Final Fall 2017Computer Science 571 2nd Exam
Prof. Papa
Thursday, December 7, 2017, 6:00pm – 7:20pm

Name: **Student ID Number:**

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

Cookies and Privacy Questions [10 pts]

Each question is worth 2 points.

Q1: Mention two ways to Opt Out of cookies.

A1:

Any two of:

a) **Select "do not track" in browser**
b) **Download opt-out cookies**
c) **Use cookie management tools in browser**
d) **View current cookies and delete what you do not need**
e) **Check account preferences on registration sites**
f) **Use browser add-ons**

Q2: Cookies include a domain, 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:

Answer:
Secure – only send over SSL, when the request is HTTPS
HttpOnly – Only send over HTTP request, not accessible to 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: Define Cross Site Scripting (XSS).

A4:

A web security violation that enables attackers to inject client-side scripts into web pages

Q5: Define Cross Site Request Forgery (CSRF).

A5:

A type of malicious exploit of whereby unauthorized commands are transmitted from an authenticated user

- **OR –**

an attack that forces an end user to execute unwanted actions on a web application in which they're currently authenticated.

Web Security Questions [10 pts]

Each question is worth 2 points.

Q1: What is a recent technique to construct highly secure passwords?

A1: create long passphrases using Diceware, based on rolling a dice and looking up 7,000+ words

Q2: What functionality do PGP and S/MIME provide?

A2: Encryption and signing of e-mail messages

Q3: What is the main functionality of TOR?

A3: TOR is a network that provides an anonymous path between a client (browser) and a server (web site)

Q4: Why are browser plugins inherently insecure?

A4: Because they bypass the browser sandbox, and can execute arbitrary malicious code

Q5: Is it possible to send a virus in a cookie?

A5: YES [ ] No [X]

Hi-Performance Web Questions [10 pts]

Each question is worth 2 points.

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

80-90%

Q2. List 2 ways that reduce the number of HTTP requests?

Answer any two oF these:

Combine scripts

Combine Style Sheets

Use image maps

Use CSS Sprites

Q3. What 5 types of files should be GZIP-ed (i.e. compressed)?

HTML, CSS, JavaScript, JSON, XML

Q4. What 2 types of files should not be GZIP-ed?

Images and PDF

Q5. Where should CSS and scripts be placed in a HTML file?

CSS at top, scripts at bottom

HTML5 Questions [10 pts]

Each question is worth 2 points.

Q1: The use of the tag has been replaced by a number of new elements included in HTML5. Name two of them.

A1: Any 2 of header, footer, section, article, nav, aside

Q2: Which of the following capabilities are included in HTML5?

A2:
[ ] drag file in browser
[ ] interactive canvas gradient

[ ] editable content
[ ] geolocation
[ ] drag and drop
[ ] storage
[X] ALL OF THE ABOVE

[You must choose the correct choice or choices. There is no partial credit]

Q3: What is the purpose of the different "profiles" included in the H. 264 video standard?

A3: each profile defines a set of "optional features" that trade complexity for file size.

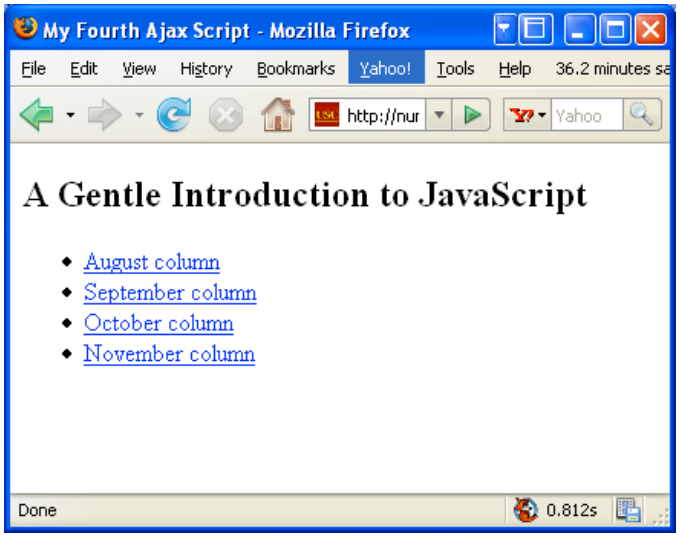
Q4: What is the meaning of the "preload" video attribute?

A4: specifies that the video will be loaded at page load and ready to run when pressing "play".

Q5: If you were asked to make sure that your video files could be viewed on the large majority of browsers, what two video "containers" would you select?

