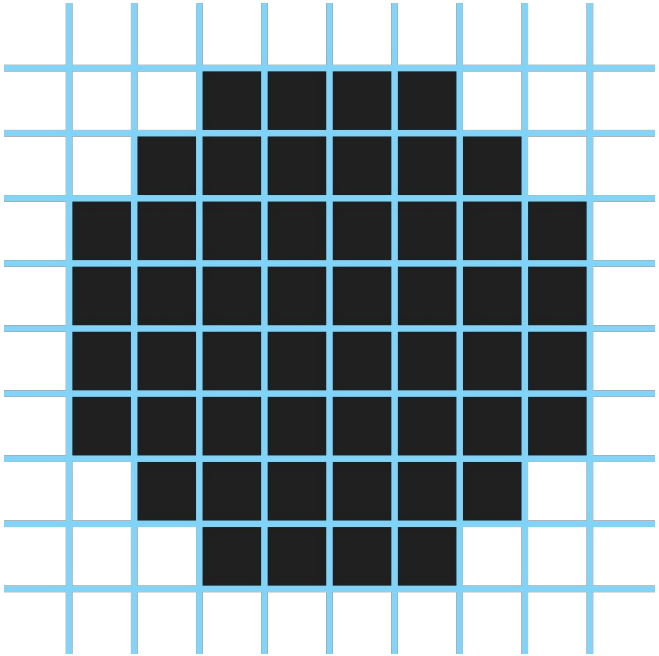
# Intro to SVGs

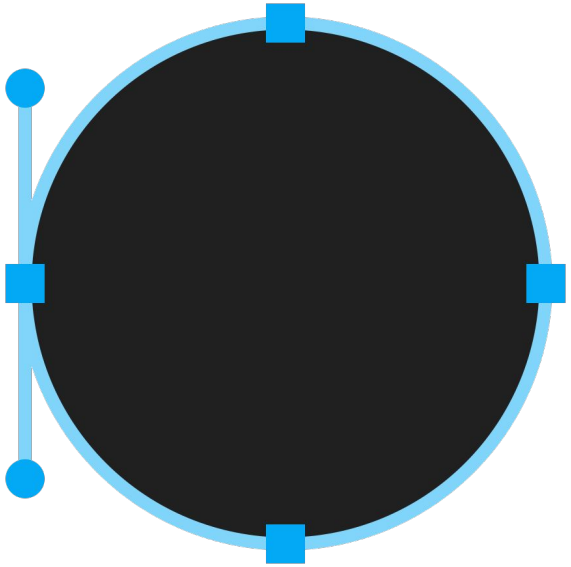
(for academic folk)

*Scalable **Vector** Graphics*

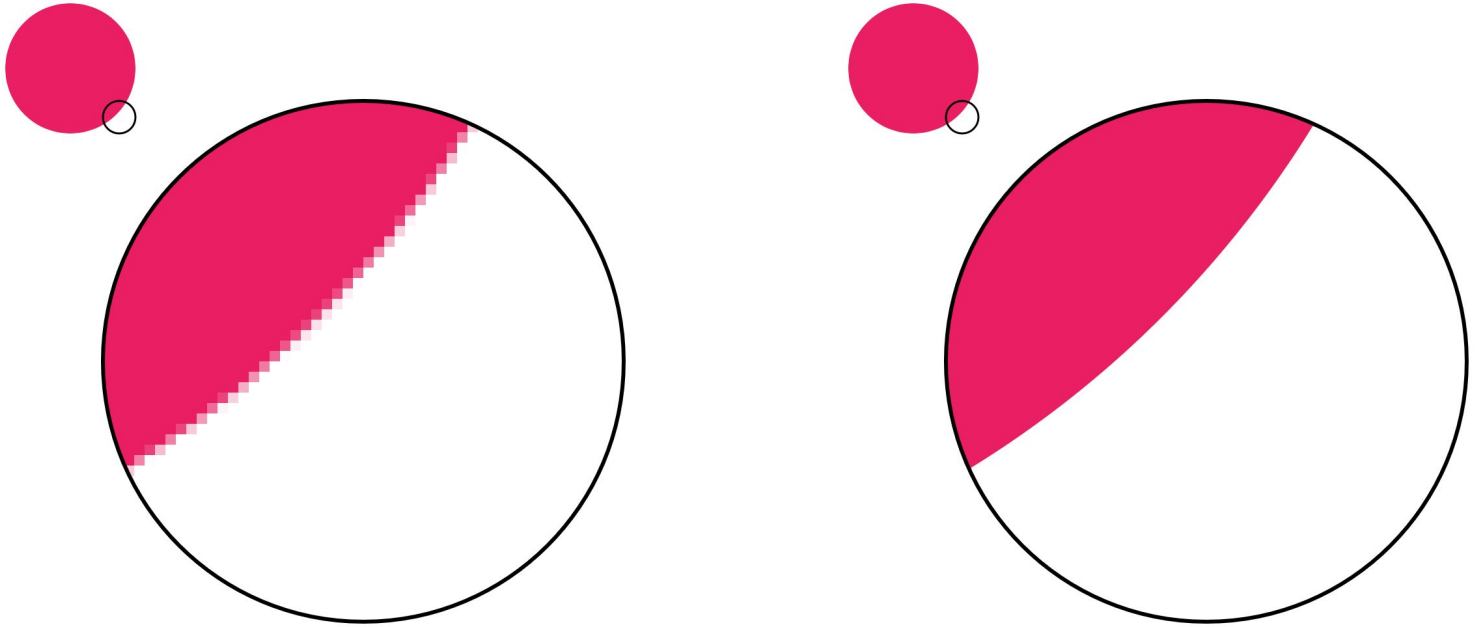
# Background

# Raster vs Vector

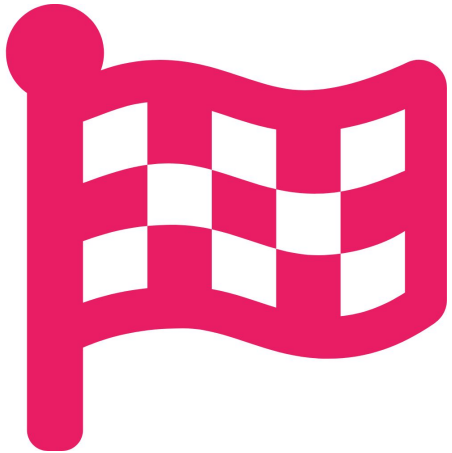




# Raster vs Vector



# Limitations of Vector Graphics



# The <svg> tag

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

# How SVGs are written

```
<element attribute="value">
    <child attribute="value">
        ... more content ...
    </child>
    <child attribute="value" />
</element>
<!-- comment -->
```

