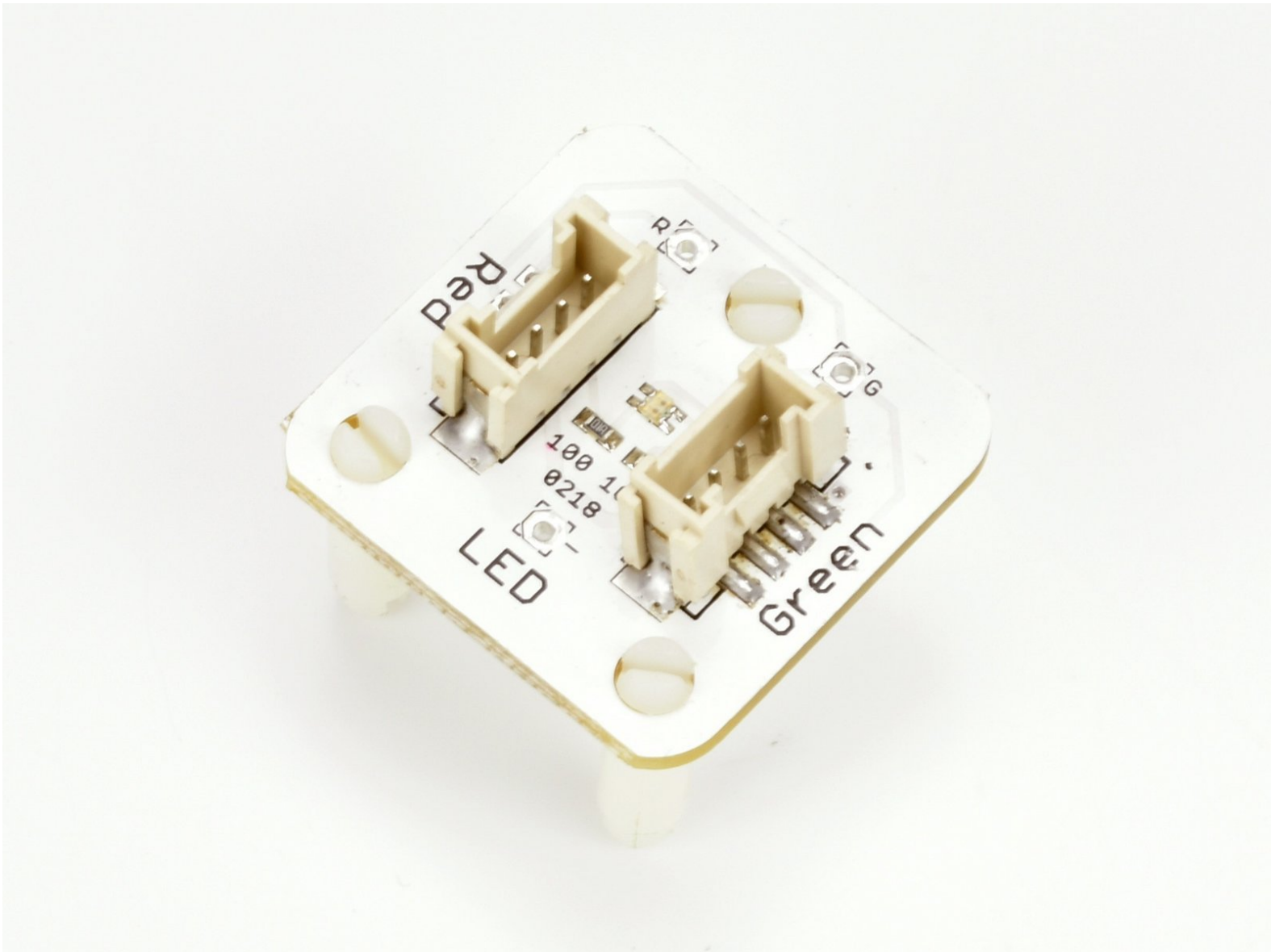


A - LEDs for Robot Communication

Our robot isn't very useful if it can't tell us how its mission is going. Let's learn about outputs and use some LEDs so it can talk back to us!



INTRODUCTION

Our robot isn't very useful if it can't tell us how its mission is going. Let's learn about outputs and use some LEDs so it can talk back to us!

