

Computer Science 571 MidTerm

Prof. Horowitz

Thursday, February 27, 2014, 9:30am – 10:45am

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

DOM 25 pts

JavaScript 50 pts

HTTP 20 pts

CGI 5 pts

DOM QUESTIONS [25 Points]

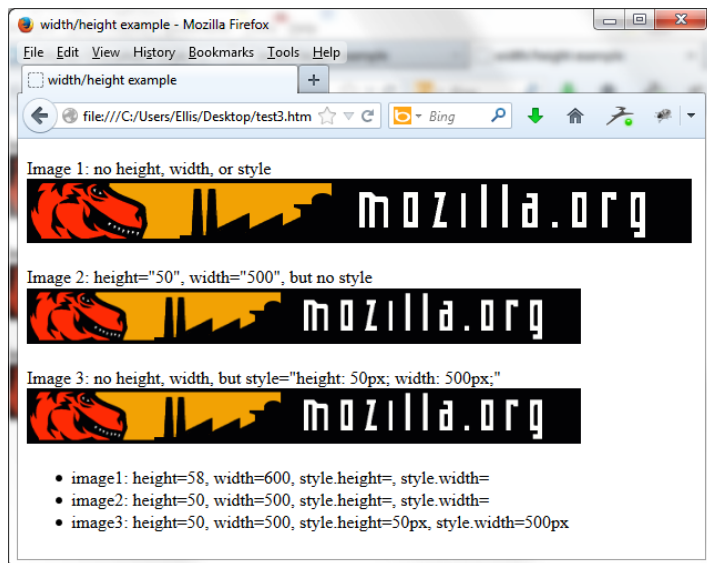
In JavaScript, `arr.map(callback[, thisArg])` calls a provided callback function once for each element in an array, in order, and constructs a new array from the results. For example

```
var numbers = [1, 4, 9];
var roots = numbers.map(Math.sqrt);
/* roots is now [1, 2, 3], numbers is still [1, 4, 9] */
```

1. [5 pts] Here is a question about the use of map; fill in the missing code.

```
var obj = {
  divisor: 10,
  remainder: function (value) {
    return value % this.divisor;
  }
}
var numbers = [6, 12, 25, 30];
var result = numbers.map(obj.remainder, obj);
document.write("output: <br />" + result);

// Output:
// 6,2,5,0
```



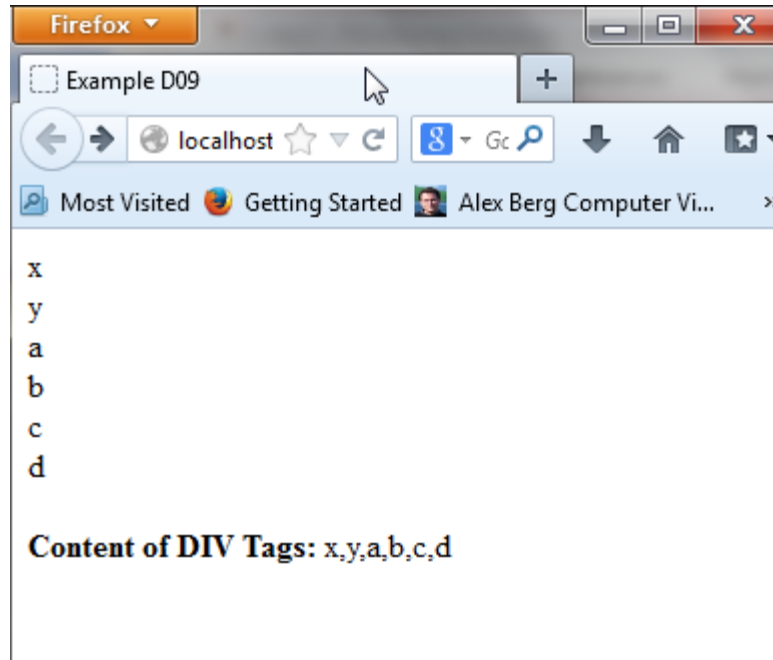
2. [10 pts] Above is a web page that was produced by the program below. But some of the code is missing. Fill in the missing code.

```
<!DOCTYPE html><html lang="en"><head><title>width/height example</title>
<script>
function init() {
    var arrImages = new Array(3);
    arrImages[0] = document.getElementById("image1");
    arrImages[1] = document.getElementById("image2");
    arrImages[2] = document.getElementById("image3");
    var objOutput = document.getElementById("output");
    var strHtml = "<ul>";

    for (var i = 0; i < arrImages.length; i++) {
        strHtml += "<li>image" + (i+1) +
            ": height=" + arrImages[i].height +
            ", width=" + arrImages[i].width +
            ", style.height=" + arrImages[i].style.height +
            ", style.width=" + arrImages[i].style.width +
            "<\li>";
    }

    strHtml += "<\ul>";
    objOutput.innerHTML = strHtml;
}
</script></head>
<body onload="init();">
<p>Image 1: no height, width, or style
    
</p>
<p>Image 2: height="50", width="500", but no style
    </p>
<p>Image 3: no height, width, but style="height: 50px; width: 500px;"
    </p>
<div id="output"> </div>
</body></html>

