Computer Science 571 2nd Exam
Prof. Horowitz
Tuesday, December 4, 2012, 9:30am – 10:45am & 11:00am-12:15pm

Name: **Student ID Number:**

This is a closed book exam.
Please answer all questions on the test

- Javascript + Ajax [20 pts]
- JSON [10 pts]
- XML Schemas [15 pts]
- Java Servlets [20 pts]
- REST in Java [10 pts]
- Tomcat [20 pts]
- Web Site Performance [5 pts]

JavaScript and AJAX Questions [20 total pts]

Below is a file containing source code used by Yahoo to help it implement the Yahoo search sidebar that you see in the snapshot below. The questions following the source code can be answered by examining the code below.

```
function Yahoo_Search() {}
Yahoo_Search.baseURL = function () {
 return "http://api.search.yahoo.com/WebSearchService/V1/";  }
Yahoo_Search.appid = function () { return "YahooSearchSidebar"; }
Yahoo_Search.baseArgs = function () { return "appid=" + this.appid();  }
Yahoo_Search.Results = function (args) {
 var xmlUrl = this.baseURL() + "webSearch?"
     + this.baseArgs()
     + "&query=" + args["Doc"]
     + "&zip="
     + "&start=" + args["First"]
     + "&results=" + args["Count"];
 var xmlhttp = new XMLHttpRequest();
 xmlhttp.open("GET", xmlUrl, false);
 xmlhttp.send(null);
 return this.readXML(xmlhttp.responseXML);
}
Yahoo_Search.readXML = function (xmlDoc) {
 try {
  var retVal = new Array();
  var resultSet = xmlDoc.getElementsByTagName("ResultSet")[0];
  var totalResultsAvailable = parseInt(resultSet.getAttribute("totalResultsAvailable"));
  var totalResultsReturned = parseInt(resultSet.getAttribute("totalResultsReturned"));
  var firstResultPosition = parseInt(resultSet.getAttribute("firstResultPosition"));
  var start = firstResultPosition;
  var end = firstResultPosition + totalResultsReturned - 1;
  var results = xmlDoc.getElementsByTagName("Result");
  for (var i = 0; i < results.length; i++) {
   var result = results[i];
   var title = result.getElementsByTagName('Title')[0].firstChild.nodeValue;
   var summary = '';
   if (result.getElementsByTagName('Summary')[0].firstChild) {
    summary = result.getElementsByTagName('Summary')[0].firstChild.nodeValue;
   }
   var clickUrl = result.getElementsByTagName('ClickUrl')[0].firstChild.nodeValue;
   var url = result.getElementsByTagName('Url')[0].firstChild.nodeValue;
   retVal[i] = { I: start + i, Title: title, Summary: summary, ClickUrl: clickUrl, Url: url };
  }
  return retVal;
 } catch(exception) {
  alert('Exception occurred while reading XML (i=' + i + '; start=' + start + ';end=' + end + '): ' + exception);
 }
}
```

1. [3 pts] What language is the code written in?

2. [3 pts] What are baseURL, appid, baseArgs, Results, readXML?

3. [3 pts] What line of the program sends the request to Yahoo?

4. [3 pts] What line of the program receives the result from Yahoo?

5. [3 pts] The above program uses DOM functions. Name two.

6. [3 pts] What type of file is Yahoo returning?

7. [2 pts] What are Title, ClickUrl and Url?

JSON Question [10 total pts]

Below is an XML file. Your task is to transform it into an equivalent JSON notation.

```
<!DOCTYPE glossary PUBLIC "-//OASIS//DTD DocBook V3.1//EN">
 <glossary><title>example glossary</title>
  <GlossDiv><title>S</title>
   <GlossList>
    <GlossEntry ID="SGML" SortAs="SGML">
     <GlossTerm>Standard Generalized Markup Language</GlossTerm>
     <Acronym>SGML</Acronym>
     <Abbrev>ISO 8879:1986</Abbrev>
     <GlossDef>
      <para>A meta-markup language, used to create markup languages.</para>
      <GlossSeeAlso OtherTerm="GML">
      <GlossSeeAlso OtherTerm="XML">
     </GlossDef>
     <GlossSee OtherTerm="markup">
    </GlossEntry>
   </GlossList>
  </GlossDiv>
```
8. [10 pts] Place your answer here:

XML Schema Questions [15 total pts]

