**HTML5 Canvas**

The HTML <canvas> element is used to draw graphics on a web page.

The graphic to the left is created with <canvas>. It shows four elements: a red rectangle, a gradient rectangle, a multicolor rectangle, and a multicolor text.

What is HTML Canvas?

The HTML <canvas> element is used to draw graphics, on the fly, via JavaScript.

The <canvas> element is only a container for graphics. You must use JavaScript to actually draw the graphics.

Canvas has several methods for drawing paths, boxes, circles, text, and adding images.

Browser Support

The numbers in the table specify the first browser version that fully supports the <canvas> element.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Element |  |  |  |  |  |
| <canvas> | 4.0 | 9.0 | 2.0 | 3.1 | 9.0 |

Canvas Examples

A canvas is a rectangular area on an HTML page. By default, a canvas has no border and no content.

The markup looks like this:

<canvas id="myCanvas" width="200" height="100"></canvas>

Note: Always specify an id attribute (to be referred to in a script), and a width and height attribute to define the size of the canvas. To add a border, use the style attribute.

Here is an example of a basic, empty canvas:

Example

<canvas id="myCanvas" width="200" height="100" style="border:1px solid #000000;">  
</canvas>

Draw a Line

Example

var c = document.getElementById("myCanvas");  
var ctx = c.getContext("2d");  
ctx.moveTo(0, 0);  
ctx.lineTo(200, 100);  
ctx.stroke();

Draw a Circle

Example

var c = document.getElementById("myCanvas");  
var ctx = c.getContext("2d");  
ctx.beginPath();  
ctx.arc(95, 50, 40, 0, 2 \* Math.PI);  
ctx.stroke();

Draw a Text

Example

var c = document.getElementById("myCanvas");  
var ctx = c.getContext("2d");  
ctx.font = "30px Arial";  
ctx.fillText("Hello World", 10, 50);

Stroke Text

Example

var c = document.getElementById("myCanvas");  
var ctx = c.getContext("2d");  
ctx.font = "30px Arial";  
ctx.strokeText("Hello World", 10, 50);

Draw Linear Gradient

Example

var c = document.getElementById("myCanvas");  
var ctx = c.getContext("2d");  
  
// Create gradient  
var grd = ctx.createLinearGradient(0, 0, 200, 0);  
grd.addColorStop(0, "red");  
grd.addColorStop(1, "white");  
  
// Fill with gradient  
ctx.fillStyle = grd;  
ctx.fillRect(10, 10, 150, 80);

Draw Circular Gradient

Example

var c = document.getElementById("myCanvas");  
var ctx = c.getContext("2d");  
  
// Create gradient  
var grd = ctx.createRadialGradient(75, 50, 5, 90, 60, 100);  
grd.addColorStop(0, "red");  
grd.addColorStop(1, "white");  
  
// Fill with gradient  
ctx.fillStyle = grd;  
ctx.fillRect(10, 10, 150, 80);

Draw Image

var c = document.getElementById("myCanvas");  
var ctx = c.getContext("2d");  
var img = document.getElementById("scream");  
ctx.drawImage(img, 10, 10);

**HTML5 SVG**

What is SVG?

SVG stands for Scalable Vector Graphics

SVG is used to define graphics for the Web

SVG is a W3C recommendation

The HTML <svg> Element

The HTML <svg> element is a container for SVG graphics.

SVG has several methods for drawing paths, boxes, circles, text, and graphic images.

Browser Support

The numbers in the table specify the first browser version that fully supports the <svg> element.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Element |  |  |  |  |  |
| <svg> | 4.0 | 9.0 | 3.0 | 3.2 | 10.1 |

SVG Circle

Example

<!DOCTYPE html>  
<html>  
<body>  
  
<svg width="100" height="100">  
  <circle cx="50" cy="50" r="40" stroke="green" stroke-width="4" fill="yellow" />  
</svg>  
  
</body>  
</html>

SVG Rectangle

Example

<svg width="400" height="100">  
  <rect width="400" height="100" style="fill:rgb(0,0,255);stroke-width:10;stroke:rgb(0,0,0)" />  
</svg>

SVG Rounded Rectangle

Sorry, your browser does not support inline SVG.

Example

<svg width="400" height="180">  
  <rect x="50" y="20" rx="20" ry="20" width="150" height="150"  
  style="fill:red;stroke:black;stroke-width:5;opacity:0.5" />  
</svg>

SVG Star

Sorry, your browser does not support inline SVG.

Example

<svg width="300" height="200">  
  <polygon points="100,10 40,198 190,78 10,78 160,198"  
  style="fill:lime;stroke:purple;stroke-width:5;fill-rule:evenodd;" />  
</svg>

SVG Logo

SVG Sorry, your browser does not support inline SVG.

Example

<svg height="130" width="500">  
  <defs>  
    <linearGradient id="grad1" x1="0%" y1="0%" x2="100%" y2="0%">  
      <stop offset="0%" style="stop-color:rgb(255,255,0);stop-opacity:1" />  
      <stop offset="100%" style="stop-color:rgb(255,0,0);stop-opacity:1" />  
    </linearGradient>  
  </defs>  
  <ellipse cx="100" cy="70" rx="85" ry="55" fill="url(#grad1)" />  
  <text fill="#ffffff" font-size="45" font-family="Verdana" x="50" y="86">SVG</text>  
  Sorry, your browser does not support inline SVG.  
</svg>

Differences Between SVG and Canvas

SVG is a language for describing 2D graphics in XML.

Canvas draws 2D graphics, on the fly (with a JavaScript).

SVG is XML based, which means that every element is available within the SVG DOM. You can attach JavaScript event handlers for an element.

In SVG, each drawn shape is remembered as an object. If attributes of an SVG object are changed, the browser can automatically re-render the shape.

Canvas is rendered pixel by pixel. In canvas, once the graphic is drawn, it is forgotten by the browser. If its position should be changed, the entire scene needs to be redrawn, including any objects that might have been covered by the graphic.

Comparison of Canvas and SVG

The table below shows some important differences between Canvas and SVG:

|  |  |
| --- | --- |
| Canvas | SVG |
| Resolution dependent  No support for event handlers  Poor text rendering capabilities  You can save the resulting image as .png or .jpg  Well suited for graphic-intensive games | Resolution independent  Support for event handlers  Best suited for applications with large rendering areas (Google Maps)  Slow rendering if complex (anything that uses the DOM a lot will be slow)  Not suited for game applications |

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