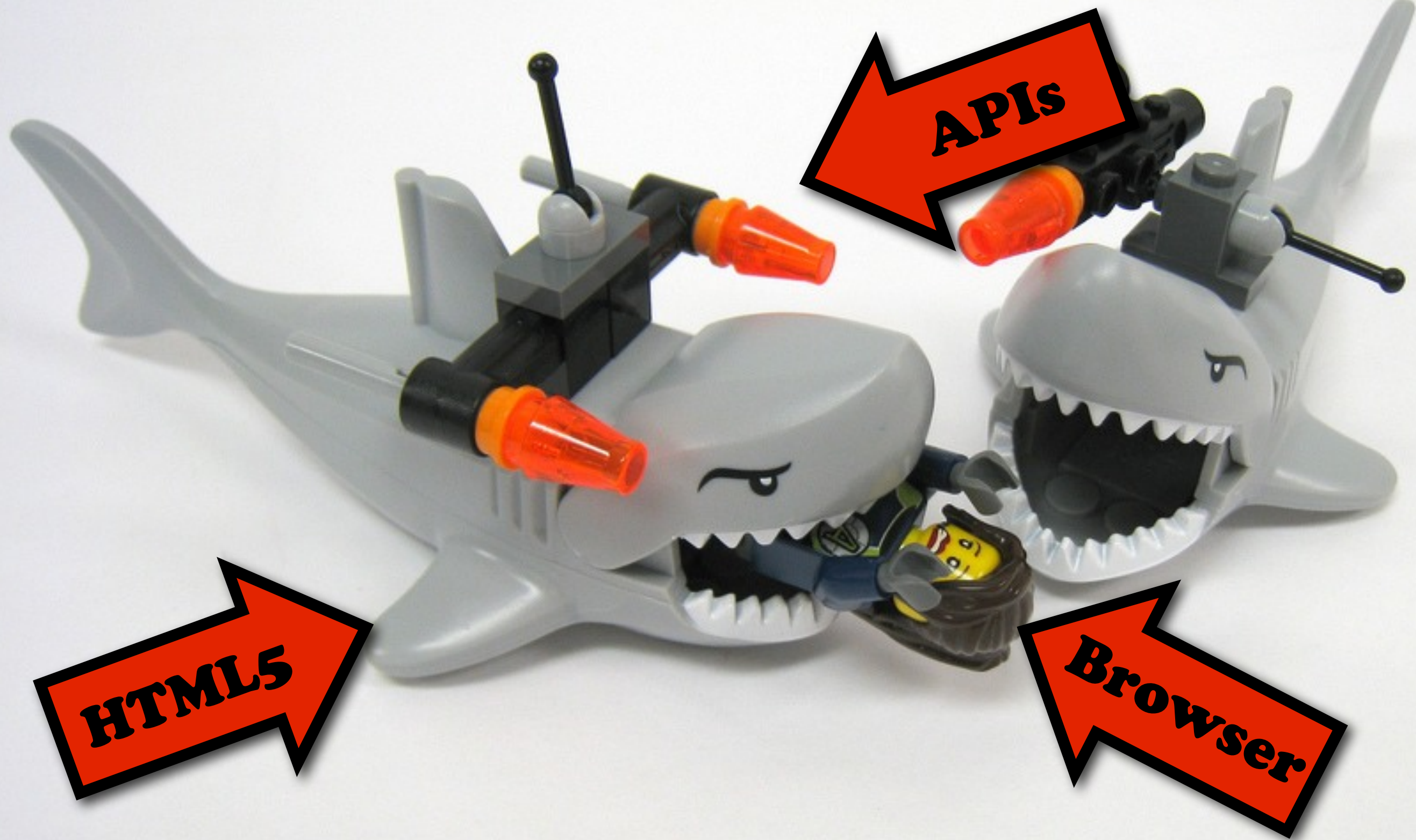




HTML5 JavaScript APIs

codebits.eu 2009

HTML5

HTML5

Web Forms

Offline

History API

Audio/Video

Drag & Drop

Undo

Canvas

Editable

X-Domain

Messaging

“HTML5”

“HTML5”

Web Forms

Offline

History API

Audio/Video

Drag & Drop

Undo

Canvas

Editable

X-Domain

Storage

Geolocation

Messaging

Databases

querySelector

Workers

Sockets

Server Events

“HTML5”

- **Video**
- **Storage**
- **Canvas**
- **Workers**
- **Offline**

“HTML5”

- **Video**

- Storage

- **Canvas**

- Workers

- **Offline**

“HTML5”

- Video

- Canvas

- Offline

- Storage

- Workers

Video (and audio)




```
<object classid="clsid:d27cddb6e-  
height="344" codebase="http://do  
flash/swflash.cab#version=6,0,40  
<param name="allowFullScreen" va  
<param name="allowscriptaccess"  
<param name="src" value="http://  
<param name="allowfullscreen" va  
<embed type="application/x-shock  
src="http://www.youtube.com/v/oH  
allowscriptaccess="always" allow  
</embed>  
</object>
```

```
<video src="dizzy.ogv" />
```


WATCH WHATEVER WHENEVER.



With Sony's Betamax SL-8600 video-recorder, you can see any TV show you want to see anytime you want to see it.

Because Betamax, which plugs into any TV set and is easy to operate, can videotape a show up to three-hours long (with the L-750 videocassette) while you're doing something else—even while you're out of the house, by setting the electronic timer.

It can also videotape something off one channel while you're watching another channel.

And remember, Sony has more experience in videorecorders than anyone (over 20 years!). In fact, we've sold more videorecorders to broadcasters and industry than any other consumer manufacturer. We even make our own tape.

For years you've watched TV shows at the times you've had to. Now you can watch them at the times you want to.


```
<video>
```

```
  <source src="dizzy.ogv" />
```

```
  <source src="dizzy.mp4" />
```

```
</video>
```



```
<video>
```

```
  <source src="dizzy.ogv" />
```

```
  <source src="dizzy.mp4" />
```

```
</video>
```

```
<video>
```

```
  <source src="dizzy.ogv" />
```

```
  <source src="dizzy.mp4" />
```

```
  <!-- QuickTime support -->
```

```
  <object><param></object>
```

```
</video>
```


<video>

<source src="dizzy.ogv" />

<source src="dizzy.mp4" />

<!-- QuickTime support -->

<object><param></object>

<!-- down to flash -->

<object><param></object>

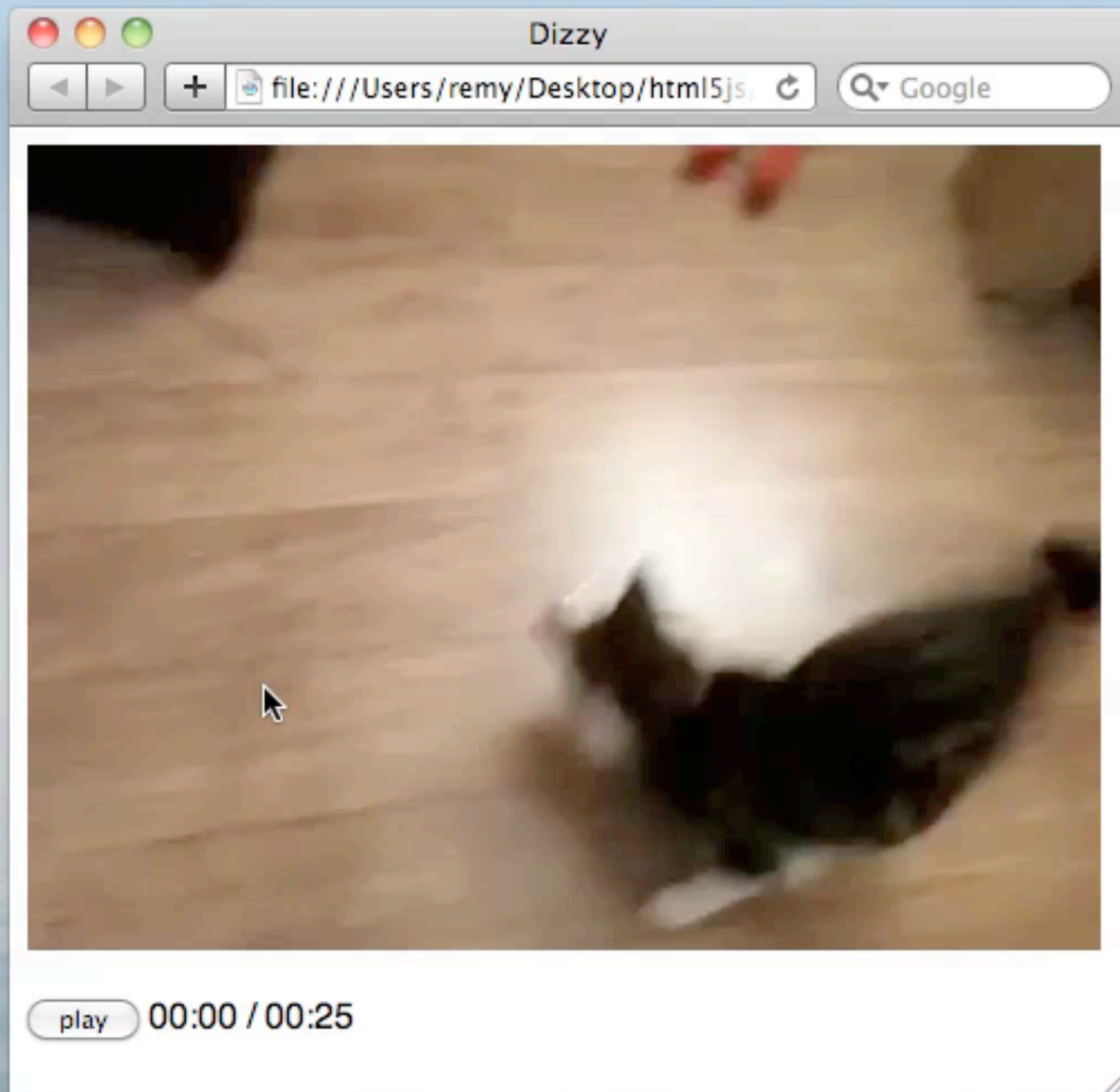
</video>

```
<video>
```

```
  <source src="dizzy.ogv" />
```

```
  <source src="dizzy.mp4" />
```

```
</video>
```



<http://html5demos.com/video>

```
if (video.paused) {  
    if (video.ended) {  
        video.currentTime = 0;  
    }  
    video.play();  
} else {  
    video.pause();  
}
```

<http://html5demos.com/video>


```
if (video.paused) {  
    if (video.ended) {  
        video.currentTime = 0;  
    }  
    video.play();  
} else {  
    video.pause();  
}
```

<http://html5demos.com/video>

```
if (video.paused) {  
    if (video.ended) {  
        video.currentTime = 0;  
    }  
    video.play();  
} else {  
    video.pause();  
}
```

<http://html5demos.com/video>

```
if (video.paused) {  
    if (video.ended) {  
        video.currentTime = 0;  
    }  
    video.play();  
} else {  
    video.pause();  
}
```

<http://html5demos.com/video>

```
addEventListener(  
    video,  
    'timeupdate',  
    function () {  
        positon.innerHTML =  
            ➡ asTime(this.currentTime);  
    }  
);
```

