Web Development

COMP 431 / COMP 531

HTML5

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January 28, 2016

Recap

- HTML
- JavaScript
- Forms
- CSS
- Events
- Homework Assignment 2 (Dynamic Page)
  - Due **TONIGHT**

~~9/3 CSS~~
~~9/8 Events~~
9/10 HTML5
9/15 Scope

Homework Assignment 3
(Draft Front-End)
Due Tuesday 2/9

Homework Assignment 4
(JavaScript Game)
Due Thursday 2/18

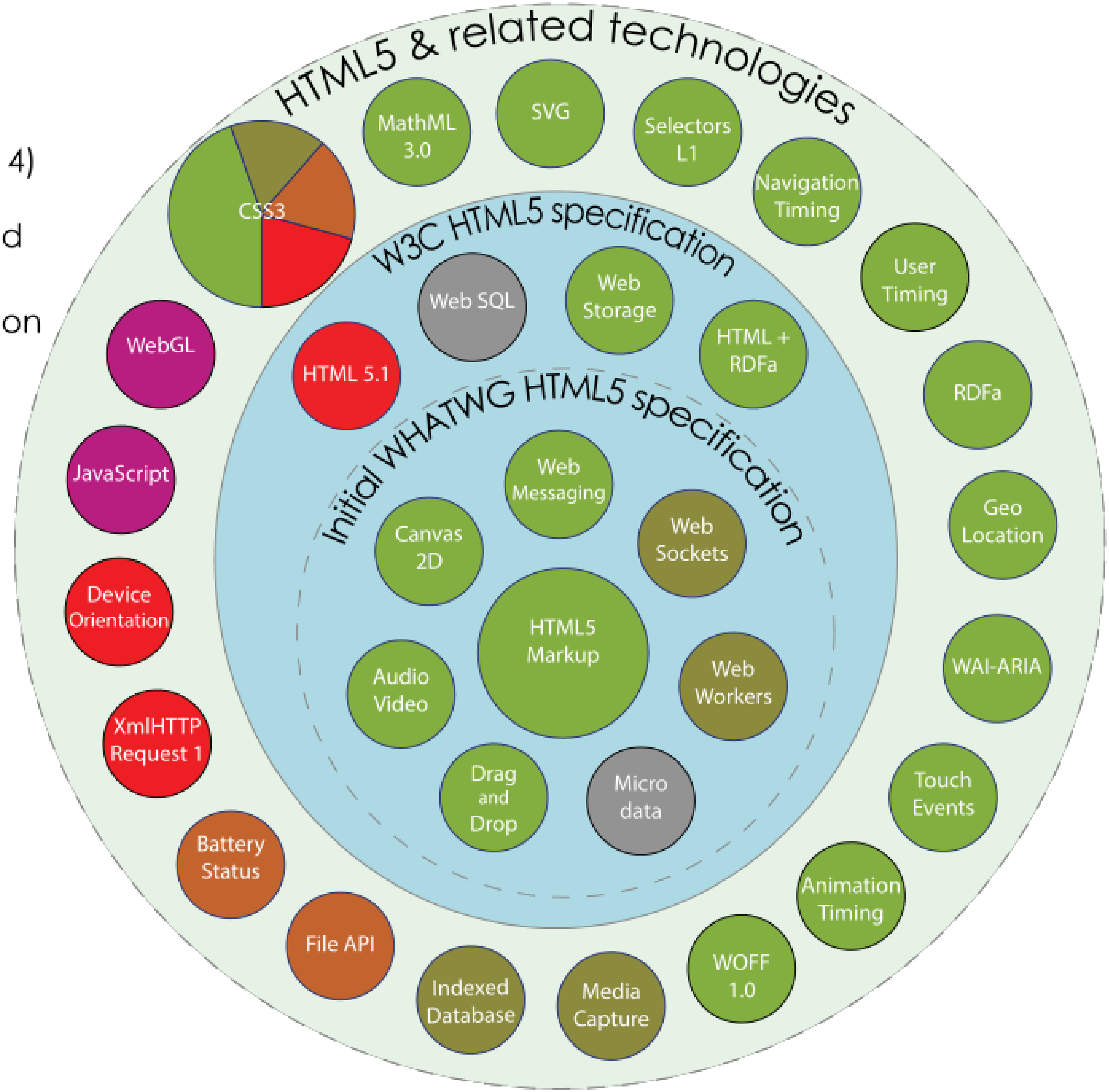
A Brief History of HTML5

- Dec 1997 – HTML 4.0 (strict/transitional/frameset)
- 2008 – First Working Draft
- 2012 – Candidate Version (*browsers start your engines*)
- Oct 2014 – HTML5

HTML5

Taxonomy & Status (October 2014)

- 🟢 Recommendation/Proposed
- 🟤 Candidate Recommendation
- 🟠 Last Call
- 🔴 Working Draft
- 🟣 Non-W3C Specifications
- ⚪ Deprecated or inactive



HTML5 & related technologies

CSS3

MathML 3.0

SVG

Selectors L1

Navigation Timing

User Timing

RDFa

Geo Location

WAI-ARIA

Touch Events

Animation Timing

WOFF 1.0

Media Capture

Indexed Database

File API

Battery Status

XmlHTTP Request 1

Device Orientation

JavaScript

WebGL

W3C HTML5 specification

Web SQL

Web Storage

HTML + RDFa

HTML 5.1

Initial WHATWG HTML5 specification

Web Messaging

Canvas 2D

Web Sockets

HTML5 Markup

Audio Video

Web Workers

Drag and Drop

Micro data

Overview

- Elemental Tour (now with audio & video)
- Web Workers
- Drag and Drop
- IndexedDB and LocalStorage
- Web Sockets
- Mobile: Camera, Touch, Orientation
- Geolocation
- SVG
- Canvas
- WebGL

https://developer.mozilla.org/en-US/docs/Web/Guide/HTML/HTML5

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HTML5 Elements

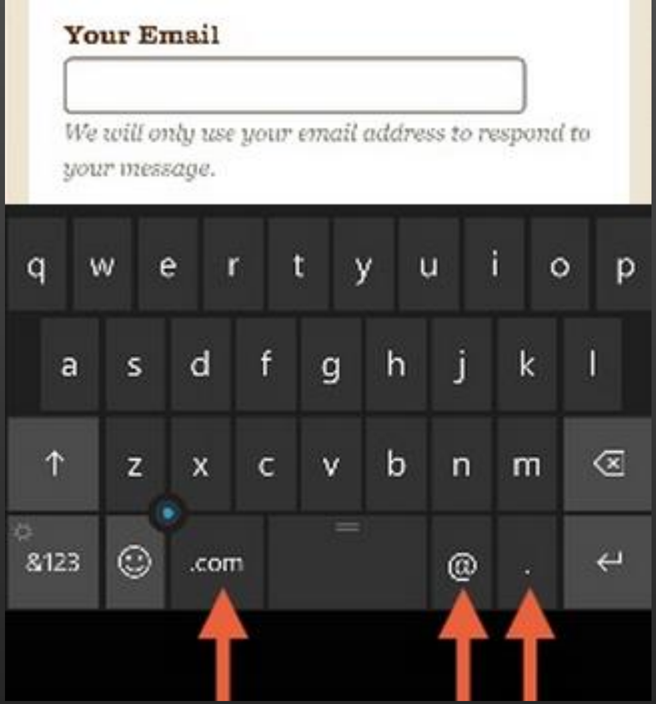
- Semantic tags

  section, aside, header, footer
  figure, figcaption, main, etc…

- Embedded Media

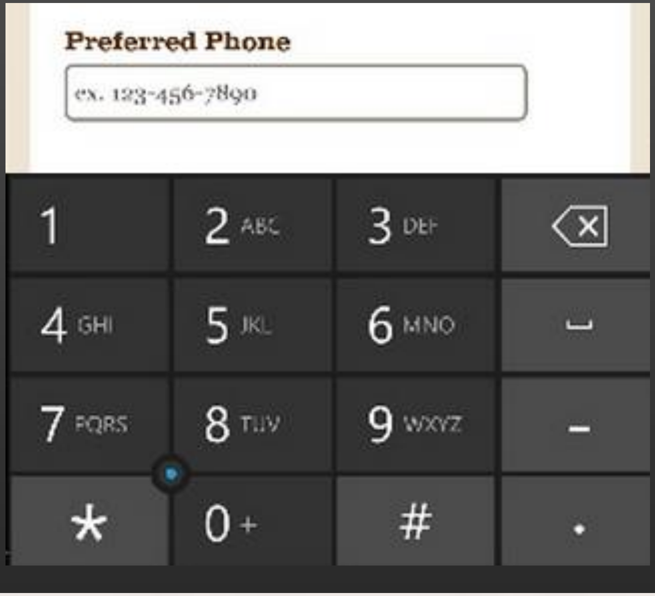
  video, audio

- Form improvements
  - Input types like email, tel, date, etc…
  - Data validation



