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Lecture 27

HTML5 Drawing Canvas and Video

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Course logo spider web photograph from [Morguefile](#) openstock photograph by Gabor Karpati, Hungary.

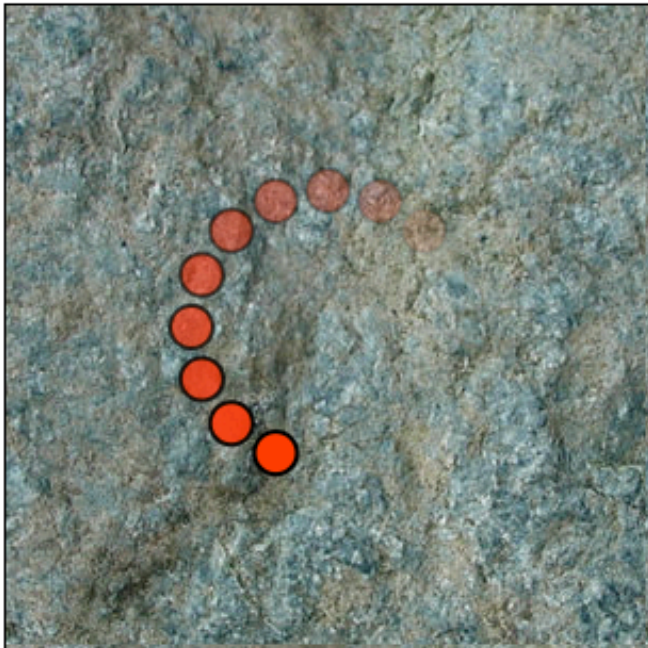
The Canvas

- A general purpose drawing canvas
- Many of the standard capabilities:
 - Curves, filled solids, text, effects, ...
- Learning curve probably depends,
 - Conventions look standard to one familiar with multiple graphic APIs.
- Brief introduction here through a redo of the animated spinny.

CT 310 PHP Lec 25 Example 01

Spinny in JavaScript and HTML5.

This is an example of using timed events to set an animation in motion.

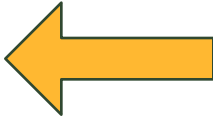


Outwardly
the Same.
Inwardly
very
different!

PHP/HTML Code

➤ Not much happening here ...

```
5 <link href="spinny5.css" rel="stylesheet" type="text/css" />
6 <script type="text/javascript" src="spinny5.js"></script>
7 <script type="text/javascript">
8     window.onload = init;
9 </script>
10 </head>
11 <?php include 'ct310lec25Header.php';?>
12 <div id="contents">
13 <h2 style="margin-left:auto;margin-right:auto">Spinny in JavaScript and HTML5.</h2>
14 <p>
15 This is an example of using timed events to set an animation in motion.
16 </p>
17 <canvas id="stones" width="300" height="300"></canvas>
18 </div>
19 <!-- end of the page contents -->
```




The of a canvas a blank (what should we call it? :-)
where drawing will later take place.

CSS Code

- Not much here either
- but see background ...

```
1
2 canvas#stones {
3     background-image: url('stoneBackground.png');
4     padding : 1px;
5     border: 1px solid #000000;
6     padding: 1px;
7 }
```



In case we never discussed it before, placing an image into a part of a page using CSS is very different from using an HTML `img` tag.

Spinny.js – Setup/Globals.

```
var i, dots, row, col;
var stones; // Canvas displaying image and spinny
var contxt; // The drawing context of the Canvas
var radius = 64;
var dotr    = 10;
var theta  = 0.0;
var delta  = Math.PI / 8;
var voff   = 150;
var hoff   = 150;
```

Spinny.js – Initialization.

- As before, the animation is set in motion using a JavaScript initialization function.

```
function init() {  
    stones = document.getElementById("stones");  
    contxt = stones.getContext('2d');  
    placeDots();  
    setTimeout(doStep, 100);  
}
```

Spinny.js – Place Dots.

