

Adding Graphics to Web Pages Using Canvas and SVG

USING SVG TO CREATE IMAGES



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Uses for SVG and Canvas



Charts

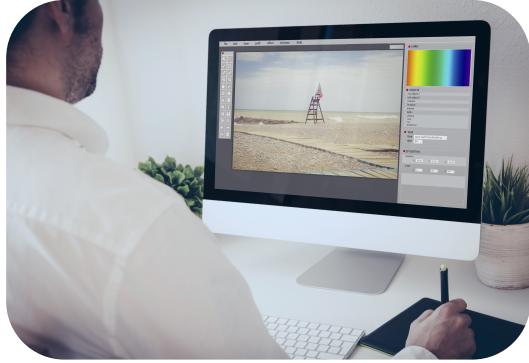


Image
editing



Sketching



Games



Course Overview

**Scalable Vector Graphics
(SVG)**

Canvas



Course Overview

SVG	Canvas
Basic shapes	Basic shapes
Paths	Paths
Text	Text
Images	Images
Gradients	Gradients
Animation	Sketching

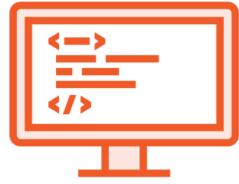


Course Overview

SVG	Canvas
Basic shapes	Basic shapes
Paths	Paths
Text	Text
Images	Images
Gradients	Gradients
Animation	Sketching



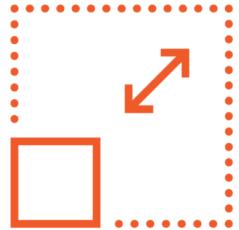
What are Scalable Vector Graphics (SVG)



