Conditional Events

Mouse events and Operators

Produced by:

Dr. Siobhán Drohan
Mr. Colm Dunphy
Mr. Diarmuid O'Connor

Waterford Institute *of* Technology
INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

Department of Computing and Mathematics
http://www.wit.ie/

Topics list

1. Mouse Events
2. Recap: Arithmetic Operators
3. Order of Evaluation

What is an event?

"…an action such as
a key being pressed,
the mouse moving,
or a new piece of data
becoming available to read."

(Reas & Fry, 2014)

What happens when an event is “fired”?

“An event interrupts

the normal flow

of a program

to run the code

within an event block”

(Reas & Fry, 2014)

Mouse Events

Mouse Variables	Description
mousePressed	***true*** if any mouse button is pressed, ***false*** otherwise. Note: this variable reverts to ***false*** as soon as the button is released.
mouseButton	Can have the value **LEFT**, **RIGHT** and **CENTER**, depending on the mouse button most recently pressed. Note: this variable retains its value until a different mouse button is pressed.

Mouse Events

- Mouse and keyboard events only work when a program has draw().

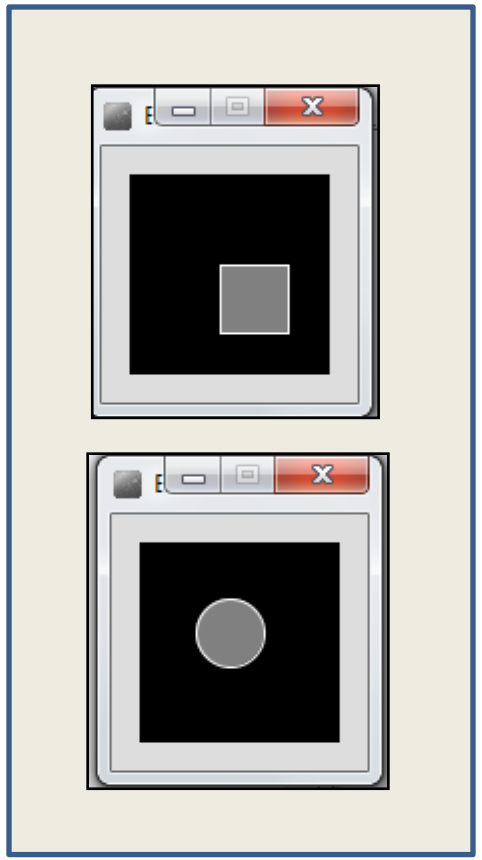
- Without draw(), the code is only run once and then stops "listening" for events.