- Now major differences emerge.
- There is a now drawDot function.

```
function placeDots() {  
  contxt.clearRect(0, 0, stones.width, stones.height);  
  for (i = 0; i < 10; i++) {  
    row = voff + (radius * Math.cos(theta + (i * delta)));  
    col = hoff + (radius * Math.sin(theta + (i * delta)));  
    drawDot(row, col, (1.0 - i/10));  
  }  
}
```


Spinny.js – Draw Dot.

- With HTML5 we see a true 2D API.
- Drawing contexts.
- Paths, arcs, fills & strokes.

```
function drawDot(xpos, ypos, alpha) {  
    ctxt.beginPath();  
    ctxt.globalAlpha = alpha;  
    ctxt.arc(xpos, ypos, dotr, 0, 2 * Math.PI, false);  
    ctxt.fillStyle = '#ff3f04';  
    ctxt.fill();  
    ctxt.strokeStyle = '#000000';  
    ctxt.lineWidth = 2;  
    ctxt.stroke();  
}
```

More on HTML5 Drawing

The screenshot shows a web browser window with the URL www.html5canvastutorials.com/tutorials/html5-canvas-tutorials-introduction/. The page title is "HTML5 Canvas Tutorials" and the navigation menu includes "Home", "Tutorials", "Labs", and "Articles". The "Tutorials" section is active, and the "Basics" sub-section is selected. The main content area displays the title "Part 1: HTML5 Canvas Basic Tutorials Introduction" with social media sharing options: 48 tweets, 40 Google+1s, and 145 likes. Below the title, there is a paragraph: "Welcome to Basic Tutorials! In these tutorials we'll focus on the fundamental drawing capabilities of the HTML5 Canvas, including line and curve drawing, path drawing, shape drawing, gradients, patterns, images, and text." The next section is titled "HTML5 Canvas Basic Tutorials Prerequisites" and states: "All you need to get started with Basic Tutorials is a modern browser such as Google Chrome, Firefox, Safari, Opera, or IE9, a good working knowledge of JavaScript, and a simple text editor like notepad." At the bottom of the page, there is a navigation bar with a left arrow, a "Canvas Element" button, and a right arrow.

HTML5 Canvas Basic Tutorials

Home Tutorials Labs Articles

Tutorials

Basics

Advanced

KineticJS

Three.js

HTML5 Canvas

Canvas Element

Lines

Line

Line Width

Line Color

Line Cap

Curves

Arc

Quadratic Curve

Bezier Curve

Paths

Path

Part 1: HTML5 Canvas Basic Tutorials Introduction

48 40 145

Tweet +1 Like

Welcome to Basic Tutorials! In these tutorials we'll focus on the fundamental drawing capabilities of the HTML5 Canvas, including line and curve drawing, path drawing, shape drawing, gradients, patterns, images, and text.

HTML5 Canvas Basic Tutorials Prerequisites

All you need to get started with Basic Tutorials is a modern browser such as Google Chrome, Firefox, Safari, Opera, or IE9, a good working knowledge of JavaScript, and a simple text editor like notepad.

< Canvas Element >

Animation – on the Edge

The screenshot shows a web browser window with the address bar displaying `www.html5canvastutorials.com/advanced/html5-canvas-animation-stage/`. The page title is "requestAnimationFrame". Below the title, there are social media sharing buttons for 15 tweets, 11 Google+ posts, and 25 likes. The main content area contains a paragraph explaining the `requestAnimationFrame` shim and its purpose. Below the text is a "Code Editor" section with a pre-formatted code block. The code defines a shim for `requestAnimationFrame` that uses `setTimeout` with a 1000/60ms interval to simulate the browser's native animation frame request.