Step 1

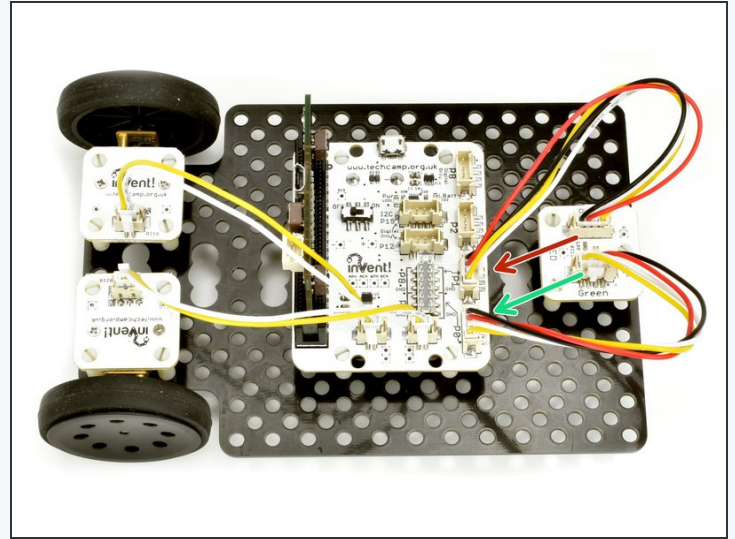
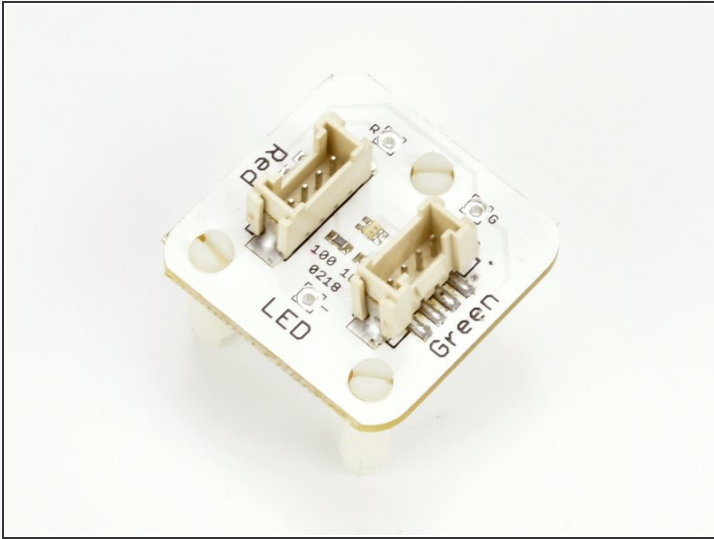
Feedback is Important



- All robots have some way of telling the user what they are doing
- This is called **feedback** - it is very important as it is very hard to understand what your robot is doing without it!
- Take a washing machine for example - they always have lights on the front to tell you what is going on.
- What about a robot hoover - they have feedback to say when they've finished, or when they need recharging

Step 2

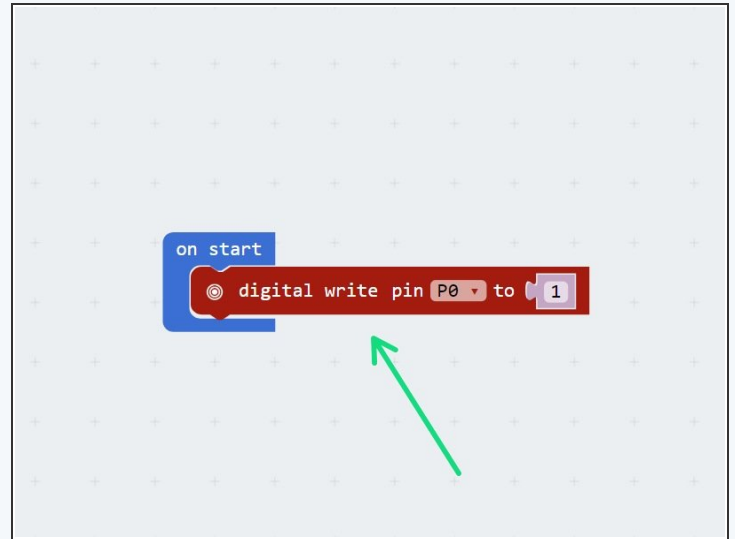
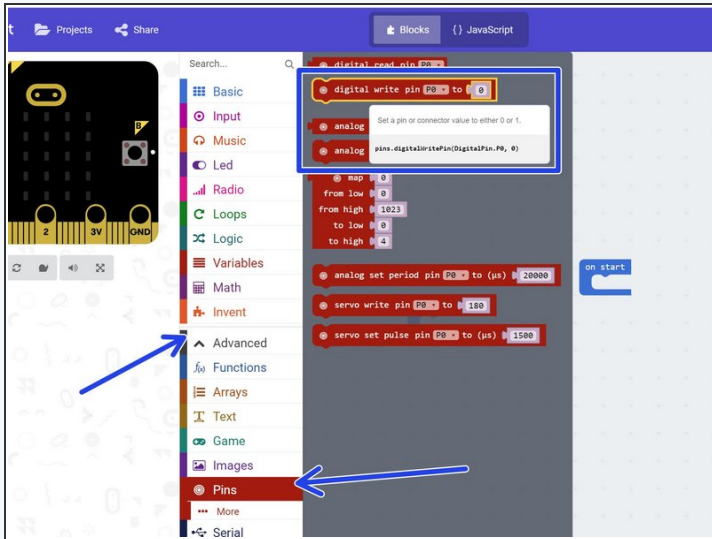
Robot LEDs



