Université d'Ottawa
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University of Ottawa
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School of Information
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WWW Structures, Techniques and Standards (CSI 3140)
Final Examination

Professor: Guy-Vincent Jourdan

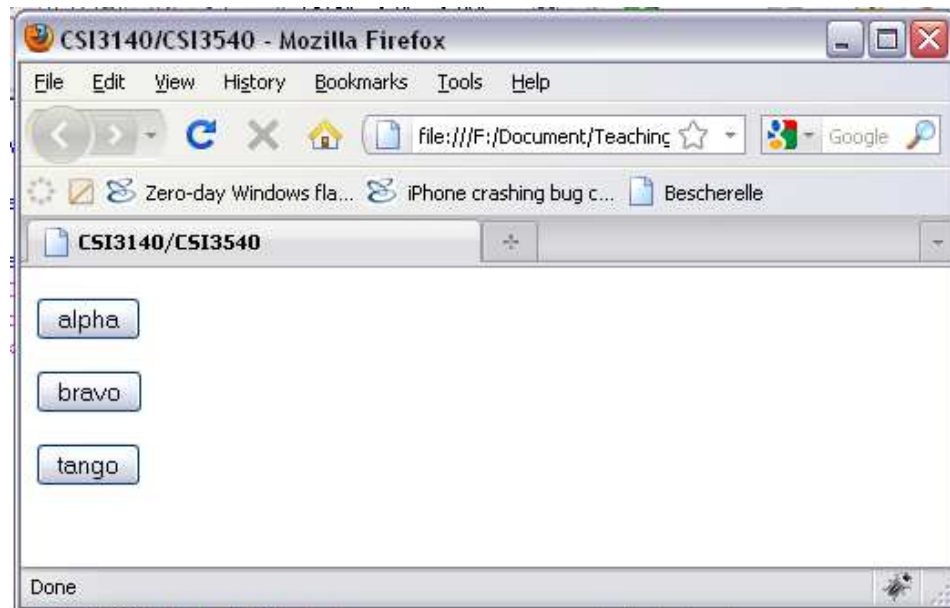April 20 2010, duration: 3 h

Identification

First Name, Last Name: _____

Student number: _____ Signature: _____

Question	Maximum	Mark
1	6	
2	8	
3	5	
4	5	
5	6	
6	8	
7	4	
8	6	
9	5	
10	6	
11	8	
12	6	
13	8	
14	4	
15	9	
16	6	
Total	**100**	

Notes: Closed books; No calculator or any other form of help; Answer on the space provided;
Write carefully and legibly, your mark also depends on it.

1. (6 marks) This question uses the XHTML document shown next page.

(a) What will be displayed in the **alert** box when button **alpha** is clicked:

    i. f(i1,i3)

    ii. g(i3,i3)

    iii. g(i3,i3), f(i1,i3), g(i1,i3)

    iv. g(i3,i3), g(i1,i3), f(i1,i3)

    v. f(i1,i3), g(i3,i3), g(i1,i3)

(b) What will be displayed in the **alert** box when button **bravo** is clicked:

    i. f(i1,i5), h(i4,i5), g(i5,i5), g(i1,i5)

    ii. g(i5,i5), h(i4,i5)

    iii. f(i1,i5), h(i4,i5)

    iv. g(i5,i5), h(i4,i5), f(i1,i5), g(i1,i5)

    v. g(i5,i5), g(i1,i5), h(i4,i5)

