Computer Science 571 2nd Exam
Prof. Papa
Thursday, May 4, 2017, 6:00pm – 7:20pm

Name: **Student ID Number:**

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

Question Category	Score
High Performance Websites Questions	
JavaScript + AJAX Questions	
Web Security Questions	
JQuery Questions	
JavaScript Frameworks and Serverless Questions	
Cookies and Privacy Questions	
Secure Web Communication Questions	
Total	

High Performance Websites Questions [10 pts]

Each question is worth 2 points.

Q1. Among the 14 rules that were given for improving the client-side performance of a web page, one rule suggests placing items at the bottom of the web page. What rule is it?

A1. place scripts to the bottom

Q2. Consider the following HTTP response header:

```
HTTP/1.1 200 OK
Date: Fri, 30 Oct 2014 13:19:41 GMT
Server: Apache/1.3.3 (Unix)
Cache-Control: max-age=3600, must-revalidate
```

```
Expires: Fri, 30 Oct 2014 14:19:41 GMT
Last-Modified: Mon, 29 Jun 2014 02:28:12 GMT
ETag: "3e86-410-3596fbbc"
Content-Length: 1040
Content-Type: text/html
```

Will this page be cached by the browser? If so, for how long?

A2. yes, 3600 seconds

Q3. What does CDN stand for and how does it improve website performance?

A3. Content Distribution Network; it improves performance by copying content to multiple servers around the world so pages are delivered more quickly.

Q4. Why is it suggested to minimize re-directs?

A4. because they require an additional trip to the server and back again.

Q5. The lecture on high performance web sites listed 14 ways to improve the download performance of a website. List 4 of the ways that were presented by providing one sentence that describe "how" they improve performance. PLACE ALL ANSWERS BELOW.

a. Make fewer http requests

b. Use a CDN

c. Add and expires header

d. Gzip components

e. Put stylesheets at the top

f. Move scripts to the bottom

g. Avoid CSS expressions

h. Make JS and CSS external

i. Reduce DNS lookups

j. Minify JavaScript

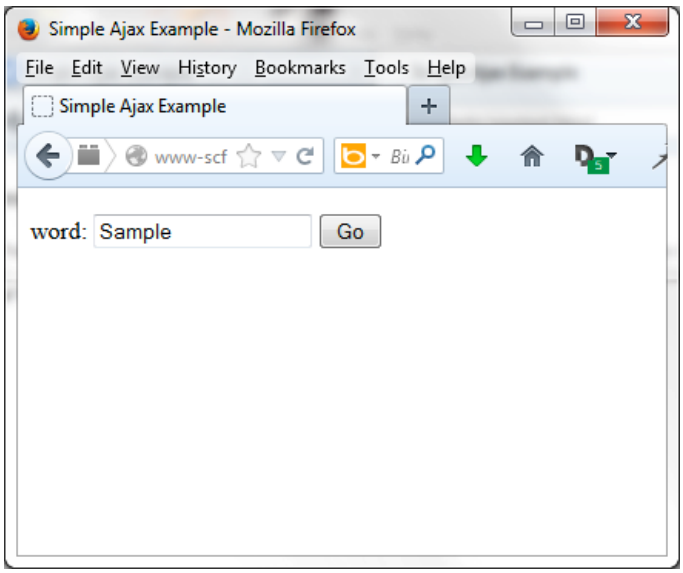
k. Avoid redirects

l. Remove duplicate scripts

m. Configure Etags

n. Make AJAX cacheable

JavaScript + AJAX Questions [10 pts]



Above is a snapshot of a web page and below the corresponding source code. Some of the code is missing. Fill in the missing elements. Each answer is worth 2 points.

```
<html><head><title>Simple Ajax Example</title>
<script language="Javascript">
function xmlhttpPost(strURL) {
    var xmlHttpReq = false;
    var self = this;
    // Mozilla/Safari
    if (window.XMLHttpRequest) {
        self.xmlHttpReq = new XMLHttpRequest();
    }
    // IE
    else if (window.ActiveXObject) {
        self.xmlHttpReq = new ActiveXObject("Microsoft.XMLHTTP");
    }
    self.xmlHttpReq.open('POST', strURL, true);                    [2 pts]
    self.xmlHttpReq.setRequestHeader('Content-Type', 'application/x-www-
form-urlencoded');
    self.xmlHttpReq.onreadystatechange = function() {
```

```
        if (self.xmlHttpReq.readyState == 4 && self.xmlHttpReq.status ==
200)
{                                                                    [2 pts]
            updatepage(self.xmlHttpReq.responseText);
        }
    }
    self.xmlHttpReq.send(getquerystring());
}

function getquerystring() {
    var form     = document.forms['f1'];
    var word = form.word.value;                                      [2 pts]
    qstr = 'w=' + escape(word);                                      [2 pts]
    return qstr;
}

function updatepage(str){
    document.getElementById("result").innerHTML = str;
}
</script></head><body>
<form name="f1">
  <p>word: <input name="word" type="text">
  <input value="Go" type="button"
onclick='JavaScript:xmlhttpPost("/cgi-bin/handle.php")'>          [2 pts]
</p>
  <div id="result"></div>
</form></body></html>
```

Web Security Questions [10 pts]

Each question is worth 2 points.