# What is SVG


# The basics

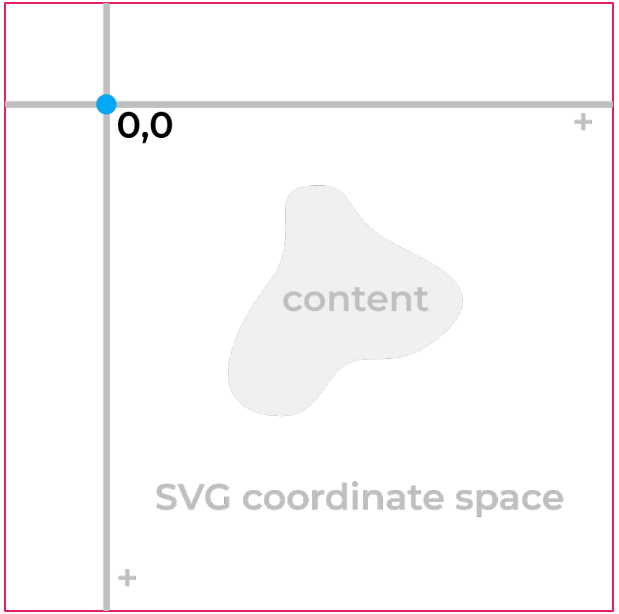
# Units

**Absolute**

1px = 1
1in = 96
1cm = 37.795
1pt = 1.333

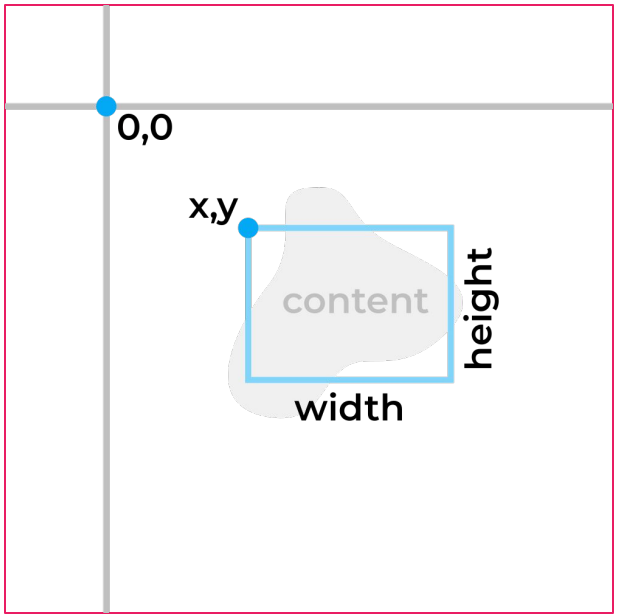
**Relative**

1em = current font size



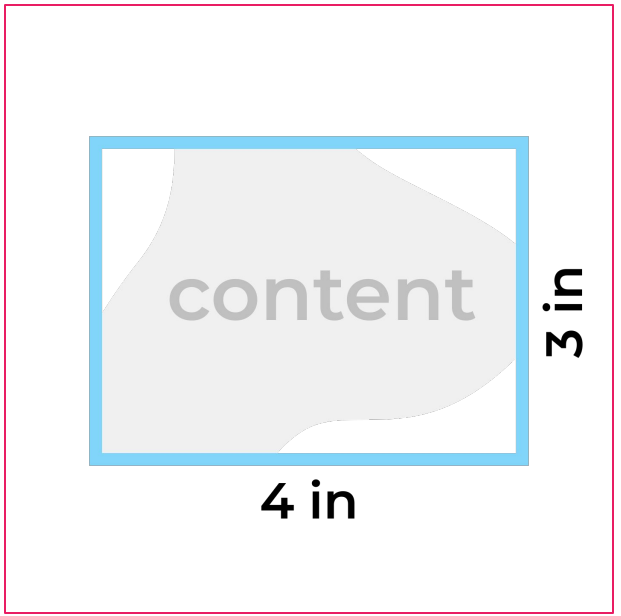
# viewBox

```
viewBox="x y width height"

viewBox="70 60 100 75"
```



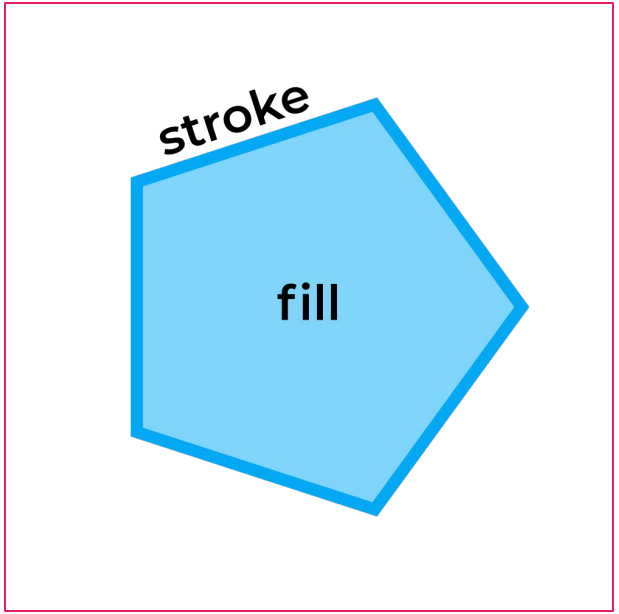
# Width and height

```
width="..." height="..."

width="4in" height="3in"
```



# Stroke and fill

```
fill="..." stroke="..."

fill="skyblue" stroke="blue"
```

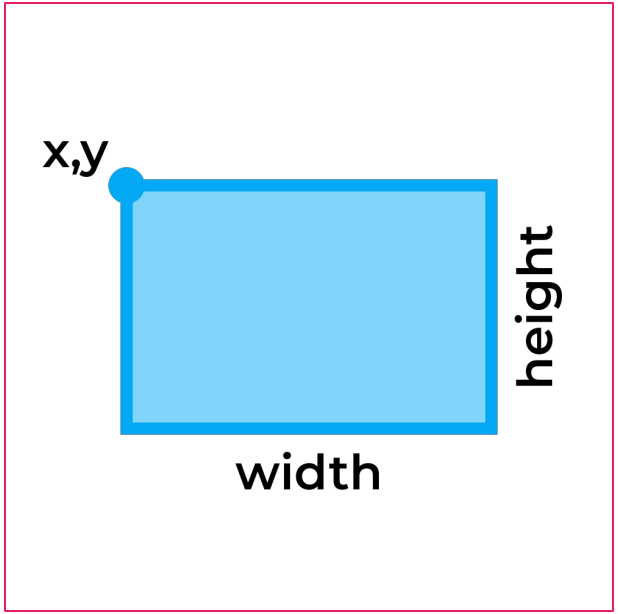


# Color

| | Normal, opaque | With transparency |
|---|---|---|
| **Named** | red | - |
| **Hex** | #ff0000 | #ff000080 |
| **Red, Green, Blue** | rgb(255, 0, 0) | rgba(255, 0, 0, 0.5) |
| **Hue, Saturation, Luminance** | hsl(0, 0%, 100%) | hsla(0, 0%, 100%, 0.5) |

