Computer Science 571 2nd Exam – Section 1
Prof. Papa
Thursday, April 26, 2011, 5:30pm – 6:40pm

Name: **Student ID Number:**

1. **This is a closed book exam.**
2. **Please answer all questions on the respective test page**

XML Schemas Question [20 points]

Below is a Schema, TripSearchResponse.xsd, for Yahoo's web service response of the Yahoo Travel Web Service.

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
  targetNamespace="urn:yahoo:travel"
  xmlns="urn:yahoo:travel"
  elementFormDefault="qualified">
      <xs:element name="ResultSet">
            <xs:complexType>
                  <xs:sequence>
                        <xs:element name="Result"
type="ResultType" minOccurs="0" maxOccurs="100" />
                  </xs:sequence>
                  <xs:attribute name="totalResultsAvailable"
type="xs:integer" />
                  <xs:attribute name="totalResultsReturned"
type="xs:integer" />
                  <xs:attribute name="firstResultPosition"
type="xs:integer" />
            </xs:complexType>
      </xs:element>
      <xs:complexType name="ResultType">
            <xs:sequence>
                  <xs:element name="Author" type="xs:string"
/>
                  <xs:element name="Title" type="xs:string"
/>
                  <xs:element name="Summary"
type="xs:string" />
                  <xs:element name="Destinations"
type="xs:string" />
                  <xs:element name="CreateDate"
type="xs:integer" />
                  <xs:element name="Duration"
type="xs:integer" minOccurs="0" />
                  <xs:element name="Image" type="ImageType"
minOccurs="0" />
                  <xs:element name="Geocode"
type="GeocodeType" minOccurs="0" />
```

```
                  <xs:element name="Url" type="xs:string"
minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="id" type="xs:integer" />
      </xs:complexType>
      <xs:complexType name="GeocodeType">
            <xs:sequence>
                  <xs:element name="Latitude"
type="xs:decimal" />
                  <xs:element name="Longitude"
type="xs:decimal" />
            </xs:sequence>
            <xs:attribute name="precision" type="xs:string"
/>
      </xs:complexType>

      <xs:complexType name="ImageType">
            <xs:sequence>
                  <xs:element name="Url" type="xs:string" />
                  <xs:element name="Height"
type="xs:integer" minOccurs="0" />
                  <xs:element name="Width" type="xs:integer"
minOccurs="0" />
            </xs:sequence>
      </xs:complexType>
</xs:schema>
```

The meaning of the schema response fields is as follows:

Field	Description
ResultSet	Parent element for the all results (element).
Result	Parent element for the trip plan (element). Attribute: id: The ID of the trip plan.

Result Elements:

Author	The Yahoo! user who created this trip plan (string).
Title	The title of the trip plan, for example "Paris Vacation in June" (string).
Summary	A summary of the items available in the trip plan (string).
Destinations	One or more destinations for the trip plan, separated by commas (string).
CreateDate	The date this trip plan was created, in Unix timestamp format (integer).
UpdateDate	The date this trip plan was most recently updated, in Unix timestamp format (integer).
Duration	The number of days this trip plan covers (integer).
Image	The image used to identify this trip plan. See Image Elements for element descriptions (element). Child elements: Url, Width, Height
Geocode	The location for the destination for this trip plan. See Geocode Elements for element descriptions (element).
Url	The URL of the trip plan on Yahoo! Travel Trip Search (string).

Image Elements:

Image	The parent element for the image (element). Child elements: Url, Width, Height
Url	The URL of the image (string).
Width	The width of the image, in pixels (integer).
Height	The height of the image, in pixels (integer).

Geocode Elements:

Geocode	The parent element for the location (element). Child elements: Latitude, Longitude Attribute: precision: the precision of the geocoder, or "not available".
Latitude	The latitude of the location (float).
Longitude	The longitude of the location (float).

[20 pts] Write out an XML file that is an instance that conforms to the above schema, for a trip search that returns a single result . Remember to define the necessary namespaces, noting that the XSD file is located at http://travel.yahooapis.com/TripService/V1.1/TripSearchResponse.xsd.

Java Servlet Questions [20 pts]

Below is an (a) XML file, book.xml, containing data to be read into a Java Servlet, (2) the output of the Java Servlet program after traversing the XML file, and (3) the Java Servlet program that performs the above function, with some code removed. Fill in the missing code in the Java Servlet file on the right of the XXXXXX.

(a) XML File book.xml:

```
<book>
<person>
  <first>Kiran</first>
  <last>Pai</last>
  <age>22</age>
</person>
<person>
  <first>Bill</first>
  <last>Gates</last>
  <age>46</age>
</person>
<person>
  <first>Steve</first>
  <last>Jobs</last>
  <age>40</age>
</person>
</book>
```

(b) Program Output:

```
Root element of the doc is book
Total no of people : 3
First Name : Kiran
Last Name : Pai
Age : 22
First Name : Bill
Last Name : Gates
Age : 46
First Name : Steve
Last Name : Jobs
Age : 40
```

(c) Java Servlet program:

```
import java.io.File;
import org.w3c.dom.Document;
import org.w3c.dom.*;

import javax.servlet.ServletException;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

import javax.xml.parsers.DocumentBuilderFactory;
import javax.xml.parsers.DocumentBuilder;
import org.xml.sax.SAXException;
import org.xml.sax.SAXParseException;

public final class MyBook extends HttpServlet {
```

```
public void doGet(HttpServletRequest request,
                  HttpServletResponse response)
  throws IOException, ServletException, SAXParseException, SAXException {

   response.setContentType("text/plain; charset=utf-8");
   PrintWriter writer = response.getWriter();
   try {

