

Introduction to Processing

Creating static drawings

Produced
by:

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INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

Topics list

- What is Processing?
- Coordinate System in Computing.
- Functions in Processing.
- Basic Shapes.
- Syntax Errors.
- Logic Errors.

What is Processing?

“Processing is a programming language,
development environment,
and online community.”

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

- This example was developed using Processing:
<http://balldroppings.com/js/>

What is Processing?

Processing...

...can be used to develop static or interactive online material and data visualisations.

...is often used by visual artists.

...produces visual and interactive representations of programming code.

What is Processing?

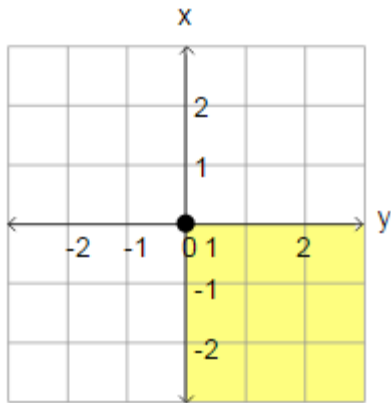
- Three different programming languages can be used with Processing:
 - Java: we will use this language.
 - JavaScript.
 - Python.

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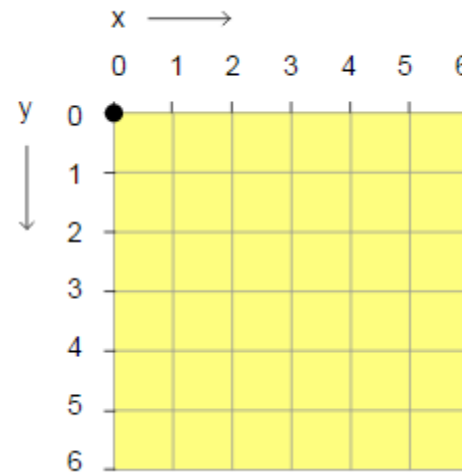
Coordinate System in Computing

In Geometry,
we use this type of
coordinate system:



point (0,0) is in the
centre.

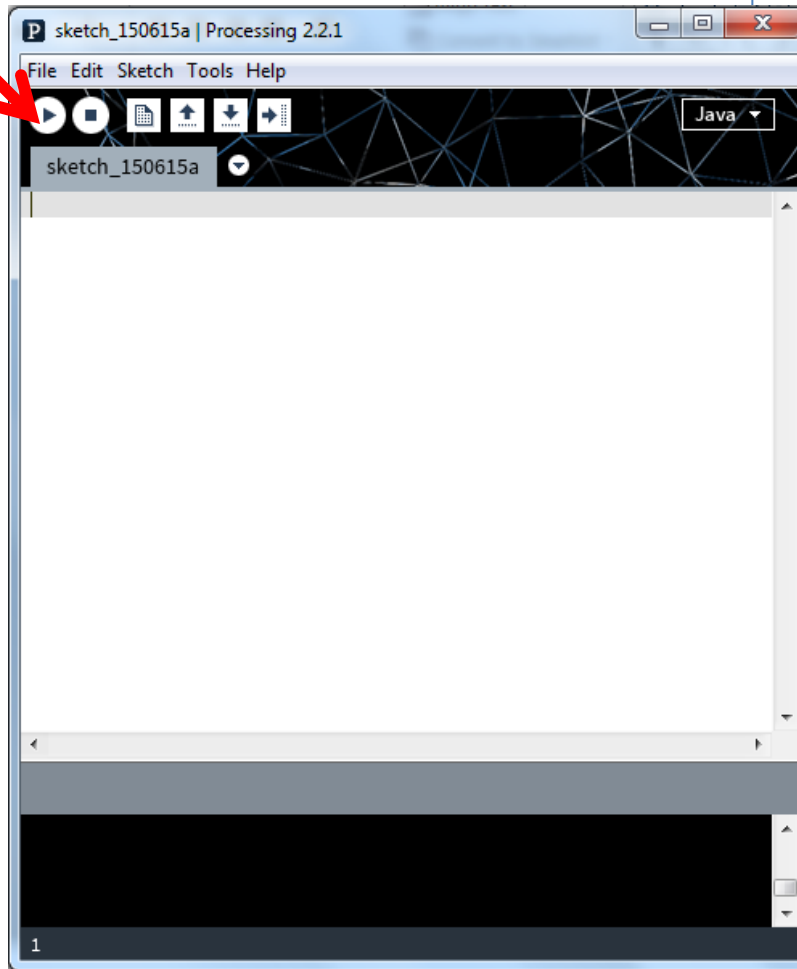
In Computing, we use this type of
coordinate system to represent the
screen:



point (0,0) is in the top left hand
corner. Each number is a pixel.

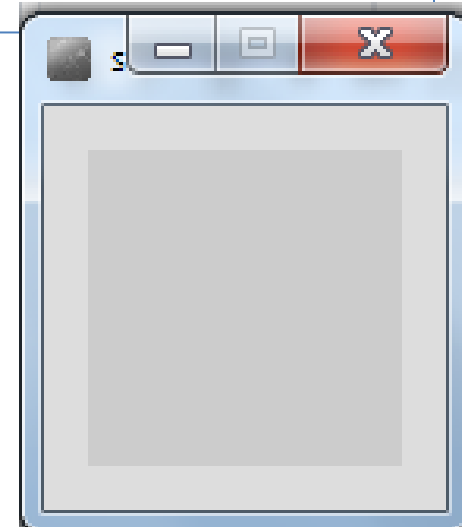
Coordinate System in Computing

**Run
button**



So how does this relate to Processing?

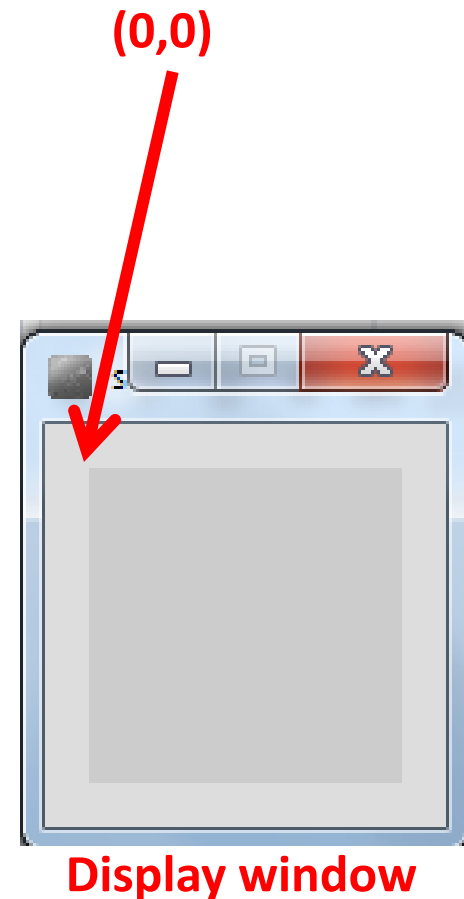
When you open Processing and click on the run button, a display window pops up.



