

What is a Program - 1

```
ellipse(10,10,10,10);
```

What is a Program - 2

Exercise:

Think of something you would like to make a program for. It could be a game, something to help you talk to friends, a program that helps you do your homework, a website for your favorite hobby, or anything else!

What is a Program - 3



What is a Program - 4



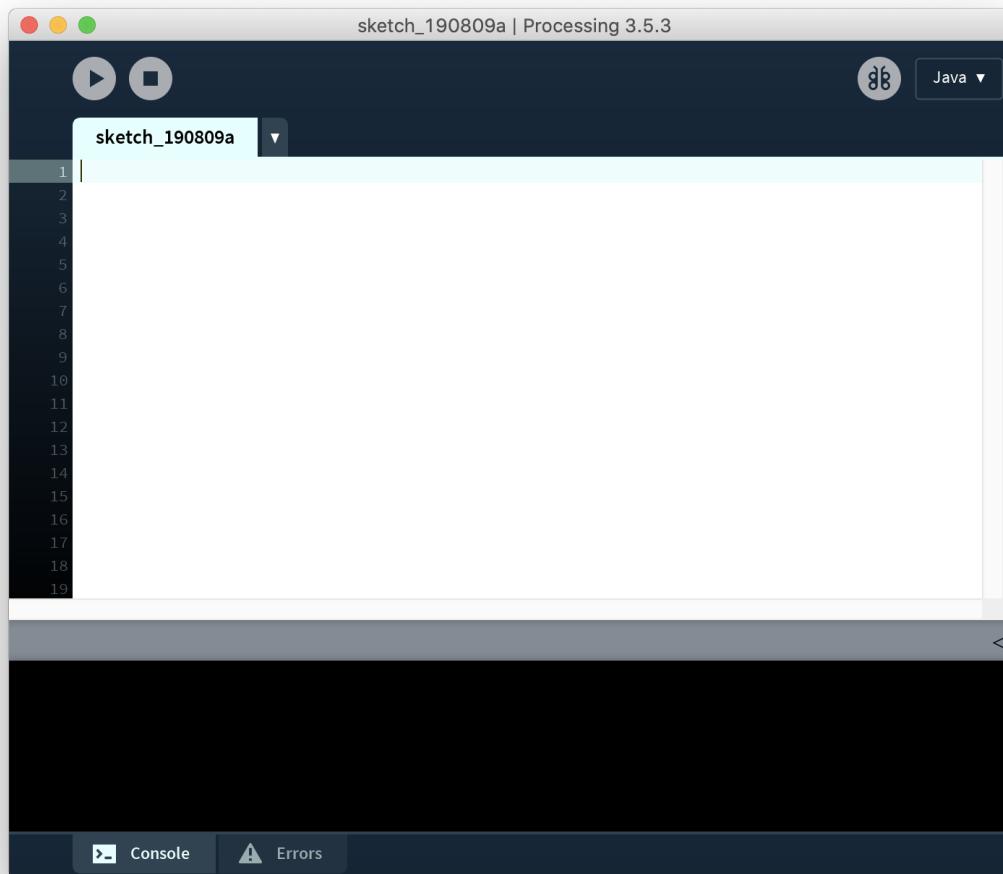
What is a Program - 5



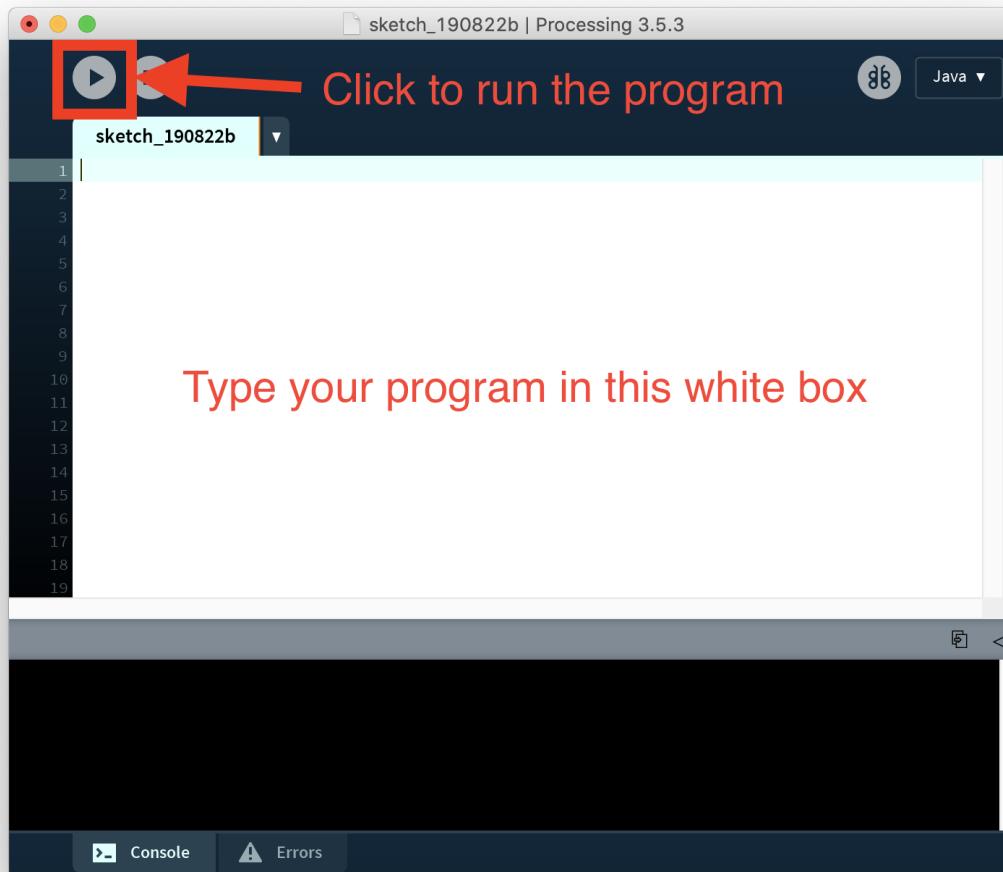
Opening Processing - 1



Opening Processing - 2



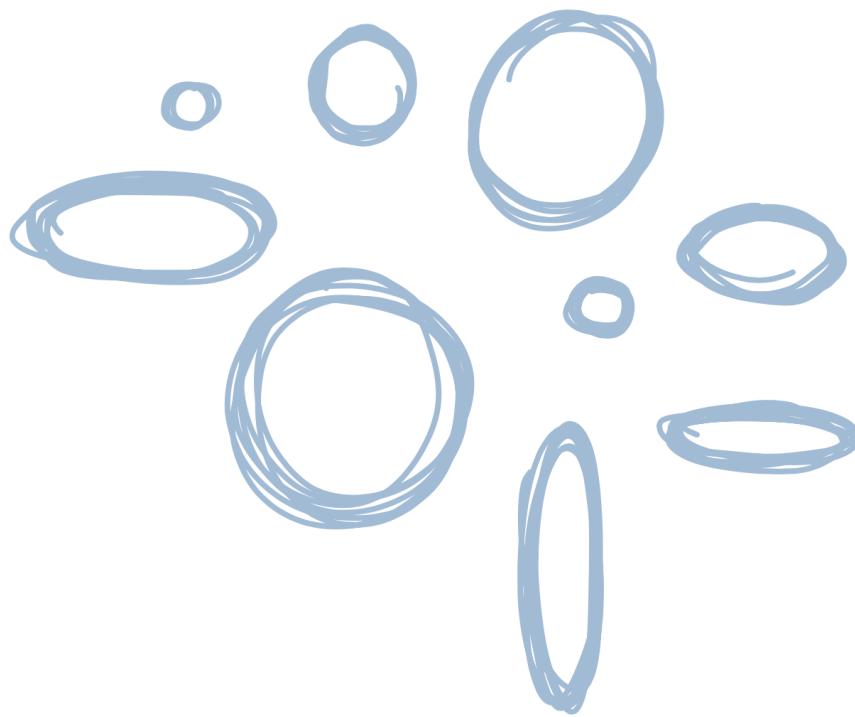
Opening Processing - 3



Drawing a Circle

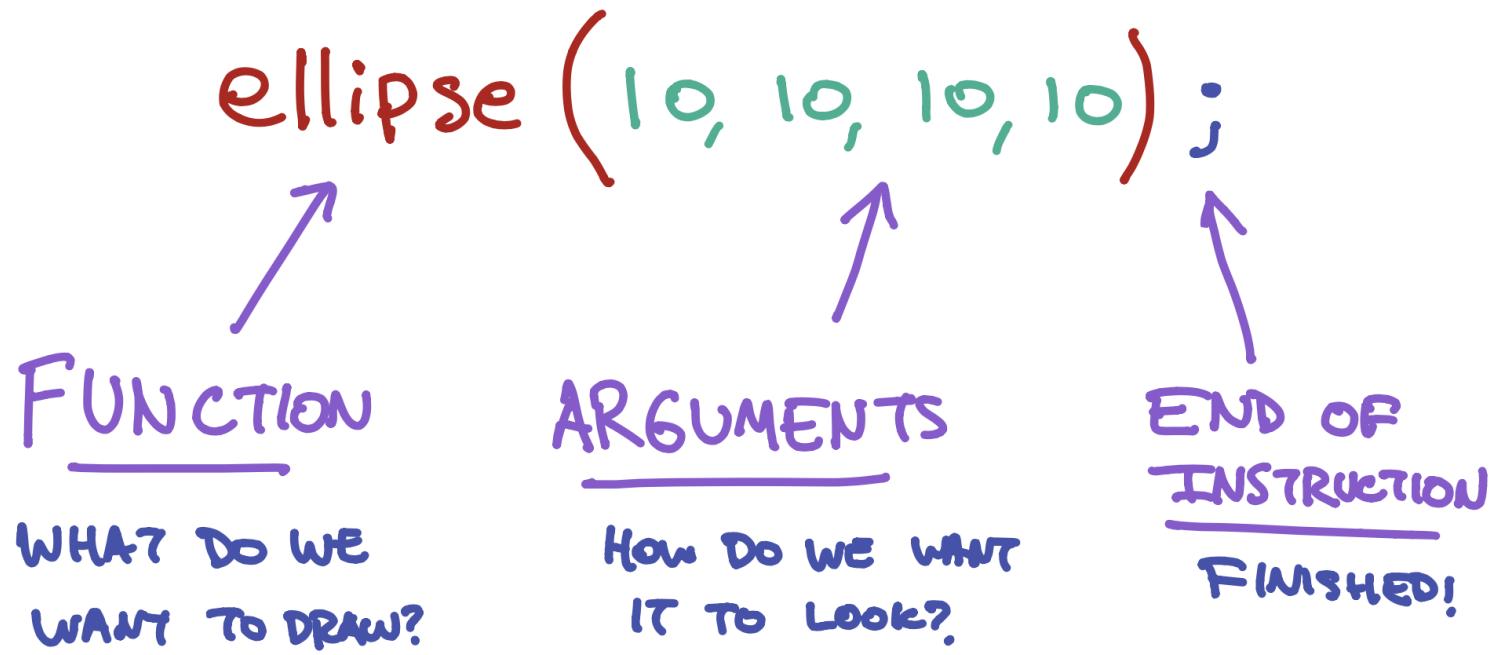
```
ellipse(10,10,10,10);
```

Parts of an Instruction - 1



DIFFERENT TYPES OF ELLIPSIS
How do we tell the computer
which one we want?

Parts of an Instruction - 2



Parts of an Instruction - 3

Exercise:

Try changing the numbers to something else like (30,25,32,48), then click Play.
What happens to your cicle? Try changing the number a few times!

Drawing a Square

Preview:

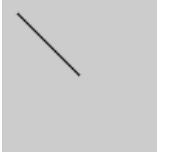
```
rect(10,10,50,50);
```



Drawing a Line

Preview:

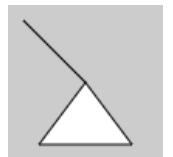
```
line(10,10,50,50);
```



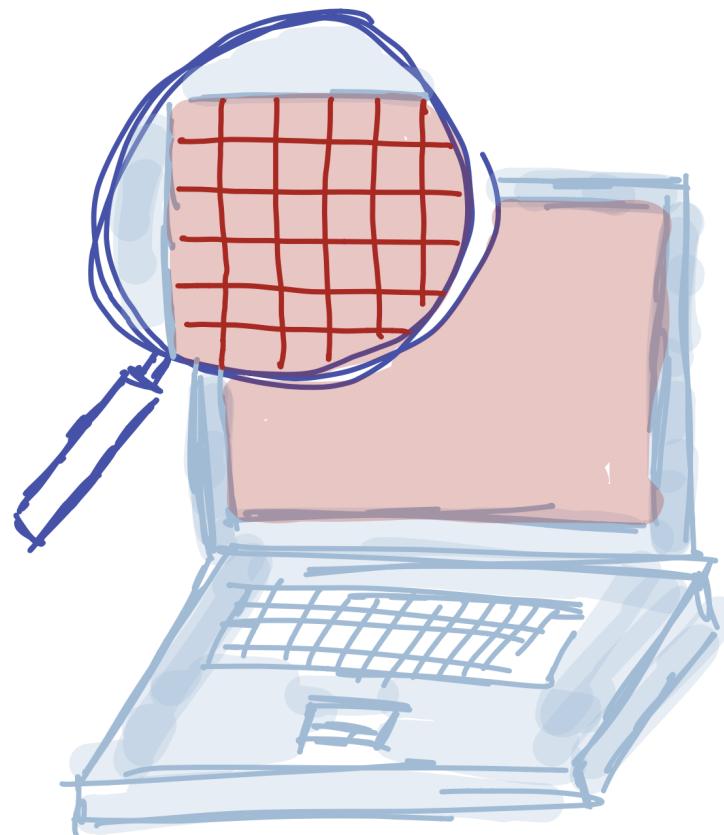
Drawing a Line and Triangle

```
line(10,10,50,50);  
triangle(50,50,20,90,80,90);
```

Preview:

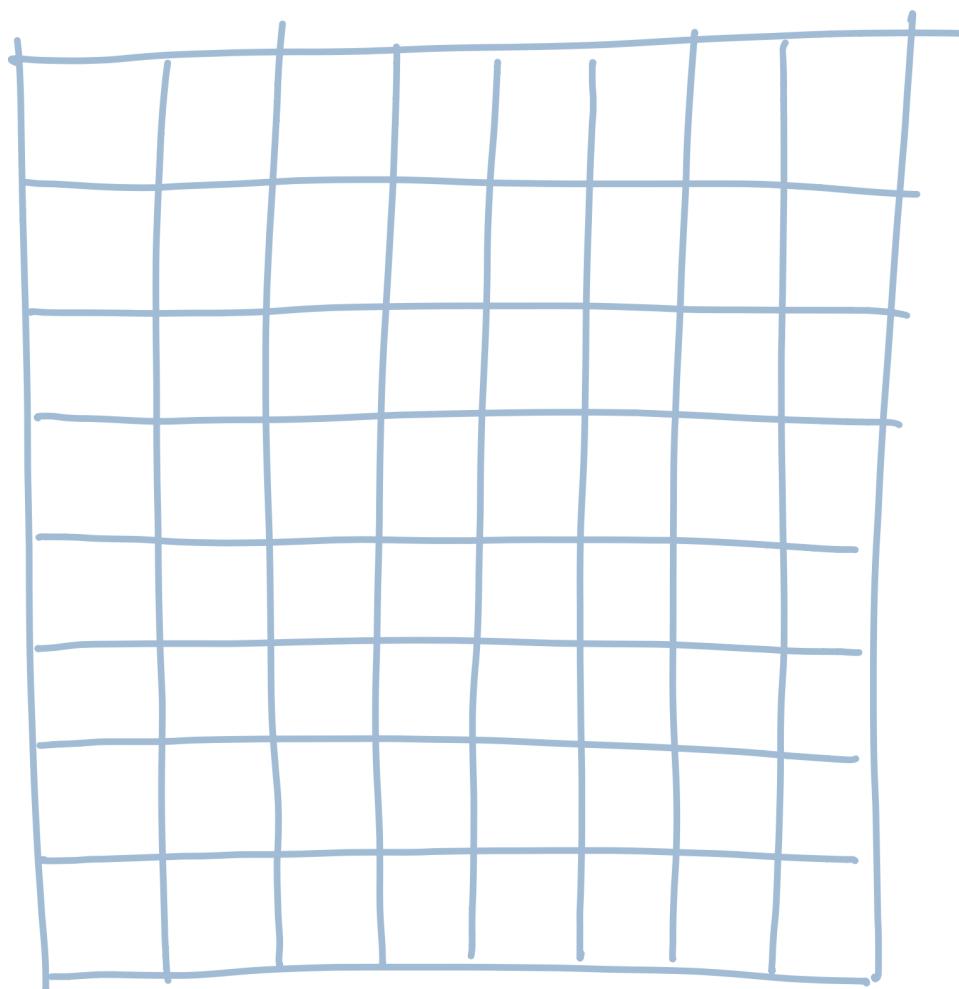


Placing Things on the Screen

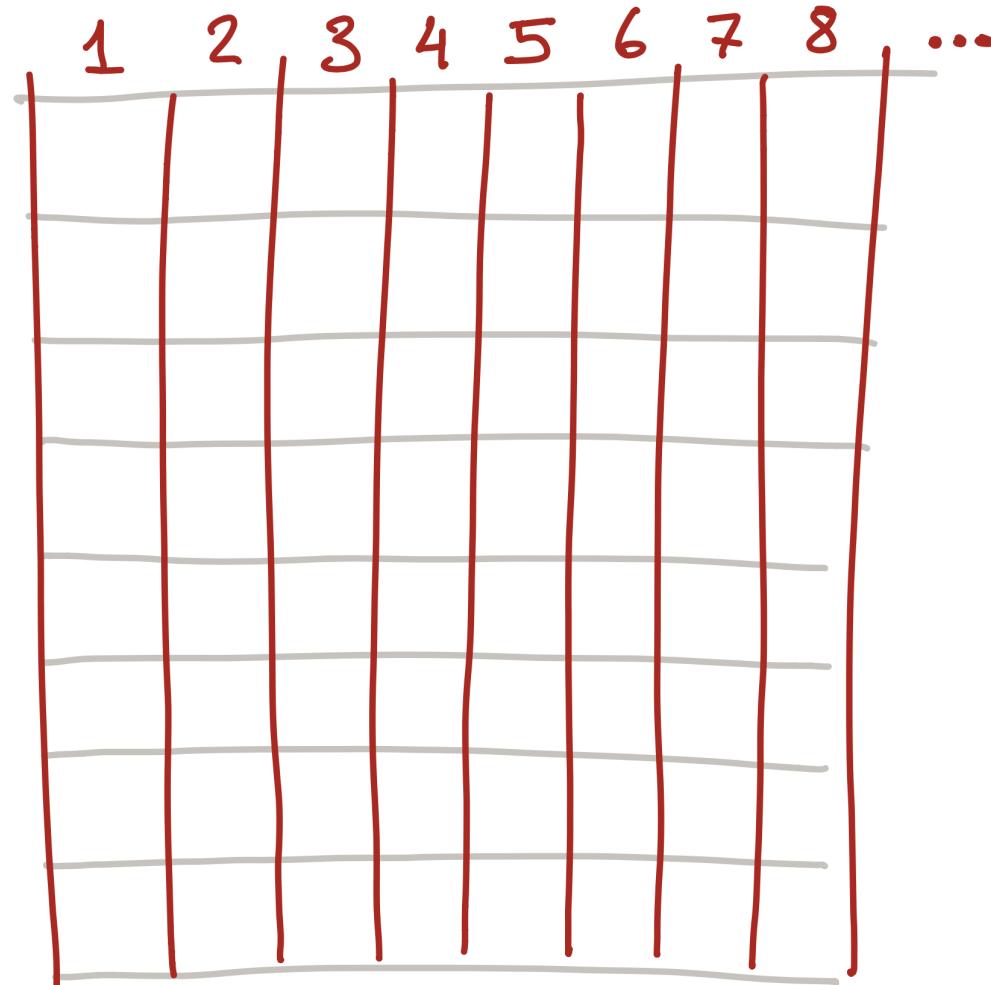


A COMPUTER SCREEN HAS
MILLIONS OF LIGHTS, CALLED PIXELS

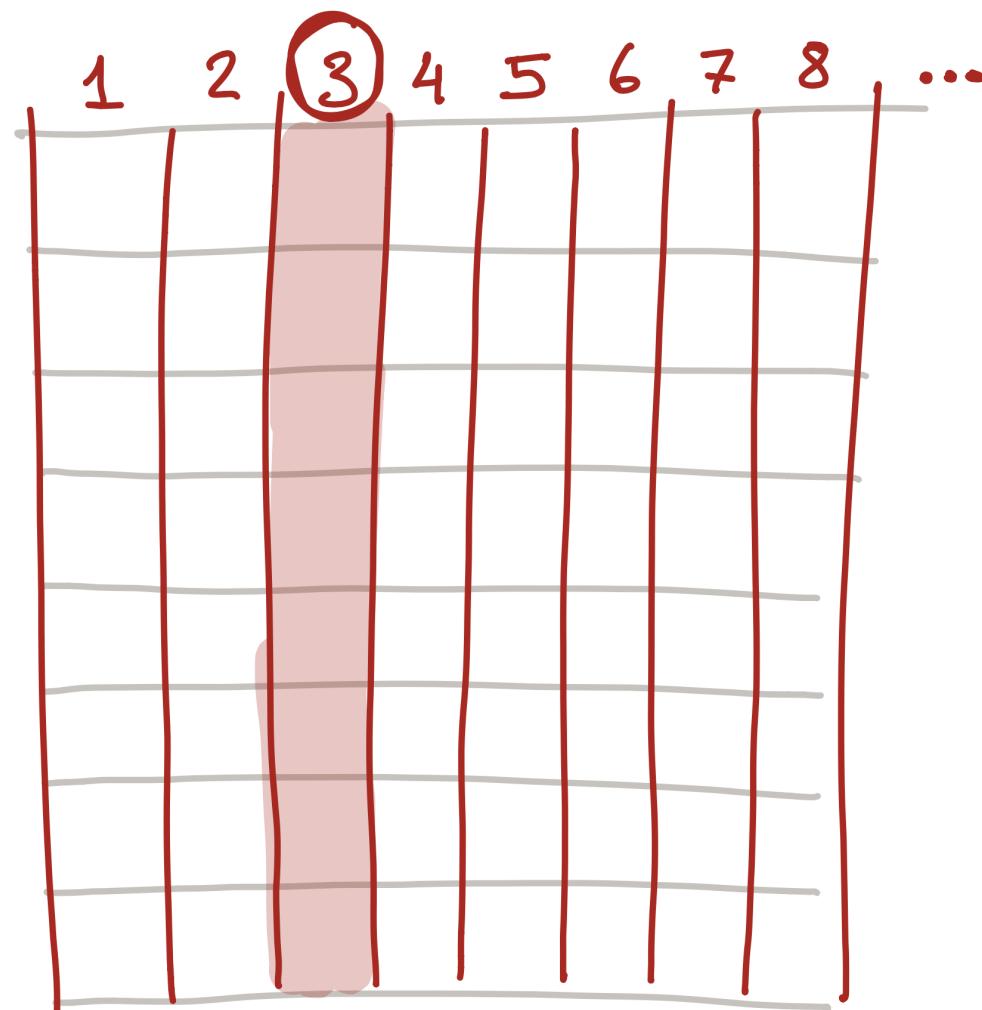
Placing Things on the Screen - 1



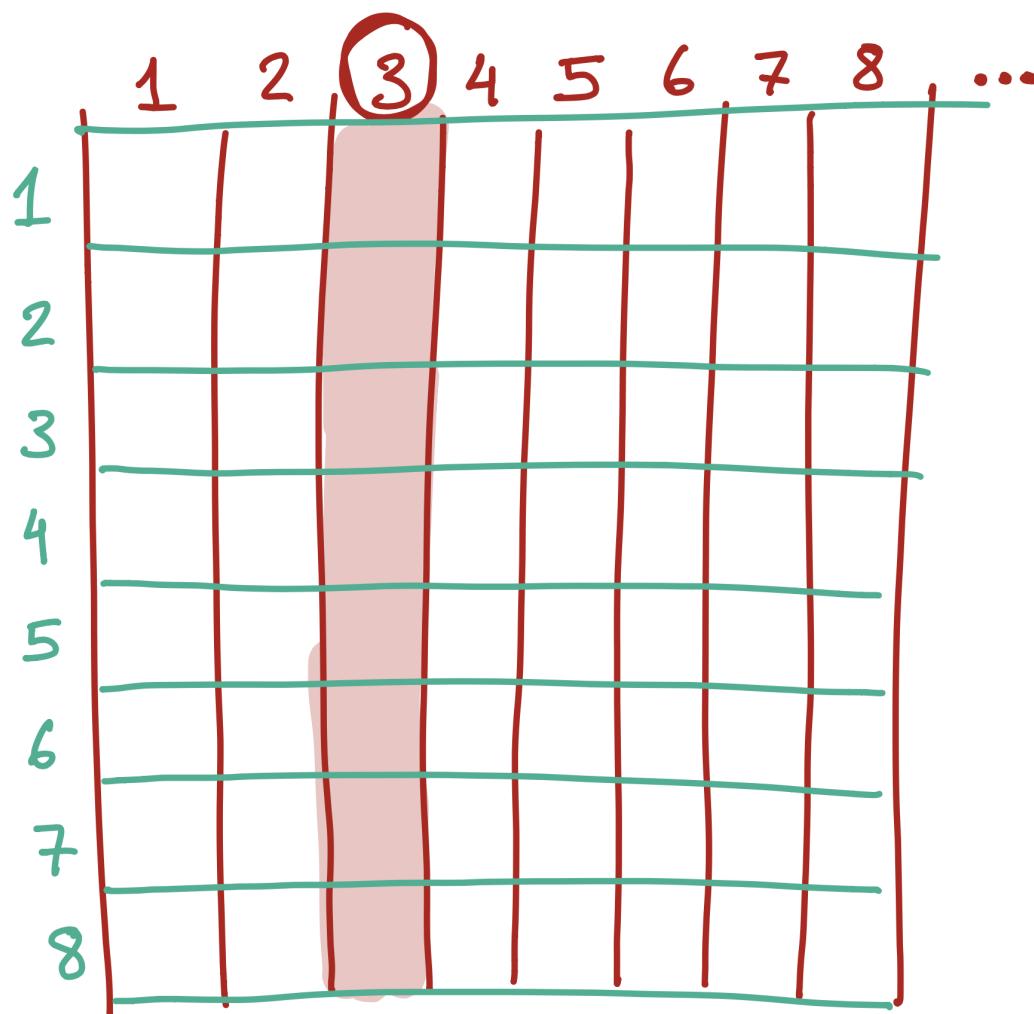