A5: MPEG4 and WebM

JavaScript and Ajax Questions [10 pts]



Below is the HTML source code that produces the web page above. There are 4 links. When the user cursor is placed over each link, a pop-up widget is displayed viewing the contents of the Web page being hyperlinked.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0
Transitional//EN">
<html>
<head>
     <title>My Fourth Ajax Script</title>
     <link rel="stylesheet" rev="stylesheet"
href="script04.css" />
     <script src="script04.js" type="text/javascript"
language="Javascript">
     </script>
</head>
<body>
<h2>A Gentle Introduction to JavaScript</h2>
<ul>
     <li><a href="jsintro/2000-08.html">August
Page</a></li>
     <li><a href="jsintro/2000-09.html">September
Page</a></li>
     <li><a href="jsintro/2000-10.html">October
Page</a></li>
     <li><a href="jsintro/2000-11.html">November
Page</a></li>
</ul>
<div id="previewWin"> </div>
</body>
</html>
```

Below is the JavaScript source code, script04.js, that was imported into the HTML above, but some of the lines are missing, replaced by XXXXXXXs. Fill in the missing.

```
window.onload = initAll;
var xhr = false;
var xPos, yPos;

function initAll() {
     var allLinks = document.getElementsByTagName("a");

     for (var i=0; i< allLinks.length; i++) {
          allLinks[i].onmouseover = showPreview;
     }
}

function showPreview(evt) {
     getPreview(evt);
```

```
     return false;
}

function hidePreview() {
     document.getElementById("previewWin").style.visibility =
"hidden";
}

function getPreview(evt) {
     if (evt) {
          var url = evt.target;
     }
     else {
          evt = window.event;
          var url = evt.srcElement;
     }
     xPos = evt.clientX;
     yPos = evt.clientY;

     if (window.XMLHttpRequest) {
          xhr = new XMLHttpRequest();
     }
     else {
          if (window.ActiveXObject) {
               try {
                    xhr = new
ActiveXObject("Microsoft.XMLHTTP");
               }
               catch (e) { }
          }
     }

     if (xhr) {
          xhr.onreadystatechange = showContents;
          xhr.open("GET", url, true);
          xhr.send(null);
     }
     else {
          alert("Sorry, but I couldn't create an
XMLHttpRequest");
     }
}

function showContents() {
     var prevWin = document.getElementById("previewWin");

     if (xhr.readyState == 4) {
```

```
            prevWin.innerHTML = (xhr.status == 200) ?
xhr.responseText : "There was a problem with the request " +
xhr.status;
            prevWin.style.top = parseInt(yPos)+2 + "px";
            prevWin.style.left = parseInt(xPos)+2 + "px";
            prevWin.style.visibility = "visible";
            prevWin.onmouseout = hidePreview;
      }
}
```

[for graders: each line is worth 2 points]

JQuery Questions [10 pts]

Q1 (2 pts): Please give an example of a jQuery Basic Class selector that modifies a "border" property.

A1: `$(".myClass").css("border", "3px solid red");`

Q2 (2 pts): What does jQuery simplify?

A2:

[X] HTML document traversing
[X] XMLHttpRequest
[ ] HTTP header manipulatin
[X] Event Handling
[X] Animating
[X] AJAX interactions
[ ] ALL OF THE ABOVE

[You must choose the correct choice or choices. <u>There is no partial credit</u>]

Q3 (6 pts): <u>[This question is worth 6 points</u>] Consider the following example <u>without JQuery</u>:

```
<html>
<body><DIV ID="counter">Number of clicks = 0</DIV>
<FORM> <INPUT TYPE="button" VALUE="Increment Counter"
     onclick="updateMessage()">
</FORM>
<SCRIPT LANGUAGE="JavaScript">
 var hits = 0;
```

```
 function updateMessage() {
    hits += 1;
    document.getElementById("counter").innerHTML = "Number of
clicks = " + hits; }
 </SCRIPT>
<noscript></body>
```

A3: Rewrite it using JQuery.

