Simple drawing

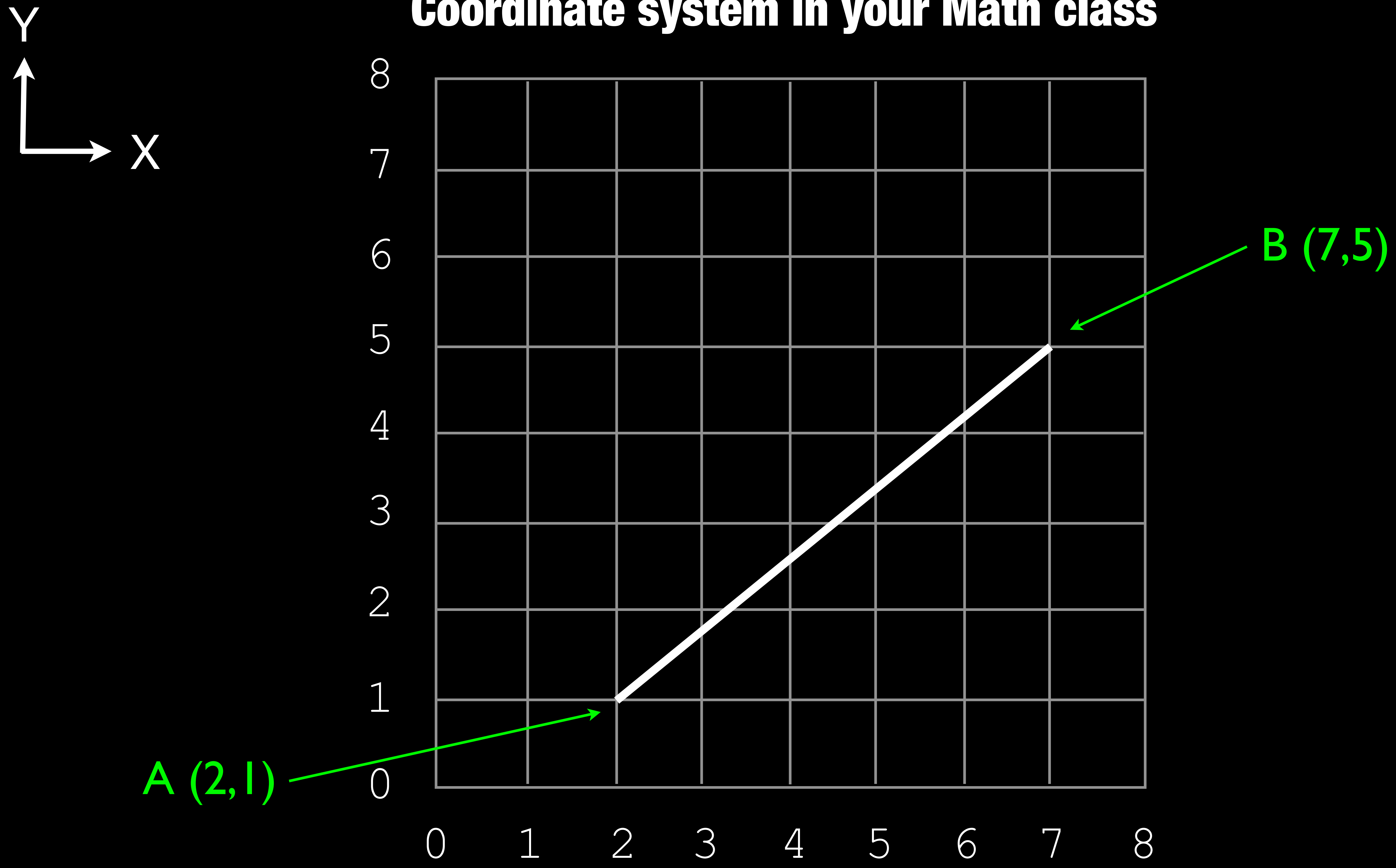
AME 230 - Programming for Media Arts

Pixel coordinates

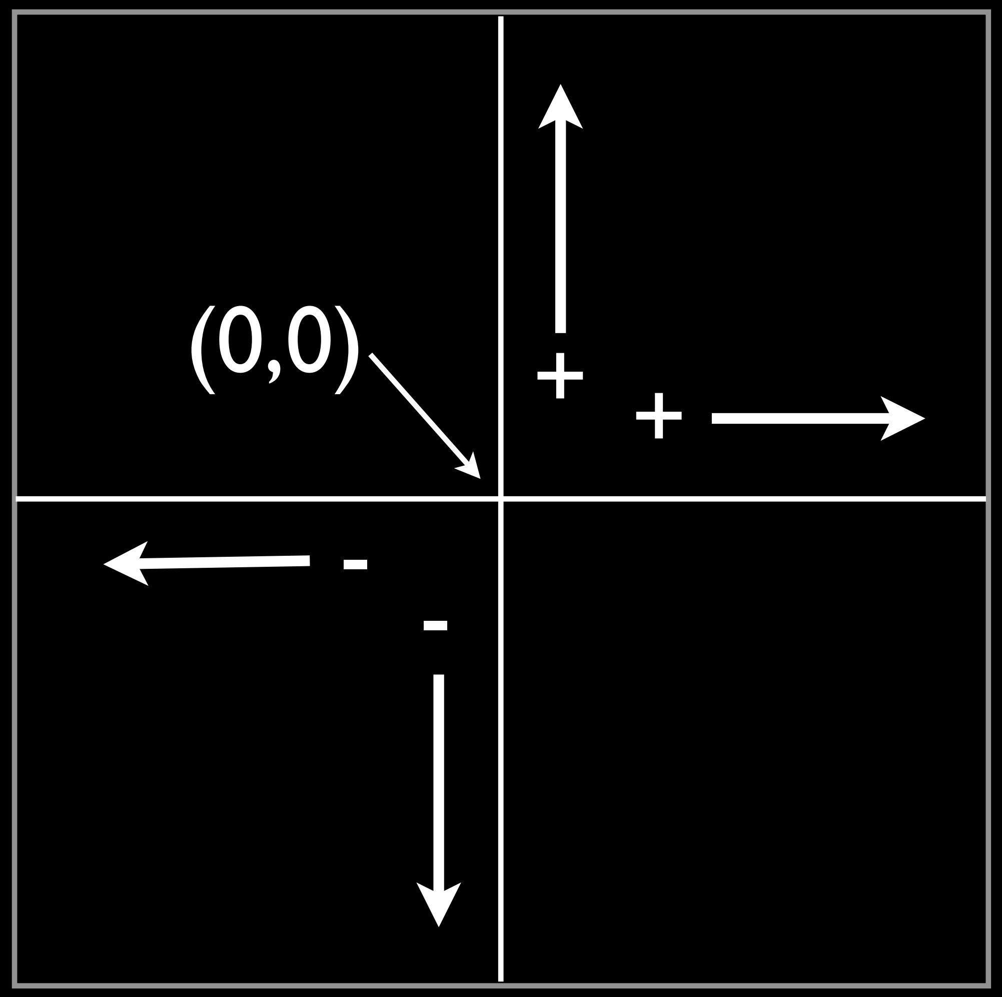
Basic shapes

Color

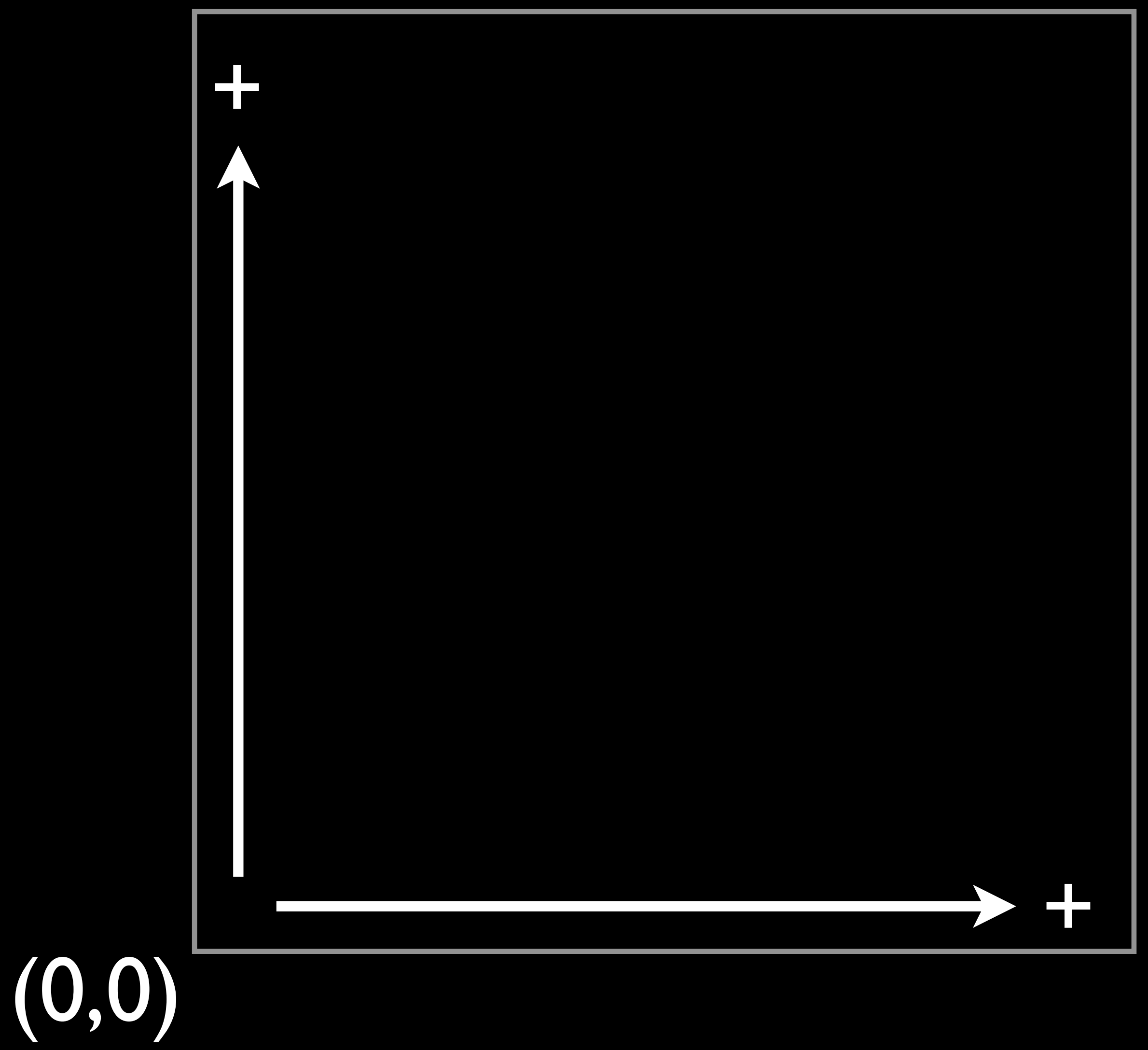
