

**Computer Science 571 Exam #1**  
**Prof. Papa**  
**Thursday, October 6, 2016, 6:00pm – 7:20pm**

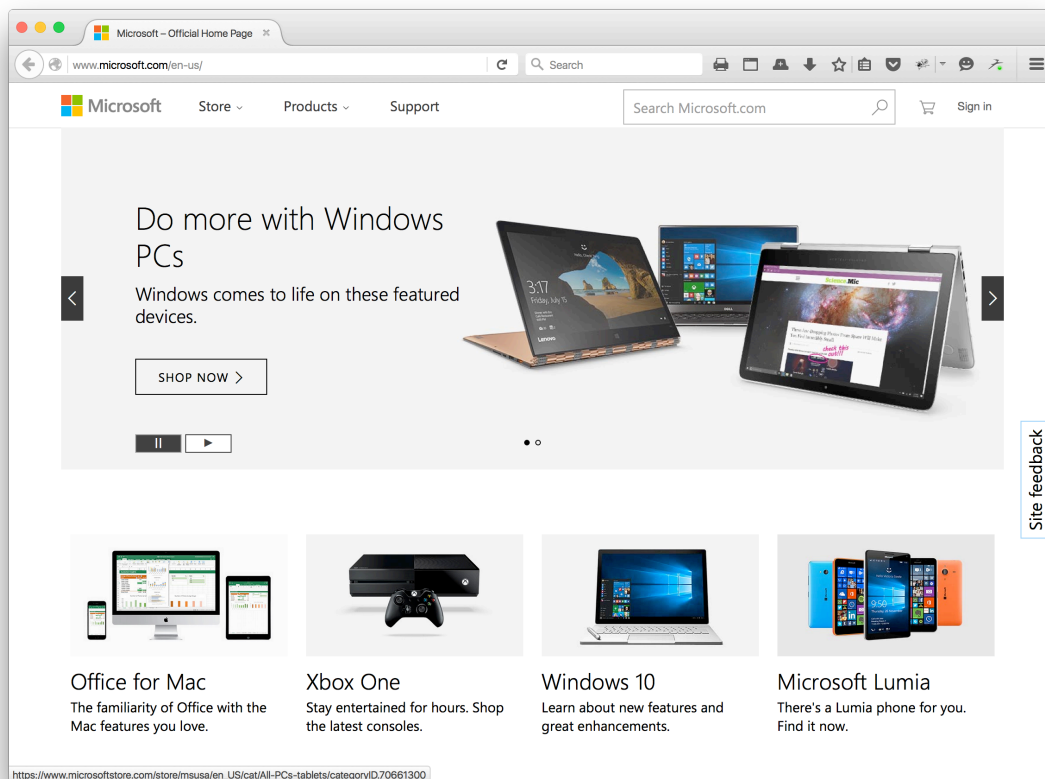
**Name:**

**Student Id Number:**

1. This is a closed book exam.
2. Please answer all questions.
3. Place all answers on the exam and return the entire exam

**HTTP QUESTIONS [20 PTS]**

Below is the web page [www.microsoft.com](http://www.microsoft.com). Following that is part of the exchange of messages between the browser and the server, obtained by running Live HTTP Headers. Answer the questions that follow. **NOTICE:** **NO PARTIAL CREDIT** on any of the questions.



(1) `http://microsoft.com/`

`GET / HTTP/1.1`  
`Host: microsoft.com`

User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.11; rv:43.0)  
Gecko/20100101 Firefox/43.0  
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,\*/\*;q=0.8  
Accept-Language: en-US,en;q=0.5  
Accept-Encoding: gzip, deflate  
DNT: 1  
Connection: keep-alive

HTTP/1.1 301 Moved Permanently  
Content-Type: text/html; charset=UTF-8  
Location: http://www.microsoft.com/  
Server: Microsoft-IIS/8.5  
X-Powered-By: ASP.NET  
Date: Sat, 01 Oct 2016 19:55:43 GMT  
Content-Length: 148

-----  
(2) http://www.microsoft.com/

GET / HTTP/1.1  
Host: www.microsoft.com  
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.11; rv:43.0)  
Gecko/20100101 Firefox/43.0  
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,\*/\*;q=0.8  
Accept-Language: en-US,en;q=0.5  
Accept-Encoding: gzip, deflate  
DNT: 1  
Connection: keep-alive

