The Web Technologies

The Web Architecture

The Web Architecture

Browser

Web Application Server

Database

request

web page

SQL

Data, user

SQL Injection

JS

Apache

Web Application Server

CSRF

XSS

Browser Side

Protect
user
data

HTTPS
SSL

browser

user

→ curl

native
code

Sandbox

native code

ActiveX
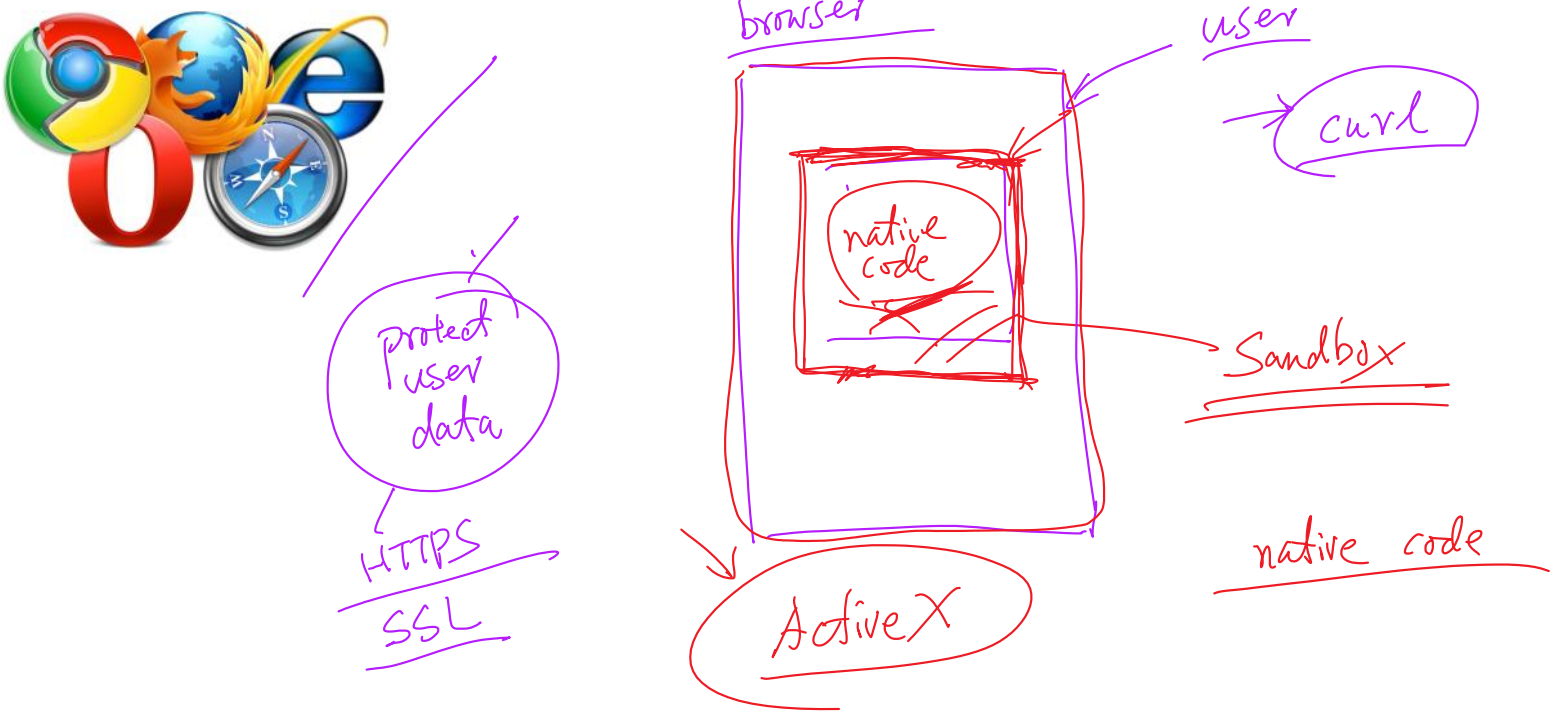
HTML and DOM


```
<html>
<head>
    <title>My title</title>
</head>

<body>
    <h1>My header</h1>
    <a href="">My link</a>
</body>
</html>
```
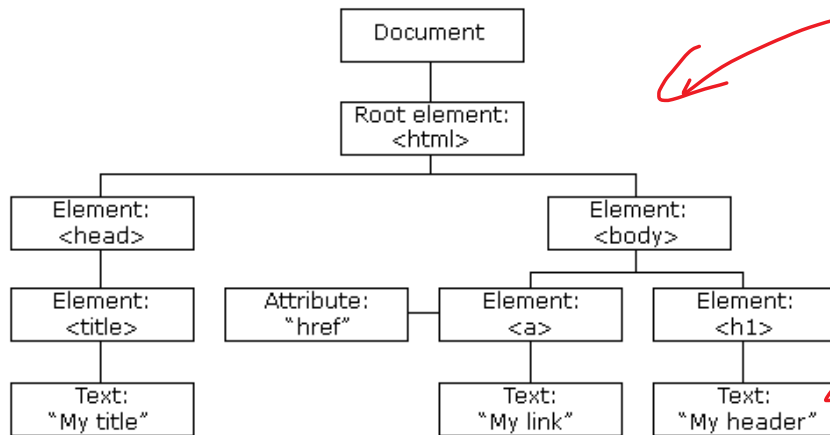
DOM

