



Programming Fundamentals 1

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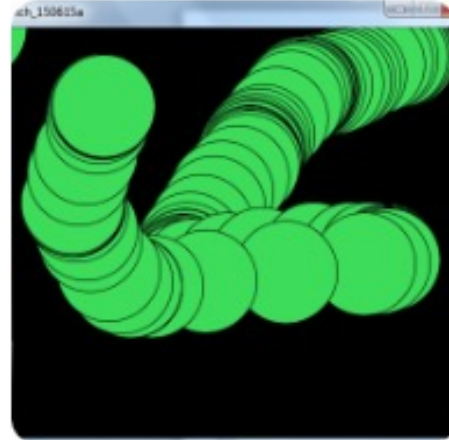




Introduction to Processing

Basics of Animation

Basic Animation



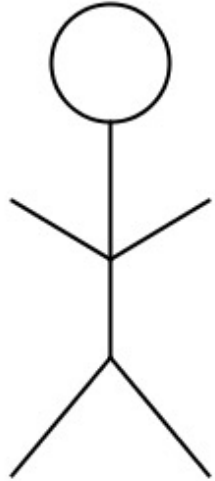
setup() · draw() · system variables (Vid 11mins)



Agenda

- The `setup()` function
- The `draw()` function
- System **Variables** in Processing

Recap



So far, all of our animations
have been static.



The setup() function





void setup()

- ❑ **setup()** is called by Processing once (when the program starts). It should not be called again.
- ❑ **setup()** can set the screen size and background colour.
- ❑ There can only be one **setup()** function for each sketch.

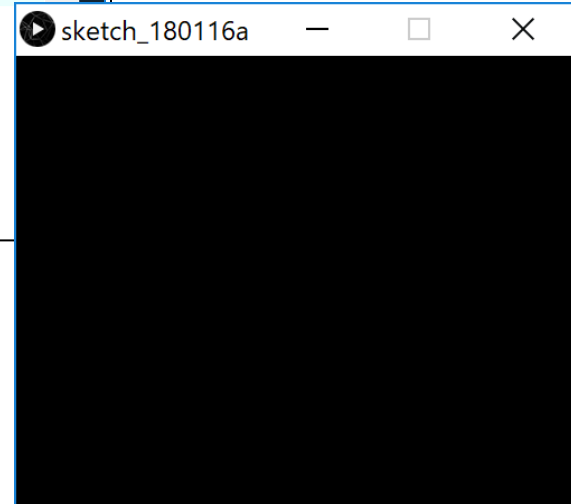
https://processing.org/reference/setup_.html



void setup() – defining a method

```
sketch_180116a | Processing 3.3.6
File Edit Sketch Debug Tools Help

sketch_180116a
1 void setup()
2 {
3   size(500,400);
4   //set to black, grayscale spectrum
5   background(0);
6 }
7
```