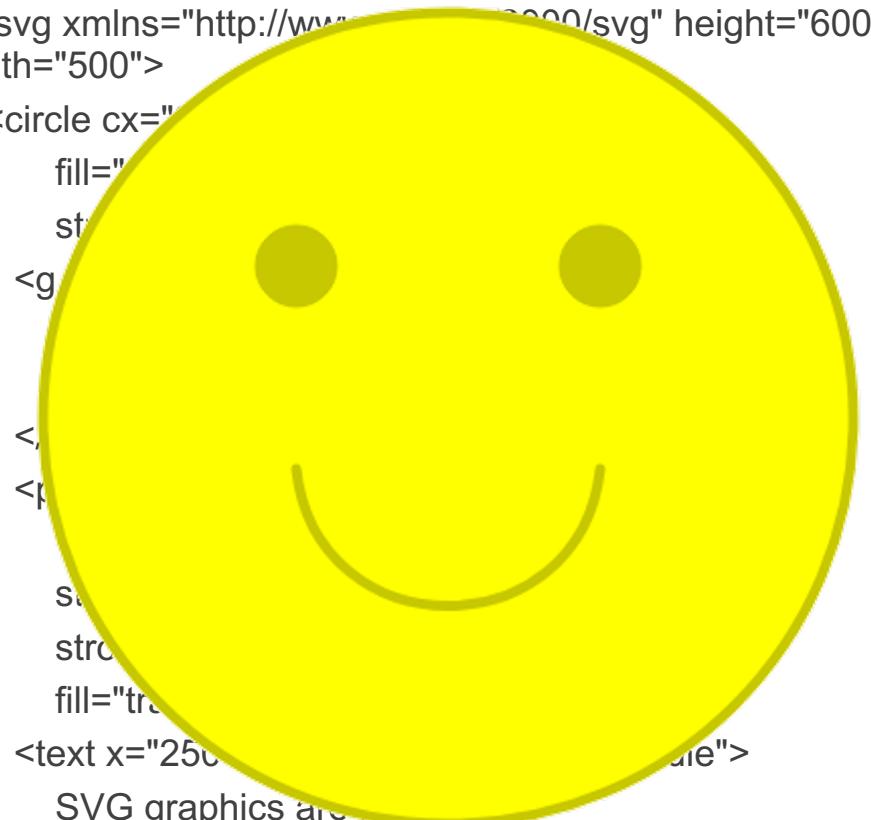
XML-based language, similar to HTML



Integrates well with HTML and CSS



Consistent quality, regardless of rendered size



The image shows a large yellow circle containing a simple smiley face with two black dots for eyes and a curved line for a mouth. To the left of the circle, there is a block of XML code:

```
<svg xmlns="http://www.w3.org/2000/svg" height="600" width="500">
  <circle cx="250" cy="300" r="250" fill="yellow" stroke="black" stroke-width="2px"/>
  <g fill="none" stroke="black" stroke-width="1px">
    <path d="M 400 300 Q 450 250 500 300 S 550 350 600 300 Q 650 250 700 300 S 750 350 800 300 Q 850 250 900 300 S 950 350 1000 300 Q 1050 250 1100 300 S 1150 350 1200 300 Q 1250 250 1300 300 S 1350 350 1400 300 Q 1450 250 1500 300 S 1550 350 1600 300 Q 1650 250 1700 300 S 1750 350 1800 300 Q 1850 250 1900 300 S 1950 350 2000 300 Q 2050 250 2100 300 S 2150 350 2200 300 Q 2250 250 2300 300 S 2350 350 2400 300 Q 2450 250 2500 300 S 2550 350 2600 300 Q 2650 250 2700 300 S 2750 350 2800 300 Q 2850 250 2900 300 S 2950 350 3000 300 Q 3050 250 3100 300 S 3150 350 3200 300 Q 3250 250 3300 300 S 3350 350 3400 300 Q 3450 250 3500 300 S 3550 350 3600 300 Q 3650 250 3700 300 S 3750 350 3800 300 Q 3850 250 3900 300 S 3950 350 4000 300 Q 4050 250 4100 300 S 4150 350 4200 300 Q 4250 250 4300 300 S 4350 350 4400 300 Q 4450 250 4500 300 S 4550 350 4600 300 Q 4650 250 4700 300 S 4750 350 4800 300 Q 4850 250 4900 300 S 4950 350 5000 300 Q 5050 250 5100 300 S 5150 350 5200 300 Q 5250 250 5300 300 S 5350 350 5400 300 Q 5450 250 5500 300 S 5550 350 5600 300 Q 5650 250 5700 300 S 5750 350 5800 300 Q 5850 250 5900 300 S 5950 350 6000 300 Q 6050 250 6100 300 S 6150 350 6200 300 Q 6250 250 6300 300 S 6350 350 6400 300 Q 6450 250 6500 300 S 6550 350 6600 300 Q 6650 250 6700 300 S 6750 350 6800 300 Q 6850 250 6900 300 S 6950 350 7000 300 Q 7050 250 7100 300 S 7150 350 7200 300 Q 7250 250 7300 300 S 7350 350 7400 300 Q 7450 250 7500 300 S 7550 350 7600 300 Q 7650 250 7700 300 S 7750 350 7800 300 Q 7850 250 7900 300 S 7950 350 8000 300 Q 8050 250 8100 300 S 8150 350 8200 300 Q 8250 250 8300 300 S 8350 350 8400 300 Q 8450 250 8500 300 S 8550 350 8600 300 Q 8650 250 8700 300 S 8750 350 8800 300 Q 8850 250 8900 300 S 8950 350 9000 300 Q 9050 250 9100 300 S 9150 350 9200 300 Q 9250 250 9300 300 S 9350 350 9400 300 Q 9450 250 9500 300 S 9550 350 9600 300 Q 9650 250 9700 300 S 9750 350 9800 300 Q 9850 250 9900 300 S 9950 350 10000 300 Q 10050 250 10100 300 S 10150 350 10200 300 Q 10250 250 10300 300 S 10350 350 10400 300 Q 10450 250 10500 300 S 10550 350 10600 300 Q 10650 250 10700 300 S 10750 350 10800 300 Q 10850 250 10900 300 S 10950 350 11000 300 Q 11050 250 11100 300 S 11150 350 11200 300 Q 11250 250 11300 300 S 11350 350 11400 300 Q 11450 250 11500 300 S 11550 350 11600 300 Q 11650 250 11700 300 S 11750 350 11800 300 Q 11850 250 11900 300 S 11950 350 12000 300 Q 12050 250 12100 300 S 12150 350 12200 300 Q 12250 250 12300 300 S 12350 350 12400 300 Q 12450 250 12500 300 S 12550 350 12600 300 Q 12650 250 12700 300 S 12750 350 12800 300 Q 12850 250 12900 300 S 12950 350 13000 300 Q 13050 250 13100 300 S 13150 350 13200 300 Q 13250 250 13300 300 S 13350 350 13400 300 Q 13450 250 13500 300 S 13550 350 13600 300 Q 13650 250 13700 300 S 13750 350 13800 300 Q 13850 250 13900 300 S 13950 350 14000 300 Q 14050 250 14100 300 S 14150 350 14200 300 Q 14250 250 14300 300 S 14350 350 14400 300 Q 14450 250 14500 300 S 14550 350 14600 300 Q 14650 250 14700 300 S 14750 350 14800 300 Q 14850 250 14900 300 S 14950 350 15000 300 Q 15050 250 15100 300 S 15150 350 15200 300 Q 15250 250 15300 300 S 15350 350 15400 300 Q 15450 250 15500 300 S 15550 350 15600 300 Q 15650 250 15700 300 S 15750 350 15800 300 Q 15850 250 15900 300 S 15950 350 16000 300 Q 16050 250 16100 300 S 16150 350 16200 300 Q 16250 250 16300 300 S 16350 350 16400 300 Q 16450 250 16500 300 S 16550 350 16600 300 Q 16650 250 16700 300 S 16750 350 16800 300 Q 16850 250 16900 300 S 16950 350 17000 300 Q 17050 250 17100 300 S 17150 350 17200 300 Q 17250 250 17300 300 S 17350 350 17400 300 Q 17450 250 17500 300 S 17550 350 17600 300 Q 17650 250 17700 300 S 17750 350 17800 300 Q 17850 250 17900 300 S 17950 350 18000 300 Q 18050 250 18100 300 S 18150 350 18200 300 Q 18250 250 18300 300 S 18350 350 18400 300 Q 18450 250 18500 300 S 18550 350 18600 300 Q 18650 250 18700 300 S 18750 350 18800 300 Q 18850 250 18900 300 S 18950 350 19000 300 Q 19050 250 19100 300 S 19150 350 19200 300 Q 19250 250 19300 300 S 19350 350 19400 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350 37600 300 Q 37650 250 37700 300 S 37750 350 37800 300 Q 37850 250 37900 300 S 37950 350 38000 300 Q 38050 250 38100 300 S 38150 350 38200 300 Q 38250 250 38300 300 S 38350 350 38400 300 Q 38450 250 38500 300 S 38550 350 38600 300 Q 38650 250 38700 300 S 38750 350 38800 300 Q 38850 250 38900 300 S 38950 350 39000 300 Q 39050 250 39100 300 S 39150 350 39200 300 Q 39250 250 39300 300 S 39350 350 39400 300 Q 39450 250 39500 300 S 39550 350 39600 300 Q 39650 250 39700 300 S 39750 350 39800 300 Q 39850 250 39900 300 S 39950 350 40000 300 Q 40050 250 40100 300 S 40150 350 40200 300 Q 40250 250 40300 300 S 40350 350 40400 300 Q 40450 250 40500 300 S 40550 350 40600 300 Q 40650 250 40700 300 S 40750 350 40800 300 Q 40850 250 40900 300 S 40950 350 41000 300 Q 41050 250 41100 300 S 41150 350 41200 300 Q 41250 250 41300 300 S 41350 350 41400 300 Q 41450 250 41500 300 S 41550 350 41600 300 Q 41650 250 41700 300 S 41750 350 41800 300 Q 41850 250 41900 300 S 41950 350 42000 300 Q 42050 250 42100 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46650 250 46700 300 S 46750 350 46800 300 Q 46850 250 46900 300 S 46950 350 47000 300 Q 47050 250 47100 300 S 47150 350 47200 300 Q 47250 250 47300 300 S 47350 350 47400 300 Q 47450 250 47500 300 S 47550 350 47600 300 Q 47650 250 47700 300 S 47750 350 47800 300 Q 47850 250 47900 300 S 47950 350 48000 300 Q 48050 250 48100 300 S 48150 350 48200 300 Q 48250 250 48300 300 S 48350 350 48400 300 Q 48450 250 48500 300 S 48550 350 48600 300 Q 48650 250 48700 300 S 48750 350 48800 300 Q 48850 250 48900 300 S 48950 350 49000 300 Q 49050 250 49100 300 S 49150 350 49200 300 Q 49250 250 49300 300 S 49350 350 49400 300 Q 49450 250 49500 300 S 49550 350 49600 300 Q 49650 250 49700 300 S 49750 350 49800 300 Q 49850 250 49900 300 S 49950 350 50000 300 Q 50050 250 50100 300 S 50150 350 50200 300 Q 50250 250 50300 300 S 50350 350 50400 300 Q 50450 250 50500 300 S 50550 350 50600 300 Q 50650 250 50700 300 S 50750 350 50800 300 Q 50850 250 50900 300 S 50950 350 51000 300 Q 51050 250 51100 300 S 51150 350 51200 300 Q 51250 250 51300 300 S 51350 350 51400 300 Q 5145
```

