

25 years of JavaScript

FOSDEM – JavaScript Devroom
2nd February 2025

by Steven Goodwin

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<https://www.MarquisdeGeek.com>



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Introduction

- As a language
- APIs and connectivity
- Graphics improvements
- Not just web development
- More about the language, less about specifics frameworks

Who am I?

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The Ego Slide

Who am I?

- General-purpose developer (JavaScript and C/C++/Actionscript/Assembler)
 - Games on PC, online, consoles, mobile
 - Cloud infrastructure with AWS and Azure
 - Education Technology
- Author – six books, including “20 GOTO 10”
- Composer and musician
- Magician
- Retro-computing enthusiast
- Open source advocate
 - FOSDEM
 - Keynote speaker

1999

1999 – *In the World*

- The human population of the world surpassed six billion.
- Euro currency introduced on 1st January in 11 countries.
- Great Britain introduced the Minimum Hourly Wage Rate - all adults must be paid at least £3.60 an hour

1999 – In Tech

- No Facebook
- No Slashdot
- No Stack Overflow
- Dotcom bubble (1995-2001)
- No other JS programmers (kinda!)

- *(p.s. Google was 1, Amazon was 4)*

1999 – In Tech

- No Facebook
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- No FOSDEM

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▣ *As a language*

▣ *As a language*

- 1999 – Brand New Writers



```
img.src = 'button_on.gif'
```

▣ *As a language*

- 1999 – Brand New Writers



```
img.src = 'button_on.gif'
```

View page source

Ctrl+U

Inspect

▣ *As a language*

- 1999 – Brand New Writers



```
img.src = 'button_on.gif'
```

- 1999 – Blue Dust
 - Retro hacking world
 - FlipGrid game
 - Photo album
 - Blog

📖 *Retro hacking world*

- The golden age of hacking and phreaking

The screenshot shows the homepage of the 'retro Hacking wörld' website. At the top left is a globe icon, and at the top right is a small portrait of a man. The title 'retro Hacking wörld' is prominently displayed in a stylized font. Below the title, the date '7/3/2019' is shown. A navigation menu includes links for 'HACK Fake', 'PHREAK E-Mail', 'LINKS', 'ABOUT', 'PASSWORD SHADOW', 'WEB HACKS', and 'KEY CODES'. The main content area features a welcome message, a 'Jargon File Entry Of The Week' section, and definitions for 'hack' and 'phreaking'. A footer note states: 'This site was conceived, designed, coded, drawn, produced, edited, re-editable and generally fussed over by us two!'.

Issue #1

7/3/2019

Welcome to the first (and possibly only!) issue of *Retro Hacking World*. It's an e-zine for the computer underground written as if it's still 1985!

Jargon File Entry Of The Week

BUCKY BITS (primarily Stanford) *noun*> The bits produced by the CTRL and META shift keys on a Stanford (or Knight) keyboard. Rumor has it that the idea for extra bits for characters came from Niklaus Wirth, and that his nick- name was "Bucky."

hack /hæk/ *noun* 1. Originally a quick job that produces what is needed, but not well. 2. The result of that job.

phreaking /freak'ing/ *noun* [from `phone phreak']

1. The art and science of cracking the phone network to make free long-distance calls, for example. 2. By extension, security-cracking in any other context (especially, but not exclusively, on communications networks)

This site was conceived, designed, coded, drawn, produced, edited, re-editable and generally fussed over by us two!

<https://marquisdegeek.com/data/rhw/default.htm>

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📖 *Retro hacking world*

- The golden age of hacking and phreaking

Issue #1

7/3/1985

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hack /hæk/ *verb* 1. Originally a quick job that

phreak

This site was conceived, created and re-editable and...

```
<map name="LINKS">
  <area coords=" 75,232, 94,325" onclick="javascript:LinkClick(0)">
  <area coords=" 94,232,113,325" onclick="javascript:LinkClick(1)">
  <area coords="113,232,132,325" onclick="javascript:LinkClick(2)">
  <area coords="132,232,151,325" onclick="javascript:LinkClick(3)">
  <area coords="151,232,170,325" onclick="javascript:LinkClick(4)">
  <area coords="406, 97,430,237" onclick="javascript:EmailClick(0)">
  <area coords="413, 0,445, 40" onclick="javascript:NextClick()">
  <area coords="413, 40,445, 80" onclick="javascript:PrevClick()">
```

<https://marquisdegeek.com/data/rhw/default.htm>

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▣ *Retro hacking world*

```
var g_Letters = new String("_ABCDEFGHIJKLMNOPQRSTUVWXYZ");
var g_imgFont = new Array();

sz=g_Letters.length;
for(i=0;i<sz;i++)
{
    fn = szBrowser+"/"+
        g_Letters.charAt(i).toLowerCase()+".gif";
    g_imgFont[i] = new Image();
    g_imgFont[i].src = fn;
}
```


▣ *Retro hacking world*

```
g_szScrollText = g_szScrollText.substring(1) +
    g_szScrollText.substring(0,1);

c = 0;
for(i=1;i<=g_ScrollSize;i++)
{
    letter = g_szScrollText.charAt(c);
    str = "document.SCROLL"+i+".src = "
    if (g_Letters.indexOf(letter) == -1)
        str = str + "g_imgNull.src;";
    else
        str = str + "g_imgFont[g_Letters.indexOf(letter)].src;";
    eval(str);
    c++;
}
```

▣ *Debugging*

▣ *Debugging*

```
str = str + "g_imgFont[g_Letters.indexOf(letter)].src;";  
  
alert(str);
```

▣ *Debugging*

```
str = str + "g_imgFont[g_Letters.indexOf(letter)].src;";  
document.getElementById("DEBUG_P").innerHTML += str;
```

APIs and connectivity

- (and extensibility)

Toolbar applets

- Regexes

```
<a href='javascript:(  
function()  
{  
var new_loc;  
  
new_loc = location.href.replace(/^.*?(?:\V)?[^\V]+?)\.\co\.\uk/i,"$1.com");  
  
if (new_loc != location.href) {  
location.href = new_loc;  
} else {  
new_loc = location.href.replace(/^.*?(?:\V)?[^\V]?)\.\com/i,"$1.co.uk");  
if (new_loc != location.href) {  
location.href = new_loc;  
}  
}  
}  
)();'>com <-> co.uk</a>
```

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Interacting with other websites

- YouTube API
 - Playback video in the browser
 - Control video speed and playback pointer
 - QTE games



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FacebookJS

- We're up to 2008, now!

