

# Programming

## Using Processing

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# What *Is* Programming?

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- Telling a computer what to do, step by step
- Like giving instructions to a very literal friend
- Computers are fast, powerful... but zero common sense

**You:** "Make tea."

**Computer:** **Error:** no instructions for picking up kettle."



# Why Learn Programming (fun reasons)?

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- Build games, apps, music generators, animations
- Control robots, drones, LEDs, VR worlds
- Make your own cheats/tools/mods
- Create stuff nobody has ever made before
- It's like magic, but real



# Why Learn Programming(serious reasons)?

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- Every industry needs developers
- High-paying, flexible jobs
- Huge shortage of skilled programmers in Ireland & worldwide
- Great for problem-solving and thinking clearly
- Opens doors to AI, cybersecurity, gaming, data science, engineering, etc.



# Where Is Programming Used?

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- Netflix recommendations
- Snapchat filters
- Spotify playlists
- Instagram stories
- Self-driving cars
- Games (Fortnite, FIFA, Minecraft)
- Even toaster ovens & traffic lights



```
public class Calculator extends  
ActionListener {  
  
 JPanel[] row = new JPanel[3];  
 JButton[] button = new JButton[16];  
 String[] buttonString = {"  
 +", "0", "1", "2", "3", "4",  
 "5", "6", "7", "8", "9", ".","  
 /", "x", "C", "="};  
  
 int[] dimM = {300, 45, 100,  
 int[] dimH = {35, 40};  
 Dimension displayDimensions =  
 dimH[0]);  
}
```

# How Programming Changes the World

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- **Apps built by students** - TikTok started by college-age developers
- **Websites and Mobile Apps** - over 1.7 billion websites on the internet
- **Digital Assistants** - Siri, Alexa, Google Assistant
- **Exploring Space** - Artemis program, where Python is being used to get a better idea of the moon
- **Solving Business Challenges**
- **Transportation & Accommodation** – Uber, booking.com



# What You'll Do Today

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- **Today, you'll become programmers.**
  - Use Processing (Java)Draw shapes & animations
  - Make something move



# Introduction to Processing



# What is Processing?

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**Processing** is a  
programming language, development environment, and online community

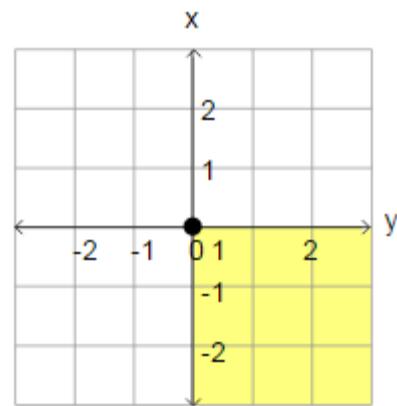
...can be used to develop static or interactive online material  
and data visualisations.

...is often used by visual artists.

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

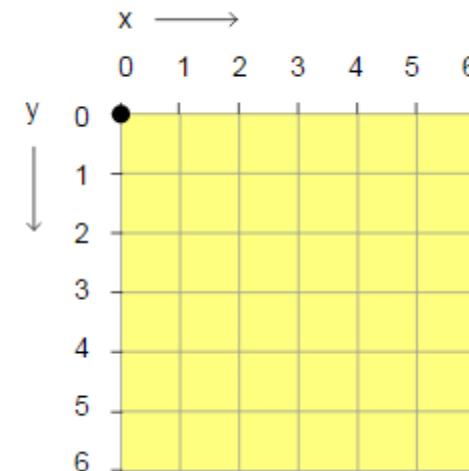
# Coordinate System in Computing

In Geometry,  
we use this type of  
coordinate system:



point  $(0,0)$  is in the centre.