Coordinate system in your Math class



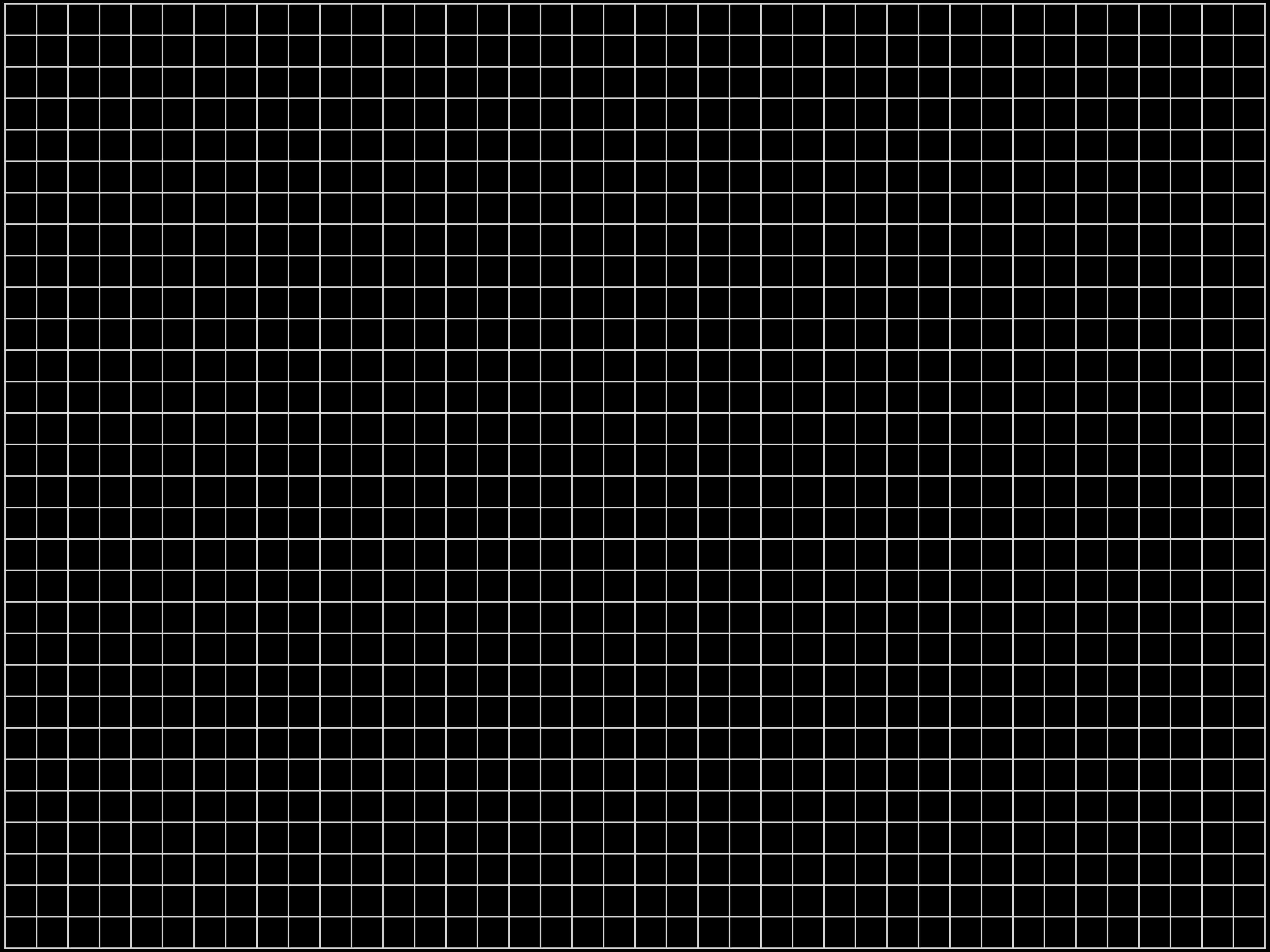
simple math
graphing coordinates



our drawing
coordinates

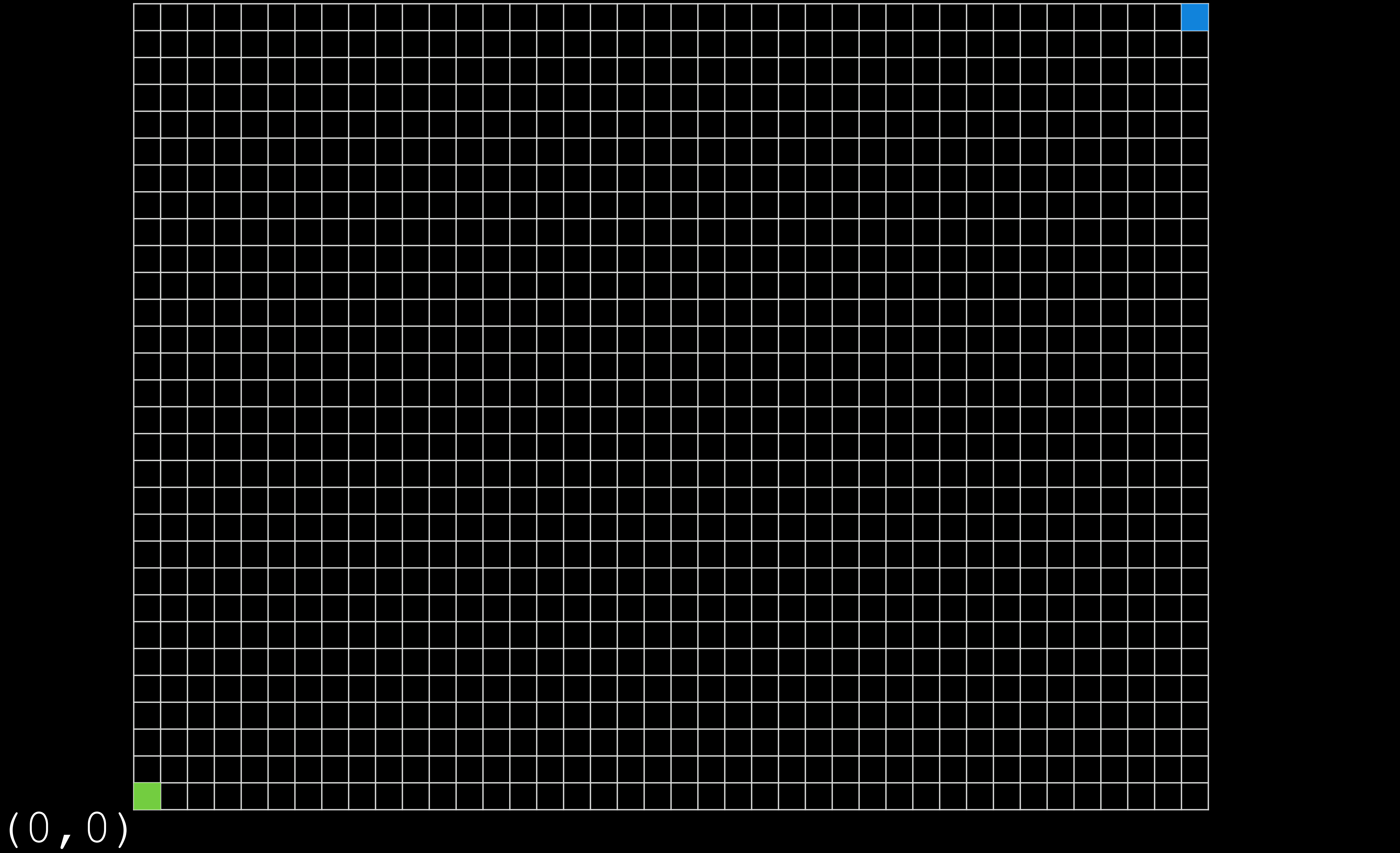


Our views on screen are made with a grid of pixels.



