

CS 247: Web and Distributed Programming

Midterm Exam 2 Information

Exam Format

The midterm exam will be taken in-class, through the BlackBoard system. You will have 45 minutes to complete the exam. The exam will start on the beginning of the class (2pm). **Anyone coming in late will not be allowed to take the exam and will receive a zero score.** You will not be able to use your book, notes, phones, and other devices, and cannot run any software on the lab computers except the browser for running BlackBoard. You can however bring two sheets of empty paper and pencils to use for scratch work.

The exam will consist of 20 questions, 16 of which will come from the same pool of questions as quizzes four and five and 4 will be new questions. Unlike the quiz questions, these 4 questions will be free response. This means that you will not receive an automatic score for this exam until I grade them. Once all the exams are graded, the scores will then be normalized as stated in the syllabus.

Topics

Material from Chs.5-7,9,10 in the textbook and everything from class lectures, including:

- DOM 0
 - What is the structure of the DOM?
 - How to access HTML elements inside JavaScript (3 ways)
 - What are events, event handlers? What is event handler registration?
 - How to add an event handler using DOM 0 Model (2 ways)?
- DOM 2
 - How are events propagated using the DOM 2 Model? (3 phases)
 - How to add/remove events using DOM 2 Model?
- What is the <canvas> element used for?
- What is the navigator object?
- Changing styles inside of JavaScript
 - How can the position of an element be set and changed?
 - What method can we use to generate animations? (e.g. setTimeout)
 - How to change any CSS style property of an element in JavaScript?
 - What is the z-index? What happens if it is changed?
 - How can we determine the position of the mouse cursor after an event occurred?
 - How events should be handled to implement Drag and Drop? Which DOM model (0 or 2) is better to be used for this feature and why?
- XML and Web Services
 - What is XML and its purpose?
 - Syntax: using elements, attributes, entities
 - Document Structure
 - Namespaces: definition and usage
 - XML Schemas
 - What is it used for?
 - Know how to write an XML Schema for an XML document and vice versa
 - Defining simple and complex types

- Viewing XML
 - Ways to view XML documents: raw XML using browser/text editor, CSS styled XML using a browser, using XSLT style sheets
 - What is XSLT?
 - Functionality: combines XSLT document with XML document through an XSLT processor and outputs an XSL document
 - What is the job of the XSLT processor?
- Parsing XML: SAX and DOM approaches (advantages and disadvantages)
- Web Services
 - How do they function?
 - What are examples of Web Services?
 - What are some of the protocols involved and what is their function?
- Ajax
 - What technologies are used by Ajax?
 - How does Ajax applications work?
 - What happens in the request/receiver phases?
 - Return document types: html, xml, json
 - advantages and disadvantages of each
 - Security issues
- PHP
 - Basic data types: integer, double, string, boolean
 - Using basic functions: rand, abs, trim, ...
 - Output: using print/echo. Know how and when value substitution is performed.
 - Know the difference between client and server scripting
 - Control statements: if-else, switch statement, while, for, do-while loops
 - Arrays: initialization, accessing elements, iterating through elements using iterators or foreach loop, sorting.
 - Functions: passing parameters, scope
 - Matching patterns (preg_match, preg_split functions)
 - Handling forms: accessing form data (\$_GET or \$_POST arrays)
 - Saving/accessing cookies
 - Using sessions

Study Questions

Below, you will find review questions that you can use to make sure you are prepared for the exam. You should review these plus all the questions that were on the quizzes. Note however, that this is just a sample and the exam questions may refer to any of the above listed topics.

Q1. Using the DOM 0 event model, we can assign an event handler function inside JavaScript.
(True/False)

Q2. Given the following code, what will be output when the button is clicked?

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <script type="text/javascript">
      function avg(n1,n2) { alert((n1+n2)/2); }
    </script>
  </head>

  <body>
    <form id="topGroup" onsubmit="submitFunc();">
      <input type="button" value="Press Me" onclick="avg(2,4);"/>
    </form>
  </body>
</html>
```

Q3. In the following function (which is an event handler for the onclick event), what code should we insert to output the coordinates of the mouse cursor (using alert):

```
function f(event) {

}
```

Q4. In DOM 2 event model, what method must be called to stop the bubbling phase from occurring?

Q5.

a. Write an XML document that stores a list of students (at least 3) with each student containing the student id, name, and a set of courses. Each course has a number, name, and number of credit hours.

b. Using an XML schema, define a complex type for the course element from (a).

Q6. (True/False) A user defined type in an XML scheme is actually a simple type element with restrictions.

Q7. Name one advantage of XML Schemas over DTD

Q8. Name one Web Service currently available on the Internet.

Q9. Which Web Services protocol is responsible for specifying the form of messages between the client and the server?

Q10. What is the purpose of the WSDL protocol?

Q11. What is the JavaScript function that is used to initiate asynchronous requests?

Q12. What is the purpose of the callback function when using AJAX?

Q13. Assume JSON is used to receive data from the server requested through AJAX. If the following data is received:

```
{ "employees" :  
  [  
    { "name" : "Dew, Dawn", "address" :  
      "1222 Wet Lane" },  
    { "name" : "Do, Dick", "address" :  
      "332 Doer Road" },  
    { "name" : "Deau, Donna", "address" :  
      "222 Donne Street" }  
  ]  
}
```

how would you retrieve the name of the 3rd employee if the reference to the parsed JSON data is stored in the variable myData ?

Q14. What is cross-site scripting?

Q15. What are the outputs of the following PHP scripts?

a.

