

Programming with Processing 3

Welcome to Processing!

Processing is a tool for learning programming in a visual context. It is free and easy to learn and it will run on most types of computers. It is also used by software developers, architects and digital media designers to create professional applications and works of art. The Processing community has written over a hundred libraries to support machine vision, data visualization, music composition, networking, 3D file exporting and control of other electronic devices. (The Internet of Everything).

Installing the Software.

If you don't have the Processing 3 tools on your computer visit <http://processing.org/download> and select the version of the software that matches your type of computer. This Web site gives detailed installation instructions.

Getting Started.

The programming tool we will use is the Processing Development Environment (PDE) for Processing 3. To launch the PDE click on the P3 icon. You should see a text editor appear displaying a blank text page with an odd name like

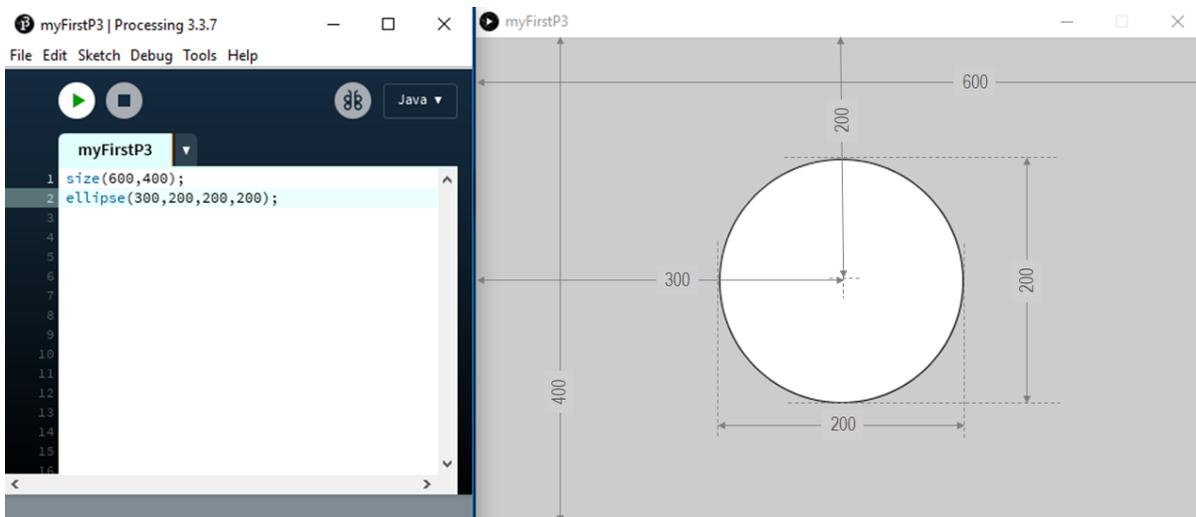


sketch_180516a

on its tab (top-left). [Can you guess the reason for that name?] Before we write any code lets change this name by selecting *File* and *Save As*. Change the name to myFirstP3 or something similar. Click inside the text page and then type,

```
size(600,400);  
ellipse(300,200,200,200);
```

To run this program click on the triangle in the circle at the top left of the PDE.



The size(600,400) code creates a graphics window 600 pixels wide by 400 pixels high. The next line creates an ellipse of size 200 x 200 pixels with its center located at position (300, 200). Close the graphics window by clicking the X in the upper right corner. Save your program.

Experiment

This is a very simple example of graphics programming in Processing 3. Notice that the program has made some decisions for us. The background of the graphics window is gray. The ellipse is drawing with a thin black line and its fill color is white. We can take control of all these choices. Experiment with these commands:

```
background(255);  
  
stroke(100);  
  
fill(50);  
  
strokeWeight(10);
```

To avoid errors keep the sizes of the numbers between 0 and 255 for now. Pick a *background*, *fill*, *stroke* and *strokeWeight* you like and then try to create a Mickey Mouse logo by adding *ellipses* to your program.