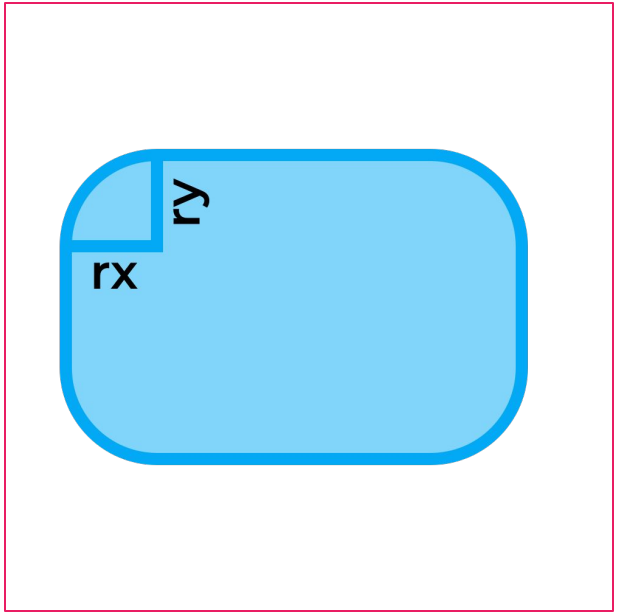
# Rectangle

```
<rect
    x="..."
    y="..."
    width="..."
    height="..."
/>
```



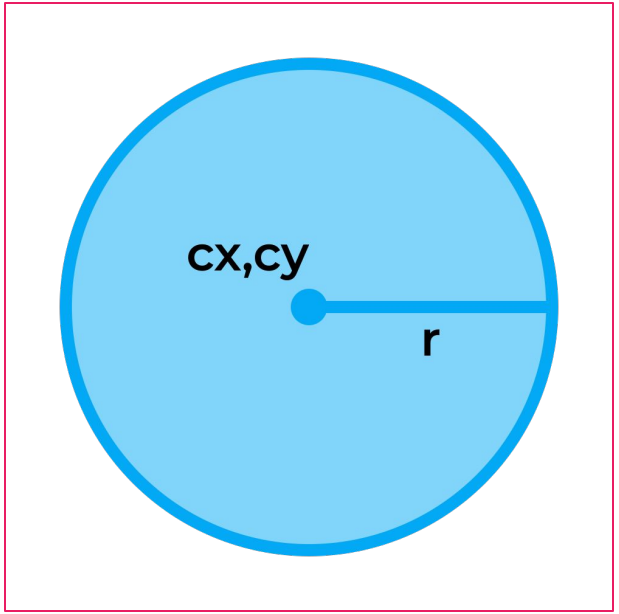
# Rounded rectangle

```
rx="..."
ry="..."
```



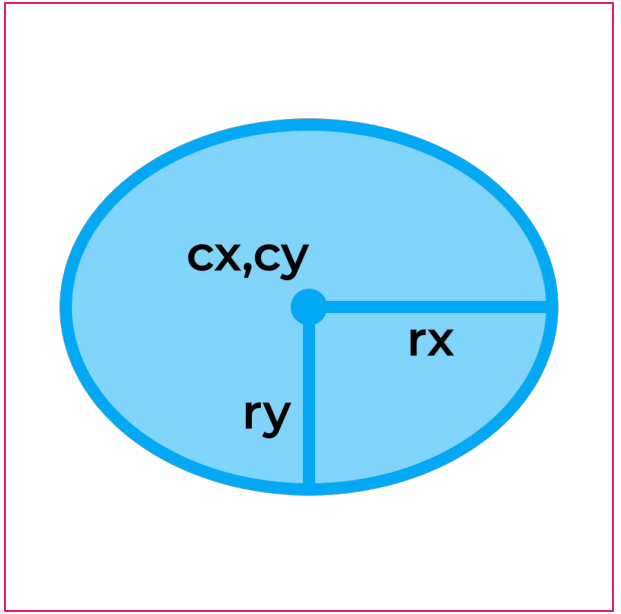
# Circle

```
<circle
     cx="..."
     cy="..."
     r="..."
/>
```



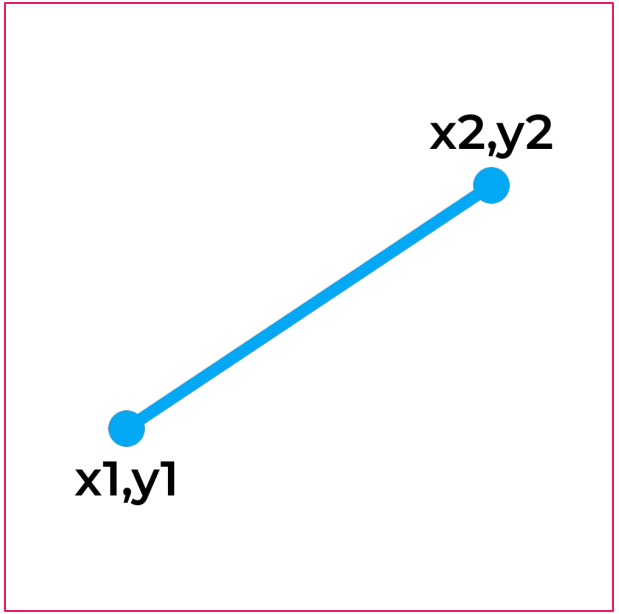
# Ellipse

```
<ellipse
     cx="..."
     cy="..."
     ry="..."
     rx="..."
/>
```



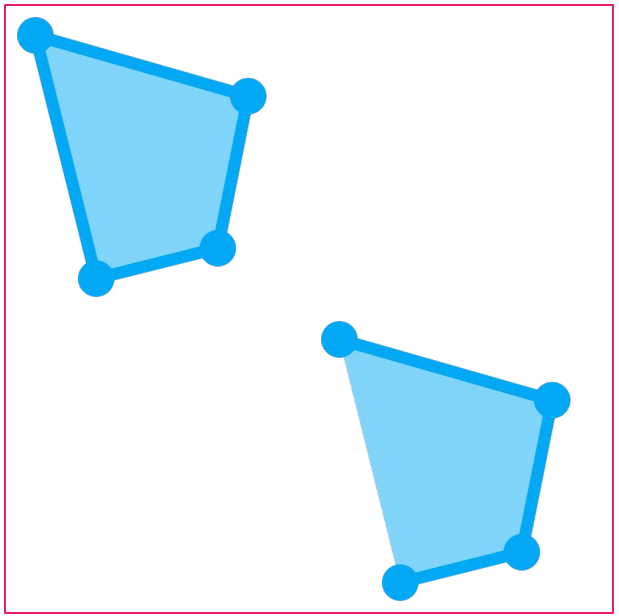
# Line

```
<line
    x1="..."
    y1="..."
    x2="..."
    y2="..."
/>
```