```
<?php
$a = 7;
$b = "7";
if ($a === $b) {
    echo "YES";
} else {
    echo "NO";
}
?>
```

b.

```
<?php
    $a = 5;
    $b = "a";
?>echo $a
<?php
    echo "={$b}";
?>
```

c.

```
<?php
$a = 5;
$b = 6;
function mult($b) {
    global $a;
    return $a * $b;
}
echo "$a*$b=" . mult(5);
?>
```

Q16. Write a PHP script that initializes an array with the values "x", "y", "z", then prints each value using the foreach construct.

Q17. In PHP, what is the difference between using single and double quoted string literals?

Q18. Name 2 superglobal variables available in PHP.

Q19. Assume there is an html page with a form that contains a textbox with attribute name set to "pwd" and a submit button. The action of the form submits the form using the GET method to a PHP script. Write a PHP script that processes this form by outputting "wrong password" if the textbox input does not equal "password".

Q20. Assume there is an html page with a form that contains a textbox with attribute name set to 'id' and a submit button. The action of the form submits the form using the POST method to a PHP script. Write a PHP script that processes this form by outputting "OK" if the textbox input includes a lower case letter followed by a sequence of digits, followed by a single upper case letter.

Q21. Assume there is an html page with a form that contains a checkbox with attribute name set to "opt1" and a value of "1", and a submit button. The action of the form submits the form using the GET method to a PHP script. Write a PHP script that starts a new session and if the checkbox with name "opt1" was checked, saves "OK" into a session variable named "state".

Q22. (True/False) The \$_POST and \$_GET arrays are accessible inside PHP functions.

Q23. Name one advantage of cookies over sessions.

Q24. Write the call to a PHP function that opens a file for appending.

ANSWERS

1. True

2. 3

3. `alert("x="+event.clientX+" y="+event.clientY);`

4. `stopPropagation()`

5.

a.

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

```
<students>
```

```
  <student>
```

```
    <id>12345</id>
```

```
    <name>John Smith</id>
```

```
    <courses>
```

```
      <course>
```

```
        <number>70-305</number>
```

```
        <name>Scientific Computing</number>
```

```
        <hours>3</hours>
```

```
      <course>
```

```
      <course>
```

```
        <number>70-470</number>
```

```
        <name>Artificial Intelligence</number>
```

```
        <hours>3</hours>
```

```
    </course>
```

```
  </courses>
```

```
</student>
```

```
<student>
```

```
  <id>5543534</id>
```

```
  <name>Mary Smith</id>
```

```
  <courses>
```

```
    <course>
```

```
      <number>70-470</number>
```

```
      <name>Artificial Intelligence</number>
```

```
      <hours>3</hours>
```

```
    </course>
```

```
  </courses>
```

```
</student>
```

```
<student>
```

```
  <id>12345</id>
```

```
  <name>Joe Smith</id>
```

```
  <courses>
```

```
    <course>
```

```
      <number>70-305</number>
```

```
      <name>Scientific Computing</number>
```

```
      <hours>3</hours>
```

```

        </course>
    </courses>
</student>
</students>

```

b.

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

```

<xsd:schema
  xmlns:xsd = "http://www.w3.org/2001/XMLSchema"
  targetNamespace = "http://cs.uccs.edu/studentSchema"
  xmlns = "http://cs.uccs.edu/studentSchema"
  elementFormDefault = "qualified">

```

```

  <xsd:element name = "course">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name = "number"
          type = "xsd:string"
          minOccurs = "1"
          maxOccurs = "1"/>
        <xsd:element name = "name"
          type = "xsd:string"
          minOccurs = "1"
          maxOccurs = "1"/>
        <xsd:element name = "hours"
          type = "xsd:positiveInteger"
          minOccurs = "1"
          maxOccurs = "1"/>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
</xsd:schema>

```

6. True

7. Allows for specifying data types for element content.

8. National Digital Forecast Database (NDFD)
Simple Object Access Protocol (SOAP)
Web Service

9. Standard Object Access Protocol (SOAP)

10. To describe available services and message protocols

11. XMLHttpRequest

12. The callback function is called each time the readystate changes. The purpose of this function is to update the page after the data arrives from the server.

13. `myData.employees[2].name`

14. Cross-site scripting means servers providing JavaScript code as an Ajax response

15.

a.

NO

b.

`echo $a =5`

c.

`5*6=25`

16.

```
$arr = array('x','y','z');  
foreach($arr as $value) {  
    echo "$value";  
}
```

17. Variables are not interpolated in single-quoted literals, but are interpolated in double-quoted literals. Similarly, escape sequences are not recognized in single-quoted literals, but are recognized in double-quoted ones.

18. GET and POST

19.

```
<?php  
if ($_GET['pwd'] != "password") {  
    echo "wrong password";  
}
```

20.

```
<?php  
if (preg_match("/^[a-z][0-9]+[A-Z]$/", $_GET['pwd'])) {  
    echo "OK";  
}  
?>
```

21.

```
<?php
```

```
if (isset($_GET['opt1'])) {  
    $_SESSION['state'] = 'OK';  
}
```

```
?>
```

22. TRUE

23. Can persist over longer durations.

24. \$file = fopen("filename", "a");