DOM APIs

JavaScript

Code:

```
<!DOCTYPE html>
<html>
<body>

<h1>My First JavaScript</h1>

<p>Click Date to display current day, date, and time.</p>

<button type="button" onclick="myFunction()">Date</button>

<p id="demo"></p>

<script>
function myFunction() {
    document.getElementById("demo").innerHTML = Date();
}
</script>
```

Result:

My First JavaScript

Click Date to display current day, date, and time.

[Date]

Mon Sep 29 2014 22:54:24 GMT-0400 (Eastern Daylight Time)

JQuery

```
<head>
<script
src="http://ajax.googleapis.com/ajax/libs/jquery/1.10.2/jquery.min.js">
</script>
<script>
$(document).ready(function(){
  $("button").click(function(){
    $("#test").hide();
  });
});
</script>
</head>

<body>
<h2>This is a heading</h2>
<p>This is a paragraph.</p>
<p id="test">This is another paragraph.</p>
<button>Click me</button>
</body>
```
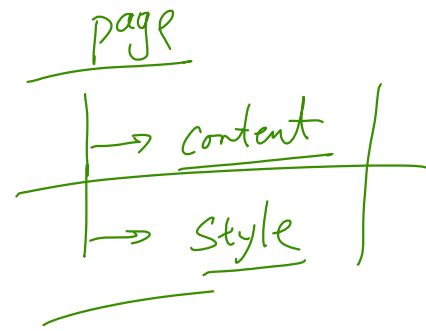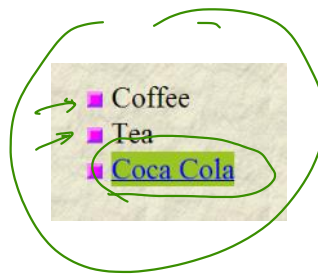
This is a heading

This is a paragraph.

This is another paragraph.

[Click me]

CSS: Cascading Style Sheets

```
<head>
<style>
body {background-image:url('paper.gif');}
a:link {background-color:#98bf21;}
ul
{
   list-style-image:url('sqpurple.gif');
}
</style>
</head>

<body>
<ul>
<li>Coffee</li>
<li>Tea</li>
<li><a href="example.com">Coca Cola</a></li>
</ul>
</body>
```

Handwritten annotations:

- Coffee
- Tea
- Coca Cola

page
→ content
→ style

HTTP Requests

HTTP Requests

Live HTTP headers

Headers | Generator | Config | About

HTTP Headers

http://lcs.syr.edu/

GET / HTTP/1.1
Host: lcs.syr.edu
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux i686; rv:23.0) Gecko/20100101 Firefox/23.0
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: wpmp_switcher=desktop; PHPSESSID=qp5478oquuttfeia32uco74b17; __utma=266734993.2080619129.1381227361.1381227361...
Connection: keep-alive
Cache-Control: max-age=0

HTTP/1.1 200 OK
Date: Tue, 08 Oct 2013 10:17:09 GMT
Server: Apache/2.2.22 (Ubuntu)
Expires: Thu, 19 Nov 1981 08:52:00 GMT
Cache-Control: no-store, no-cache, must-revalidate, post-check=0, pre-check=0
Pragma: no-cache
X-Pingback: http://lcs.syr.edu/xmlrpc.php
X-Mobilized-By: WordPress Mobile Pack 1.2.5
Set-Cookie: wpmp_switcher=desktop; expires=Wed, 08-Oct-2014 10:17:11 GMT; path=/
Vary: Host,Accept-Encoding
Content-Encoding: gzip
Content-Length: 8329
Keep-Alive: timeout=15, max=100
Connection: Keep-Alive
Content-Type: text/html; charset=UTF-8

