

B - Save our Robot!

What if our robot gets in trouble half way across the planet? Let's make a program so it can transmit S.O.S in Morse Code to let us know if its in trouble!



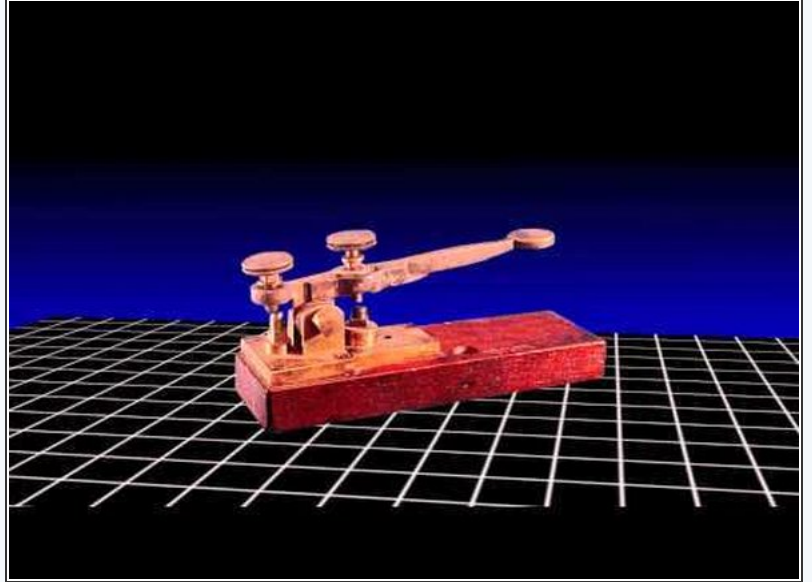
INTRODUCTION

What if our robot gets in trouble half way across the planet? Let's make a program so it can transmit S.O.S in Morse Code to let us know if its in trouble!

Step 1

Morse Code?

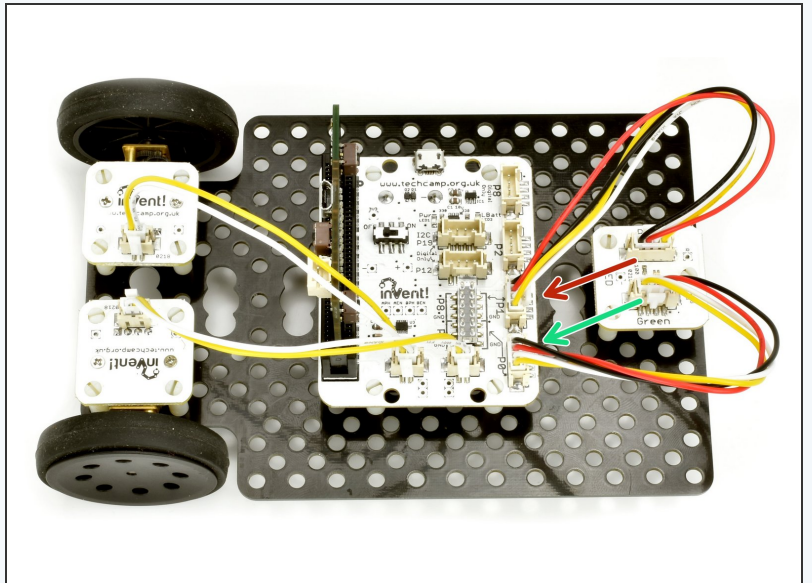
- Having red/green LEDs is a great start to communicating with our robot
- What if we want to communicate more than just red or green?
- **Morse Code** allows us to send any letter or number we like, just using a single light or buzzer!
- Watch the video to find out more.



Step 2

Robot Setup

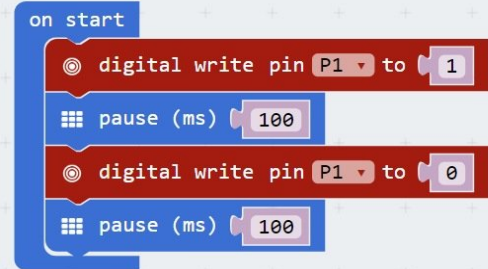
- Make sure your robot is setup in the same way as the previous section.
- The **red LED** should be connected to **P1**, and the **green LED** should be connector to **P0**.