Display window

Coordinate System in Computing

- The display window is where your code is run/ displayed.
- It follows the rules of the Computing coordinate system i.e. the top left hand corner is $(0,0)$.
- A point $(10,20)$ is 10 pixels to the right of $(0,0)$ and 20 pixels below $(0,0)$.



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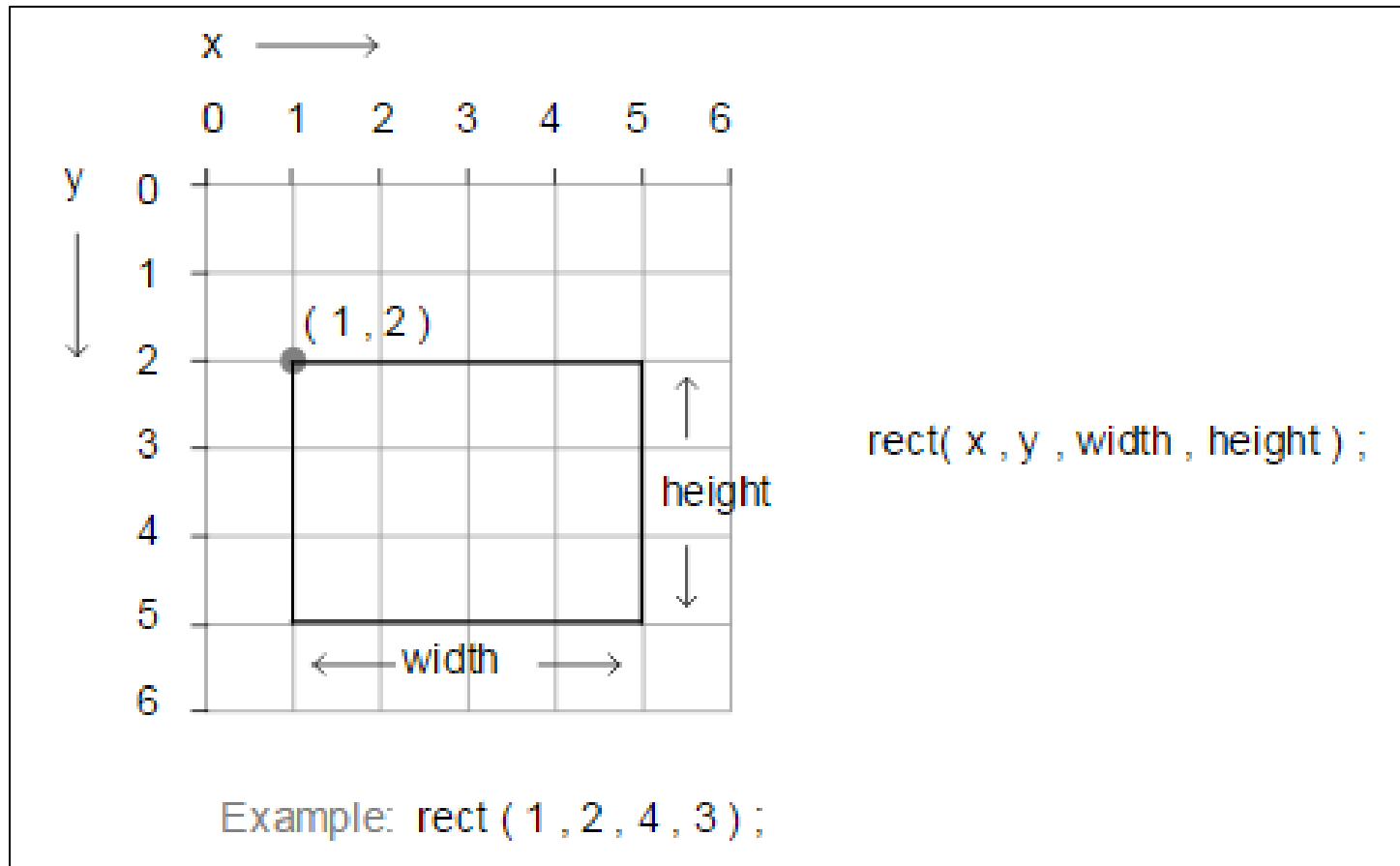
Functions in Processing

- Processing comes with several pre-written functions that we can use.
- A function comprises a set of instructions that performs some task.
- When you call the function, it performs the task.
- We will now look at functions that draw the following shapes:
 - Rectangle, square, line, oval and circle.

