CSC 337 Fall 2013
Final Examination Solutions

Problem 1: (8 points) Mean: 5.2

Note: Answers are underlined and in bold.

The PHP `setcookie()` function causes

(a) the browser to be sent a `Cookie:` header

(b) the browser to be sent a `Set-Cookie:` header

(c) a cookie to be saved in the session

(d) all of the above

In PHP, the value of "x" + 5 is

(a) 0

(b) 5

The common wrong answer was "x5" but many times in class we'd talked about how PHP's + operator always produces an integer so that should immediately rule out "x" and "x5".

(c) "x"

(d) "x5"

The final result of an HTTP GET or POST that's received by the browser is called a...

(a) message

(b) query

(c) request

(d) response

Which of the following best describes the key function of a `<form>` element?

(a) specifies a set of input elements to display in close proximity to each other

(b) specifies the set of input elements that are to be treated as a security group

(c) specifies the set of input elements whose values are to be sent in a single GET or POST

(d) specifies the set of input elements that are required fields

Which one of the following does not have a standard (actual or proposed) that is maintained by an independent standards organization?

(a) HTML

(b) CSS

(c) PHP

(d) JavaScript

When I wrote the question I had PHP in mind since "The PHP Group" makes all decisions. HTML and CSS have standards maintained by the W3C. I consider JavaScript to be defined by the ECMAscript standard but that's debatable so we counted both (c) and (d) as correct.

Which one of the following is not a JavaScript datatype?

(a) `boolean`

(b) `int`

(c) `string`
(d) `undefined`

Which of the following fully describes PHP arrays?

(a) They are like Java arrays and Python lists.
(b) They are like Java maps and Python dictionaries.
(c) They are like Java sets and Python tuples.
(d) None of the above.

This was surely a tricky one but it's important to recognize that if `$a` is a PHP array, then we can do things like adding values to one end or the other, which is array/list-like, or associating values with a key, which is map/dictionary-like.

SQL injection is when an attacker

(a) Splices unexpected text into a query
(b) Modifies the PDO `bindParam` *call*
(c) Uses an XSS worm to execute a series of SQL queries
(d) Replaces a network database with one that is SQL-enabled

Problem 2: (8 points) Mean: 5.9

XAMPP, MAMP, and WAMP provide LAMP-like stacks for various platforms. What do the letters A, M, and P stand for? (one point)

Apache, MySQL, PHP

There's an important difference between where session data is stored and where cookies are stored. What's that difference? (one point)

Session data is stored on the server. Cookies are held by browsers (and are thus trivially vulnerable to tampering.)

Using only HTML there are two ways to make a page do an HTTP GET in response to an element being clicked. What are those two ways? (two points)

(1) Click a button made with `<input type=submit>`.
(2) Click an anchor element whose `href` differs from the current page by more than the fragment.

What's the basic idea of Ajax? (two points)

Being able to do a GET or a POST and have the response, which is asynchronous, be used to alter some number of elements on the page. The page is not reloaded.

What's the basic idea of an XSS attack? (two points)

In the form of XSS attack that we discussed an attacker causes his/her JavaScript to be executed by other users. There are many variations of XSS attacks.

Problem 3: (2 points) Mean: 0.8

There's a new jQuery UI component, TicTacToe, which displays an NxN (not 3x3) Tic-Tac-Toe board. Assuming it follows the pattern of other jQuery UI components, write an expression to turn this `div` *into a* ***5x5*** *Tic-Tac-Toe board:*

```
<div id=board></div>
```

Hint: The component is named `ttt`*. The author of the component likes short names for options, too.*

```
$("#board").ttt({n: 5})
```

When writing this question I looked for simple ideas that were common to the jQuery UI examples. I decided that a call to transform an element, with an option specified via an object was a reasonable thing to have picked up from the examples we covered in class.

An answer like `$("#board").ttt(5)` was worth one point. `$("#board").ttt(n=5)` was counted as correct, since it showed some cognizance of named options being used for configuration.

Problem 4: (8 points) (two points each) **Mean: 5.6**

For each of the following PHP arrays describe a specific action or series of actions that would cause a value to be assigned to a key "x" in that array. For example, what's something that could cause `$_GET["x"]` *to be 100?*

`$_GET`

Hit a URL with `...?x=100`

`$_POST`

Submit a form that has an input element with `name=x` and `value=100`.

`$_COOKIE`

Do `setcookie("x", 100, ...)` in a previous run of the program.

`$_SESSION`

Do `session_start();` and then `$_SESSION["x"] = 100;` in a previous run of the program.

Problem 5: (5 points) **Mean: 3.1**

Write a `<script>` element that contains jQuery code that implements this behavior:

> *Clicking any paragraph element that is a child of an element with id "x" removes the last character in the paragraph. This may be repeated any number of times. If no characters remain, nothing happens.*

Important: Assume that the `<script>` element will precede any paragraph elements in the HTML document.

```
<script>
$(document).ready(function () {
    $("#x p").click(function() {
        var t = $(this).text();
        t = t.substr(0, t.length - 1);
        $(this).text(t);
        })
    });
</script>
```

Problem 6: (4 points) Mean: 3.8

Recall the `sum2.php` example from the slides...

