Programming

Using Processing

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What *Is* Programming?

- 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)?

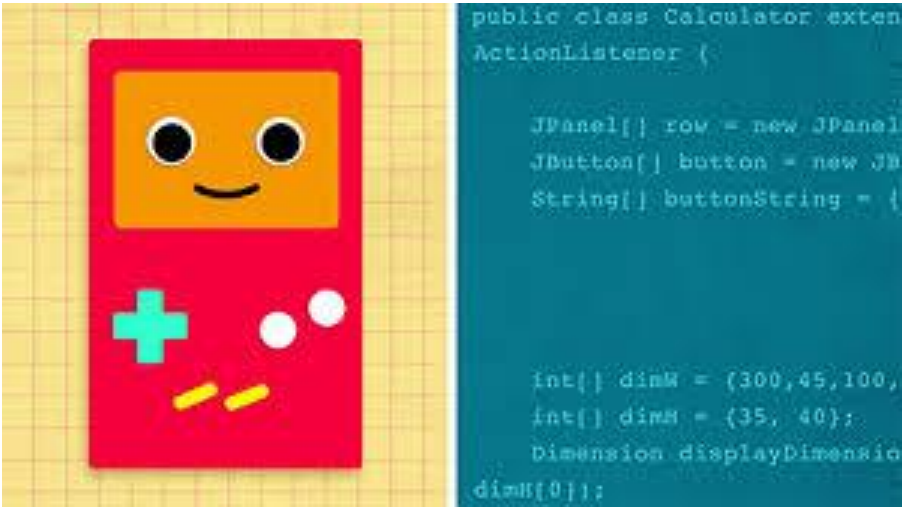
- Build games, apps, music generators, animations
- Control robots, drones, LEDs, VR worlds
- Make your own cheats/tools/mods
- Create stuff nobody has ever made before
- It’s like magic, but real

Why Learn Programming(serious reasons)?

- 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?

- Netflix recommendations → AI algorithms
- Snapchat filters → computer vision
- Spotify playlists → machine learning
- Instagram stories → mobile apps
- Self-driving cars → robotics + sensors
- Games (Fortnite, FIFA, Minecraft) → game engines + physics
- Even toaster ovens & traffic lights → embedded systems



How Programming Changes the World

- **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

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

Introduction to Processing

What is Processing?

Processing is a

programming language, development environment, and online community

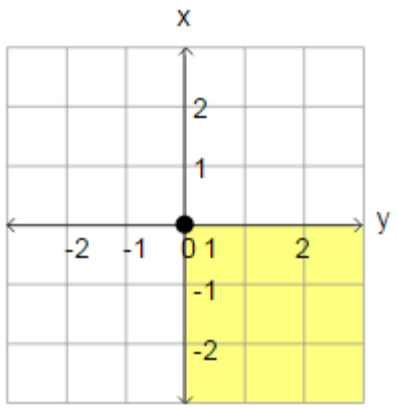
…can be used to develop static or interactive online material
and data visualisations.

…is often used by visual artists.

…produces visual and interactive representations of programming code.

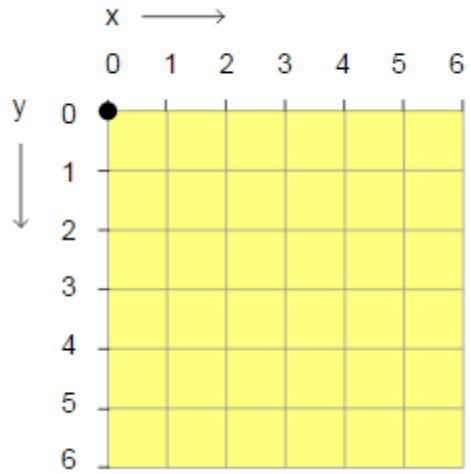
Coordinate System in Computing

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:

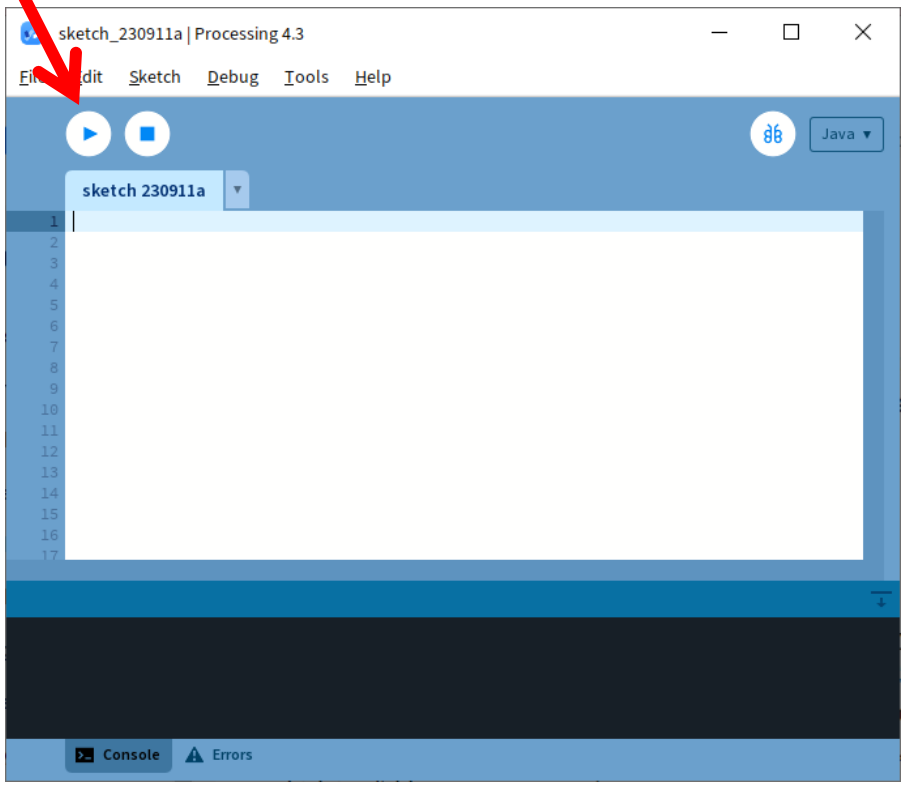


point (0,0) is in the top left hand corner. Each number is a pixel.

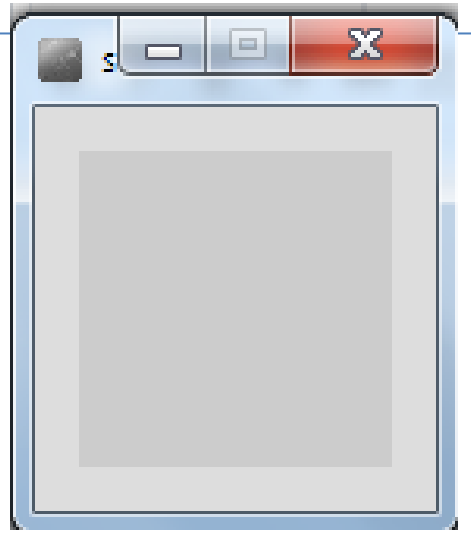
https://processing.org/

Coordinate System in Computing

Run button



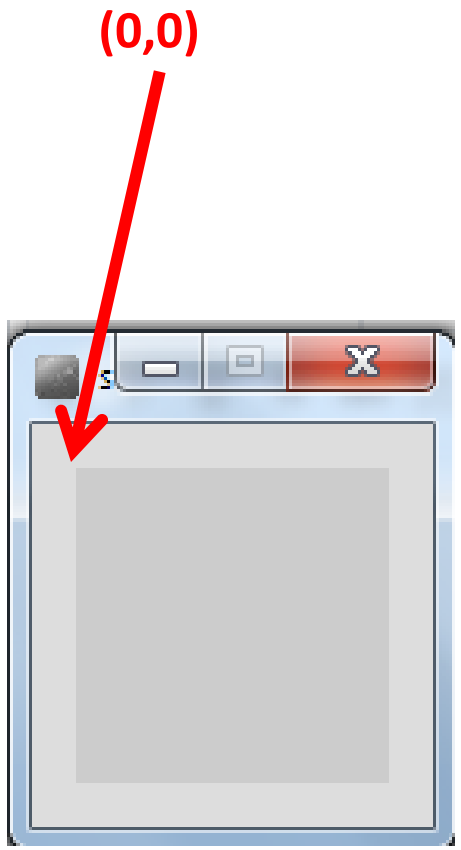
- So how does this relate to Processing?
- When you open Processing and click on the run button, a display window pops up.