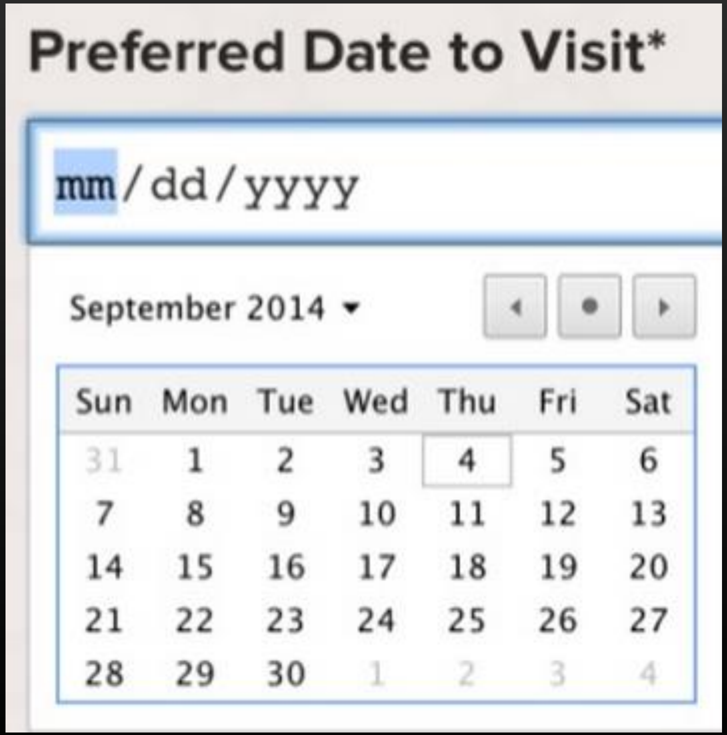
Your Email

We will only use your email address to respond to your message.



Preferred Phone

ex. 123-456-7890



Preferred Date to Visit*

mm / dd / yyyy

September 2014 ▾

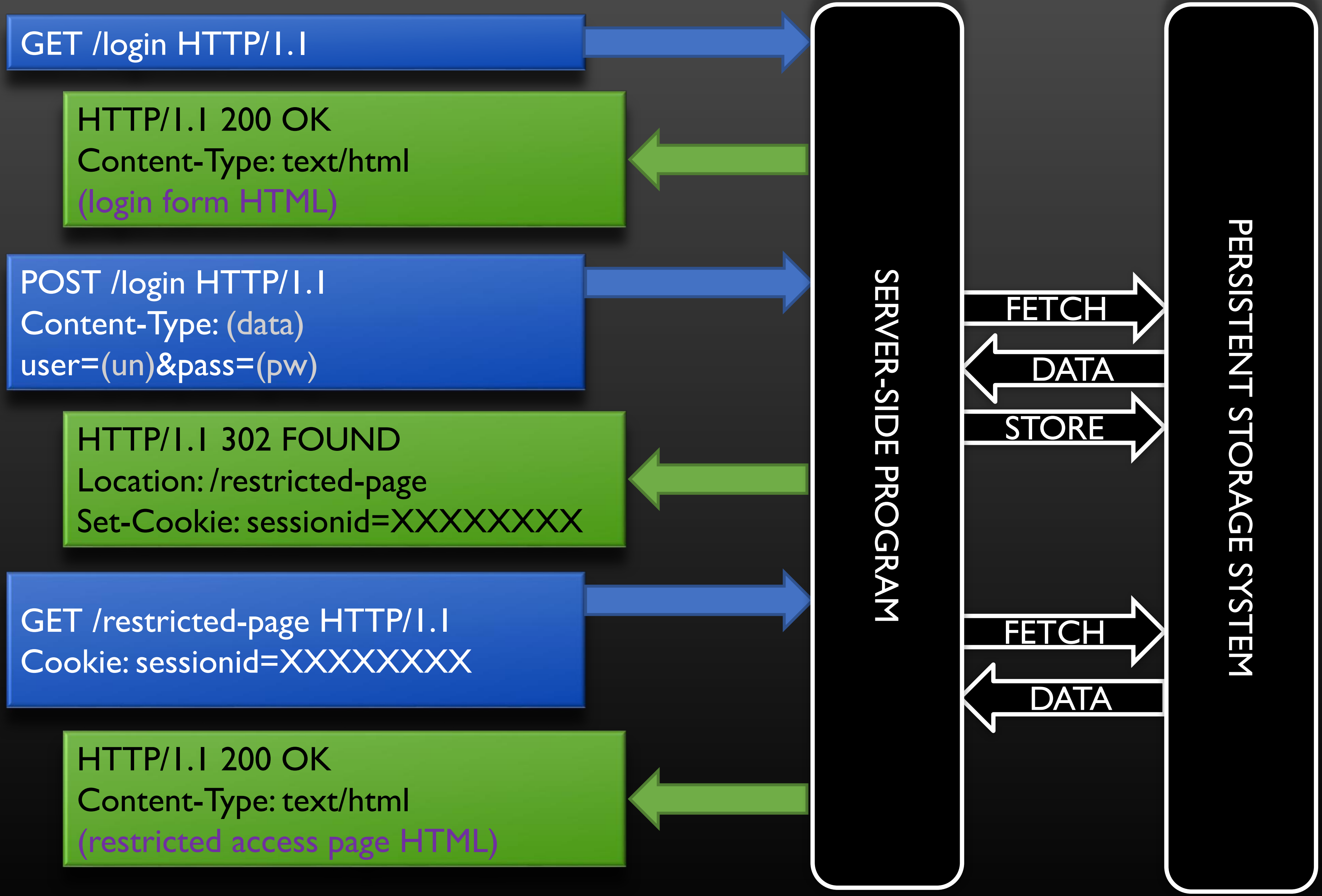
Sun	Mon	Tue	Wed	Thu	Fri	Sat
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	1	2	3	4

Form Example

http://codepen.io/aarongustafson/pen/Kppxxy

Stateless Servers

- HTTP is a *stateless* protocol
- Each transaction is independent of previous ones
- There is no implementation in the protocol to retain state or session
- If you want state then you have to do it, i.e., by sending data back and forth in the payload



```
GET /login HTTP/1.1
```

```
HTTP/1.1 200 OK
Content-Type: text/html
(login form HTML)
```

```
POST /login HTTP/1.1
Content-Type: (data)
user=(un)&pass=(pw)
```

```
HTTP/1.1 302 FOUND
Location: /restricted-page
Set-Cookie: sessionid=XXXXXXXX
```

```
GET /restricted-page HTTP/1.1
Cookie: sessionid=XXXXXXXX
```

```
HTTP/1.1 200 OK
Content-Type: text/html
(restricted access page HTML)
```

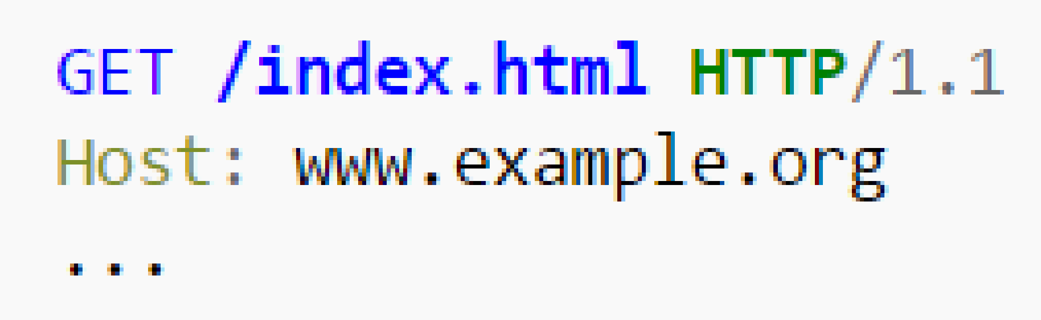
Note: "sessionid" will be attached to all future requests.