First Steps with SVG

```
<svg xmlns="http://www.w3.org/2000/svg"  
height="100"  
width="100">  
  
</svg>
```



First Steps with SVG

```
<svg xmlns="http://www.w3.org/2000/svg"
```

```
height="100"
```

```
width="100">
```

```
</svg>
```

SVG tag wraps entire image



First Steps with SVG

```
<svg xmlns="http://www.w3.org/2000/svg"
```

```
height="100"
```

```
width="100">
```

```
</svg>
```

SVG tag wraps entire image

XML namespace to define vocabulary



First Steps with SVG

```
<svg xmlns="http://www.w3.org/2000/svg"
```

```
    height="100"
```

```
    width="100">
```

```
</svg>
```

SVG tag wraps entire image

XML namespace to define vocabulary

Set height and width of document*



Drawing Basic Shapes



```
<svg height="200" width="200"  
      xmlns="http://www.w3.org/2000/svg">  
  
<rect  
      x="10" y="10"  
      width="50" height="50"  
      stroke="black" stroke-width="5"  
      fill="rgb(240,90,40)"  
/>  
  
</svg>
```

◀ Outer SVG tag

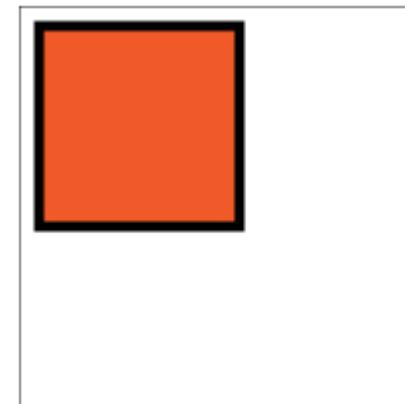
◀ Rectangle

◀ Position of upper, left corner of shape

◀ Size of rectangle

◀ Color and thickness of outline

◀ Color of shape's body



Basic Shapes

```
<rect width="100" height="100" />
```

```
<rect width="100" height="100" rx="10" ry="10" />
```



```
<circle cx="50" cy="50" r="20" />
```

```
<ellipse cx="50" cy="50" rx="50" ry="20" />
```



```
<line x1="25" y1="25" x2="50" y2="50" />
```