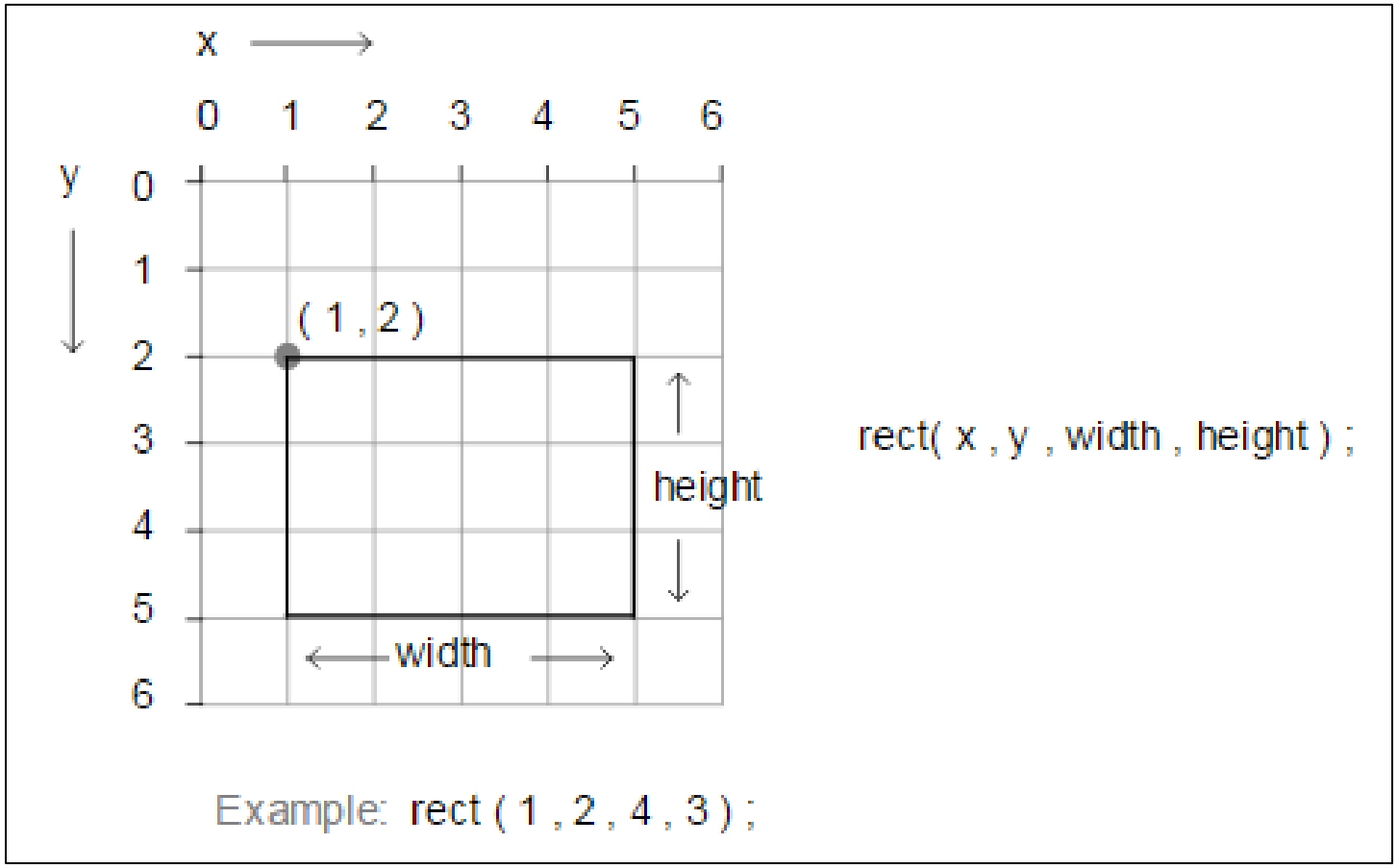
Display window

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).

