Lesson 8: Code Blocks - Setup and Draw

Lesson aim:

Dynamic (moving) programs are more complicated but this is key in making modern programs. All apps and games have some moving parts and user input. In this lesson we are going to learn how to do that in processing.

Why:

Like colour; this is a section that we will use in every program after this. Its vital to get a good understanding of how to make dynamic apps in order to make our game project.

Setup and Draw - keys to dynamic programs

void setup() and **void draw**() are special functions. We call them "*{code blocks}*" - this means that they each have **a block of code associated with them**. The blocks start with a "**{**", and end with a "**}**". For now, any program that uses **setup**() and **draw**() should have all code inside those code blocks (there are special cases we'll see later on where this isn't true).

```
void setup(){
    //everything in here
    //is associated with
    //the void setup()
}

void draw(){
    //everything in here
    //is associated with
    //the void draw()
}
```

Example!

Here is something that we did before, try it out again.

```
void setup(){
 size(600,600); //← in setup code block
}

void draw(){
 ellipse(mouseX, mouseY, 100, 100);  //← in draw code block
}
```

Quick tasks:

1. Make a new program, name starting with "**Lesson8**"
2. Copy the code from lesson 3 into this program
3. Change this program to make a rectangle follow the mouse.
4. Add in a `background()` function to:
   a. the `setup`*{code block}*
   b. the `draw()` *{code block}*
   Why are the results different?
5. Make the rectangle coloured.
   a. Where do you have to put the `fill()` function?
6. Make a circle and a rectangle follow the mouse around. (both at the same time!)
   a. If you have time, add more shapes if you'd like, of all sizes and colours!

Setup vs. Draw

What is the difference between the code in the "`void setup()`" code block and the "`void draw()`" *{code block}*?

differences\code blocks	void setup()	void draw()
How many times is the code run?	Once	Infinity times - depends on how long the app is running for
When is the code in this block run?	Right at the start, when the program is launched	After the void setup() block
How often is this code block run in the program	Once, at the start	Normally 30 times a second (30 fps) - this can be changed though

List some reasons you think we need to use the `void setup()` and `void draw()` rather than just running the code once as we have been? What **advantages** do we get?

1. _____

2. _____

3. _____

Here are some reasons that we thought of: To use animation (to get things to move on their own); to add user input (such as moving things with the mouse or the keyboard) for games.

Pretty much every program or app that you use on a computer, phone or tablet changes over time and will use a function like the `void draw()` function to make things move or take in user input.