Source: https://processing.org/reference/

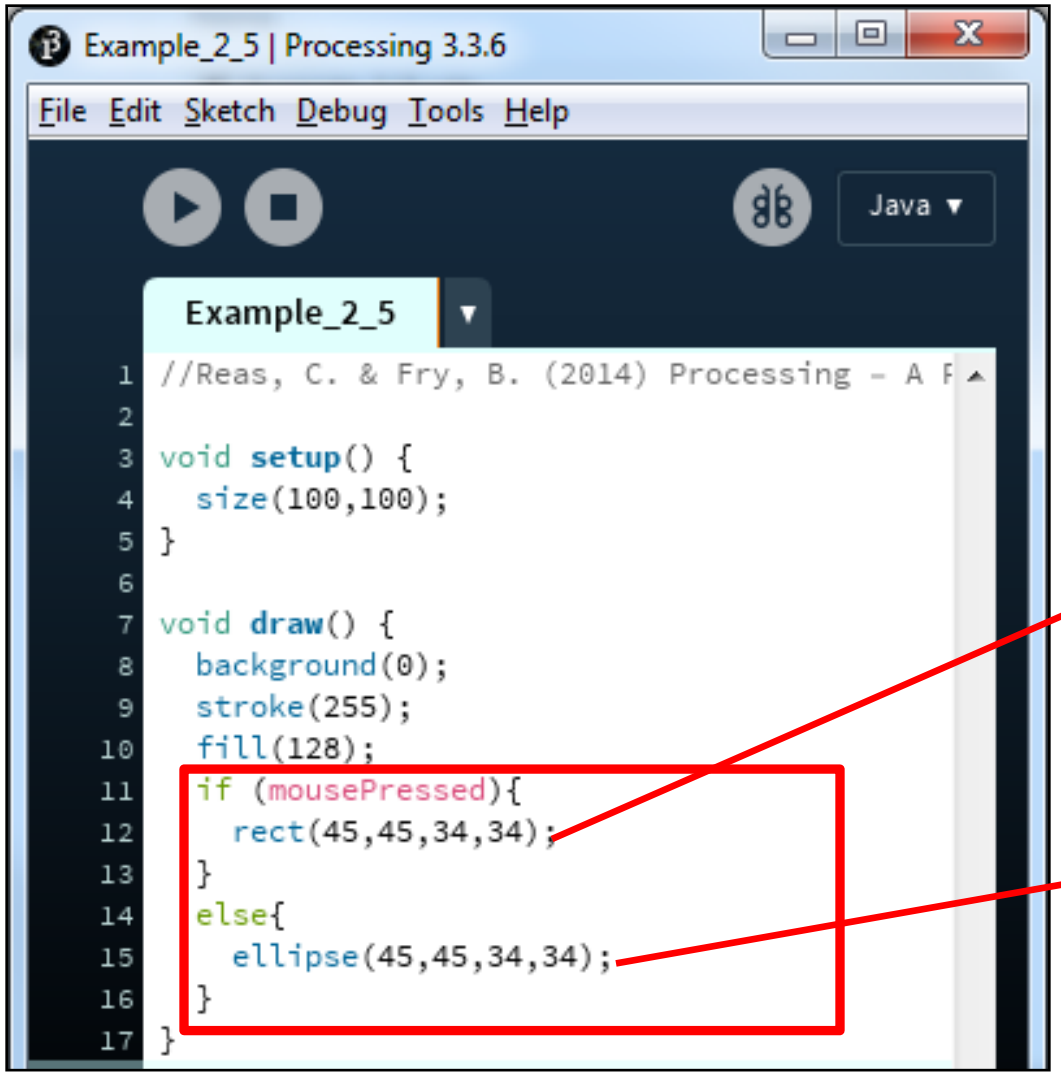
Processing Example 2.5

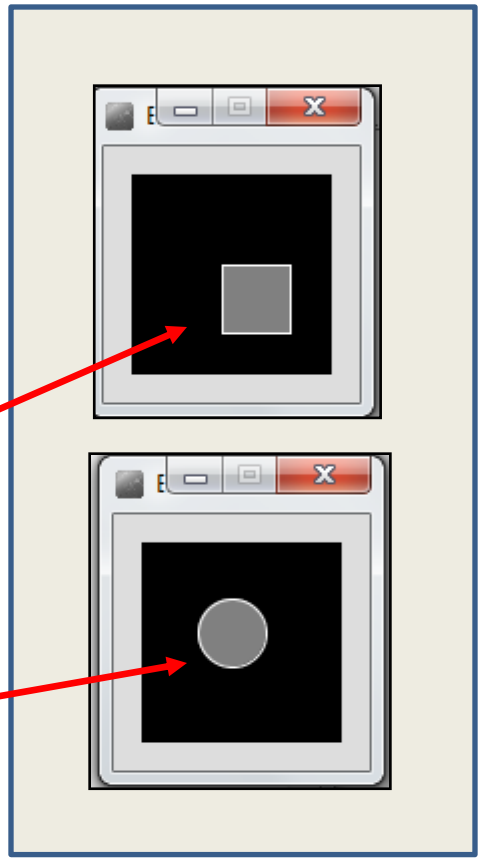
Functionality:

- If the mouse is pressed:
  - draw a grey square with a white outline.
  - otherwise draw a grey circle with a white outline.