requestAnimationFrame

15 11 25

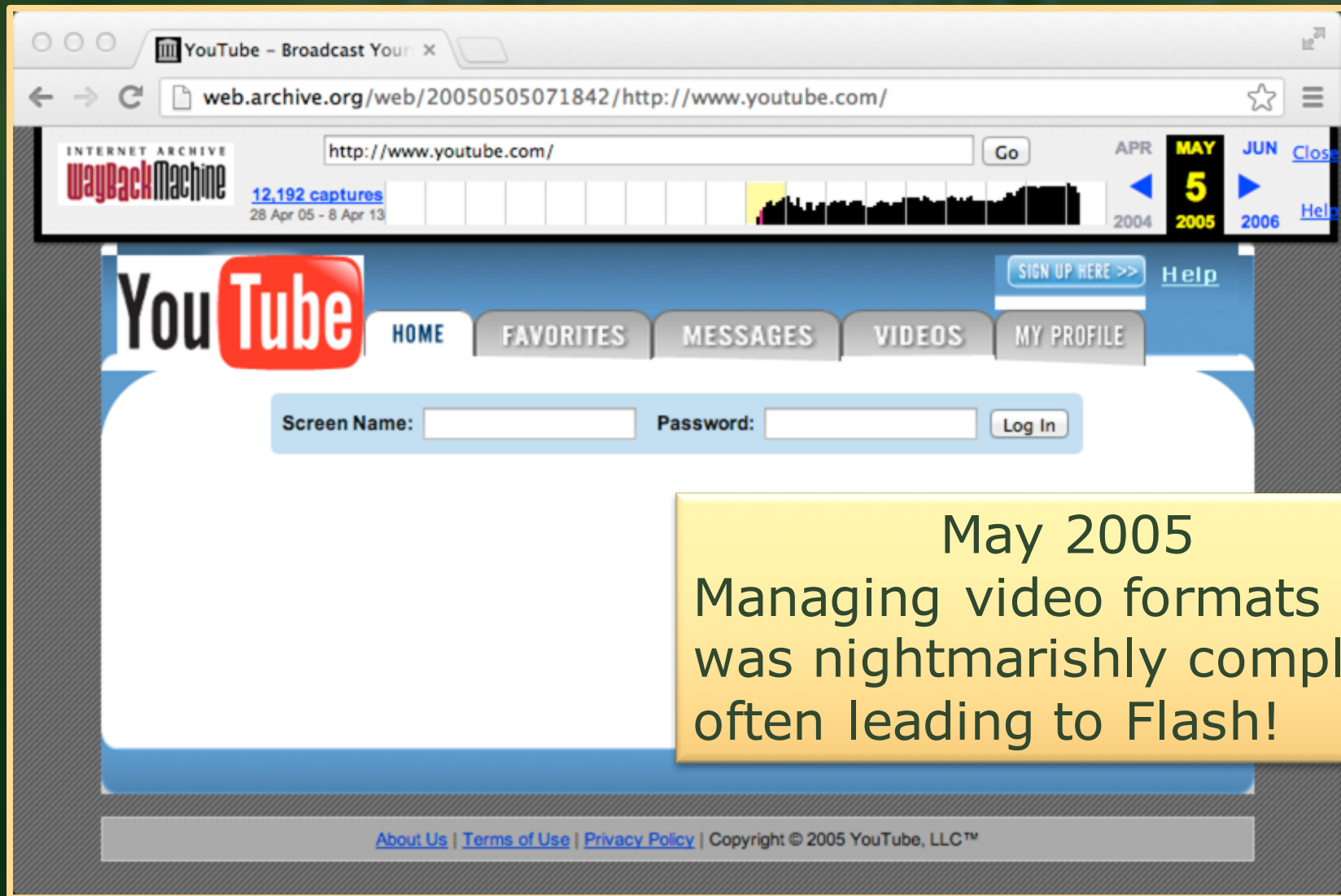
Tweet +1 Like

To create an animation using HTML5 Canvas, we can use the `requestAnimationFrame` shim which enables the browser to determine the optimal FPS for our animation. For each animation frame, we can update the elements on the canvas, clear the canvas, redraw the canvas, and then request another animation frame.