<http://html5demos.com/video>

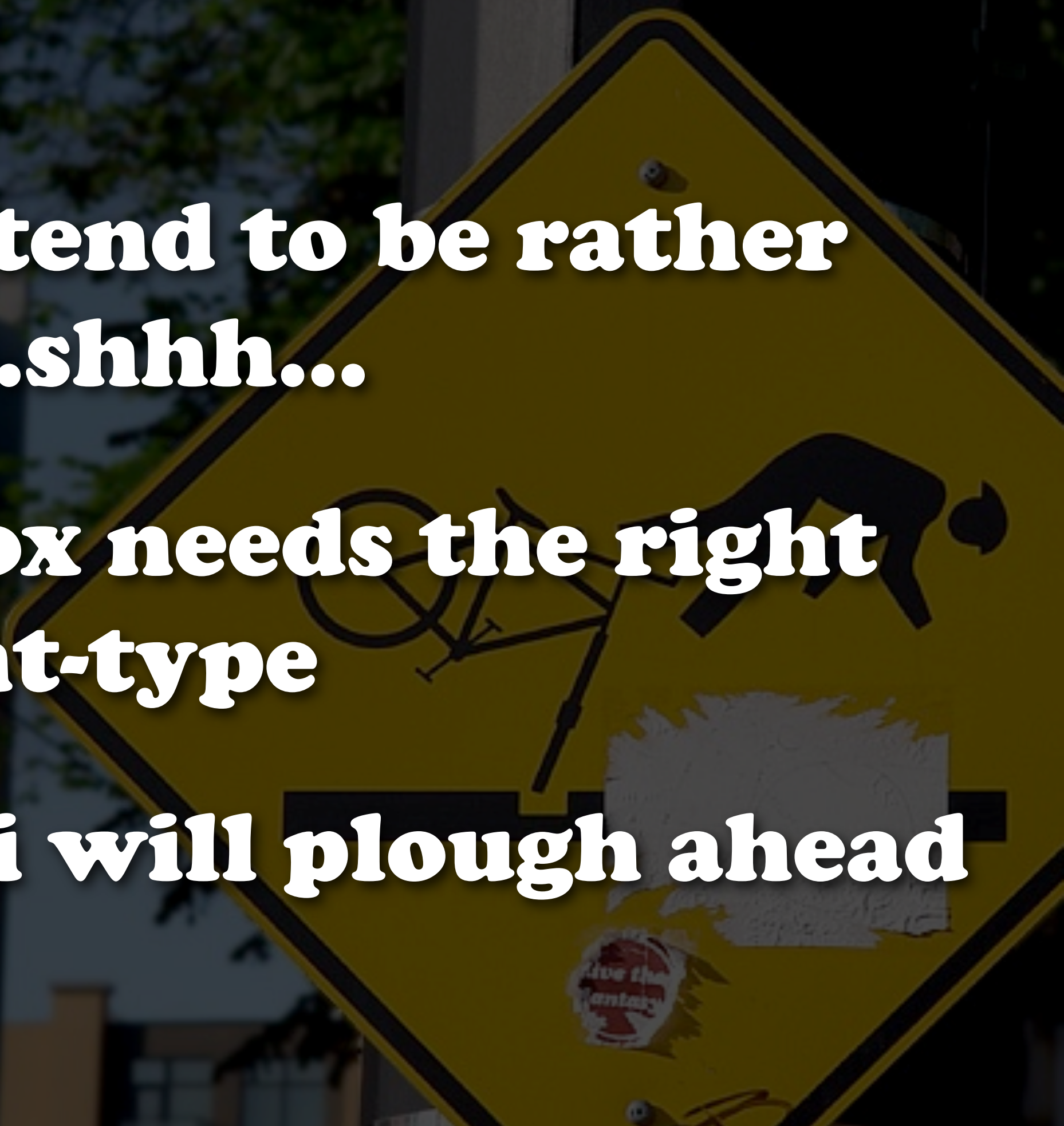
```
addEventListener(  
    video,  
    'timeupdate',  
    function () {  
        position.innerHTML =  
            ↪ asTime(this.currentTime);  
    }  
);
```

<http://html5demos.com/video>


```
addEventListener(  
    video,  
    'timeupdate',  
    function () {  
        positon.innerHTML =  
            ➡ asTime(this.currentTime);  
    }  
);
```

<http://html5demos.com/video>

- **play() , pause()**
- **paused, ended, currentTime**
- **canplay, timeupdate, ended**
- **and a bunch more.**

- 
- **Bugs tend to be rather quiet...shhh...**
 - **Firefox needs the right content-type**
 - **Safari will plough ahead**

Accessibility?

R&D TV Episode 2

<http://open.bbc.co.uk/rad/demos/html5/rdtv/episode2/> Google



▼ Programme chapters

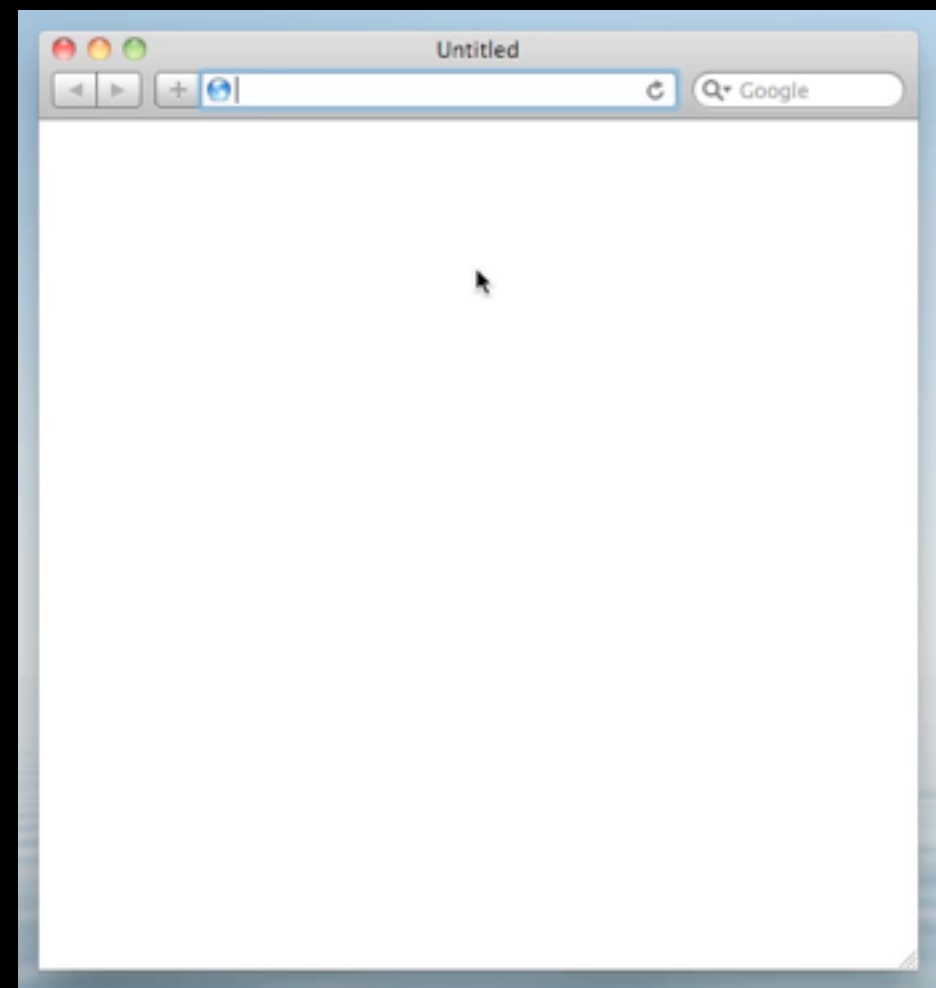
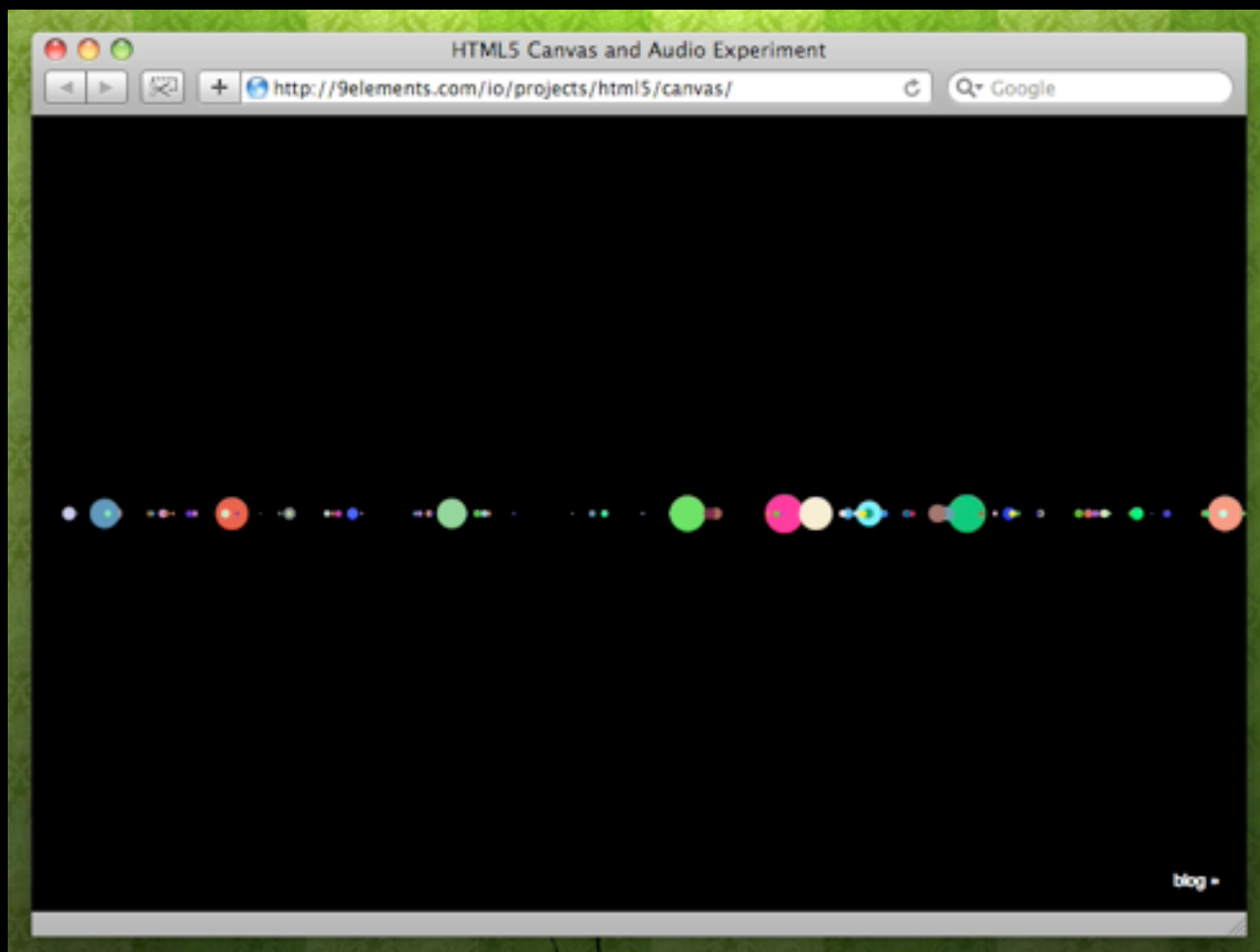
This is a proof of concept demonstration of HTML pluginless Video and Audio playback, showing AV content synchronised to chapters, allowing direct access to specific sections

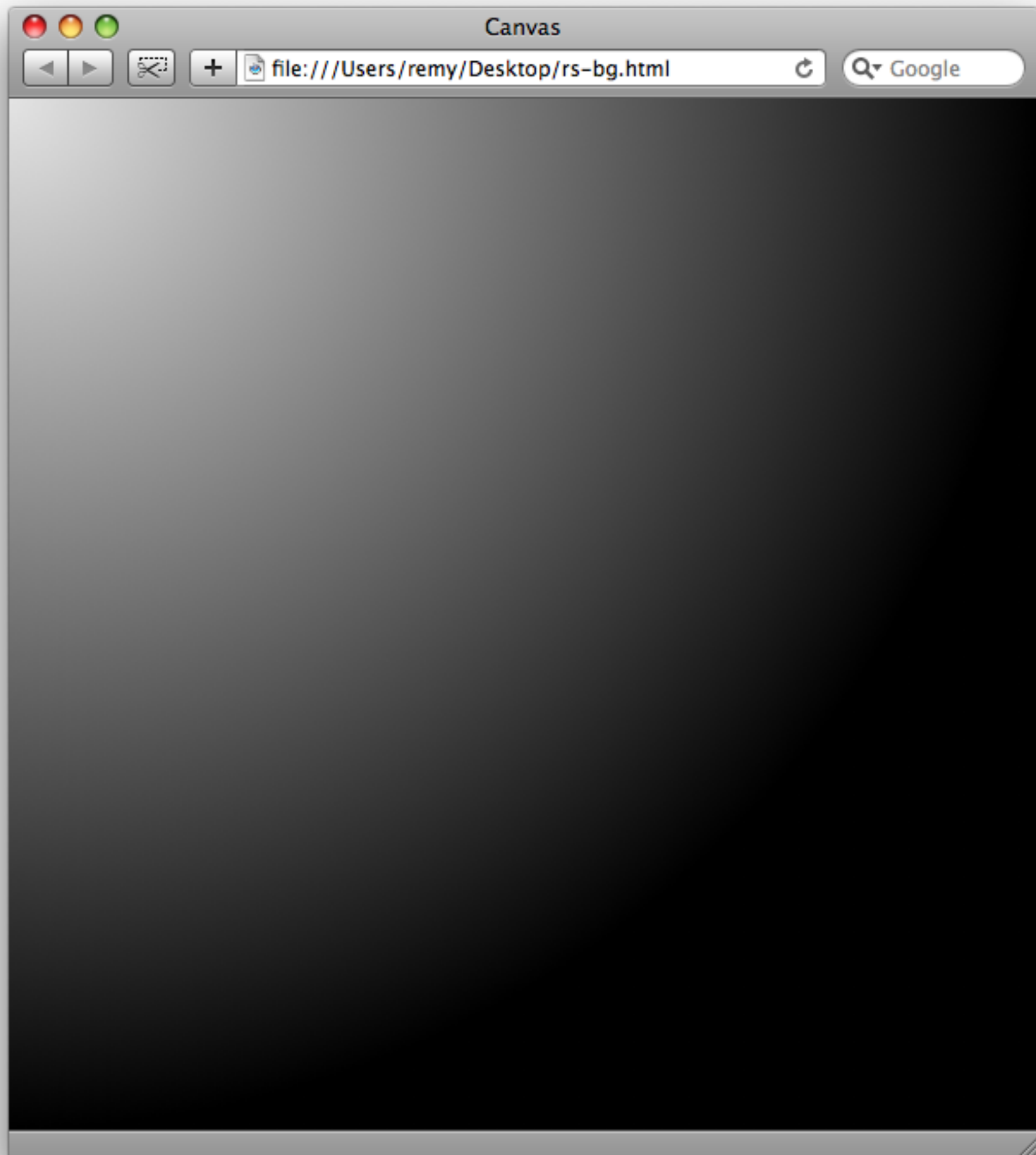
<http://open.bbc.co.uk/rad/demos/html5/rdtv/episode2/>