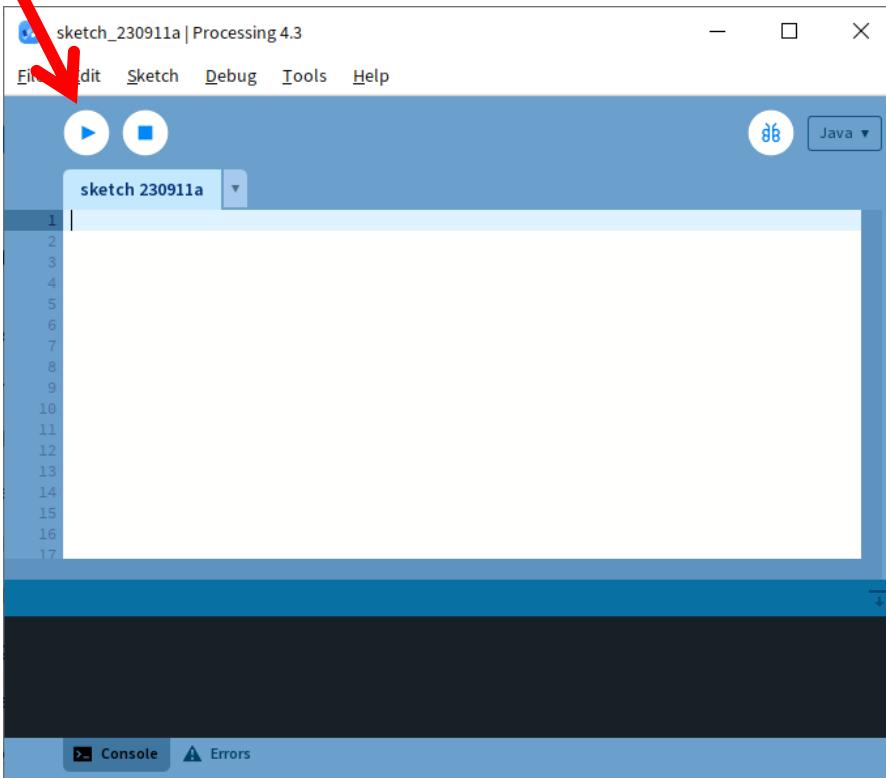
In Computing, we use this type of coordinate system to represent the screen:



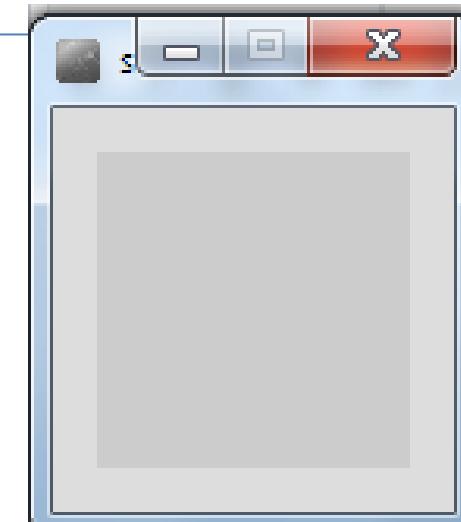
point  $(0,0)$  is in the top left hand corner. Each number is a pixel.

