University of Cape Town

Department of Computer Science

CSC3002f Supplementary 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) What is the difference between well-formedness and validity? [2]

well-formed has properly nested with a single root, valid is following a formal definition

b) Explain how some Unicode encodings are optimised for languages such as English. [2]

UTF-8 has variable length codes, with shorter codes for characters common in English and longer codes for other characters

c) Well-formed UTF-8-encoded XML may be parsed by either a SAX or DOM parser. Under what circumstances would a SAX parser be the one of choice? [1]

when the size of the XML data to process is large

d) 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. Which Web Service standard relies most upon XML Schema? [1]

SOAP

b. Describe 2 purposes that XML Schema can serve when creating Web Services. [2]

data validation and data format definition

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 the **office** attribute is required.. [4]

```
<notebooks xmlns="http://bleek">
   <researcher office="111">Bleek</researcher>
</notebooks>
```

```
<complexType name="notebooksType">
  <sequence>
    <element name="researcher">
      <complexType>
        <simpleContent>
          <extension base="string">
            <attribute name="office" type="string" use="required"/>
          </extension>
        </simpleContent>
      </complexType>
    </element>
  </sequence>
</complexType>
```

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

Question 2: XML [7]

a. If an XSLT engine CANNOT match the root node, what does it do? [1]

recursively match against each of the child nodes

b. If an XSLT engine CAN match the root node, what does it do? [2]

it replaces the entire XML tree with the contents of the template that matches

c. Write an XSLT template to convert the **notebooks** node into the **academic** subtree. Assume that the **researcher** element will occur exactly once and that the **office** attribute is required. [4]

```
<notebooks xmlns="http://bleek">
   <researcher office="111">Bleek</researcher>
</notebooks>
```

```
<academic xmlns="http://bleek2">
   <name>Wilhelm Bleek</name>
   <office>111</office>
</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>
    <target:office><xsl:value-of select=”source:researcher/@office”/></target:office>
  </target:academic>
</xsl:template>
```

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