Question 1:

If `sum2.php` is used to compute the sum of the values 75, 28, and 104, how many times is `sum2.php` run?

Question 2:

Explain the reasoning behind your answer.

I was proud as a peacock to see that almost everybody got this one right, recognizing that `sum2.php` is run four times: once to get the initial view and then once for each of the three values. It demonstrates an important key understanding of how PHP programs work.

Problem 7: (5 points) Mean: 4.5

Write a PHP function `sum($values)` whose argument is a string containing a comma-separated list of positive integers and that returns the sum of those integers.

```
function sum($s)
{
    $sum = 0;
    foreach (explode(",",$s) as $x)
        $sum += $x;

    return $sum;
}
```

Oops—some students got a minor deduction for not having `$sum = 0` but that is not actually needed because `explode(",", "")` produces `array("")`. I apologize! No final scores

Problem 8: (18 points) Mean: 16.3

Write a PHP program, `box.php`, that draws a red or blue square of the requested size. ...

```
<!doctype html>
<title>box</title>
<?php
if ($color = @$_GET["color"]) {
   $sz = $_GET["size"];
   echo "<div style=background-color:$color;width:{$sz}px;height:{$sz}px></div>";
   }
?>
<form action=box.php method=get>
   Size: <input type=text name=size required><br>
   <input type=submit name=color value="Red">
   <input type=submit name=color value="Blue">
</form>
```

Problem 9: (42 points) Mean: 35.2

For this problem you are to write a PHP program that displays a list of images and the number of times each image has been viewed. Each image has a **View** button that if clicked displays the image on a page by itself. That page has a Back link that the user can click to return to the list of images.

```
<!doctype html>
<title>pic.php</title>
<style>
    .pic { width: 300px }
</style>
<?php
if ($show = @$_POST["show"]) {
    //
    // A little security -- be sure the filename has no slashes,
    // assume images are in an images directory, and be sure the
    // file exists.  Otherwise, silently exit.
    $path = "images/$show";
    if (strstr($show, "/") !== false || !file_exists($path))
        exit();

    echo "<div class=pic><img width=300 src='$path'></div>";
    echo "<br><a href=pic.php>Back</a>";
    update();
    exit();
}

$conn=getconn();

$stmt = $conn->query("select * from picture order by name");
$rows = $stmt->fetchAll(PDO::FETCH_ASSOC);
foreach ($rows as $row) {
    echo "<form action=pic.php method=post>
    <input type=submit value=View> {$row['name']} ({$row['views']})
    <br>
    <input type=hidden name=show value={$row['file']}>
    <input type=hidden name=id value={$row['id']}>
    </form><br>";
    }

function update()
{
    $conn=getconn();
    $stmt = $conn->prepare(
                    "update picture set views=views+1 where id=:id");
    $stmt->bindParam(":id", $_POST["id"]);
    $result = $stmt->execute();

    if (!$result)
        var_dump($stmt->errorInfo());
}
```

Extra Credit Section (½ point each unless otherwise noted) Mean: 2.6

(1) I've made the TAs learn all your names but let's see if you've learned theirs. What are the TA's names and which one has red hair?

Jackson Westeen and Harrison Stovall. Harrison has red hair. Thanks again to them!

(2) It's redundant to say "Write a `<script>` element..." or "a click on a `<p>` element...". Why is that?

Most properly, `<script>` and `<p>` are opening tags for script and paragraph elements. If one knows HTML terminology, "Write a script element..." or "a click on a paragraph element..." is sufficiently descriptive.

(3) What is Lorem Ipsum?

Placeholder text used in publishing and design. Like almost everything else you can think of, Wikipedia has some interesting background on it.

(4) Write the shortest possible valid HTML5 document.

```
<!doctype html><title>x</title>
```

(5) Here's a jQuery question that was scratched because when whm wrote his solution it didn't work!

"Click a paragraph. If its text is blue, turn it black. If it's black, turn it blue."

What's the bug whm had in his solution?

I didn't anticipate that `$(this).css("color")` would return the color in functional form, like `"rgb(0, 0, 0)"`. That made me reconsider the merit of including it since the problem then became clumsier to explain.

(6) It's been said that a programmer should know only three numbers. What are they?

0, 1, and N.

(7) Describe in detail the visual effect of each of the following CSS declarations: (one point)

```
color: "red"
font: "sans-serif"
width: 300
```

Writing "no effect" was sufficient. I tried several variations of these during the semester: assignment 0 (the pre-class survey), a slide (CSS 16), quiz 3, quiz 7, and the mid-term, to name a few.

(8) If you only remember one thing from this class, what will it be? (Ok to try to be funny!)

The funny(?) winner: "Dump your gf before finals and study."—anon.
The serious winner: "Never trust the users."—Paul Regan