```



3. [10 pts] Below is the HTML for a web page and above is the output when the web page is displayed. The effect is produced by the JavaScript program below. Fill in the missing code.

```

<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN"
"http://www.w3.org/TR/html4/strict.dtd">
<head>
<title>Example </title>
</head>
<body>
<div>x</div>
<div>y</div>
<div>a</div>
<div>b</div>
<div>c</div>
<div>d</div>
<script type="text/javascript" src="example.js"></script>
</body>
</html>

```

Below is the JavaScript file example.js that produces the output above, but some of the code is missing. Fill in the missing code.

```

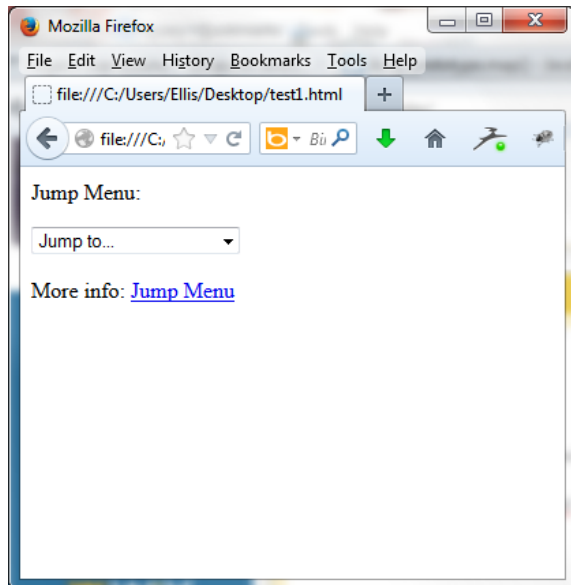
bodywalk = function(body) {
    var str = new Array();
    for (var i = 0; i < body.childNodes.length; i++) {
        if (body.childNodes[i].nodeName == 'DIV')
        {
            str.push(body.childNodes[i].innerHTML);
        }
    }

    return str;
}

var txtnodes = bodywalk(document.getElementsByTagName('body')[0]);
document.write("<br /><b>Content of DIV Tags: </b>" + txtnodes);

```

JavaScript Questions [50 Points]



[10 pts] Above to the left is a screenshot of the web page produced by the source code below and to the right is a new page containing the web page that results when the first selection is chosen. Fill in the missing code below

```

<script language="javascript" type="text/javascript" >
function jumpto(x){
    if (document.form1.jumpmenu.value != "null") {
        window.open(x, '_blank');
    }
}
</script>
<p>Jump Menu:</p>
<form name="form1">
<select name="jumpmenu"
    onChange=
"jumpto(document.form1.jumpmenu.options[document.form1.jumpmenu.options.selectedIndex
.value])">
    <option>Jump to...</option>

```

4.[5 pts]