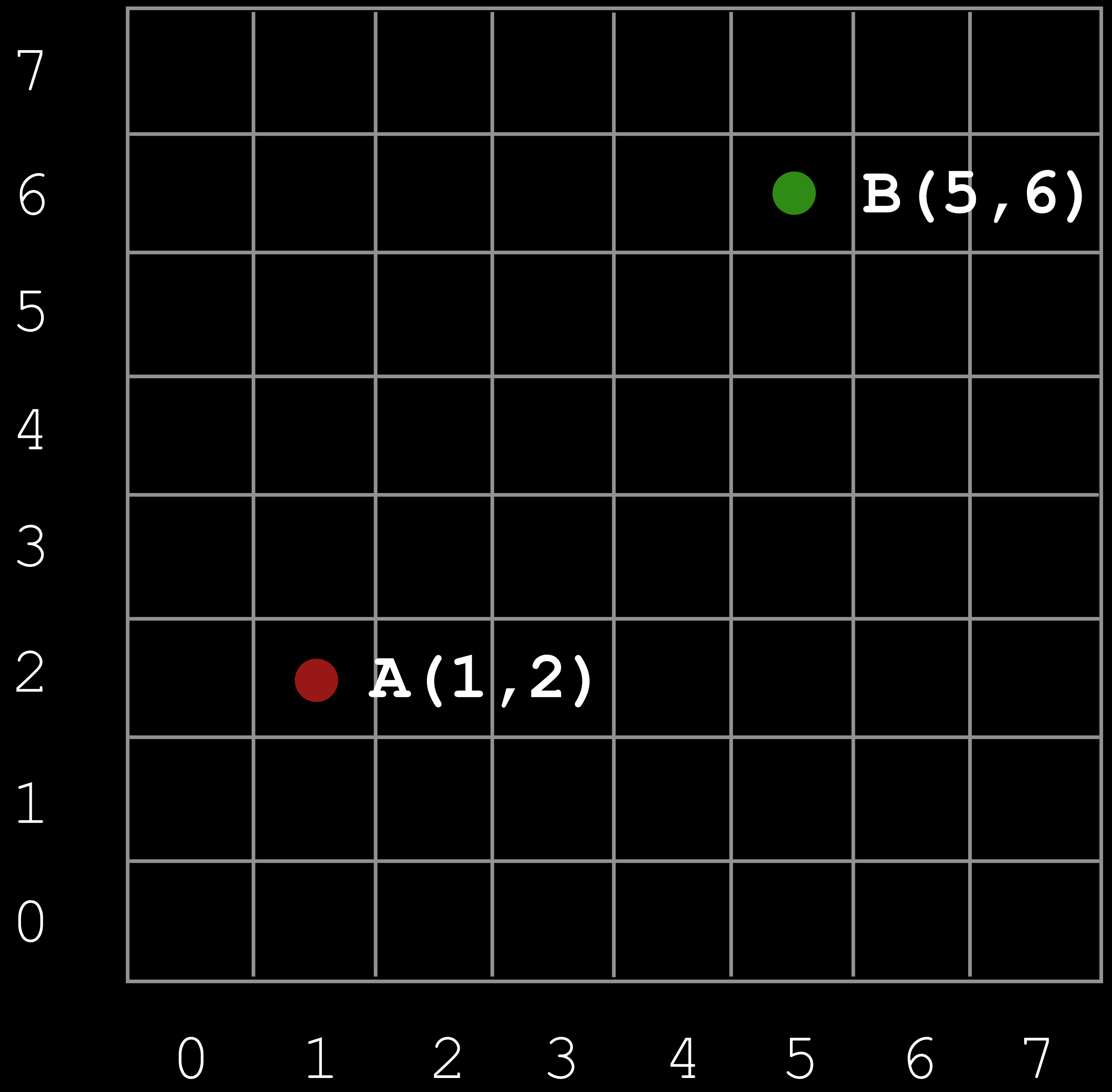
A pixel is a “picture element” - a point with a color value.

A 40x30 pixel grid.