Processing Example 2.5 - Code

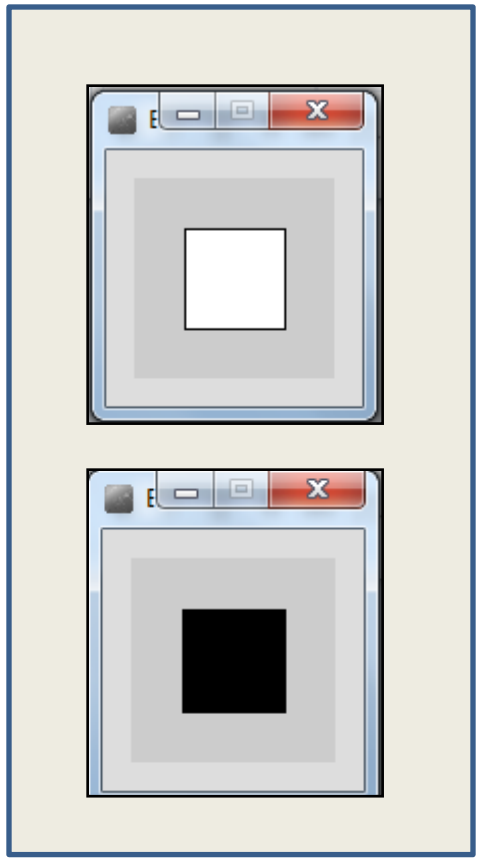




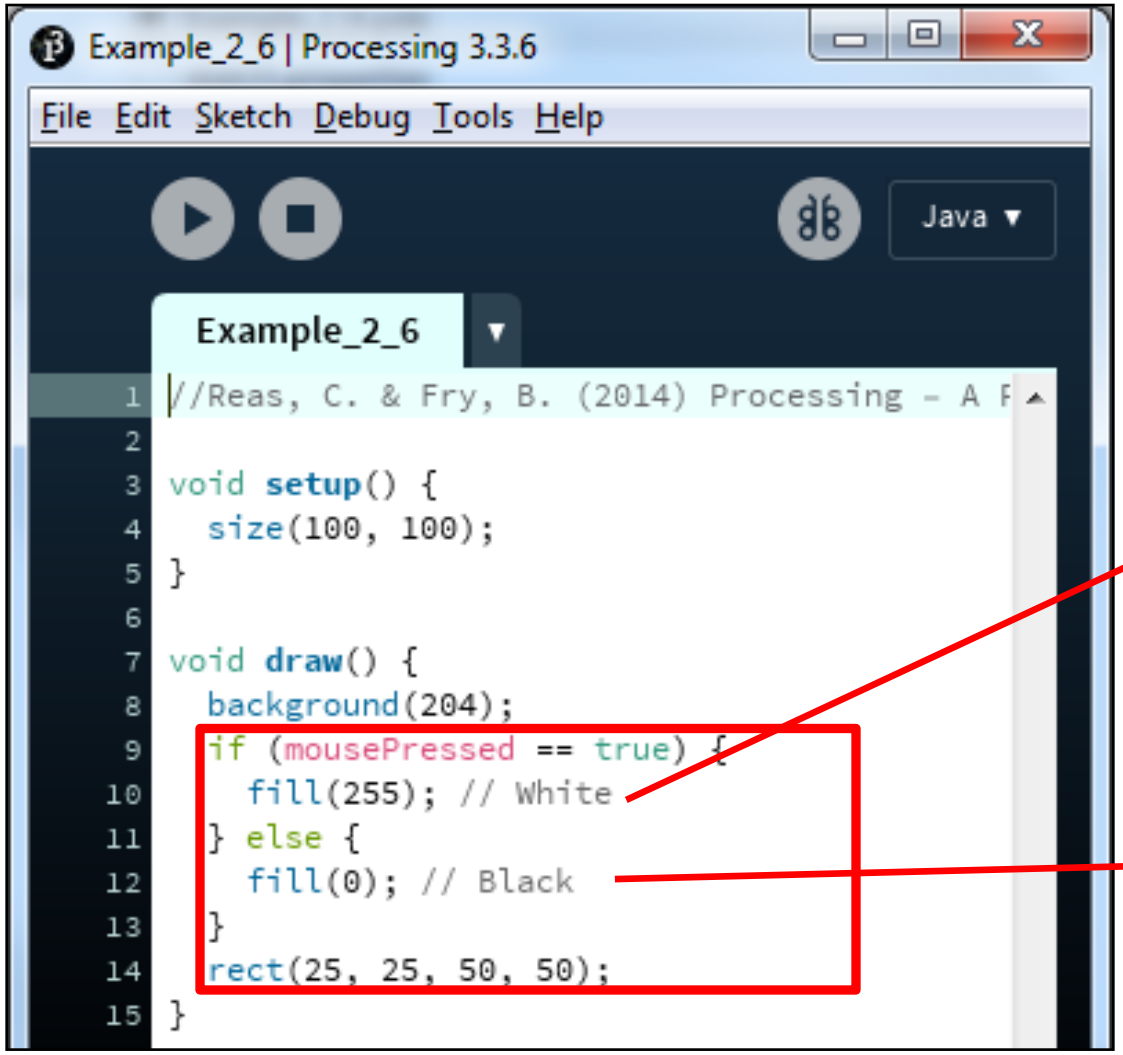
Processing Example 2.6

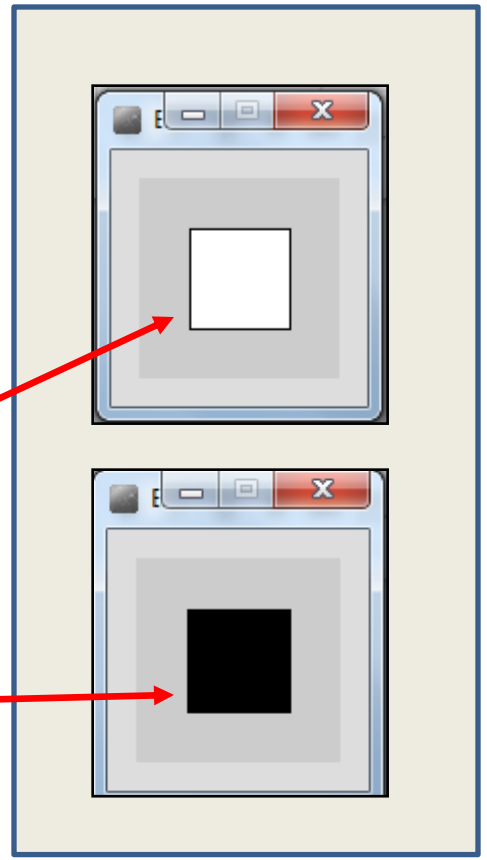
Functionality:

- If the mouse is pressed:
  - set the fill to white and draw a square.
  - otherwise set the fill to black and draw a square.