Color

Try replacing the single numbers in your *background*, *stroke*, and *fill* commands with sets of three numbers (separated by commas) such as

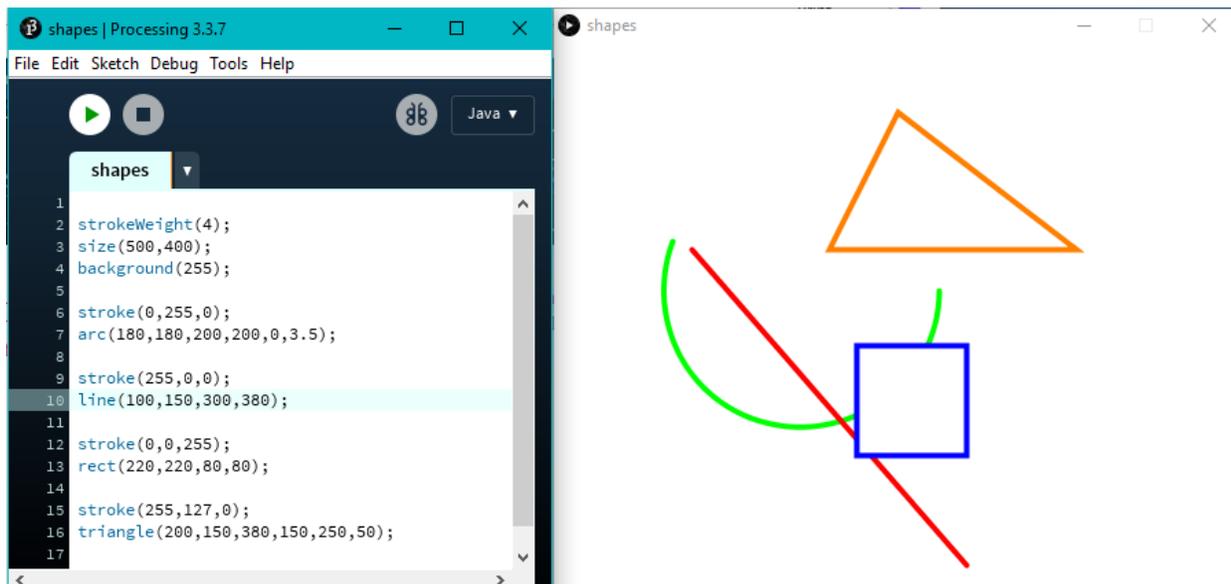
```
fill(255,0,0); or background(100,200,100);
```

Be sure to keep the values of each number between 0 and 255. These three values are called the RGB values because they give the amount of RED, GREEN, and BLUE used to make the color.

When you mix colors of light you get a different effect than when mixing paint. This is because each color of paint absorbs light rather than generating it. This is my paint mixing is called subtractive and light mixing is called additive. For example mixing RED light and GREEN light makes YELLOW.

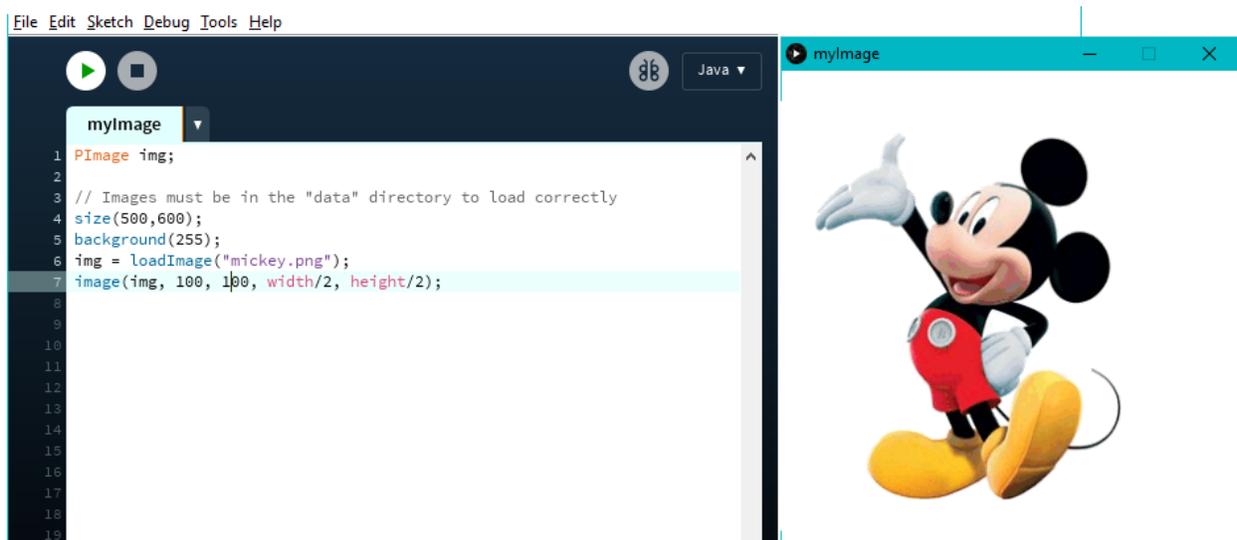
Shapes

Processing lets you draw lots of different shapes...