```
<html>
<head>
<meta charset="UTF-8">
<script
src="https://ajax.googleapis.com/ajax/libs/jquery/1.9.0/jquery.
min.js"></script>
<script>
$(function() {
     var hits = 0;
     $("#updateMessage").click(function() {
          $("#counter").html("Number of clicks = " + ++hits);
     });
});
</script>
</head>
<body>
<DIV ID="counter">Number of clicks = 0</DIV>
<FORM> <INPUT TYPE="button" VALUE="Increment Counter"
     id="updateMessage">
</FORM>

<noscript>
</body>
```

Grading Guidelines:

If any student came with different solution might be correct please spread the solution to the other graders to take a decision

Responsive Website Design Questions [10 pts]

Each question is worth 2 points.

Q1: Mention two reasons why hosting a separate `.mobi` website is not recommended?

A1: Any two of:

(1) Requires duplication of content
(2) Over time can result in synchronization of content issues
(3) May work only on a specific mobile size

Q2: Name the three "concepts" that are the basis of Responsive Website Design?

A2: All three of:

(1) fluid grids
(2) flexible images
(3) CSS3 Media Queries

There is no partial credit on question A2. You must mention all 3.

Q3: What is the CSS code (property and value) to hide content on small screens?

A3: display: none; -OR- visibility: hidden;

Q4: Please write an example of a media query.

A4: <link rel="stylesheet" type="text/css" media="screen and (max-device-width: 480px)" href="min.css" />

Answering screen and (max-device-width: 480px) is enough

Q5: List one property of "fluid" grids.

A5: Any one of these: (a) defined using relative-based dimensions (b) define a grid divided into a specific number of columns (c) each grid element is designed with "proportional" width and height, not in pixels

Web Performance Questions [10 pts]

Each question is worth 2 points.

Q1: When estimating Web Server performance requirements, what are the three numbers that you should be estimating?

A1:

What is the number of clients that will connect per second (the "traffic")
What is the average number of bytes sent to the server (request)
What is the average number of bytes sent to the client (response)

Q2: What is a web server "farm"?

A2:

Multiple server with load balancing hardware to distribute web requests (“the “load”) across the servers.

Q3: What is the approach used by sites like CNN for Load Balancing?

A3:

DNS Redirection

Q4: What are the 2 main reasons that Nginx is recommended for high traffic sites.

A4:

a) “low” memory usage and b) “large” number of requests per second for large concurrent connections (high traffic).

Q5: List two ways of improving Apache performance.

A5:

Two of these:

a) **Add additional RAM,**
b) **Tune MinSpareServers and MaxSpareServers**
c) **Enable HTTP compresions**
d) **Use Nginx as reverse-proxy**
e) **Use “fast:” modules liker mod_fastcgi**
f) **Use “direct” modules like mod_php**
g) **Load only “required: module for a smaller footprtint (low memory)**

JavaScript Frameworks Serverless Applications Questions [10 pts]

Each question is worth 2 points.

Q1: Name two properties of Node.js?

A1:

Javascript runtime built on Chrome V8Event driven
Uses non-blocking IO model
Modules handle HTTP
Modules handel networking
Provides POSIX File IO

Supported by both AWS and GCP

Q2: What architectures are supported by AngulaJS

A2:

MVC (Model – View - Controller)

MVVM (Model – View – ViewModel)

Q3: What is the approach used by sites like CNN for Load Balancing?

A3: Which of the following are true of Serverless Architectures?

[X] No compute resource to manage
[ ] Provisioning and scaling handled by the client
[X] Execution environment provided by service
[X] Provides authorization and authentication services
[ ] All of the above

Note: <u>there is no partial credit</u>

Q4: What are the 2 main reasons that Nginx is recommended for high traffic sites.

A4: Which of the following are true of AWS Lambda?

[X] No servers to manage
[X] Continuous scaling
[ ] Subminute metering
[X] bring your oen code
[ ] Complex resource model
[X] Flexible Authorization and Use
[ ] Not suitable for real-time data processing
[X] Easy to build scalable backend services
[ ] All of the above

Note: <u>there is no partial credit</u>

Q5: What is this code an example of?

```
exports.helloGET = function helloGET (req, res) {
  res.send('Hello World!');
```

A5: A Google Cloud Function

Agile Development Questions [10 pts]

Each question is worth 2 points.

Q1-Q3: What is the difference between non-agile and agile regarding each of these? Complete the missing portion of the phrases.

A1: Regarding documents

Non-agile: document-driven

Agile: high bandwidth communication

A2: Process

Non-agile: serial

Agile: iterative

A3: Testing

Non-agile: test late

Agile: test early and continuously

Q4: Who make up the observers or "chickens" in agile development?

A4:

People that do not have deliverables in the sprint, like stakeholders, non-stakeholder, and Subject-Matter-Experts (SMEs).

Q5: What is a Scrum "retrospective"?

A5: Scrum team does a port-mortem after a sprint.