Processing Example 2.6





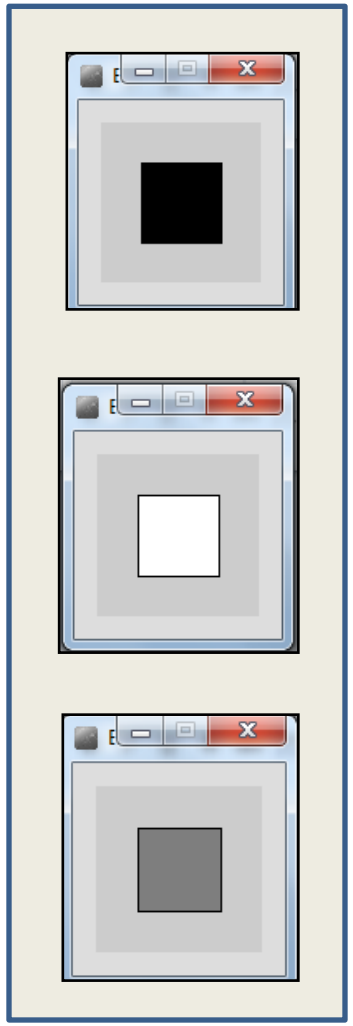
Processing Example 2.7

Functionality:

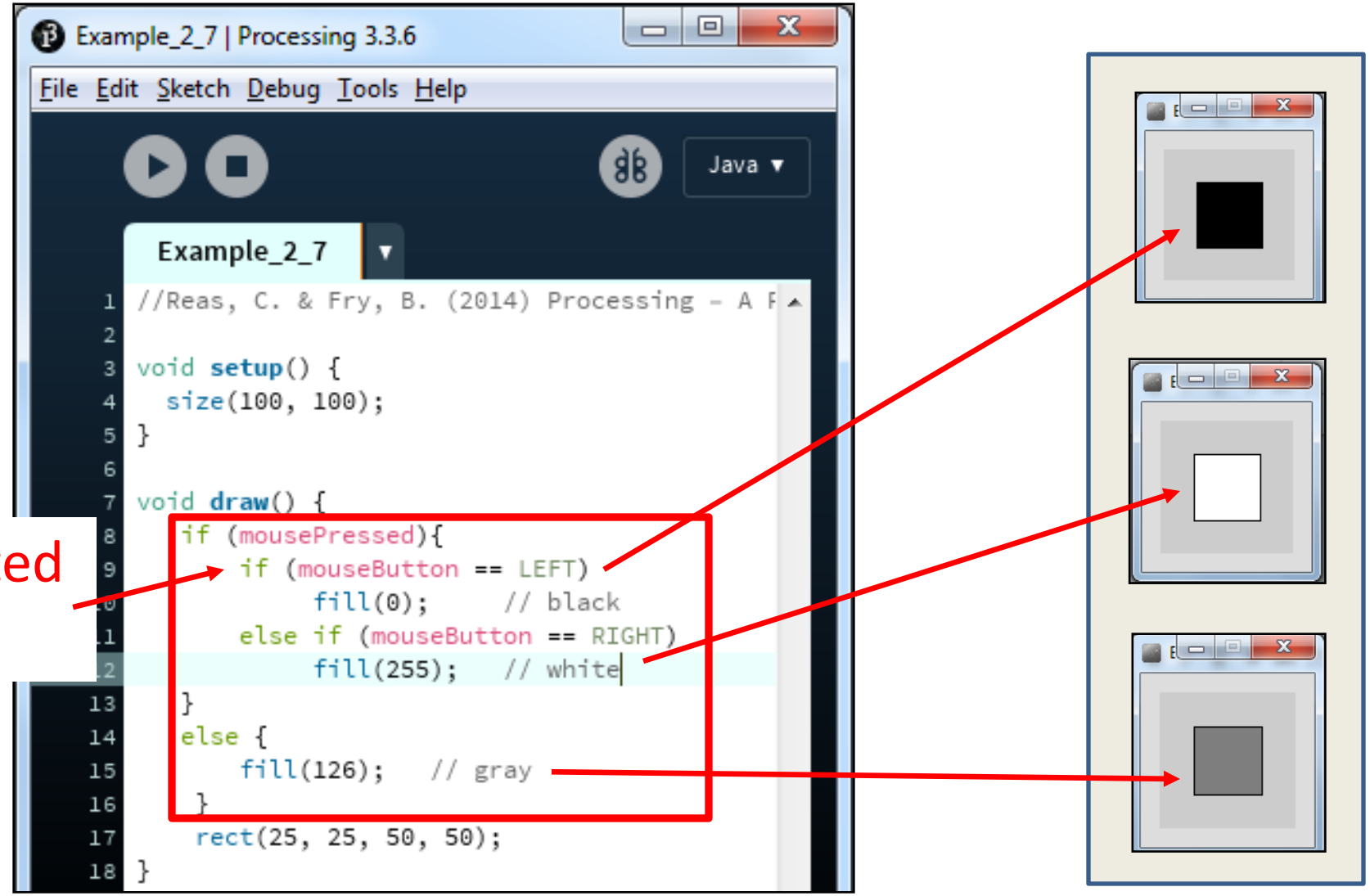
- If the LEFT button on the mouse is pressed, set the fill to black and draw a square. As soon as the LEFT button is released, grey fill the square.

