule *or*.

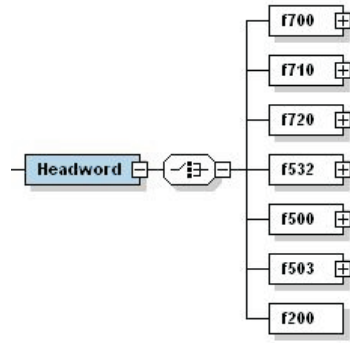


Figure 2: The concept Headword

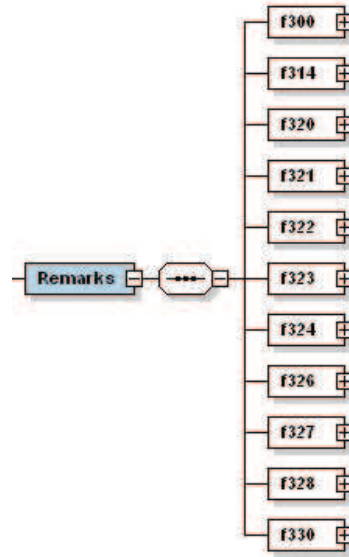


Figure 3: The concept Remarks

The part of the document in Schema Design view that is related to the *remarks* of the bibliographic cataloguing card is given in Figure 3. The remarks consist of the specified subfield content. These subfields are displayed in sequence, which means that their content is placed in that order but none of them is obligatory. The procession rule is the rule *aggregation*.

#### 4. The XML Schema document for the main cataloguing card description

The second XML Schema document describes the content of the main cataloguing card for a monograph publication, i.e. the concepts of this card. This document has information neither on fields/subfields that are part of the concepts nor on punctuation and procession rules. In this way it is possible to create XML Schema documents that are going to represent different sorts of bibliographic cataloguing cards. All other data about concepts can be found in the first specified document. The XML Schema document for main cataloguing card for a monograph publication is given in Listing 2.

In this way the cataloguing card structure is separated from the cataloguing card content. If a new concept needs to be added, it is specified in the XML Schema document for all concepts. Only its name is displayed in the description of the cards.

```

<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XML Spy v3.5 NT (http://www.xmlspy.com) by () -->
<xsd:schema xmlns:xsd="http://www.w3.org/2000/10/XMLSchema"
  elementFormDefault="qualified">
  <xsd:element name="MainCatCard">
    <xsd:annotation>
      <xsd:documentation>Concepts that are part of the main cataloguing
card for monograph publications</xsd:documentation>
    </xsd:annotation>
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="CallNumber"/>
        <xsd:element name="Headword"/>
        <xsd:element name="Header" minOccurs="0"
maxOccurs="unbounded"/>
        <xsd:element name="CataloguingDescM"/>
        <xsd:element name="Remarks"/>
        <xsd:element name="ISBN"/>
        <xsd:element name="Tracing"/>
        <xsd:element name="Appendix"/>
        <xsd:element name="UDCNumber"/>
        <xsd:element name="IDNumber"/>
        <xsd:element name="InventarNumber"/>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
</xsd:schema>

```

Listing 2: The XML Schema document for main cataloguing card

These two documents are the base for creating an application for the cataloguing card generation. In the first pass the program has to extract the concept names for a certain card from the XML Schema document for that card. After that it has to find fields, subfields and subsubfields for those concepts in the XML Schema document that has the description of all concepts. Then it takes the content of needed elements from the bibliographic record and creates the XML document that is visualized in the second pass. The base of this application is given in [3].

## 5. Conclusion

In this paper two XML Schema documents are presented. One of them describes all concepts that can be found on any bibliographic cataloguing card. The other one describes the main cataloguing card structure for monograph publication. In the same way the XML Schema documents for any card type

can be defined putting only the concept names that can be found on that card. These XML Schema documents are processed by the application, the result being a cataloguing card.

If there is a need for adding a new concept the user can edit the XML Schema document. Beside fields and subfields it is necessary to enter the attributes for processing rule, punctuation and language. The application will process the new concept in the same way as the existing concepts.

The XML Schema language is a convenient language for the cataloguing card description since it strictly defines the structure and data types. This approach gives the possibility of the cataloguing card design and content changes transforming the XML document without compiling the source for the document visualization.

## References

- [1] Surla, D., Konjović Z., Milosavljević, B., Vidaković, M., Library Information System BISIS ver. 3.01. In: Proceedings of IX International Conference "Informatics in Education, Quality and Information Technologies", pp. 494–504. Zrenjanin, 2000 (in Serbian).
- [2] Felbapov, J., The Application of XML Technology in Library Reporting. *Infoteka. Journal of Informatics and Librarianship* 2(1–2) (2001) 111–119 (in Serbian).
- [3] Felbapov, J., Racković, M., Modeling of The Bibliographic Cataloguing Cards Using XML Schema Language. CD-ROM from Symposium on Computer Sciences and Information Technologies YU INFO 2002, Kopaonik 2002 (in Serbian).
- [4] [www.w3.org/TR/xmlschema-0/](http://www.w3.org/TR/xmlschema-0/) XML Schema Part 0: Primer, 2 May 2001.
- [5] Vulić, T., The reporting and Documentation Process of the Library Information System. Master Thesis, Novi Sad, 1997 (in Serbian).
- [6] Vulić, T., The Reporting Subsystem in a Library Information System, In: Proceedings of XI Conference on Applied Mathematics. pp. 451–458. Budva, 1996.
- [7] Vulić, T., Bilić, G., The Retrospective Conversion of the Cataloguing Cards in the YUMARC Format. *Computers in University Practice*, Novi Sad, 1997 (in Serbian).

*Received by the editors December 23, 2002*