Canvas

(+ excanvas.js)





```
<!DOCTYPE html>
<html>
<head>
  <title>Canvas</title>
</head>
<body>
  <canvas></canvas>
</body>
</html>
```

```
var ctx = canvas.getContext( '2d' );
```

```
var ctx = canvas.getContext( '2d' );
```

```
// Create radial gradient
```

```
var grad = ctx.createRadialGradient(0,0,0,0,0,600);
```



```
var ctx = canvas.getContext( '2d' );  
  
// Create radial gradient  
var grad = ctx.createRadialGradient(0,0,0,0,0,600);  
grad.addColorStop(0, ' #E4E4E4 ' );  
grad.addColorStop(1, ' #000 ' );
```

```
var ctx = canvas.getContext( '2d' );

// Create radial gradient
var grad = ctx.createRadialGradient(0,0,0,0,0,600);
grad.addColorStop(0, ' #E4E4E4 ' );
grad.addColorStop(1, ' #000 ' );

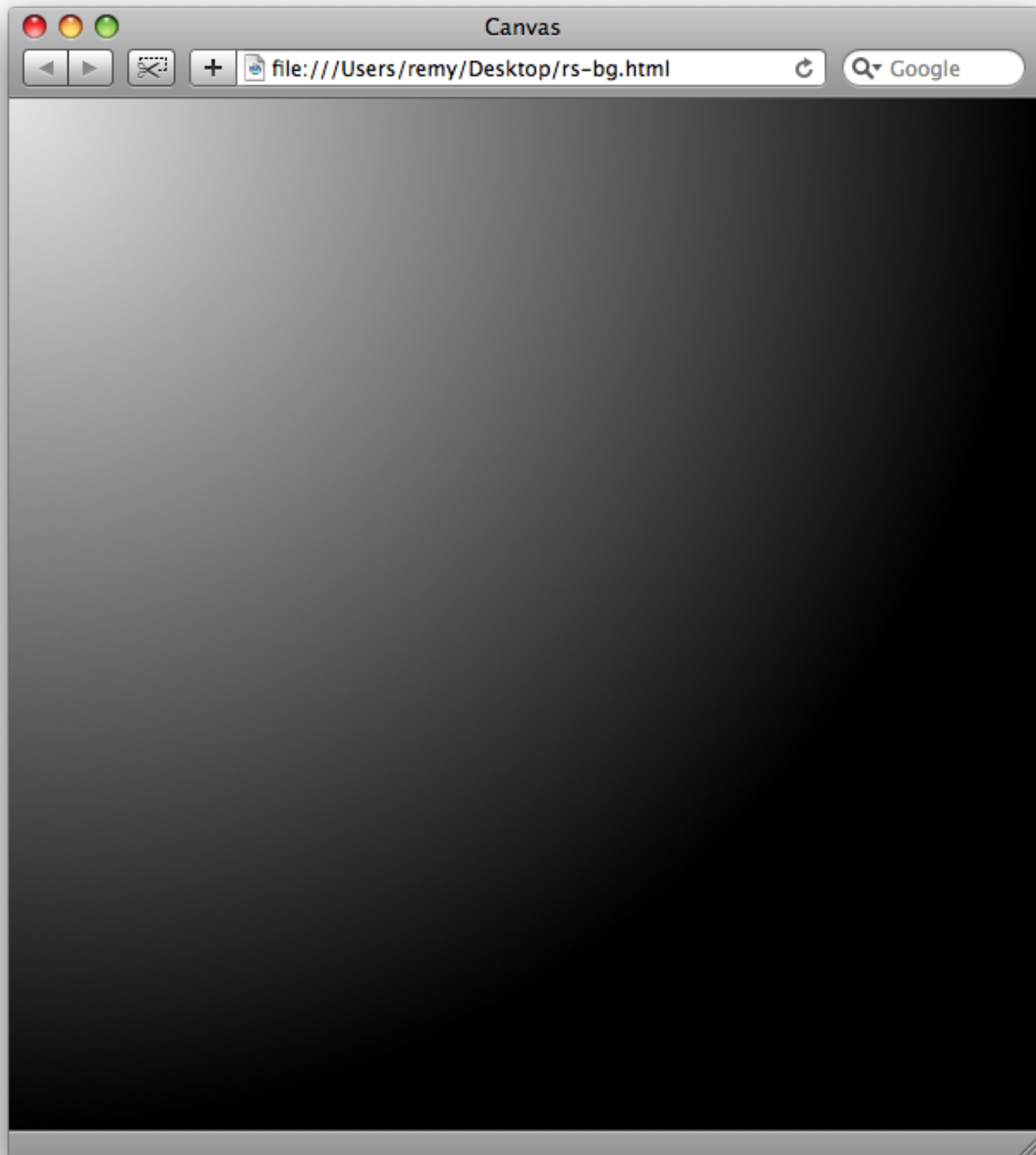
// assign gradients to fill
ctx.fillStyle = grad;
```

```
var ctx = canvas.getContext( '2d' );

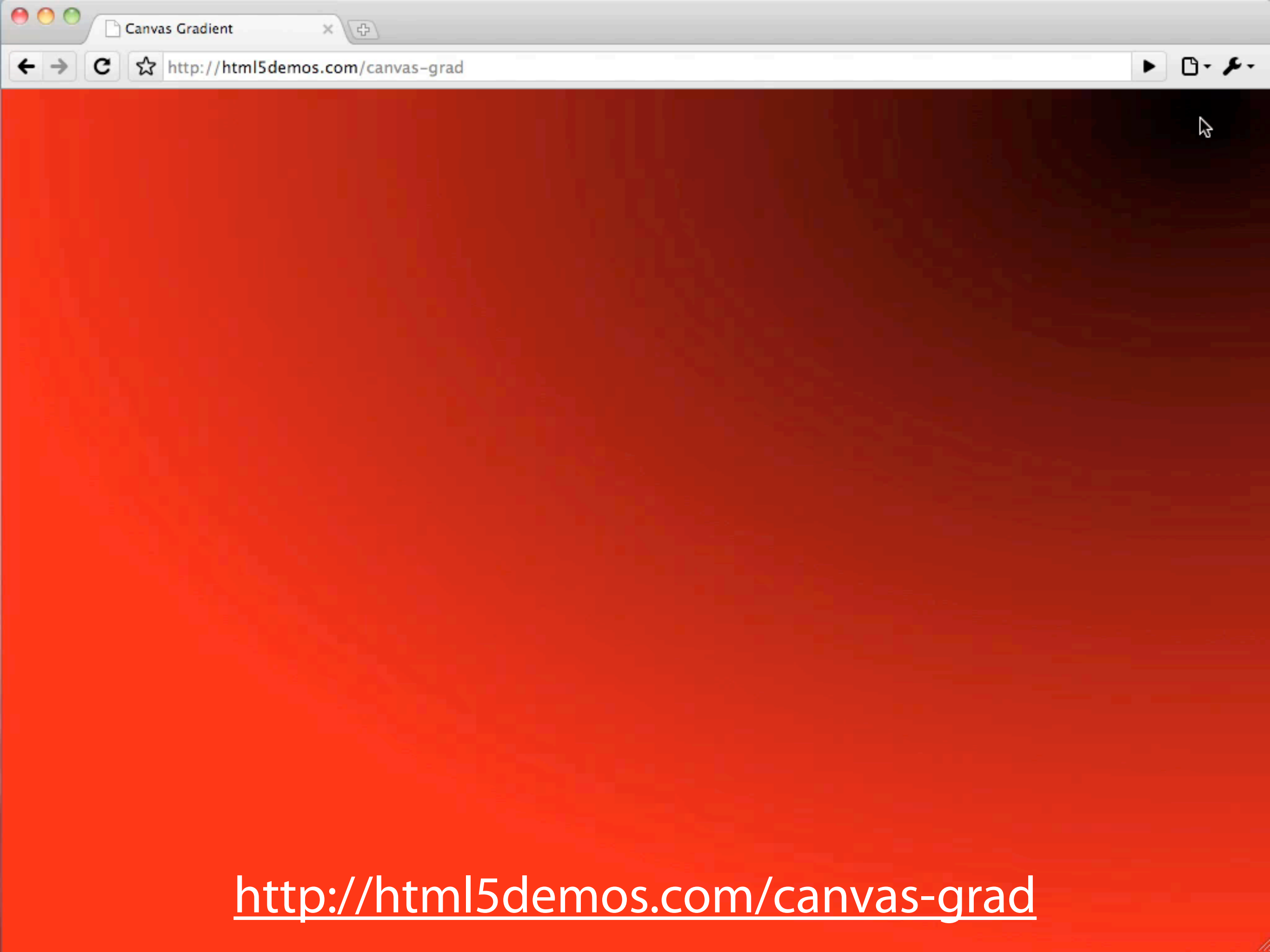
// Create radial gradient
var grad = ctx.createRadialGradient(0,0,0,0,0,600);
grad.addColorStop(0, ' #E4E4E4 ' );
grad.addColorStop(1, ' #000 ' );

// assign gradients to fill
ctx.fillStyle = grad;

// draw 600x600 fill
ctx.fillRect(0,0,600,600);
```



Let's mix it up



<http://html5demos.com/canvas-grad>

```
body.onmousemove = function (event) {  
    var width = window.innerWidth,  
        height = window.innerHeight,  
        x = event.clientX,  
        y = event.clientY,  
        rx = 600 * x / width,  
        ry = 600 * y / height;  
  
    var xc = parseInt(256 * x / width);  
    var yc = parseInt(256 * y / height);  
  
    grad = ctx.createRadialGradient(rx, ry, 0, rx, ry, 600);  
    grad.addColorStop(0, '#000');  
    grad.addColorStop(1, 'rgb(' + xc + ', ' + (255 - xc) + ', ' + yc + ')');  
  
    ctx.fillStyle = grad;  
    ctx.fillRect(0, 0, 600, 600);  
};
```

<http://html5demos.com/canvas-grad>

```
body.onmousemove = function (event) {  
    var width = window.innerWidth,  
        height = window.innerHeight,  
        x = event.clientX,  
        y = event.clientY,  
        rx = 600 * x / width,  
        ry = 600 * y / height;  
  
    var xc = parseInt(256 * x / width);  
    var yc = parseInt(256 * y / height);  
  
    grad = ctx.createRadialGradient(rx, ry, 0, rx, ry, 600);  
    grad.addColorStop(0, '#000');  
    grad.addColorStop(1, 'rgb(' + xc + ', ' + (255 - xc) + ', ' + yc + ')');  
  
    ctx.fillStyle = grad;  
    ctx.fillRect(0, 0, 600, 600);  
};
```

Calculate from
the mouse the
radius and
colours

<http://html5demos.com/canvas-grad>

```
body.onmousemove = function (event) {  
    var width = window.innerWidth,  
        height = window.innerHeight,  
        x = event.clientX,  
        y = event.clientY,  
        rx = 600 * x / width,  
        ry = 600 * y / height;  
  
    var xc = rx / width;  
    var yc = ry / height;  
  
    grad = ctx.createRadialGradient(rx, ry, 0, rx, ry, 600);  
    grad.addColorStop(0, '#000');  
    grad.addColorStop(1, 'rgb(' + xc + ', ' + (255 - xc) + ', ' + yc + ')');  
  
    ctx.fillStyle = grad;  
    ctx.fillRect(0, 0, 600, 600);  
};
```

Re-render the
gradient

<http://html5demos.com/canvas-grad>

```
body.onmousemove = function (event) {  
    var width = window.innerWidth,  
        height = window.innerHeight,  
        x = event.clientX,  
        y = event.clientY,  
        rx = 600 * x / width,  
        ry = 600 * y / height;  
  
    var xc = parseInt(256 * x / width);  
    var yc = parseInt(256 * y / height);  
  
    grad = ctx.createRadialGradient(rx, ry, 0, rx, ry, 600);  
    grad.addColorStop(0, '#000');  
    grad.addColorStop(1, 'rgb(' + xc + ', ' + yc + ', 255)');  
  
    ctx.fillStyle = grad;  
    ctx.fillRect(0, 0, 600, 600);  
};
```

Set the new fill
style and refill -
the browser
handles the hard
work

<http://html5demos.com/canvas-grad>

```
body.onmousemove = function (event) {  
    var width = window.innerWidth,  
        height = window.innerHeight,  
        x = event.clientX,  
        y = event.clientY,  
        rx = 600 * x / width,  
        ry = 600 * y / height;  
  
    var xc = parseInt(256 * x / width);  
    var yc = parseInt(256 * y / height);  
  
    grad = ctx.createRadialGradient(rx, ry, 0, rx, ry, 600);  
    grad.addColorStop(0, '#000');  
    grad.addColorStop(1, 'rgb(' + xc + ', ' + (255 - xc) + ', ' + yc + ')');  
  
    ctx.fillStyle = grad;  
    ctx.fillRect(0, 0, 600, 600);  
};
```