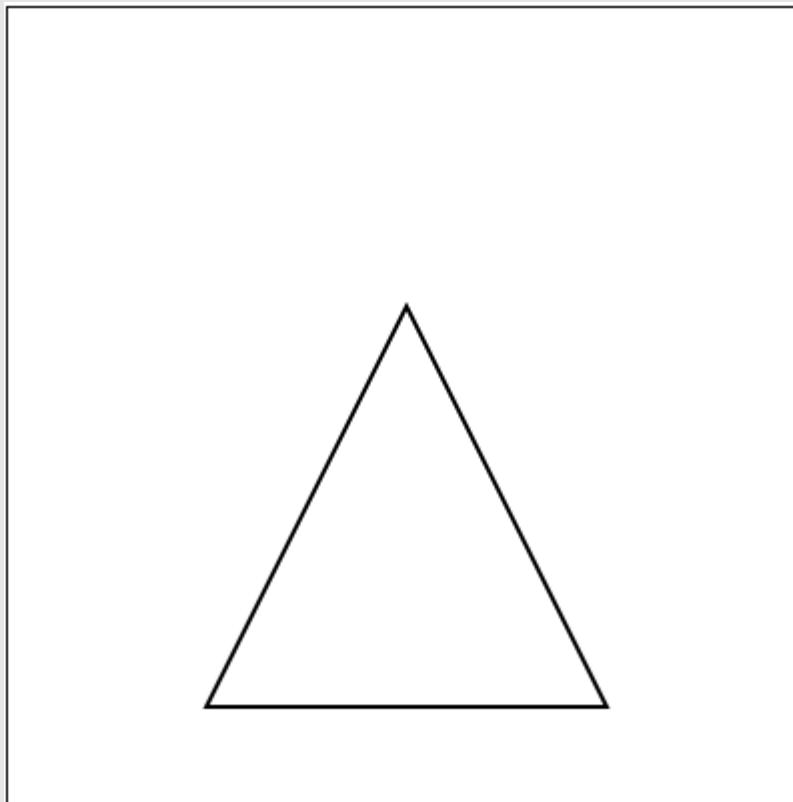
```
<polyline points="100,75 150,175 50,175" />
```

```
<polygon points="100 75 150 175 50 175" />
```



Drawing with Path Elements

```
<path  
    d="M 100, 75  
      l 50, 100  
      h -100  
      z"  
/>
```



Drawing with Path Elements

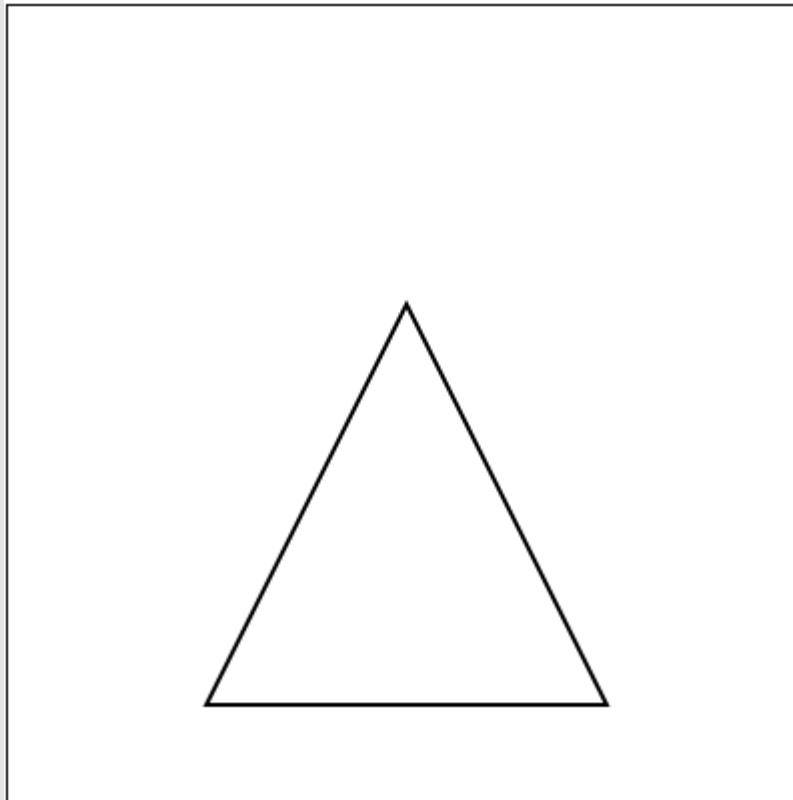
<path

d="M 100, 75

l 50, 100

h -100

z"