void setup() – defining a method

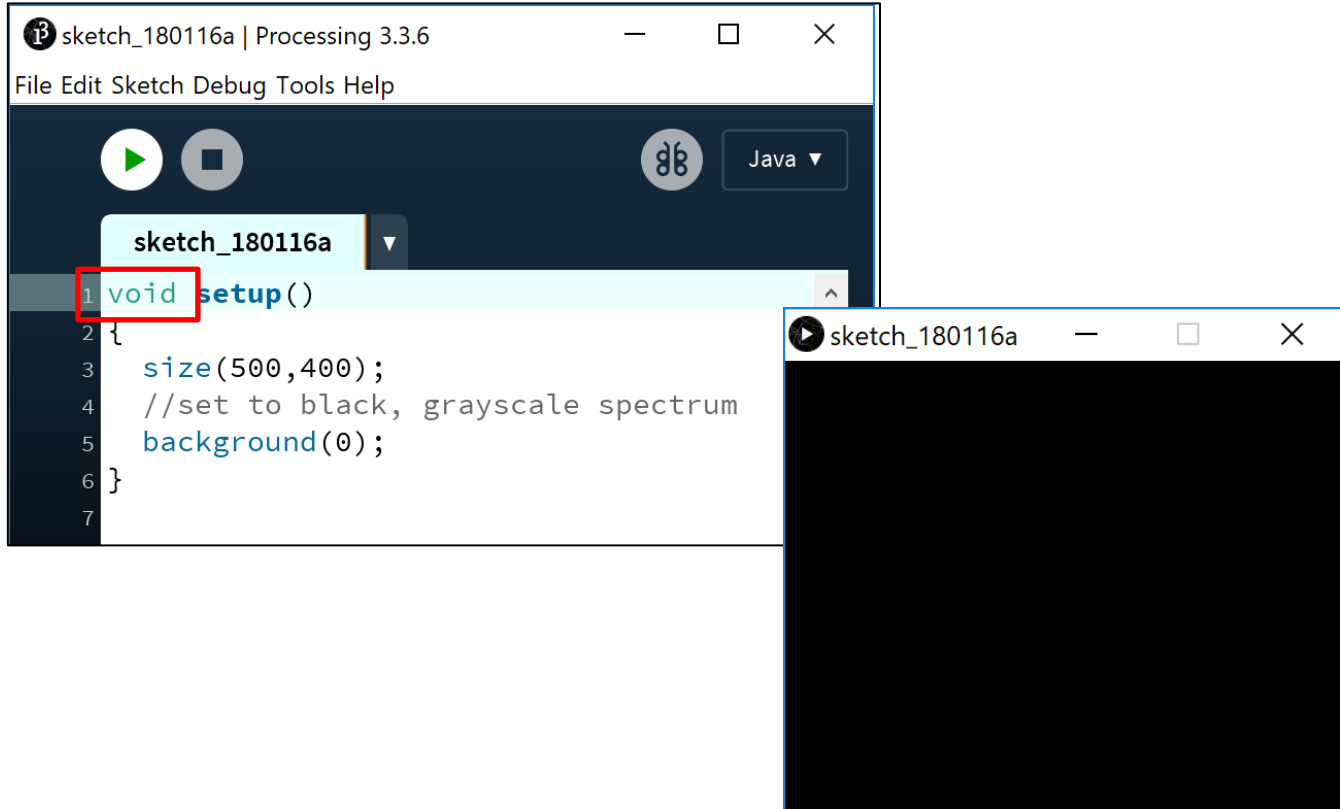
The image shows two windows from the Processing IDE. The top window, titled 'sketch_180116a | Processing 3.3.6', displays the code editor with the following code:

```
1 void setup()  
2 {  
3   size(500,400);  
4   //set to black, grayscale spectrum  
5   background(0);  
6 }  
7
```

The `void setup()` line is highlighted in light blue, and the word `setup()` is enclosed in a red rectangular box. The bottom window, titled 'sketch_180116a', shows a solid black rectangular area, which is the visual output of the code.



void setup() – defining a method





void setup() – defining a method

The image shows two windows from the Processing IDE. The top window is the code editor for 'sketch_180116a', displaying the following code:

```
1 void setup()  
2 {  
3   size(500,400);  
4   //set to black, grayscale spectrum  
5   background(0);  
6 }  
7
```

The opening curly brace on line 2 is highlighted with a red box. The bottom window is the sketch preview, which is a solid black rectangle.



void setup() – defining a method

The image shows a screenshot of the Processing IDE interface. The main window displays the code for a sketch named 'sketch_180116a'. The code is as follows:

```
1 void setup()  
2 {  
3   size(500,400);  
4   //set to black, grayscale spectrum  
5   background(0);  
6 }  
7
```

The code is displayed in a dark-themed editor. A red rectangular box highlights the lines 3 through 5, which contain the `size(500,400);`, a comment `//set to black, grayscale spectrum`, and the `background(0);` call. To the right of the code editor, there is a preview window titled 'sketch_180116a' which shows a solid black rectangle, representing the output of the `background(0);` function.