FacebookJS

- I had learned:

```
function renderTimer(min, sec) {
  document.getElementById("t0").src =
    "$url/" + (Math.floor(min/10)) + ".png";

  document.getElementById("t1").src =
    "$url/" + (min%10) + ".png";

  document.getElementById("t2").src =
    "$url/" + (Math.floor(sec/10)) + ".png";

  document.getElementById("t3").src =
    "$url/" + (sec%10) + ".png";
}
```

FacebookJS

- I had to re-learn:

```
function renderTimer(min, sec) {
  document.getElementById("t0").
    setSrc("$url/" + (Math.floor(min/10)) + ".png");

  document.getElementById("t1").
    setSrc("$url/" + (min%10) + ".png");

  document.getElementById("t2").
    setSrc("$url/" + (Math.floor(sec/10)) + ".png");

  document.getElementById("t3").
    setSrc("$url/" + (sec%10) + ".png");
}
```

See also: *FBML*

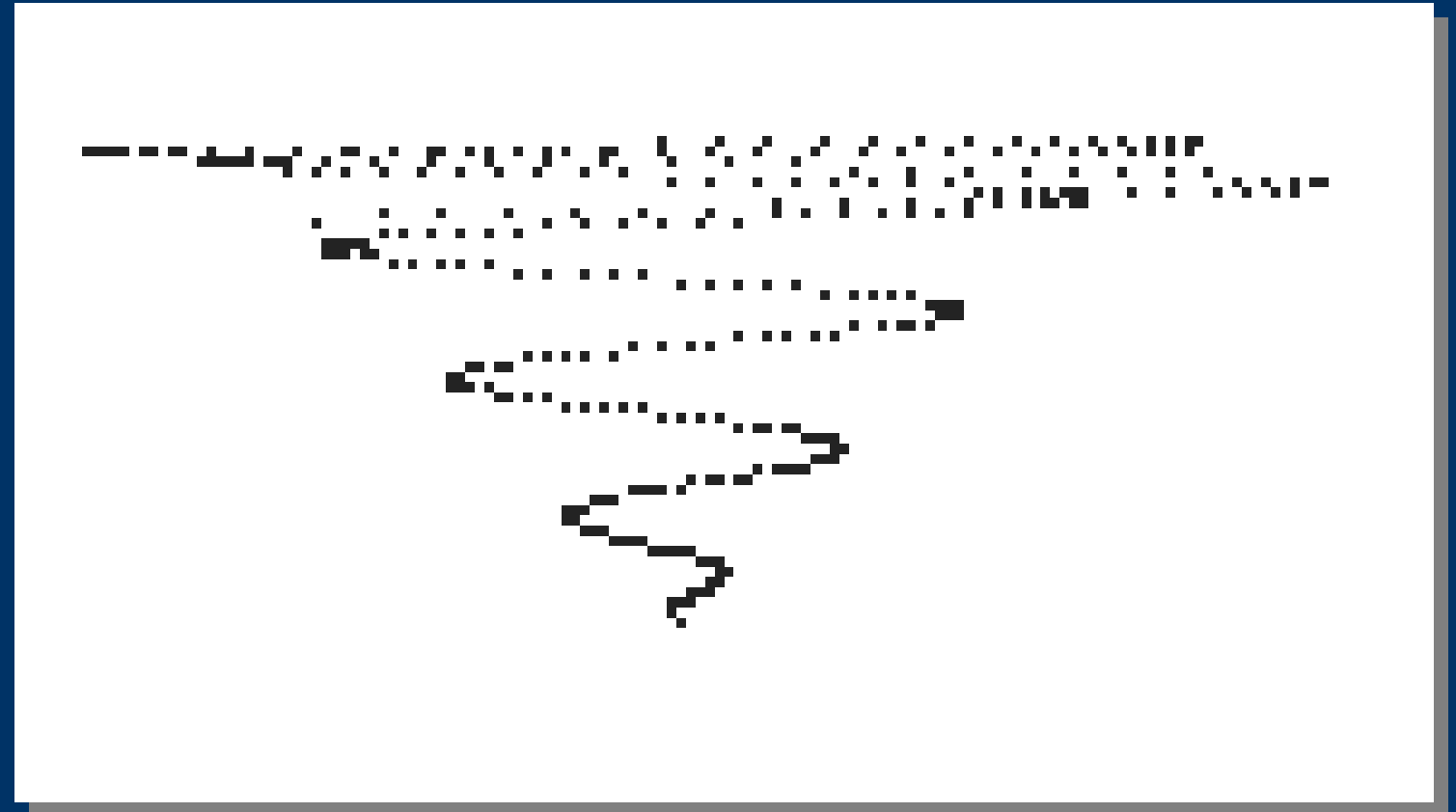
```
$fbml .= '<fb:if-can-see uid="' . $post['from'] . '"'>' .  
  '<div style="clear: both; padding: 3px;">' .  
  '<fb:profile-pic style="float: left;" uid="' .  
    $post['from'] . '"' size="square"/>' .  
  
  '<fb:name uid="' . $post['from'] .  
    '"' capitalize="true"/> trampled on <fb:name uid="' .  
$post['to'] . '"'>' .  
  ' at <fb:time t="' . $post['time'] . '"'>.' .  
  
'<br/>' .  
render_step_link($post['from']) . '<br/>' .  
'</div></fb:if-can-see>';
```

Graphics

Spiral, 2006

- DOM manipulation
- 1px images

```
function update() {  
  var i=0;  
  
  theta+=5/360;  
  
  for(;i<dots.length;++i) {  
    var x = 180 + i/5 * Math.cos(theta+i/10)  
    var y = 180 + i/5 * Math.sin(theta+i/200)  
    dots[i].style.marginLeft = Math.floor(x);  
    dots[i].style.marginTop = Math.floor(y);  
  }  
  
  setTimeout(update, 1);  
}
```