Placing Things on the Screen - 2



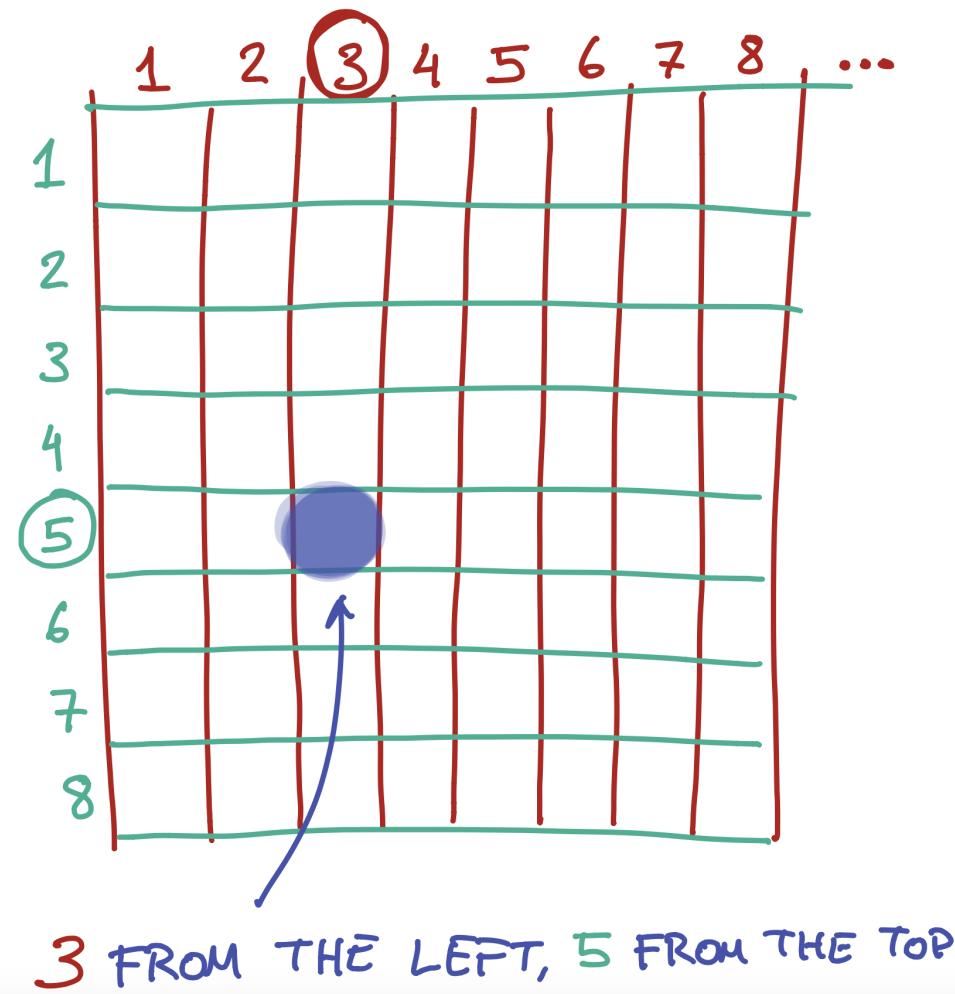
Placing Things on the Screen - 3



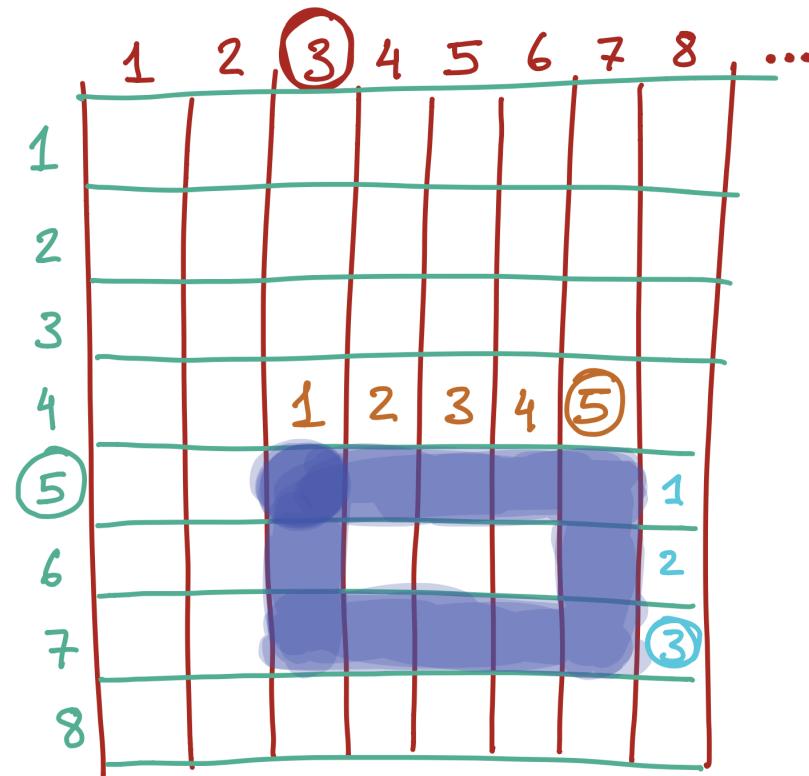
Placing Things on the Screen - 4



Placing Things on the Screen - 5



Placing Things on the Screen - 6

