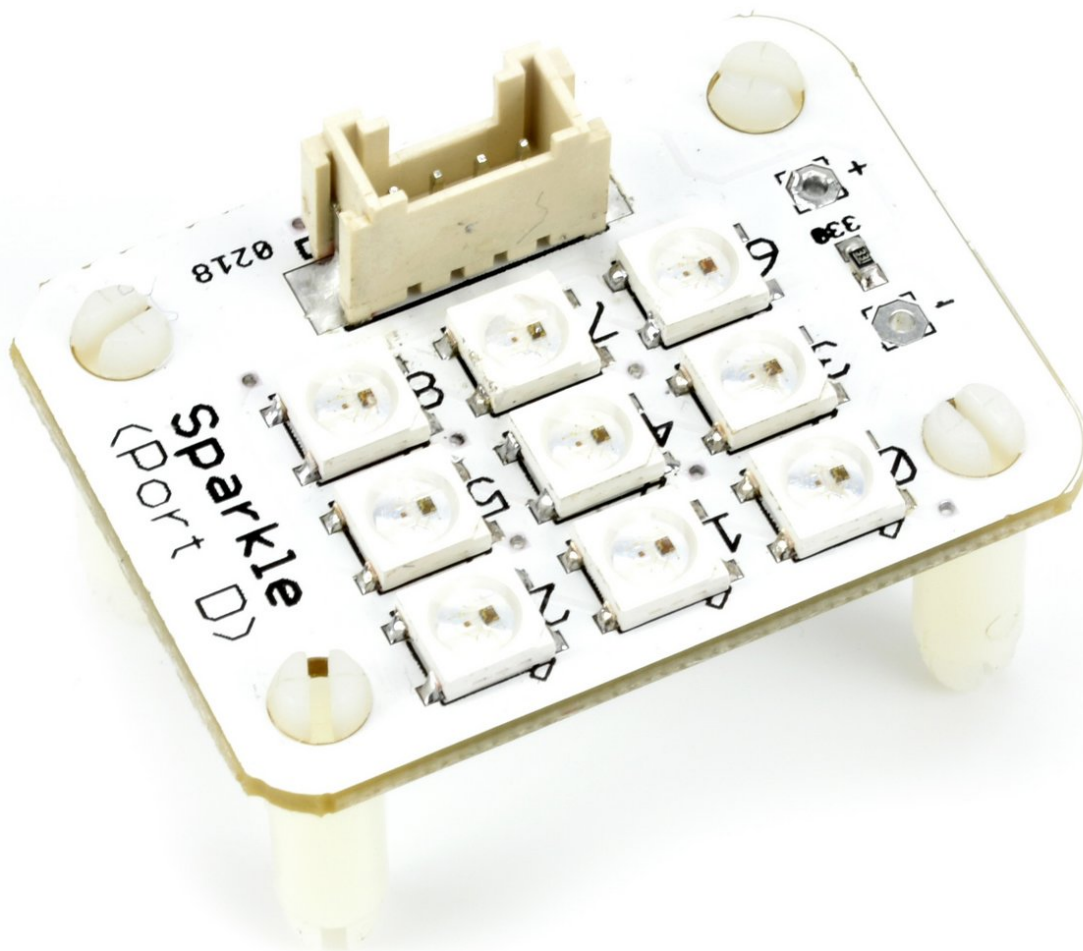


C - Sparkle Feedback

You may have found that when testing your robot, it was sometimes difficult to know what was going wrong as there was no feedback about the sensors!



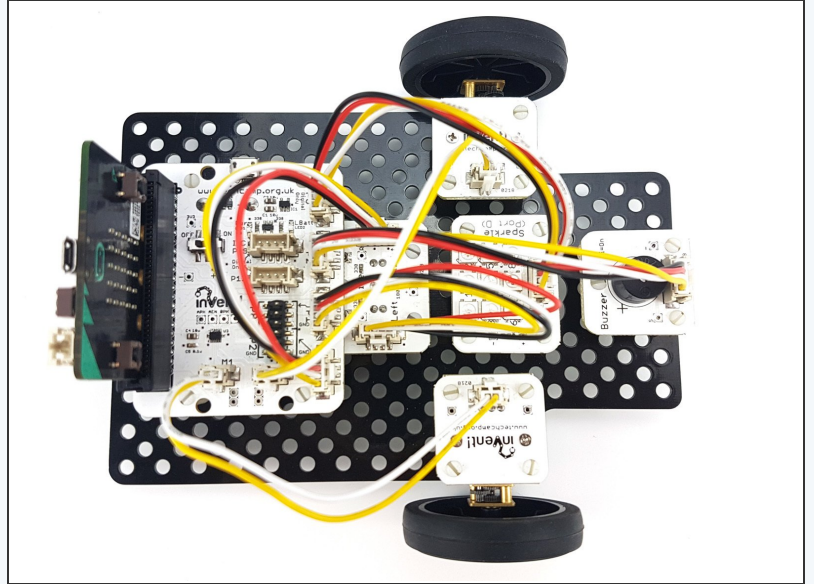
INTRODUCTION

You may have found that when testing your robot, it was sometimes difficult to know what was going wrong as there was no feedback about the sensors! Let's use the sparkles to add some feedback and make it easier to see what is going on.