The draw() function





void draw()

- ❑ You should *never* call the **draw()** function. (Just write it)
 - Processing **automatically** calls it straight after the **setup()** call.
- ❑ **draw()** continuously executes the code contained inside it.
 - (60 times a second by default)
- ❑ There can only be one **draw()** function for each sketch.

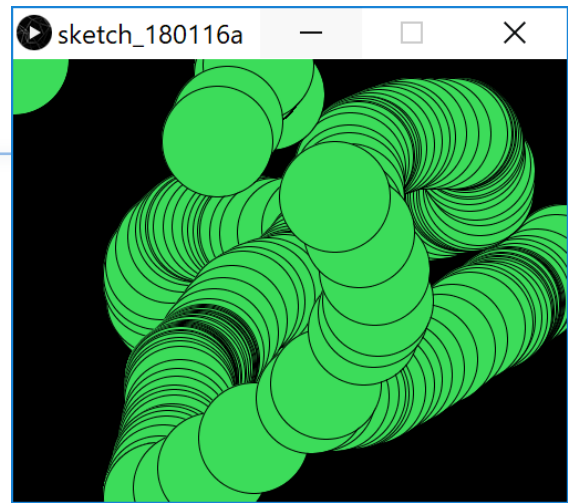
https://processing.org/reference/draw_.html

void draw()



```
sketch_180116a | Processing 3.3.6
File Edit Sketch Debug Tools Help

sketch_180116a
1 void setup()
2 {
3   size(500,400);
4   //set to black, grayscale spectrum
5   background(0);
6 }
7
8 void draw()
9 {
10  stroke(0, 0, 0);    //black outline
11  fill(60, 220, 90); //green
12  ellipse(mouseX, mouseY, 100, 100);
13 }
14
```



System Variables



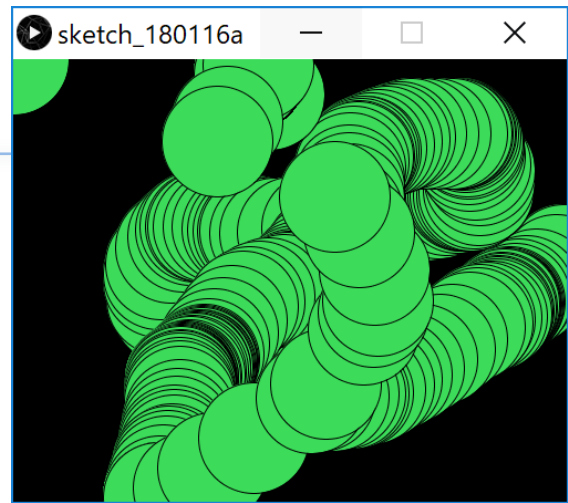
mouseX = x co-ordinate of mouse pointer
mouseY = y co-ordinate of mouse pointer

void draw()



```
sketch_180116a | Processing 3.3.6
File Edit Sketch Debug Tools Help

sketch_180116a
1 void setup()
2 {
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Q: Why many circles?

System Variables



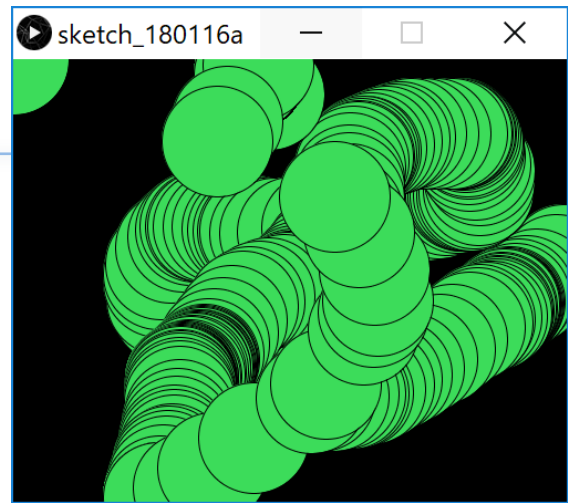
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void draw()



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sketch_180116a | Processing 3.3.6
File Edit Sketch Debug Tools Help

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```



Q: Why many circles?

A: background(0) is in the setup function.

System Variables



mouseX = x co-ordinate of mouse pointer
mouseY = y co-ordinate of mouse pointer



void draw()