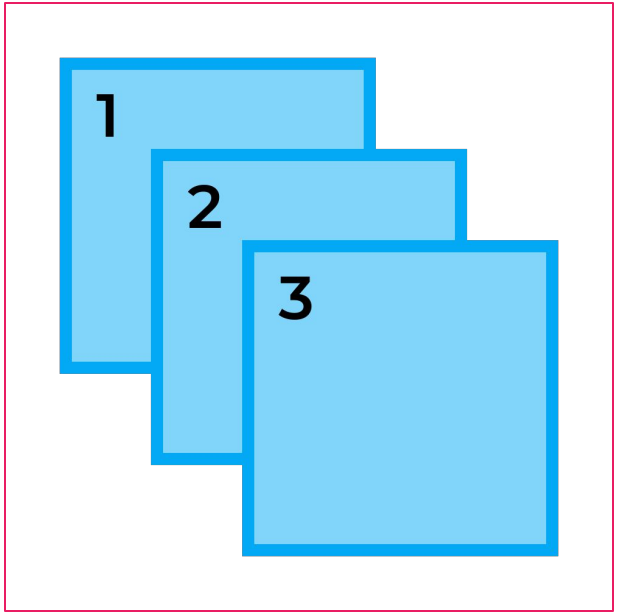
# Polygon / polyline

```
<polygon/polyline
    points="... x y x y ..."
/>
```

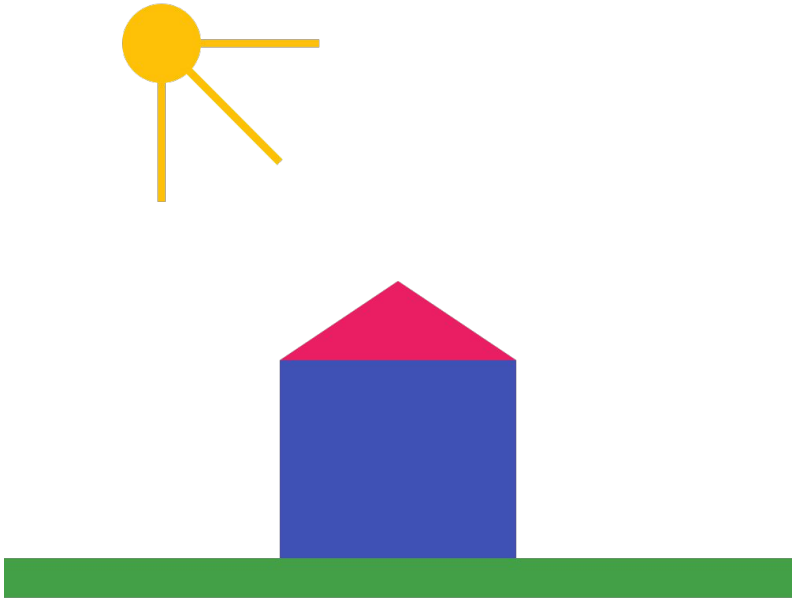


# Z-order

```
<!-- 1 -->
<rect />
<!-- 2 -->
<rect />
<!-- 3 -->
<rect />
```



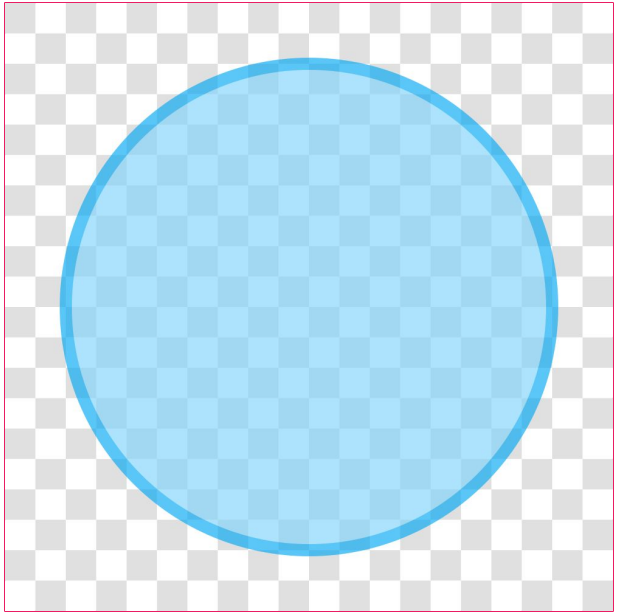
# Exercise 1



# Strokes, text, and more

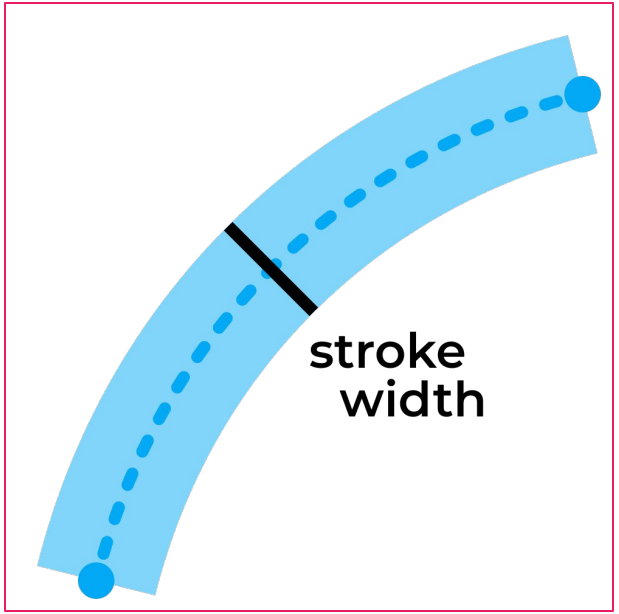
# Opacity

```
opacity="..."
```



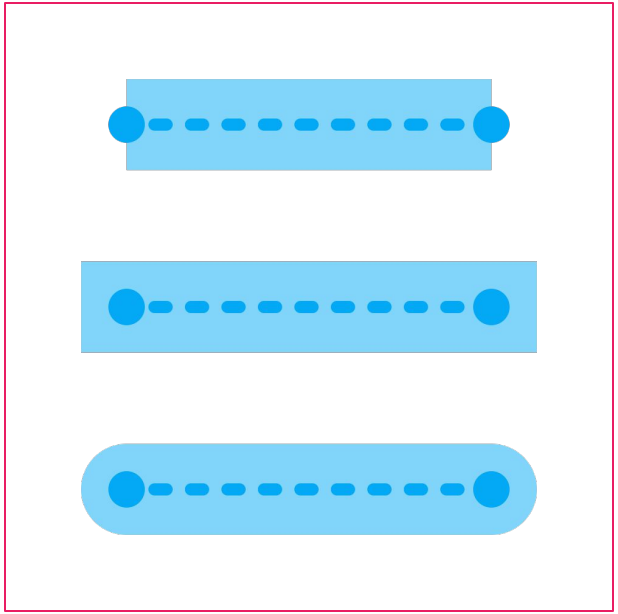
# Stroke width

```
stroke-width="..."
```