/>

Drawing with Path Elements

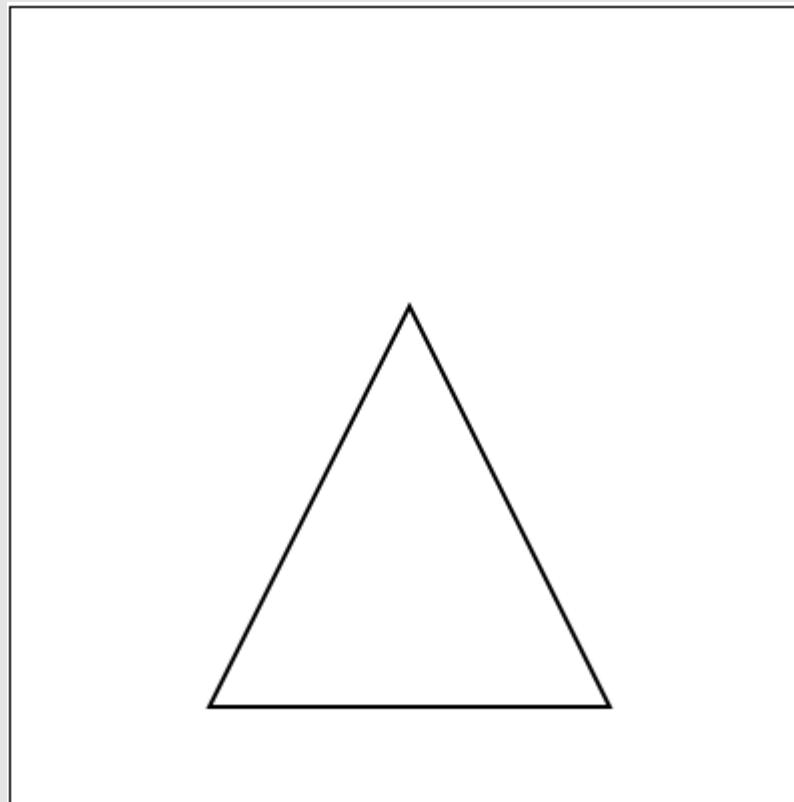
```
<path
```

```
    d="M 100, 75
```

```
    l 50, 100
```

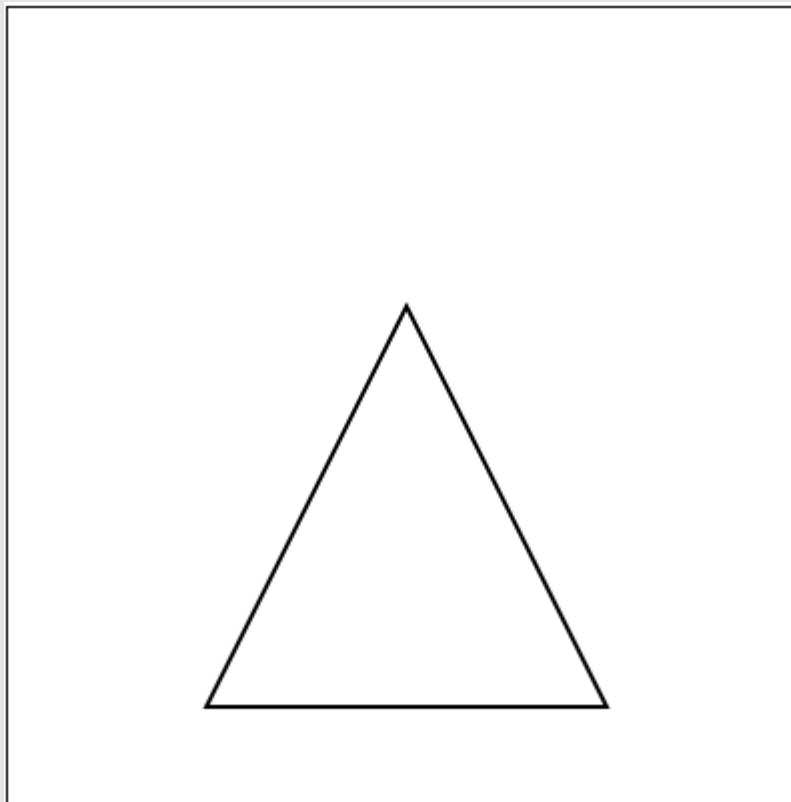
```
    h -100
```

```
    z"
```

/>

Drawing with Path Elements

```
<path  
    d="M 100, 75  
      l 50, 100  
      h -100  
      z"  
/>
```



