Basic usage of canvas

« Previous Next »

Let's start this tutorial by looking at the `<canvas>` HTML element itself. At the end of this page, you will know how to set up a canvas 2D context and have drawn a first example in your browser.

The `<canvas>` element

```html
<canvas id="tutorial" width="150" height="150"></canvas>
```

At first sight a `<canvas>` looks like the `<img>` element, with the only clear difference being that it doesn't have the `src` and `alt` attributes. Indeed, the `<canvas>` element has only two attributes, `width` and `height`. These are both optional and can also be set using DOM properties. When no `width` and `height` attributes are specified, the canvas will initially be **300 pixels** wide and **150 pixels** high. The element can be sized arbitrarily by CSS, but during rendering the image is scaled to fit its layout size: if the CSS sizing doesn't respect the ratio of the initial canvas, it will appear distorted.

Note: If your renderings seem distorted, try specifying your `width` and `height` attributes explicitly in the `<canvas>` attributes, and not using CSS.

The `id` attribute isn't specific to the `<canvas>` element but is one of the global HTML attributes which can be applied to any HTML element (like `class` for instance). It is always a good idea to supply an `id` because this makes it much easier to identify it in a script.

The `<canvas>` element can be styled just like any normal image (`margin`, `border`, `background`…). These rules, however, don't affect the actual drawing on the canvas. We'll see how this is done in a dedicated chapter of this tutorial. When no styling rules are applied to the canvas it will initially be fully transparent.

Fallback content

The `<canvas>` element differs from an `<img>` tag in that, like for `<video>`, `<audio>`, or `<picture>` elements, it is easy to define some fallback content, to be displayed in older browsers not supporting it, like versions of Internet Explorer earlier than version 9 or textual browsers. You should always provide fallback content to be displayed by those browsers.

Providing fallback content is very straightforward: just insert the alternate content inside the `<canvas>` element. Browsers that don't support `<canvas>` will ignore the container and render the fallback content inside it. Browsers that do support `<canvas>` will ignore the content inside the container, and just render the canvas normally.

For example, we could provide a text description of the canvas content or provide a static image of the dynamically rendered content. This can look something like this:

```
<canvas id="stockGraph" width="150" height="150">
  current stock price: $3.15 + 0.15
</canvas>

<canvas id="clock" width="150" height="150">
  <img src="images/clock.png" width="150" height="150" alt=""/>
</canvas>
```

Telling the user to use a different browser that supports canvas does not help users who can't read the canvas at all, for example. Providing a useful fallback text or sub DOM helps to make the canvas more accessible.

Required `</canvas>` tag

As a consequence of the way fallback is provided, unlike the `<img>` element, the `<canvas>` element **requires** the closing tag (`</canvas>`). If this tag is not present, the rest of the document would be considered the fallback content and wouldn't be displayed.

If fallback content is not needed, a simple `<canvas id="foo" ...></canvas>` is fully compatible with all browsers that support canvas at all.

The rendering context

The `<canvas>` element creates a fixed-size drawing surface that exposes one or more **rendering contexts**, which are used to create and manipulate the content shown. In this tutorial, we focus on the 2D rendering context. Other contexts may provide different types of rendering; for example, WebGL uses a 3D context based on OpenGL ES.

The canvas is initially blank. To display something, a script first needs to access the rendering context and draw on it. The `<canvas>` element has a method called `getContext()`, used to obtain the rendering context and its drawing functions. `getContext()` takes one parameter, the type of context. For 2D graphics, such as those covered by this tutorial, you specify `"2d"` to get a `CanvasRenderingContext2D`.

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

The first line in the script retrieves the node in the DOM representing the `<canvas>` element by calling the `document.getElementById()` method. Once you have the element node, you can access the drawing context using its `getContext()` method.