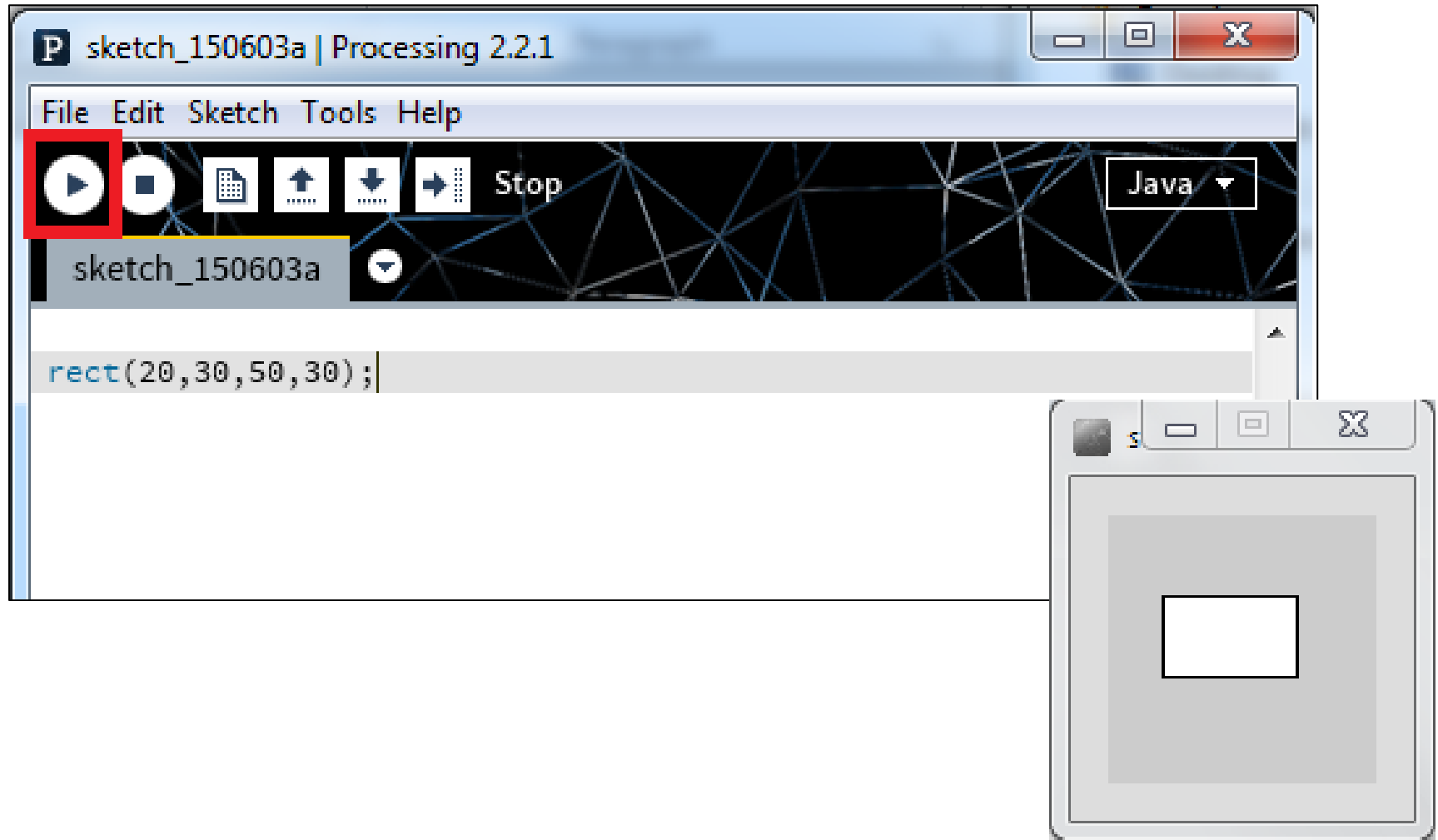
Topics list

- What is Processing?
- Coordinate System in Computing.
- Functions in Processing.
- Basic Shapes.
- Formatting the display window.
- Syntax Errors.
- Logic Errors.

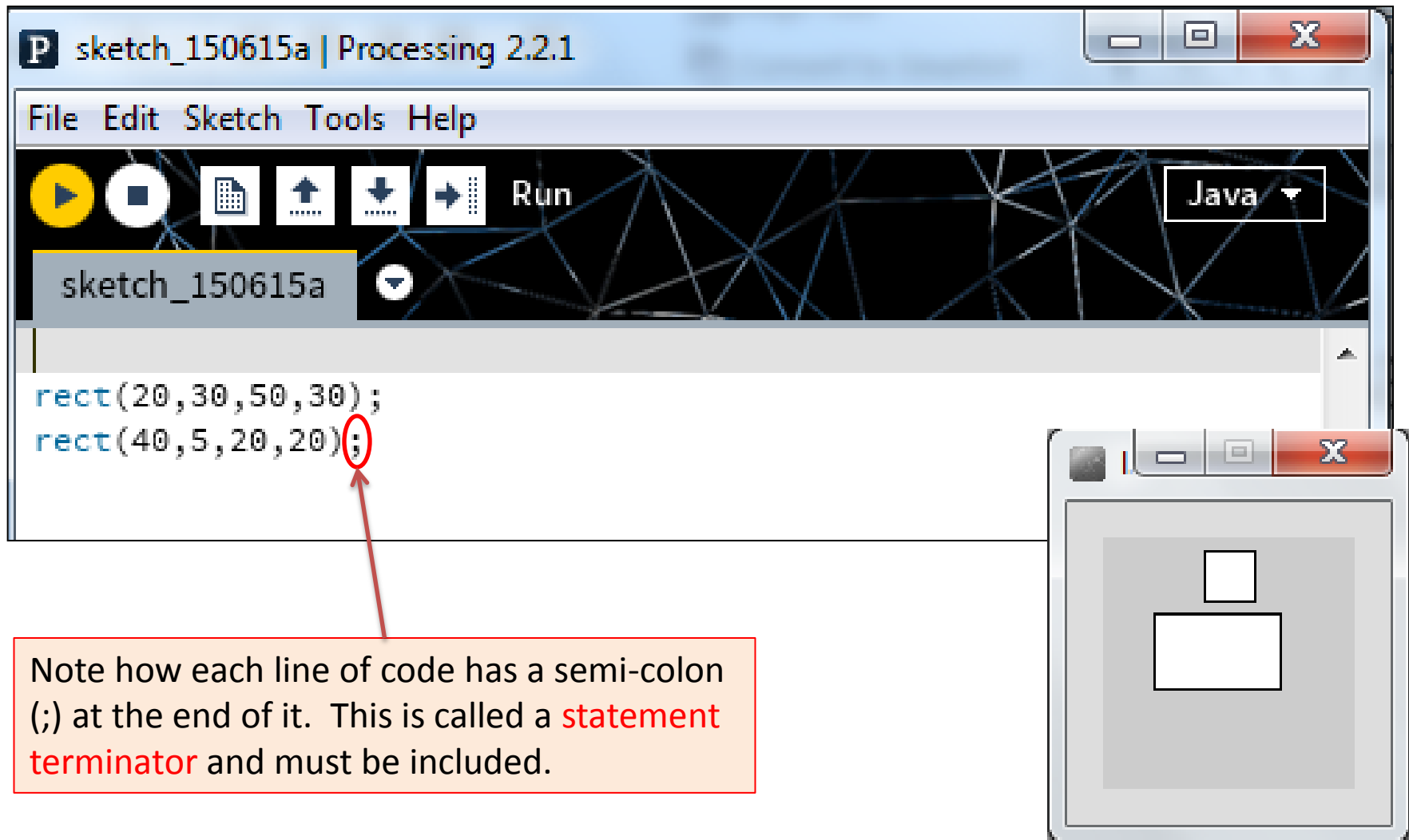
rect()