5.[5 pts]

```

<option value=http://www.quackit.com>Quackit Homepage</option>
<option value=http://www.quackit.com/javascript/>JavaScript</option>
<option value=http://www.quackit.com/html/>HTML</option>
<option value=http://www.quackit.com/css/>CSS</option>
<option value=http://www.quackit.com/sql/tutorial/>SQL</option>
<option value=http://www.quackit.com/database/tutorial/>Database Tutorial</option>
<option value=http://www.quackit.com/web_hosting/>Web Hosting Tutorial</option>
</select>
</form>
<div class="more-info">
<p>More info: <a href="/javascript/javascript_dropdown_menu.cfm">Jump
Menu</a></p>
</div>

```

[5 pts] What are the values of x(6) and y(7)?

```

function makeAdder(a) {
    return function(b) {
        return a + b;
    };
}
x = makeAdder(5);
y = makeAdder(20);
x(6)
?
y(7)
?

```

6. [2½ pts]

7. [2½ pts]


Answer: X(6) returns 11 and y(7) returns 27; makeAdder(5) returns an anonymous function which adds 5 to the function argument; makeAdder(20) returns an anonymous function which adds 20 to the function argument;

The regular expression below includes three sets of parentheses (...). Explain in one sentence the pattern contained in each of the parentheses.

```

var pattern = "^(\\w+)@([a-zA-Z_]+)\\.([a-zA-Z]{2,3})$";

```



8. [5 pts] What is the purpose of the pattern within the first set of parentheses

Answer: One or more alphanumeric characters

9. [5 pts] What is the purpose of the pattern within the second set of parentheses

Answer: one or more alphabetic upper/lower case or underscore

10. [5 pts] What is the purpose of the pattern within the third set of parentheses

Answer: two or three alphabetic characters

11. [5 pts] What is the purpose of the ^ and the \$

Answer: the ^ anchors the pattern at the start of the string,
The \$ anchors the pattern at the end of the string;

[15 pts] Below is a JavaScript function for evaluating a password. Fill in the missing code:

```
function validatePassword() {
var p = document.getElementById('newPassword').value,
    errors = [];
if (p.length < 8) {
    errors.push("Your password must be at least 8 characters");
}
if (p.search(/[a-z]/i) < 0) {
    errors.push("Your password must contain at least one letter.");
}
if (p.search(/[0-9]/) < 0) {
    errors.push("Your password must contain at least one digit.");
}
if (errors.length > 0) {
    alert(errors.join("\n"));
    return false;
}
return true;
}
```

12. [5 pts]

13. [5 pts]

14. [5 pts]

HTTP Questions [20 Points]

Below are the entire HTTP headers exchanged between the browser and www.google.com.

https://www.google.com/

```
GET / HTTP/1.1
Host: www.google.com
User-Agent: Mozilla/5.0 (Windows NT 6.1; WOW64; rv:26.0) Gecko/20100101 Firefox/26.0
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
Cookie:
PREF=ID=6071bfff31af7b094:U=5b697a0afdbaf161:LD=en:TM=1364436987:LM=1391892814:GM=1:SG=
1:S=12CgY0xgml0BnDi_; NID=67=PRYGZwG3OrF_o6Whn6lBehspMzOutVAvVOJKq0Ziks5X5VtP4Uc2I9PJ-
QtENjxADGTYHWHpyivxKLU1blICu2iSLJ-3l-NJc5QpFRvc-A7l3Da6l37tUs3-
p4RTG3Yht4kzrkqxVKFSWJBDcrod97U5FqM3DC_MUU5RySdIYwsIm5vzB5kbrvJ0lBnw9W-
B7nPKrTToc2_C7SK08N3PjtSI-QFH8Y-FieJ6SFUkUge4;
SID=DQAAAMUAAABlXWvlF7NFO8orDc0Q0bul4Lp8OhozFldjzsbVuLgYHgtlIhMZrSPaDzADJ8caOQMD0_YWSh
eGmVdQkzBAYlRDcVZHT8QDtrMiIOiSktkZ_FL60a47C_Jk5YfOF6KBhBZoSKXOSibfEdPjiCbZStTQEtLVdjar
s9PfD6o79ABT0AGHWkTAMWyPf9DcYyWCs4nClGFbBXUgdU_h0OxDrJeMEuxlnL51fRK90jeQ3GQS8on9Mm4Tby
qsxGgJgdwur4DPHrarkS8sonfl6DRnrcV-; HSID=AGA2i2P09edxpHm2N; SSID=AdpAV2WHO009IIXwB;
APISID=D-Yuaw6HFJxkMeac/Alotmp7Xh0t8tyq8D; SAPISID=LKdAgPQoxwUrndVl/A1jt9hu7WxrSir7Ve
Connection: keep-alive
```

