Lesson 1: Connecting Crumbles

Year 5 – Programming – Selection in physical computing

National Centre for Computing Education

Raspberry Pi

Lesson 1: Connecting Crumbles

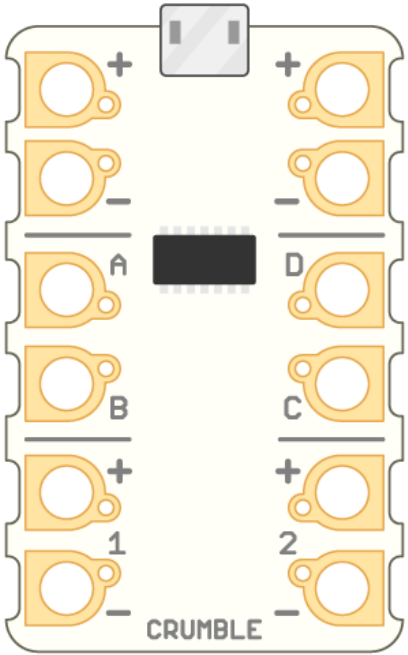
To control a simple circuit connected to a computer

- I can create a simple circuit and connect it to a microcontroller
- I can program a microcontroller to make an LED switch on
- I can explain what an infinite loop does

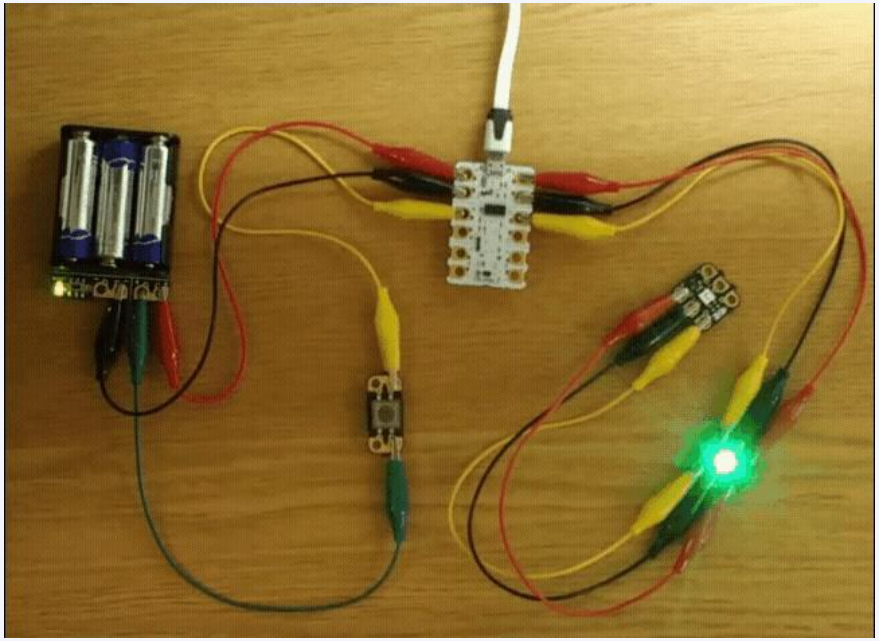
Crumble controller

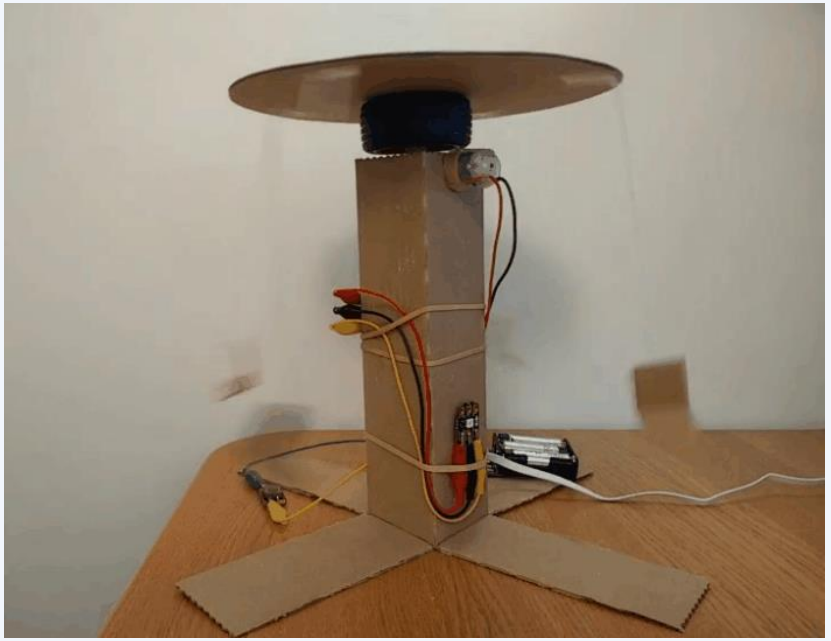
A microcontroller is a small device that can be programmed to control components that are connected to it.