- Let's add some LEDs to our robot so we can get some **feedback** about the mission.
- Add the LED module to your robot like the picture.
- Plug the Red side into **P1**
- And the Green side into **P0**

Step 3

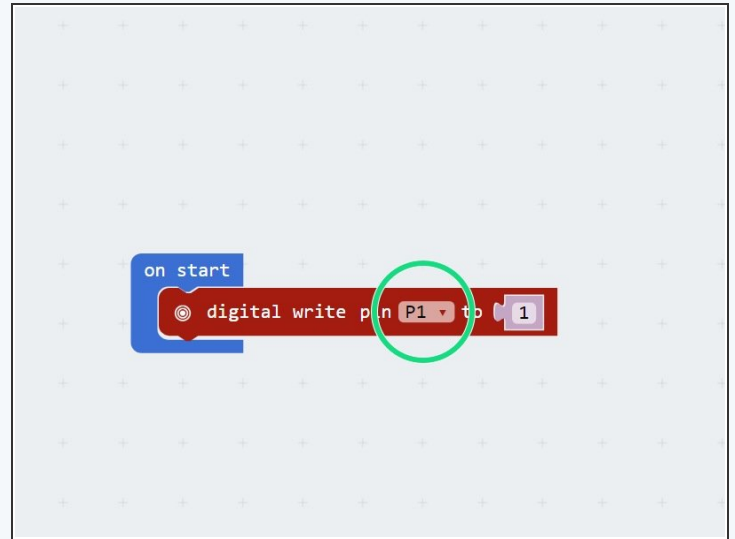
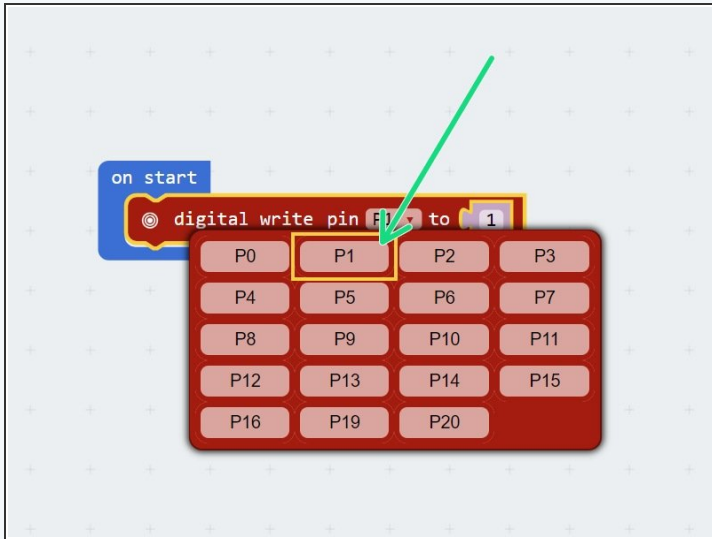
Using Outputs



- The green and red LEDs are both **outputs**
- An **output** is the name for anything that can be **controlled** by your robot
- Outputs can be set to either **ON** or **OFF** - there is no in between! In electronics, we call on **1**, and off **0**.
- To control outputs on the micro:bit, we use a **digital write** block - drag one in from the **pins menu** (you will have to click the **advanced** tab to find it).
- Copy the program in the picture and **upload** it to your robot. The **green LED** should light up!