Q1: Name 2 of the top 5 vulnerabilities according to WhiteHat Security?

A1: Any two of:

Cross-site scripting (XSS)
Information Leakage
Content Spoofing
Cross-Site Request Forgery (CSRF)
Brute Force

Q2: Name 2 types of Authentication Attacks?

A2: Any two of:

Brute Force Attacks
Insufficient Authentication
Weak Password Recovery Validation

Q3: What problem Diceware solves?

A3: Coming up with an easy-to-memorize but very secure passphrase (-OR one with high degree of randomness or entropy).

Q4: Name 2 examples of Client Side Attacks?

A4: Any two of:

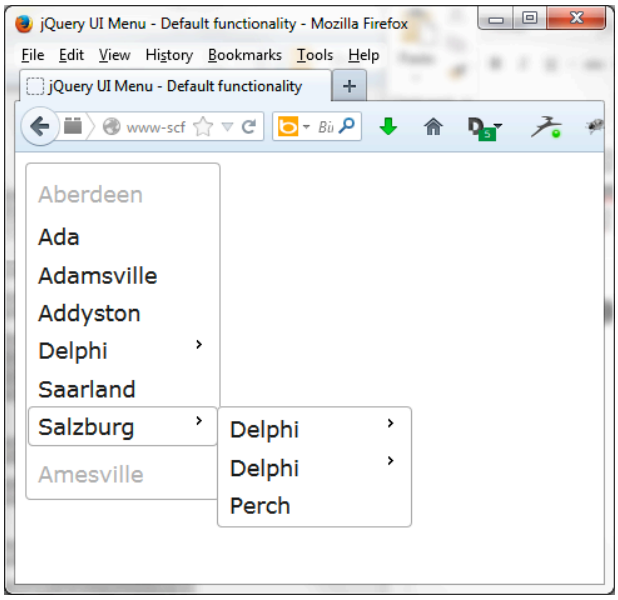
Cross-site Scripting (XSS)
Browser and Plugin Vulnerabilities
Clickjacking

Q5: What is a DDos attack?

A5:

An attack which occurs when a system is overwhelmed by malicious electronic traffic.

JQuery Questions [20 pts]



Above is a snapshot of a menu produced using the jQuery library menu widget. Below is the code that produces the above menu. Answer the questions below.

```
<!doctype html><html lang="en"><head>
  <meta charset="utf-8"><title>jQuery UI Menu</title>
  <link rel="stylesheet"
href="//code.jquery.com/ui/1.10.4/themes/smoothness/jquery-ui.css">
  <script src="//code.jquery.com/jquery-1.9.1.js"></script>
```

```
  <script src="//code.jquery.com/ui/1.10.4/jquery-ui.js"></script>
  <link rel="stylesheet" href="/resources/demos/style.css">
  <script>
  $(function() {
    $( "#menu" ).menu();
  });
  </script>
  <style>
  .ui-menu { width: 150px; }</style>
</head>
<body>
<ul id="menu">
  <li class="ui-state-disabled"><a href="#">Aberdeen</a></li>
  <li><a href="#">Ada</a></li>
  <li><a href="#">Adamsville</a></li>
  <li><a href="#">Addyston</a></li>
  <li>
    <a href="#">Delphi</a>
    <ul>
      <li class="ui-state-disabled"><a href="#">Ada</a></li>
      <li><a href="#">Saarland</a></li>
      <li><a href="#">Salzburg</a></li>
    </ul>
  </li>
  <li><a href="#">Saarland</a></li>
  <li><a href="#">Salzburg</a>
    <ul>
        <li><a href="#">Delphi</a>
        <ul>
          <li><a href="#">Ada</a></li><li><a href="#">Saarland</a></li>
          <li><a href="#">Salzburg</a></li></ul>
      </li>
      <li>
        <a href="#">Delphi</a>
        <ul>
          <li><a href="#">Ada</a></li><li><a href="#">Saarland</a></li>
          <li><a href="#">Salzburg</a></li></ul>
      </li>
      <li><a href="#">Perch</a></li>
    </ul>
  </li>
  <li class="ui-state-disabled"><a href="#">Amesville</a></li>
</ul></body></html>
```

Q1: [4 pts] Assuming the initial menu (Ada, Adamsville, . . .) in the picture above is at level 1, how deep does the menu go, meaning what is the maximum level?