HTTP/1.1 302 Moved Temporarily  
Server: AkamaiGHost  
Content-Length: 0  
Location: http://www.microsoft.com/en-us/  
Date: Sat, 01 Oct 2016 19:55:44 GMT  
Connection: keep-alive  
X-CCC: US  
X-CID: 2

-----  
(3) http://www.microsoft.com/en-us/

GET /en-us/ HTTP/1.1  
Host: www.microsoft.com  
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.11; rv:43.0)  
Gecko/20100101 Firefox/43.0  
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,\*/\*;q=0.8  
Accept-Language: en-US,en;q=0.5  
Accept-Encoding: gzip, deflate  
DNT: 1  
Connection: keep-alive

HTTP/1.1 200 OK  
Cache-Control: no-cache, no-store  
Pragma: no-cache  
Content-Type: text/html  
Expires: -1  
Server: Microsoft-IIS/8.0  
CorrelationVector: w/wiET7pBEKkMsHf.1.1  
X-AspNet-Version: 4.0.30319

X-Powered-By: ASP.NET  
access-control-allow-headers: Origin, X-Requested-With, Content-Type, Accept  
access-control-allow-methods: GET, POST, PUT, DELETE, OPTIONS  
access-control-allow-credentials: true  
X-Frame-Options: SAMEORIGIN  
Vary: Accept-Encoding  
Content-Encoding: gzip  
Date: Sat, 01 Oct 2016 19:55:45 GMT  
Content-Length: 16412  
Connection: keep-alive  
X-CCC: US  
X-CID: 2

-----  
(4) https://cdn.optimizely.com/js/6212760188.js

GET /js/6212760188.js HTTP/1.1  
Host: cdn.optimizely.com  
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.11; rv:43.0) Gecko/20100101 Firefox/43.0  
Accept: \*/\*  
Accept-Language: en-US,en;q=0.5  
Accept-Encoding: gzip, deflate  
DNT: 1  
Cookie: cdn=http%3a%2f%2fedgecast%3ahs%40na  
Connection: keep-alive

HTTP/1.1 200 OK  
Content-Encoding: gzip  
Accept-Ranges: bytes  
Cache-Control: max-age=120  
Content-Type: text/javascript  
Date: Sat, 01 Oct 2016 19:55:45 GMT  
Etag: "02e0973efd4a0abdaeaef617855e82b0"  
Last-Modified: Fri, 30 Sep 2016 22:00:48 GMT  
Server: ECS (oxr/83AA)  
Set-Cookie: cdn=http%3a%2f%2fedgecast%3ahs%40na; path=/; domain=.optimizely.com  
Timing-Allow-Origin: \*  
Vary: Accept-Encoding  
x-amz-meta-revision: 939  
X-Cache: HIT  
Content-Length: 46965

-----  
(5) http://ajax.aspnetcdn.com/ajax/jquery/jquery-1.7.2.min.js

GET /ajax/jquery/jquery-1.7.2.min.js HTTP/1.1  
Host: ajax.aspnetcdn.com  
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.11; rv:43.0) Gecko/20100101 Firefox/43.0  
Accept: \*/\*  
Accept-Language: en-US,en;q=0.5  
Accept-Encoding: gzip, deflate  
DNT: 1  
Connection: keep-alive

HTTP/1.1 200 OK

Content-Encoding: gzip  
Accept-Ranges: bytes  
Access-Control-Allow-Origin: \*  
Cache-Control: public, max-age=28778572  
Content-Type: application/x-javascript  
Date: Sat, 01 Oct 2016 19:55:45 GMT  
Etag: "08be15d9b7cd1:0"  
Last-Modified: Wed, 21 Mar 2012 19:46:54 GMT  
Server: ECAcc (oxr/8372)  
Vary: Accept-Encoding  
VTag: 791105556000000000  
X-Cache: HIT  
X-CCC: US  
X-CID: 2  
X-Powered-By: ASP.NET, ARR/2.5, ASP.NET  
Content-Length: 42690

-----  
(6) http://c.s-microsoft.com/en-us/CMSStyles/style.csx?k=82f5f57f-a81c-5468-be33-6bcc6578cbaa\_20d3f19f-9acc-5455-5927-c0990d073641\_0a295c26-3eb3-4234-019c-1bfc9e5a6b62