HTTP/1.1 200 OK
Alternate-Protocol: 443:quic
Cache-Control: private, max-age=0
Content-Encoding: gzip
Content-Type: text/html; charset=UTF-8
Date: Sat, 08 Feb 2014 20:55:28 GMT
Expires: -1
Server: gws
Set-Cookie:
PREF=ID=6071bfff31af7b094:U=5b697a0afdbaf161:FF=0:LD=en:TM=1364436987:LM=1391892928:GM=1:SG=1:S=Hzjj9NnFuvy09qII; expires=Mon, 08-Feb-2016 20:55:28 GMT; path=/;
domain=.google.com
X-Frame-Options: SAMEORIGIN

https://www.google.com/gen_204?v=3&s=webhp&action=&e=31215,4000116,4007661,4007830,4008067,4008133,4008142,4009016,4009033,4009352,4009565,4009641,4010806,4010858,4010899,4011109,4011228,4011258,4011550,4011552,4011556,4011558,4011559,4011679,4011863,4011959,4011996,4012001,4012316,4012318,4012320,4012512,4012538,4012869,4012896,4012897,4013099,4013100,4013338,4013374,4013414,4013416,4013436,4013499,4013591,4013609,4013723,4013823,4013842,4013868,4013881,4013918,4013979,4014085,4014091,4014092,4014115,4014273,4014431,4014513,4014515,4014518,4014565,4014572,4014573,4014597,4014632,4014636,4014649,4014685,4014718,4014750,4014794,4014822,4014825,4014865,4014989,4015027,4015133,4015199,4015222,8300007,8500073,8500153,8500156,10200002,10200012,10200029,10200030,10200040,10200066&ei=wJn2UqH3H4PyoAS0yoH4Cw&imc=3&imn=3&imp=0&atyp=csi&adh=&xjs=init.30.39.sb.18.p.2.foot.2.cr.1.r.1&rt=xjsls.18,prt.18,xjses.86,xjsee.129,xjs.133,ol.209,iml.18,wsrt.349,cst.0,dnst.0,rqst.232,rspt.5

GET
/gen_204?v=3&s=webhp&action=&e=31215,4000116,4007661,4007830,4008067,4008133,4008142,4009016,4009033,4009352,4009565,4009641,4010806,4010858,4010899,4011109,4011228,4011258,4011550,4011552,4011556,4011558,4011559,4011679,4011863,4011959,4011996,4012001,4012316,4012318,4012320,4012512,4012538,4012869,4012896,4012897,4013099,4013100,4013338,4013374,4013414,4013416,4013436,4013499,4013591,4013609,4013723,4013823,4013842,4013868,4013881,4013918,4013979,4014085,4014091,4014092,4014115,4014273,4014431,4014513,4014515,4014518,4014565,4014572,4014573,4014597,4014632,4014636,4014649,4014685,4014718,4014750,4014794,4014822,4014825,4014865,4014989,4015027,4015133,4015199,4015222,8300007,8500073,8500153,8500156,10200002,10200012,10200029,10200030,10200040,10200066&ei=wJn2UqH3H4PyoAS0yoH4Cw&imc=3&imn=3&imp=0&atyp=csi&adh=&xjs=init.30.39.sb.18.p.2.foot.2.cr.1.r.1&rt=xjsls.18,prt.18,xjses.86,xjsee.129,xjs.133,ol.209,iml.18,wsrt.349,cst.0,dnst.0,rqst.232,rspt.5 HTTP/1.1