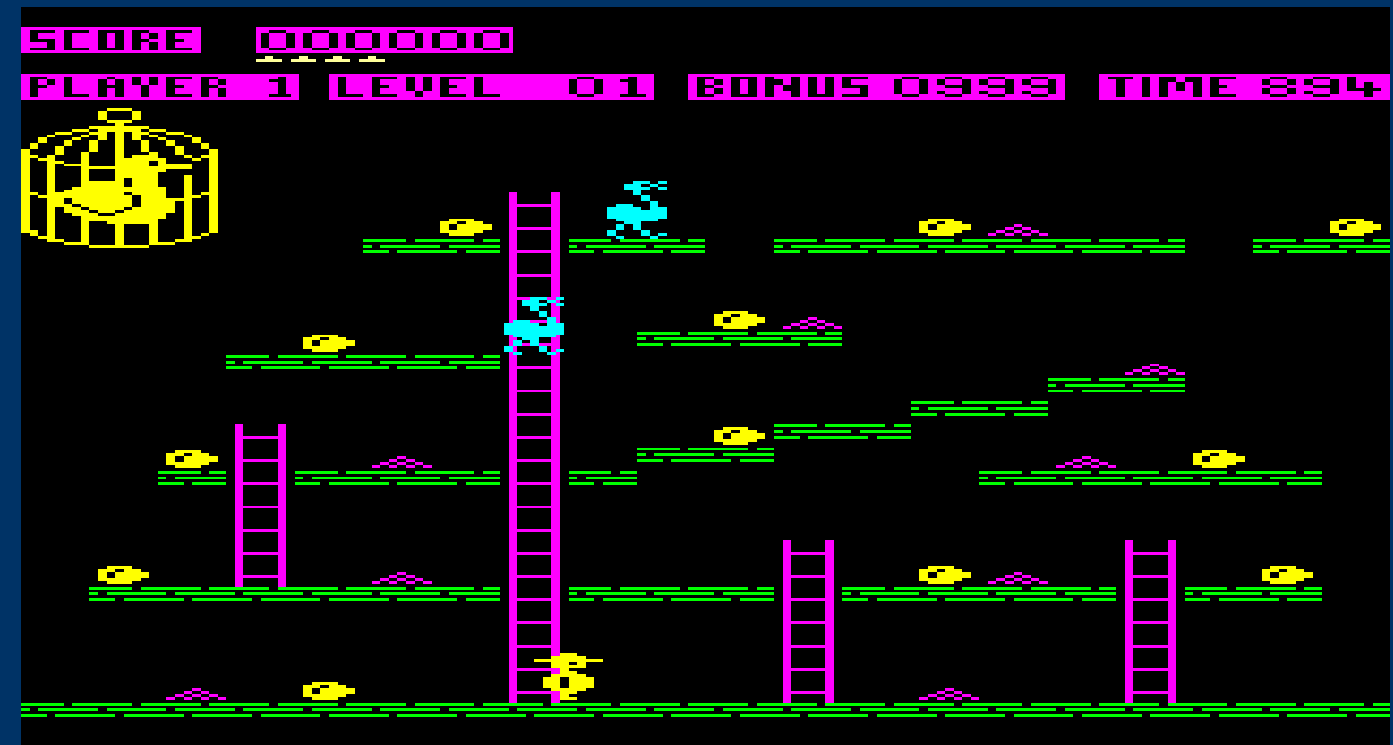


<https://www.dwitter.net/d/33040>

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DOM Games

- SGX Engine
- Chuckie Egg (version 1)



<https://sgxengine.com/examples/chuckie/>

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DOM Games

- Teeth defender
 - Using OO ideas
 - Bind/call/apply



<https://sgxengine.com/examples/teethdefender/html5/>

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DOM Games

```
function Missile(id) {
  var timecum;
  var size;

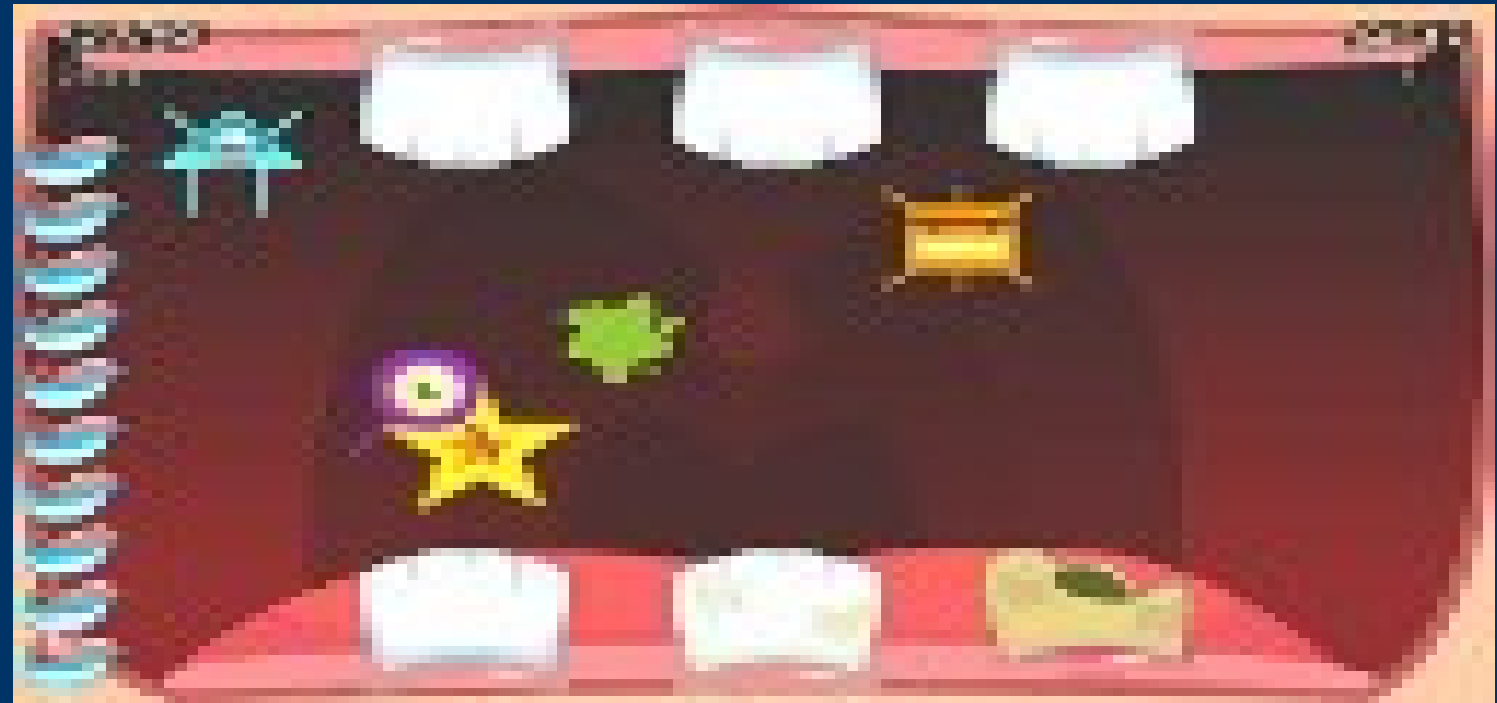
  this.maxsize = 80;
  this.active = false;
  this.obj = new GameObject(id);
  this.obj.setImage(gfxBang);
}

Missile.prototype.getRect = function() {
  return this.obj.getRect();
}

Missile.prototype.draw = function() {
  if (this.obj) {
    this.obj.draw();
  }
}
```