Courtesy of Matthew Schurr

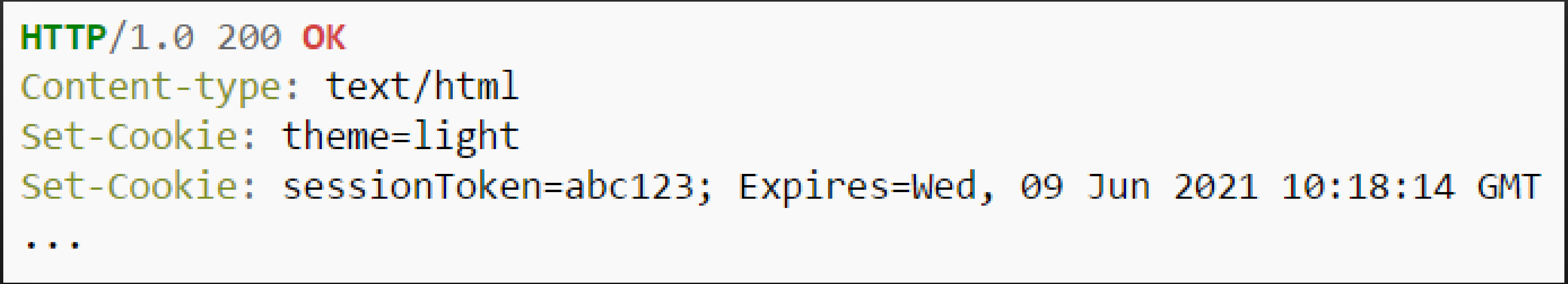
Cookies

- It’s a *magic cookie* (received and sent back unchanged)
- June 1994 – first introduced [Netscape]
- They are key-value pairs with zero or more attributes
- The server creates them
- Browser retains for the session or until some server declared expiration

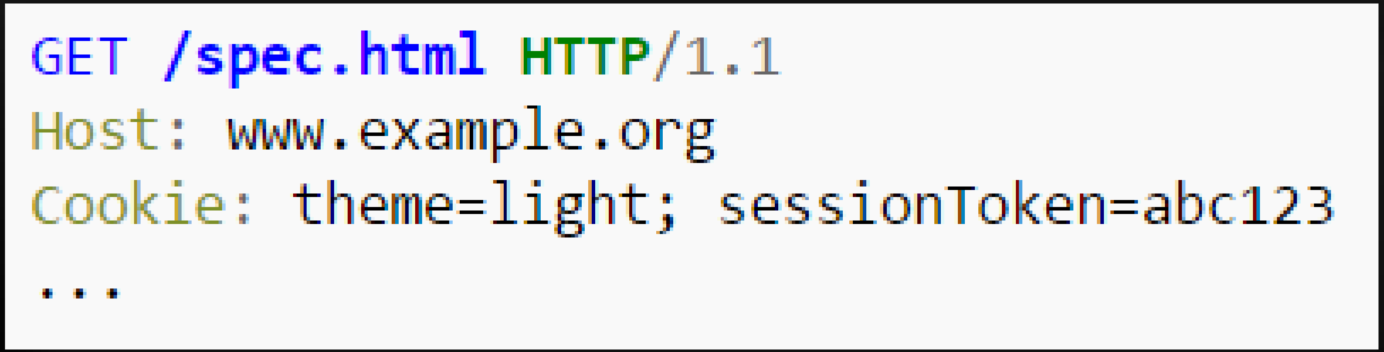
Wikipedia’s Example



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



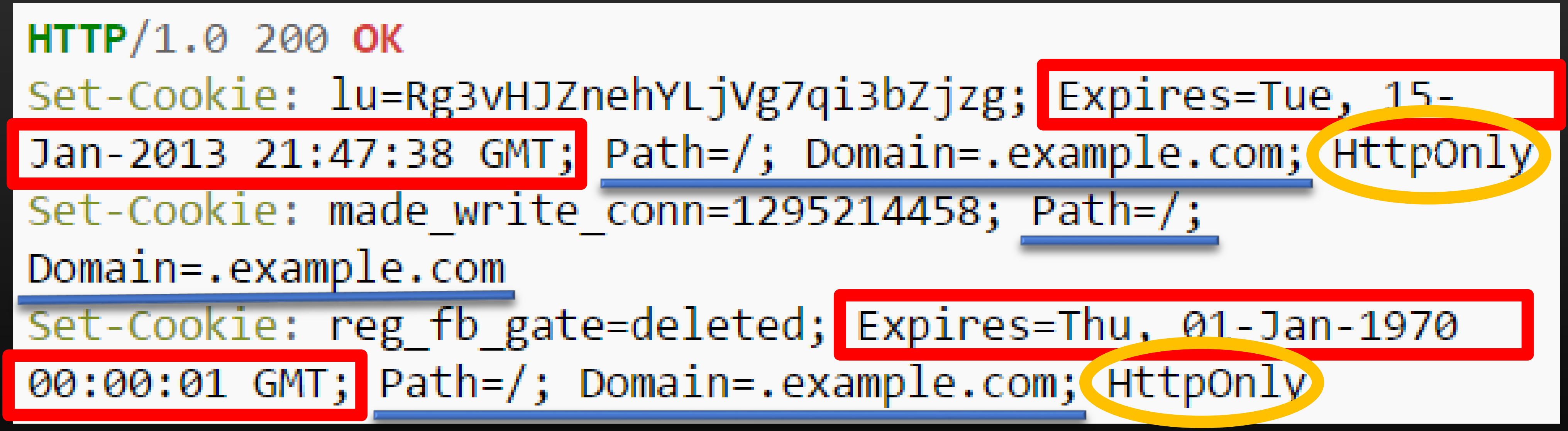
```
HTTP/1.0 200 OK
Content-type: text/html
Set-Cookie: theme=light
Set-Cookie: sessionToken=abc123; Expires=Wed, 09 Jun 2021 10:18:14 GMT
...
```



```
GET /spec.html HTTP/1.1
Host: www.example.org
Cookie: theme=light; sessionToken=abc123
...
```