GET /en-us/CMSStyles/style.csx?k=82f5f57f-a81c-5468-be33-6bcc6578cbaa\_20d3f19f-9acc-5455-5927-c0990d073641\_0a295c26-3eb3-4234-019c-1bfc9e5a6b62 HTTP/1.1  
Host: c.s-microsoft.com  
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.11; rv:43.0) Gecko/20100101 Firefox/43.0  
Accept: text/css,\*/\*;q=0.1  
Accept-Language: en-US,en;q=0.5  
Accept-Encoding: gzip, deflate  
DNT: 1  
Connection: keep-alive

HTTP/1.1 200 OK  
Content-Type: text/css  
Etag: "W6rYhhZZBgFHVq7VS01RuQ=="  
Server: Microsoft-IIS/8.0  
X-AspNet-Version: 4.0.30319  
X-Powered-By: ASP.NET  
access-control-allow-headers: Origin, X-Requested-With, Content-Type, Accept  
access-control-allow-methods: GET, POST, PUT, DELETE, OPTIONS  
access-control-allow-credentials: true  
P3P: CP="ALL IND DSP COR ADM CONo CUR CUSo IVAo IVDo PSA PSD TAI TELo OUR SAMo CNT COM INT NAV ONL PHY PRE PUR UNI"  
X-Frame-Options: SAMEORIGIN  
Vary: Accept-Encoding  
Content-Encoding: gzip  
Cache-Control: private, max-age=243784  
Expires: Tue, 04 Oct 2016 15:38:49 GMT  
Date: Sat, 01 Oct 2016 19:55:45 GMT  
Content-Length: 7845  
Connection: keep-alive

-----  
(7) https://c.s-microsoft.com/en-in/CMSImages/HPFeb15\_social\_Twitter.png?version=8cd2eefc-dabe-c03f-8302-0f5c5956a70d

GET /en-in/CMSImages/HPFeb15\_social\_Twitter.png?version=8cd2eefc-dabc03f-8302-0f5c5956a70d HTTP/1.1

Host: c.s-microsoft.com

User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.11; rv:43.0)

Gecko/20100101 Firefox/43.0

Accept: image/png,image/\*;q=0.8,\*/\*;q=0.5

Accept-Language: en-US,en;q=0.5

Accept-Encoding: gzip, deflate

DNT: 1

Connection: keep-alive

HTTP/2.0 200 OK

Content-Type: image/png

Etag: "IGmsUtXaZlEOxcE7+cxDKw=="

Server: Microsoft-IIS/8.0

X-AspNet-Version: 4.0.30319

X-Powered-By: ASP.NET

access-control-allow-headers: Origin, X-Requested-With, Content-Type, Accept

access-control-allow-methods: GET, POST, PUT, DELETE, OPTIONS

access-control-allow-credentials: true

X-Frame-Options: SAMEORIGIN

Content-Length: 252

Cache-Control: private, max-age=444895

Expires: Thu, 06 Oct 2016 23:30:40 GMT

Date: Sat, 01 Oct 2016 19:55:45 GMT

X-Firefox-Spdy: h2

-----  
(8) http://img-prod-cms-rt-microsoft-com.akamaized.net/cms/api/am/imageFileData/REGxSu?ver=6d63

GET /cms/api/am/imageFileData/REGxSu?ver=6d63 HTTP/1.1

Host: img-prod-cms-rt-microsoft-com.akamaized.net

User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.11; rv:43.0)

Gecko/20100101 Firefox/43.0

Accept: image/png,image/\*;q=0.8,\*/\*;q=0.5

Accept-Language: en-US,en;q=0.5

Accept-Encoding: gzip, deflate

DNT: 1

Connection: keep-alive

HTTP/1.1 200 OK

Content-Type: image/jpeg

Content-Location: http://img-prod-cms-rt-microsoft-com.akamaized.net/cms/api/am/imageFileData/REGxSu?ver=6d63