The microcontroller that you will be using is a Crumble controller. You will program a Crumble to control outputs and respond to inputs.

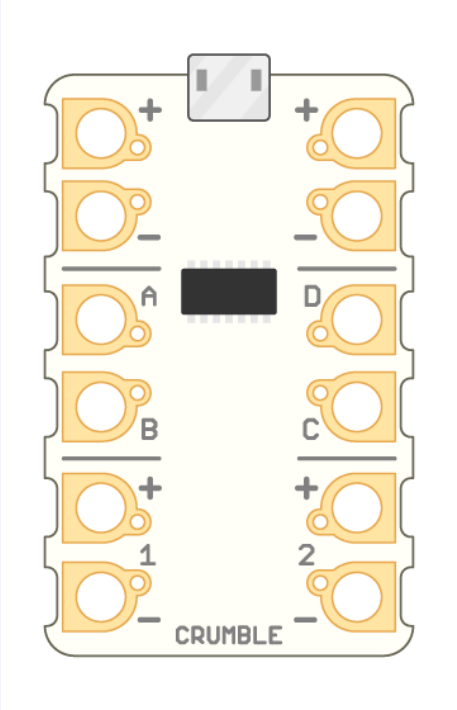


Crumble controller





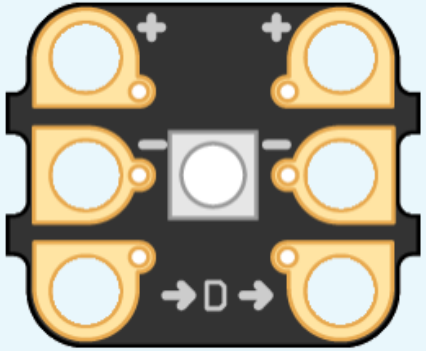
Making observations and asking questions

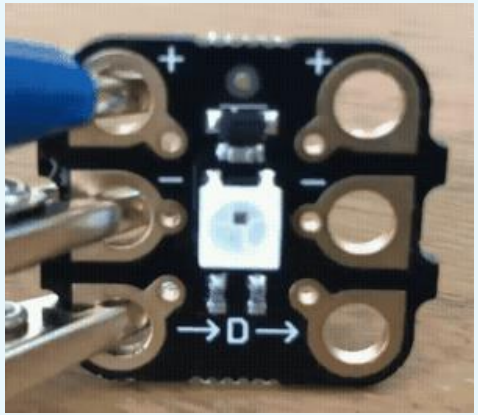


Connecting a Sparkle

A Sparkle is a multi-colour LED designed to work with the Crumble.

The crocodile clip leads connect the Sparkle to the Crumble. These connections provide power to light the LED and data for its colour.