Step 1

Assemble Your Robot

- Let's add some more modules to allow our robot to give **feedback** about the line it is following.
- Add the Line sensor underneath as before then add **Sparkle** and **buzzer** modules to your robot like in the picture.
- It can be quite hard to see the wiring with so many things plugged in! The **motors** and **line sensor** should be the same as before (M1, M2 and P0, P1)
- Plug the **buzzer** into P2, and the Sparkles into **P8**.



Step 2

Two Sensor Program

- Load up your **two sensor line follower program** from the last lesson.
- It should look something like our **example** in the picture.

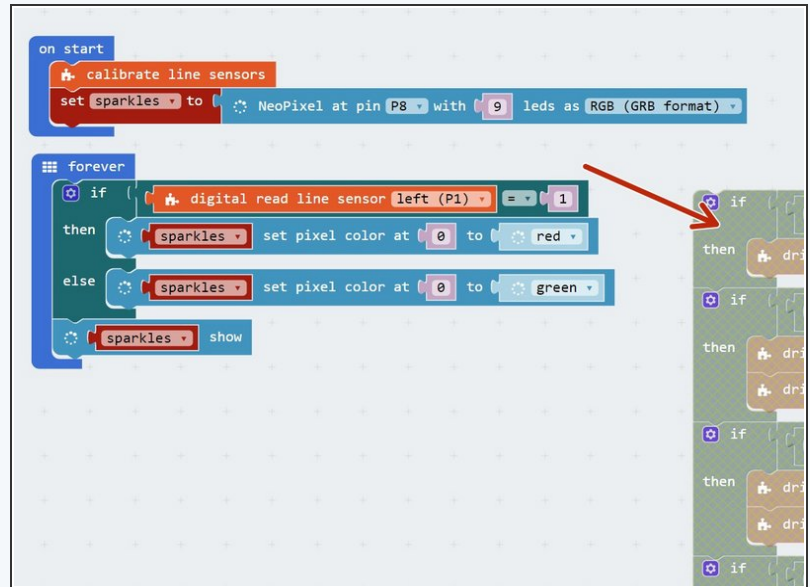


Step 3

Left Sensor

- Let's use the **outer front** two Sparkles (**0** and **2**) to show the state of the two **infrared sensors**.
- If the **left** sensor is on the line (**0**), turn the **left** Sparkle **green**.
- If the **left** sensor is off the line (**1**), turn the **left** sparkle **red**.
- **Drag** your main program to the side for now - **don't delete it!**
- **Write** the simple code in the picture - **test it** on the track by moving the robot side to side across the line.

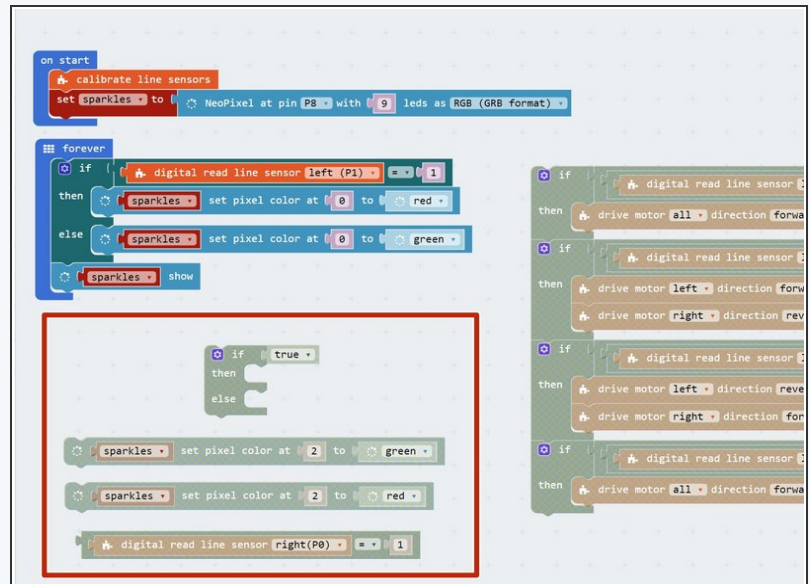
i You will need to install the **Neopixel** package and setup the Sparkles - if you can't remember how, have a look at the [Sparkles Guide](https://courses.techcamp.org.uk/Guide/A++Starting+Lights/187) (<https://courses.techcamp.org.uk/Guide/A++Starting+Lights/187>).