- If the RIGHT button on the mouse is pressed, set the fill to white and draw a square. As soon as the RIGHT button is released, grey fill the square.

- If no mouse button is pressed, set the fill to grey and draw a square.



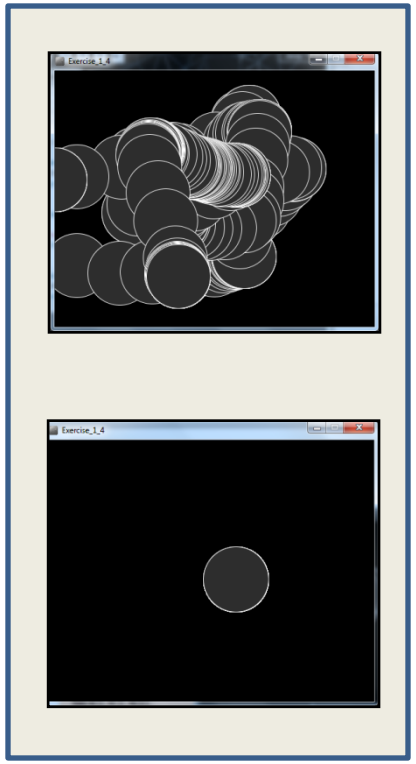
Processing Example 2.7



Processing Example 2.8

Functionality:

- Draw a circle on the mouse (x,y) coordinates.
- Each time you move the mouse, draw a new circle.
- All the circles remain in the sketch until you press a mouse button.
- When you press a mouse button, the sketch is cleared and a single circle is drawn at the mouse (x,y) coordinates.



Processing Example 2.8

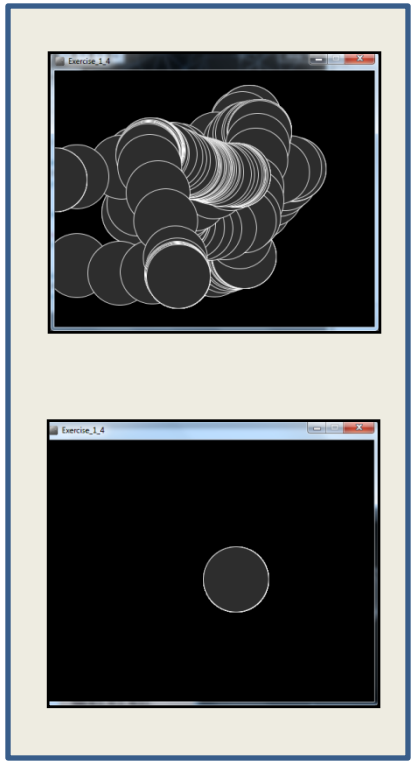
Example_2_8 | Processing 3.3.6

File Edit Sketch Debug Tools Help

Java

Example_2_8

```
1  //https://processing.org/tutorials/interactivity
2
3  void setup() {
4    size(500,400);
5    background(0);
6  }
7
8  void draw() {
9
10   if (mousePressed) {
11     background(0);
12   }
13
14   stroke(255);
15   fill(45,45,45);
16   ellipse(mouseX, mouseY, 100, 100);
17
18 }
```



https://processing.org/tutorials/interactivity/

Processing Example 2.8

We moved the stroke and fill function calls to the setup() function.
Q: Does this change the functionality of our sketch?