<http://html5demos.com/canvas-grad>


```
canvas.toDataURL("image/png");
```

canvas.toDataURL("image/png");

data:image/
png;base64,iVBORw0KGgoAAAANSUHEUgAAAMgAAADICAYAAACtWK6eAAAFxU1EQVR4Ae3dQW5jORAEUXvQ97+yez
CzNQpNyPwdIp+XJkVlRTKgheGvz69/fz78IIDA twT+
+fa3fokAAv8RIIiLgMBAgCADHEsIEMQdQGA gQJABjiUECOIOIDAQIMgAxxICBHEHEBgIEGSAYwkBgrgDCAwECDLAs
YQAQdwBBAYCBB...
fuQfHehf6/8Ik
+4aAYKs8bL7Mg
+zICBLmsc0OuE
+4aAYKs8bL7Mg
+zICBLmsc0OuESDIGi+7LyNAkMsKN+4aAYKs8bL7MgI//3R3T1m/
7AqdPa5PkLP7Nd2LBAjyIkAvP5sAQc7u13QvEiDIiwC9/
GwCBDm7X9O9SIAgLwL08rMJEOTsfk33IgGCvAjQy88mQJCz+zXdiwR+/i/pLwba/fLPj7/zPe5fH1+7R3P+BgI
+QTZAdeQ5BAhyTpcm2UCAIBugOvIcAgQ5p0uTbCBAkA1QHxkOAYKc06VJNhAgyAaojjyHAEHO6dIkGwgQZANUR55D
gCDndGmSDQQIsgGqI88hQJBzujTJBgIE2QDVkecQIMg5XZpkAwGcbIDqyHMIEOsLk2ygQBBNkB15DkECHJOlybZQ
IAgG6A68hwCBDmnS5NsIECQDVAdeQ4BgpzTpUk2ECDIBqiOPicAQc7p0iQbCBBkA1RHnkOAIod0aZINBAiyAaojzy
FAkHO6NMkGA gTZANWR5xC47ununrJ+zuV9YhKfIE9Q9h5vS4Agblud4E8QIMgTlL3H2xIgyNtWJ/
gTBajyBGXv8bYECpk21Qn+BAGCPEHze7wtAYK8bXWCP0GAIE9Q9h5vS+C6v6TXm/r8O1/j/vHla9y/vRo
+Qb7F4pcI/E
+AIG4CAgMBggxwLCFAEHcAgYEAQQY4lhAgIDuAwECAIAMcSwgQxB1AYCBAkAG0JQQI4g4gMBAgyADHEgIEcQcQGA g
QZIBjCQGCuAMIDAQIMsCxhABB3AEEBgIEGeBYQoAg7gACAwGCDHASIUAQdwCBgQBBBjiWECCIO4DAQIAgAxxLCBDE
HUBgIECQAY4lBAjiDiAwECDIAMcSAgRxBxAYCBBkgGMJAU93j90BT1lvFeITpNWHNDECBIkVIk6LAEFafUgTI0CQW
CHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBI
kVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0C
QWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDEC
BIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI
0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHND
ECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUg
TI0CQWCHitAgQpNWHNDECBIkVIk6LAEFafUgTI0CQWCHitAgQpNWHNDECvwhnaxGSkeUPVAAAAABJRu5ErkJggg==

Canvas
+
drawImage
+
Video
=



HUNGRY
OPER

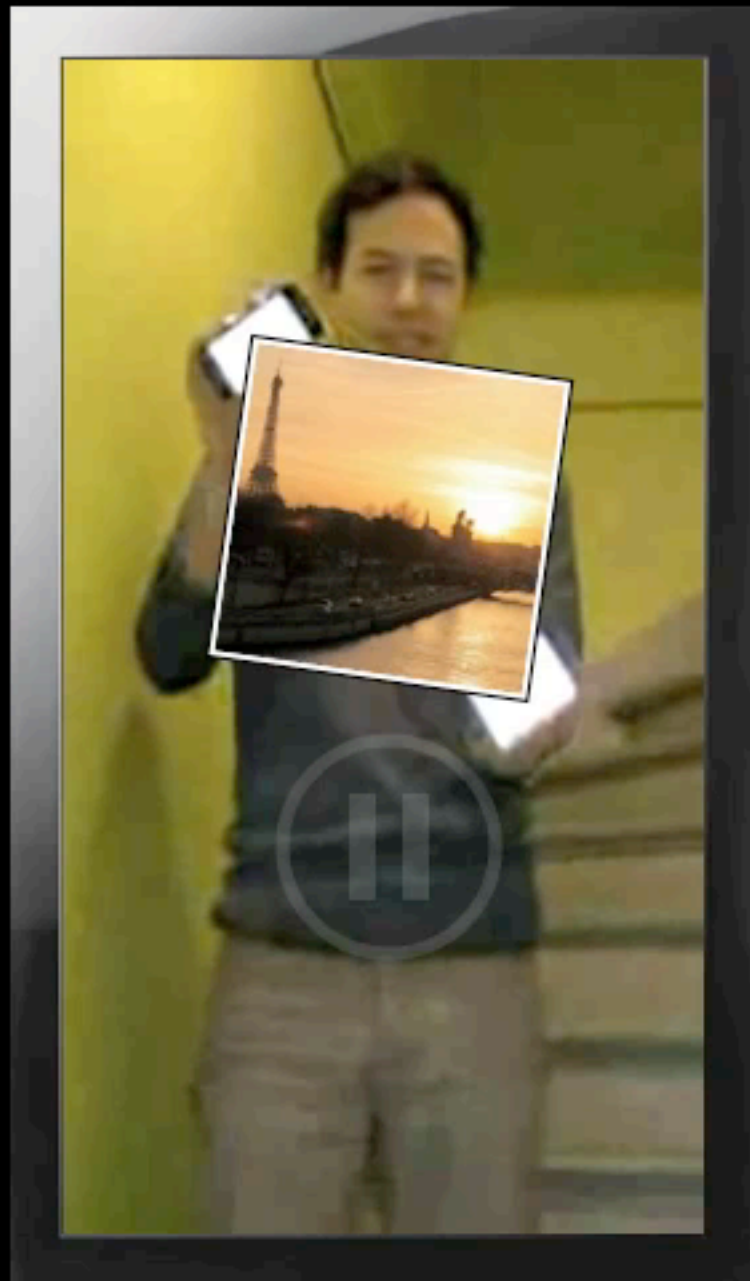
HOUSE OF
MONSTER
THE FEAR STAR



NG
OPER

HOUSE OF
Frank
THE FEAR STAR

Click to play:



Choose a pattern:

Video:



Image:

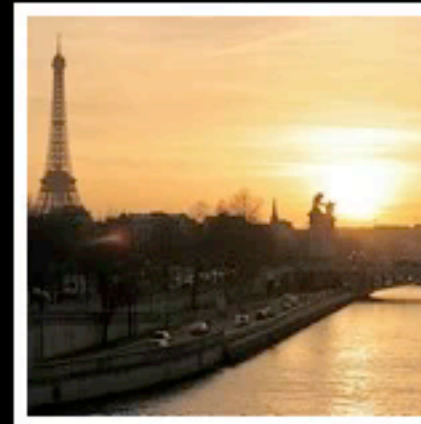
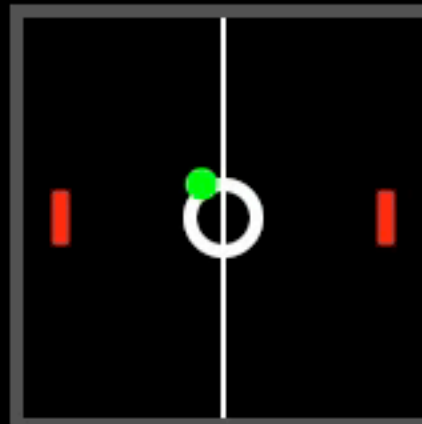


Image:



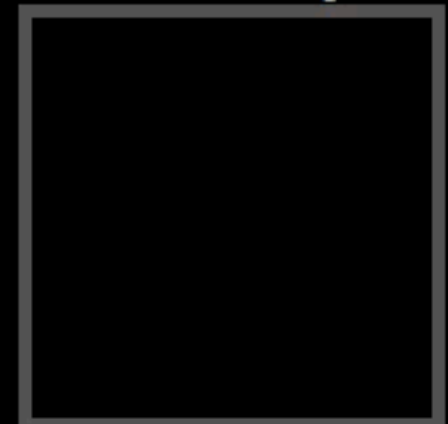
Canvas:



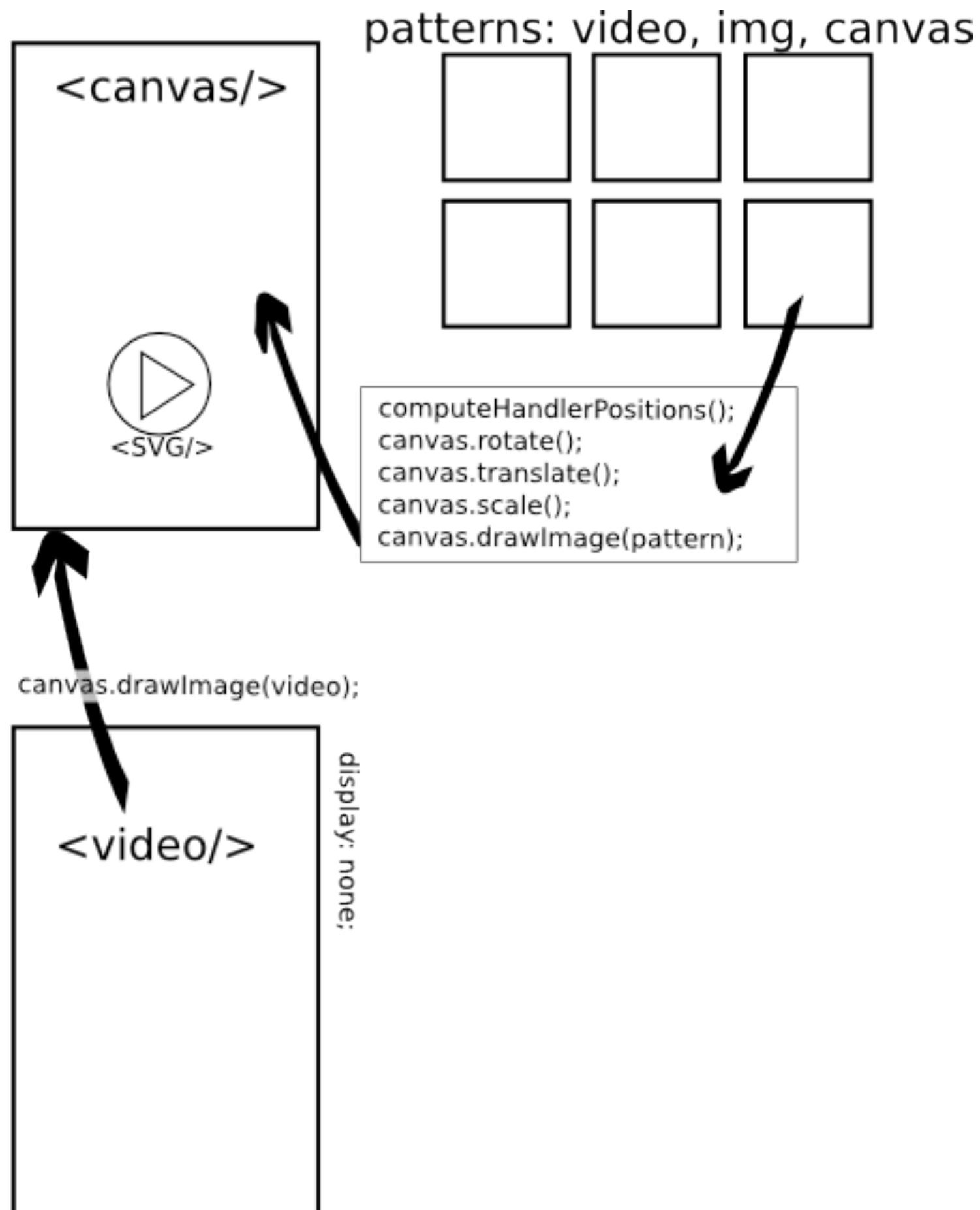
Your text:



Your drawing:



clear 3



```
ctx.translate(canvas.width/2, canvas.height/2);  
ctx.scale(-1, 1);  
ctx.translate(-canvas.width/2, -canvas.height/2);
```

```
ctx.drawImage(  
    video, 0, 0,  
    video.width,  
    video.height,  
    0, 0,  
    canvas.width,  
    canvas.height);
```