DOM Games

- Classes, with faked inheritance
 - Using OO ideas
 - Bind/call/apply



DOM Games

```
// Usage: Inheritance_Manager.extend(newCls, parentCls);  
// To be placed after both ctor  
// Also, to call the parent ctor:  
//   newClass.baseConstructor.call(this, params);  
Inheritance_Manager = {};
```

```
Inheritance_Manager.extend = function(subCls, baseCls) {  
  function inheritance() { }  
  inheritance.prototype = baseClass.prototype;  
  subClass.prototype = new inheritance();  
  subClass.prototype.constructor = subClass;  
  subClass.baseConstructor = baseClass;  
  subClass.superClass = baseClass.prototype;  
}
```

```
sgxVector2f = function(x,y) { ... }
```

```
Inheritance_Manager.extend(sgxVector2f, sgxPoint2f);
```

Canvas

- Hooray!

Canvas - Reading

- Prepare a canvas

```
tempCanvas_ = document.createElement("canvas");  
tempContext_ = tempCanvas_.getContext("2d");  
tempContext_.drawImage(this.image, 0, 0);
```

- Read the bitmap

```
imageData_ = tempContext_.getImageData(0, 0,  
    this.image.width, this.image.height);
```

- Process it

```
var pBitmap = imageData_.data;  
var offset = (x + y*this.iWidth_) * 4;  
var r = pBitmap_[offset+0];  
var g = pBitmap_[offset+1];  
var b = pBitmap_[offset+2];  
var a = pBitmap_[offset+3];
```

- Put it back

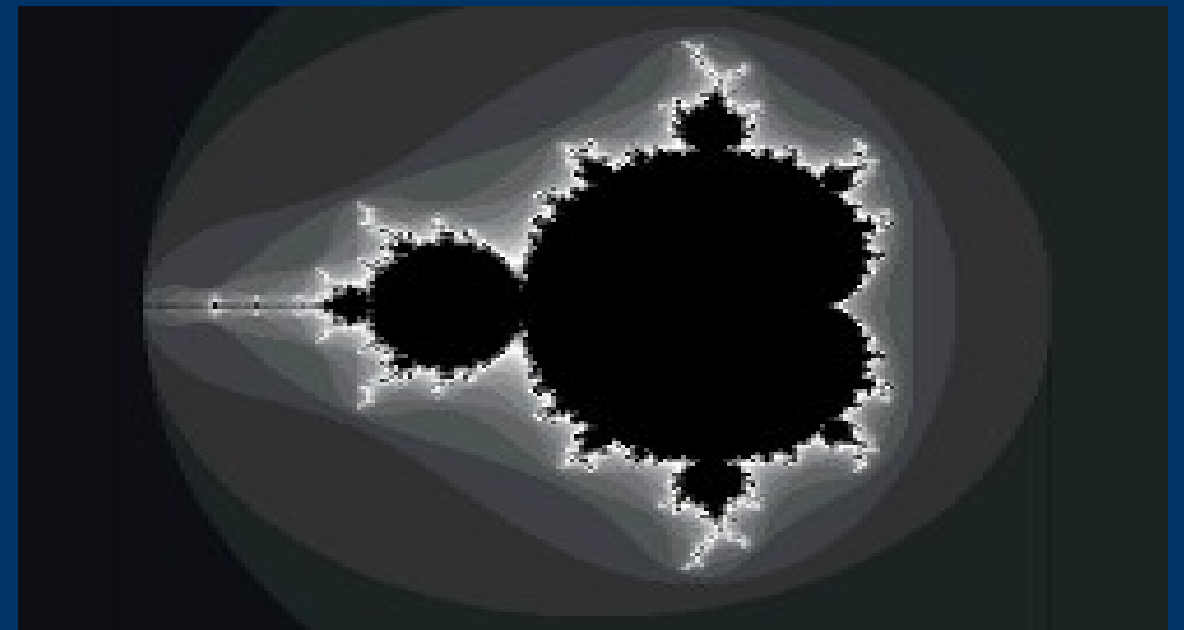
```
tempContext_.putImageData(imageData.imageData_, 0, 0);
```

Mandelbrot

- Per-pixel manipulation (also used in emulators)
- Manual optimisation
- Google Closure
- Revisited with webworkers



<https://em.ulat.es/machines/SinclairZXSpectrum/#>



<https://sgxengine.com/examples/mandelbrot/html5/mandel.htm>

LEGO GTA

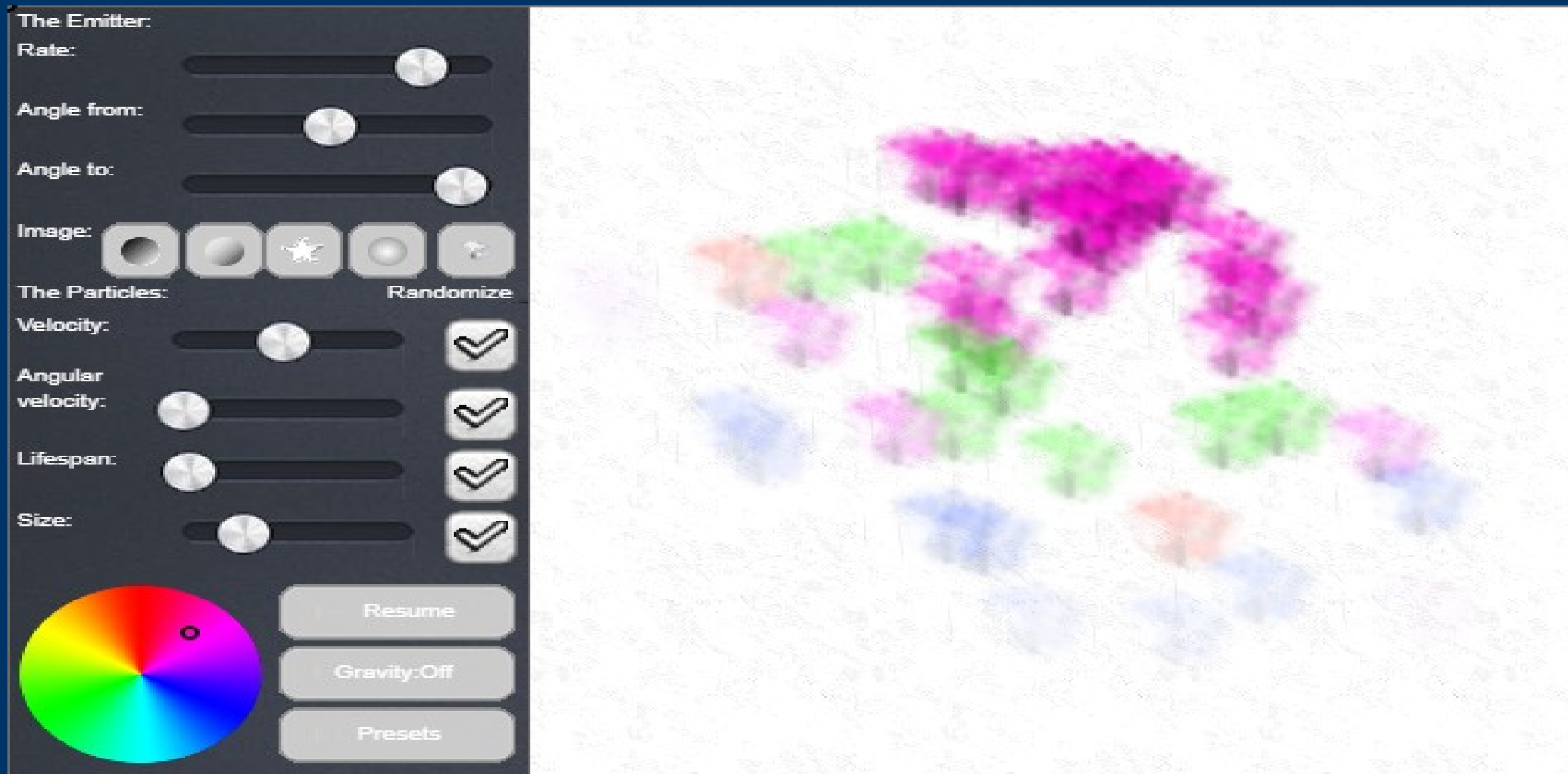
- 3D graphics, without 3D (part 1)
- Scanline rendering
- Transparency
- Darken shadows