Step 4

Right Sensor

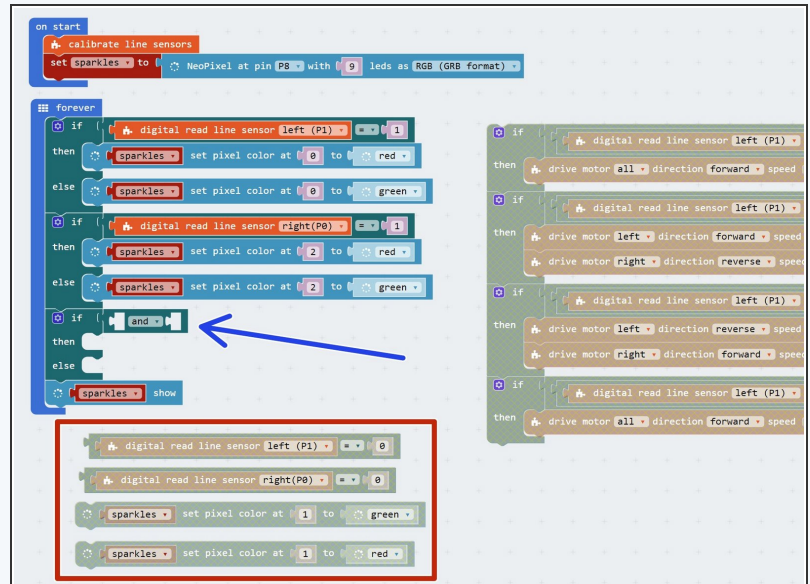
- Let's use the right Sparkle (**Sparkle 2**) to do the same thing for the **right hand sensor**.
- **Add some blocks** to set the **right** Sparkle in the same way as the left one, but using the **right sensor**.
- There are some **hint blocks** if you need them!
- Don't forget to **test it properly**.



Step 5

Centre

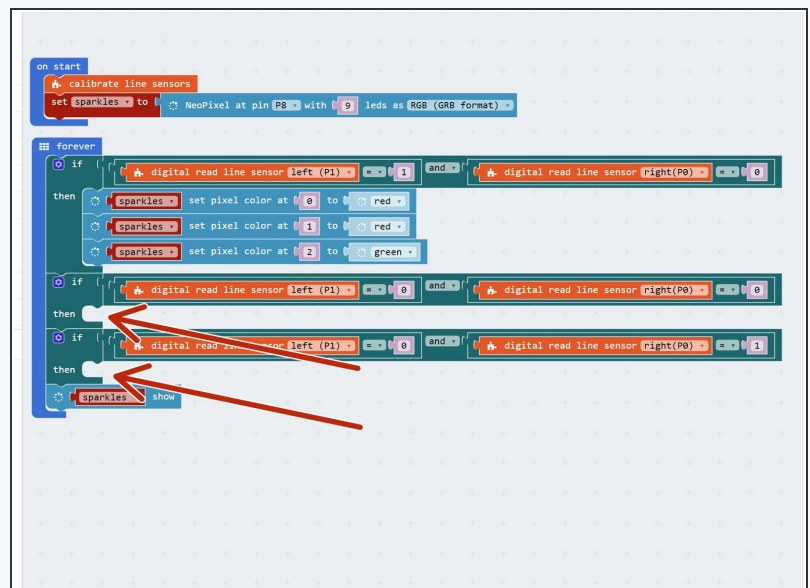
- Let's add some more blocks so the **middle Sparkle** (Sparkle 1) is **green** when **both** sensors are on the line.
- This is when both the left sensor **and** right sensor are **0**!
- Add a third **IF/ELSE** block that checks if both the left **and** right sensors are **0**, and sets the middle Sparkle **green** if they are.
- There are some **hint blocks** if you need them!
- Don't forget, the **AND** block is in the **logic menu**.



Step 6

Make it Better

- You may have thought the last program **didn't look quite right** - as the robot moved over the line, **two** Sparkles changed at once!
- It would be more sensible for the program to set **just the middle** Sparkle green when both sensors are on the line, instead of **all three**.
- We need to change the code to do this, to set the colours of **all three Sparkles** for each **combination** of sensor states.
- In the picture is the structure you will need - **3 IF blocks** for checking if the robot is to the **left**, **right** or on the **centre** of the line.
- **Add blocks** to the bottom **two** IF blocks to set the Sparkles properly, like in the top IF block we have **done already**.



Step 7

Combine the Code

- You may have noticed that our Sparkle code and line following code have some **very similar IF blocks**.
- Move** the Sparkle blocks into the **matching IF blocks** in the main program, to **merge** your line follower and Sparkle programs together.
- You should end up with something like the picture - a combination of the **Sparkle** and **Line following** code.
- Test** it properly on the track!

Step 8

Red Lights for Stop



- What about when the robot comes **off the line completely**?
- Add some more Sparkle blocks to the first **IF block** to turn all the Sparkles **red** if the robot is **off the line**.

Step 9

SOS - I'm Lost!

- Our robot should probably make more of a fuss if it **gets lost completely** and doesn't know where the line is.
- **Add** some blocks to make the buzzer **beep SOS** if the robot goes off the line.
- You can look back at the [Morse Code lesson](https://courses.techcamp.org.uk/Guide/B+-+Save+our+Robot!/180) (<https://courses.techcamp.org.uk/Guide/B+-+Save+our+Robot!/180>) if you can't remember how to do this!