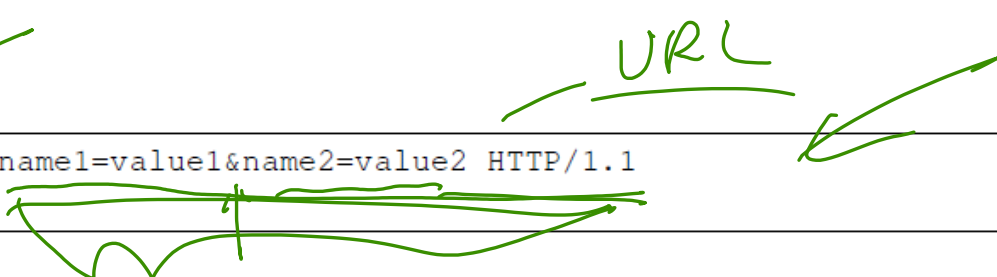*Handwritten annotations:* HTTP Header, response, browser, Server, HTTP, response
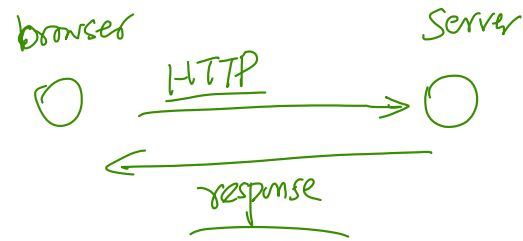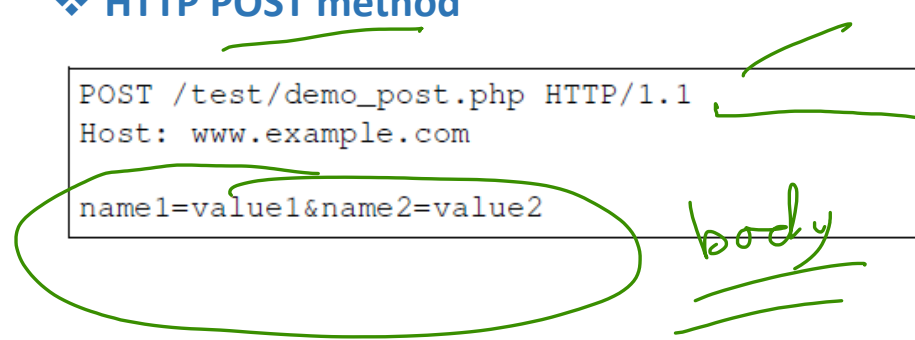
HTTP GET/POST Methods