Images

With processing you can display your own images...



You can use the tint command to change the color of an image. Place this command just before the image command.

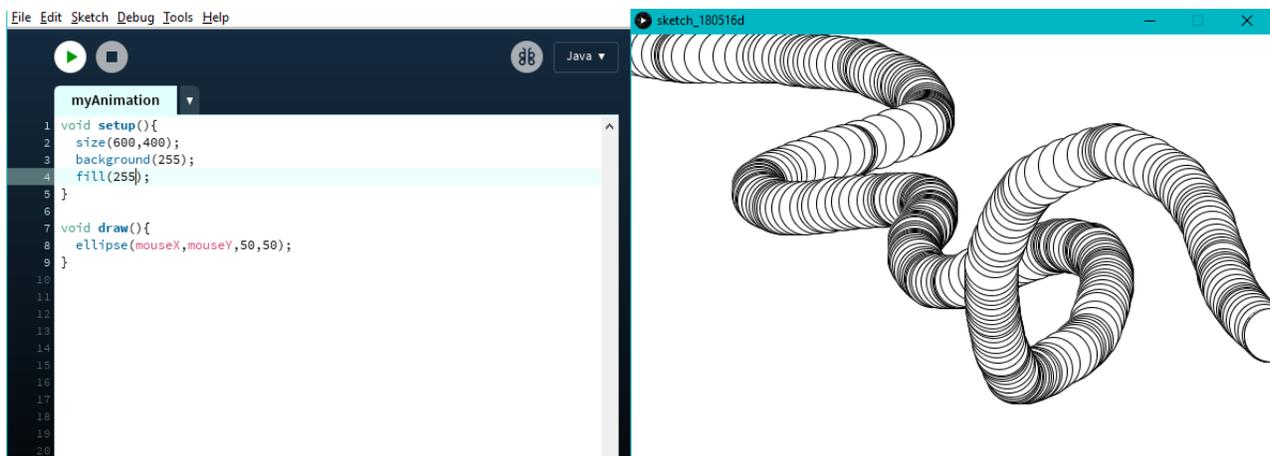
```
tint(127,255,0);
```

Animation

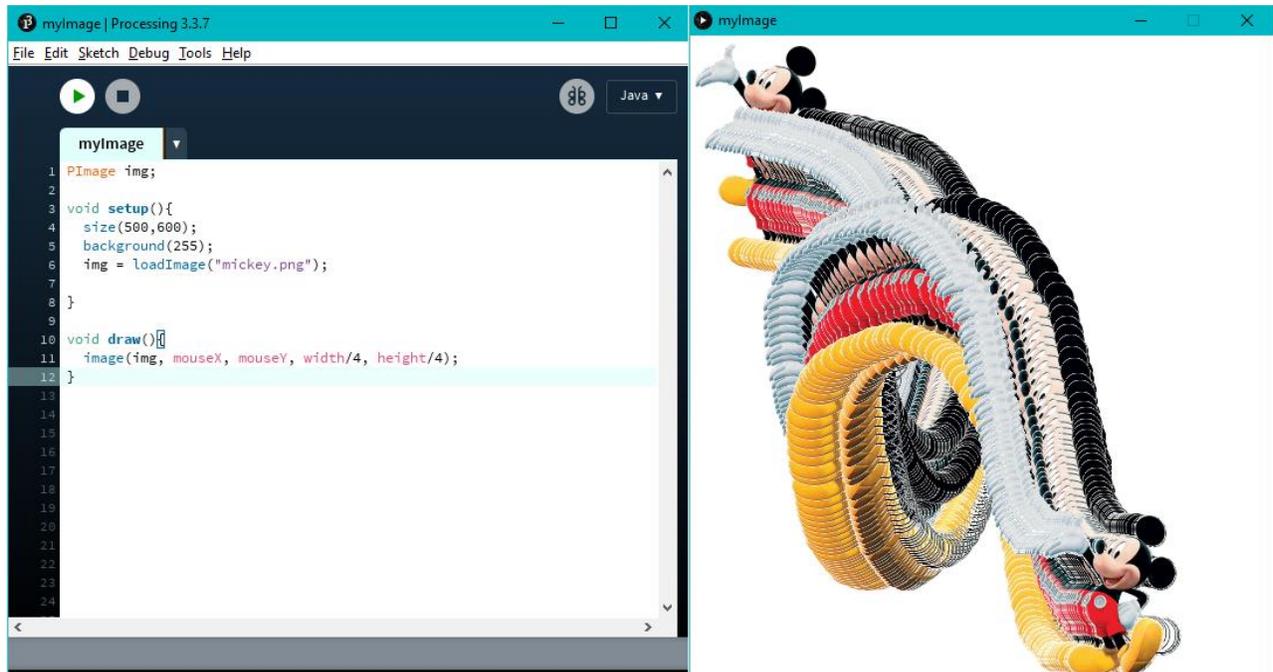
Up to now you have used commands to draw picture and show still images, but P3 can do a lot more. A P3 program has two parts:

- (1) The `setup()` which is executed once when the program is started, and
- (2) The `draw()` which is executed over and over until the program is stopped.

Let's try a simple example.

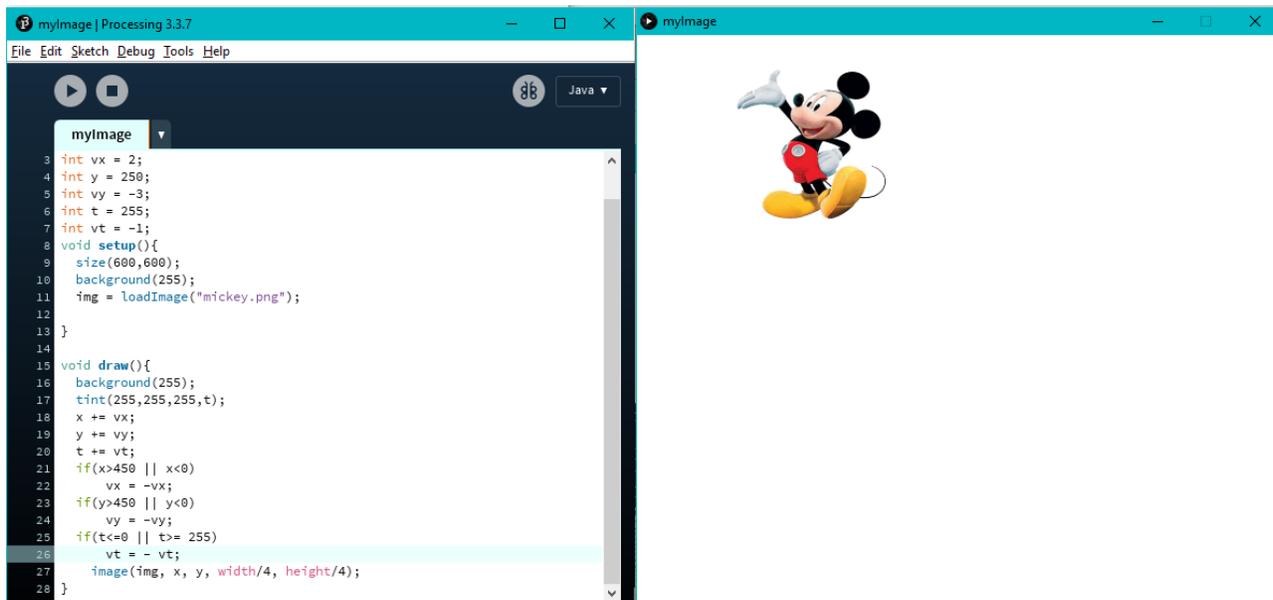


We can do the same thing with our image...



We can get rid of the mickey snake effect by adding a background(255) command just before the image command.

Finally we can animate our image *programmatically*. by creating variables for the x and y position. We can even make Mickey disappear using the transparency property in the tint command.



To learn more about P3 check out the references section of the Processing.org home Website.

<https://processing.org/reference/>