        DocumentBuilderFactory docBuilderFactory =
                DocumentBuilderFactory.newInstance();
        DocumentBuilder docBuilder = docBuilderFactory.newDocumentBuilder();
        Document doc = docBuilder.parse (new File("book.xml"));

        // normalize text representation
        doc.getDocumentElement ().normalize ();
        writer.println ("Root element of the doc is " +
             doc.getDocumentElement().getNodeName());

        NodeList listOfPersons =                                    2.1 [5 pts]
        int totalPersons =                                          2.2 [5 pts]
        writer.println("Total no of people : " + totalPersons);

        for(int s=0; s<listOfPersons.getLength() ; s++){

            Node firstPersonNode = listOfPersons.item(s);
            if(                            == Node.ELEMENT_NODE){ 2.3 [5 pts]

                Element firstPersonElement = (Element)firstPersonNode;

                //-------
                NodeList firstNameList =
                                                                    2.4 [1 pt]
                Element firstNameElement = (Element)firstNameList.item(0);

                NodeList textFNList = firstNameElement.getChildNodes();
                writer.println("First Name : " +
                       ((Node)textFNList.item(0)).getNodeValue().trim());

                //-------
                NodeList lastNameList =
                                                                    2.5 [1 pt]
                Element lastNameElement = (Element)lastNameList.item(0);

                NodeList textLNList = lastNameElement.getChildNodes();
                writer.println("Last Name : " +
                       ((Node)textLNList.item(0)).getNodeValue().trim());

                //----
                NodeList ageList =
                                                                    2.6 [1 pt]
                Element ageElement =                               2.7 [2 pts]

                NodeList textAgeList = ageElement.getChildNodes();
                writer.println("Age : " +
                       ((Node)textAgeList.item(0)).getNodeValue().trim());
                //------

            }//end of if clause

        }//end of for loop with s var

    }catch (SAXParseException err) {
```

```
        writer.println ("** Parsing error" + ", line "
             + err.getLineNumber () + ", uri " + err.getSystemId ());
        writer.println(" " + err.getMessage ());

        }catch (SAXException e) {
        Exception x = e.getException ();
        ((x == null) ? e : x).printStackTrace ();

        }catch (Throwable t) {
        t.printStackTrace ();
        }
        //System.exit (0);
    }//end of main

}
```

JavaScript Questions [20 pts]

1. [5 pts] Below is the code that counts the number of table data (<TD>) cells in a web page. Please fill in the missing code.

```
var allTDs =

alert("# of table cells: " + allTDs.         );
```

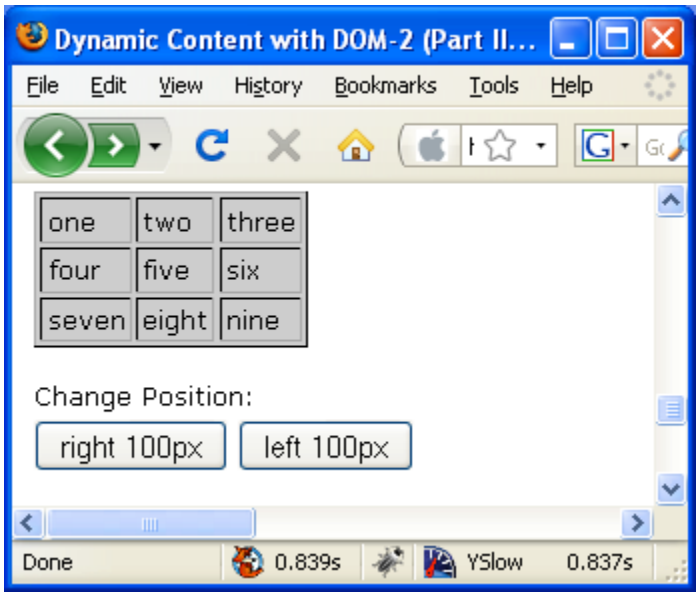
2. [5 pts] The inspectStyle() function below checks the element in question (elem) for a style object (attribute) and prints its value in an alert box. Provide the missing code.

```
function inspectStyle(elm){
  if (            ){
    var str = "";
    for (                ){
                                              ;
        }
        alert(str);
  }
}
```

```
For example, the above function might be called as

var header = document.getElementById("h2");
inspectStyle(header);
```

Below is a web page containing: a 3 x 3 table at position (0,0) and two buttons (labeled “right 100px” and “left 100px”) that when clicked move the entire table to the right by 100 pixels, or to the left by 100 pixels, respectively.



3. [10 pts] Write some JavaScript code that implements the functionality of the two buttons. The table's ID is "tableMain3" and it is passed to getElementById() in order to get a reference to the table element.

```
<script language="JavaScript" type="text/javascript">
  function tableRight(){



  }
  function tableLeft(){



  }
```

Web Performance Questions [20 pts]

Q1. What percentage of the end-user response time is spent in the front-end?

Q2. What are 4 ways that reduce the number of HTTP requests?

Q3. What 5 components can be GZIP-ed?

Q4. What 2 components should not be GZIP-ed?

JSON /AJAX Questions [20 pts]

Q1. What is a possible drawback of the eval ()function?

Q2. What is the first index in a JSON array?

Q3. JSON Parsers (True / False)

A JSON encoder must only produce well-formed JSON text [ ]T [ ]F

Q4. What is JSONP?

Q5. What are the responsibilities of an "AJAX engine"?