❖ HTTP GET method

```
GET /test/demo_get.php?name1=value1&name2=value2 HTTP/1.1
Host: www.example.com
```
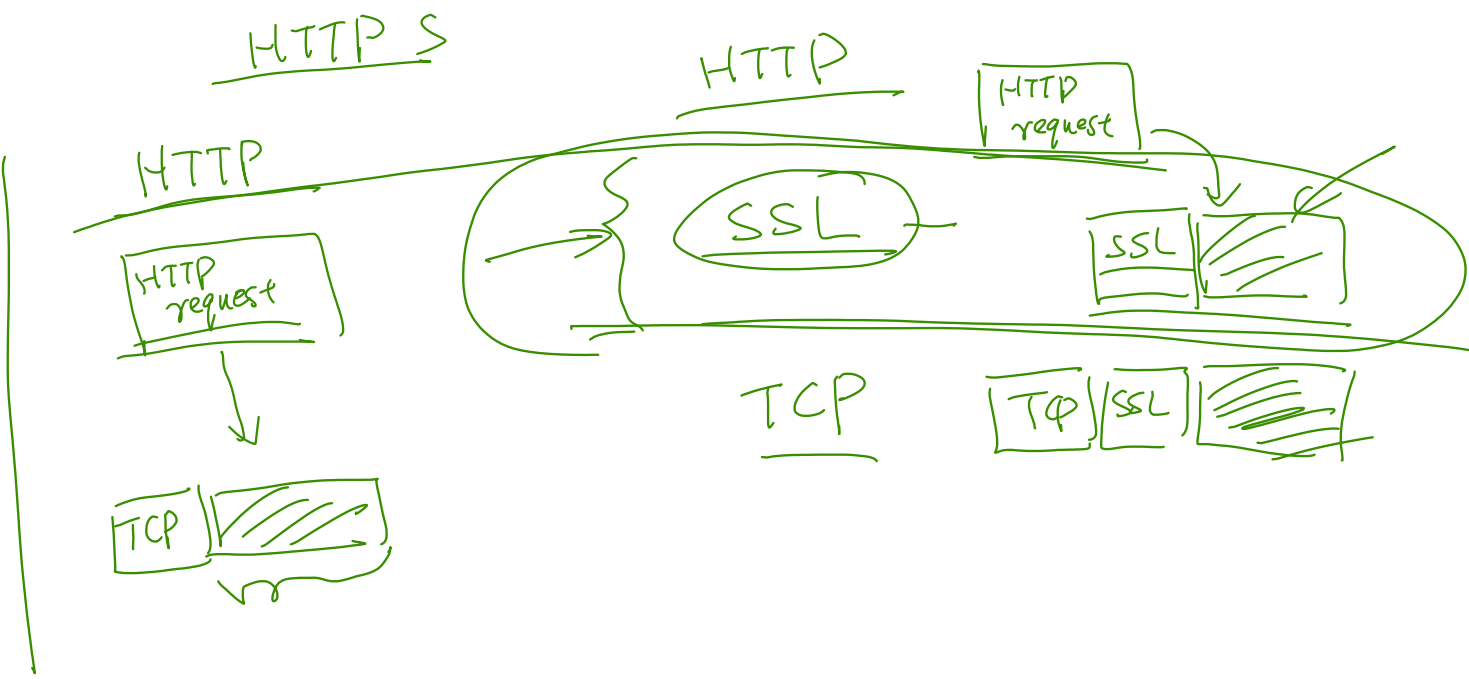
URL

❖ HTTP POST method

```
POST /test/demo_post.php HTTP/1.1
Host: www.example.com

name1=value1&name2=value2
```

body

HTTPS

HTTP S

HTTP

HTTP request

TCP

HTTP

HTTP request

SSL

SSL

TCP

TCP SSL

Ajax

Ajax Request

```html
<html>
<body>

<script type="text/javascript">

function sendAjaxRequest()
{
  // Initialize the Ajax request.
  var xhr = new XMLHttpRequest();
  xhr.open('GET', 'time.php',true);

  // Register the callback function
  xhr.onreadystatechange= function () {
    if(xhr.readyState === 4)
    {
      // Display the return result in the form entry
      document.myForm.time.value=xhr.responseText;
    }
  }

  // Send the GET request to time.php
  xhr.send(null);
}

</script>

<form name="myForm">
Input: <input type="text" name="input" onkeyup="sendAjaxRequest();" />
Time: <input type="text" name="time" />
</form>

</body>
</html>
```
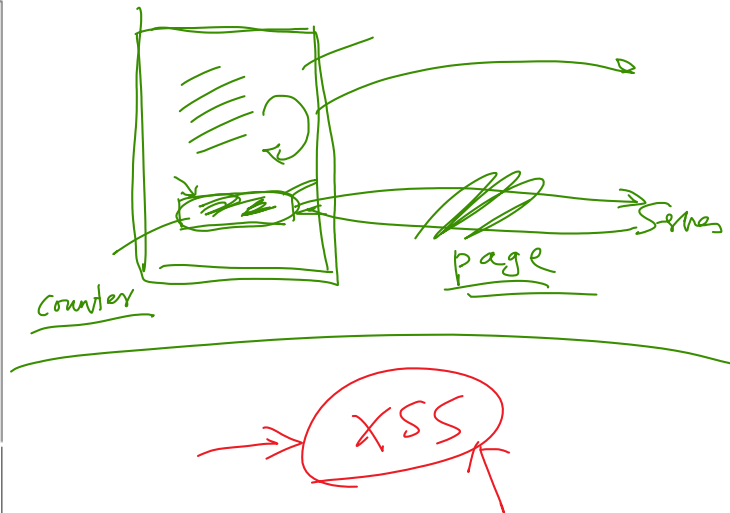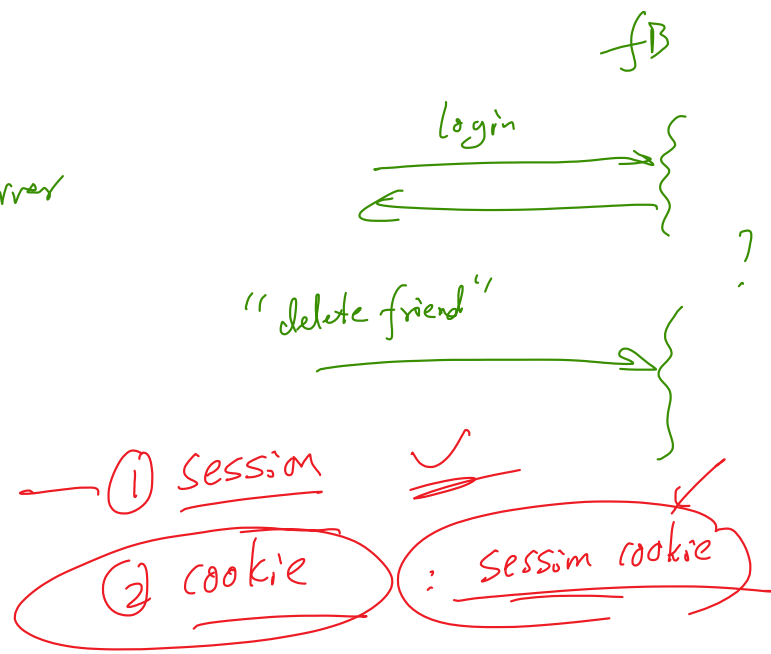
Call back