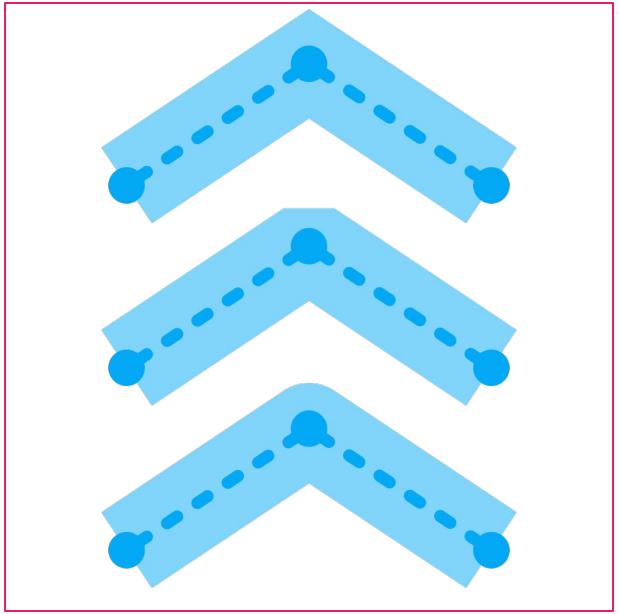
# Stroke line cap

```
stroke-linecap="butt"

stroke-linecap="square"

stroke-linecap="round"
```



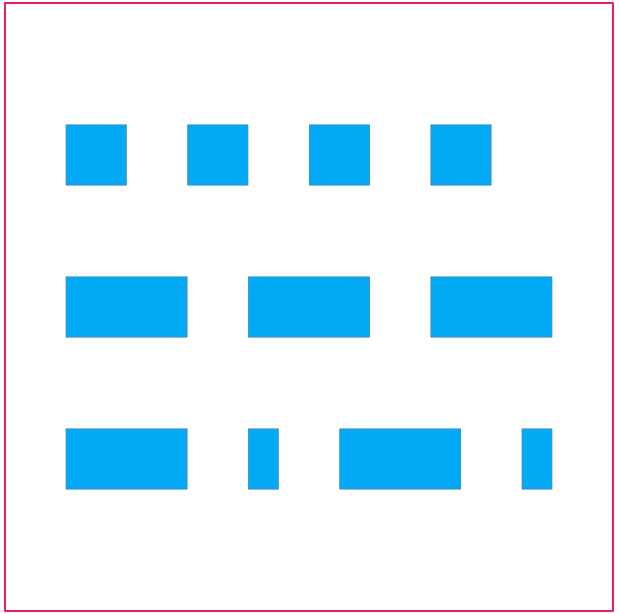
# Stroke line join

```
stroke-linejoin="miter"

stroke-linejoin="bevel"

stroke-linejoin="round"
```



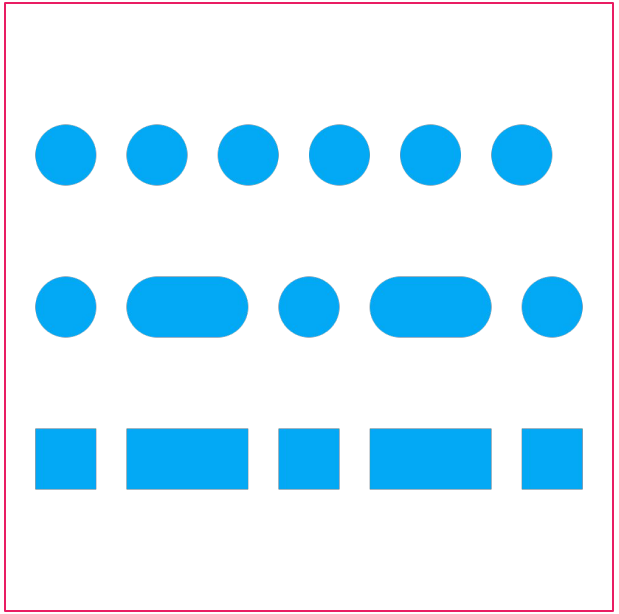
# Dashed lines

```
stroke-dasharray="d g d g ..."

stroke-dasharray="10"
stroke-dasharray="20 10"
stroke-dasharray="20 10 5 10"
```



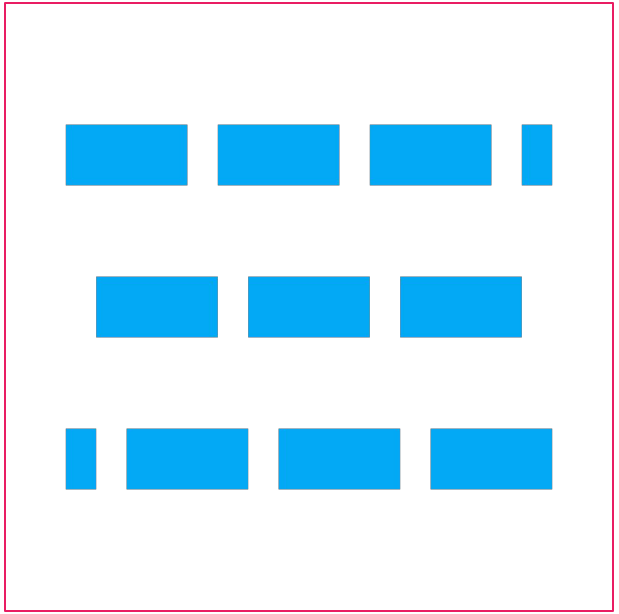
# Dotted lines

```
stroke-dasharray="0 15"

stroke-dasharray="0 15 10 15"

stroke-dasharray="0 15 10 15"
```



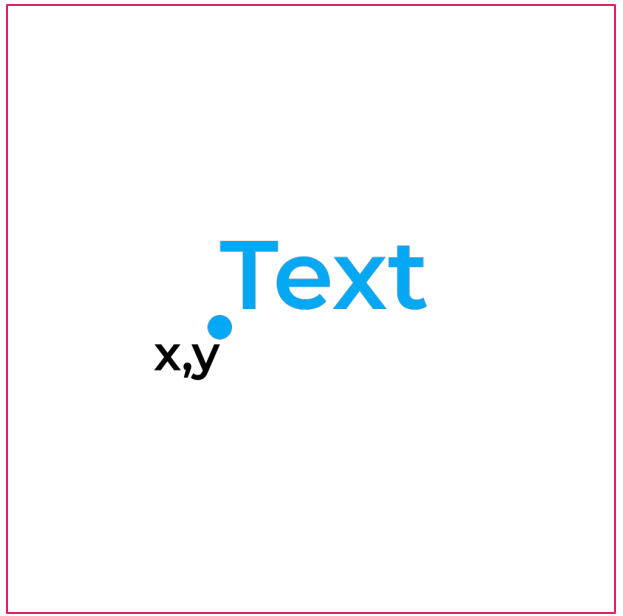
# Dash offset

```
stroke-dashoffset="0"

stroke-dashoffset="-5"

stroke-dashoffset="-10"
```