Cookies are scoped

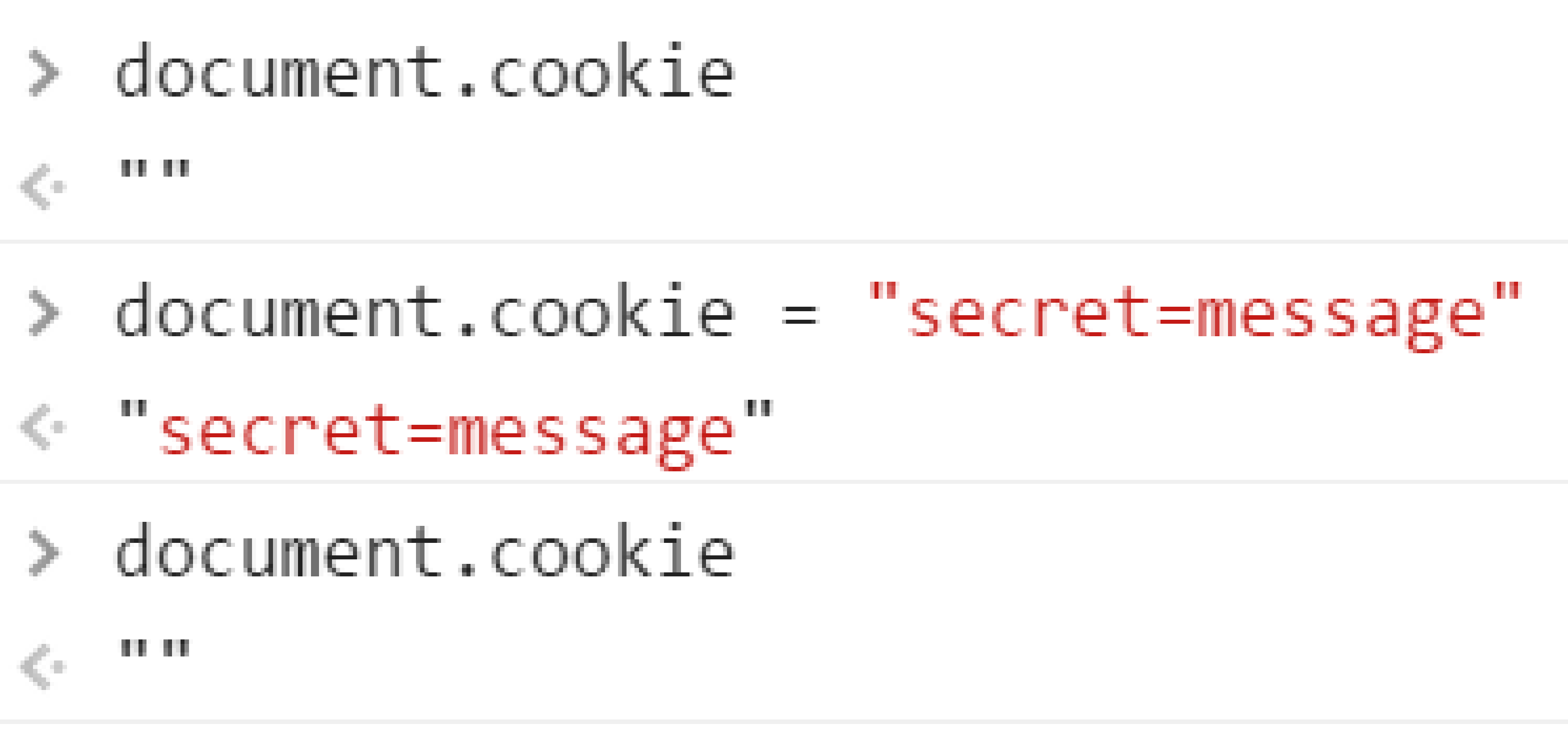
- Default is the domain and path for the page requested
- Can expand path as well as to entire domain, i.e., `*.foo.com`



```
HTTP/1.0 200 OK
Set-Cookie: lu=Rg3vHJZnehYLjVg7qi3bZjzg; Expires=Tue, 15-
Jan-2013 21:47:38 GMT; Path=/; Domain=.example.com; HttpOnly
Set-Cookie: made_write_conn=1295214458; Path=/;
Domain=.example.com
Set-Cookie: reg_fb_gate=deleted; Expires=Thu, 01-Jan-1970
00:00:01 GMT; Path=/; Domain=.example.com; HttpOnly
```

Cookies in JavaScript *(i.e., not HttpOnly)*

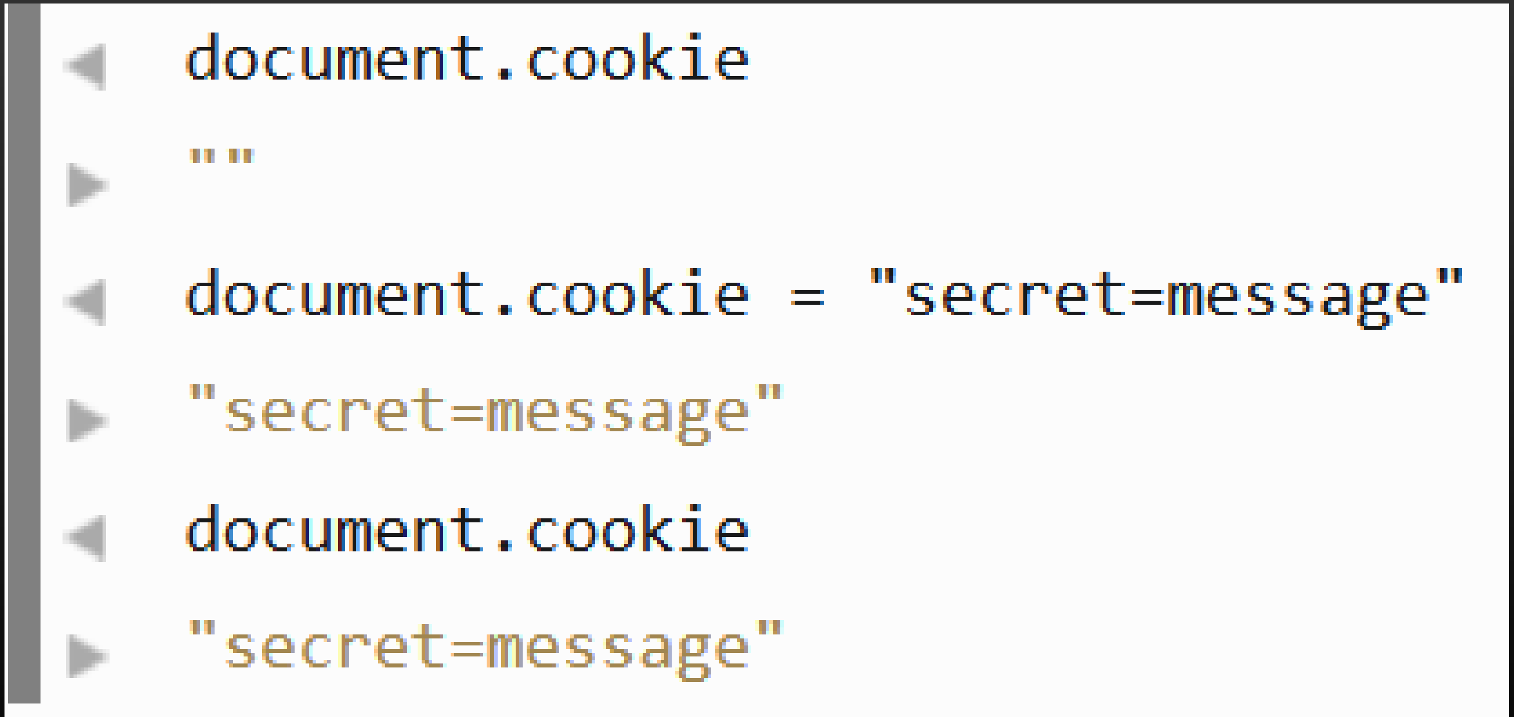
- In Chrome, file:// will not store cookies



```
> document.cookie
<· ""
> document.cookie = "secret=message"
<· "secret=message"
> document.cookie
<· ""
```