rect() – drawing a rectangle



rect() – drawing a square



rect() – syntax

rect(x, y, w, h)

x = x-coordinate of the upper left corner of the rectangle

y = y-coordinate of the upper left corner of the rectangle

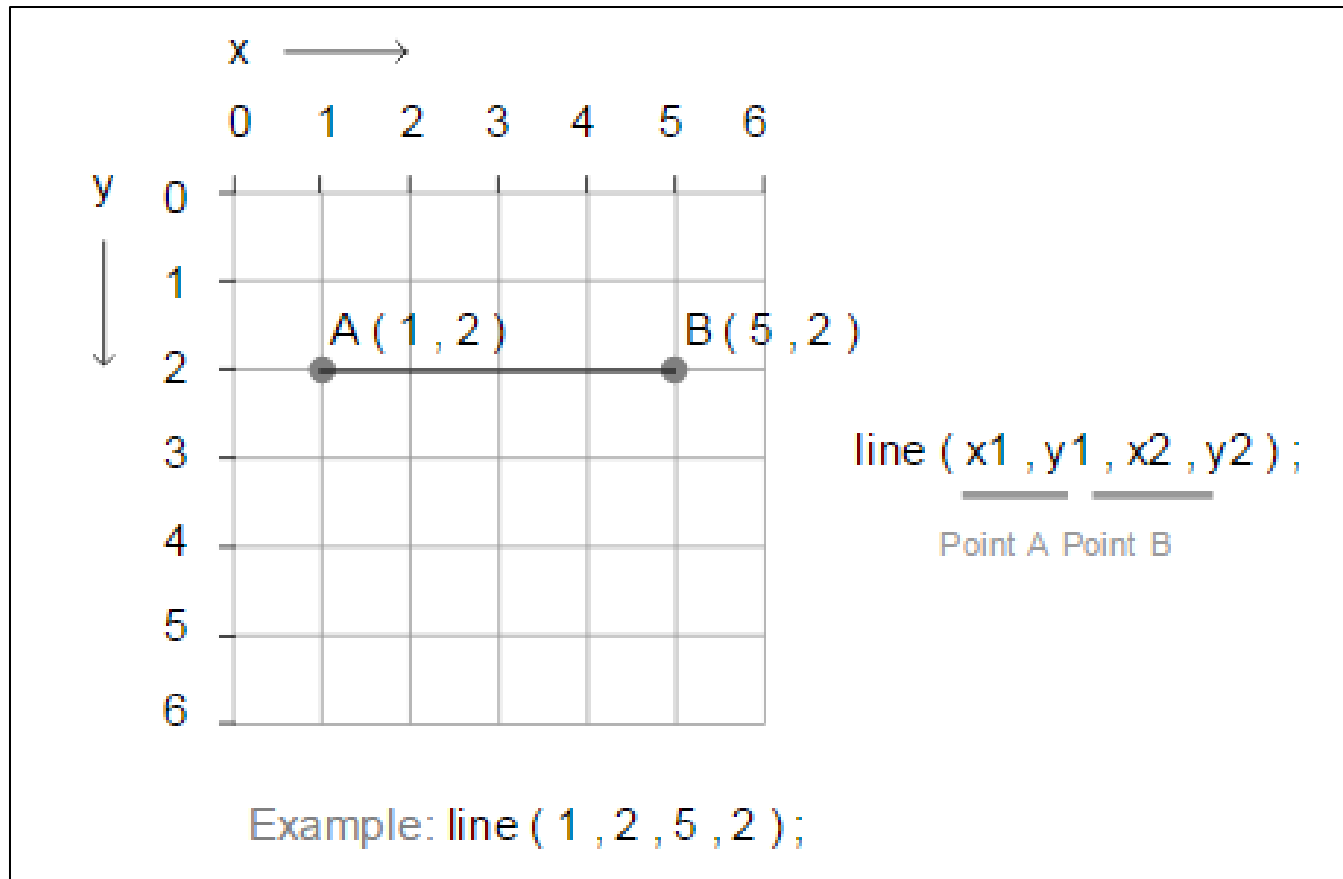
w = width of the rectangle

h = height of the rectangle

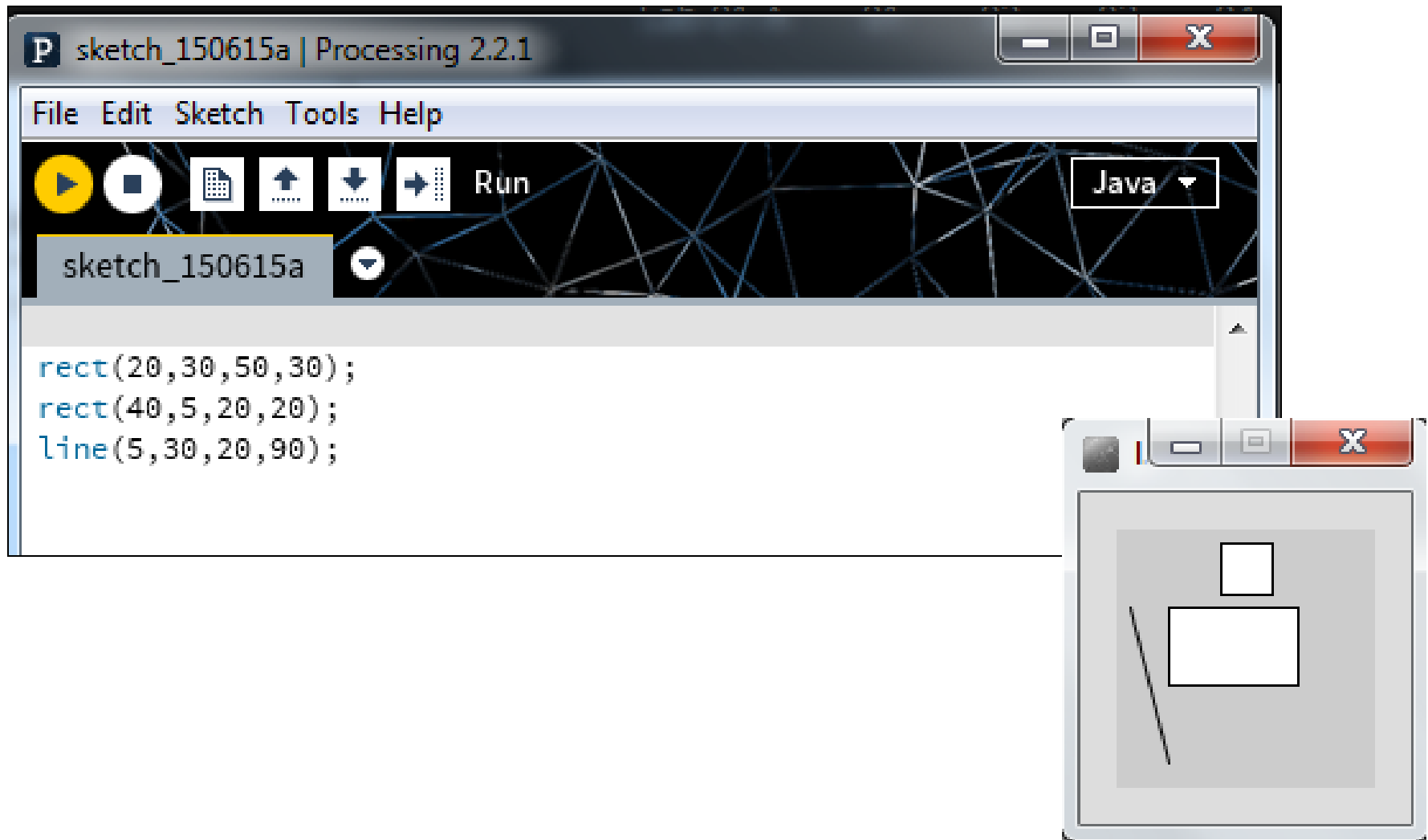
- The rect function above defines four **parameters** i.e. x, y, w, h.
- When you call rect, you are expected to pass four numbers to it. These actual numbers are called **arguments**.
- rect uses these four numbers to render the rectangle on the display window.