<https://sgxengine.com/examples//carmodel/html5/>

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Particle System



<https://sgxengine.com/examples//particles/html5/>

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3D engines without WebGL (part 2)

- OpenGL API
- Affine xforms

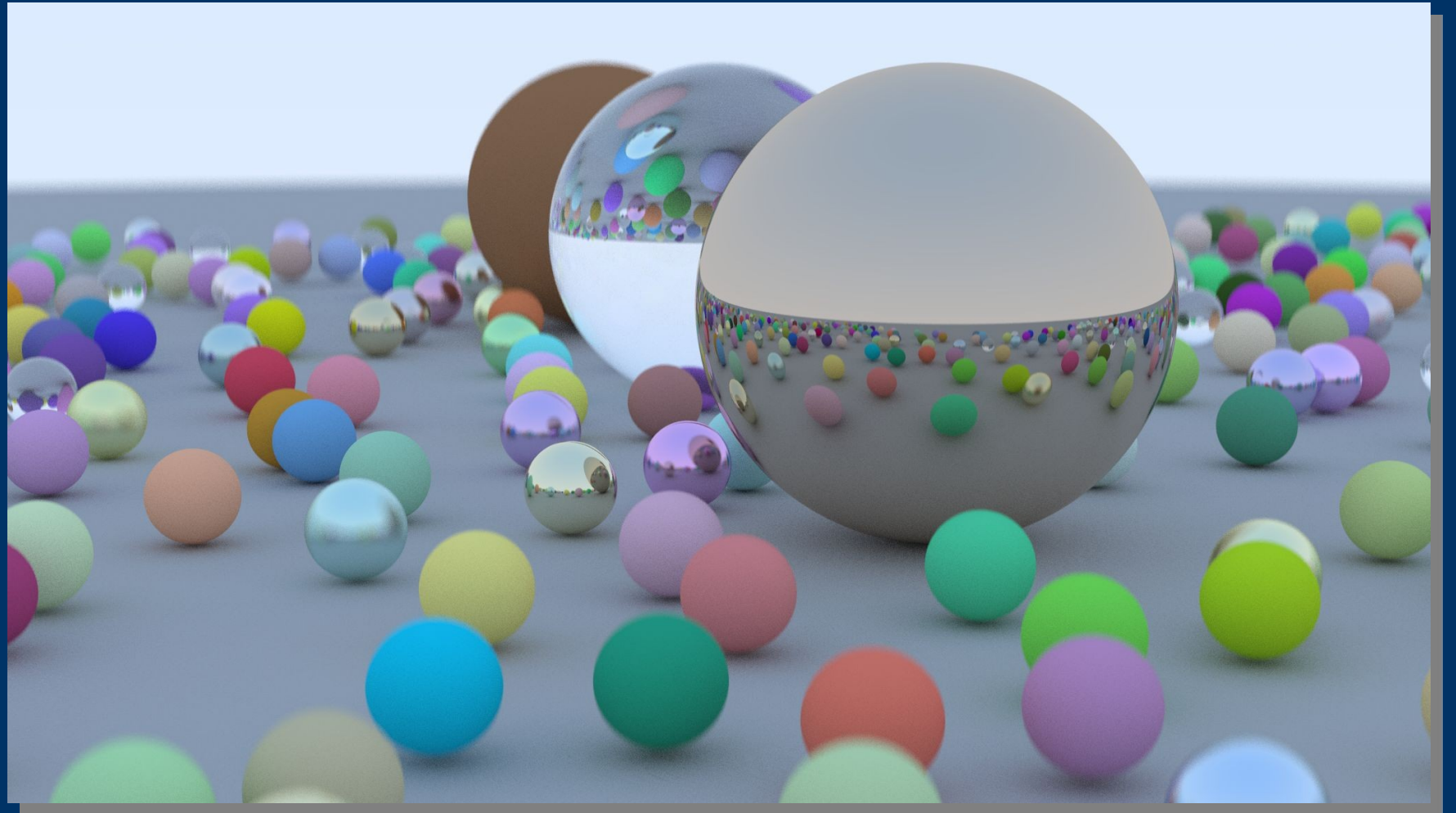


<https://sgxengine.com/gl4js/>

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3D engines without WebGL (part 3)