# Text

```
<text
    x="..."
    y="..."
>
    Text
</text>
```

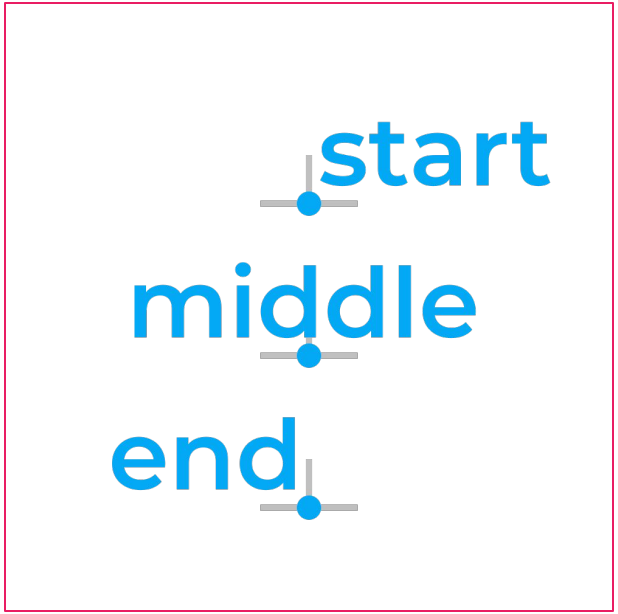


# Text style

```
font-family="Montserrat"
font-size="16"
font-weight="bold"
font-style="italic"
text-decoration="underline"
letter-spacing="5"
```

# Text horizontal align

```
text-anchor="start"

text-anchor="middle"

text-anchor="end"
```



# Text vertical align

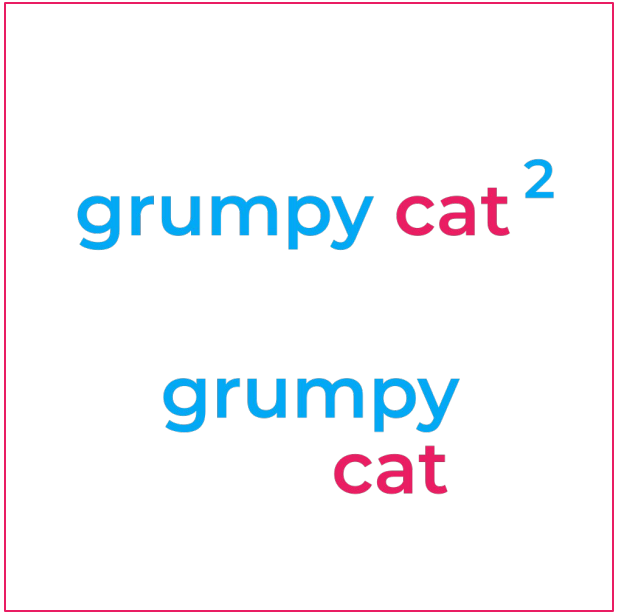
```
dominant-baseline="baseline"

dominant-baseline="middle"

dominant-baseline="hanging"
```

# <tspan>

```
<text>
    grumpy
    <tspan fill="#e91e63">
        cat
    </tspan>
</text>
```

# <tspan> offset

```
baseline-shift="super"
baseline-shift="sub"

dx="..."
dy="..."
```

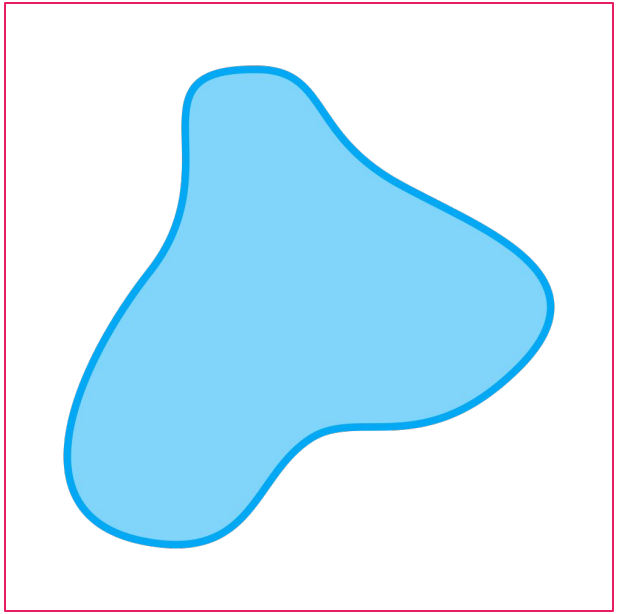


# Exercise 2

# Paths

# Paths

```
<text
    d="..."
    fill="..."
    stroke="..."
/>
```

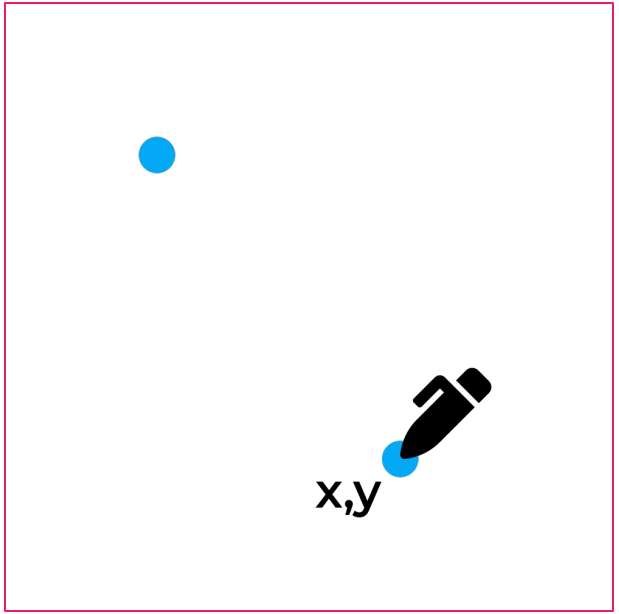


# Path d syntax

```
M 50 50 L 100 100 C 75 100, 50 75, 50 50


M 50,50 L 100,100 C 75,100 50,75 50,50


M 50 50
L 100 100
C 75 100 50 75 50 50
```