Below is an xml schema file defining the Web search response for the Yahoo sidebar.

```xml
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
  targetNamespace="urn:yahoo:srch"
  xmlns="urn:yahoo:srch"
  elementFormDefault="qualified">
    <xs:element name="ResultSet">
        <xs:complexType>
            <xs:sequence>
                <xs:element name="Result" type="ResultType"
            minOccurs="0" maxOccurs="50" />
            </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="Title" type="xs:string" />
            <xs:element name="Summary" type="xs:string" />
            <xs:element name="Url" type="xs:string" />
            <xs:element name="ClickUrl" type="xs:string" />
    <xs:element name="ModificationDate" type="xs:string" minOccurs="0" />
        <xs:element name="MimeType" type="xs:string" minOccurs="0" />
            <xs:element name="Cache" type="CacheType" minOccurs="0" />
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="CacheType">
        <xs:sequence>
            <xs:element name="Url" type="xs:string" />
            <xs:element name="Size" type="xs:string" />
        </xs:sequence>
    </xs:complexType>

</xs:schema>
```

9. [15 pts] Write out an XML file that is an instance that conforms to the above schema. Remember to define the necessary namespaces. PLACE YOUR ANSWER BELOW OR INDICATE HERE THAT YOU ARE USING THE BACK OF THIS SHEET.

Java Servlet Questions [20 total pts]

Below is a Java servlet. Read it over and then answer the questions below.

```java
/* the usual imports */
public class ShowSession extends HttpServlet {
 public void doGet(HttpServletRequest request,
               HttpServletResponse response)
   throws ServletException, IOException {
     response.setContentType("text/html");
     PrintWriter out = response.getWriter();
     String title = "Tracker";
     HttpSession session = request.getSession(true);
     String heading;
     Integer accessCount =  (Integer)
      session.getAttribute("accessCount");
     if (accessCount == null ) {
       accessCount = new Integer (0);
       heading = "Welcome";
     } else { heading = "Welcome";
accessCount = new Integer(accessCount.intValue() + 1);
     }
     session.setAttribute("accessCount", accessCount);
out.println(
     "<html><head><title>Count</title></head>\n" +
     "<body><h1>" + heading + "</h1>\n" +
     "<h2>Information</h2>\n" +
     "<table border=1><tr><th>Info
         type</th><th>Value</th>\n" +
     "<tr><td>ID</td><td>" + session.getId() +
     "<tr><td>Creation time</td><td>" +
     new Date(session.getCreationTime()) +
     "<tr><td>Time </td><td>\n" +
     new Date(session.getLastAccessedTime()) +
     "<tr><td>Number</td><td>" +
   accessCount + "</td></table></body></html>");
  }
}
```

10. [5 pts] What imported files are missing?

11. [5 pts] In a sentence or two describe what the servlet does.

12. [10 pts] Draw a sample output for the servlet. You can make up any data that is not specified.

REST in Java Questions [10 pts]

The following code issues a request and returns the entire response as one long string. Some of the code has been removed. Answer the 4 questions below supplying the missing code.

```java
public static String httpGet(String urlStr)
      throws IOException {
    URL url = new URL(urlStr);
    HttpURLConnection conn =
    (HttpURLConnection)url.13.XXXXXXXXXX();
    if (conn.getResponseCode() != 14.XX) {
        throw new IOException(conn.getResponseMessage());
    }
    BufferedReader rd = new BufferedReader(new
    InputStreamReader(conn.getInputStream()));
    StringBuilder sb = new StringBuilder();
    String line;
    while ((line = rd.15.XXXXXX()) != null) {
        sb.append(line);
    }
    rd.close();
    conn.disconnect();
    return sb.16.XXXXXX();
}
```

13. [3 pts]

14. [3 pts]

15. [2 pts]

16. [2 pts]

Tomcat (Assignment #7) Questions [20 total pts]

17. [2 pts] In one sentence describe the contents of the file whose name is server.xml?

18. [2 pts] Name two methods that are handled by this web server.

19. [2 pts] What is the condition that causes the web server to return a 304 status code?

20. [2 pts] What does SOAP stand for, and what is its purpose?

21. [3 pts] What is Apache Axis?

22. [3 pts] Define the acronym WAR and in one sentence give its definition:

23. [2 pts] What is a major difference between Tomcat and Apache?

24. [2 pts] In what directory of Tomcat does one place Java servlets that are part of a user-developed application?

25. [2 pts] Below are 4 possible addresses of Tomcat servers for this class, but only one is correct. Choose the correct one.

    a.   http://www-scf.usc.edu:9980/index.jsp

    b.   http://cs-server.usc.edu:80/index.jsp

    c.   http://www-scf.usc.edu/~csci571/index.jsp

    d.   http://cs-server.usc.edu/index.html

High Performance Web Sites [5 total points]

27. [5 pts] The lecture on high performance web sites listed 14 ways to improve the download performance of a website. List 5 of the ways that were presented by providing one or two sentences that describe what they are.