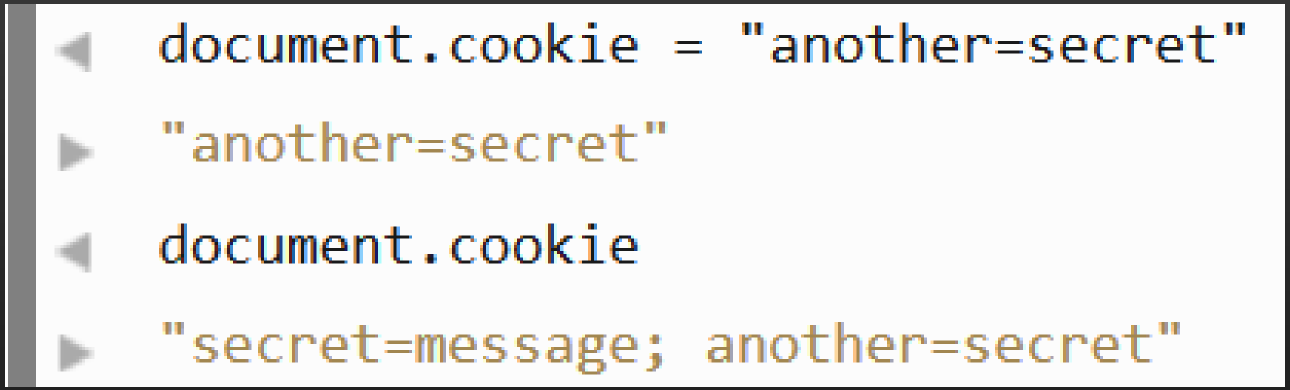
Cookies in JavaScript *(i.e., not HttpOnly)*

- In Chrome, file:// will not store cookies, so we move to Firefox



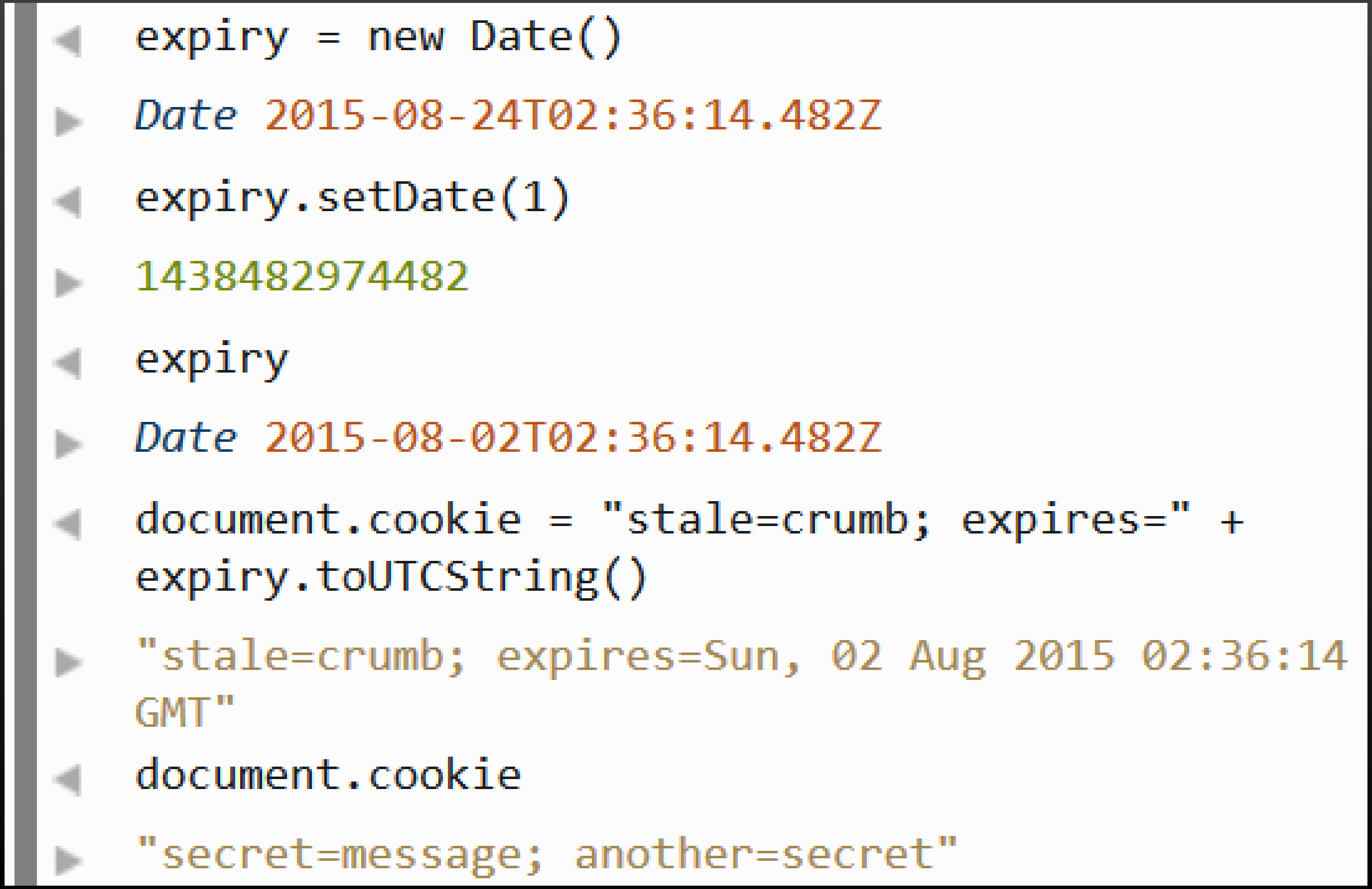
```
◀  document.cookie
▶  ""
◀  document.cookie = "secret=message"
▶  "secret=message"
◀  document.cookie
▶  "secret=message"
```

Cookies append



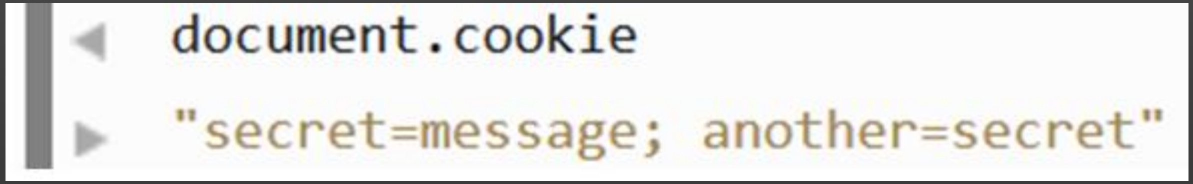
```
◀ document.cookie = "another=secret"
▶ "another=secret"
◀ document.cookie
▶ "secret=message; another=secret"
```

Adding expiration



```
expiry = new Date()
Date 2015-08-24T02:36:14.482Z
expiry.setDate(1)
1438482974482
expiry
Date 2015-08-02T02:36:14.482Z
document.cookie = "stale=crumb; expires=" +
expiry.toUTCString()
"stale=crumb; expires=Sun, 02 Aug 2015 02:36:14
GMT"
document.cookie
"secret=message; another=secret"
```