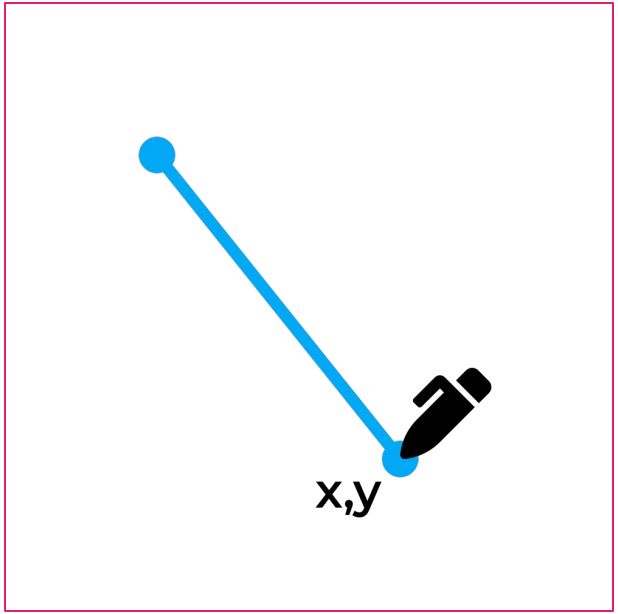
# Move to

```
M x y
```



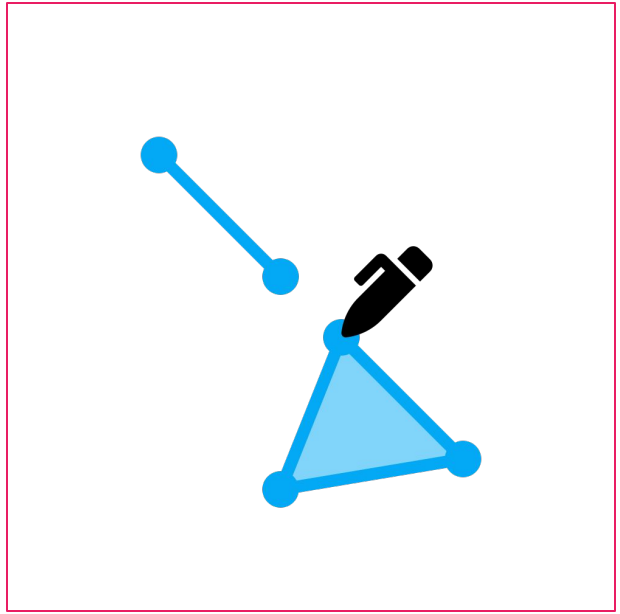
# Line to

```
L x y

H x
V y
```



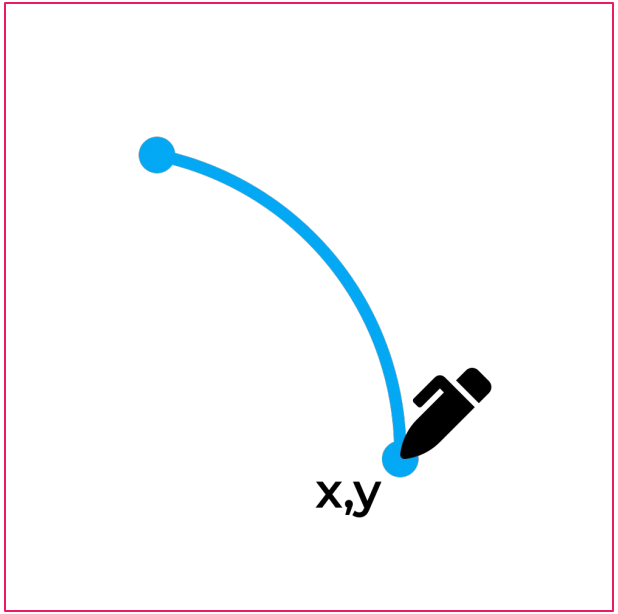
# Close

```
M 25 25
L 45 45
M 55 55
L 75 75
L 45 80
Z
```



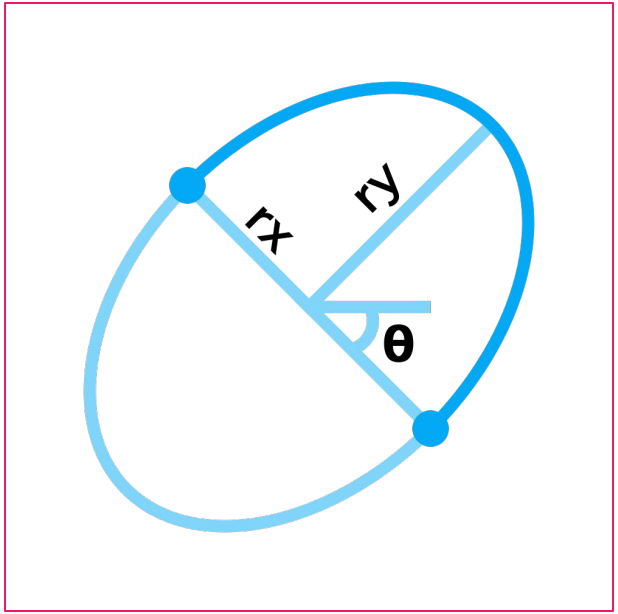
# Arc to

```
A rx ry angle large cw x y

A 50 50 0 0 1 65 75
```



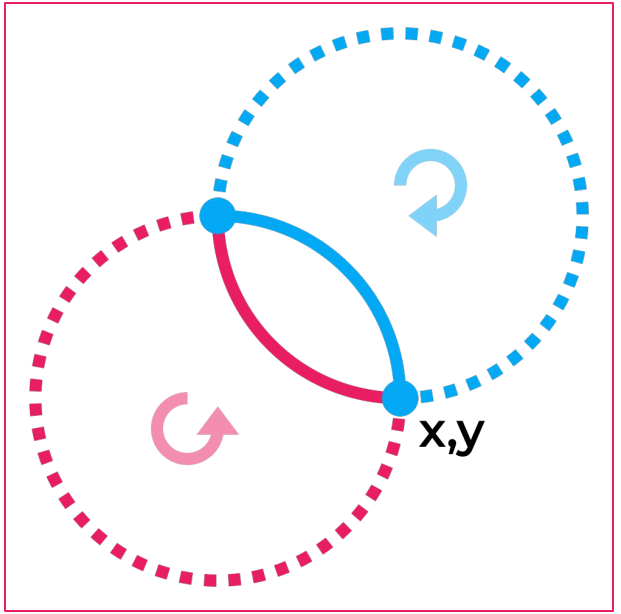
# Arc to - radius and rotation

```
A rx ry angle large cw x y
```



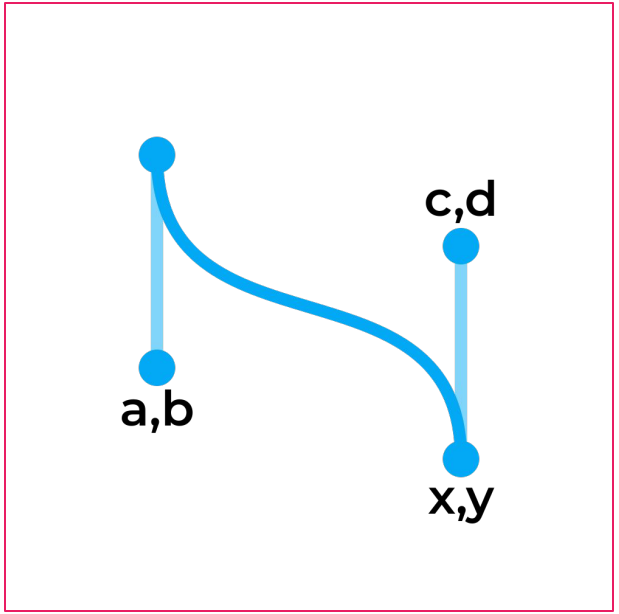
# Arc to - flags

```
A rx ry angle large cw x y
```