- Raytracing



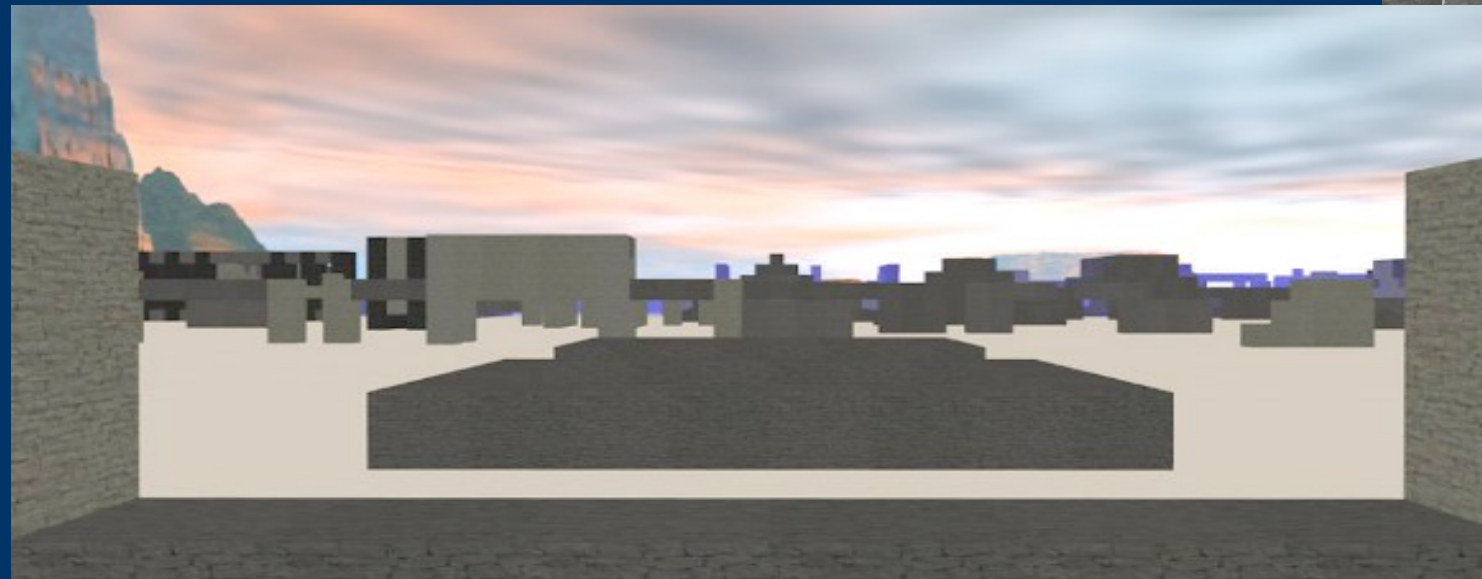
https://marquisdegeek.github.io/six_hour_raytracer/

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3D engines with WebGL

- Using three.js
- VR
- Learn when to give up
- It moves the problem

<https://marquisdegeek.com/vrphotowall/index.html?do=castle>



<https://marquisdegeek.com/antescher/>

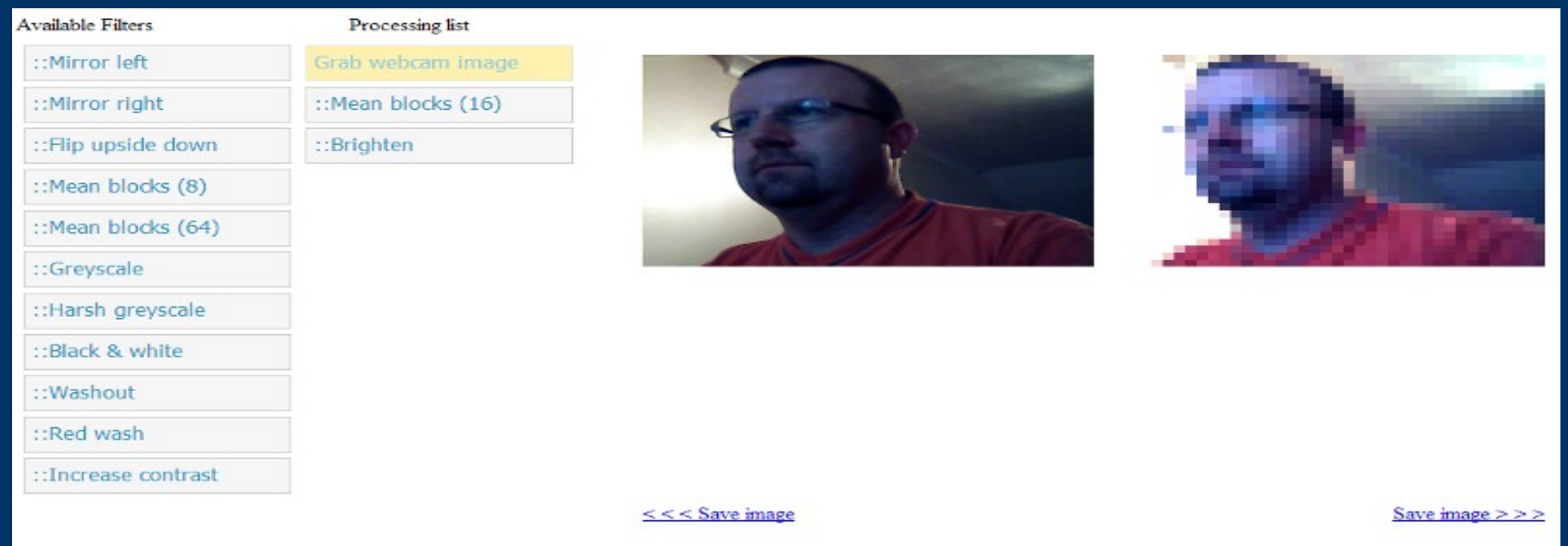
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▣ *Outside the web*

Accessing WebCams

- Use GetUserMedia to grab an image
- Manipulate the pixels on the canvas
- Render to another canvas