Code Editor

```
1 <!DOCTYPE HTML>
2 <html>
3   <head>
4     <style>
5       body {
6         margin: 0px;
7         padding: 0px;
8       }
9     </style>
10  </head>
11  <body>
12    <canvas id="myCanvas" width="578" height="200"></canvas>
13    <script>
14      window.requestAnimationFrame = (function(callback) {
15        return window.requestAnimationFrame || window.webkitRequestAnimationFrame ||
16        function(callback) {
17          window.setTimeout(callback, 1000 / 60);
18        };
19      })();
20
```

Web Video – Ancient History



The screenshot shows a web browser window with the address bar displaying `web.archive.org/web/20050505071842/http://www.youtube.com/`. Below the browser is the Internet Archive Wayback Machine interface, showing the URL `http://www.youtube.com/` and a calendar for May 2005 with the 5th highlighted. The YouTube homepage is visible, featuring the YouTube logo, navigation tabs for HOME, FAVORITES, MESSAGES, VIDEOS, and MY PROFILE, and a login form with fields for Screen Name and Password. A yellow callout box is overlaid on the bottom right of the page.

May 2005
Managing video formats
was nightmarishly complex,
often leading to Flash!

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HTML5 Video – Better!



The screenshot shows a web browser window displaying the Wikipedia article for "HTML5 video". The browser's address bar shows the URL "en.wikipedia.org/wiki/HTML5_video". The page title is "HTML5 video - Wikipedia, the free encyclopedia". The article content includes a section on the "HTML5" specification, which introduced the "video element" for playing videos, partially replacing the "object element". The article also features a "Contents" table of contents and a sidebar with navigation links.

en.wikipedia.org/wiki/HTML5_video

HTML5 video - Wikipedia, the free encyclopedia

Not logged in Talk Contributions Create account Log in

Article Talk Read Edit View history Search

HTML5 video

From Wikipedia, the free encyclopedia

The **HTML5** specification introduced the **video element** for the purpose of playing videos,^[1] partially replacing the **object element**. HTML5 video is intended by its creators to become the new standard way to show video on the web without plugins, instead of the previous de facto standard of using the proprietary **Adobe Flash** plugin, though early adoption was hampered by lack of agreement as to which **video coding formats** should be supported in web browsers.

HTML

- HTML · Dynamic HTML
- HTML5 (audio · canvas · **video**)
- XHTML (Basic · Mobile Profile · C-HTML)
- HTML element (span and div)
- HTML attribute · HTML frame · HTML editor
- Character encodings (Unicode)
- Language code
- Document Object Model
- Browser Object Model
- Style sheets (Cascading (CSS))
- Font family · Web colors
- HTML scripting
- JavaScript (WebGL · WebCL)
- W3C (Validator)
- WHATWG · Quirks mode · Web storage

Contents [hide]

- History of <video> element
- <video> element examples

Main page
Contents
Featured content
Current events
Random article
Donate to Wikipedia
Wikipedia store