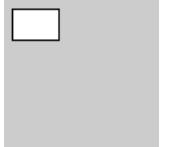


3 FROM THE LEFT, 5 FROM THE TOP,
5 WIDE, 3 TALL

Placing Things on the Screen - 7

Preview:

```
rect(5,10,30,20);
```



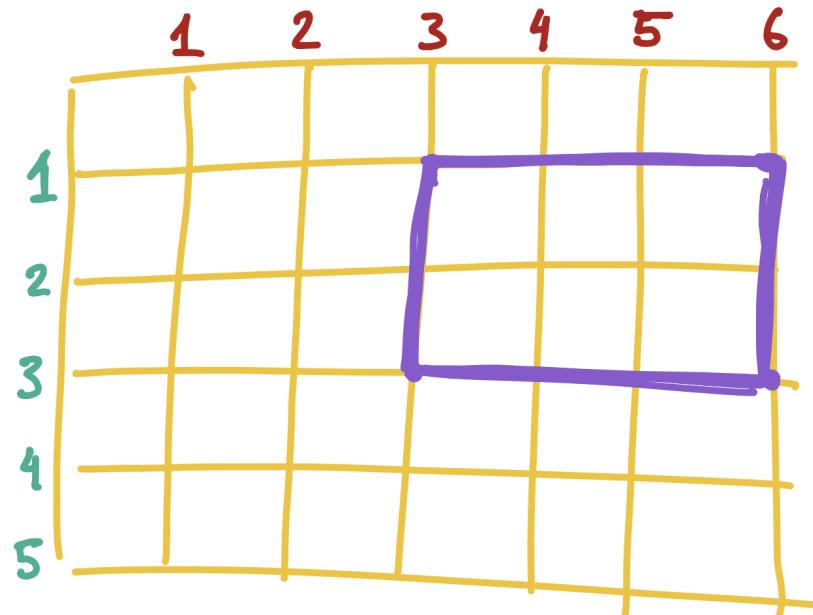
Placing Things on the Screen - 8

rect(left, top, width, height);