<https://marquisdegeek.com/supercamtoy/>

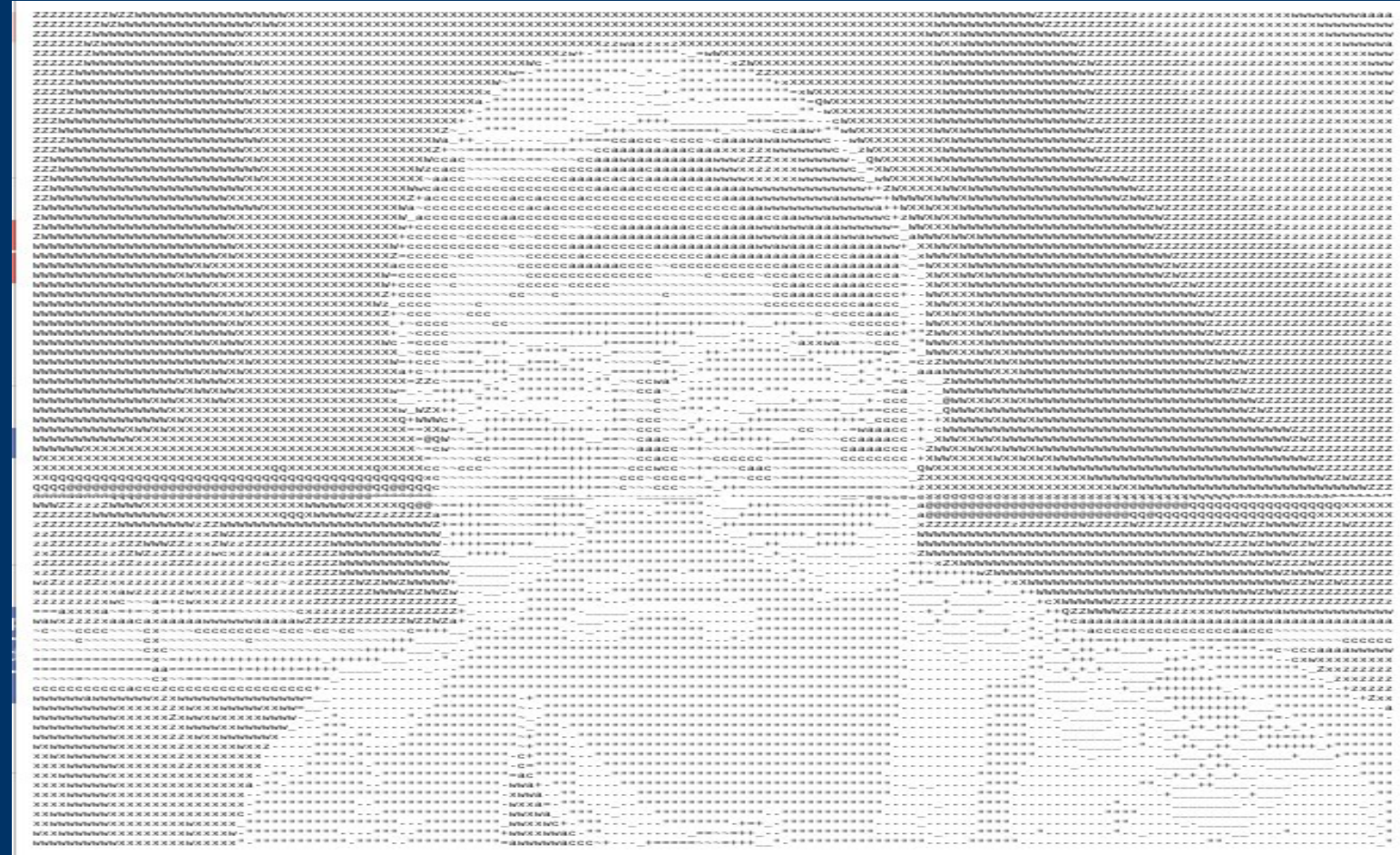


The screenshot shows a web application interface for processing webcam images. It features two columns of buttons: 'Available Filters' and 'Processing list'. The 'Available Filters' column includes buttons for 'Mirror left', 'Mirror right', 'Flip upside down', 'Mean blocks (8)', 'Mean blocks (64)', 'Greyscale', 'Harsh greyscale', 'Black & white', 'Washout', 'Red wash', and 'Increase contrast'. The 'Processing list' column includes buttons for 'Grab webcam image', 'Mean blocks (16)', and 'Brighten'. Below the buttons are two image thumbnails: the original webcam image on the left and the processed image on the right. At the bottom, there are two 'Save image' buttons with navigation arrows.

Available Filters	Processing list
::Mirror left	Grab webcam image
::Mirror right	::Mean blocks (16)
::Flip upside down	::Brighten
::Mean blocks (8)	
::Mean blocks (64)	
::Greyscale	
::Harsh greyscale	
::Black & white	
::Washout	
::Red wash	
::Increase contrast	

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ASCII Cam



marquisdegeek.com/asciicam/

```
var bitmap = imageData.pBitmap_;  
var grades = ".,\"\\- _+=~cawxzZWXQ@@";  
for(var y=0;y<imageData.iHeight_;++y) {  
  for(var x=0;x<imageData.iWidth_;++x) {  
    grey = (bitmap[index] + bitmap[index+1] + bitmap[index+2] + 255) >> 2;  
    ascii += grades.substr((grey * grades.length) / 255, 1);  
    index += 4;  
  }  
  ascii += '\n';  
}
```

▣ *Accessing WebCams*

- Use GetUserMedia to grab an image
- Manipulate the pixels on the canvas
- Render to another canvas

- What else?
 - a) Pair with YouTube?
 - b) Transmit it peer to peer?

One step to WebRTC

- What is WebRTC?
 - Real-time communication
 - PeerConnection (i.e. peer-to-peer, no server)
 - Signalling (via a, er, server!?!?)
 - Data **sockets**
 - Comms analysis