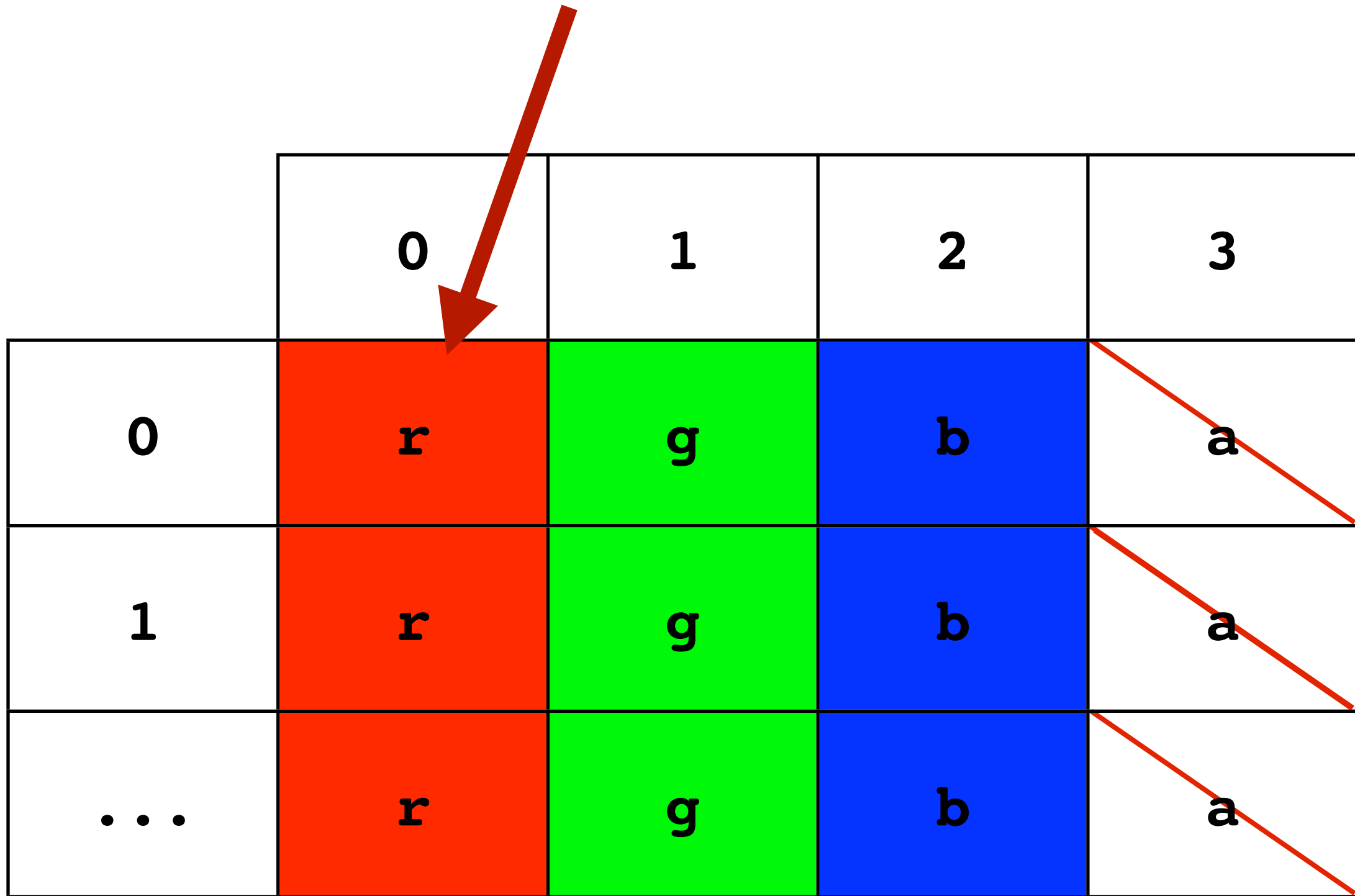
<http://html5demos.com/video-canvas>

```
ctx.getImageData(0, 0, w, h);
```

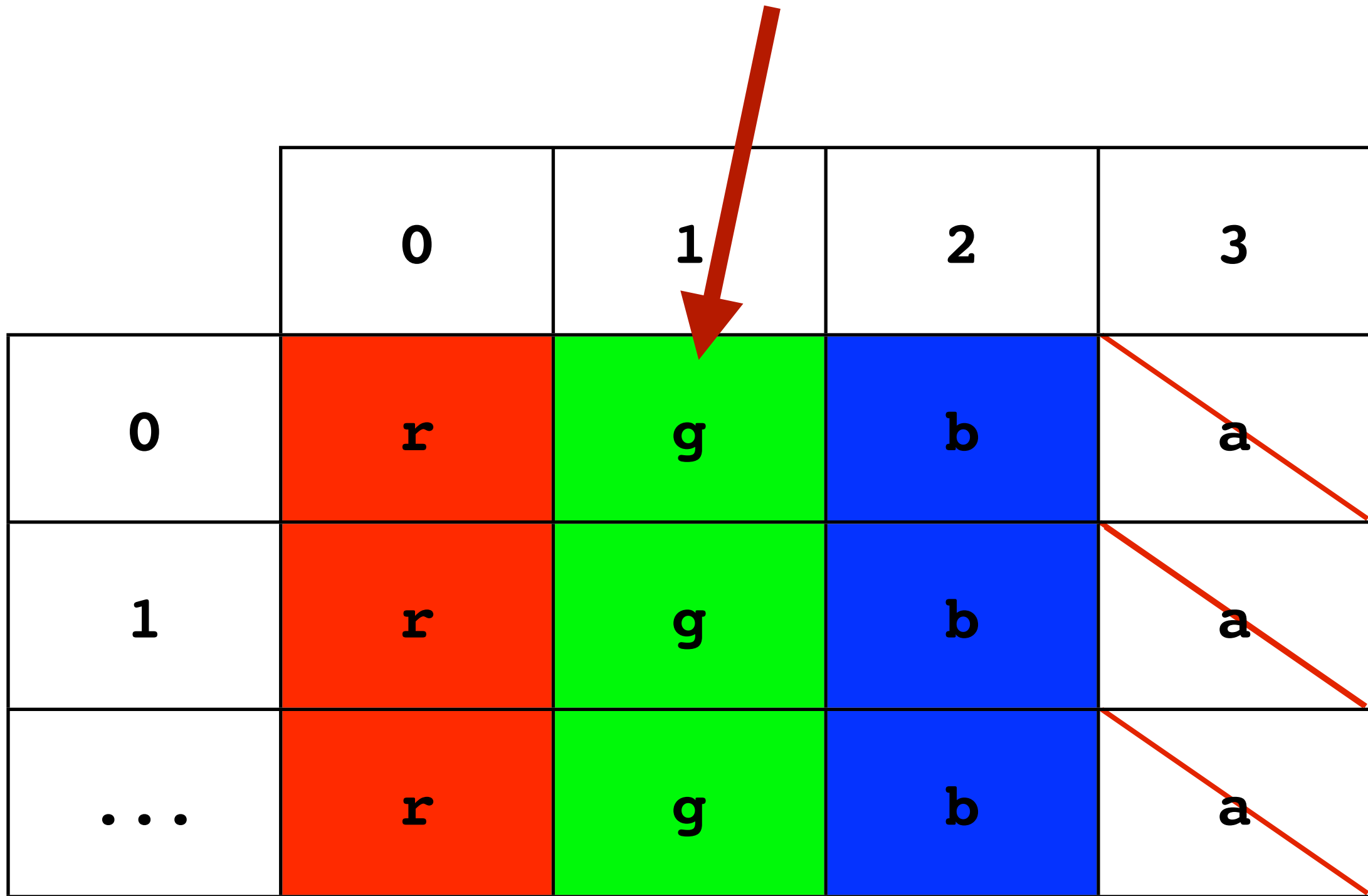
```
ctx.getImageData(0, 0, w, h);
```

	0	1	2	3
0	r	g	b	a
1	r	g	b	a
...	r	g	b	a

```
pixels.data[i * 4 + 0];
```

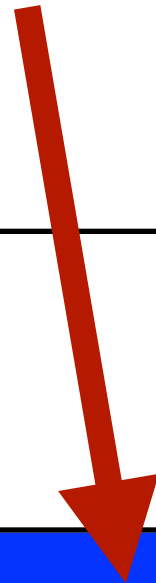



```
pixels.data[i * 4 + 1];
```



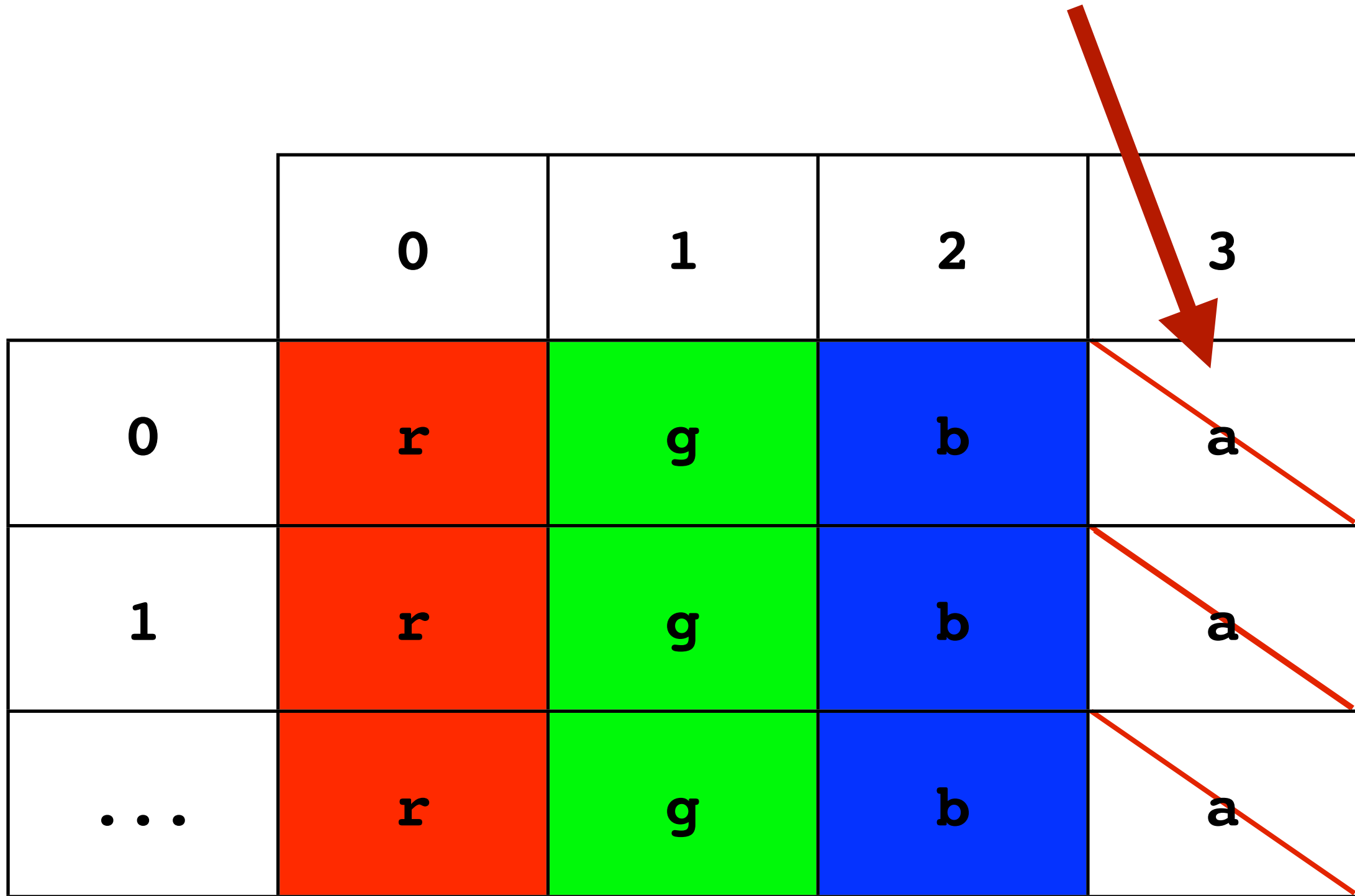
	0	1	2	3
0	r	g	b	a
1	r	g	b	a
...	r	g	b	a

```
pixels.data[i * 4 + 2];
```