(c) What will be displayed in the **alert** box when button **tango** is clicked:

    i. f(i1,i7), h(i6, i7)

    ii. g(i7,i7), h(i6, i7)

    iii. g(i7,i7), h(i6, i7), f(i6, i7)

    iv. f(i1,i7), h(i6, i7), f(i6, i7)

    v. g(i7,i7), h(i6, i7), f(i6, i7), f(i1,i7)

```
<!DOCTYPE html SYSTEM "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
  <head>
    <title>CSI3140/CSI3540</title>
    <script type="text/javascript">
    function f( event ) {
        alert( "f(" + event.currentTarget.id + "," + event.target.id + ")" );
    }
    function g( event ) {
        alert( "g(" + event.currentTarget.id + "," + event.target.id + ")" );
    }
    function h( event ) {
        alert( "h(" + event.currentTarget.id + "," + event.target.id + ")" );
        event.stopPropagation();
    }
    function addHandlers() {
        var elem = document.getElementById( "i1" );
        elem.addEventListener( "click", f, true );
        elem.addEventListener( "click", g, false );
        var elem = document.getElementById( "i3" );
        elem.addEventListener( "click", g, false );
        var elem = document.getElementById( "i4" );
        elem.addEventListener( "click", h, true );
        var elem = document.getElementById( "i5" );
        elem.addEventListener( "click", g, false );
        var elem = document.getElementById( "i6" );
        elem.addEventListener( "click", h, true );
        elem.addEventListener( "click", f, true );
        var elem = document.getElementById( "i7" );
        elem.addEventListener( "click", g, false );
    }
    </script>
  </head>
  <body id="i1" onload="addHandlers()">
    <p id="i2">
      <input id="i3" type="button"  value="alpha"/>
    </p>
    <p id="i4">
      <input id="i5" type="button"  value="bravo"/>
    </p>
    <p id="i6">
      <input id="i7" type="button"  value="tango"/>
    </p>
  </body>
</html>
```

2. (8 marks) There are several mechanisms to access the elements of the document client-side. For each mechanism, give an example of JavaScript code and XHTML.

(a) Some intrinsic XHTML events are associated to the elements of the document. In this case, one can associate a JavaScript function to the element. Give an exemple (XHTML+JavaScript) showing how the JavaScript function gets a reference to a node of the tree.

(b) DOM level 2 gives several methods to get a reference to one or several nodes of the DOM tree. Give at least one example.

(c) DOM level 2 gives an explicit representation of the structure of the document. A JavaScript program can thus traverse the tree from the root to a specific node. Illustrate this mechanism with an example.

(d) Do you know a fourth mechanism that a JavaScript program can use get a reference to a specific element in the document? Give an example.

3. (5 marks) DOM level 2 does more that giving access to the element of the document, it also allows to modify the document. Describe the main steps of a JavaSript function that transforms the following document (with an empty body):

```
<!DOCTYPE html SYSTEM "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
   .... <!-- headers omitted -->
  <body>
  </body>
</html>
```

into the following document (with a paragraph in the body):

```
<!DOCTYPE html SYSTEM "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
   .... <!-- headers omitted -->
  <body>
   <p>Good luck with your exam!</p>
  </body>
</html>
```

4. (5 marks) Consider the following XML document:

```
1.  <root xmlns="http://www.CSI3140.org/one" xmlns:pref="http://www.CSI3140.org/two
2.    <pref:elt />
3.      <pref:elt xmlns:pref="http://www.CSI3140.org/three">
4.        <pref:elt />
5.        <elt />
6.    </pref:elt>
7.  </root>
```

(a) To which namespace belongs the element `root` line 1?

(b) To which namespace belongs the element `elt` line 2?

(c) To which namespace belongs the element `elt` line 3?

(d) To which namespace belongs the element `elt` line 4?

(e) To which namespace belongs the element `elt` line 5?

5. (6 marks) An XML processor can be validating or not.

    (a) When is an XML document rejected by both validating and non-validating XML processors?

    (b) When is an XML document accepted by both validating and non-validating XML processors?

    (c) When is an XML document accepted by only one type of processor? Which type, validating or non validating?.

6. (8 marks) Java provides two types of XML parsers: DOM (Document Object Model) and SAX (Simple API for XML).

    (a) Which processor would you use to

        i. Find the URLs of all IMG elements of a given XHTML document?

        ii. Implement an XSLT processor?

(b) You need to count the number of occurrences of an element in an XML document.

    i. What are the steps if you do it with DOM?

    ii. What are the steps if you do it with SAX?

    iii. Which approach is more efficient, and why?

