UNIVERSITY *of* LIMERICK

OLLSCOIL LUIMNIGH

COLLEGE *of* INFORMATICS *and* ELECTRONICS
Department of Computer Science and Information Systems

End-of-Semester Exam

Academic Year: 2005/2006		**Semester:** Spring
Module Title: Document Architecture Language Engineering 2		**Module Code:** CS4146 and CS5512
Exam Duration: 2½ Hours		**Total Marks:** 80
Lecturer: Dr. N. S. Nikolov		

Instructions to Candidates:

Section A: Multiple-choice and short-answer questions **25 marks**
ALL questions should be attempted.

Section B: Long-answer questions **55 marks**
ALL questions should be attempted.

Please write all answers in the answer booklet.
State clearly any assumptions you make.

Section A:

Multiple Choice questions are no available on the public folders – see Section B only

Section B: Long-Answer Questions

All questions should be attempted

Q8. (total of 20 marks) Consider the following two XML documents.

tvshow01.xml	**tvshow02.xml**
`<?xml version="1.0" encoding="UTF-8"?>`	`<?xml version="1.0" encoding="UTF-8"?>`
`<tvshow year="1999" rating="PG" season="1">`	`<tvshow year="1999" rating="PG" season="1">`
`    <title>Futurama</title>`	`    <title>Futurama</title>`
`    <genrelist>`	`    <genrelist>`
`       <genre name="Animation"/>`	`       <genre name="Cartoon"/>`
`       <genre name="SciFi"/>`	`    </genrelist>`
`       <genre name="Comedy"/>`	`    <creator>`
`    </genrelist>`	`       <firstname>Matt</firstname>`

```
    <creator>
       <firstname>Matt</firstname>
       <surname>Groening</surname>
    </creator>
    <cast>
       <castmember role="Philip J. Fry">
          <firstname>Billy</firstname>
          <surname>West</surname>
       </castmember>
       <castmember role="Turanga Leela">
          <firstname>Katey</firstname>
          <surname>Sagal</surname>
       </castmember>
    </cast>
</tvshow>
```

```
          <surname>Groening</surname>
       </creator>
       <cast>
          <castmember role="Philip J. Fry">
             <firstname>Billy</firstname>
             <surname>West</surname>
          </castmember>
       </cast>
    </tvshow>
```

a. **(10 marks)** Write a DTD file tvshow.dtd such that tvshow01.xml conforms to it (i.e. it is valid), and tvshow02.xml does NOT conform to it (i.e. it is invalid).

b. **(10 marks)** Write an XML schema tvshow.xsd such that tvshow01.xml conforms to it (i.e. it is valid), and tvshow02.xml does NOT conform to it (i.e. it is invalid).

Q9. (total of 15 marks) Consider the following XML document.

library.xml

```
<?xml version="1.0" encoding="UTF-8"?>

<library>
    <section id="1" subject="Computer Science">
       <book language="English" copies="10">
            <title>Problem Solving with Java</title>
            <author>
                <firstname>Nell</firstname>
                <surname>Dale</surname>
            </author>
       </book>
       <book language="English" copies="20">
           <title>C++ Primer</title>
           <author>
               <firstname>John</firstname>
               <surname>Murphy</surname>
           </author>
           <author>
               <firstname>Dan</firstname>
               <surname>North</surname>
           </author>
       </book>
    </section>
    <section id="2" subject="Chemistry"/>
</library>
```

Let

```
xmlDoc = new ActiveXObject('Microsoft.XMLDOM');
xmlDoc.load('books.xml');
```

a. **(2 marks)** Draw the XML DOM tree for **`library.xml`**. For each node, specify its name, type and value.

b. **(3 marks)** What are the values of the variables **`a`** and **`b`** after executing the following fragment of JavaScript code.

```
doc = xmlDoc.documentElement;
a = doc.firstChild.childNodes.item(0).firstChild.nodeValue;
b = doc.firstChild.childNodes.item(0).firstChild.firstChild.nodeValue;
c = doc.lastChild.getAttribute("subject");
```

c. **(5 marks)** Write a JavaScript statement that assigns the contents of the last **`surname`** element (i.e., the string "**`North`**") to a variable called **`sname`**.

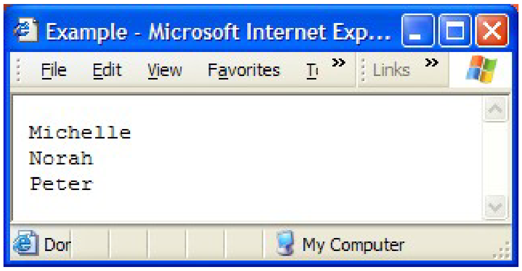
d. **(5 marks)** Write a JavaScript statement that assigns the value of the attribute **`copies`** of the second **`book`** element (i.e., "**`20`**") to a variable called **`ncopies`**.

Q10. (total of 20 marks) Consider the following XML document.

class.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<Class>
      <Students>
            <Student id="03453345">
                  <Name>Michelle</Name>
                  <Grade module="CS8182" value="3"/>
                  <Grade module="CS8358" value="2"/>
                  <Grade module="CS8234" value="1"/>
                  <Grade module="CS8742" value="4.5"/>
            </Student>
            <Student id="03329032">
                  <Name>Norah</Name>
                  <Grade module="CS8182" value="8"/>
                  <Grade module="CS8358" value="6.25"/>
                  <Grade module="CS8234" value="5"/>
                  <Grade module="CS8742" value="4"/>
            </Student>
            <Student id="03353453">
                  <Name>Peter</Name>
                  <Grade module="CS8182" value="1"/>
                  <Grade module="CS8358" value="2"/>
                  <Grade module="CS8234" value="2"/>
                  <Grade module="CS8742" value="2"/>
            </Student>
      </Students>
</Class>
```

a. (5 marks) Write an XSLT stylesheet that transforms **`class.xml`** into an HTML document which contains only the names of the students. When loaded in a browser the HTML document should look like:



```
Michelle
Norah
Peter
```

b. (15 marks) Write an XSLT stylesheet that transforms **`class.xml`** into an XML document which contains only the students whose last grade is greater than or equal to 4, and has the following format:

```
<?xml version="1.0" encoding="utf-8"?>
<Class>
    <Student name="Michelle">
        <Grades>3, 2, 1, 4.5</Grades>
    </Student>
    <Student name="Norah">
        <Grades>8, 6.25, 5, 4</Grades>
    </Student>
</Class>
```

End of Exam