To draw a square, the width and height must be the same value.

line()



line () – drawing a line



line() – syntax

`line(x1, y1, x2, y2)`

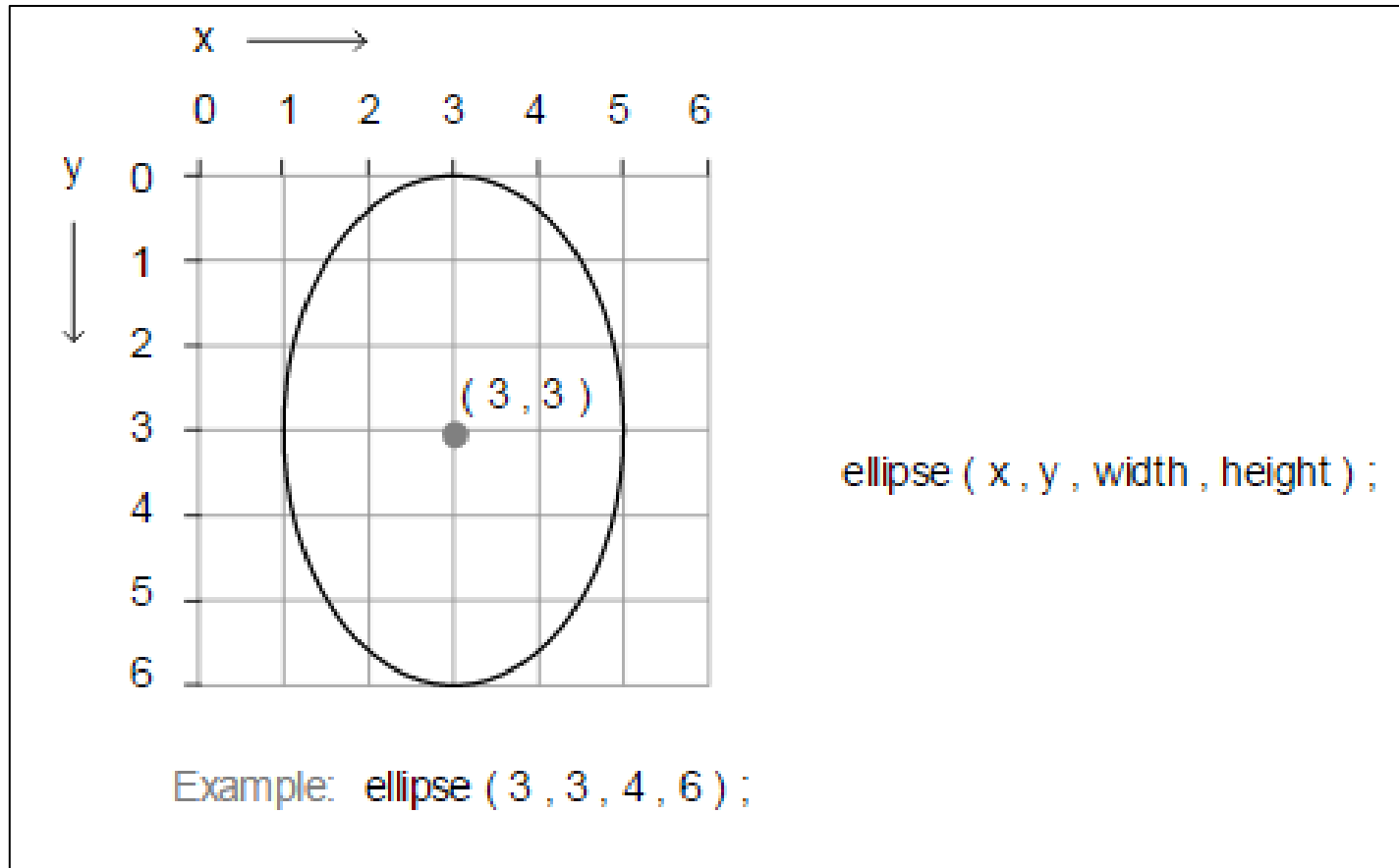
`x1` = x-coordinate of first point