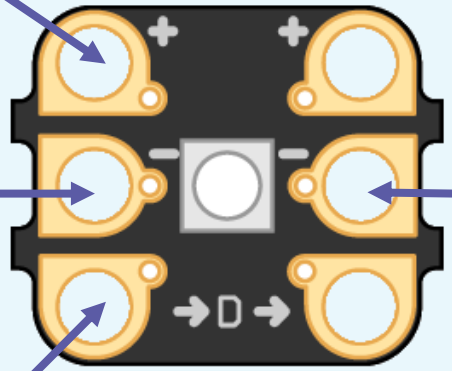




Connecting Sparkle

Connects to a positive power (+) pad on the Crumble controller

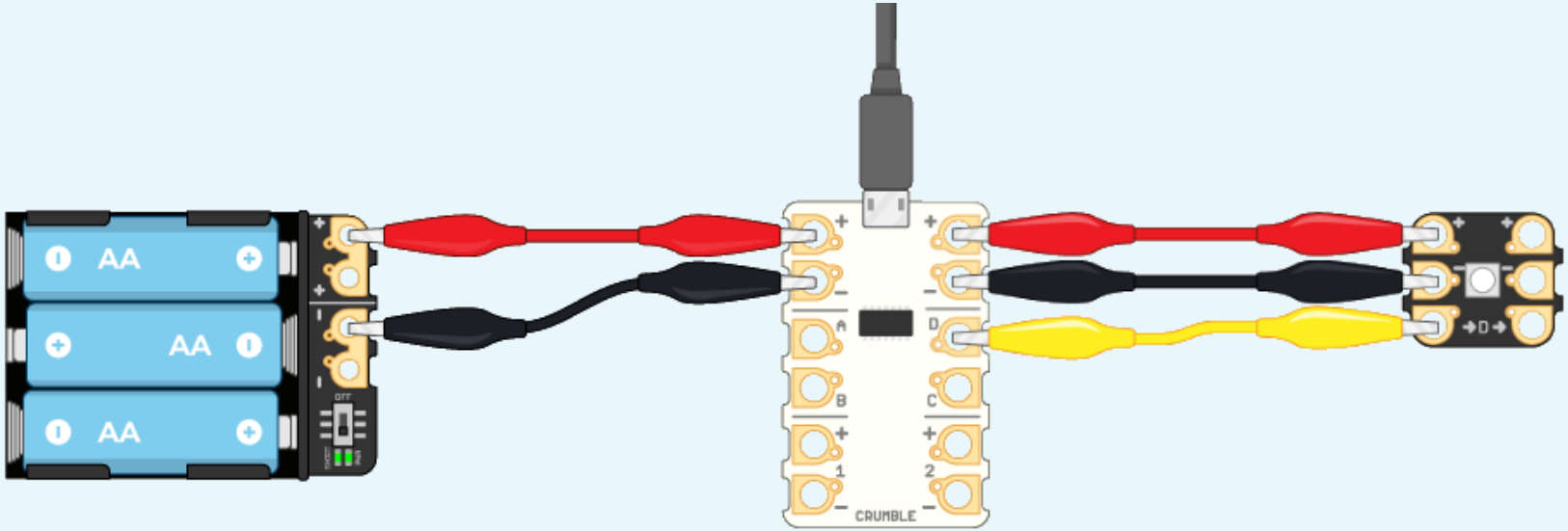
Connects to a negative power (–) pad on the Crumble controller



The pads on this side are used to connect other Sparkles

Connects to the D pad on the Crumble controller

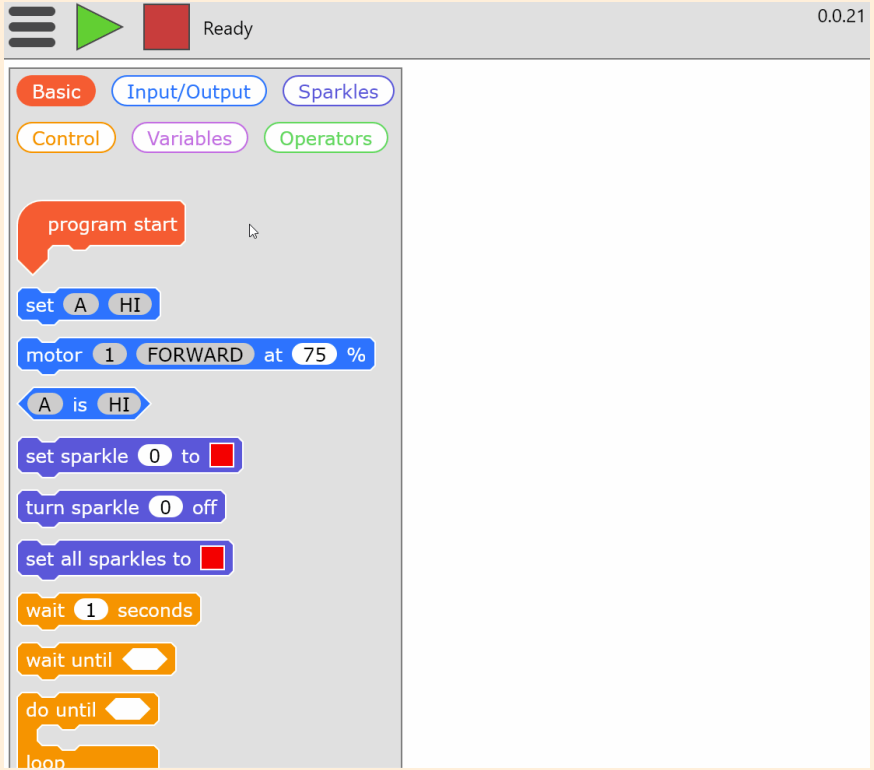
Connecting circuits



Connect your Crumble using the guide above. The Sparkle will flash white six times when you've connected it correctly.