Last-Modified: Tue, 27 Sep 2016 15:38:09 GMT

Server: Microsoft-IIS/8.5

Access-Control-Allow-Origin: \*

X-Source-Length: 9782

X-Datacenter: centralus

X-ActivityId: df613390-346f-4f6d-9bf9-d2f460b206ca

X-Instance: Resizer.Web\_IN\_3

X-Deployment: dead43a81c7541a2946372259a12ad24

Timing-Allow-Origin: \*

X-AspNet-Version: 4.0.30319

X-Powered-By: ASP.NET

```

Content-Length: 9782
Cache-Control: public, max-age=70904
Expires: Sun, 02 Oct 2016 15:37:29 GMT
Date: Sat, 01 Oct 2016 19:55:45 GMT
Connection: keep-alive
-----
(9) https://www.microsoft.com/en-us/silentauth

GET /en-us/silentauth HTTP/1.1
Host: www.microsoft.com
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.11; rv:43.0)
Gecko/20100101 Firefox/43.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
DNT: 1
Connection: keep-alive

HTTP/2.0 302 Found
Content-Length: 0
Location:
https://login.live.com:443/login.srf?wa=wsignin1.0&rpsnv=13&checkda=1&c
t=1475351747&rver=6.7.6643.0&wp=MBI&wreply=https%3a%2f%2fwww.microsoft.
com%2fen-us%2fsilentauth%3fsilentauth%3dmsa&lc=1033&id=74335&aadredir=1
Server: Microsoft-IIS/8.5
P3P: CP="ALL IND DSP COR ADM CONo CUR CUSo IVAo IVDo PSA PSD TAI TELo
OUR SAMo CNT COM INT NAV ONL PHY PRE PUR UNI"
X-Powered-By: ASP.NET, ARR/2.5, ASP.NET
access-control-allow-headers: Origin, X-Requested-With, Content-Type,
Accept
access-control-allow-methods: GET, POST, PUT, DELETE, OPTIONS
access-control-allow-credentials: true
X-Frame-Options: SAMEORIGIN
Expires: Sat, 01 Oct 2016 19:55:47 GMT
Cache-Control: max-age=0, no-cache, no-store
Pragma: no-cache
Date: Sat, 01 Oct 2016 19:55:47 GMT
Set-Cookie: MS-CV=w/wiET7pBEKkMsHf.3; domain=.microsoft.com;
expires=Sun, 02-Oct-2016 19:55:47 GMT; path=/
X-CCC: US
X-CID: 2
X-Firefox-Spdy: h2
-----

```

**Q1. What is the name of the web server that returns the Microsoft home page HTML?**

**Microsoft-IIS/8.0 (notice Microsoft-IIS/8.5 is incorrect)**

**Q2. How big in “bytes” is the www.microsoft.com home page?**

**16412 bytes**

**Q3. What CDN or CDNs deliver the JavaScript used in www.microsoft.com?**

**cdn.optimizely.com and ajax.aspnetcdn.com**

**Q4. List any transactions that are “compressed”.**

**#3, #4, #5, #6**

**Q5. How many redirects are executed before the Microsoft homepage is displayed?**

**2 redirects, 301 Moved permanently and 302 Moved Temporarily**

**Q6. List all servers used in these transactions?**

**Microsoft-IIS/8.5, AkamaiGHost, Microsoft-IIS/8.0, ECS, ECAcc,**

**Q7. List four (4) headers used to improve browser cache performance?**

**Any 4 of Expires, Cache-Control, Etag, Last-Modified, Pragma, X-Cache-Control**

**Q8. Transaction (7) includes the header X-Firefox-Spdy. What is Spdy?**

**SPDY is Google HTTP speedup with header compression now included in HTTP/2**

**Q9. What type of compression is supported by the Firefox browser used in these transactions?**

**gzip and deflate**

**Q10. How long after the execution of these transactions will the Twitter image need to be refreshed, if requested again?**

**About 5 days (+ 3 hours and 35 minutes to be exact)**

## **APACHE SERVER and PHP5 QUESTIONS [10 PTS]**

The Apache 2 build and installation involved 3 basic steps. Briefly explain the purpose of each step:

**Q1. ./configure**

**A1. Creates the source files, resolves dependencies, and configures it based on your "hardware" environment**

**Q2. make**

**A2. Compiles and links the source code**

**Q3.** make install

**A3.** Installs the httpd binary in the destination directory, usually apache2

The Apache 2 configuration and customization steps involve 2 basic “Editing” steps. Briefly explain the “purpose” of each step (Q4 & Q5):

**Q4.** Edit httpd.conf configuration file

Listen 54321

**A4.** Purpose: Change server port so that it does not conflict with port 80 already used

**Q5.** Edit httpd-mpm.conf configuration file

```
<IfModule mpm_prefork_module>
    StartServers      2
    MinSpareServers   2
    MaxSpareServers   2
    MaxClients        2
    MaxRequestsPerChild 0
</IfModule>
```