Drawing with Path Elements

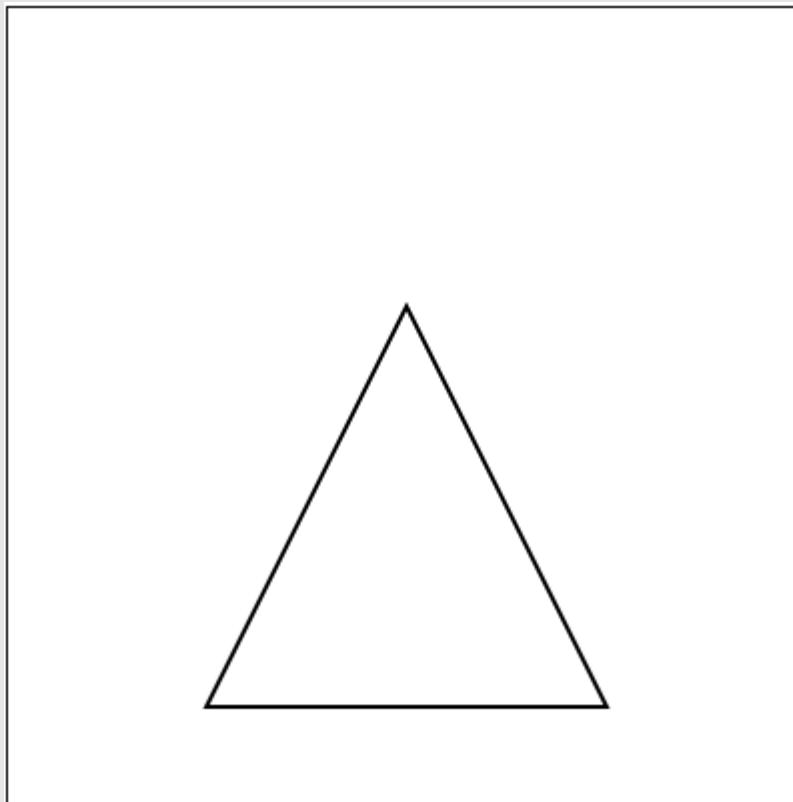
```
<path
```

```
    d="M 100, 75
```

```
    l 50, 100
```

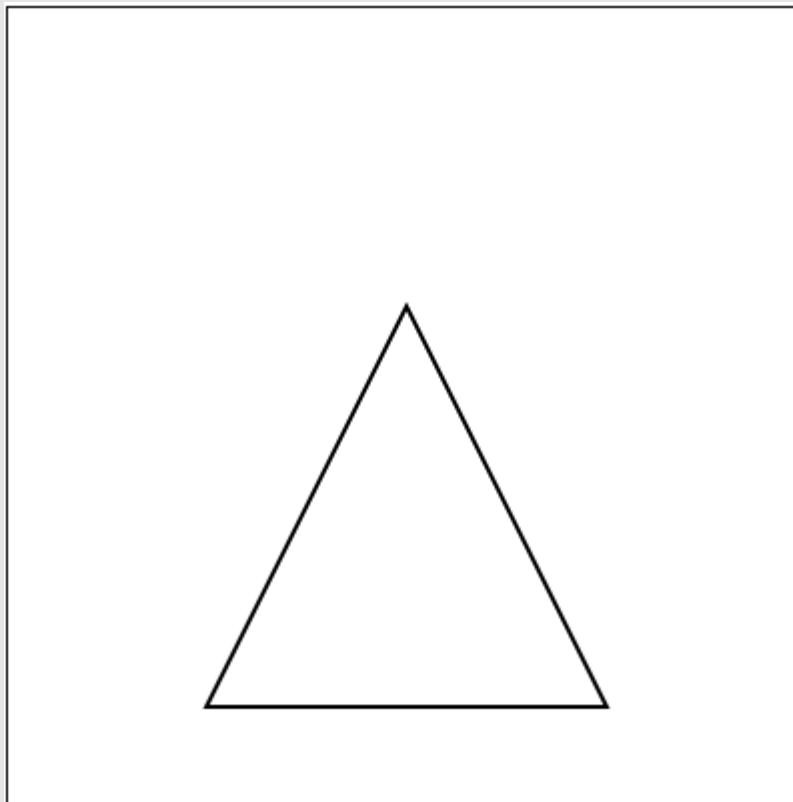
```
    h -100
```

```
    z"
```

/>

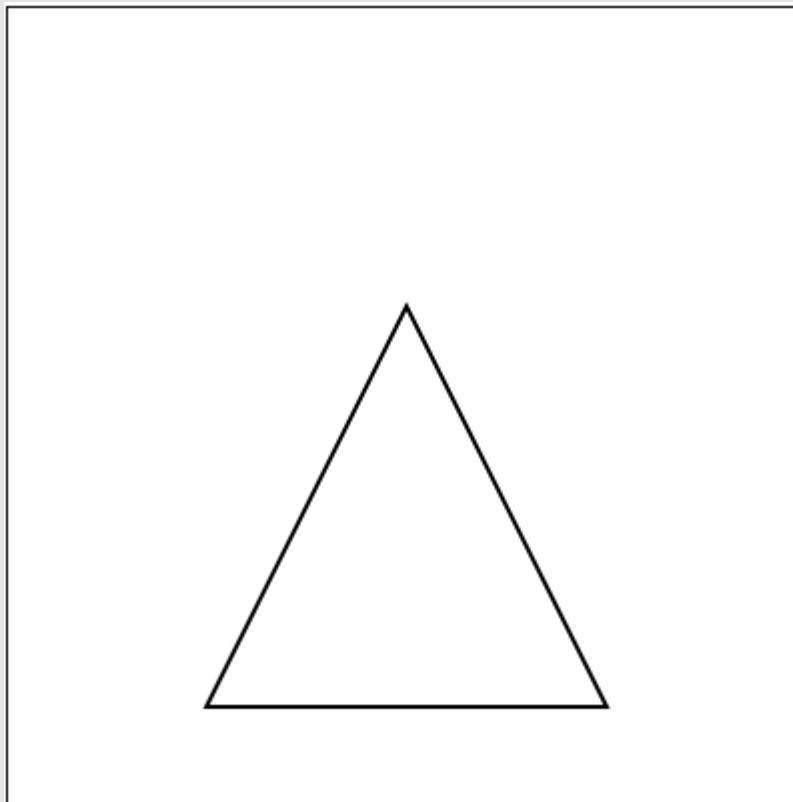
Drawing with Path Elements

```
<path  
    d="M 100, 75  
      l 50, 100  
      h -100  
      z"  
/>
```