# 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.

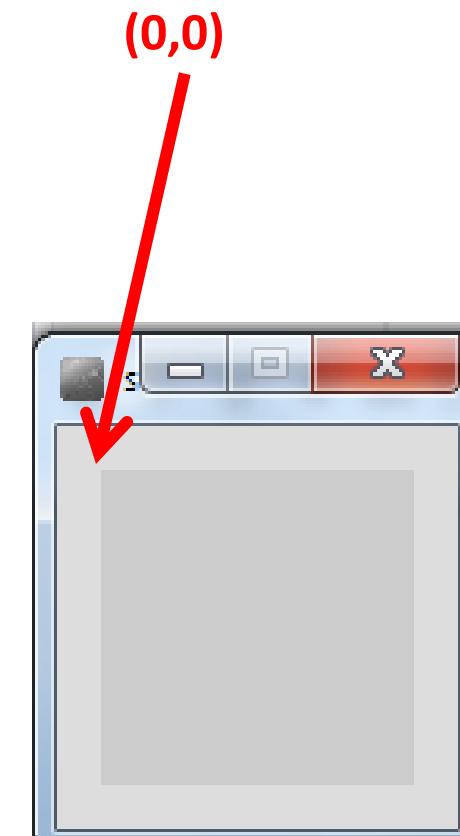


Display window

# Coordinate System in Computing

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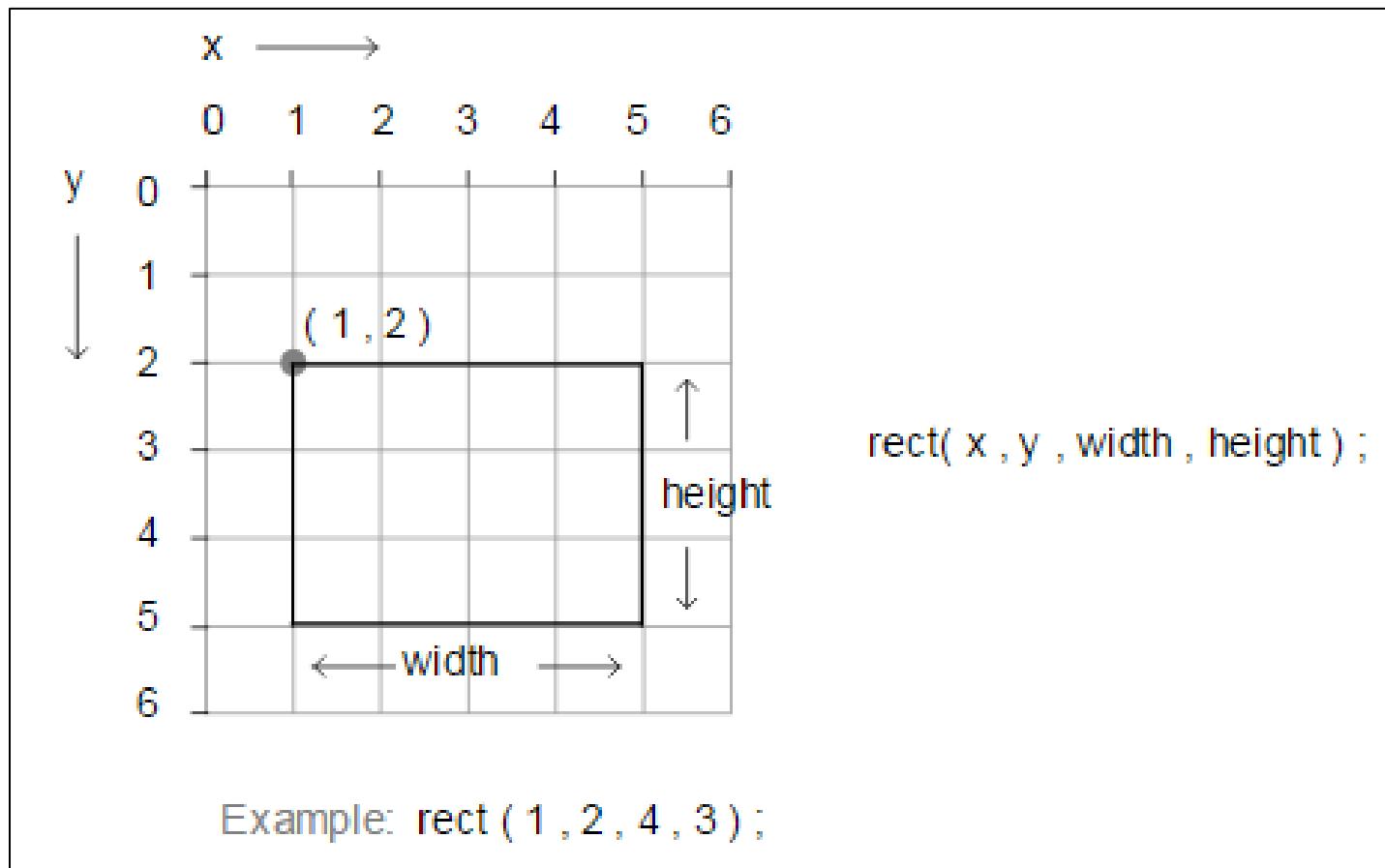
- The display window is where your code is run/ displayed.
- It follows the rules of the Computing coordinate system i.e. the top left hand corner is (0,0).
- A point (10,20) is 10 pixels to the right of (0,0) and 20 pixels below (0,0).