**A5.** Purpose: Ensure your servers take up only a minimum amount of resources

**Q6.** What are the 4 basic steps in the PHP installation?

**A6.** Configure, make, make install, edit httpd.conf

**Q7.** What is the purpose of these lines to be added to the http.conf file?

```
<FilesMatch "\.ph(p[2-6]?|tml)$">
    SetHandler application/x-httpd-php
</FilesMatch>
```

**A7.** Ensures that Apache, when it recognizes scripts ending with extension .php will invoke the PHP direct module.

**Q8.** What is libphp5.so in this line that is automatically added to httpd.conf?

```
LoadModule php5_module modules/libphp5.so
```

**A8.** It is the binary module built by the PHP installation

**Q9.** What are the commands to start and stop Apache?

**A9.** Apachectl start, apachectl stop  
OR



httpd -k start and httpd -k stop

**Q10. List 3 possible uses of Apache log files.**

**A10.**

Finding problem with a site  
Analyzing Traffic patterns  
Detecting malicious activity

### **LYNDA.COM QUESTIONS [10 PTS]**

**Q1. What is the purpose of the error log file in Apache? List two (2).**

**A1.**

- log “**diagnostic**” information
- record any “**errors**” found
- first place to look for “**problems**”

**Q2. What is the purpose of the access log file in Apache?**

**A2. record all requests**

**Q3. what is the Three-Way-handshake?**

**A3. Normal TCP traffic always begins with the 3 way handshake, where a client initiates the conversation by requesting to have a communication session with a server.**

**-OR-**

- The SYN packet will synchronize the sequence numbers, and the first two packets of the 3-way handshake have the SYN flag set.

**-OR-**

**First the client sends a synchronization packet. If the server accepts, it responds with a synchronization acknowledgment saying that the door is open, the light is on, let's do this thing. The client responds within an acknowledgment.**

**Q4. HTTP uses what protocol as the Transport layer protocol?**

**A4. TCP**

**Q5. What does the autofocus attribute indicate?**

**A5. Indicates to the browser that this control should receive the input focus when the page is opened**

**Q6. What would be a good reason for a FORM developer to turn off autocomplete for a given input?**

**A6. Security reasons, like for a banking account number**

**Q7. What is the purpose of the pattern attribute?**

**A7. To restrict the field into to a matching Regex patterns (or regular expression)**

**Q8. Indicate 4 different JavaScript functions for selecting DOM elements.**

**A8. All of these 4:**

- getElementById()
- getElementsByTagName()
- getElementsByClassName
- querySelector and/or querySelectorAll

**Q9. What is an XML Schema?**

**A9. Allowed answers:**

- An alternative to using DTDs
- An alternative way of enforcing rules and constraints on your XML data

**Q10: Is there a ways using DTDs to say that an element can only appear four times in another element?**

**A10. NO, that can only be done with XML Schemas**

## **JAVASCRIPT REGULAR EXPRESSIONS QUESTIONS [10 PTS]**

JavaScript 1.5 introduced a new notation for Regular Expressions using the ?= notation. Please explain the meaning of each of the following four (4) regular expressions:

**Q1. ?=.\*\d**

**A1. means at least one character that is a number**

**Q2. ?=.\*[a-z]**

**A2. means at least one character that is a lower case letter**

**Q3. ?=.\*[A-Z]**

**A3. means at least one character that is an upper case letter**

**Q4. .{6,}**

**A4. means at least 6 characters**

**Q5. What is the following code testing for?**

```
re = /^\\w+$/;  
if(!re.test(form.username.value))
```

**A5. Username must contain only letters, numbers and underscores**

## **XML/DOM QUESTIONS [20 pts]**

The example below traverses ALL available "book" tags and loops through all child nodes of each <book> tag and displays their name and values, producing the following output:

```
title: Everyday Italian  
author: Giada De Laurentiis  
year: 2005
```

Complete the missing code that performs the loop, and produces the output. Notice that loadxmlstring.js contains the function loadXMLString() that returns back the Document Object.

```
<html>  
<head>  
<script src="loadxmlstring.js"></script>  
</head>  
<body>  
<script>  
text="<book>";  
text=text+"<title>Everyday Italian</title>";  
text=text+"<author>Giada De Laurentiis</author>";  
text=text+"<year>2005</year>";  
text=text+"</book>";
```

```
xmlDoc=loadXMLString(text);
```

```

x=xmlDoc.documentElement.childNodes;
for (i=0;i<x.length;i++)
{
document.write(x[i].nodeName) ;
document.write(": ");
document.write(x[i].childNodes[0].nodeValue) ;
document.write("<br>");
}

</script>
</body>
</html>

```

The program must begin by checking if your browser has an XML/DOM parser.