Step 4

Digital Write



- We can use the **digital write** block to set any of the connections (P0, P1, P2, P8, P12) to **1** or **0** (on or off).
- You can change the connection and whether it is 0 or 1 by **clicking them**, just like the other blocks.
- Try changing the program so the **red LED** turns on!

Step 5

Green & red LED

challenge

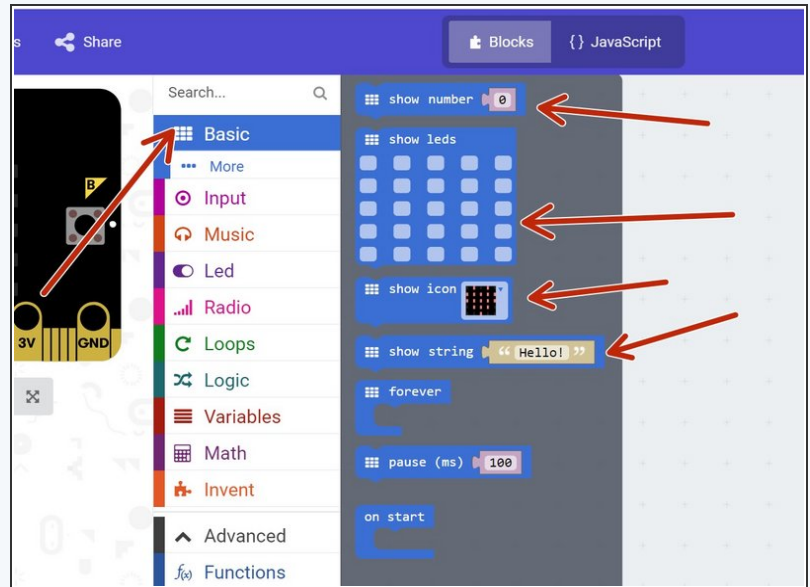
- We can use lots of digital write blocks to turn things on (and off) whenever we like!
- Make a program that:
 - Turns on the green LED
 - Pauses for 1 second
 - Turns off the green LED, and turns on the red LED
 - Pauses for 1 second
 - Turns off the red LED



Step 6

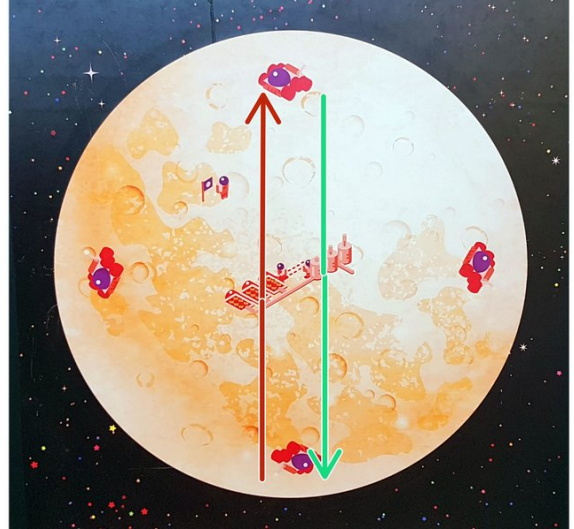
Using the Screen

- The micro:bit also has an **LED screen** built into it, which is great for giving **feedback** as it can show lots of different things.
 - Have a look in the **Basic** menu for some blocks that can control the screen -you can display text, numbers, icons and even custom designs!
 - **Try out some of the blocks** to see what they can do.
- i** We won't use the screen much in these tutorials, however feel free to use it whenever you like to **improve your programs**, or add extra features to make things better!



Extension Challenge

Extension Challenge!



- Load up your program that crosses the planet, picks up the astronaut, turns and drives back.
- Add some digital write blocks to turn on the red LED **before** the astronaut is picked up, then the green one **after** they are picked up and when the robot is driving back.
- Let's use the screen as well - show a **Sad Face** before you pickup the astronaut, and a **Happy Face** when you have picked them up!
- Now your robot is giving some real feedback, so you can see from your base when it has picked up the astronaut!