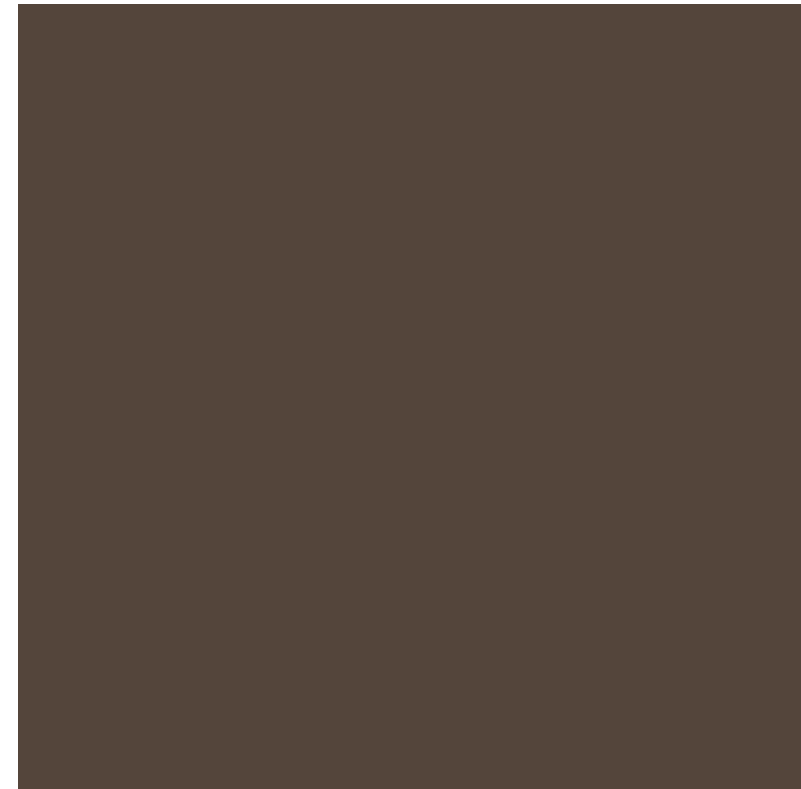
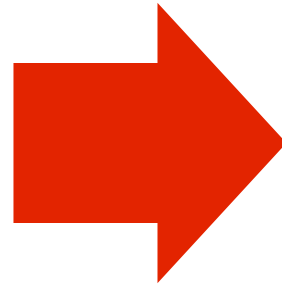
	0	1	2	3
0	r	g	b	a
1	r	g	b	a
...	r	g	b	a

```
pixels.data[i * 4 + 3];
```



A diagram illustrating a 3x4 grid of pixels. The columns are indexed 0, 1, 2, and 3. The rows are indexed 0, 1, and ... (representing multiple rows). The first three columns represent the RGB color channels (red, green, blue), and the fourth column represents the alpha channel (a). A red arrow points from the code snippet above to the alpha channel of the first row (row 0, column 3).

	0	1	2	3
0	r	g	b	a
1	r	g	b	a
...	r	g	b	a



```
for (i = 0; i < pixels.data.length / 4; i++) {  
    totals.r += pixels.data[i * 4 + 0]; // r  
    totals.g += pixels.data[i * 4 + 1]; // g  
    totals.b += pixels.data[i * 4 + 2]; // b  
}
```

```
var r = parseInt(totals.r / (w*h)),  
    g = parseInt(totals.g / (w*h)),  
    b = parseInt(totals.b / (w*h)),  
    rgb = [r, g, b].join(',');
```




Don't use for evil



Storage

(supersized cookies)

Storage Database



Storage Database



Storage



Storage

window based

sessionStorage

localStorage

Storage

window based

sessionStorage

domain based

localStorage

Storage

```
var ss = sessionStorage;
```

```
ss.setItem( 'key' , 12 );
```

```
alert( ss.getItem( 'key' ) );
```


HTML 5 Demos and Examples

http://html5demos.com/ Google

HTML 5 Demos and Examples

HTML 5 experimentation and demos live hooked together.

Elements Resources Scripts Profiles Databases Search Databases

DATABASES

LOCAL STORAGE

html5demos.com

SESSION STORAGE

html5demos.com

Key	Value
version	5

```
> sessionStorage.setItem('version', 5)
undefined
>
```


Storage

```
var ss = sessionStorage;
```

```
ss.setItem( 'key' , 12 );
```

```
alert( ss.getItem( 'key' ) );
```


Storage

```
var ss = sessionStorage;
```

```
ss.key = 12;
```

```
alert( ss.key );
```


**Values set with
expando syntax & that
overwrite methods:
are removed on reload**

**...but not removed
using setItem**

**// Safari debugger broken:
ss.setItem('key' , 12);**

Storage

- **setItem(key, value)**
- **getItem(key)**
- **removeItem(key)**
- **key(index)**
- **clear()**



Values are strings

Work around: <http://www.json.org/json2.js>



Tweet stream demo using localStorage



Untitled



file:///Users/remy/Sites/test/htdocs/colours.html

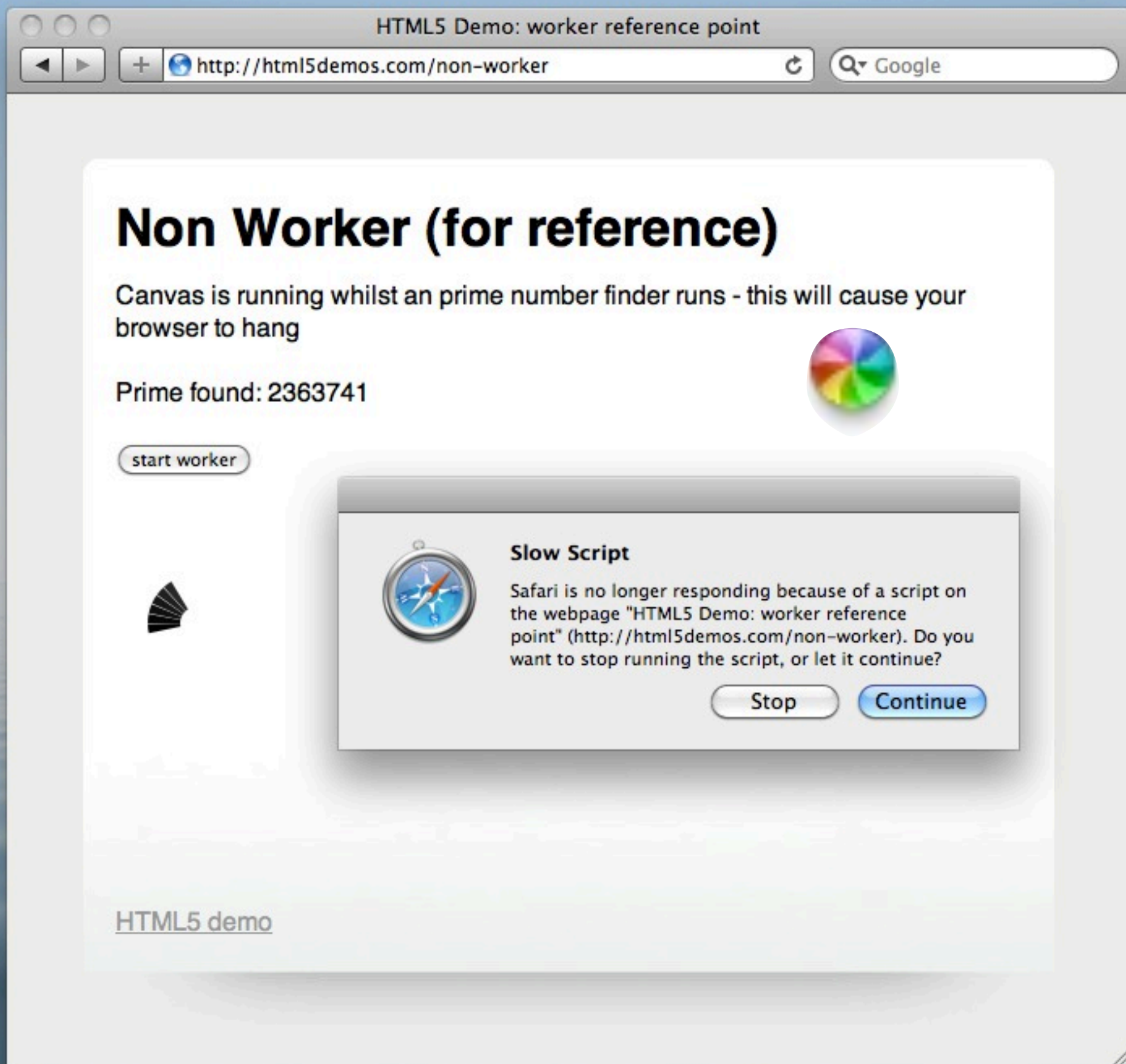


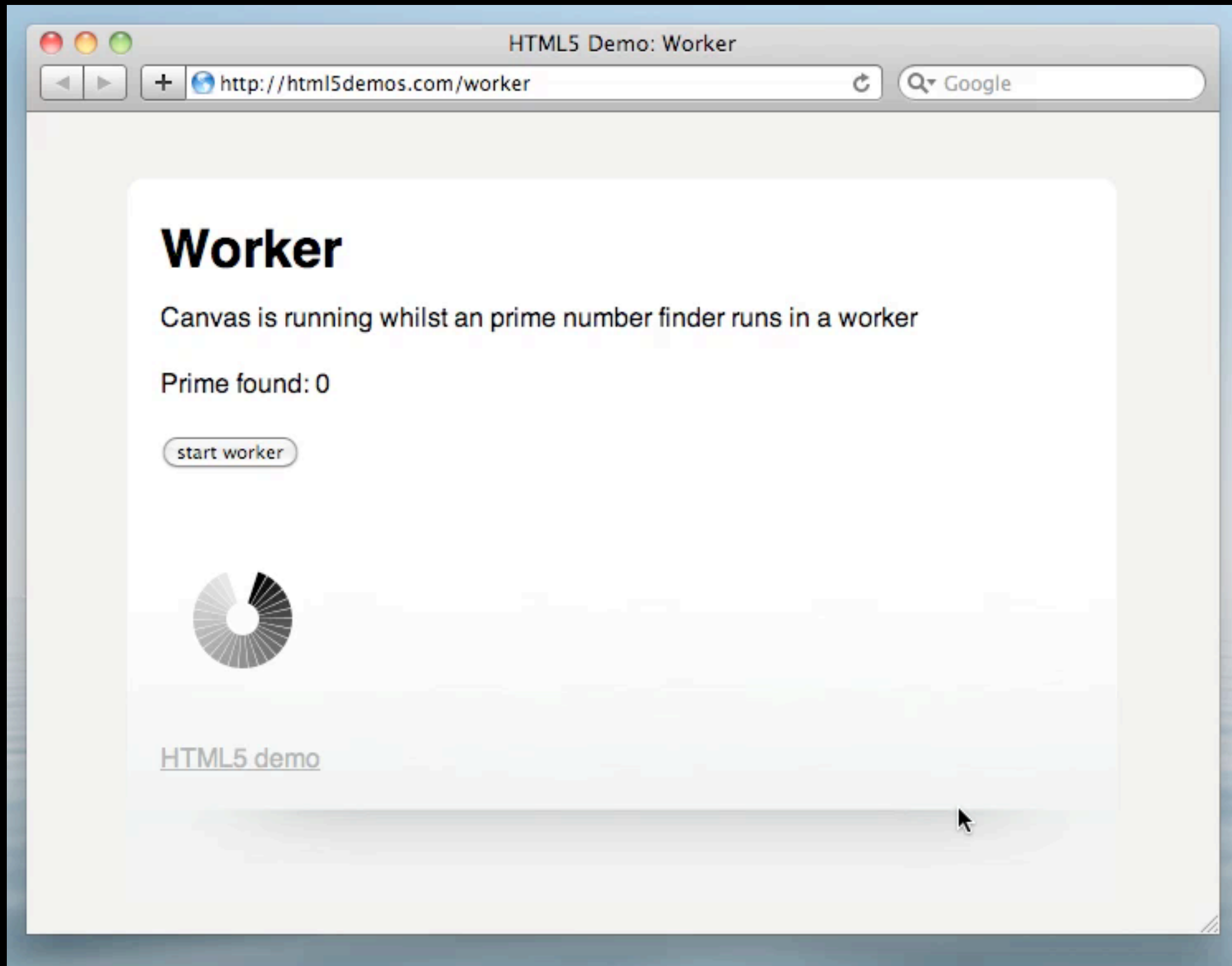
Google

Web Workers



- **"Threads"**
- **Native or via Gears**
- **Sandboxed**
- **Debugging can be tricky**