Drawing with Path Elements

```
<path  
    d="M 100, 75  
      l 50, 100  
      h -100  
      z"  
/>
```

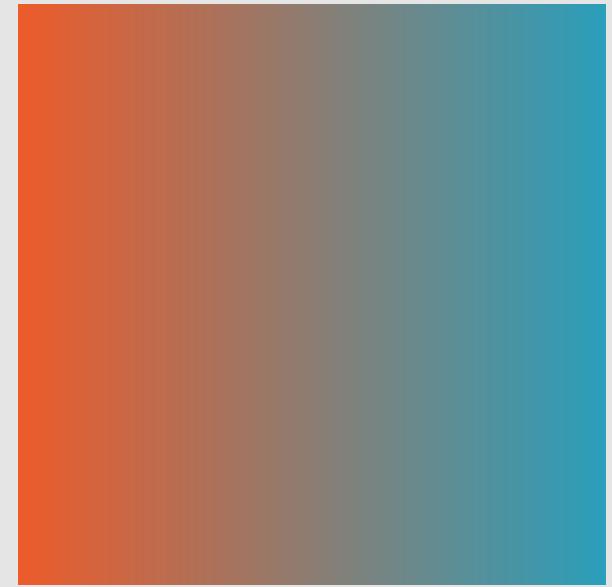


M or m	◀ Move absolute or relative
L or l	◀ Line
H or h	◀ Horizontal line
V or v	◀ Vertical line
C or c	◀ Bezier curve
S or s	◀ Smooth adjacent Bezier curves
Q or q	◀ Quadratic curve
T or t	◀ Smooth adjacent quadratic curves
A or a	◀ Arc
Z or z	◀ Close curve



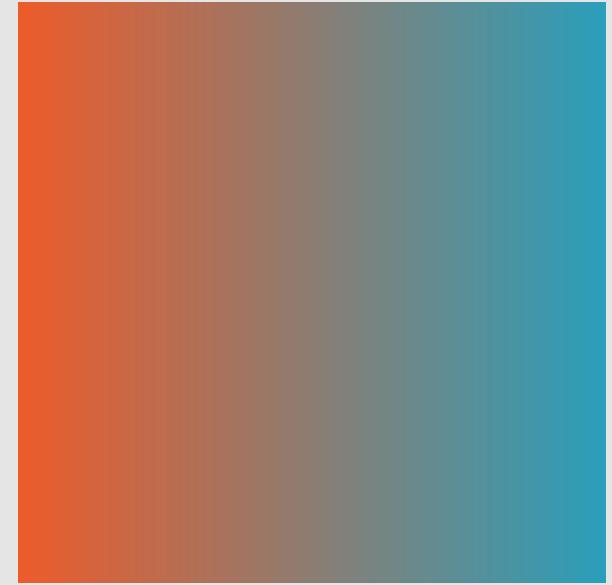
Gradients

```
<svg height="500" width="200"  
      xmlns="http://www.w3.org/2000/svg">  
  
<defs>  
  
  <linearGradient id="gradient1">  
    <stop offset="0%" stop-color="rgb(240, 90, 40)"/>  
    <stop offset="100%" stop-color="rgb(42, 159, 188)" />  
  </linearGradient>  
  
</defs>  
  
<rect x="10" y="10" width="180" height="180" fill="url(#gradient1)"/>  
  
</svg>
```