Programming Crumbles

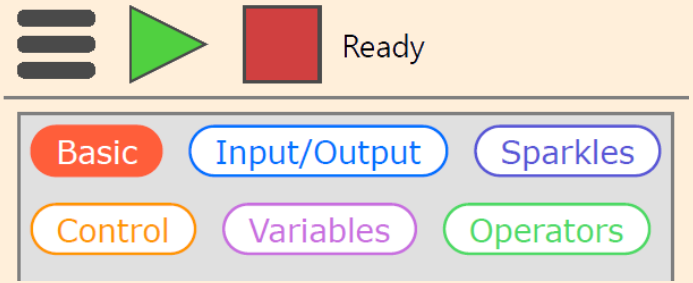
To create a Crumble program drag the blocks from the side panel to the main coding area.

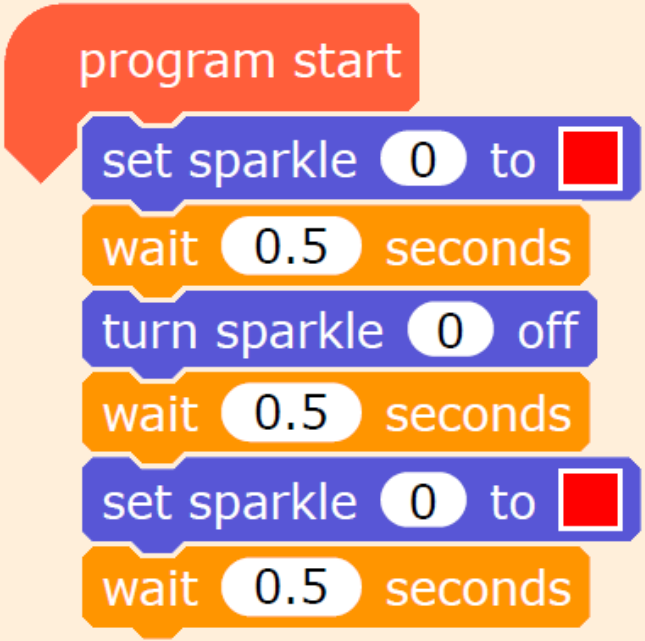


Programming Crumbles

Create this program in the Crumble software.

After you've checked your Crumble is connected to your computer, press the green play button.

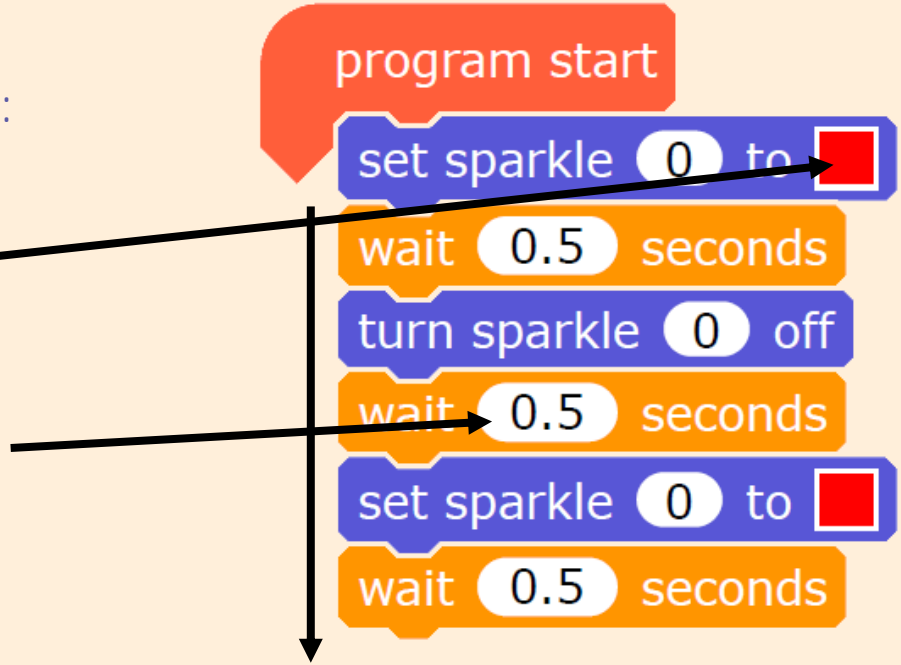




Programming Crumbles

You can modify the program to change the Sparkle lights. You can:

- Set the Sparkle to a different colour
- Wait for a different length of time
- Flash a different number of times

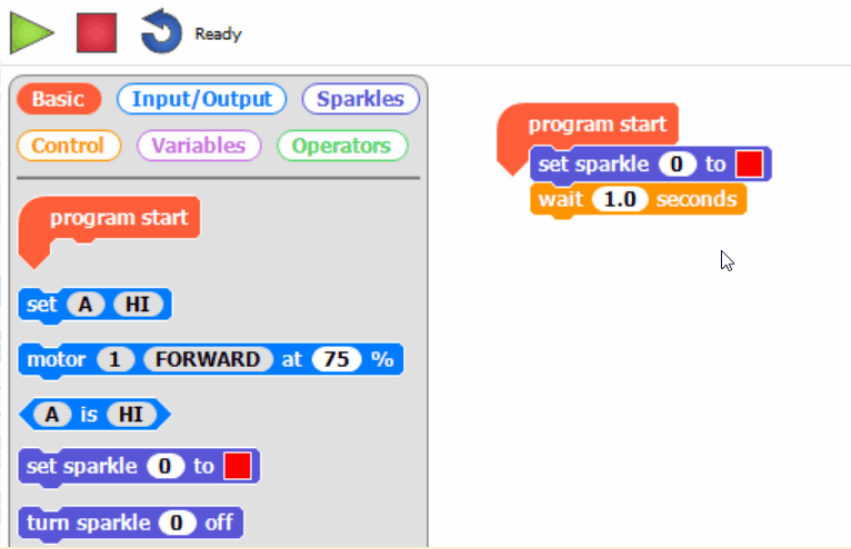


Programming Crumbles

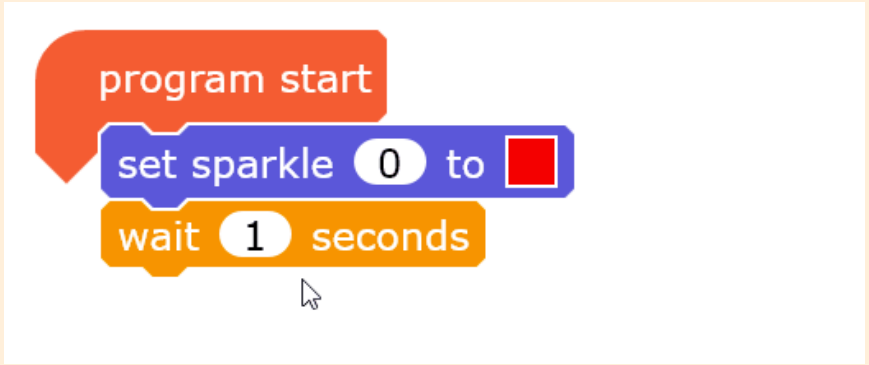
Sparkle flashes:	How many times:	Sparkle stays on and off for:	Achieved
	3	0.5 seconds	
	3	1 second	
	3	2 seconds	
	4	2 seconds	
	4	0.5 seconds	
	5	0.5 seconds	
	3	2 seconds	
	2	1.5 seconds	

Program your Crumble to make the Sparkle flash in different ways

Programming Crumbles



Setting a Sparkle's colour

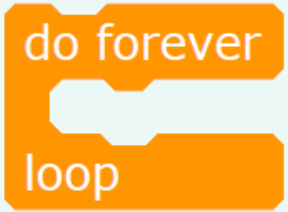


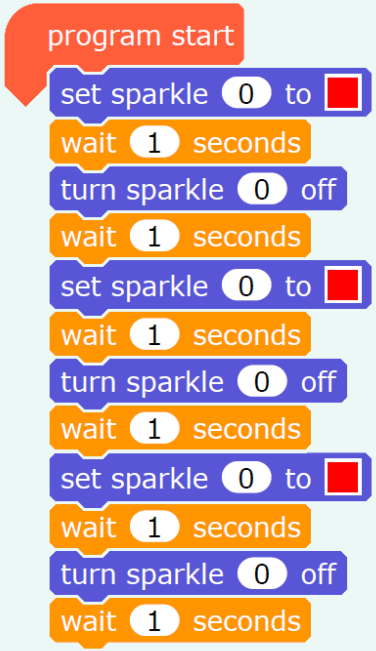
Changing a wait command

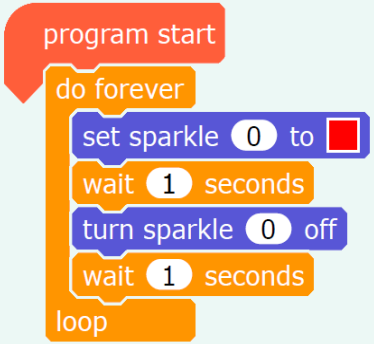
Forever flashing

You might want to repeat some or all of the commands in your program. You can do this using a repeat block.