Host: www.google.com
User-Agent: Mozilla/5.0 (Windows NT 6.1; WOW64; rv:26.0) Gecko/20100101 Firefox/26.0
Accept: image/png,image/*;q=0.8,*/*;q=0.5
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: https://www.google.com/
Cookie:
PREF=ID=6071bfff31af7b094:U=5b697a0afdbaf161:FF=0:LD=en:TM=1364436987:LM=1391892928:GM=1:SG=1:S=Hzjj9NnFuvy09qII;
NID=67=PRYGZwG3OrF_o6Whn6lBehspMzOutVAvVOJKq0Ziks5X5VtP4Uc2I9PJ-QtENjxADGTyHWHpyivxKLULbLICu2iSLJ-31-NJC5QpFRvc-A7l3Da6137tUs3-p4RTG3Yht4kzrkqxVKFSWJBDcrod97U5FqM3DC_MUU5RySdIYwsIm5vzB5kbrvJ01Bnw9W-B7nPKrTtOc2_C7SK08N3PjtSI-QFH8Y-FieJ6SFUkUge4;
SID=DQAAAMUAAABlXWvlf7NFO8orDc0Q0bul4Lp8OhozFldjzsbVuLgYHgtlIhMzrSPaDzADJ8caOQMD0_YWSh eGmVdQkzBAYlRDcVZHT8QDtrMiIOiSktkZ_FL60a47C_Jk5YfOF6KBhBZoSKXOSibfEdPjiCbZStTQEtLVdjar s9PfD6o79ABT0AGHWkTAMWypf9DcYyWCs4nClGfBbXUgdU_h0OxDrJeMeuxlnL51fRK90jeQ3GQS8on9Mm4Tby qsxGgJgdwur4DPHrarkS8sonf16DRnrcV-; HSID=AGA2i2PO9edxpHm2N; SSID=AdpAV2WHo009IIXwB; APISID=D-Yuaw6HFJxkMeac/Alotmp7Xh0t8tyq8D; SAPISID=LKdAgPQoxwUrndVl/Aljt9hu7WxrSir7Ve
Connection: keep-alive

HTTP/1.1 204 No Content
Alternate-Protocol: 443:quic
Content-Length: 0

Content-Type: text/html; charset=UTF-8
Date: Sat, 08 Feb 2014 20:55:28 GMT
Server: gws
Set-Cookie:
PREF=ID=6071bfff31af7b094:U=5b697a0afdbaf161:FF=0:LD=en:TM=1364436987:LM=1391892928:GM=1:SG=1:S=Hzjj9NnFuvy09qII; expires=Mon, 08-Feb-2016 20:55:28 GMT; path=/;
domain=.google.com
X-Frame-Options: SAMEORIGIN