Cookies



```
document.cookie
"secret=message; another=secret"
```

- To “use” a cookie JavaScript you have to parse it out

- As you can see…. they really are crumby origin = protocol://hostname:port

Storage in HTML5

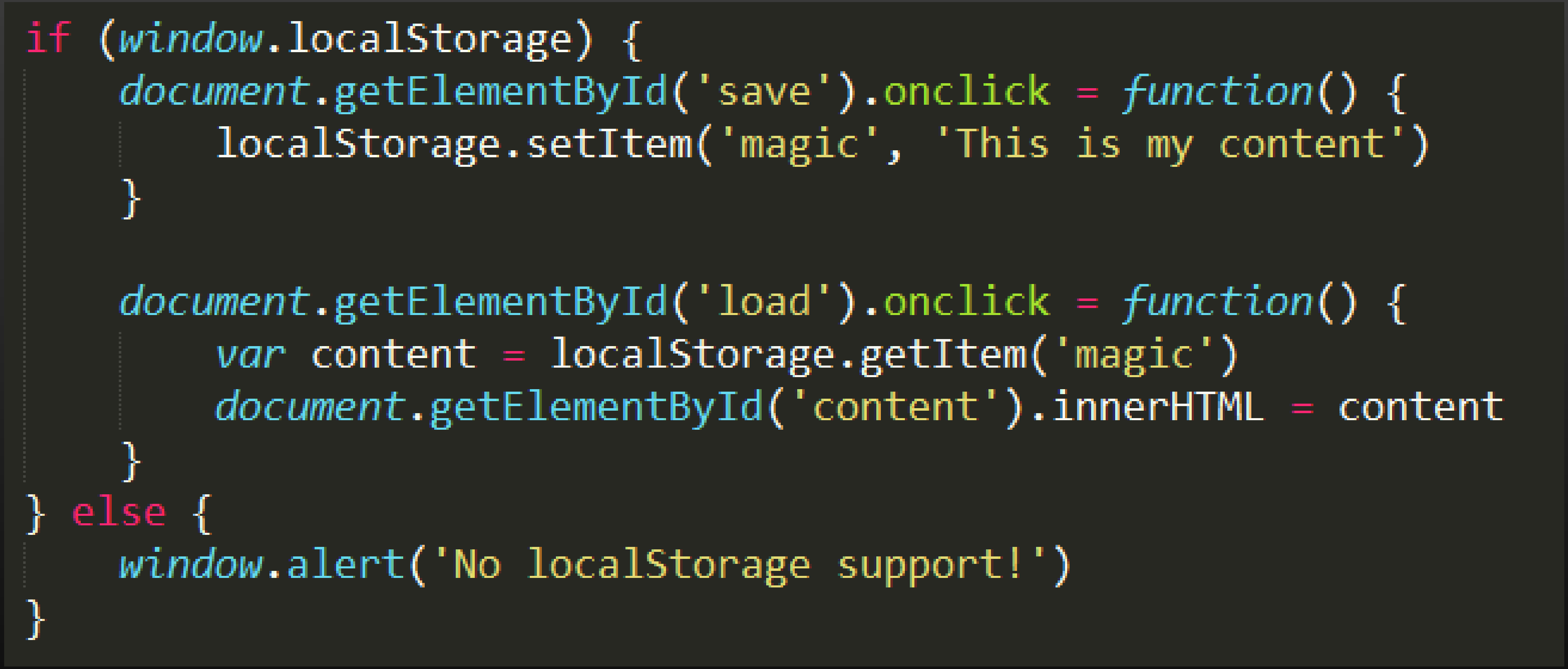
- Cookies (IE2+)
  - Limited to **4095 bytes**
  - No expiration = session cookie
  - Expiration per cookie

- Indexed Database API (IE10+)
  - Sounds promising…
  - *YMMV*

- Local Storage (IE8+)
  - **5MB** per origin (browser dependent)
  - No expiration
  - … UTF-16 (!) so really it's **2.5MB**
  - Compression? => **50 MB!**

- Session Storage (IE8+)
  - Like local storage but released when session terminates
  - per origin per window

LocalStorage Example



```
if (window.localStorage) {
    document.getElementById('save').onclick = function() {
        localStorage.setItem('magic', 'This is my content')
    }

    document.getElementById('load').onclick = function() {
        var content = localStorage.getItem('magic')
        document.getElementById('content').innerHTML = content
    }
} else {
    window.alert('No localStorage support!')
}
```

demo

Overview

- ~~Elemental Tour (now with audio & video)~~
- Web Workers
- Drag and Drop
- IndexedDB and ~~LocalStorage~~
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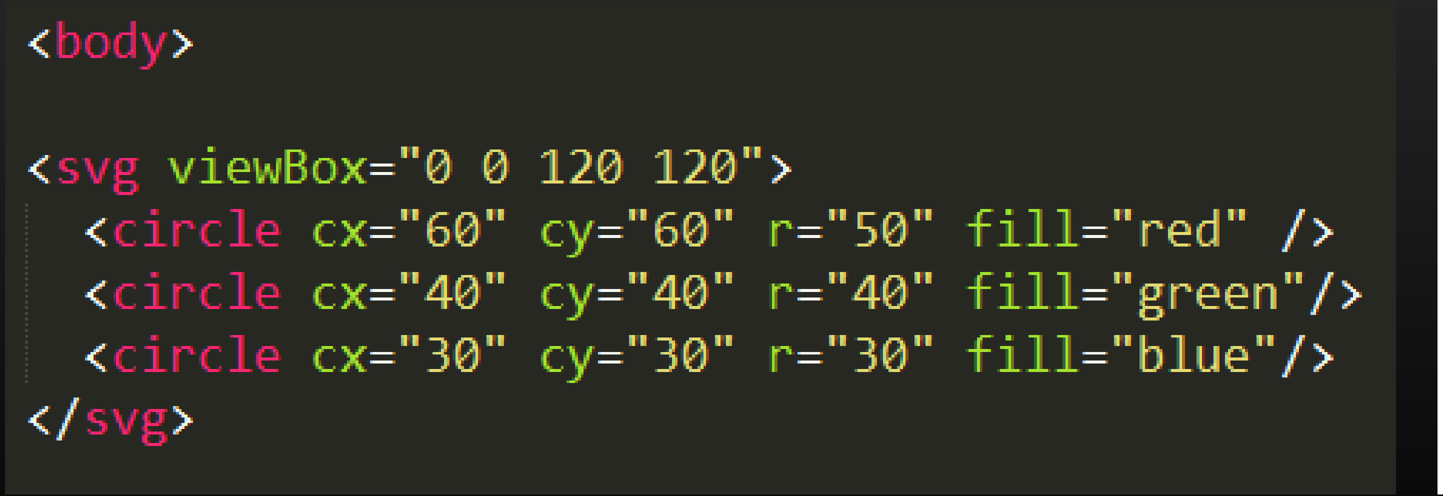
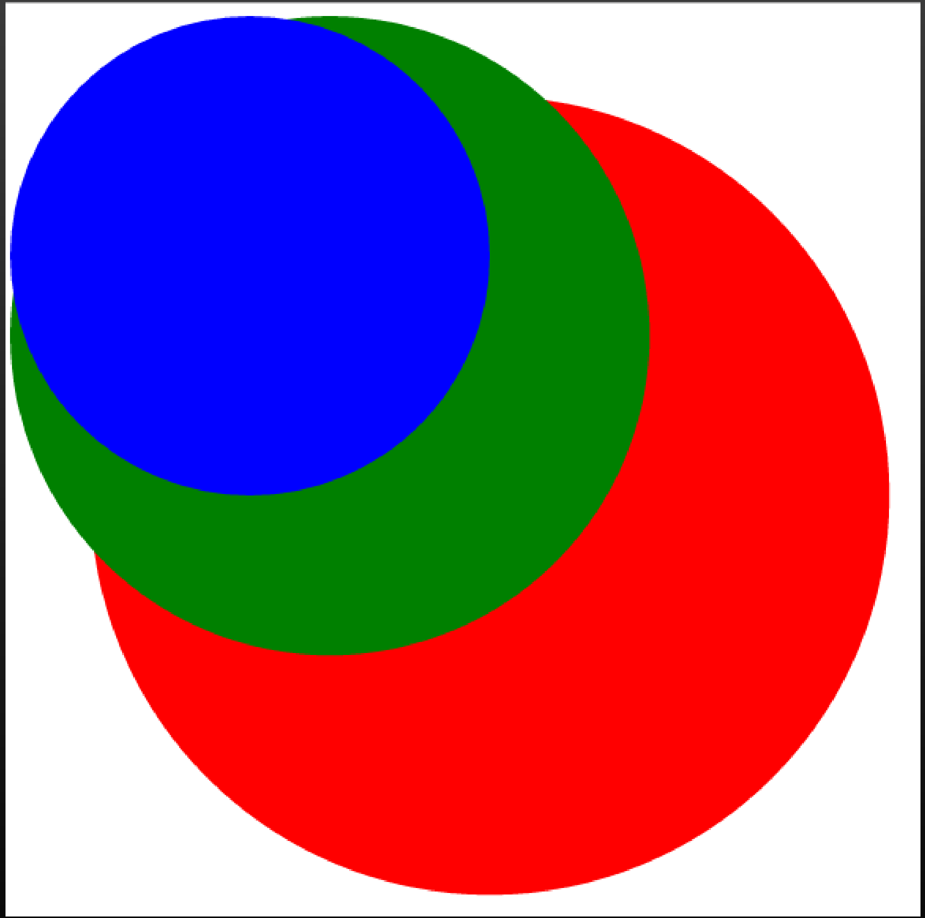
https://developer.mozilla.org/en-US/docs/Web/Guide/HTML/HTML5

Scalable Vector Graphics

XML-based vector image format for 2D graphics.