This block repeats the commands inside it forever.

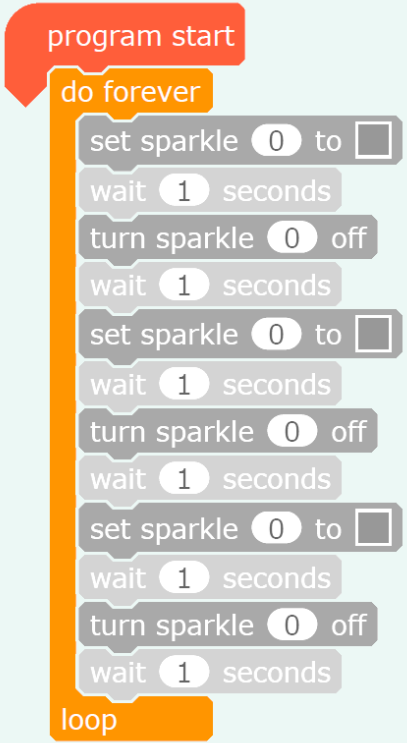




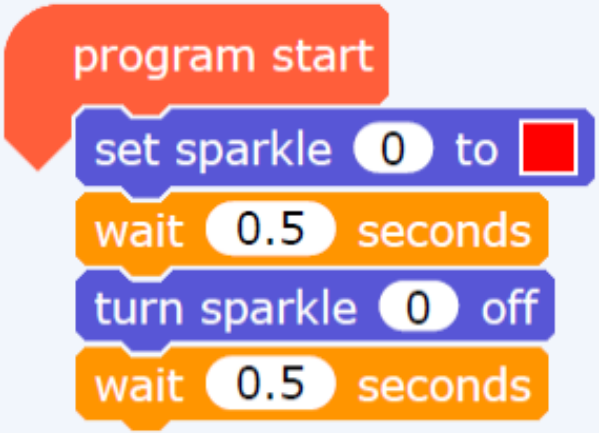


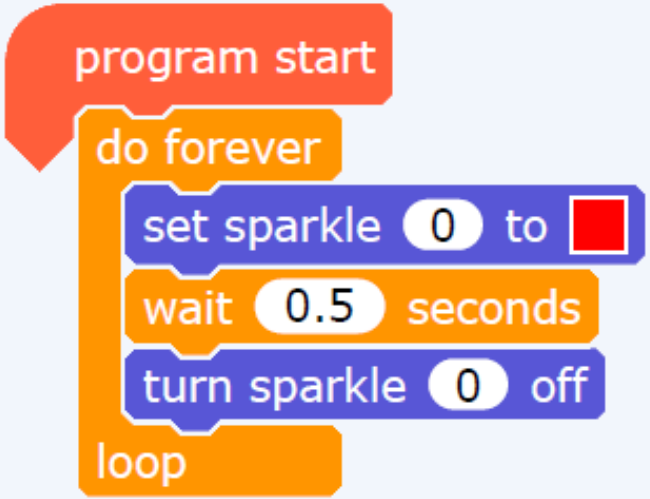
Forever flashing

Create your own Crumble program so that your Sparkle flashes a colour pattern continuously.



Debugging





Why don't these programs produce a continuously flashing Sparkle?

How confident are you? (1–3)

- I can create a simple circuit and connect it to a microcontroller
- I can program a microcontroller to make an LED switch on
- I can explain what an infinite loop does

3 – Very confident

2 – Unsure

1 – Not confident

Next lesson

In this lesson, you...

Built a simple circuit using a microcontroller and connected it to a computer

Programmed a microcontroller to light a Sparkle in different ways

Used repetition in the form of an infinite loop

Next lesson, you will...

Connect additional components to the microcontroller

Program a microcontroller to control more than one output

Use repetition in the form of count-controlled loops