Placing Things on the Screen - 9

Exercise:

What would the four (left, top, width, height) arguments for this rectangle be?

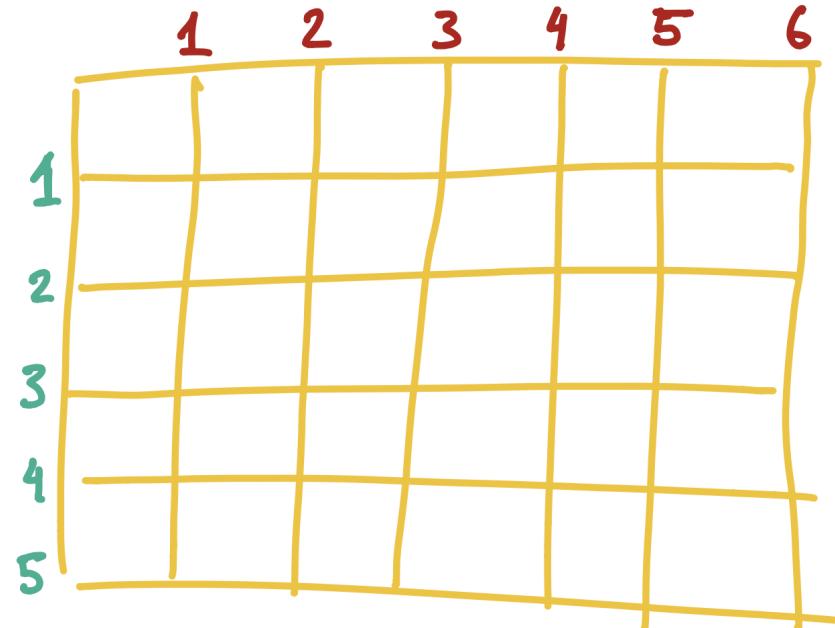


rect ();
HINT: LEFT, TOP, WIDTH, HEIGHT

Placing Things on the Screen - 10

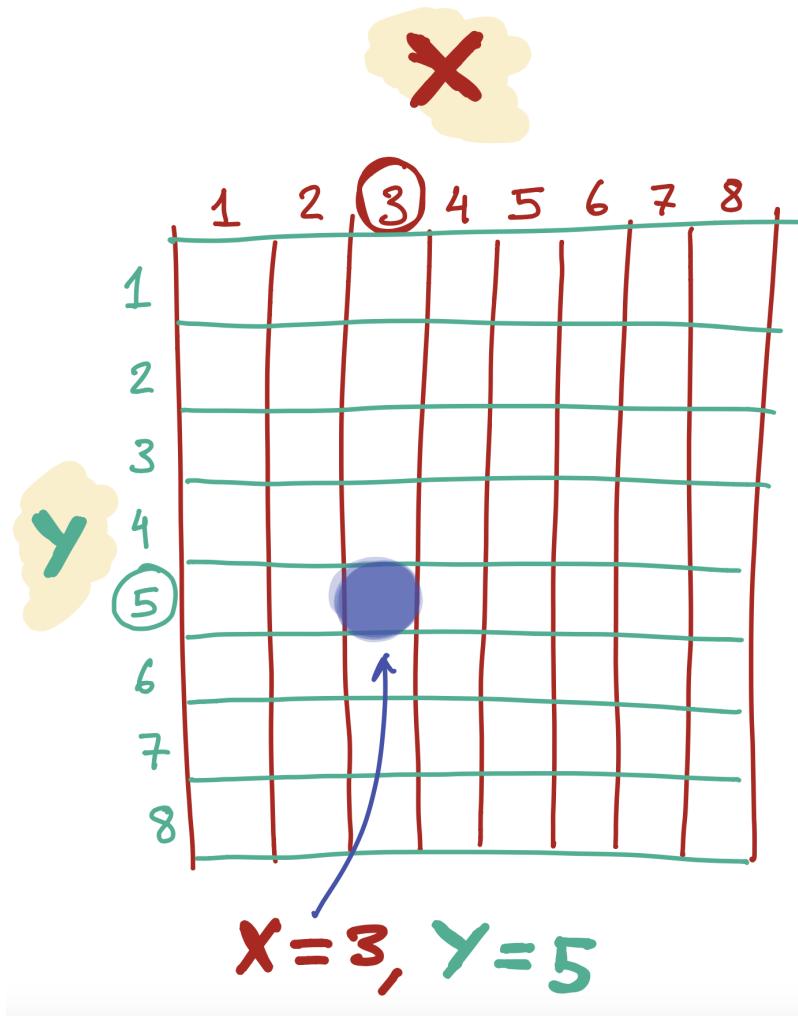
Exercise:

Draw your own rectangle on the graph paper below, then write the *rect* function that would create it.



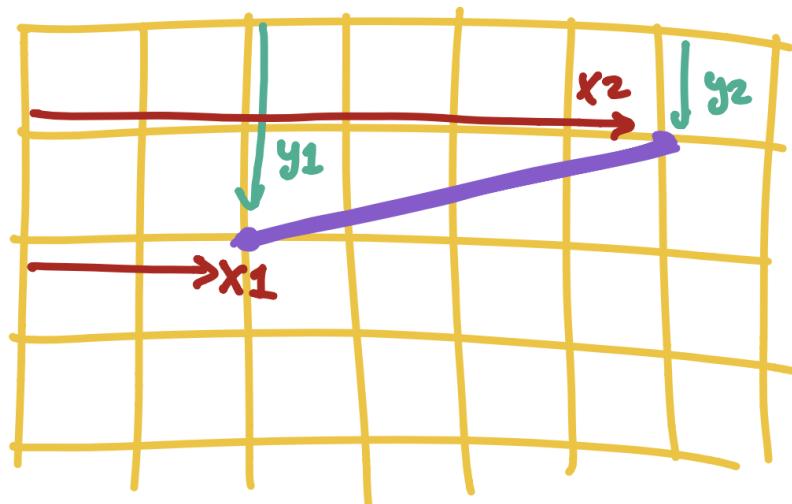
rect (
 ↑ ↑ ↑ ↑
 HINT: LEFT, TOP, WIDTH, HEIGHT);

X & Y



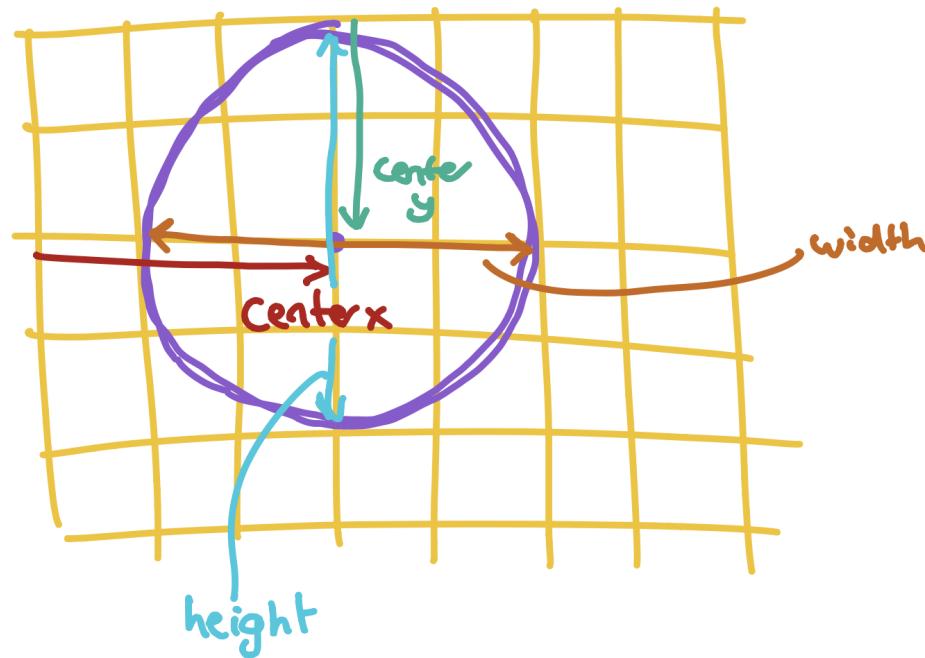
Placing a line on the screen

line (x_1, y_1, x_2, y_2);



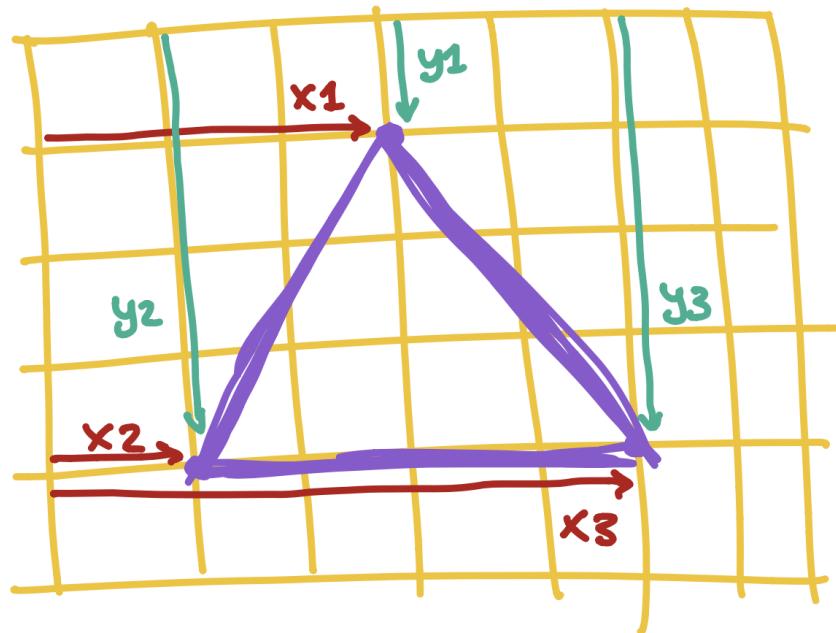
Placing an ellipse/circle on the screen

ellipse(**center x**, **center y**, **width**, **height**);



Placing a triangle on the screen

`triangle (x1, y1, x2, y2, x3, y3);`



Drawing a Face on the Screen

Exercise:

Create a program that draws a face on the screen. You will need to draw two circles - one for each eye - and a rectangle for the mouth. If you want, you can also draw a triangle for the nose!