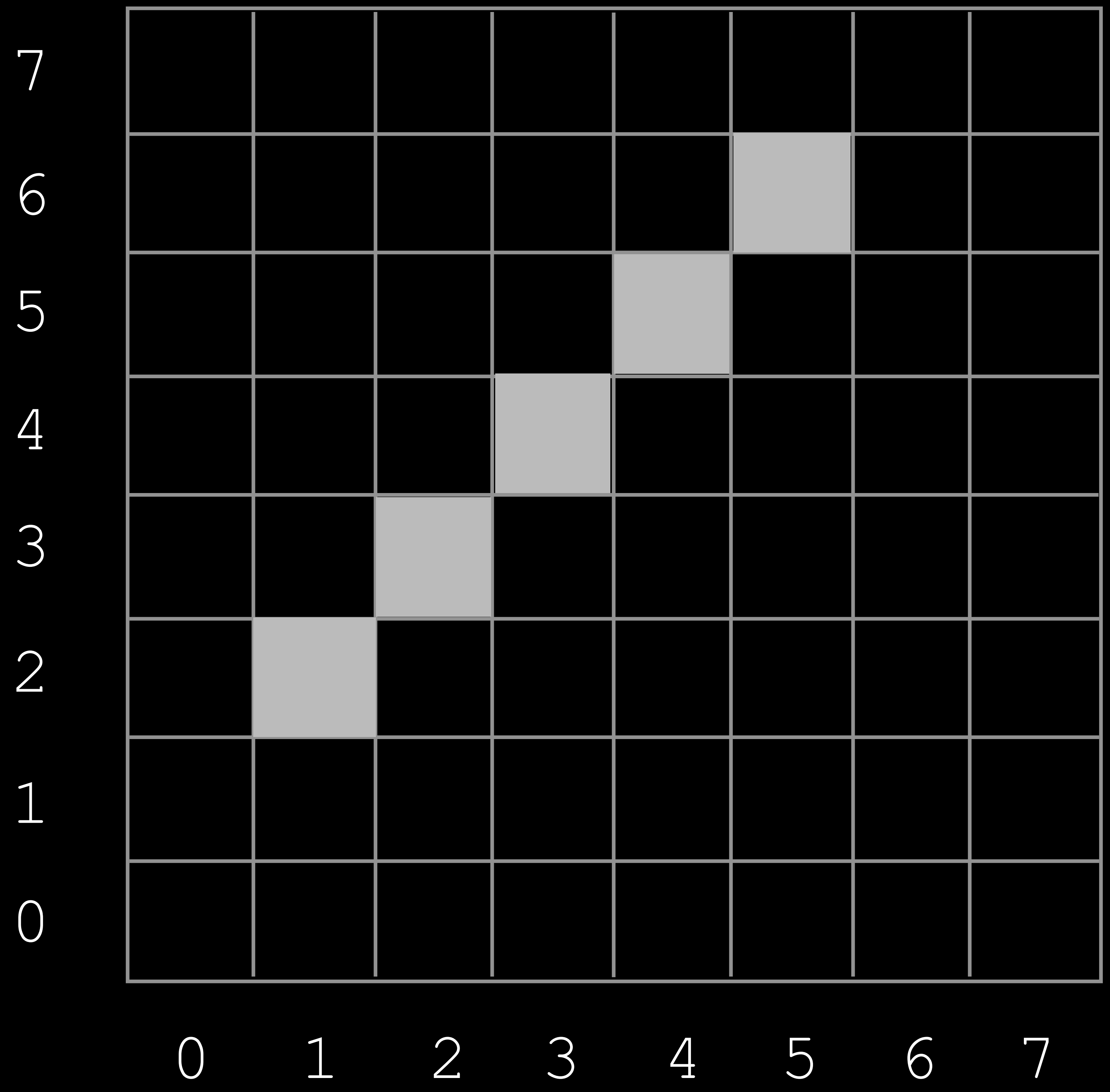


Drawing shapes

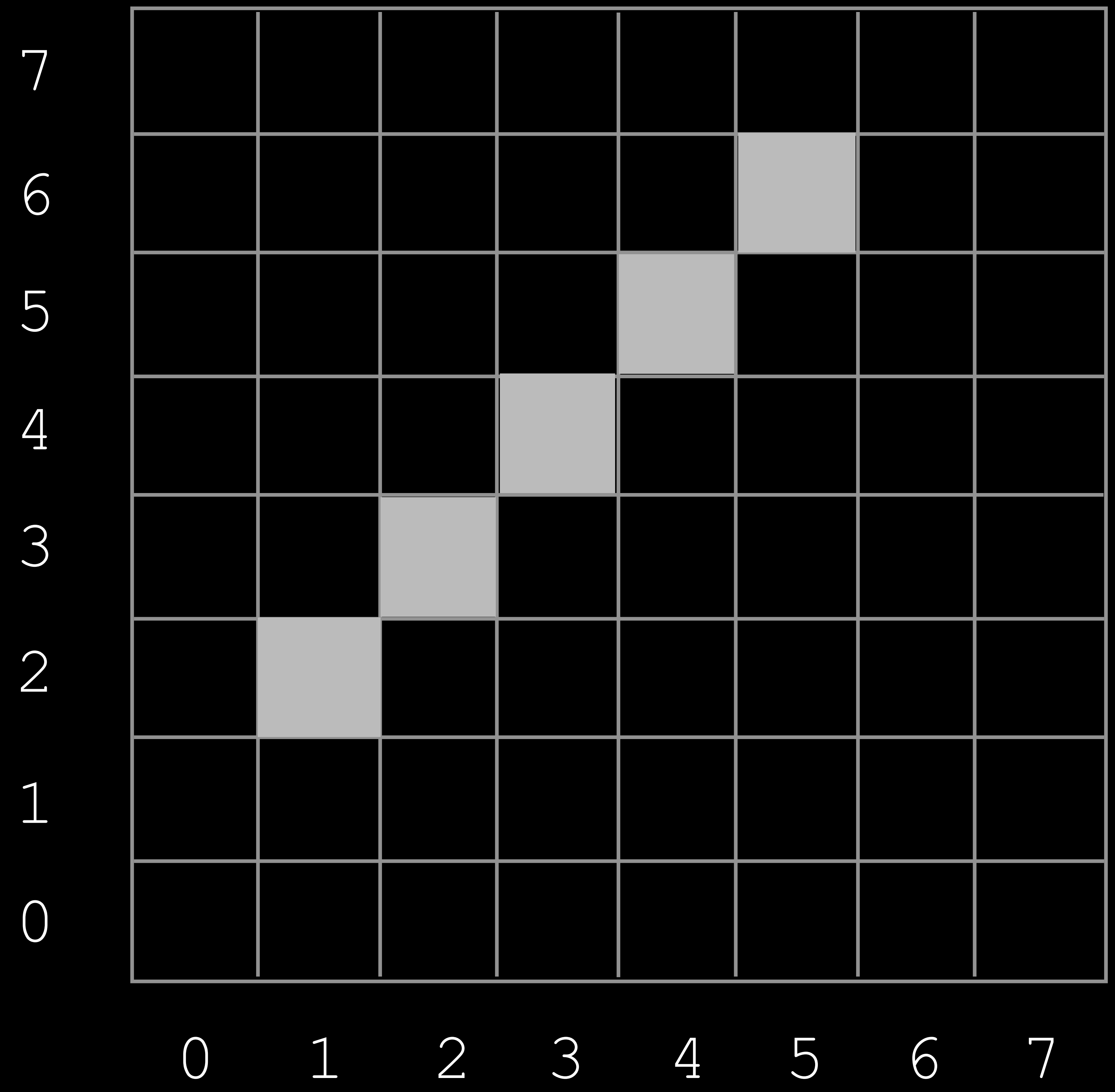
```
line
rect
ellipse
triangle

lineWidth

pathBegin
pathEnd
pathVertex
pathAddCurve
pathClose
```



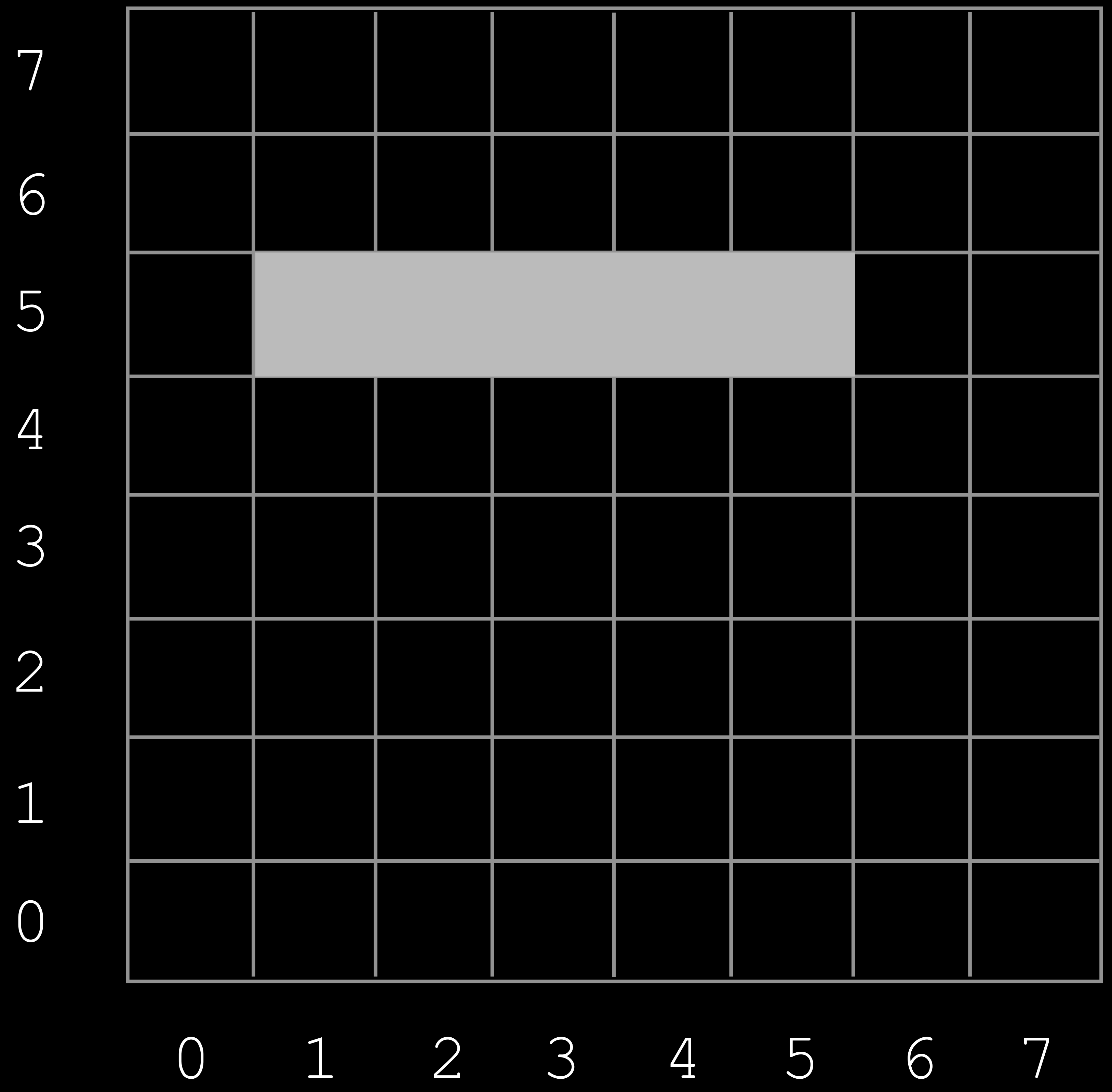
B(5,6)
A(1,2)
7
6
5
4
3
2
1
0
0
1
2
3
4
5
6
7


