

HTML5 Canvas

Notes for Professionals

Chapter 1: Getting started with HTML5 Canvas

Section 1.1: Detecting mouse position on the canvas

This example will show how to get the mouse position relative to the canvas, such that (0,0) is the top-left corner of the HTML5 Canvas. The `event.clientX` and `event.clientY` will get the mouse position on the document, to change this to be based on the top of the canvas we subtract the left and top of the canvas from the client X and Y.

```
var canvas = document.getElementById("myCanvas");
var ctx = canvas.getContext("2d");
ctx.font = "16px Arial";

canvas.addEventListener("mousemove", function(e) {
    var object = canvas.getBoundingClientRect();
    var canvasX = Math.round(e.clientX - object.left);
    var canvasY = Math.round(e.clientY - object.top);
    ctx.fillStyle = "red";
    ctx.fillRect(0, 0, canvas.width, canvas.height);
    ctx.fillText("X: " + canvasX + " Y: " + canvasY, 10, 20);
});
```

Runnable Example

The use of `Math.round` is due to ensure the X,Y positions are integers, as the browser does not have integer positions.

Section 1.2: Canvas size and resolution

The size of a canvas is the area it occupies on the page and is defined by the CSS `width` and `height` properties. If not specified the canvas defaults to 300 by 150.

The canvas resolution defines the number of pixels it contains. The resolution is defined by the `width` and `height` properties. If not specified the canvas defaults to 300 by 150.

This will result in each pixel being stretched unevenly. The pixel aspect is broader will use bilinear filtering. This has an effect of blurring out pixels. For the best results when using the canvas ensure that the canvas resolution is the same pixel count as the style defines.

```
<canvas id="myCanvas" width="1000" height="1000"></canvas>
<canvas id="myCanvas" width="1000" height="1000"></canvas>
```

Section 1.3: Rotate

The `rotate(r)` method of the 2D context rotates the canvas by the specified amount `r` of radians around the origin.

HTML

```
<canvas id="canvas" width=240 height=240 style="background-color:#000000;">
</canvas>
<button type="button" onclick="rotate_ctx()">Rotate context</button>
```

JavaScript

```
var canvas = document.getElementById("canvas");
var ctx = canvas.getContext("2d");
var ox = canvas.width / 2;
var oy = canvas.height / 2;
ctx.font = "16px serif";
ctx.textAlign = "center";
ctx.fillStyle = "red";
ctx.fillText("Hello World", ox, oy);

rotate_ctx = function() {
    // translate so that the origin is now (ox, oy) the center of the canvas
    ctx.translate(ox, oy);
    // convert degrees to radians with radians = (Math.PI/180)*degrees
    ctx.rotate(Math.PI / 180 * 45);
    ctx.fillText("Hello World", 0, 0);
    ctx.translate(-ox, -oy);
};
```

Live Demo on JSFiddle

Section 1.4: Save canvas to image file

You can save a canvas to an image file by using the method `canvas.toDataURL()`, that returns the data URI for the canvas' image data.

The method can take two optional parameters `canvas.toDataURL([type][, encoderOptions])` type is the image format (if omitted the default is image/png); encoderOptions is a number between 0 and 1 indicating image quality (default is 0.92).

Here we draw a canvas and attach the canvas' data URI to the "download to myImage.jpg" link:

HTML

```
<canvas id="canvas" width=240 height=240 style="background-color:#000000;">
</canvas>
<a href="#" id="download" download="myImage.jpg" href="" onclick="download_img(this)">download to myImage.jpg</a>
```

JavaScript

```
var canvas = document.getElementById("canvas");
```

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Chapter 9: Media types and the canvas

Section 9.1: Basic loading and playing a video on the canvas

The canvas can be used to display video from a variety of sources. This example shows how to load a video as a file resource, display it and add a simple click on screen play/pause toggle.

This Stackoverflow self answered question [How to display a video using HTML5 canvas tag](#) shows the following example code in action.

Just an image

A video is just an image as far as the canvas is concerned. You can draw it like any image. The difference being the video can play and has sound.

Get canvas and basic setup

It is assumed you know how to add a canvas and correctly size it.

```
var canvas = document.getElementById("myCanvas"); // get the canvas from the page
var videoContainer = // object to hold video and associated info
```

Creating and loading the video

var video = document.createElement("video"); // create a video element

video.src = "urlOfVideo.mp4"; // the video src will now begin to load

As some additional info is needed we will place the video in a video wrapper object for convenience

```
video.readyState = false; // ensure that the video does not auto play
videoContainer = { // set the video in loop
    video: video,
    ready: false;
};
```

Unlike other elements videos don't have to be fully loaded to be displayed on the canvas. Videos also provide a host of extra events that can be used to monitor status of the video.

In this case we wish to know when the video is ready to play. `oncanplay` means that enough of the video has loaded to play some of it, but there may not be enough to play to the end.

```
video.oncanplay = readyToPlayVideo; // set the event to the play function that
// can be found below
```

Alternatively you can use `onplaythrough` which will fire when enough of the video has loaded so that it can be played to the end.

```
video.onplaythrough = readyToPlayVideo; // set the event to the play function that
// can be found below
```

Only use one of the `canPlay` events not both.

The can play event (equivalent to image onload)

function readyToPlayVideo(event) { // this is a reference to the video

```
videoContainer.scale = Math.min(
    canvas.width / this.videoWidth,
```

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