https://plus.google.com/u/0/_/n/gcosuc

POST /u/0/_/n/gcosuc HTTP/1.1
Host: plus.google.com
User-Agent: Mozilla/5.0 (Windows NT 6.1; WOW64; rv:26.0) Gecko/20100101 Firefox/26.0
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
Content-Type: application/x-www-form-urlencoded; charset=utf-8
Referer: <https://www.google.com/>
Content-Length: 109
Origin: <https://www.google.com>
Cookie:
PREF=ID=6071bfff31af7b094:U=5b697a0afdbaf161:FF=0:LD=en:TM=1364436987:LM=1391892928:GM=1:SG=1:S=Hzjj9NnFuvy09qII;
NID=67=PRYGZwG3OrF_o6Whn6lBehspMzOutVAVVOJKq0Ziks5X5VtP4Uc2I9PJ-
QtENjxADGTYHWHpyivxKLU1blICu2iSLJ-31-NJc5QpFRvc-A7l3Da6137tUs3-
p4RTG3Yht4kzrkqxVKFSWJBDcrod97U5FqM3DC_MUU5RySdIYwsIm5vzB5kbrvJ01Bnw9W-
B7nPKrTToc2_C7SK08N3PjtSI-QFH8Y-FieJ6SFUkUge4;
SID=DQAAAMUAAAB1XWv1F7NFO8orDc0Q0bul4Lp8OhozF1djzsbVulGyYHgt1IhMZrSPaDzADJ8caOQMD0_YWSh
eGmVdQkzBAY1RDCVZHT8QDtrMiIOiSktkZ_FL60a47C_Jk5YfOF6KBhBZoSKXOSibfEdPjicBzStTQEtLVdjar
s9Pfd6o79ABTOAGHWkTAMWypf9DcYyWCs4nClGFbBXUgdU_h0OxDrJeMEuxlnL51fRK90jeQ3GQS8on9Mm4Tby
qsxGgJgdwur4DPHrarkS8sonf16DRnrcV-; HSID=AGA2i2P09edxpHm2N; SSID=AdpAV2WHO009IIXwB;
APISID=D-Yuaw6HFJxkMeac/Alotmp7Xh0t8tyq8D; SAPISID=LKdAgPQoxwUrndVl/AljT9hu7WxrSir7Ve;
OTZ=2159788_88_88_104280_84_446940
Connection: keep-alive
Pragma: no-cache
Cache-Control: no-cache
ntok=APfa0bqYOnKQRBOFWlH16L6lyG1MfVeUEl3G2Un_p8sxUzUU4gxcPmU7g0vP7LTmJtBAIcVYoCNKJG1l_
x7QxETGf3-zi_t1Cw%3D%3D
HTTP/1.1 200 OK
access-control-allow-credentials: true
access-control-allow-origin: <https://www.google.com>
Alternate-Protocol: 443:quic
Cache-Control: no-cache, no-store, max-age=0, must-revalidate
Content-Disposition: attachment; filename="json.txt"; filename*=UTF-8''json.txt
Content-Encoding: gzip
Content-Type: application/json; charset=utf-8
Date: Sat, 08 Feb 2014 20:55:29 GMT
Expires: Fri, 01 Jan 1990 00:00:00 GMT
Pragma: no-cache
Server: GSE
X-Frame-Options: SAMEORIGIN

https://plus.google.com/u/0/_/notifications/frame?sourceid=1&hl=en&origin=https%3A%2F%2Fwww.google.com&jsh=m%3B%2F%2Fscs%2Fabc-static%2F%2Fjs%2Fk%3Dgapi.gapi.en.BjPelxWx9Rw.O%2Fm%3D__features__%2Frt%3Dj%2Fd%3Dl%2Frs%3DAItRSTMdKBWysIqw0iL_wtXL-PuVX_sSCQ#pid=1&rpctoken=undefined&_methods=onError%2ConInfo%2ChideNotificationWidget%2CpostSharedMessage%2Ccreauth%2CsetNotificationWidgetHeight%2CsetNotificationWidgetSize%2CswitchTo%2CnavigateTo%2CsetNotificationText%2CsetNotificationAnimation%2CgetNotificationText%2C_ready%2C_close%2C_open%2C_resizeMe%2C_renderstart&id=1l_1391892938641&parent=https%3A%2F%2Fwww.google.com&pfname=


```

GET
/u/0/_/notifications/frame?sourceid=1&hl=en&origin=https%3A%2F%2Fwww.google.com&jsh=m%
3B%2F_%2Fscs%2Fabc-
static%2F_%2Fjs%2Fk%3Dgapi.gapi.en.BjPelxWx9Rw.O%2Fm%3D__features__%2Frt%3Dj%2Fd%3D1%2
Frs%3DAItRSTMDkBwySIqw0iL_wtXL-PuVX_sSCQ HTTP/1.1
Host: plus.google.com
User-Agent: Mozilla/5.0 (Windows NT 6.1; WOW64; rv:26.0) Gecko/20100101 Firefox/26.0
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
Referer: https://www.google.com/
Cookie:
PREF=ID=6071bfff31af7b094:U=5b697a0afdbaf161:FF=0:LD=en:TM=1364436987:LM=1391892928:GM=
1:SG=1:S=Hzjj9NnFuvy09qII;
NID=67=PRYGZwG3OrF_o6Whn6lBehspMzOutVAVVOJKq0Ziks5X5VtP4Uc2I9PJ-
QtENjxADGTYHWHpyivxKLU1blICu2iSLJ-3l-NJc5QpFRvc-A7l3Da6l37tUs3-
p4RTG3Yht4kzrkqxVKFSWJBDCrod97U5FqM3DC_MUU5RySdIYwsIm5vzB5kbrvJ0lBnw9W-
B7nPKrTToc2_C7SK08N3PjtSI-QFH8Y-FieJ6SFUkUge4;
SID=DQAAAMUAAAB1XWvlf7NFO8orDc0Q0bul4Lp8OhozFldjzsBVuLgYHgtlIhMZrSPaDzADJ8caOQMD0_YWSh
eGmVdQkzBAYlRDCvZHT8QDtrMiIOiSktkZ_FL60a47C_Jk5YfOF6KBhBZoSKXOSibfEdPjicBzStTQEtLVdjar
s9PfD6o79ABT0AGHWkTAMWypf9DcYyWCs4nClGFbBXUgdU_h0OxDrJeMEuxlnL5lFRK90jeQ3GQS8on9Mm4Tby
qsxGgJgdwur4DPHrarkS8sonf16DRnrcV-; HSID=AGA2i2PO9edxpHm2N; SSID=AdpAV2WHO009IIXwB;
APISID=D-Yuaw6HFJxkMeac/Alotmp7Xh0t8tyq8D; SAPISID=LKdAgPQoxwUrndVl/AljT9hu7WxrSir7Ve;
OTZ=2159788_88_88_104280_84_446940
Connection: keep-alive

HTTP/1.1 200 OK
Alternate-Protocol: 443:quic
Cache-Control: private, max-age=0
Content-Encoding: gzip
Content-Type: text/html; charset=utf-8
Date: Sat, 08 Feb 2014 20:55:29 GMT
Expires: Sat, 08 Feb 2014 20:55:29 GMT
Server: GSE
x-content-type-options: nosniff
-----
http://127.0.0.1:49203/test.txt?_=1391892942342

GET /test.txt?_=1391892942342 HTTP/1.1
Host: 127.0.0.1:49203
User-Agent: Mozilla/5.0 (Windows NT 6.1; WOW64; rv:26.0) Gecko/20100101 Firefox/26.0
Accept: text/plain, */*
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
X-Requested-With: XMLHttpRequest
Connection: keep-alive

HTTP/1.1 200 OK
Content-Type: text/plain
Date: Sat, 08 Feb 2014 20:55:42 GMT
Last-Modified: Tue, 02 Oct 2012 14:08:14 GMT
-----