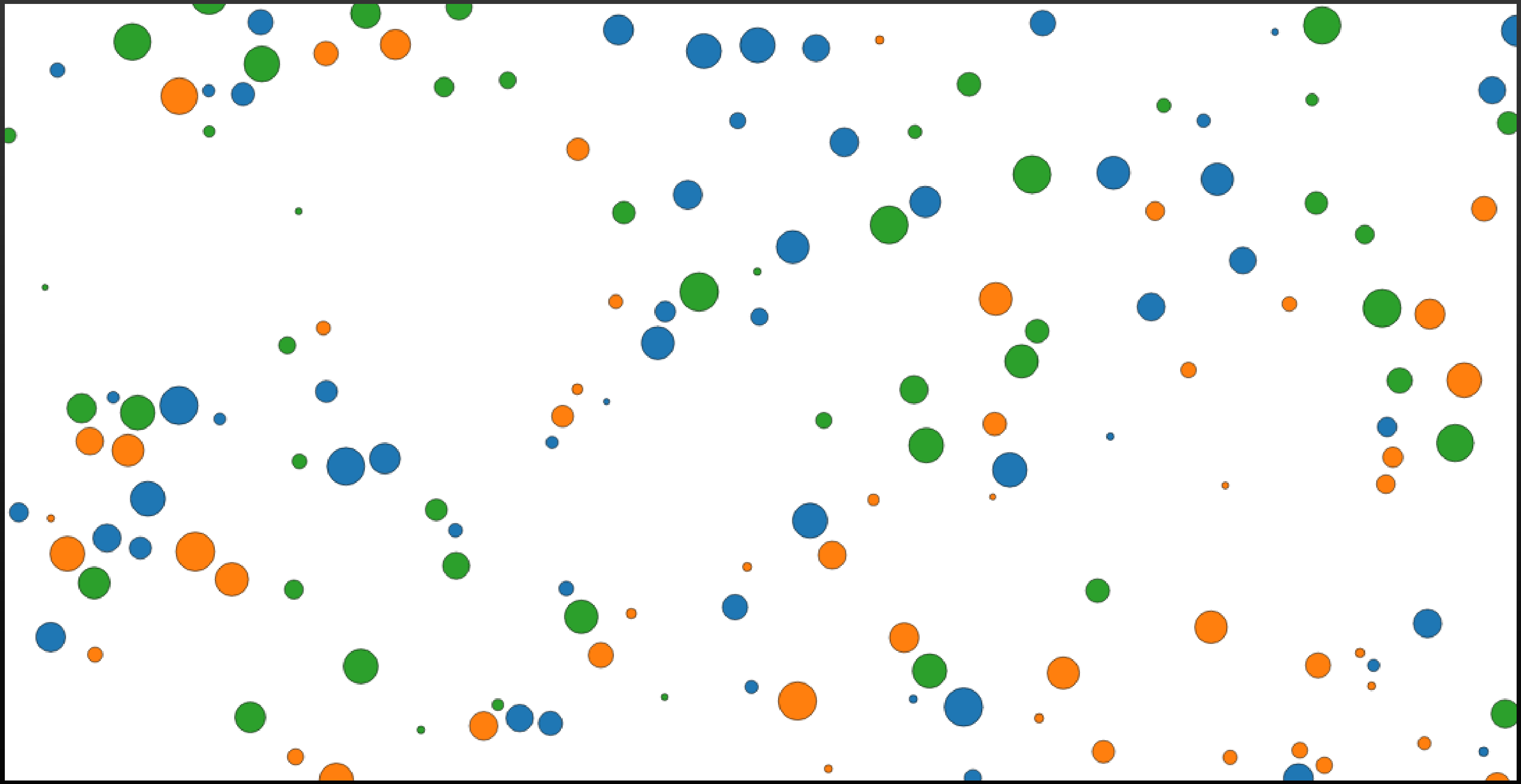


```
<body>

<svg viewBox="0 0 120 120">
  <circle cx="60" cy="60" r="50" fill="red" />
  <circle cx="40" cy="40" r="40" fill="green"/>
  <circle cx="30" cy="30" r="30" fill="blue"/>
</svg>
```