7
6
5
4
3
2
1
0
0
1
2
3
4
5
6
7

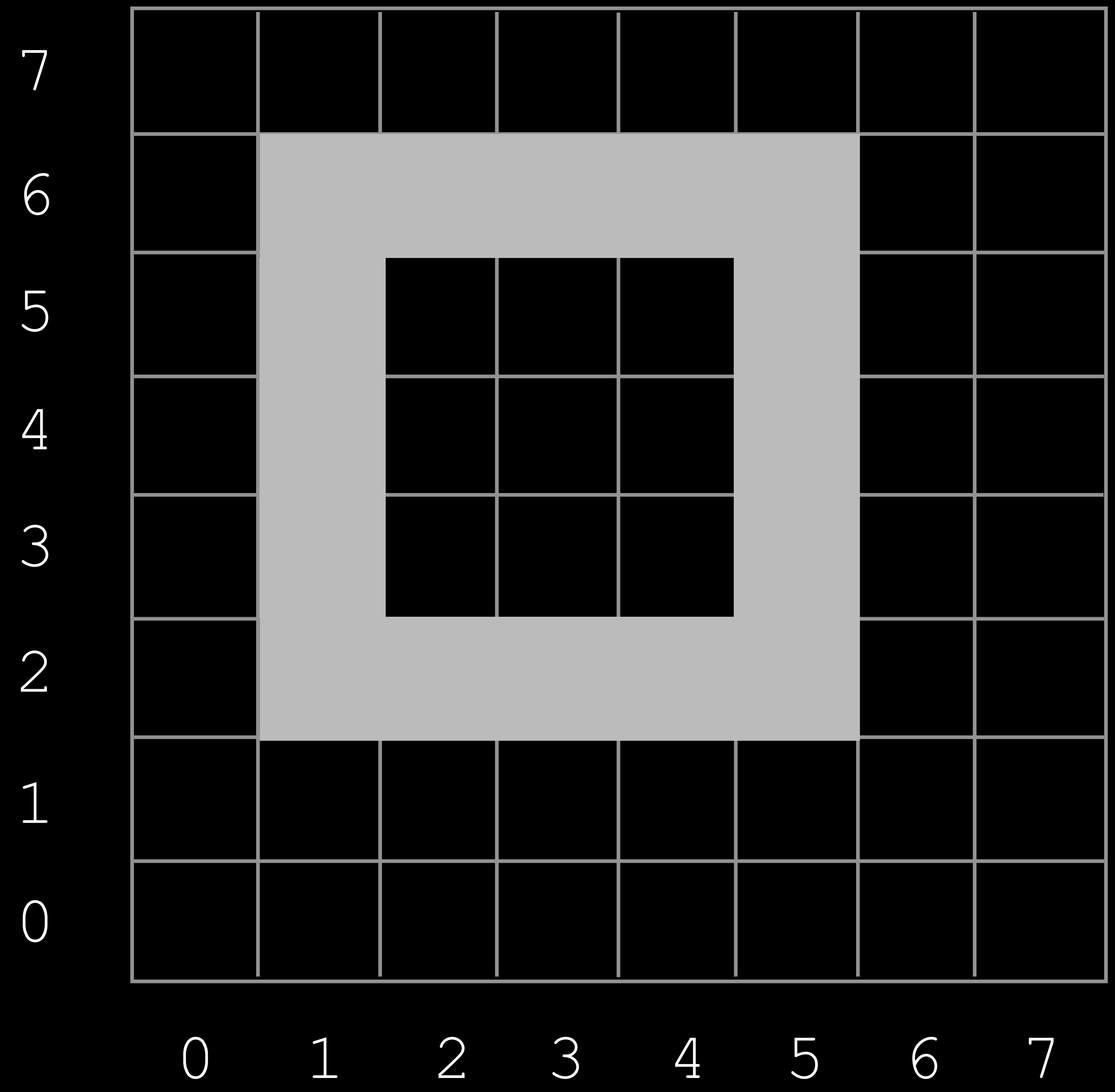
```
line(x1: 1, y1: 2, x2: 5, y2: 6)
```



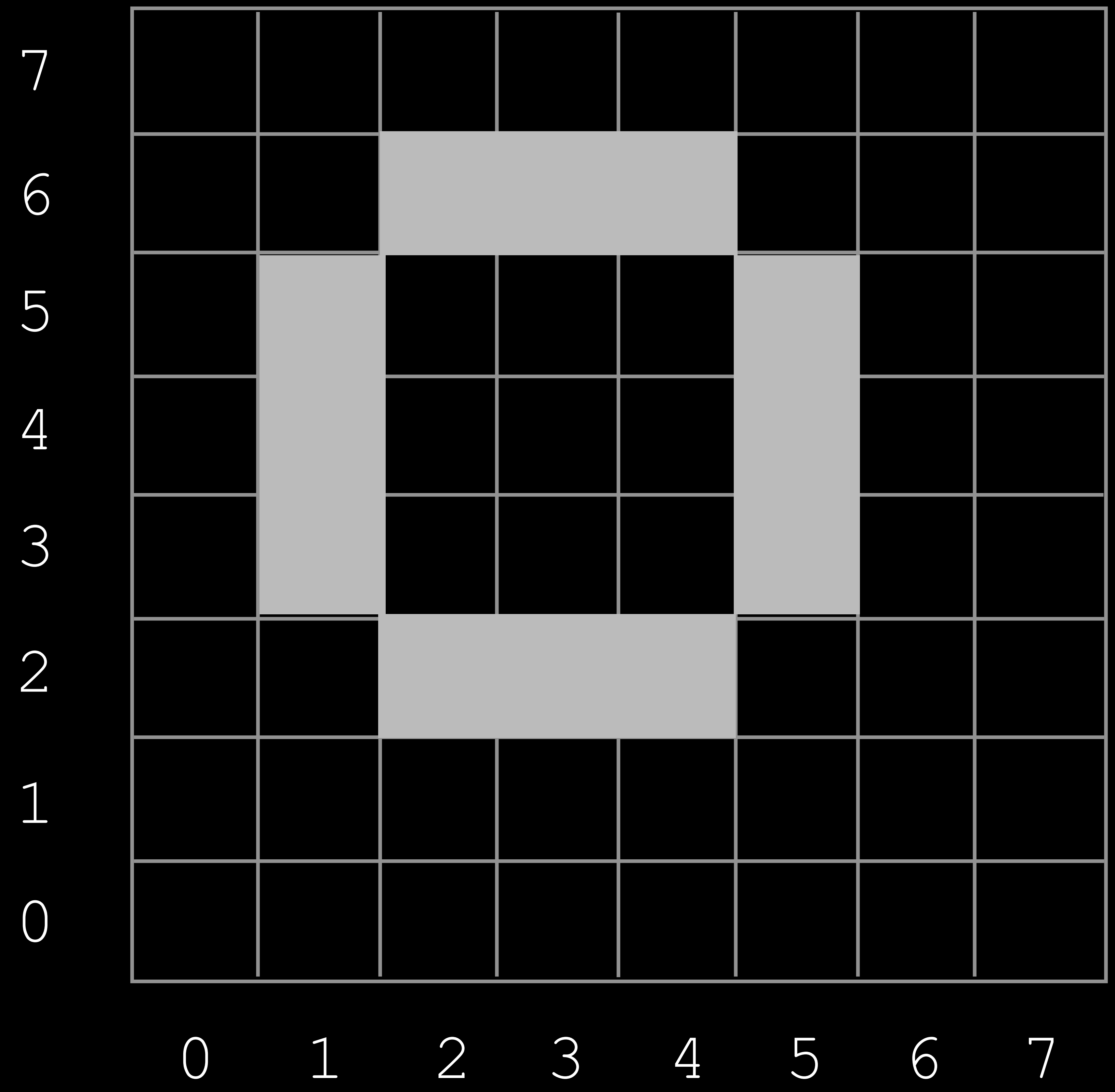
```
line(x1: 1, y1: 5, x2: 5, y2: 5)
```