```
sketch_180116a | Processing 3.3.6
File Edit Sketch Debug Tools Help

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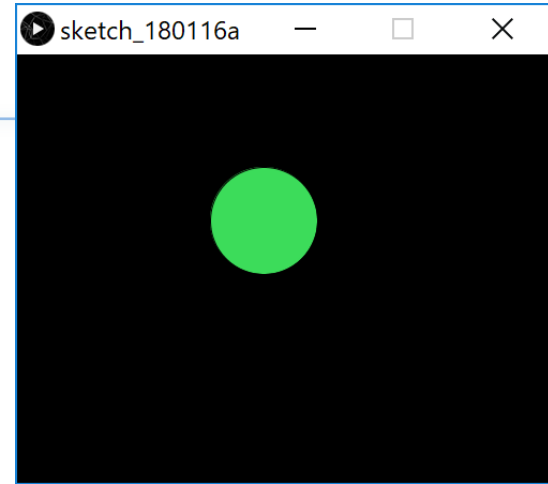
*Q: What happens when we move **background(0)** into the draw function?*

void draw()



```
sketch_180116a | Processing 3.3.6
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```



*Q: What happens when we move **background(0)** into the draw function?*

A: Before each circle is drawn, the background is painted black, so it clears the previous circle.



System Variables in Processing





System Variables in Processing

Some **examples** of system variables in Processing:

mouseX (x co-ordinate of the mouse pointer on the display window)

mouseY (y co-ordinate of the mouse pointer on the display window)

width (width of the display window)

height (height of the display window)

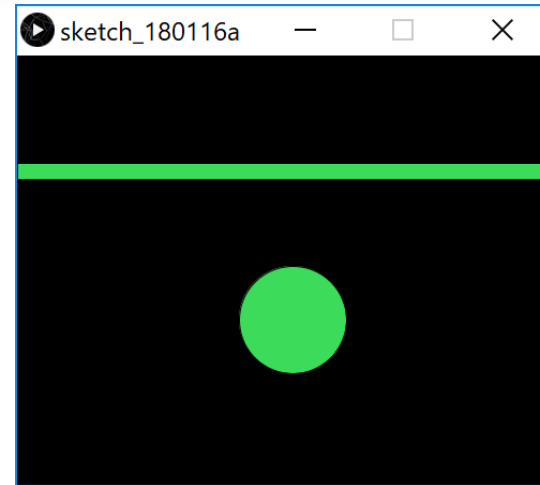
We don't have to **define/create** these; just use them



System Variables in Processing

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sketch_180116a | Processing 3.3.6
File Edit Sketch Debug Tools Help

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5
6 void draw()
7 {
8   //set to black, grayscale spectrum
9   background(0);
10  stroke(0, 0, 0);    //black outline
11  fill(60, 220, 90); //green
12  rect(0,100,width, 15);
13  ellipse(mouseX, mouseY, 100, 100);
14 }
15
```



Using the **width** system variable in the **rect** function to draw a thick line.



System Variables in Processing

```
sketch_180116a | Processing 3.3.6
File Edit Sketch Debug Tools Help

[Run] [Stop] [Java]

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14 }
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```

*Q: What would happen to our animation if we swapped the **mouseX** and **mouseY** variables in the `ellipse` function with each other?*



System Variables in Processing

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sketch_180116a | Processing 3.3.6
File Edit Sketch Debug Tools Help

[Run] [Stop] [Java]

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12  rect(0,100,width, 15);
13  ellipse(mouseX, mouseY, 100, 100);
14 }
15
```

*Q: What would happen to our animation if we swapped the **mouseX** and **mouseY** variables in the `ellipse` function with each other?*

A: As you move your mouse right on the x axis, the circle will move down on the y axis and vice versa.

Questions?





Thanks.