A1: level = 3

Q2: [4 pts] Describe what occurs when a user's cursor hovers over
Ada and then clicks on Ada.

A2: The anchor will be seen as live and should produce a hand pointer on hover and clicking will take the user back to the same page.

Q3: [4 pts] Is #menu a class attribute or an id attribute?

A3: an id attribute

Q4: [4 pts] What is the purpose of ui-state-disabled?

A4: It causes the menu item to be grayed out

Q5: [4 pts] Copy over the line that uses the jQuery menu widget.

A5: `$("#menu").menu();`

JavaScript Frameworks and Serverless Questions [20 pts]

Each question is worth 2 points. Please choose all correct answers. <u>There is no partial credit.</u>

Q1: Which JavaScript Framework provides two-way Data Binding?

A1: AngularJS

Q2: Which of the following is true of Node.js?

[ ] Is a JavaScript runtime built on Chrome V8
[ ] Is event-driven
[ ] Uses non-blocking I/O model
[ ] Modules handle HTTP
[ ] Modules handle networking
[ ] Provides POSIX File I/O
[ ] Is supported by AWS and Google Cloud Platform (GCP)
[X] ALL OF THE ABOVE

Q3: What directive is used in AngularJS for loop and replication of the template to the number of rows in the model?

A3: ng-repeat

Q4: What are the two problems with Virtual Machines and why?

A4:

- **Money – You need to predict the instance size you need. You are charged for every CPU cycle, even when the system is "running its thumbs"**
- **Time – Many operations related to virtual machines are typically slow**

Q5: What are two solutions of the problems with Virtual Machines?

A5: Serverless Architectures and Containers

Q6: What are the 3 components of a Microservice?

A6: 1. An API – OR – REST Endpoint
2. A Service – OR – FaaS (Function as a Service)
3. A Data Store

Q7: What is the code below an example of?

```
module.exports.handler = function(event, context, callback) {
  console.log("event: " + JSON.stringify(event));
    if ((!event.hasOwnProperty("email") ||
!event.hasOwnProperty("restaurantId")) || (!event.email ||
!event.restaurantId)) { callback("[BadRequest] email and
restaurantId are required");
  return; }
}
```

A7: One of these:

(a) Node.js with AWS lambda
(b) FaaS (Function as a Service)

Q8: What is one (1) key feature of Containers?

A8: any one of "lightweight" and "portable"

Q9: Which of the following is true of AWS lambda?

[X] Uses AWS Compute Service
[X] Supports Java, Python and Node.js
[X] You pay only for the compute time you use
[ ] Can be triggered by HTTP only
[X] No machines or VMs are visible in the Programming Model
[X] It auto-scales and is layaways available
[X] It competes with Google Cloud Platform (GCP)
[ ] ALL OF THE ABOVE

Q10: Does Google Cloud Platform (GCP) supports both Microservices and Containers?

A10: No, supports Only Microservices.

Cookies and Privacy Questions [20 pts]

Q1. The class notes list six (6) ways to Opt Out of cookies. Mention 2 of them.

A1:

1. Select "do not track" in your browser Settings
2. Download opt-out cookies
3. Use the cookie management tools in your web browser
4. View current cookies and delete what you don't need.
5. Check your account preferences on registration sites
6. Use browser add-ons

Q2. Cookies include a domain, a path, a name/value pair and an expiration date. There are two other fields that may be included in a cookie. What are they and describe them briefly?

A2. Secure – only send over SSL, when the request is https HttpOnly – only send via an HTTP request, not accessible to scripts in JavaScript

Q3. Define: 3rd party cookie

A3. Third-party cookies are cookies that belong to domains different from the one shown in the address bar

Q4. What are the 4 parties involved in web advertising?

A4. Advertisers, website owners, ad network and visitors

Q5. What is a Conversion Tracking Cookie?

A5. A cookie set when you click an advertisement (ad) delivered by Google, used by advertisers to track when a click results in a purchase.

Secure Web Communication Questions [10 pts]

Each question is worth 2 points. There is no partial credit.

Q1: In Public Key Encryption (PKC), who generates the keys used for "authentication"?

A1: The Sender

Q2: Given a data item X, and a hash function H, what is another name for H(X)?

A2: A "message digest" or a "digital signature".

Q3: What are RC2, RC-40 and DES examples of?

A3: Bulk Ciphers

Q4: Name 2 roles of a CA.

A4: Any 2 of

(a) Verifies identities of client and servers
(b) Issues digital certificates
(c) Signs digital certificates with its private key

Q5: The SSL protocol fits between which two layers?

A5: TCP and HTTP