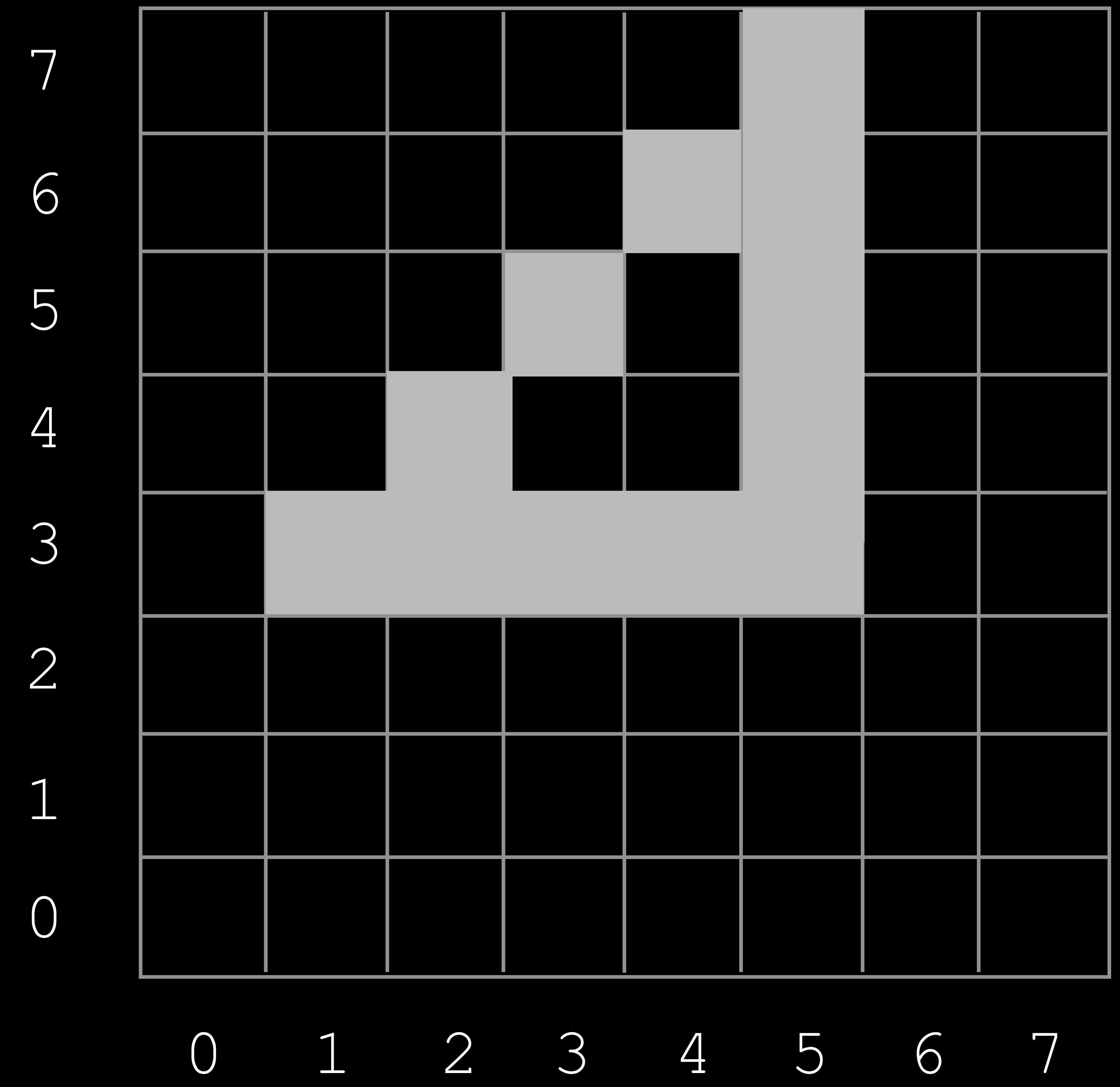
```
rect(x: 1, y: 2, width: 5, height: 5)
```

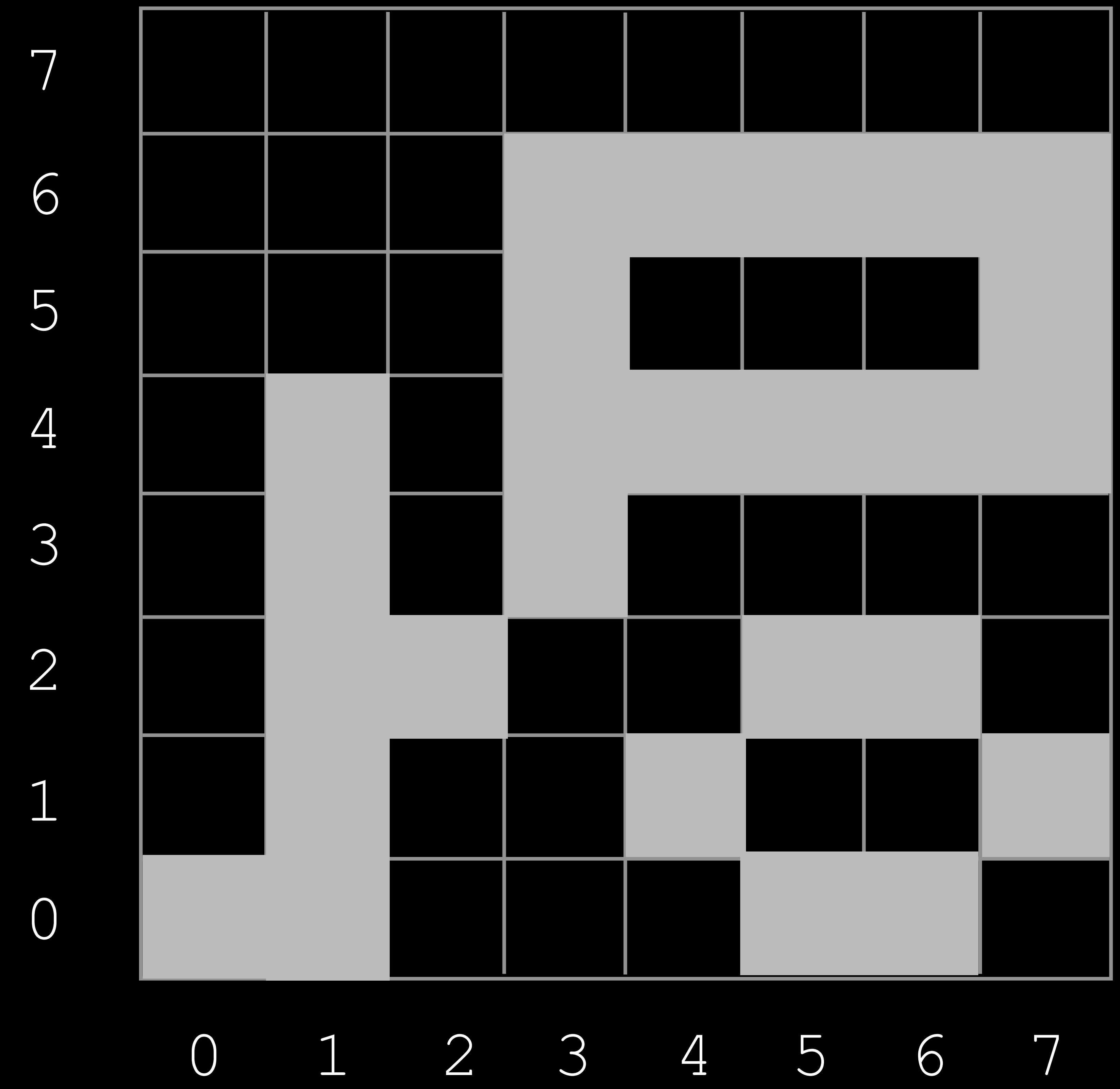


```
ellipse(centerX: 3, centerY: 4, width: 5, height: 5)
```

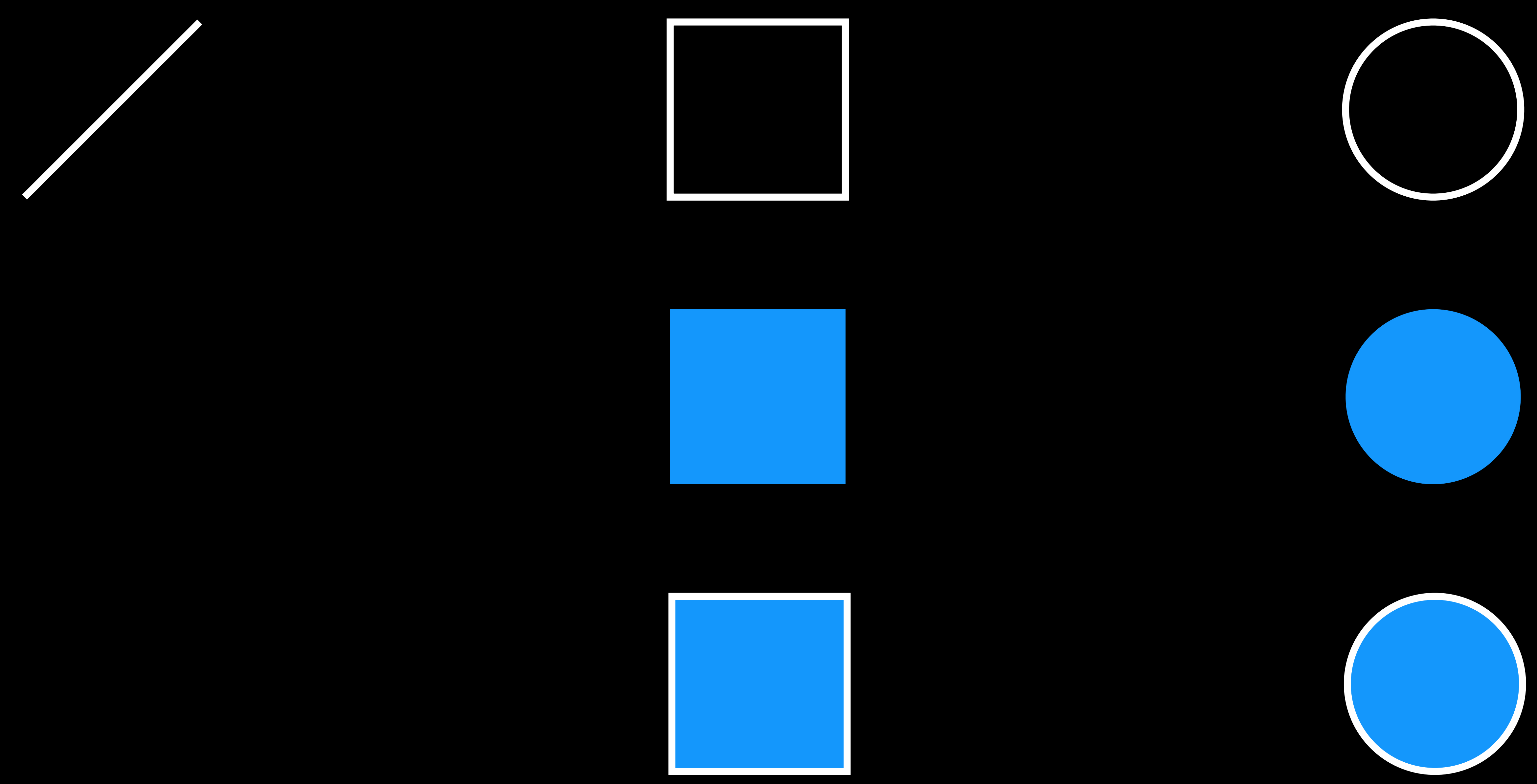


```
triangle(x1: 1, y1: 3, x2: 5, y2: 3, x3: 5, y3: 7)
```