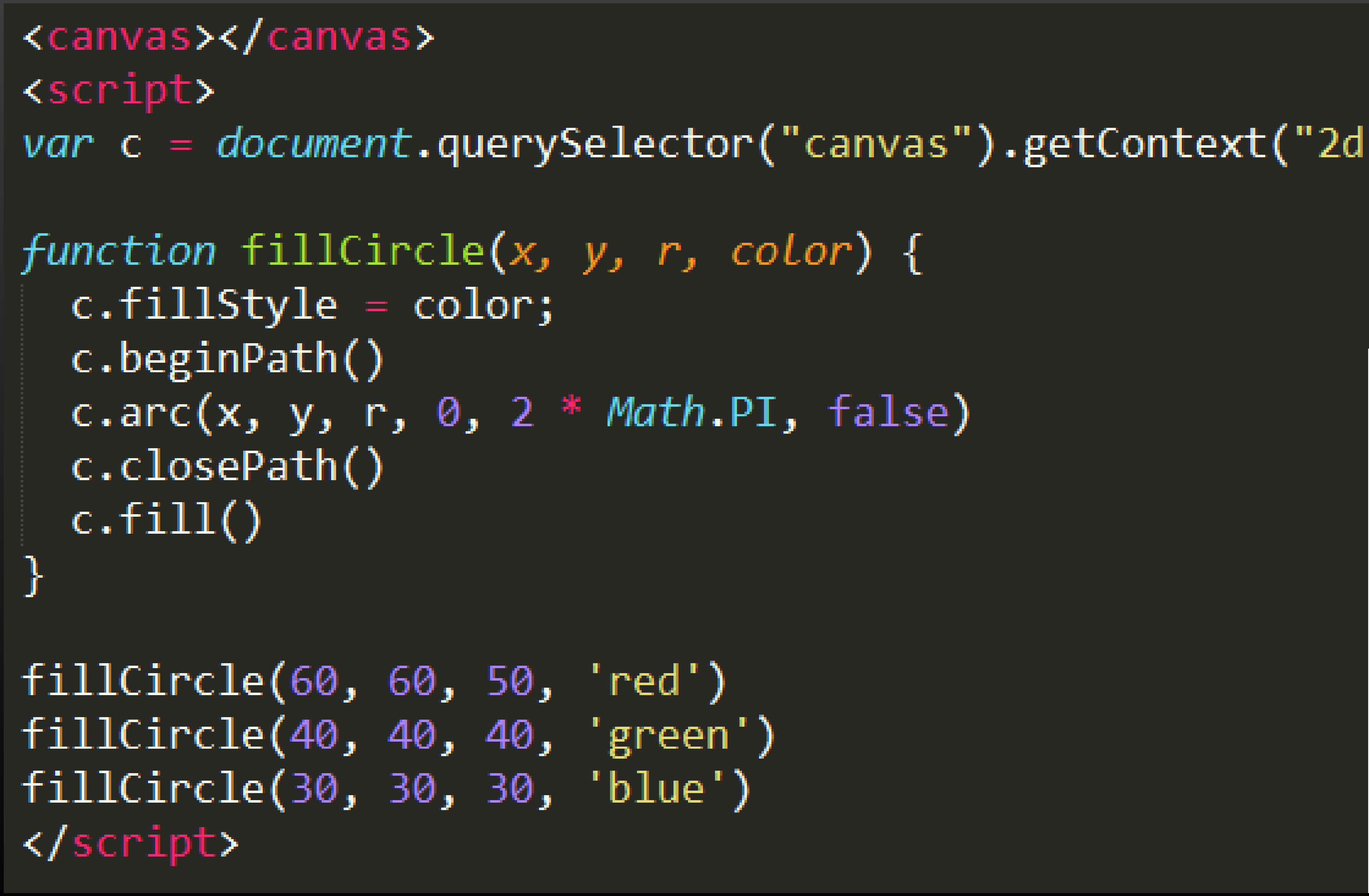


SVG Example

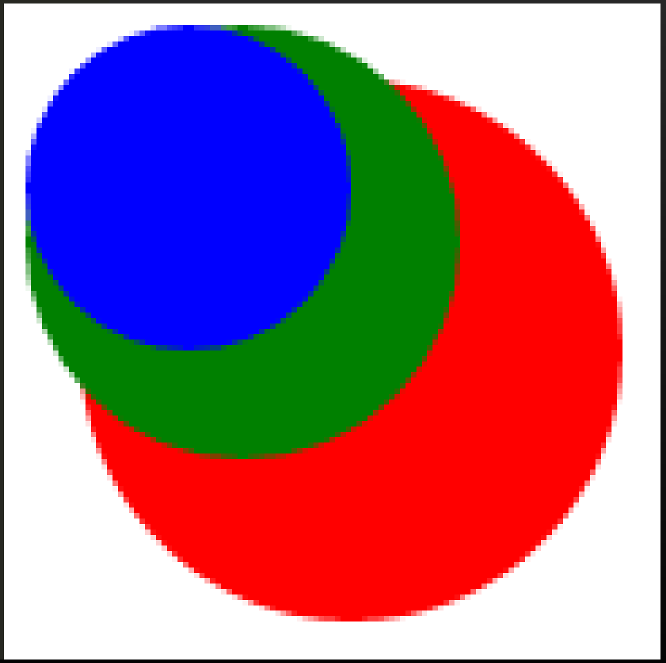
http://mbostock.github.io/d3/talk/20111018/collision.html



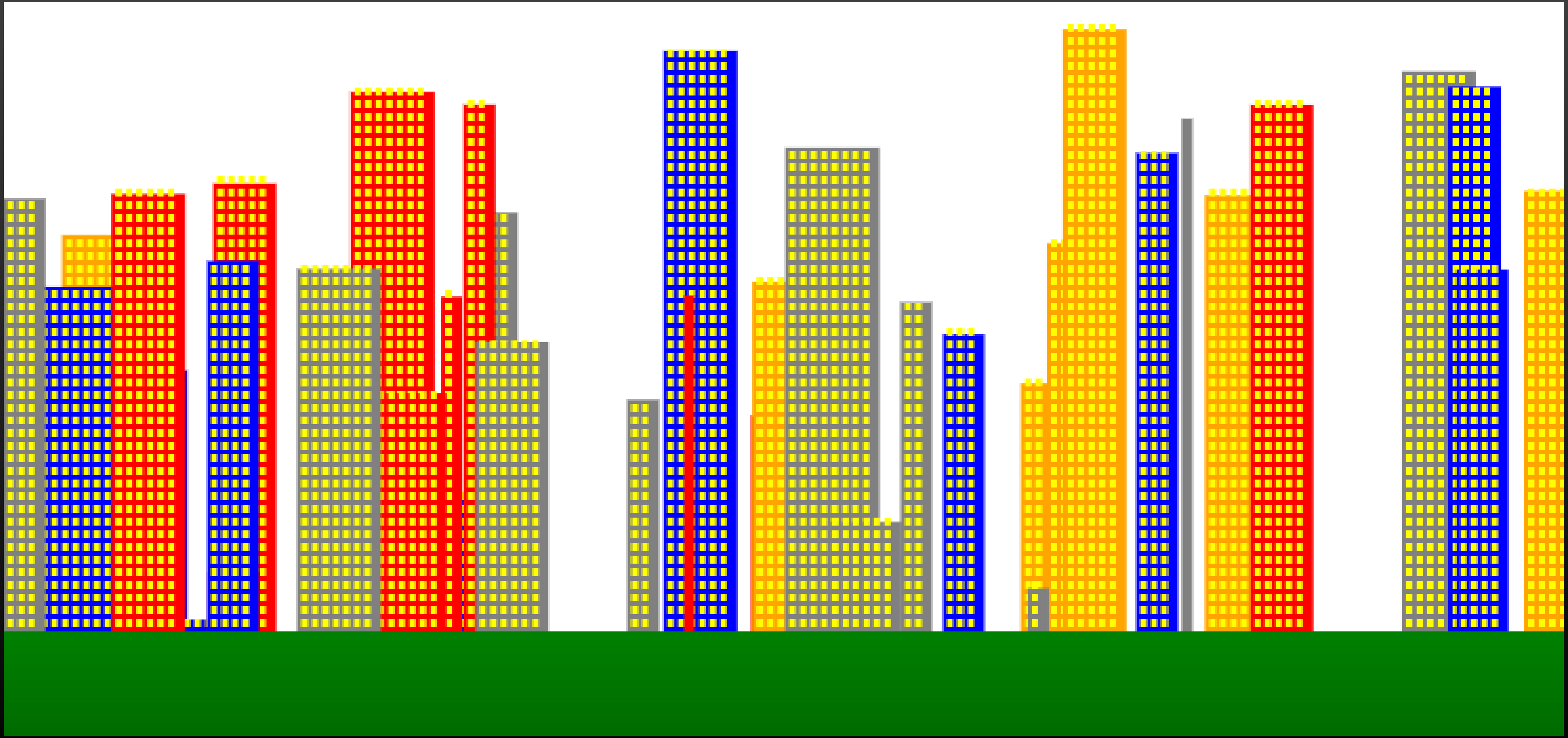
Canvas



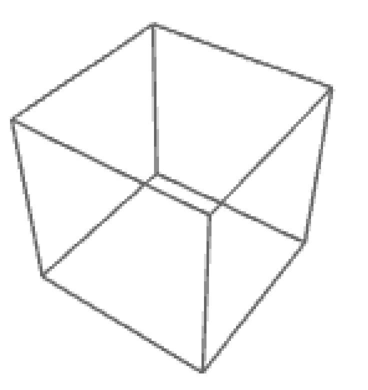
```
<canvas></canvas>
<script>
var c = document.querySelector("canvas").getContext("2d");

function fillCircle(x, y, r, color) {
  c.fillStyle = color;
  c.beginPath()
  c.arc(x, y, r, 0, 2 * Math.PI, false)
  c.closePath()
  c.fill()
}

fillCircle(60, 60, 50, 'red')
fillCircle(40, 40, 40, 'green')
fillCircle(30, 30, 30, 'blue')
</script>
```



Canvas Example



WebGL



https://get.webgl.org/

http://inear.se/beanstalk/

http://dinosaurpictures.org/ancient-earth/

In-Class Exercise: Skyline Game

Improve the skyline game

1. Not all lights are on in each building
2. Mouse click on a building makes that building grow taller
3. Add the Sun and have it move across the sky
4. Add a car that drives along the ground

https://www.clear.rice.edu/comp431/sample/skyline.html
https://www.clear.rice.edu/comp431/sample/skyline.js

https://www.clear.rice.edu/comp431/sample/skyline.jar
https://www.clear.rice.edu/comp431/sample/runSkylineDynamic

***Turnin* skyline.(html & js) *to* COMP431-S16:inclass-6**