

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

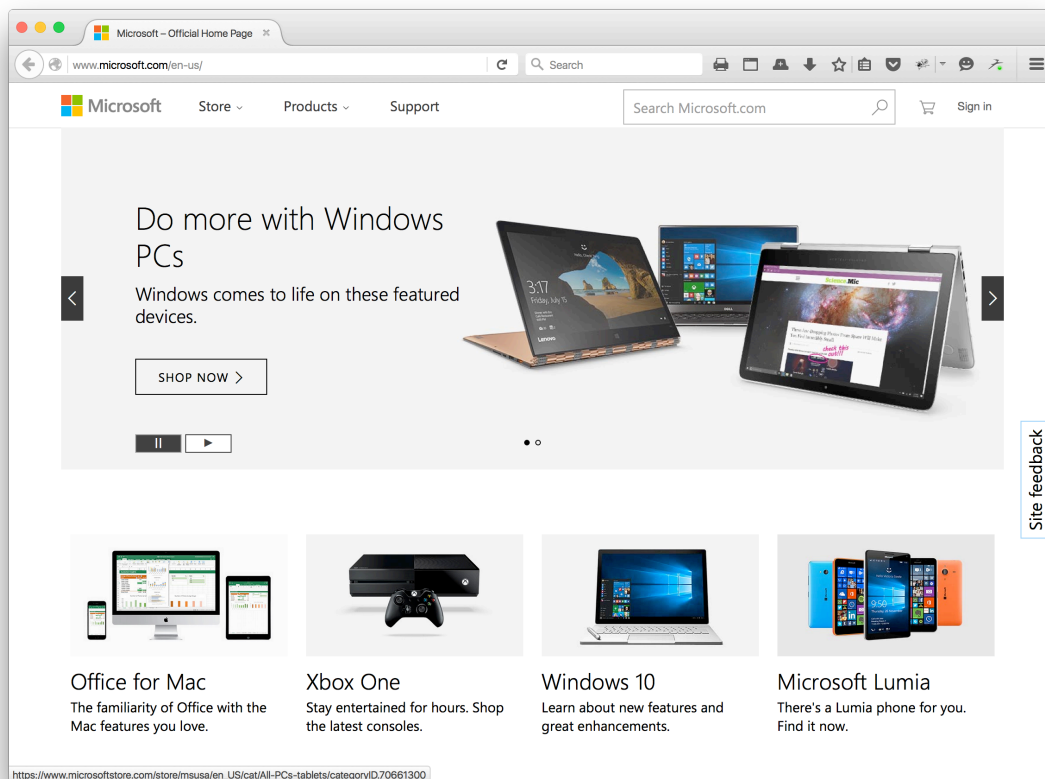
Name:

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. 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.