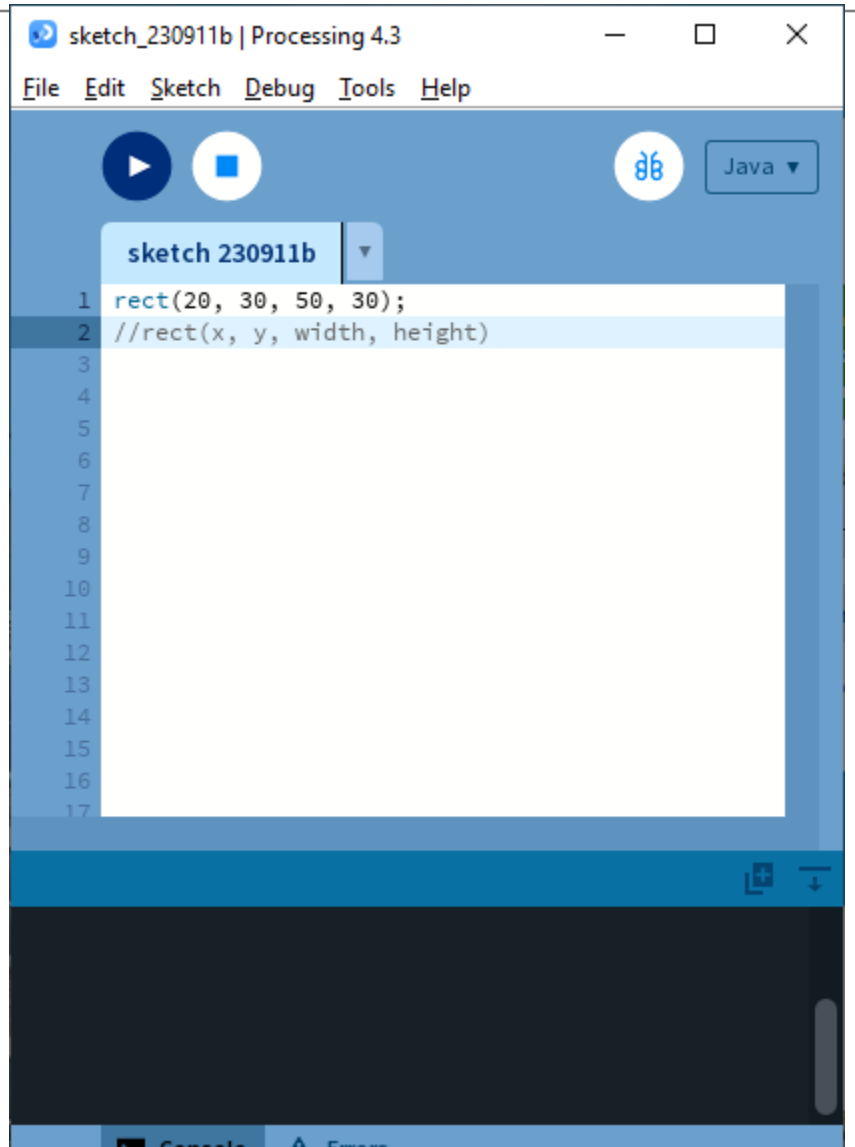


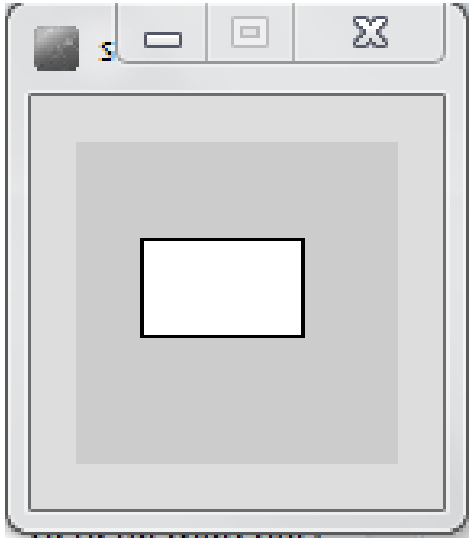
rect()