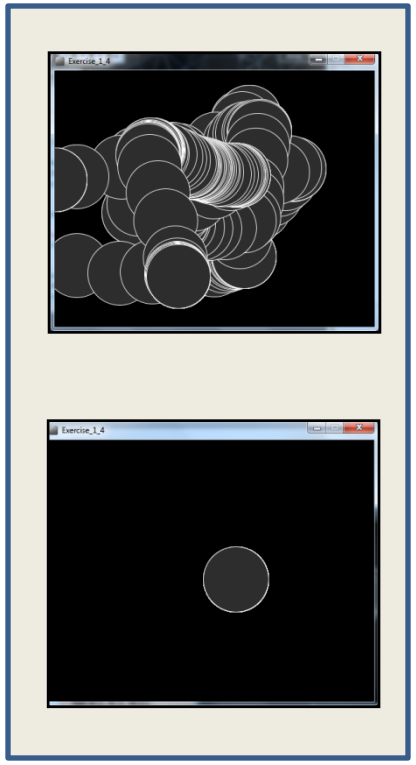
Example_2_8 | Processing 3.3.6

File Edit Sketch Debug Tools Help

Java ▾

Example_2_8

```
1  //https://processing.org/tutorials/interactivity
2
3  void setup() {
4    size(500,400);
5    background(0);
6    stroke(255);
7    fill(45,45,45);
8  }
9
10 void draw() {
11
12   if (mousePressed) {
13     background(0);
14   }
15
16   //stroke(255);
17   //fill(45,45,45);
18   ellipse(mouseX, mouseY, 100, 100);
19
20 }
```



https://processing.org/tutorials/interactivity/

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Recap: Arithmetic Operators

Arithmetic Operator	Explanation	Example(s)
+	Addition	6 + 2 amountOwed + 10
-	Subtraction	6 – 2 amountOwed – 10
*	Multiplication	6 * 2 amountOwed * 10
/	Division	6 / 2 amountOwed / 10