Interaction
Help
About Wikipedia
Community portal
Recent changes
Contact page

Tools

Two Formats Emerging

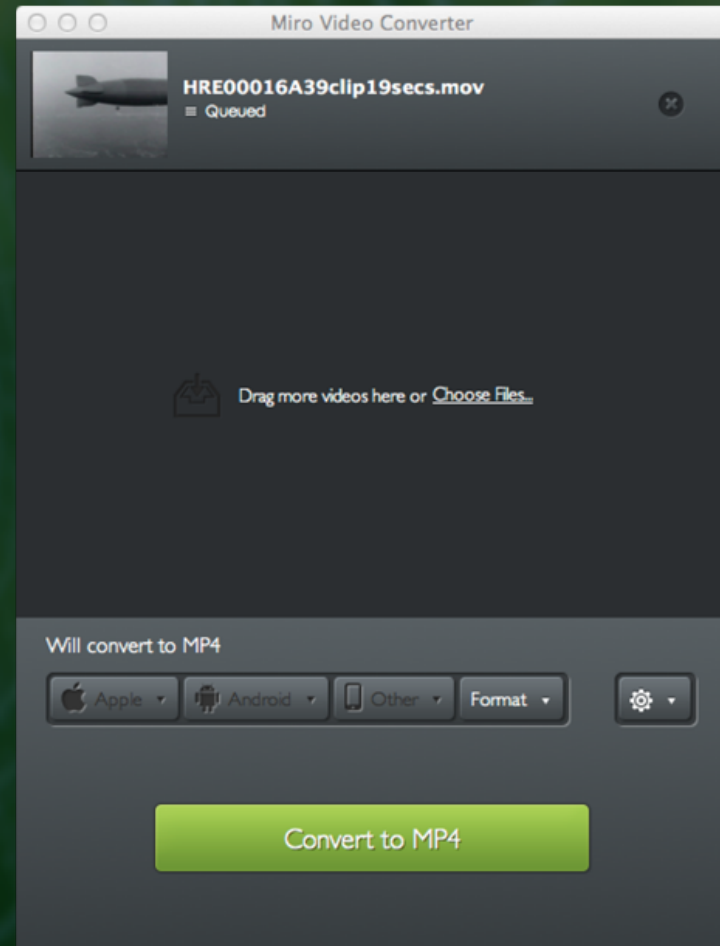
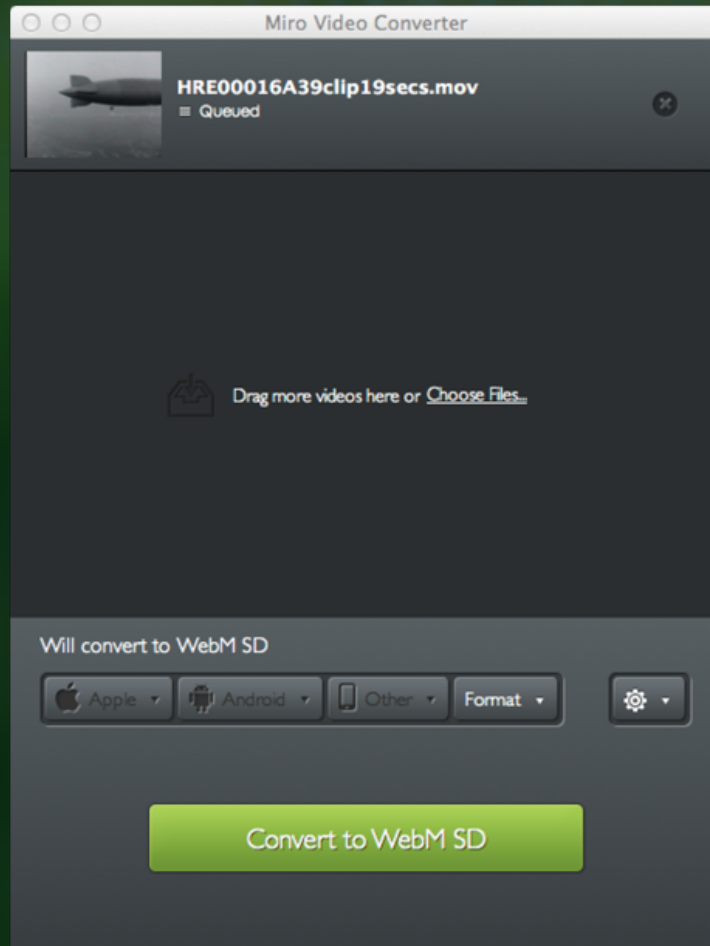
➤ Webm