Black and White - 1

```
fill(0);
```

Black and White - 2

```
fill(0);  
ellipse(25,30,30,30);  
ellipse(75,30,30,30);  
rect(20,60,60,20);
```

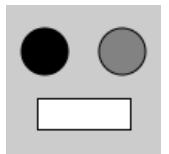
Preview:



Black and White - 3

```
fill(0);  
ellipse(25,30,30,30);  
fill(130);  
ellipse(75,30,30,30);  
fill(255);  
rect(20,60,60,20);
```

Preview:



Black to White Colors

Color	Number	Code
Black	0	<code>fill(0);</code>
Dim Gray	105	<code>fill(105);</code>
Gray	128	<code>fill(128);</code>
Dark Gray	169	<code>fill(169);</code>
Silver	192	<code>fill(192);</code>
Light Gray	211	<code>fill(211);</code>
Gainsboro	220	<code>fill(220);</code>
White Smoke	245	<code>fill(245);</code>
White	255	<code>fill(255);</code>

Fill with Black and White

```
fill(grayscale);  
fill(0);  
fill(120);  
fill(255);
```

Black and White - Exercise

Exercise:

Change the color of the face you made in your last program. You can make it black, white, or anything in between.

Fill with Color

```
fill(red, green, blue);  
fill(255,0,0);  
fill(255,0,255);  
fill(150,150,20);
```

Red, Green, Blue Colors

Color	Red	Green	Blue	Code
 Red	255	0	0	<code>fill(255,0,0);</code>
 Green	0	255	0	<code>fill(0,255,0);</code>
 Blue	0	0	255	<code>fill(0,0,255);</code>

More Colors

Color	Red	Green	Blue	Code
Yellow	255	255	0	<code>fill(255,255,0);</code>
Cyan	0	255	255	<code>fill(0,255,255);</code>
Fuchsia	255	0	255	<code>fill(255,0,255);</code>
Purple	128	0	128	<code>fill(128,0,128);</code>
Navy	0	0	128	<code>fill(0,0,128);</code>
Crimson	220	20	60	<code>fill(220,20,60);</code>
Gold	255	215	0	<code>fill(255,215,0);</code>
Deep Pink	255	20	147	<code>fill(255,20,147);</code>
Wheat	245	222	179	<code>fill(245,222,179);</code>
Steel Blue	119	196	222	<code>fill(119,196,222);</code>
Sea Green	46	139	87	<code>fill(46,139,87);</code>

Colors - Exercise

Exercise:

Change the color of your face so that it is your favorite color. You can use one of the colors from the table above, or try typing in different numbers until you find a brand new color you like!

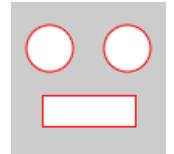
Fill, Stroke, Background - 1

```
stroke(red, green, blue);
```

Fill, Stroke, Background - 2

```
stroke(255,0,0);
ellipse(25,30,30,30);
ellipse(75,30,30,30);
rect(20,60,60,20);
```

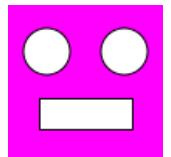
Preview:



Fill, Stroke, Background - 3

```
background(255,0,255);  
ellipse(25,30,30,30);  
ellipse(75,30,30,30);  
rect(20,60,60,20);
```

Preview:



Variables - 1

```
fill(255);
```

Variables - 2

```
int color = 255;  
fill(color);
```

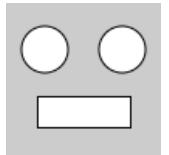
Variables - 3

```
int color = 255;  
int myFavoriteColor = 255;  
int age = 15;  
int shoe_size = 8;
```

Variables - 4

```
ellipse(25,30,30,30);  
ellipse(75,30,30,30);  
rect(20,60,60,20);
```

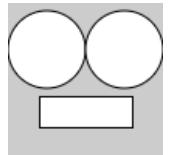
Preview:



Variables - 5

```
ellipse(25,30,50,50);  
ellipse(75,30,50,50);  
rect(20,60,60,20);
```

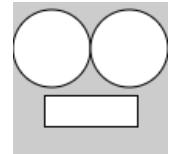
Preview:



Variables - 6

```
int eyeSize = 50;  
ellipse(25,30,eyeSize,eyeSize);  
ellipse(75,30,eyeSize,eyeSize);  
rect(20,60,60,20);
```

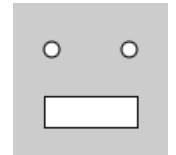
Preview:



Variables - 7

```
int eyeSize = 10;  
ellipse(25,30,eyeSize,eyeSize);  
ellipse(75,30,eyeSize,eyeSize);  
rect(20,60,60,20);
```

Preview:



Variables - 8

```
int left = 20;
```

Variables - 9

```
ellipse(25,30,eyeSize,eyeSize);
```

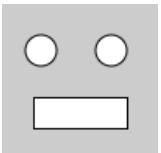
Variables - 10

```
ellipse(left + 5, 30, eyeSize, eyeSize);
```

Variables - 11

```
int eyeSize = 20;  
int left = 20;  
ellipse(left + 5,30,eyeSize,eyeSize);  
ellipse(left + 50,30,eyeSize,eyeSize);  
rect(left,60,60,20);
```

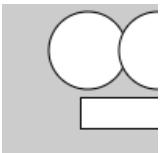
Preview:



Variables - 12

```
int eyeSize = 50;  
int left = 50;  
ellipse(left + 5, 30, eyeSize, eyeSize);  
ellipse(left + 50, 30, eyeSize, eyeSize);  
rect(left, 60, 60, 20);
```

Preview:



Variables - 13

Exercise:

Create a new variable called *top*, which determines where the top of the face will start. Update each eye and the mouth so their top *attribute* uses a calculation based on the *top* variable.