`y1` = y-coordinate of first point

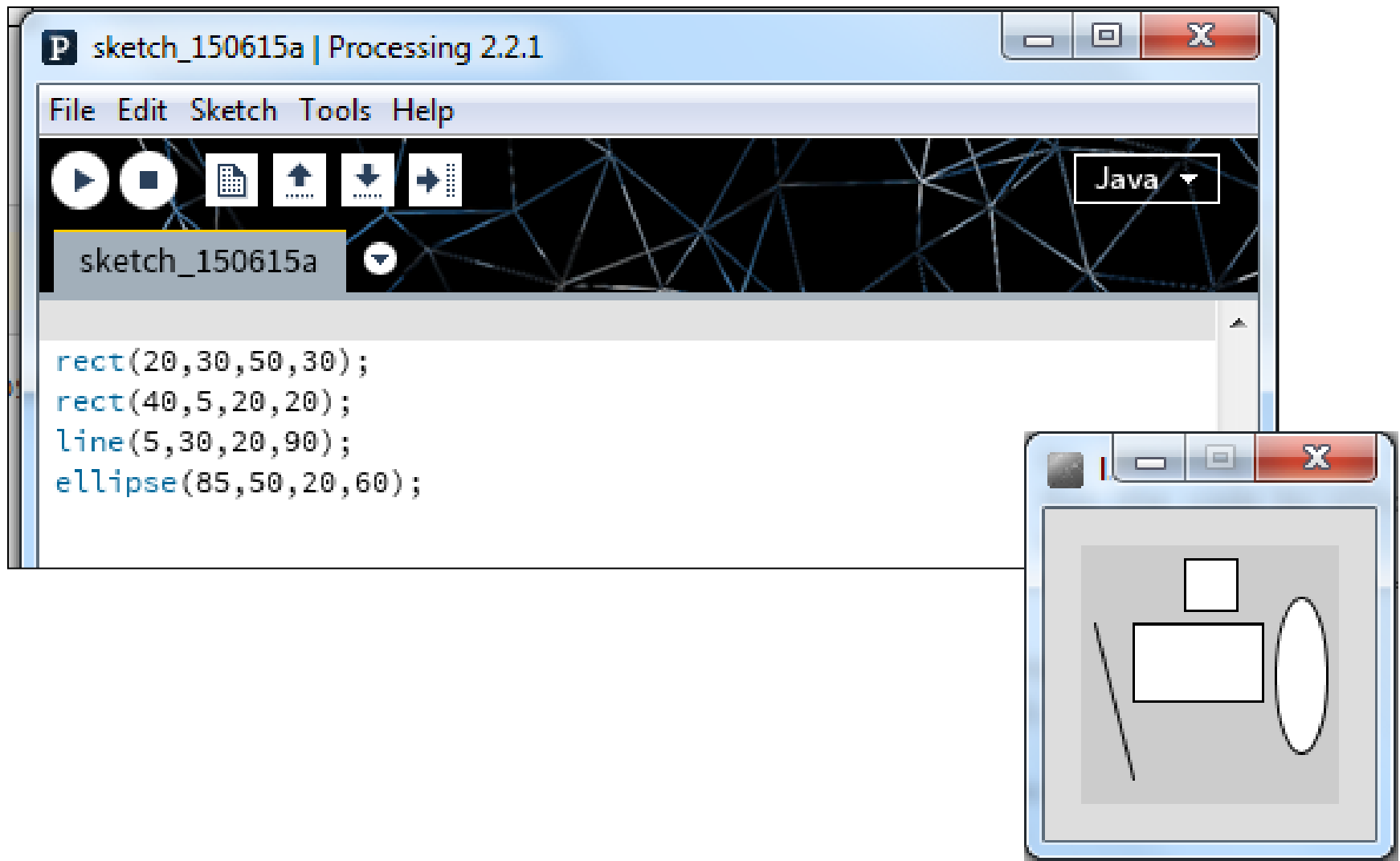
`x2` = x-coordinate of second point

`y2` = y-coordinate of second point

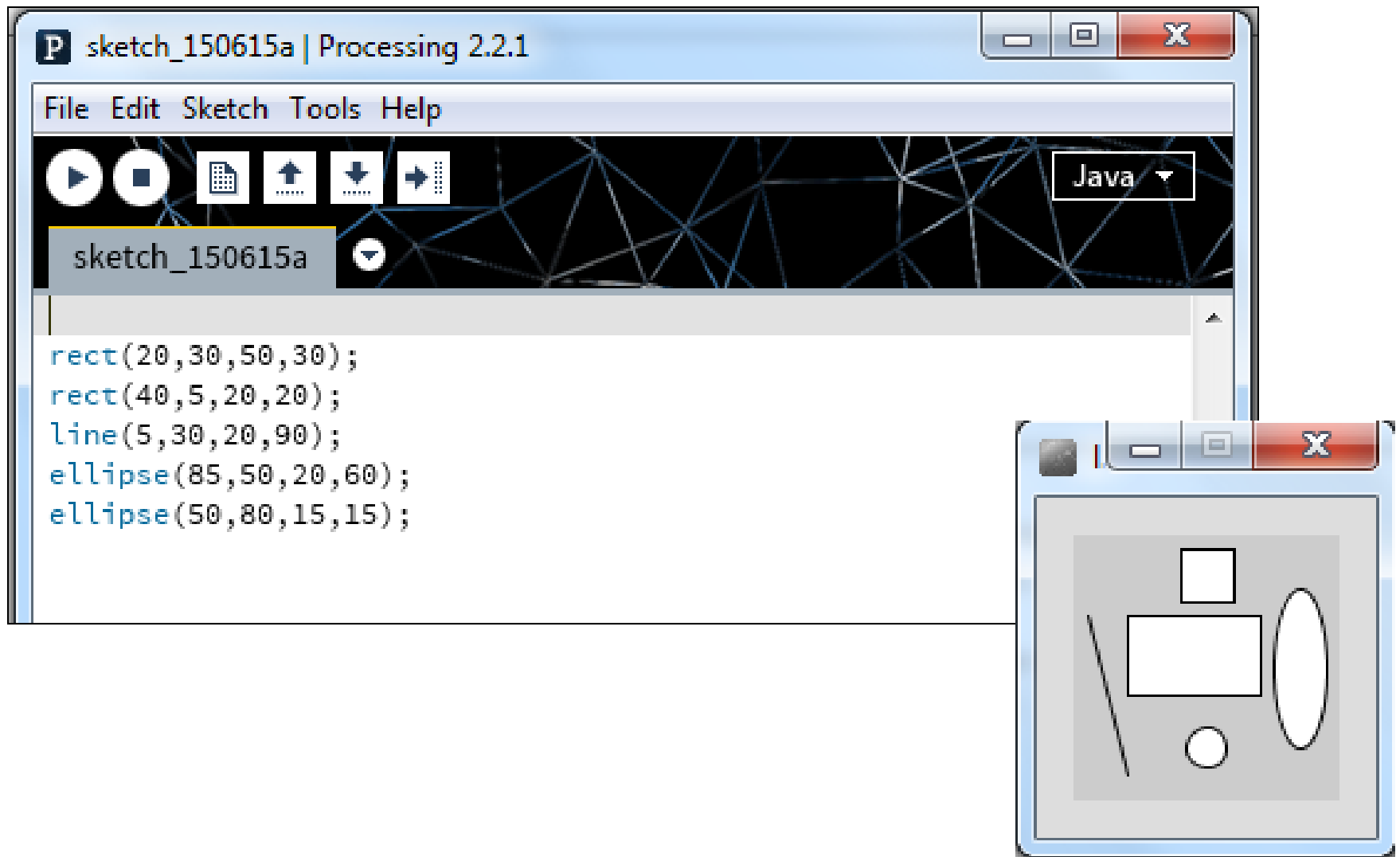
ellipse()