<http://html5demos.com/worker>

- **importScripts**
- **postMessage**
- **onmessage**
- **onconnect**

app.html

```
var w = new Worker( 'worker.js' );
```

```
w.onmessage = function (event) {  
    alert( "msg: " + event.data );  
};
```

```
w.postMessage( 'run' );
```


app.html

```
var w = new Worker( 'worker.js' );
```

```
w.onmessage = function (event) {  
    alert( "msg: " + event.data );  
};
```

```
w.postMessage( 'run' );
```

app.html

```
var w = new Worker( 'worker.js' );  
  
w.onmessage = function (event) {  
    alert( "msg: " + event.data );  
};  
  
w.postMessage( 'run' );
```

app.html

```
var w = new Worker( 'worker.js' );
```

```
w.onmessage = function (event) {  
    alert( "msg: " + event.data );  
};
```

```
w.postMessage( 'run' );
```


worker.js

```
onmessage = function (event) {  
    if (event.data == 'run') {  
        run();  
    }  
};  
  
function run() {  
    var data = doCrazyNumberCrunch();  
    postMessage(data);  
}
```

worker.js

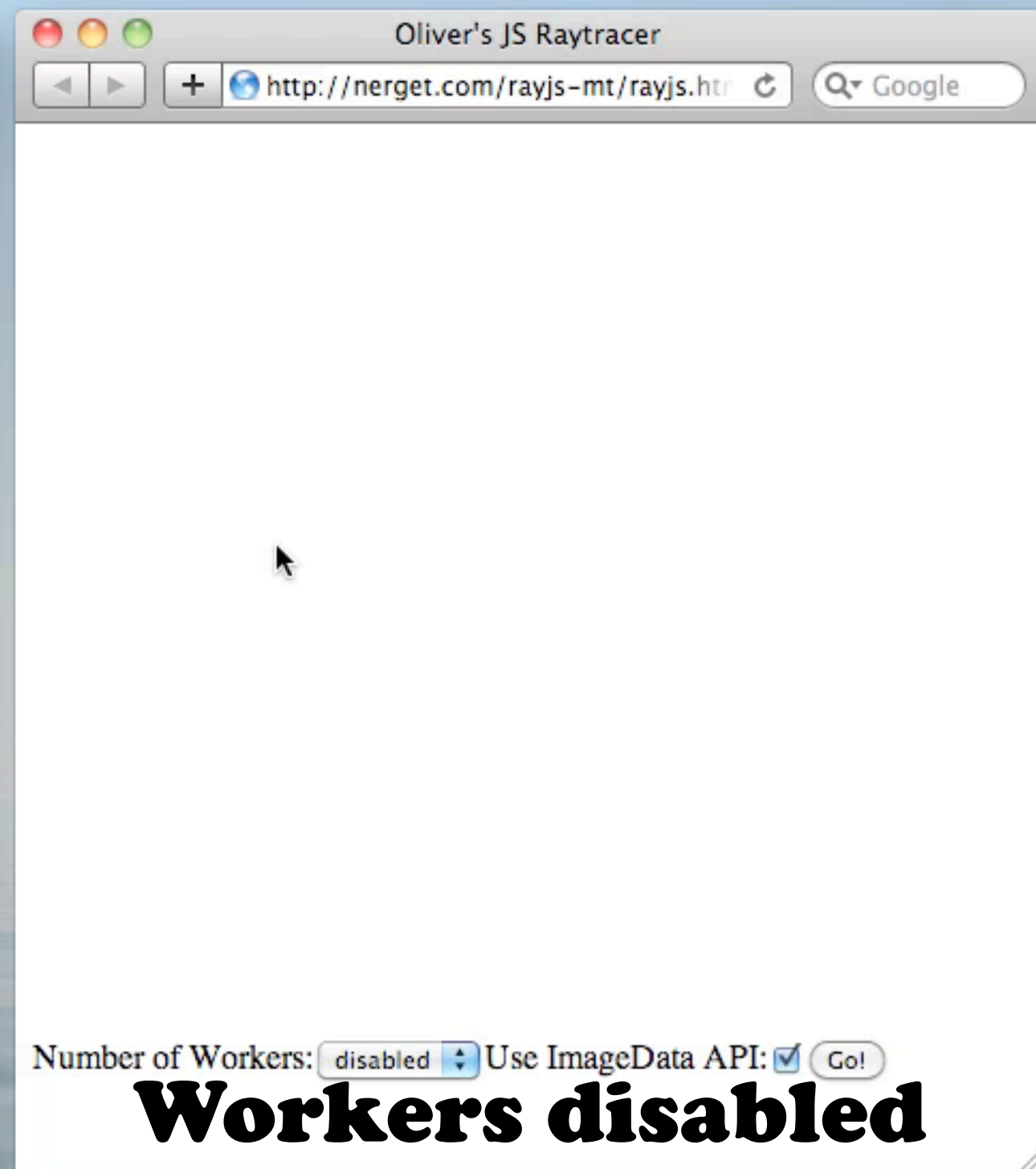
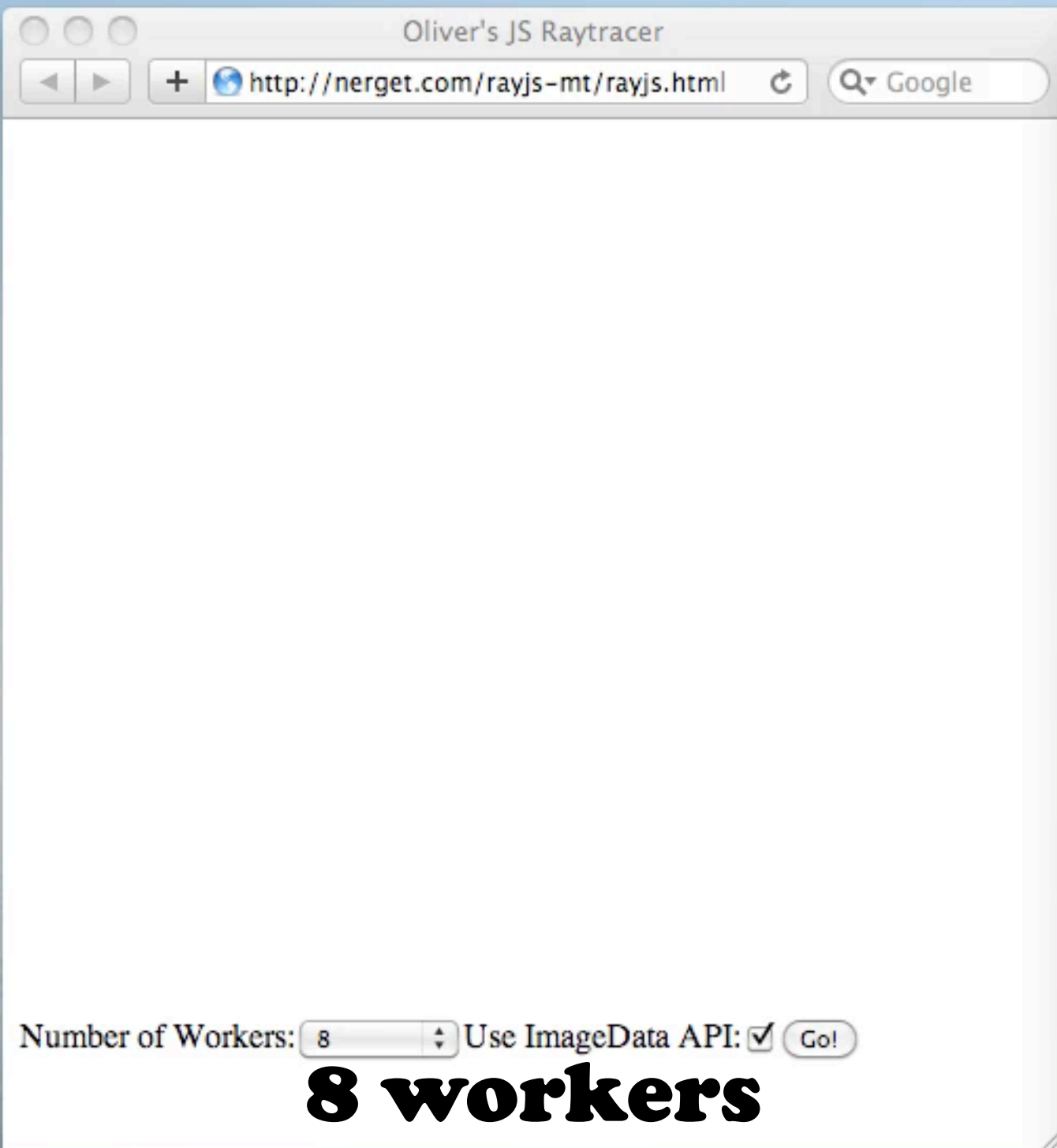
```
onmessage = function (event) {  
    if (event.data == 'run') {  
        run();  
    }  
};  
  
function run() {  
    var data = doCrazyNumberCrunch();  
    postMessage(data);  
}
```

worker.js

```
onmessage = function (event) {  
    if (event.data == 'run') {  
        run();  
    }  
};  
  
function run() {  
    var data = doCrazyNumberCrunch();  
    postMessage(data);  
}
```

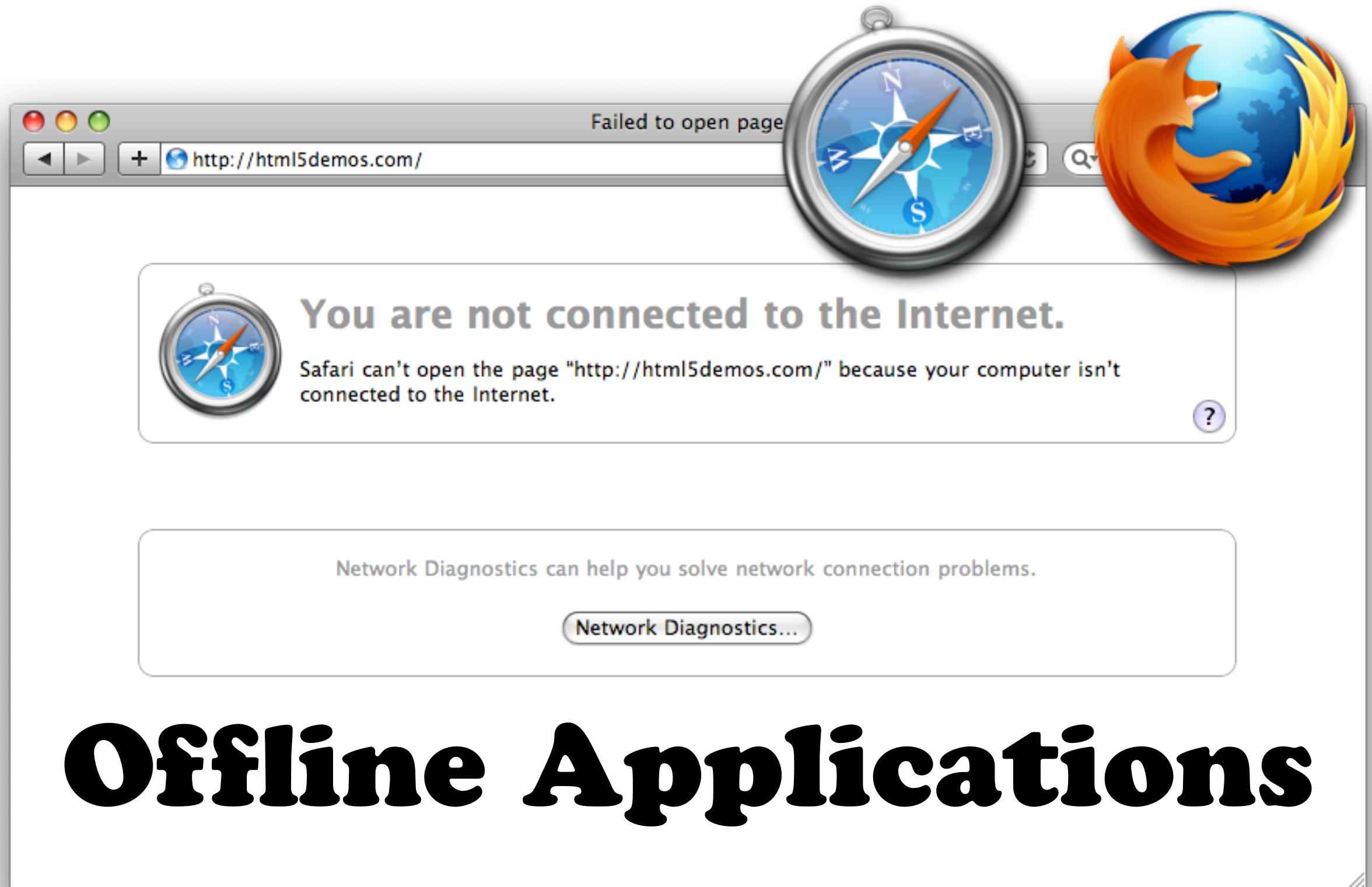

Can dos

- **Spawn more workers**
- **setTimeout/Interval & clear**
- **Access navigator**
- **Error handling onerror**
- **XHR (though responseXML is null)**