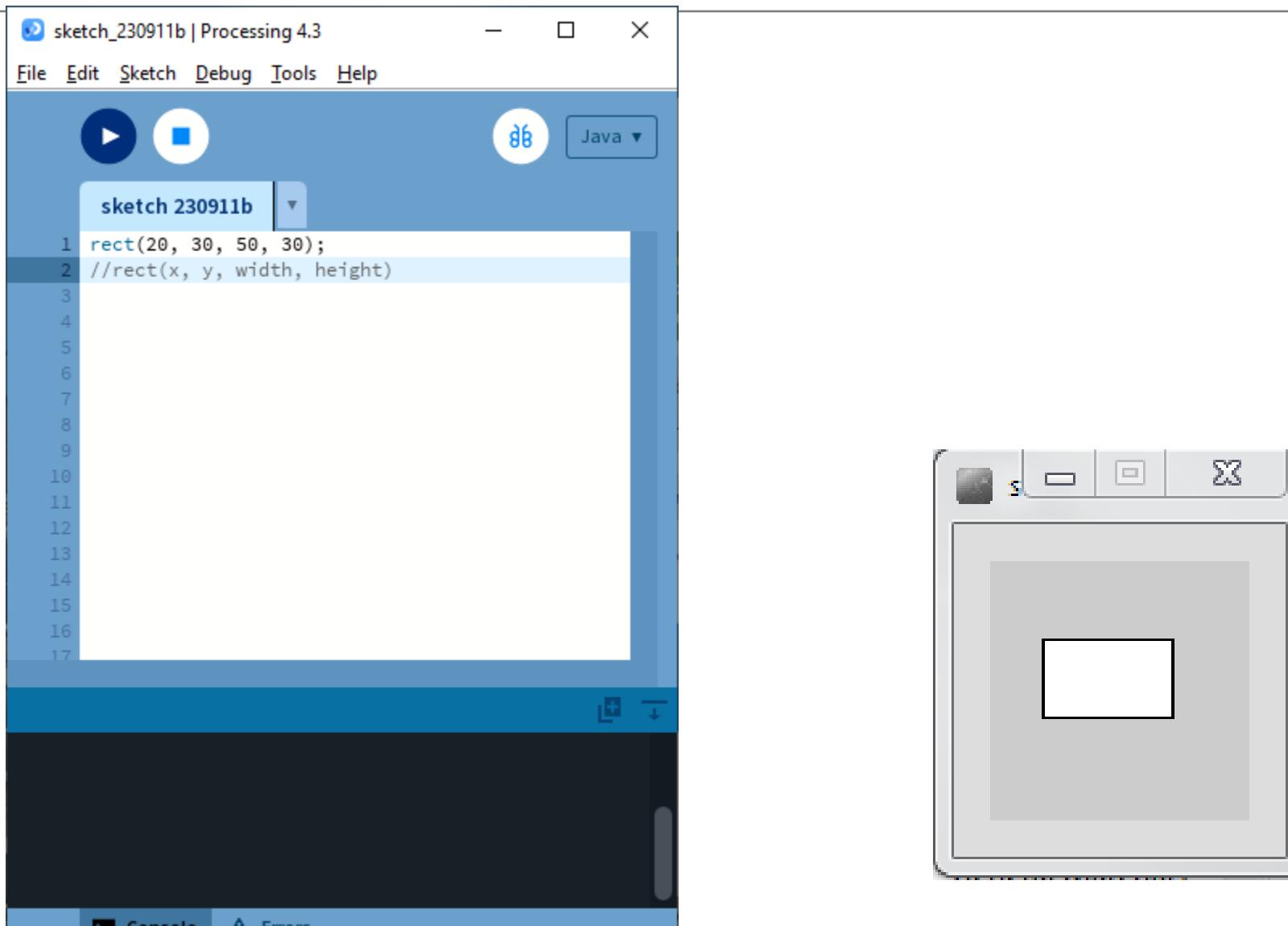
Display window

# rect()

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# rect() – Drawing a Rectangle



The image shows the Processing 4.3 software interface. On the left, the code editor window titled "sketch\_230911b | Processing 4.3" contains the following Java code:

```
1 rect(20, 30, 50, 30);
2 //rect(x, y, width, height)
3
4
5
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15
16
17
```

The code uses the `rect()` function to draw a rectangle at coordinates (20, 30) with a width of 50 and a height of 30. The code editor has a blue header bar and a dark blue sidebar on the right.

On the right, the preview window displays the resulting output. It shows a gray rectangular frame with a white rectangle centered inside it, representing the drawn shape.

# rect() – Drawing a Square

The image shows the Processing 2.2.1 IDE interface. The title bar reads "P sketch\_150615a | Processing 2.2.1". The menu bar includes File, Edit, Sketch, Tools, and Help. Below the menu is a toolbar with icons for play, stop, file, and run. The sketch name "sketch\_150615a" is displayed. The code editor contains the following code:

```
rect(20,30,50,30);
rect(40,5,20,20);
```

A red circle highlights the semi-colon at the end of the second line of code, and a red arrow points from this circle to a callout box. The callout box contains the text: "Note how each line of code has a semi-colon (;) at the end of it. This is called a **statement terminator** and must be included." To the right of the code editor is a preview window showing the resulting output: a light gray square containing a smaller white square.

# rect() – Syntax

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`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.

# Questions?

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