ellipse()



ellipse()



ellipse() – syntax

ellipse(**x**, **y**, **w**, **h**)

x = x-coordinate of the centre of the ellipse

y = y-coordinate of the centre of the ellipse

w = width of the ellipse

h = height of the ellipse

To draw a circle,
the width and
height must be the
same value.

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Syntax and Syntax Errors

- You will have seen the term **Syntax** mentioned above.
- Syntax are the rules you must follow when writing well-formed statements in a programming language.
- When you don't follow the rules, Processing will not run your code; instead you will get an error.
- Some syntax error examples are on the upcoming slides.

Syntax Errors

The spelling of the line function must be identical to the spelling below (case sensitive!).

`line(x1, y1, x2, y2)`

x1 = x-coordinate of first point

y1 = y-coordinate of first point

x2 = x-coordinate of second point

y2 = y-coordinate of second point



Syntax Errors

*The line
function has
too many
arguments
passed to it*

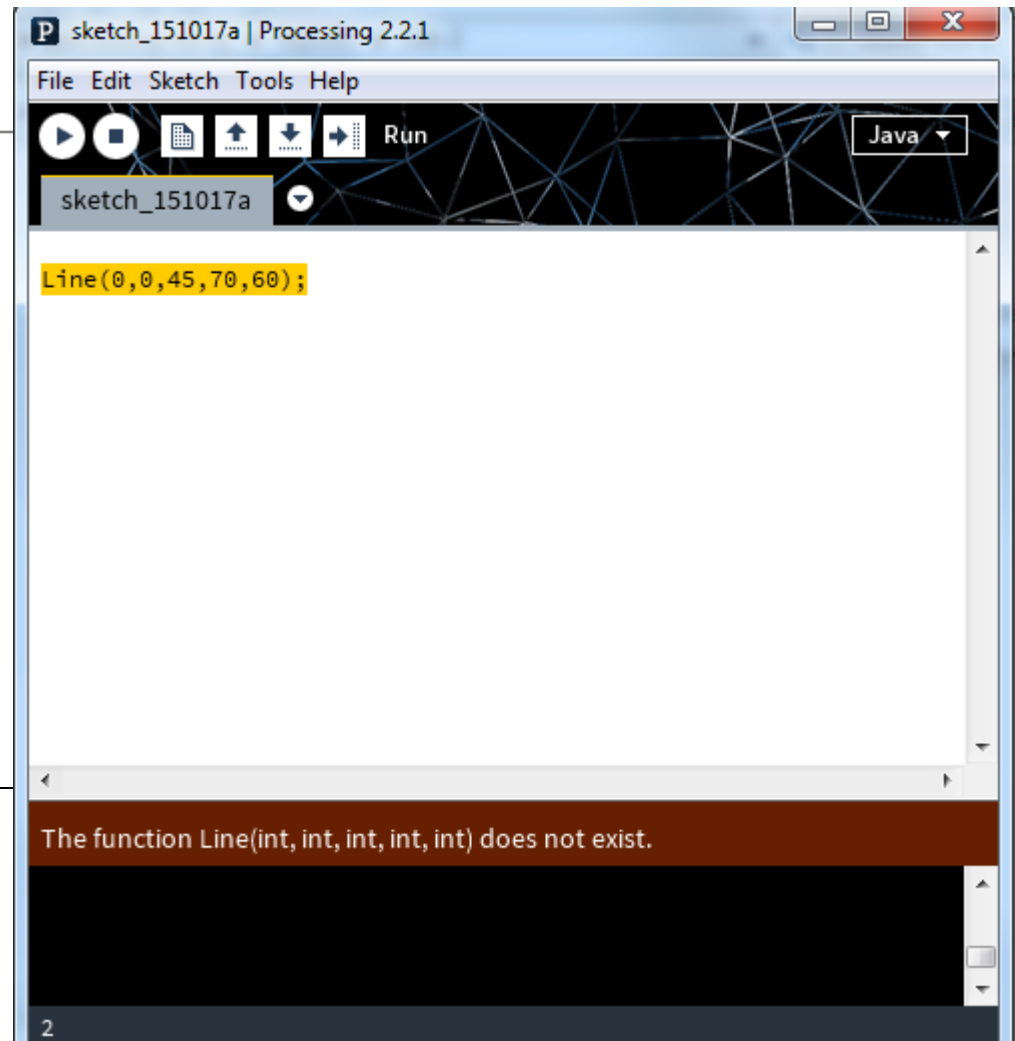
`line(x1, y1, x2, y2)`

`x1` = x-coordinate of first point