Counter   page   Server

XSS

Cookies

The Stateless Nature of Web

SSL-[

login

Server

"rm file"

fB

login

?

"delete friend"

SID

SID

SID

└ local file

① Session

② cookie
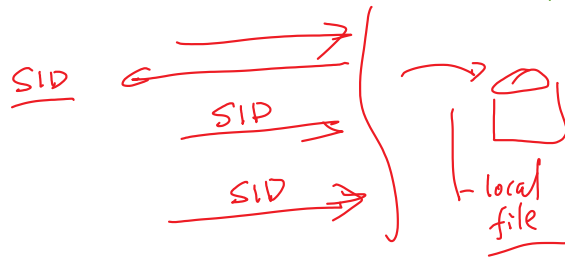
: Session cookie

Cookies

Cookies in Action

```
GET /index.html HTTP/1.1
Host: www.example.org
```

browser   -------→   server
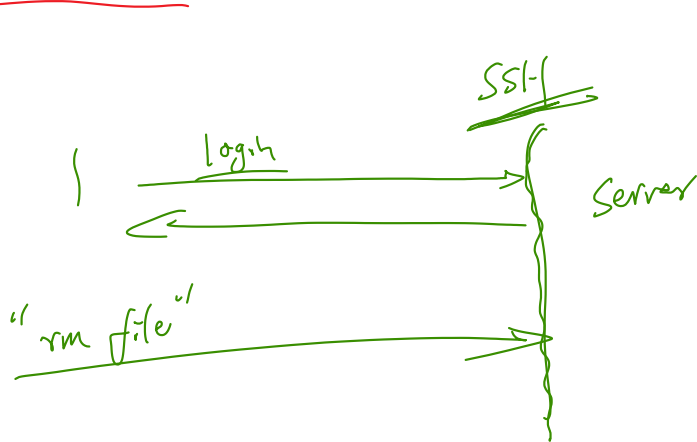
```
HTTP/1.0 200 OK
Content-type: text/html
Set-Cookie: name=value
Set-Cookie: name2=value2; Expires=Wed, 09 Jun 2021 10:18:14 GMT

(content of page)
```

browser   ←--------   server

```
GET /spec.html HTTP/1.1
Host: www.example.org
Cookie: name=value; name2=value2
Accept: */*
```

browser   -------→   server

(handwritten, circled) Same origin policy

Web Tracking

Web Tracking Using Third-Party Cookies

Session Cookies

Special Cookie: Session Cookies

Session Cookies

Summary

❖ HTML, JavaScript, and DOM

❖ HTTP and HTPS

❖ Ajax

❖ Cookies and session cookies