7								
6				■	■	■	■	■
5				■				■
4		■		■	■	■	■	■
3		■		■				
2		■	■			■	■	
1		■			■			■
0	■	■				■	■	
	0	1	2	3	4	5	6	7



line

rect

ellipse

stroke

fill

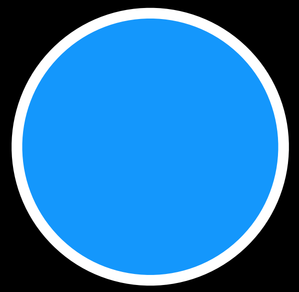
stroke
and fill

Color

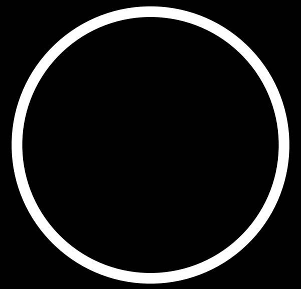
```
strokeColor(gray: value)
strokeColor(red: value, green: value, blue: value, alpha: value)
strokeDisable()

fillColor(gray: value)
fillColor(red: value, green: value, blue: value, alpha: value)
fillDisable()

background(gray: value)
background(red: value, green: value, blue: value)
```

Values are a Double (floating point number) in the range [0,1]

```
strokeColor(red: 1.0, green: 1.0, blue 1.0, alpha: 1.0)
fillColor(red: 0.0, green: 0.0, blue: 1.0, alpha: 1.0)
ellipse(centerX: 400, centerY: 400, width: 50, height: 50)
```



```
strokeColor(red: 1.0, green: 1.0, blue 1.0, alpha: 1.0)
fillDisable()
ellipse(centerX: 400, centerY: 400, width: 50, height: 50)
```

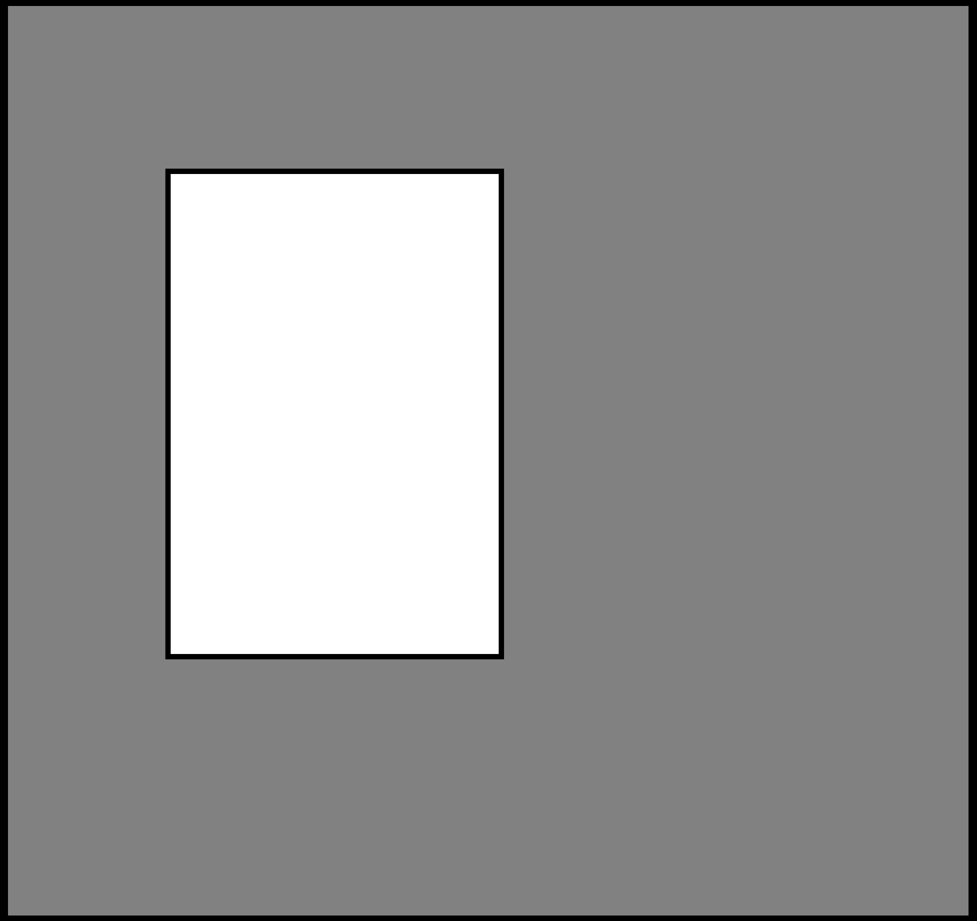


RGB Color Model

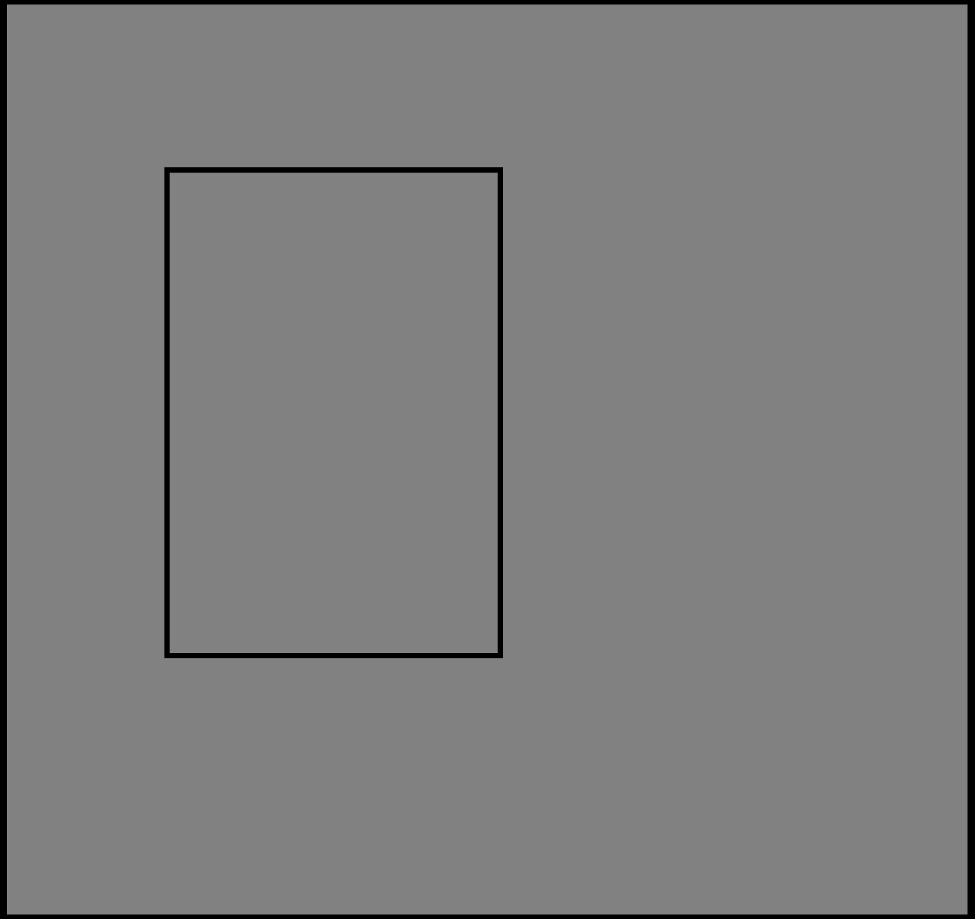
⬜	1.0, 1.0, 1.0
🟥	1,0, 0.0, 0.0
🟨	1.0, 1.0, 0.0
🟩	0.0, 1.0, 0.0
🟦	0.0, 1.0, 1.0
🟦	0.0, 0.0, 1.0
⬛	0.0, 0.0, 0.0

