University of Cape Town

Department of Computer Science

CSC3002f Final Exam

2007

Marks : 100

Time : 180 minutes

Instructions:

- Show all calculations where applicable.

SECTION A : ANSWER ALL QUESTIONS

Question 1: XML and Web Services [8]

a) Name one advantage and one disadvantage in using XML to represent semi-structured data. [2]

widely used, human-readable, etc.

increases size of data

b) XML is arguably a generic information encoding. Explain what facilities it offers to solve each of the following problems:

i) Languages around the world cannot be represented with ASCII. [1]

unicode to express all possible character sets

ii) Fields may have different meanings in different contexts. [1]

namespaces to disambiguate

iii) XML assigns special meaning to some characters (e.g., <) so they cannot be used in documents. [1]

character entities corresponding to special characters

c) The Web Services architecture for distributed computing uses XML as the basis for standards that describe its key components. Explain what the purpose of each of the following standards is:

i) SOAP [1]

standard message envelope for core communication

ii) WSDL [1]

formal description of services, bindings, protocols, etc.

iii) UDDI [1]

registries of web services

SECTION B : ANSWER QUESTION 2 or QUESTION 3

Question 2: XML [7]

a. What is the purpose of XML Schema?   [1]

   formally defines structure of XML, supports validation, etc.

b. How is an XML document or document fragment associated with its XML Schema?   [2]

   by means of a schemaLocation attribute in the root node of the (sub)tree

c. Write an XML Schema complexType type definition **notebooksType** corresponding to the content of the **notebooks** element and its descendents. Assume that the **researcher** element will occur exactly once and that the **book** element must occur at least once.   [4]

```
<notebooks xmlns="http://bleek">
    <researcher>Wilhelm Bleek</researcher>
    <book>BC1</book>
    <book>BC2</book>
</notebooks>
```

<complexType name="notebooksType">
 <sequence>
  <element name="researcher" type="string"/>
  <element name="book" type="string" maxOccurs="unbounded"/>
 </sequence>
</complexType>

[4] Minus one for each major error (incorrect attribute, incorrect structure, missing elements, etc.)

Question 2: XML [7]

a. What is XSLT?   [1]

   language that specifies rules to transform XML into other XML

b. What is XSL-FO?   [1]

   it is an XML format page layout language

c. Write an XSLT template to convert the **notebooks** node into the **academic** subtree. Assume that the **name** element will occur exactly once and that the **book** element must occur at least once.   [5]

```
<notebooks xmlns="http://bleek">
    <researcher>Wilhelm Bleek</researcher>
    <book>BC1</book>
    <book>BC2</book>
</notebooks>

<academic xmlns="http://bleek2">
    <name>Wilhelm Bleek</name>
    <book>BC1</book>
    <book>BC2</book>
</academic>
```

Assume your template will be placed within the following stylesheet:

```
<xsl:stylesheet version="1.0"
    xmlns:xsl=http://www.w3.org/1999/XSL/Transform
```

```
            xmlns:source="http://bleek"
            xmlns:target="http://bleek2">
        ...
        </xsl:stylesheet>
```

<xsl:template match="source:notebooks">
* <target:academic>*
*   <target:name><xsl:value-of select="source:researcher"/></target:name>*
*   <xsl:for-each select="source:book">*
*   <target:book><xsl:value-of select="source:book"/></target:book>*
*   </xsl:for-each>*
* </target:academic>*
</xsl:template>

[5] Minus one for each major error (incorrect attribute, incorrect structure, missing elements, etc.)