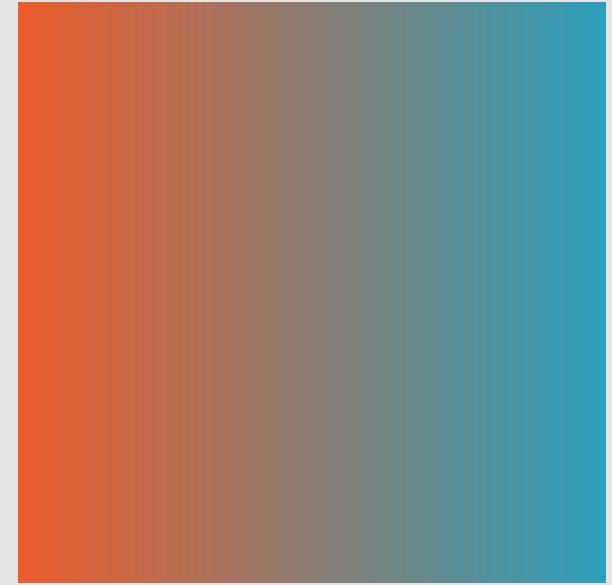
Gradients

```
<svg height="500" width="200"  
      xmlns="http://www.w3.org/2000/svg">  
  
<defs>  
  
  <linearGradient id="gradient1">  
    <stop offset="0%" stop-color="rgb(240, 90, 40)"/>  
    <stop offset="100%" stop-color="rgb(42, 159, 188)" />  
  </linearGradient>  
  
</defs>  
  
<rect x="10" y="10" width="180" height="180" fill="url(#gradient1)"/>  
  
</svg>
```



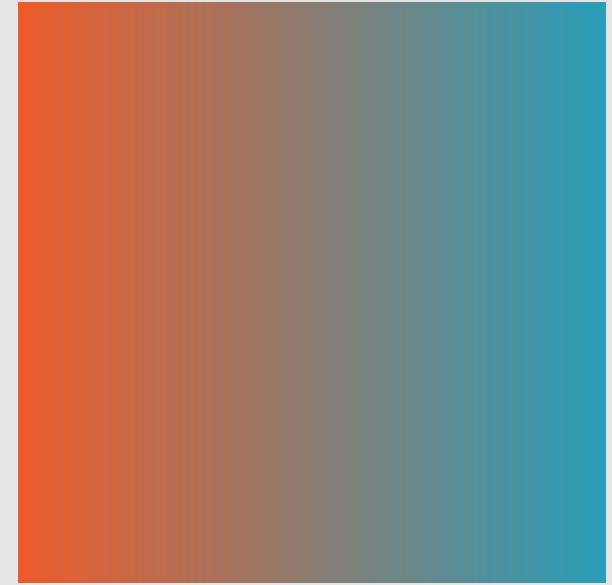
Gradients

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<svg height="500" width="200"  
      xmlns="http://www.w3.org/2000/svg">  
  
<defs>  
  
  <linearGradient id="gradient1">  
    <stop offset="0%" stop-color="rgb(240, 90, 40)"/>  
    <stop offset="100%" stop-color="rgb(42, 159, 188)" />  
  </linearGradient>  
  
</defs>  
  
<rect x="10" y="10" width="180" height="180" fill="url(#gradient1)"/>  
  
</svg>
```



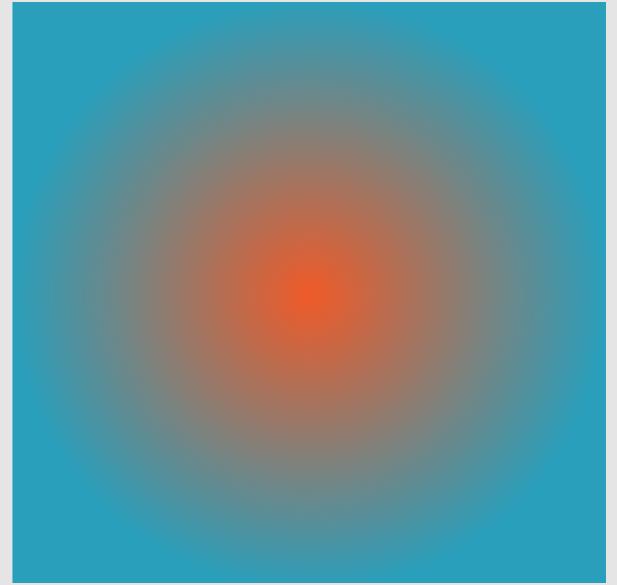
Gradients

```
<svg height="500" width="200"  
      xmlns="http://www.w3.org/2000/svg">  
  
<defs>  
  
  <linearGradient id="gradient1">  
    <stop offset="0%" stop-color="rgb(240, 90, 40)"/>  
    <stop offset="100%" stop-color="rgb(42, 159, 188)" />  
  </linearGradient>  
  
</defs>  
  
<rect x="10" y="10" width="180" height="180" fill="url(#gradient1)"/>  
  
</svg>
```



Gradients

```
<svg height="500" width="200"  
      xmlns="http://www.w3.org/2000/svg">  
  
<defs>  
  
  <radialGradient id="gradient2">  
    <stop offset="0%" stop-color="rgb(240, 90, 40)"/>  
    <stop offset="100%" stop-color="rgb(42, 159, 188)" />  
  </radialGradient>  
  
</defs>  
  
<rect x="10" y="10" width="180" height="180" fill="url(#gradient2)"/>  
  
</svg>
```



Summary



What are Scalable Vector Graphics (SVG)?

Rendering different types of content

- Basic shapes
- Paths
- Text
- Images

Animating SVGs

<https://developer.mozilla.org/en-US/docs/Web/SVG>

