

Web and Distributed Programming

Midterm Exam 1 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. **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 25 questions, 21 of which will come from the same pool of questions as the first three quizzes and 4 will be new questions. Unlike the quiz questions, these last 4 questions will be free response. This means that you will not receive an automatic score for this exam until I grade them.

Topics

Material from Chs.1-5 in the textbook and everything from class lectures, including:

- Distributed Systems (DSs)
 - What are they? Why are they used?
 - What are the properties of DSs?
 - Example of one DS (e.g.: world wide web)
 - What are the issues when dealing with DSs (know at least 2)
- Communication
 - What is the difference between Client/Server communication and Peer to Peer?
 - How does packet switching work? What are the advantages of using it compared to circuits (circuit switching)?
- Internet
 - TCP/IP protocols: name of each layer, responsibilities at each layer, 1 example of protocol for each layer (e.g.: TCP for the Transport layer)
 - What is the IP address?
 - What are domain names? Why are they used? What converts a domain name to an IP address?
- World Wide Web
 - What is it?
 - What is the communication architecture that it uses?
 - What is the role of the Web Server and the Web Browser?
 - How are document requests made?
 - What is an URL? What is MIME?
- HyperText Transfer Protocol
 - How does it work?
 - What is the form of the request?
 - What is the form of the response?
- Security
 - How does public-key encryption work? How can Alice send a message to Bob using public-key encryption?

- What are some security issues with the WWW? (e.g. denial of service attacks, worms, viruses)
- What are examples of client-side technologies? What are examples of server-side technologies?
- What is a three-tiered architecture? (what are the tiers? what is the purpose of each tier?)
- HTML
 - Basic syntax: what is an element, a container, content, tag, etc.
 - Programming style: comments in HTML
 - HTML document structure: which elements must be included?
 - Tags for entering text: <p>,
, <h1>, <h2>, ... (know the syntax + semantics)
 - What are character entities. Know a few examples.
 - How to insert an image? Name 1 image format that is used on the web.
 - How to insert a hyperlink to an external page or within a page?
 - Lists (know the structure and tags used)
 - Tables (know the structure and tags used)
 - Forms
 - What are they used for?
 - What happens when you click Submit or Reset buttons?
 - How to insert widgets into the form? (know at least the syntax for a textbox and a button)
 - What are the types of widgets that can be used?
 - HTML5
 - Know examples of new elements introduced in HTML5 (e.g. audio, video, ...)
 - How is it different from XHTML (know the main difference)
- CSS
 - What is CSS? What is it used for?
 - What are the 3 levels of style sheets?
 - Know the syntax for specifying a style and the semantics
 - What are the different types of selectors? What do they select? What is a pseudo-class (know a few examples)?
 - What types of things can we change using CSS?
 - What is the box model? How does it control the spacing of elements?
 - What are and <div> tags? Why are they used?
 - Conflict resolution: how does CSS resolve conflicting specifications of styles? What has precedence?
- JavaScript
 - What is it used for? How to insert it into HTML?
 - Basic syntax: statements, use of semicolons, comments, reserved words
 - Creating/using objects
 - Doing basic Input/Output (document.write, alert, etc.): know the basic syntax and semantics
 - Evaluating expressions (try a few examples using different operations, remember the precedence rules)
 - Using Strings (know the basic methods/properties, e.g.: length, indexOf())
 - What does the typeof operator do?
 - Boolean expressions (comparing variables using relational operations, e.g.: ==, !=, <, >, ...), Boolean operators (&&, ||, !)
 - Syntax/Semantics of control statements (e.g. if... else)
 - Syntax/Semantics of loop statements (while, for, ...)

- Make sure you can determine the value of a variable that is changed in a loop (i.e., trace the loop execution)
- Arrays (how to create them, how to add/remove elements)
- Using functions (declaration, calling function)
 - How can constructor functions be used to initialize objects?
- Pattern Matching
 - What string method can you use to find a pattern in a string?
 - Basic Regular Expressions: anchors, character classes (e.g. `\d` or `\w`), quantifiers (`+`, `*`, `{n}`)
- Document Object Model
 - What is it?
 - How to access it from JavaScript?
- Handling events
 - Registration (what are the different ways to register an event handler?)
 - DOM 2 event model (how does it work?)

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. Reliability is one advantage of using a distributed system? (True/False)

Q2. Name two issues when dealing with distributed systems.

Q3. Name one advantage of packet switching?

Q4. What is the role of a DNS server?

Q5. What are the 2 phases of the HTTP protocol?

Q6. If Bob steals Alice's private key, he can use it to encrypt messages and send them, pretending to be Alice. (True/False)

Q7. Write the HTML code that will insert a hyperlink image in a document. The image filename is "pic.jpg" and the hyperlink URL is "page.html".

Q8. Draw the table that corresponds to this HTML code:

```

<table border=1>
  <caption>Cars</caption>
  <tr>
    <th>Make</th>
    <th>Model</th>
  </tr>
  <tr>
    <td rowspan=2>Toyota</td>
    <td>Supra</td>
  </tr>
  <tr>
    <td>Camry</td>
  </tr>
  <tr>
    <td>Ford</td>
    <td>Mustang</td>
  </tr>
</table>

```

Q9. What is the HTML code to insert a button into a form with a label “Press Me”?

Q10. Write the CSS code that will change the foreground color of the following HTML element to red:
 <p id="part1">Data Structures</p>

Q11. Given the following CSS and HTML code, which text will have the background color changed to black?

```

<head>
  <style type="text/css">
    .mytext { background-color: black; }
    .othertext { color: red; }
  </style>
</head>
<body>
  <p>Introduction</p>
  <div class="mytext">
    <p class="othertext">Section</p>
  </div>
</body>

```

Q12. In JavaScript, String is a primitive type. (True/False)

Q13. What is the value of x after the following JavaScript statements are executed?
 var num1 = 5;

```
var num2 = 15;  
var x = (num2 - ++num1) % 5;
```

Q14. What is the output of the following JavaScript code?

```
var x=3;  
var y="3";  
if (x++==y)  
    document.write("yes");  
else  
    document.write("no");
```

Q15. What is stored in the array arr after the execution of the following JavaScript statements?

```
var arr = [1, 2, 3, 4];  
var arr2 = arr.splice(2,1);  
arr.push(arr2);
```

Q16. Given the string: "A dog, a plan, a canal: pagoda", will the following regular expression find a match in the string? `/^,*.~.*$/`

Q17. Using the DOM 0 event model, we can assign an event handler function inside JavaScript.
(True/False)

Q18. 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>
```

Q19. 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) {  
}
```

Q20. In DOM 2 event model, what method must be called to stop the bubbling phase from occurring?

ANSWERS

1. True
2. Security, Synchronization
3. It's more robust because it can reroute around failed nodes.
4. To translate domain names into IP addresses.
5. Request and response
6. False
7.

```
<a href = "page.html" >  
    
</a>
```
- 8.

Cars

Make	Model
Toyota	Supra
	Camry
Ford	Mustang

9. `<input type="button" value="Press Me" />`
10. `#part1 { color = "red"; }`
11. "Section"
12. True
13. 4
14. yes

15. [1, 2, 4, 3]

16. yes

17. True

18. 3

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

20. `stopPropagation()`