Checking for support

The fallback content is displayed in browsers which do not support `<canvas>`. Scripts can also check for support programmatically by simply testing for the presence of the `getContext()` method. Our code snippet from above becomes something like this:

```
var canvas = document.getElementById('tutorial');

if (canvas.getContext) {
  var ctx = canvas.getContext('2d');
  // drawing code here
} else {
  // canvas-unsupported code here
}
```

A skeleton template

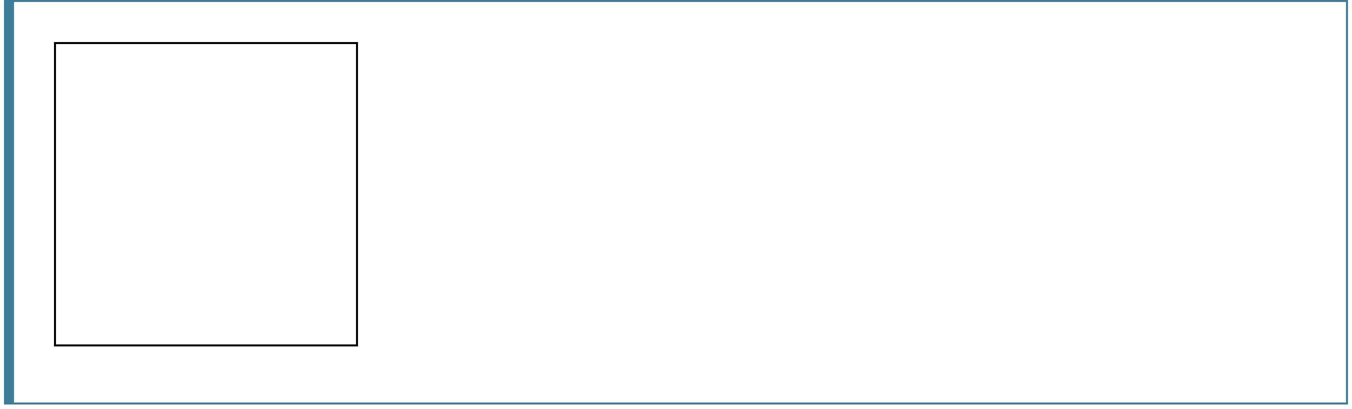
Here is a minimalistic template, which we'll be using as a starting point for later examples.

Note: it is not good practice to embed a script inside HTML. We do it here to keep the example concise.

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset="utf-8"/>
    <title>Canvas tutorial</title>
    <script type="text/javascript">
      function draw() {
        var canvas = document.getElementById('tutorial');
        if (canvas.getContext) {
          var ctx = canvas.getContext('2d');
        }
      }
    </script>
    <style type="text/css">
      canvas { border: 1px solid black; }
    </style>
  </head>
  <body onload="draw();">
    <canvas id="tutorial" width="150" height="150"></canvas>
  </body>
</html>
```

The script includes a function called `draw()`, which is executed once the page finishes loading; this is done by listening for the `load` event on the document. This function, or one like it, could also be called using `window.setTimeout()`, `window.setInterval()`, or any other event handler, as long as the page has been loaded first.

Here is how a template would look in action. As shown here, it is initially blank.



A simple example

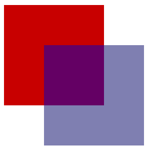
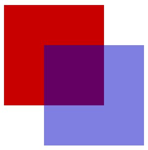
To begin, let's take a look at a simple example that draws two intersecting rectangles, one of which has alpha transparency. We'll explore how this works in more detail in later examples.

```
<!DOCTYPE html>
<html>
 <head>
  <meta charset="utf-8"/>
  <script type="application/javascript">
    function draw() {
      var canvas = document.getElementById('canvas');
      if (canvas.getContext) {
        var ctx = canvas.getContext('2d');

        ctx.fillStyle = 'rgb(200, 0, 0)';
        ctx.fillRect(10, 10, 50, 50);

        ctx.fillStyle = 'rgba(0, 0, 200, 0.5)';
        ctx.fillRect(30, 30, 50, 50);
      }
    }
  </script>
 </head>
 <body onload="draw();">
   <canvas id="canvas" width="150" height="150"></canvas>
 </body>
</html>
```

This example looks like this:

Screenshot	Live sample
	

« Previous Next »

Last modified: Dec 5, 2019, by MDN contributors

Related Topics

Canvas API

▼ Examples

A basic raycaster

Canvas code snippets

Manipulating video using canvas

▼ Interfaces

`HTMLCanvasElement`

`CanvasRenderingContext2D`

`CanvasGradient`

`CanvasPattern`

`ImageBitmap`

`ImageData`

`TextMetrics`

`Path2D`

Documentation:

▶ Useful lists

▶ Contribute