```

15. [5 pts] What browser, name and version, participated in the exchange of HTTP data?

Answer: Firefox, version 26

16. [5 pts] List the names of all web servers involved in these transactions?

Answer: gws, GSE

17. [5 pts] What are the names of the cookies sent by the web servers to the client?

Answer: PREF

18. [5 pts] How many transactions between client and server occur?

Answer: 5

CGI Question [5 Points]

19. [5 points] In class we discussed a set of CGI environment variables. List any 5 and briefly describe their content.

DOCUMENT_ROOT	The root directory of your server
HTTP_COOKIE	The visitor's cookie, if one is set
HTTP_HOST	The hostname of the page being attempted
HTTP_REFERER	The URL of the page that called your program
HTTP_USER_AGENT	The browser type of the visitor
HTTPS	"on" if the program is being called through a secure server
PATH	The system path your server is running under
QUERY_STRING	The query string (see GET, below)
REMOTE_ADDR	The IP address of the visitor
REMOTE_HOST	The hostname of the visitor (if your server has reverse-name-lookups on; otherwise this is the IP address again)
REMOTE_PORT	The port the visitor is connected to on the web server
REMOTE_USER	The visitor's username (for .htaccess-protected pages)
REQUEST_METHOD	GET or POST
REQUEST_URI	The interpreted pathname of the requested document or CGI (relative to the document root)
SCRIPT_FILENAME	The full pathname of the current CGI
SCRIPT_NAME	The interpreted pathname of the current CGI (relative to the document root)
SERVER_ADMIN	The email address for your server's webmaster
SERVER_NAME	Your server's fully qualified domain name (e.g. www.cgi101.com)
SERVER_PORT	The port number your server is listening on
SERVER_SOFTWARE	The server software you're using (e.g. Apache 1.3)