- Unencumbered by I.P. claims, hence
- OpenSource Compatible
- Backed by Google

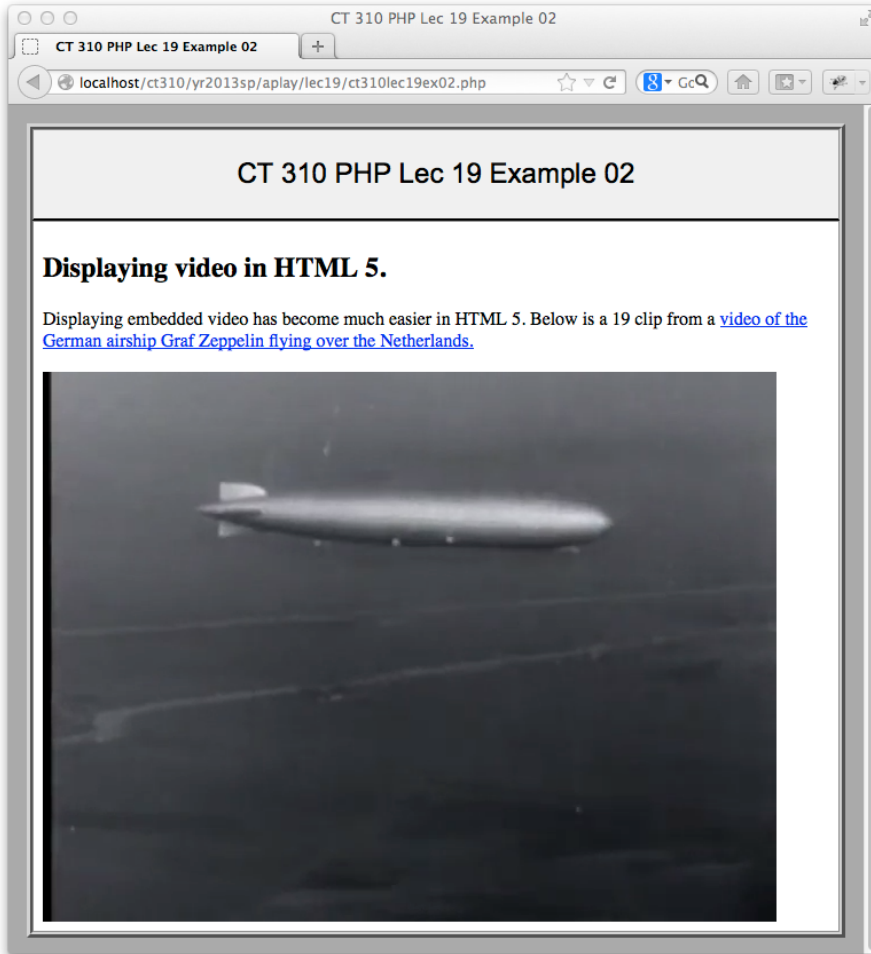
➤ H2.64 (MPEG4)

- Good quality, well supported, but ...
- Users are expected to pay license/royalty

So, encode with both ...



Plays on Firefox, Safari, ...



The HTML (5) Code.

```
8 <h2 style="margin-left: auto; margin-right: auto">Displaying video in
9 HTML 5.</h2>
10 <p>Displaying embedded video has become much easier in HTML 5.</p>
11 <p>Below is a 19 second clip from a
12 <a href='http://archive.org/details/oi55297'>video of the German airship
13 Graf Zeppelin flying over the Netherlands.</a>
14 </p>
15 <video width=640 height=480 controls="controls">
16 <source src="./HRE00016A39clip19secs.webm" type="video/webm">
17 <source src="./HRE00016A39clip19secs.mp4" type="video/mp4">
18 ..... Your browser does not support the video tag.
19 ..... </video>
20 </div>
```

Think about a list of options and then the browser moves down the list until it finds a suitable option.