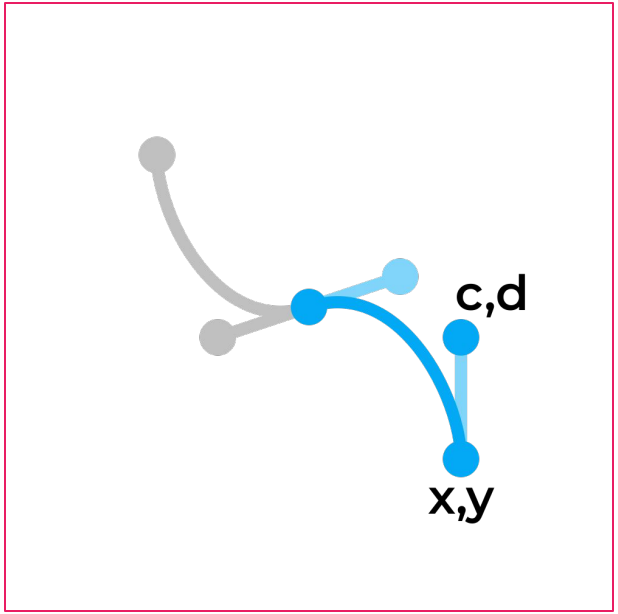
# Curve to

```
C a b c d x y
```



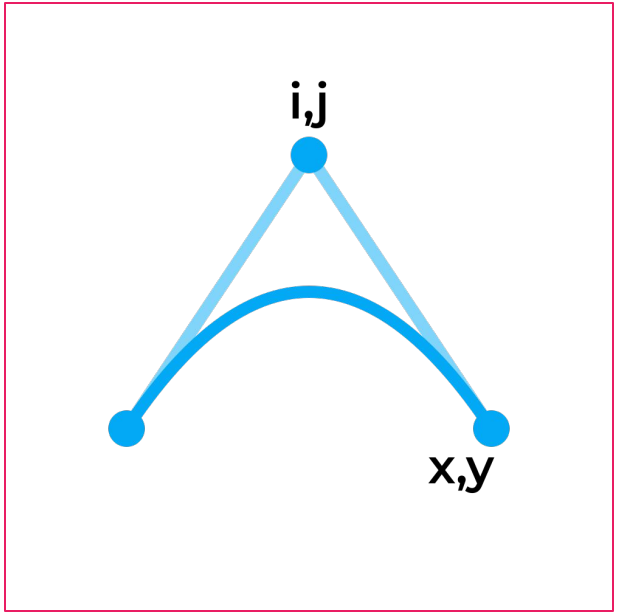
# Curve to - shorthand

```
S c d x y
```



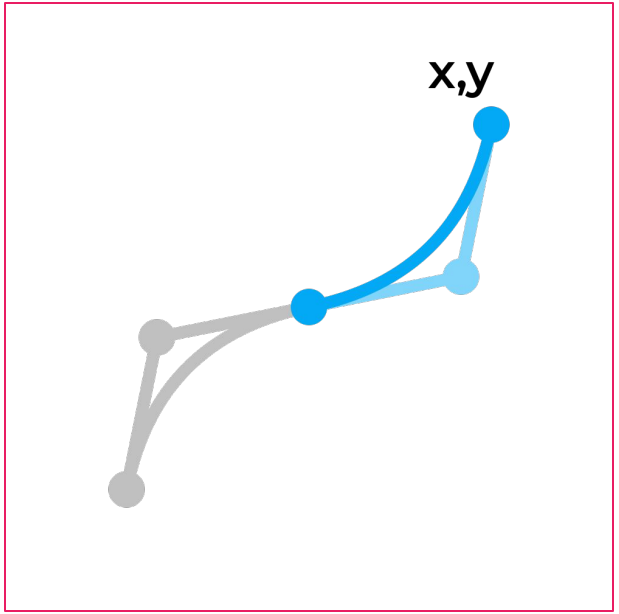
# Quadratic to

```
Q i j x y
```



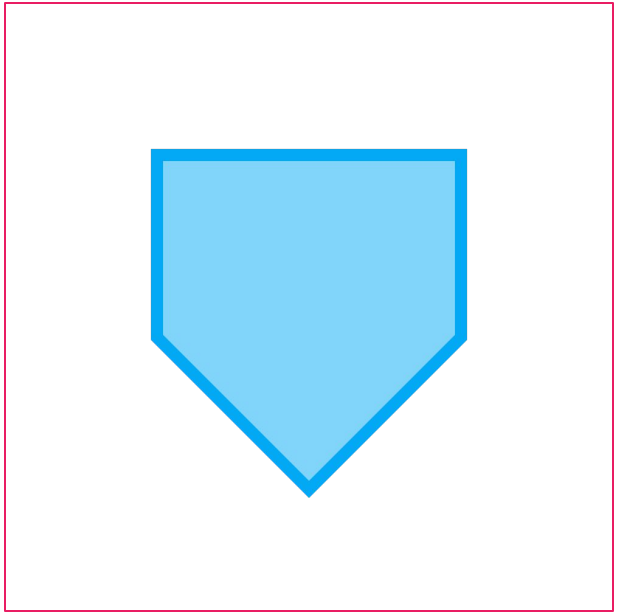
# Quadratic to - shorthand

```
T x y
```



# Relative coordinates

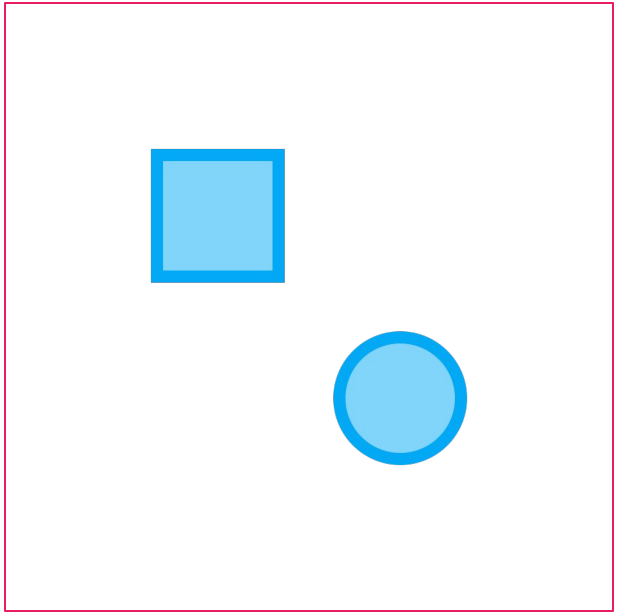
```
M 25 25
h 50
v 30
l -25 25
l -25 -25
z
```



# Quirks

```
M 25 25
l 20 0
  0 20
  65 55
  -20 0
z
```

```
M 65 55
A 10 10 0 0 1 65 75
A 10 10 0 0 1
z
```



# Exercise 3