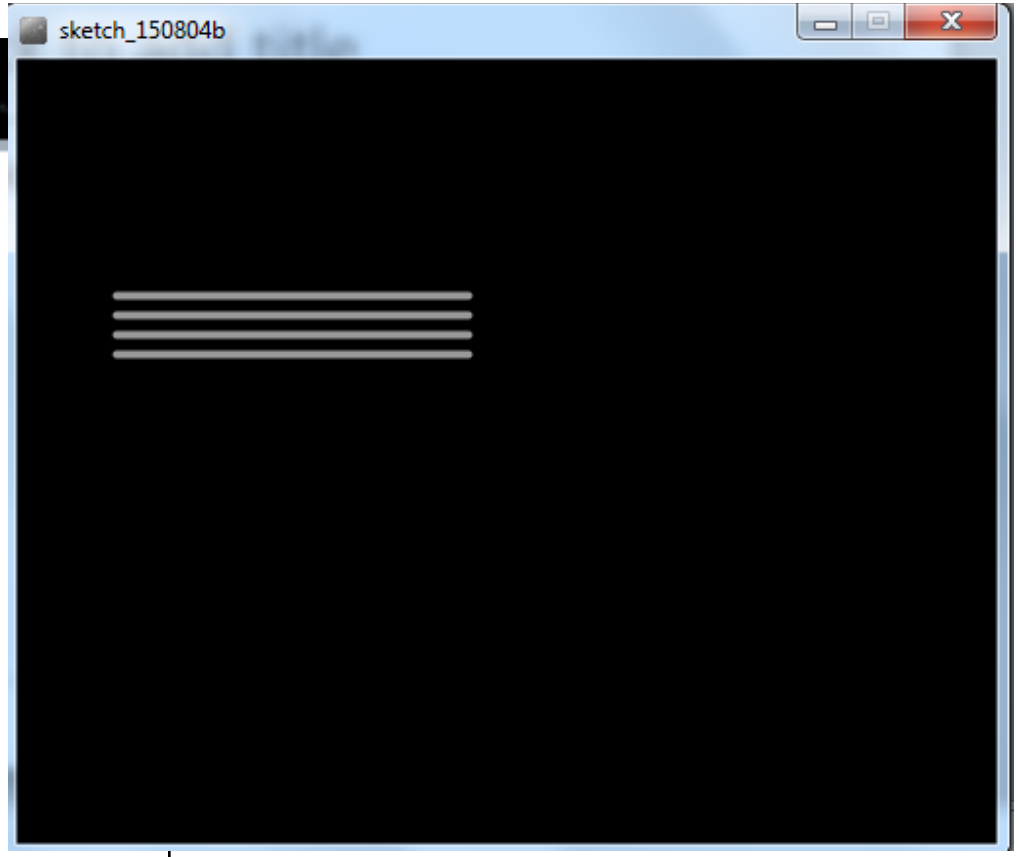
Recap: Arithmetic operators

sketch_150804b

```
size(500, 400);
background(0);
stroke(153);
strokeWeight(4);

int a = 50;
int b = 120;
int c = 180;

line(a, b, a+c, b);
line(a, b+10, a+c, b+10);
line(a, b+20, a+c, b+20);
line(a, b+30, a+c, b+30);
```



Based on the Processing Example: Basics → Data → Variables

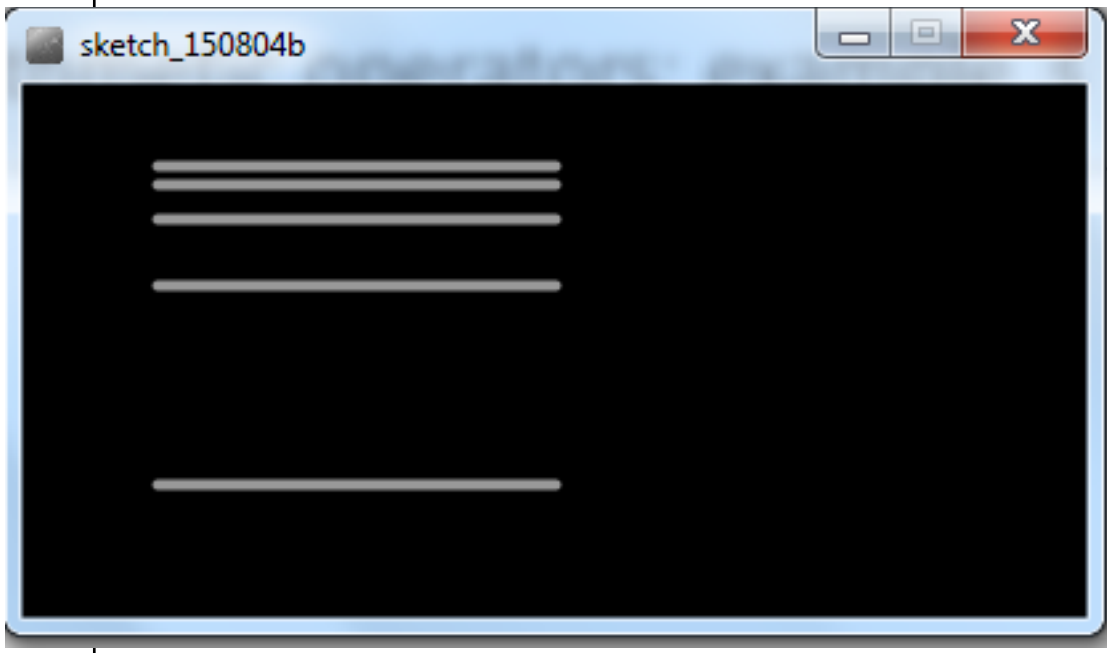
Recap: Arithmetic operators

sketch_150804b

```
size(400, 200);
background(0);
stroke(153);
strokeWeight(4);

int a = 50;
int b = 1500;
int c = 4;

line(a, b/10, a*c, b/10);
line(a, b/20, a*c, b/20);
line(a, b/30, a*c, b/30);
line(a, b/40, a*c, b/40);
line(a, b/50, a*c, b/50);
```



Based on the Processing Example: Basics → Data → Variables

Arithmetic Operators

- If you want to keep track of how many times something happens, you are keeping a **running total** e.g.
  - The number of times you drew a line on the computer screen.
  - As each line is drawn, you add one to your counter variable.