7. (4 marks) What is required from a Java class to be useable as a Java Bean?

8. (6 marks) caching mechanism client side sometimes interfere with Web applications. This problem is particularly true when the application uses Ajax. Briefly describe Ajax and how caching interferes with it. How to solve this problem?

9. (5 marks) For each **XPath** expression, give the list of the selected nodes in the following XML document

```
1.   <?xml version="1.0" encoding="UTF-8"?>
2.   <Course>
3.       <Section>
4.           <Prof>Jourdan</Prof>
5.           <Code>CSI3140</Code>
6.       </Section>
7.       <Section>
8.           <Prof>Turcotte</Prof>
9.           <Code>CSI3540</Code>
10.      </Section>
11. </Course>
```

(a) /Course/Section/Code

(b) /Course/Section[Prof='Turcotte']

(c) //Section[Prof and Code]/Code

(d) //*//Section[Prof='Turcotte']/Prof

(e) //Section[Prof='Turcotte'][Code!= 'CSI3540']

10. (6 marks) What would the result of applying the **input.xsl** XSL transformation to the **input.xml** document?

input.xml :

```
<?xml version="1.0" encoding="UTF-8"?>
<next>
  <previous>
    <item>A</item>
  </previous>
  <item>B</item>
  <item>C</item>
</next>
```

input.xsl :

```
<?xml version="1.0" encoding="UTF-8"?>
<xsl:stylesheet xmlns:xsl="http://www.w3.org/1999/XSL/Transform" version="1.0">

  <xsl:template match="/">
    <HowDoes>
      <xsl:apply-templates select="next/item" />
      <xsl:apply-templates select="previous/item" />
    </HowDoes>
  </xsl:template>

  <xsl:template match="item">
    <ThisWork>
      <xsl:copy-of select="." />
    </ThisWork>
  </xsl:template>

</xsl:stylesheet>
```

11. (8 marks) In **Servlets**, what are the parameters of **doGet** and **doPost** methods? Give 3 types of information associated with these paramters.

12. (6 marks) Cookies

- What is a Cookie?

- What are cookies used for in an application?

- How are cookies represented at the level of an HTTP request?

- End-users can disable cookies. 1) Wat is the impact on a Web application? 2) what can a programmer do against this? 3) Is this a general solution for the problem?

13. (8 marks) With JSP(X), variable have a **scope**. What are the different scopes and what are they used for.

14. (4 marks) Why should we avoid using **scriptlets** in JSPX documents? What other technologies can we use instead?

15. (9 marks) Since the mid seventies, there are protocols allowing remote procedure calls between distant computers. Unlike other technologies, Web Services rely on a set of open, XML based protocols.

   For each of the following XML technologies, **XML Schema**, **SOAP** and **WSDL**:

   (a) Describe the technology.

   (b) Explain its role in the context of Web Services.

   (c) Explain its relation with the two other technologies.

16. (6 marks) What will be written in the **alert** window by the following JavaScript code?

```
var o;
o = new Data( "alpha" );

function Data( value ) {
    this.data = value;
}

function getConstant() {
    return this.constant;
}

function makeData( value ) {
    o = new Object();
    o.constant = "bravo";
    o.data = getConstant;
    return o;
}

function test( param1, param2, param3 ) {
    param1 = makeData( "charlie" );
    param2.data = "delta";
    param3.data = "echo";
    param2 = param3;
    return param1;
}

var o1;
o1 = new Data( "foxtrot" );
var o2 = o1;
o2.data += "golf";
var o3;
o3 = new Data( "hotel" );
var o4;
o4 = makeData( "india" );
var o5;
o5 = test( o2, o3, o4 );

window.alert( "o.data = " + o.data() +
        "\n o1.data = " + o1.data +
        "\n o2.data = " + o2.data +
        "\n o3.data = " + o3.data +
        "\n o4.data = " + o4.data +
        "\n o5.data = " + o5.data() );
```

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