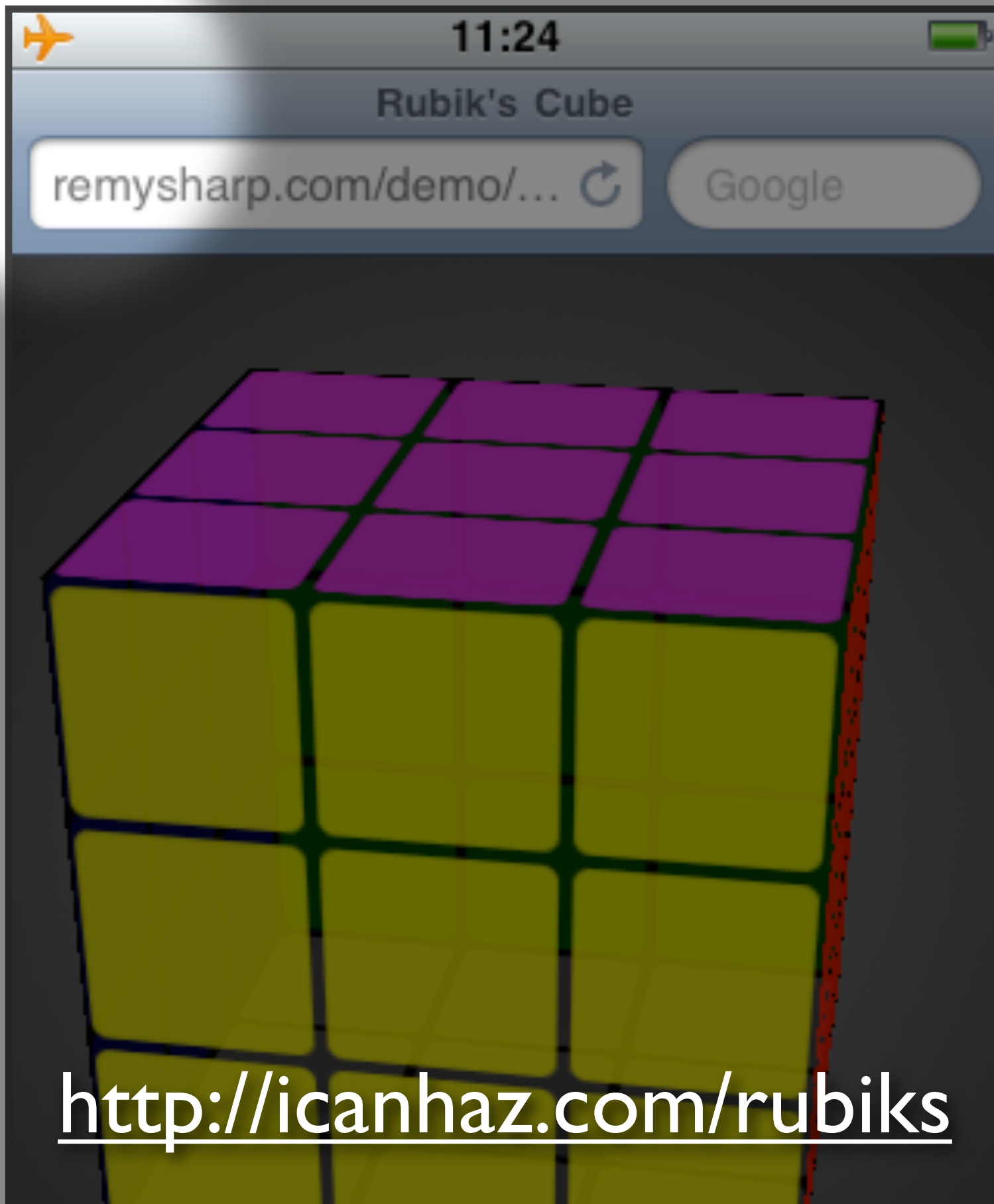
Offline Applications



Offline Applications

Offline Apps

- **Application cache / manifest**
- **Events: offline, online**
- **navigator.onLine property**



<http://icanhaz.com/rubiks>

Using a Manifest

```
<!DOCTYPE html>
```

```
<html manifest="my.manifest">
```

```
<body>
```

```
<!-- my page -->
```

```
</body>
```

```
</html>
```

my.manifest

CACHE MANIFEST

app.html

css/style.css

js/app.js

#version 13

The Manifest

- 1. Serve as text/manifest, by adding to mime.types:**

text/cache-manifest manifest

The Manifest

2. First line must be:

CACHE MANIFEST

The Manifest

- 3. Including page is implicitly included in the cache.**

The Manifest

**4. Two further namespaces:
NETWORK & FALLBACK**

FALLBACK:

/ offline.html

The Manifest

**5. Include some versioning
to cache bust your
manifest**

version 16

The process



Browser: request



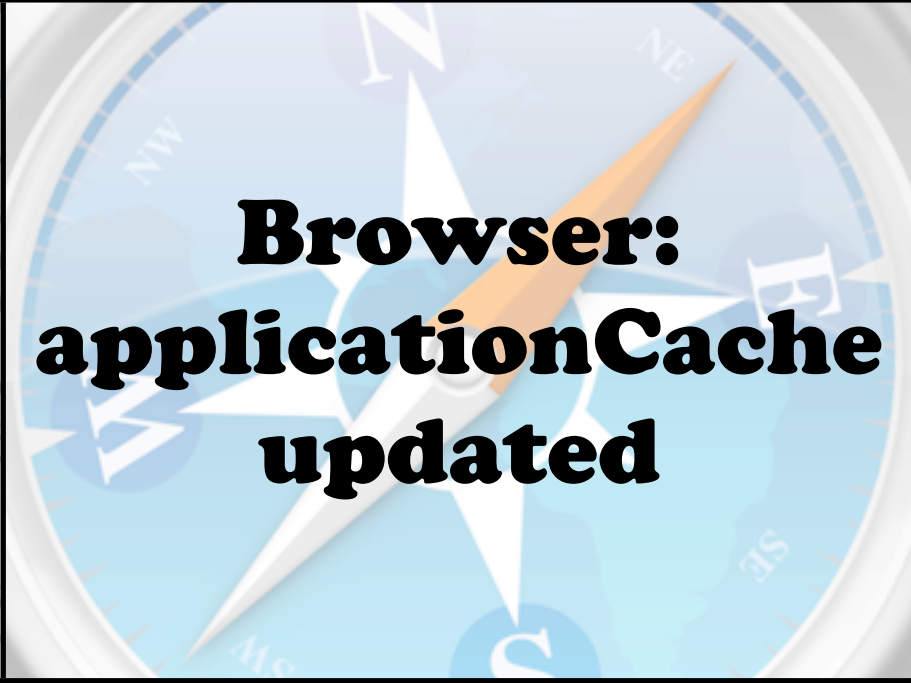
Server: serve all



**Browser: I have a
manifest, cache
assets**



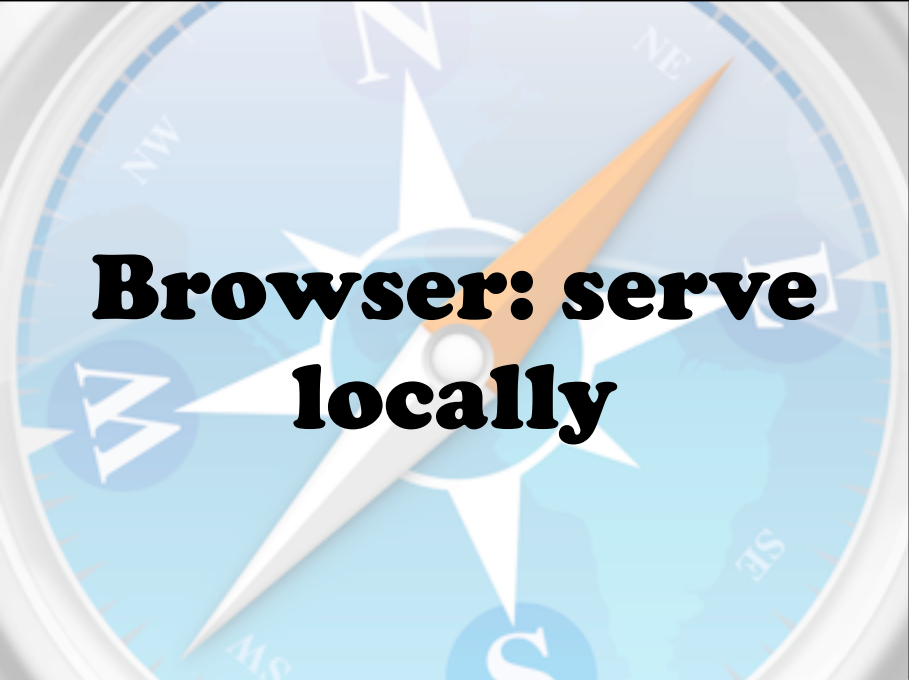
**Server: serve
manifest assets**



**Browser:
applicationCache
updated**



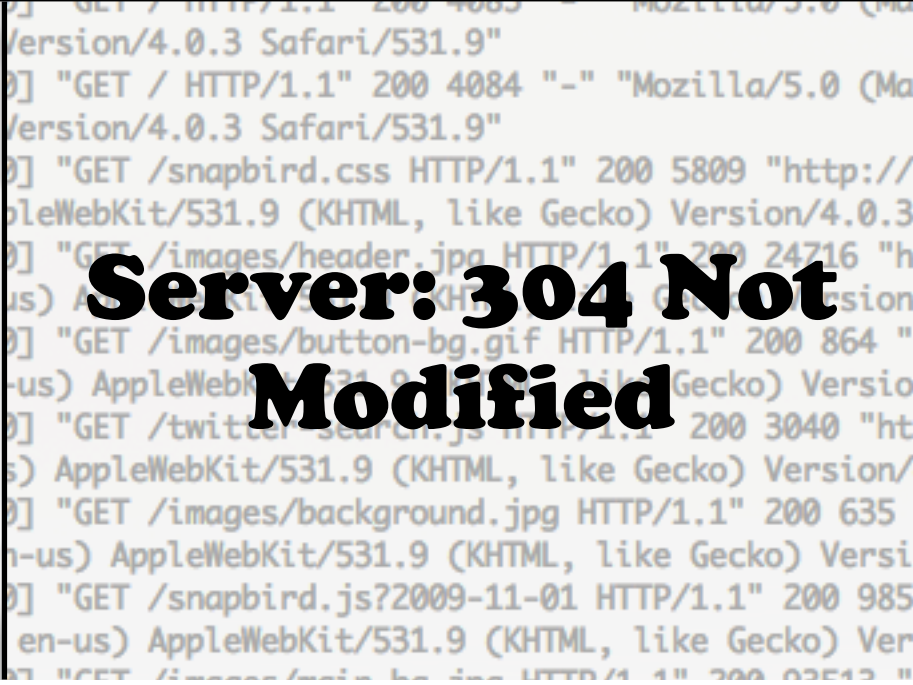
Browser: reload



**Browser: serve
locally**



**Browser: only
request manifest
file**



**Server: 304 Not
Modified**

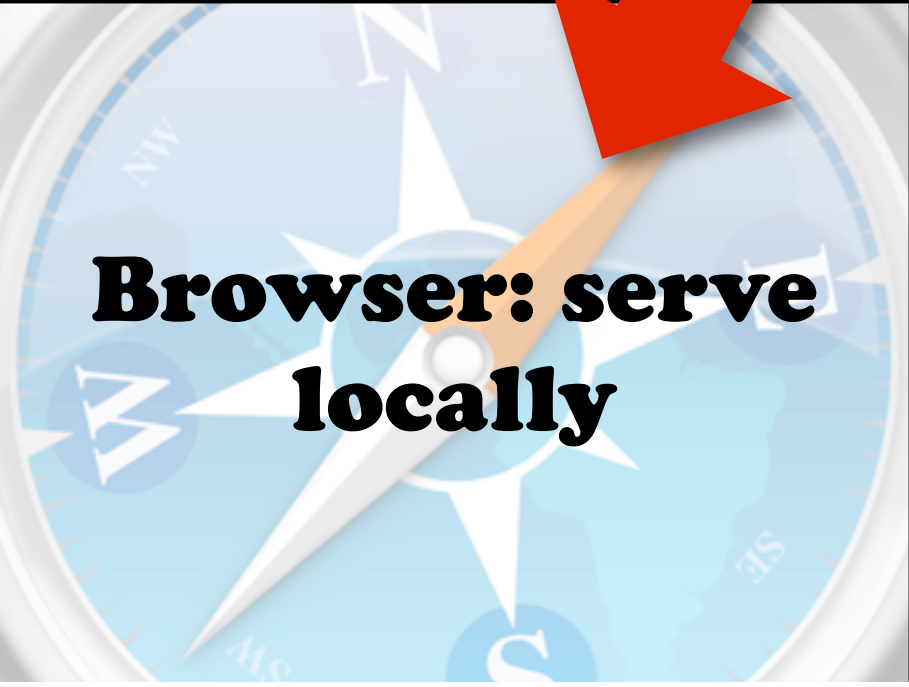
Problem:
Change of content
requires 2 refreshes

**Server: serve all
manifest asset**

**Browser: I have a
manifest, cache
assets**

**Browser:
applicationCache
updated**

Browser: reload



**Browser: serve
locally**

**Browser: only
request manifest
file**

**Server: 304 Not
Modified**

```
applicationCache.onUpdateReady =  
function () {  
    applicationCache.swapCache();  
    notice('reload');  
};
```

```
window.onOnline =  
function () {  
    // fire an update to the cache  
    applicationCache.update();  
};
```

**And a
lot
more...**

**Attributes: data-*, itemProp,
sandbox (on iframes)**

<progress>

<meter>

<datalist>

<ruby>

**Microdata API,
datagrid, XHR2 &
upload progress**

querySelector

**Drag & Drop,
History manager**

ARIA overlap



<http://www.whatwg.org/html5/>

http://tr.im/whatwg_complete

<irc://irc.freenode.net/#whatwg>

Remy Sharp

@rem

Links:

html5demos.com

icnhz.com/rs_codebits



The Dizzy HTML5 cat