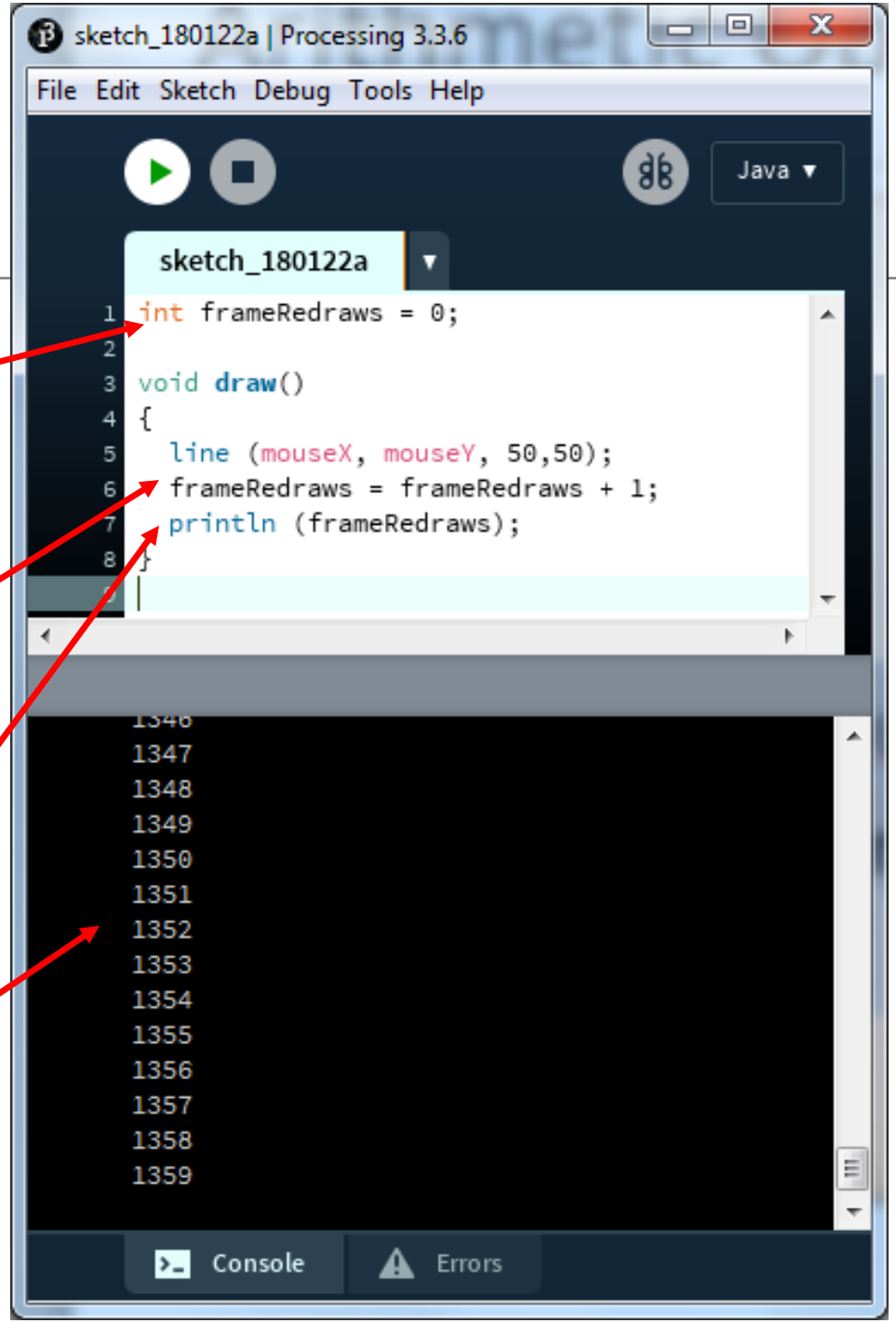
Arithmetic Operators

This code declares a new variable of type integer called frameRedraws and initialises it to 0.

One is added to the frameRedraws variable each time the draw() method is called.

The value of frameRedraws is then printed to the console.

frameRedraws is a **“running total”** of the number of frame redraws.



Arithmetic Operators

- These examples are straightforward uses of the arithmetic operators.
- However, we typically want to do more complex calculations involving many arithmetic operators.
- To do this, we need to understand the **Order of Evaluation**.

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Order of Evaluation

- **B**rackets **()**
- **M**ultiplication (*)
- **D**ivision (**/**)
- **A**ddition (**+**)
- **S**ubtraction (**-**)

BoMDAS

Beware My Dear Aunt Sally

Order of Evaluation - **Quiz**

What are the results of these calculations?

- Q1: 3+6*5-2
- Q2: 3+6*(5-2)
- Q3: (3+6)*5-2

Questions?

References

- Reas, C. & Fry, B. (2014) Processing – A Programming Handbook for Visual Designers and Artists, 2nd Edition, MIT Press, London.