Step 3

Letter S

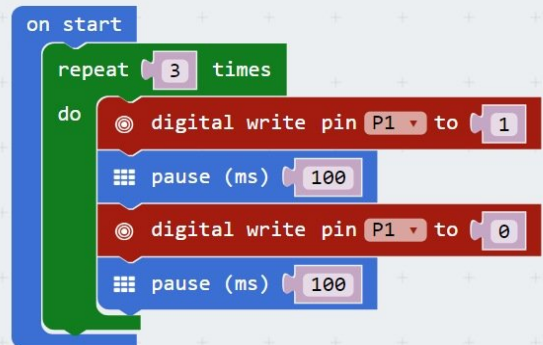
- Let's write a program that will send the **letter S** - this is **3 dots**.
- In the picture is a program to send **1 dot** with the red LED. For your **pause blocks**, we suggest:
 - **100 milliseconds** for a dot
 - **1 second** for a dash
- **Extend** the program in the picture to send **3 dots**, which is an **S**.



Step 4

S with a Loop

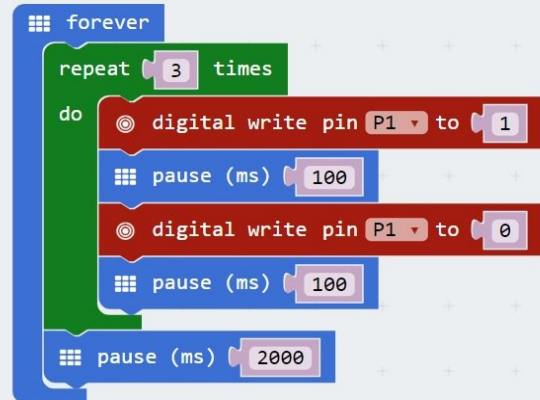
- Can you work out how to make the S program **shorter**?
- We can use a **do _ times loop** like we used for moving the robot in a square!
- Change your program so it sends Morse Code for an **S** using a **loop**.

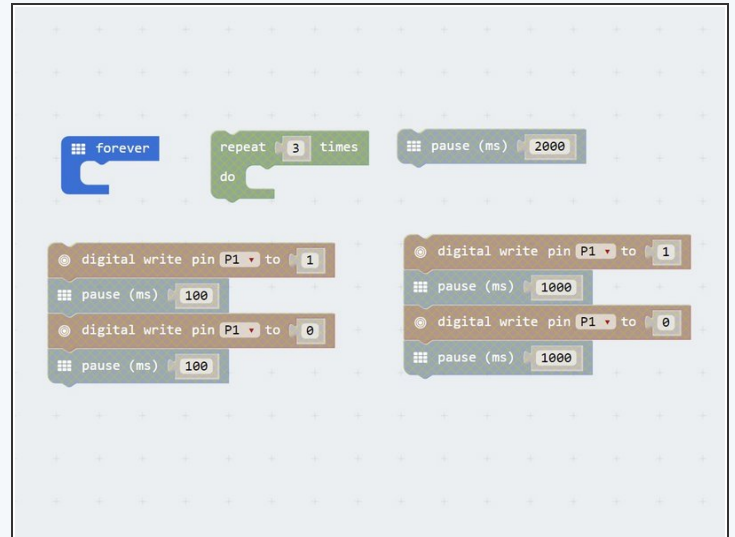



Step 5

Gaps Between Letters

- You might have noticed when you were listening to the code, that **between the letters** we need **longer gaps** so you can tell when they **start and finish**.
- A time of **2 seconds** works well.
- Put your loop that flashes an S inside the **forever** loop so it flashes S forever, and **add a pause block** so there is a **gap of 2 seconds between each S**.





- Let's make a program to get our robot to flash **SOS** using an LED, in case it has a problem.
 - Your program should flash the sequence of dots and dashes required for the letters SOS - for bonus points put it in a loop to make it flash SOS **forever!**
 - Try to shorten your program using **do _ times loops**.
-  If you're a bit stuck, have a look in the picture to see which blocks you will need to use.

Extension Challenge!



- Using lights for Morse Code is great for long distances, such as between two ships, but what if you are looking the other way when your robot is in trouble?
- Replace your LED module with the **buzzer module** like in the picture, so your robot buzzes SOS instead.
- If you're feeling really clever, put the LED module back into another output and add some more digital write blocks, so it flashes **and** buzzes the sequence for S.O.S!