## CSS QUESTIONS [10 PTS]

Below are lines extracted from the CSS sheet of microsoft.com. For each line answer the question. Each question is worth two points.

```

html, body, div, p, table, td, form, img, h1, h2, h3, h4,
h5, h6, input { font-family: Tahoma, Verdana, Segoe, sans-
serif; padding: 0px; margin: 0px; border: 0px transparent
none; background-position: left top; background-repeat: no-
repeat; }

```

**Q1. Explain the purpose of the line above**

**A1. Changes fonts, border, margin and other layout settings for 15 tags all at once.**

```

a:active, a:hover { color: #4E7DC2; text-decoration:
underline; }

```

**Q2. Explain the purpose of the line above**

**A2. It modifies the color and underlines the text of active hyperlinks or hyperlinks where the mouse is over.**

```

#page { margin-left: auto; margin-right: auto; width:
934px; position: relative; top: 0px; }

```

**Q3. Explain the purpose of the line above**

**A3. It creates an “ID Attribute” named #page, and applies styles to modify margins, width, position and top**

```
.patent { font-size: 82%; font-family: Tahoma; margin: 0px 17px 10px 0px; color: #AECADDE; clear: both; }
```

**Q4. On the line above, what is “patent”?**

**A4. A “class” name**

```
#superNav { position: absolute; top: 49px; right: 15px; width: 192px; z-index: 70; }
```

**Q5. On the line above, what is “superNav”?**

**A5. An “ID Attribute” name**

## PHP QUESTIONS [20 PTS]

**Q1 [4 points].** Consider the following PHP Program. Complete the missing code.

```
<?php
$contacts = array(
    array(
        "name" => "Peter Parker",
        "email" => "peterparker@mail.com",
    ),
    array(
        "name" => "Clark Kent",
        "email" => "clarkkent@mail.com",
    )
);
echo "Peter Parker's Email-id is: " XXXXXXXXXXXXXXXX1 ;
?>
```

Answer: **. \$contacts[0]["email"]; (grader notice the 'dot')**

**Q2 [12 points].** For each of the following examples code, enter the expected output that would be displayed in a browser. Notice that print() in PHP outputs one or more strings. The print() function is not actually a function, so you are not required to use parentheses with it. The print() function is slightly slower than echo().

```
<?php
// Show all errors
error_reporting(E_ALL);
```

```
$arr = array('fruit' => 'apple', 'veggie' => 'carrot');

//
print $arr['fruit'];
print $arr['veggie'];
```

**Answer:**

**apple carrot**

```
//
define('fruit', 'veggie');
//
print $arr['fruit'];
print $arr[fruit];
```

**Answer:**

**apple carrot**

```
//
print "Hello $arr[fruit]";
```

**Answer:**

**Hello apple**

```
// braces surrounding arrays within strings allows constants
// to be interpreted
print "Hello {$arr[fruit]}";
print "Hello {$arr['fruit']}";
```

**Answer:**

**Hello carrot Hello apple**

```
//
print "Hello $_GET['foo']";
```

**Answer:**

**Parse error. 'foo' is undefined**

```
//
print "Hello " . $arr['fruit'];
```

**Answer:**

**Hello apple**

?>

[note for graders: accept output with or without spaces, ie. applecarrot –OR- apple carrot]

**Q3 [4 points].** Consider the following files.

Order.html:

```
<html><body>
<h4>Tizag Art Supply Order Form</h4>
<form action="process.php" method="post">
<select name="item">
<option>Paint</option>
<option>Brushes</option>
<option>Erasers</option>
</select>
Quantity: <input name="quantity" type="text" />
<input type="submit" />
</form>
</body></html>
```

process.php:

```
<html><body>
<?php
$quantity = XXXXXXXXXXXXXXXX2
```

**Answer:** \_\_\_\_\_ **`$_POST['quantity'];`**

```
$item = XXXXXXXXXXXXXXXX3
```

**Answer:** \_\_\_\_\_ **`$_POST['item'];`**

```
echo "You ordered ". $quantity . " " . $item . "<br />";
echo "Thank you for ordering from Tizag Art Supplies!";
```

?>

```
</body></html>
```

Complete the missing code.