WebSockets

- Real-time data
- Leap Motion + Swarm + XR

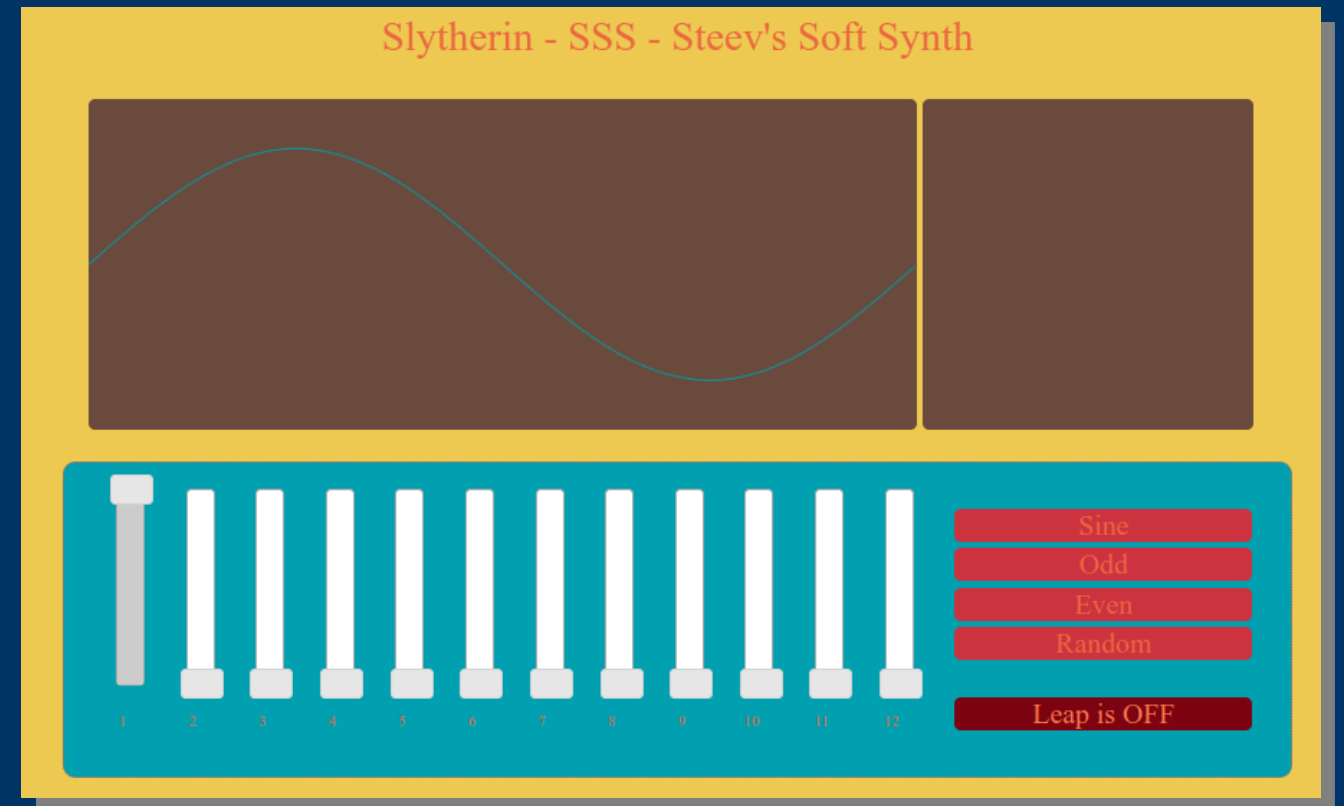


<https://marquisdegeek.com/swarm/index.htm#>

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WebAudio

- Writing audio data like pixel data
- Soft synths
- Sound effects



<https://marquisdegeek.com/slytherin/>

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MIDI

- Original C-based MIDI library, from 1998

<https://github.com/MarquisdeGeek/midilib>

- Ported to JS, 2016

<https://github.com/MarquisdeGeek/sml>

- Creating Symphony No. 1

<https://nodemusic.bandcamp.com/album/symphony-no-1-in-c-minor>

WebMIDI

- Creating Symphony No. 1
- Original C-based MIDI library
- MIDI sequencers + processing units

WebMIDI

- MIDI sequencers
- Complete soft synths
- Processing units
- Live performance
- “In C” – virtual live musicians

<https://github.com/MarquisdeGeek/midi-live-performer>

Speech recognition

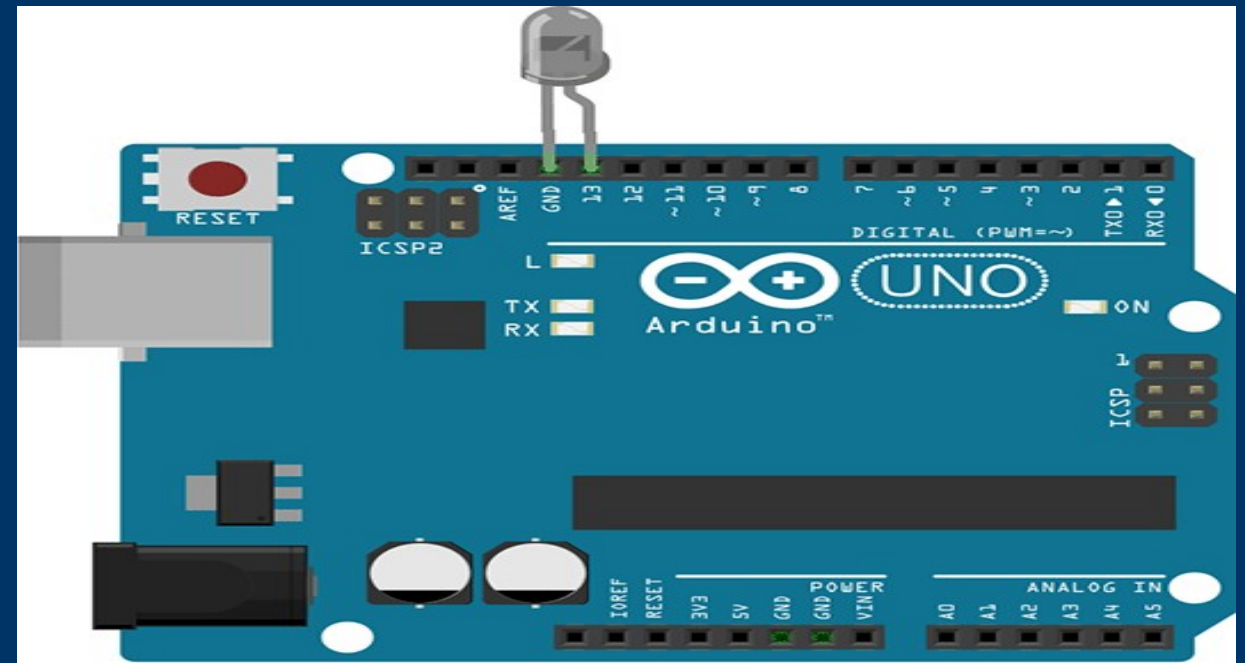
- It's 4 lines...
 - `const recognition = new window.SpeechRecognition();`
 - `recognition.onresult = (e) => {`
 - `const speechToText = e.results[0][0].transcript;`
 - `}`
 - `recognition.start();`
- ...in Chrome (Edge and Firefox)
- Also with `SpeechGrammarList`

Alexa – it's all just JavaScript

- How skills work
 - Create a list of intents (e.g. 'get item')
 - Create utterances for each intent
 - Describe the slots
- Alexa processes this skill, and calls a JS Lambda
- You return the `<speech>` text

API - Johnny-Five

- Talking to Arduino
- Controller JS
 - What is Arduino?
 - How does it connect?
 - Why is this cool?



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Frameworks

- 2004 – Gmail
- 2006 – jQuery
- 2010 – Backbone
- 2010 – Angular
- 2012 – Meteor
- 2013 – React (FLOSS version)
- 2014 – Vue



Conclusions

- It's no longer a language
 - Or a library
 - Or framework
- It's no longer software
 - On the client
 - On the server
 - In the cloud
- It's an ecosystem

Any Questions?

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FOSDEM Scorecard:

Attended: 25

Diaries written: 20

Talks given: 24 (on 22 different topics)

Devroom Diversity: 12



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