`y1` = y-coordinate of first point

`x2` = x-coordinate of second point

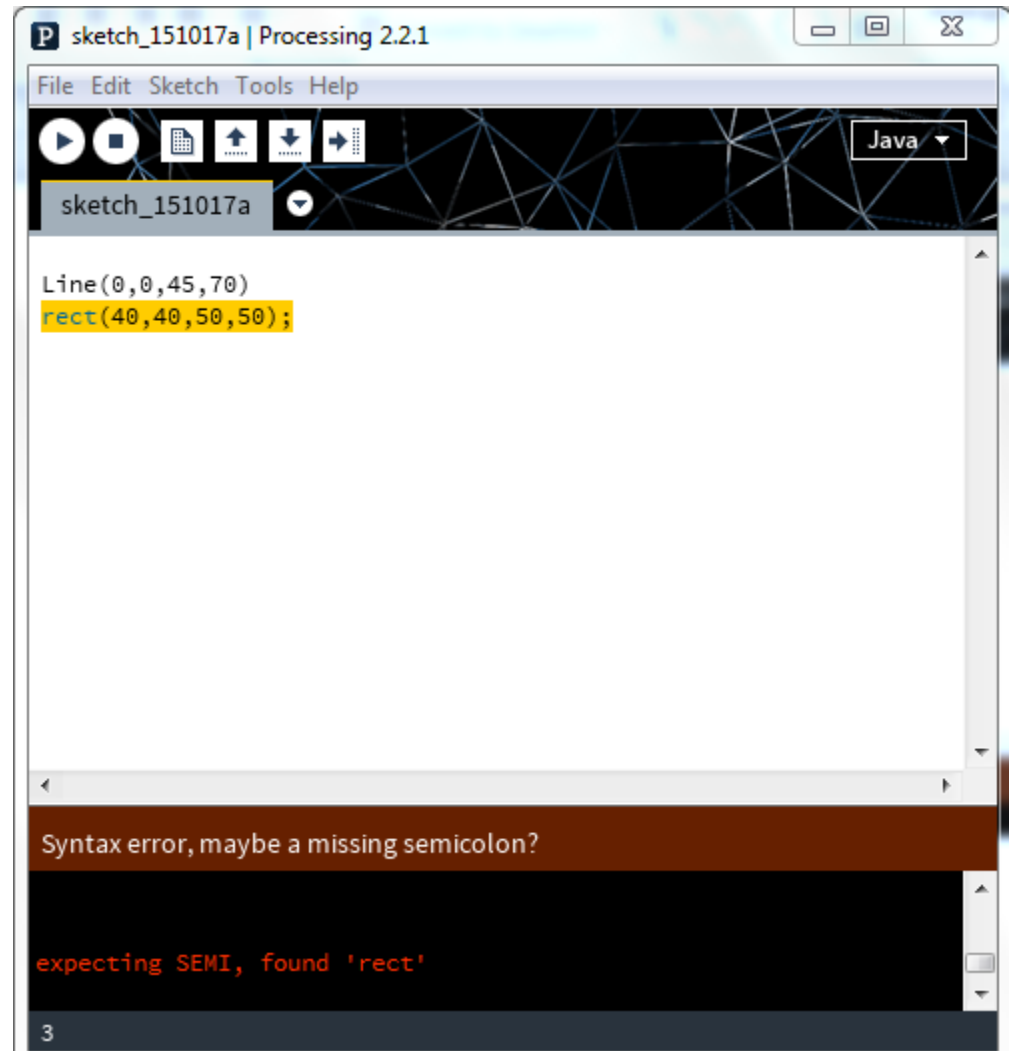
`y2` = y-coordinate of second point



Syntax Errors

The semi-colon (;) is missing at the end of the statement.

Java needs a statement terminator for each line!



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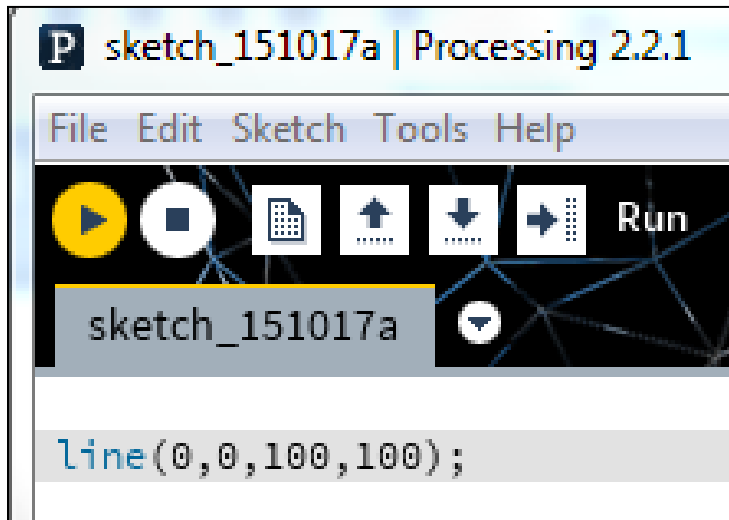
Logic Errors

In computer programming, a **logic error** is a bug in a program that causes it to operate incorrectly, but not to terminate abnormally (or crash). A **logic error** produces unintended or undesired output or other behaviour, although it may not immediately be recognised as such.

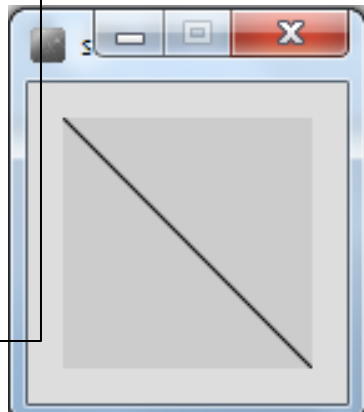
[Logic error - Wikipedia, the free encyclopedia](https://en.wikipedia.org/wiki/Logic_error)

en.wikipedia.org/wiki/Logic_error

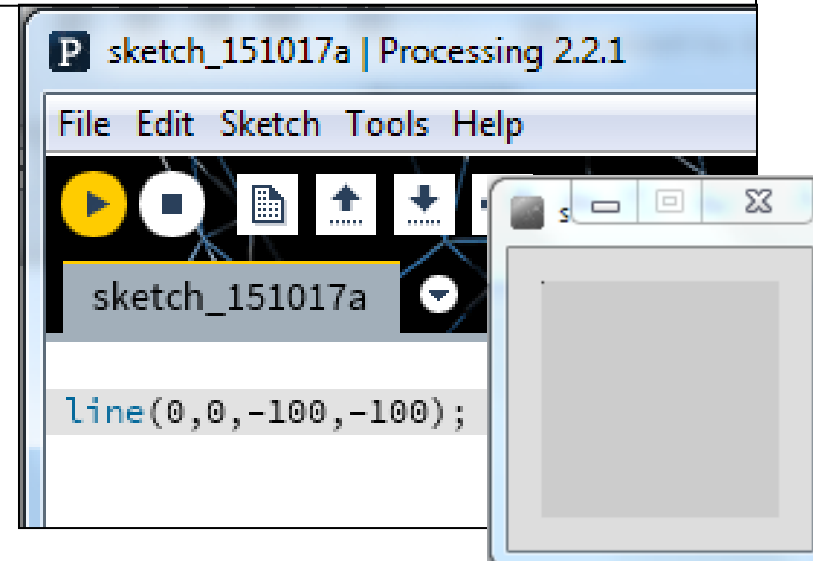
Logic Errors



Say we wanted to draw a diagonal line on our display window.



But we accidentally entered negative numbers for our point b co-ordinates...no line is drawn. This is an example of a simple logic error.



Questions?





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