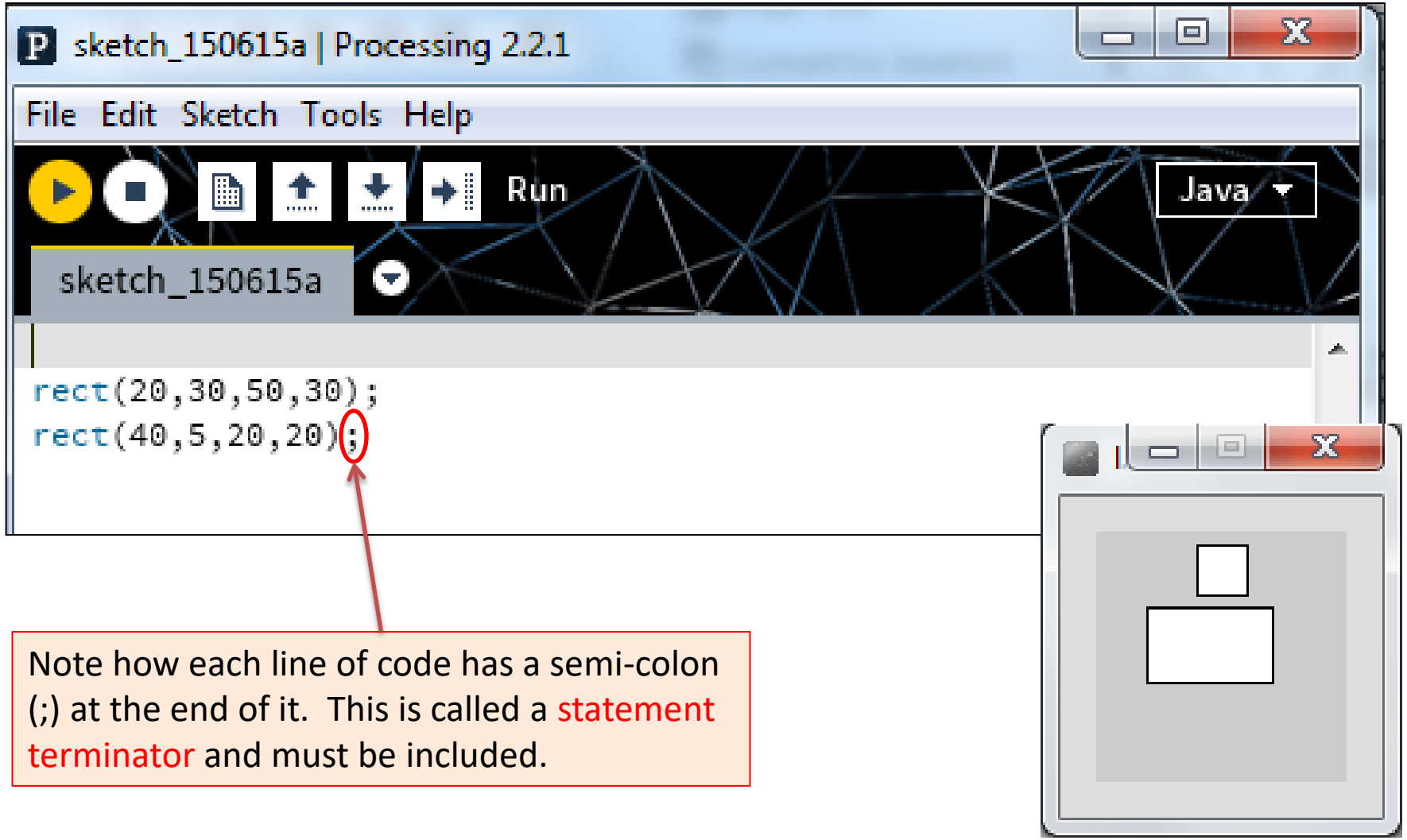
https://processing.org/

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.

Questions?