RGB Color Model

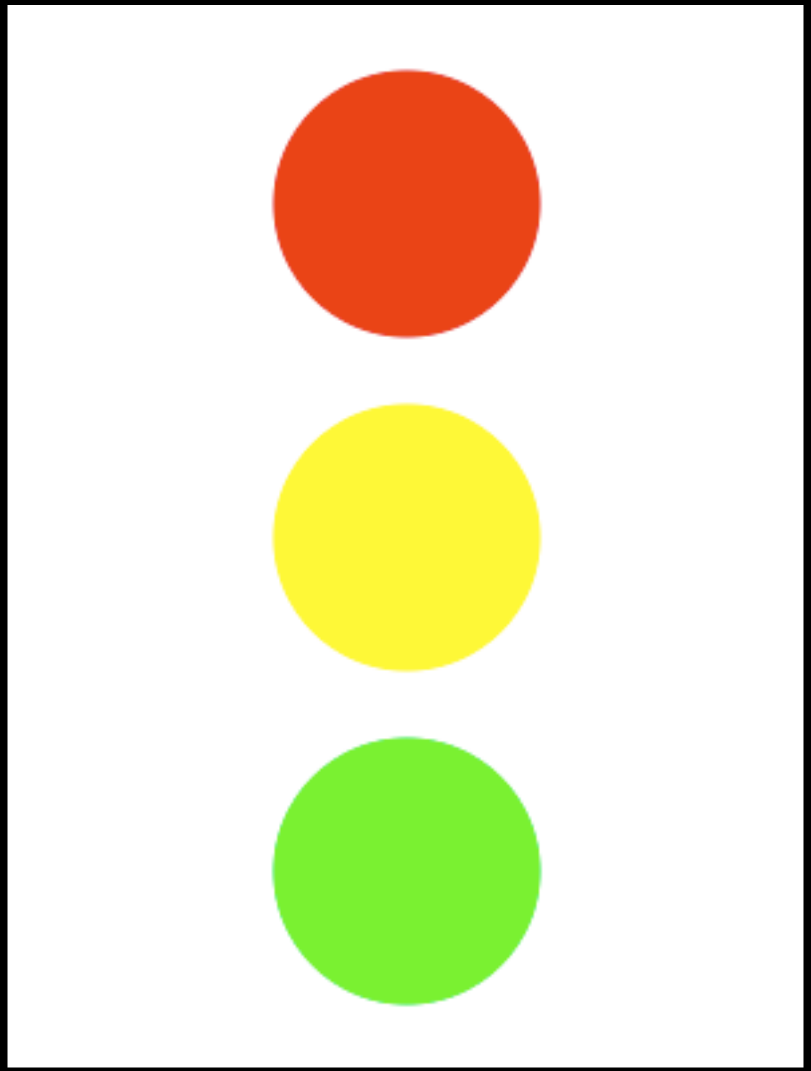
🟥	`1.0, 0.0, 0.0`
🟥	`0.8, 0.0, 0.0`
🟥	`0.6, 0.0, 0.0`
🟥	`0.4, 0.0, 0.0`
🟥	`0.2, 0.0, 0.0`
□	`0.0, 0.0, 0.0`



```
background(gray: 0.5)
strokeColor(gray: 0.0)
fillColor(gray: 1.0)
rect(x: 50.0,y: 100.0,width: 75.0,height: 100.0)
```



```
background(gray: 0.5)
strokeColor(gray: 0.0)
fillDisable()
rect(x: 50.0,y: 100.0,width: 75.0,height: 100.0)
```



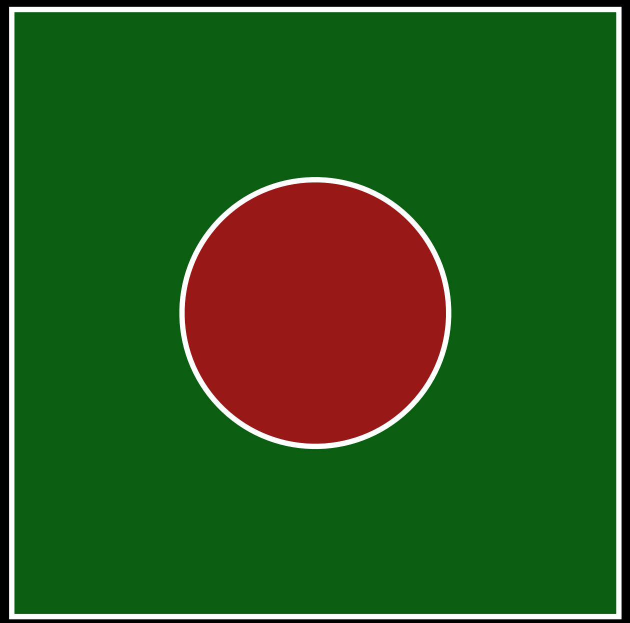
```
background(gray: 1.0)
strokeDisable()

fillColor(red: 1.0, green: 0, blue: 0, alpha: 1)
ellipse(centerX: 150,centerY: 325,width: 100,height: 100)

fillColor(red: 1.0, green: 1.0, blue: 0, alpha: 1)
ellipse(centerX: 150,centerY: 200,width: 100,height: 100)

fillColor(red: 0.0, green: 1.0, blue: 0, alpha: 1)
ellipse(centerX: 150,centerY:  75,width: 100,height: 100)
```

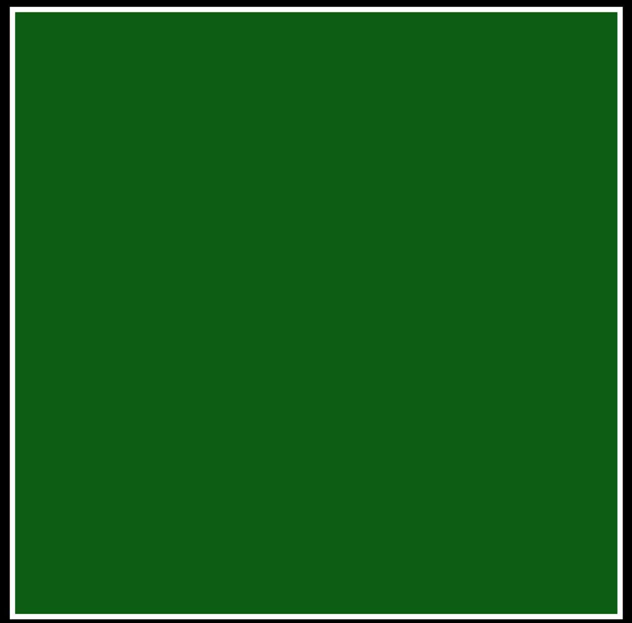
Painter's algorithm

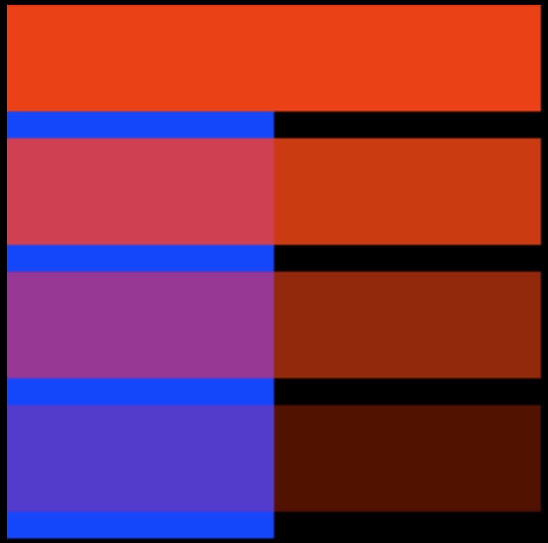
Whatever is drawn last goes on top.

```
rect(x: 50, y: 50, width: 100, height: 100)
fillColor(red:1, green:0, blue:0, alpha:1)
ellipse(centerX: 100, centerY: 100, width 50, height: 50)
```

```
ellipse(centerX: 100, centerY: 100, width 50, height: 50)
fillColor(red:0, green:1, blue:0, alpha:1)
rect(x: 50, y: 50, width: 100, height: 100)
```







```
background(gray: 0.0)
strokeDisable()

fillColor(red: 0,green: 0,blue: 1, alpha: 1)
rect(x: 0,y: 0,width: 100,height: 200)

fillColor(red: 1,green: 0,blue: 1, alpha: 1)
rect(x: 0,y: 160,width: 200,height: 40)

fillColor(red: 1,green: 0,blue: 1, alpha: 0.75)
rect(x: 0,y: 110,width: 200,height: 40)

fillColor(red: 1,green: 0,blue: 1, alpha: 0.5)
rect(x: 0,y: 60,width: 200,height: 40)

fillColor(red: 1,green: 0,blue: 1, alpha: 0.25)
rect(x: 0,y: 10,width: 200,height: 40)
```

Functions we have seen so far

Drawing primitives

`line, rect, ellipse, triangle`

Primitive Color

`strokeDisable, fillDisable`
`strokeColor, fillColor`

View background color

`background`