

D - Secure the Planet!

One of your tasks on the mission is to secure the planet for mankind - learn how to speed up your programs to get our robot to patrol the planet surface.



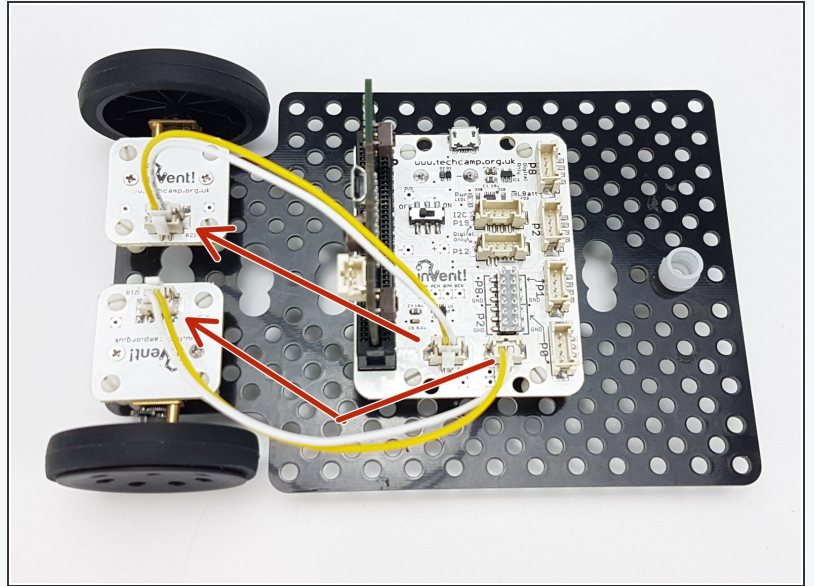
INTRODUCTION

One of your tasks on the mission is to secure the planet for mankind - learn how to speed up your programs to get our robot to patrol the planet surface.

Step 1

Robot Setup

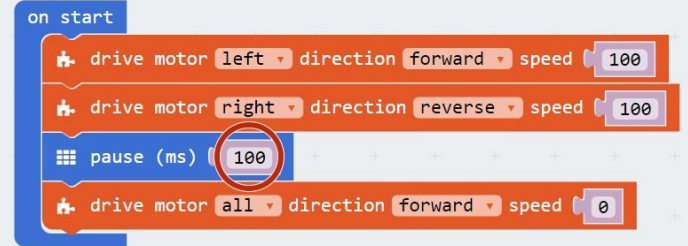
- Make sure your robot is setup in the same way as the **previous sections!**
- You **don't need** the magnet module for this section.



Step 2

Turning Accurately

Challenge!



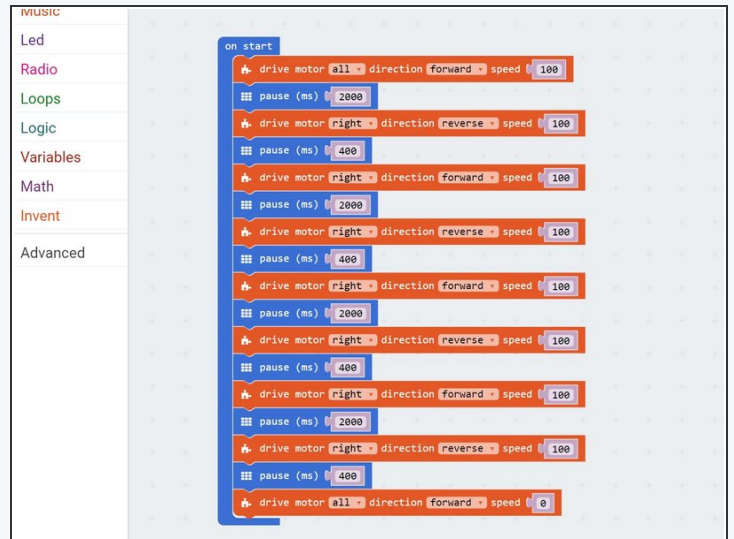
- For the rest of this lesson, we need to be able to make the robot turn **accurately**.
- Build the program in the picture, and **try it out** on the robot - it should turn a small amount, then **stop**.
- For the next few steps, we need to make our robot turn **exactly 90 degrees** - adjust the length of the **pause** block until your robot accurately turns **90 degrees**.

⚠ You won't be able to complete the next steps until your robot **turns accurately** - get your teacher to check before you move on!

Step 3

Driving in a Square

Challenge!

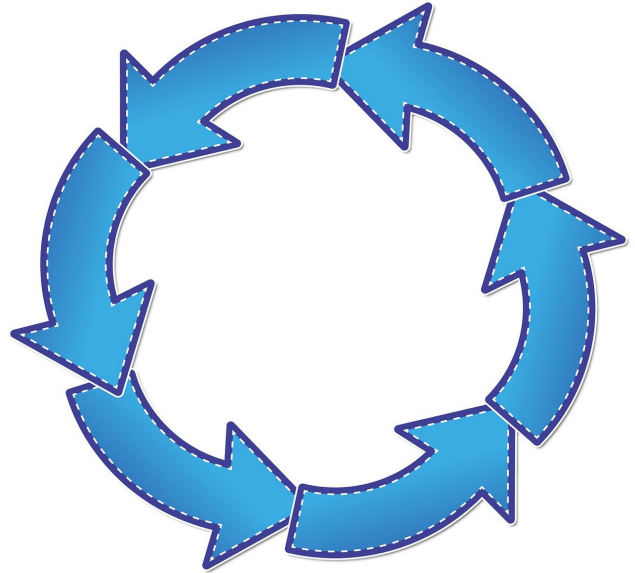


- Now you can turn by 90 degrees, write a program that makes your robot **move in a square!**
 - It should like something like the example in the picture, but your '**pause**' blocks will be different.
 - If you think about it, you only need to **reverse** 1 motor and then set it to **forwards** again to change direction - one motor can be going forward **all the time**.
- i** Also, you don't necessarily need to **stop** after turning - just **set the motor going in reverse** to go forward again!

Step 4

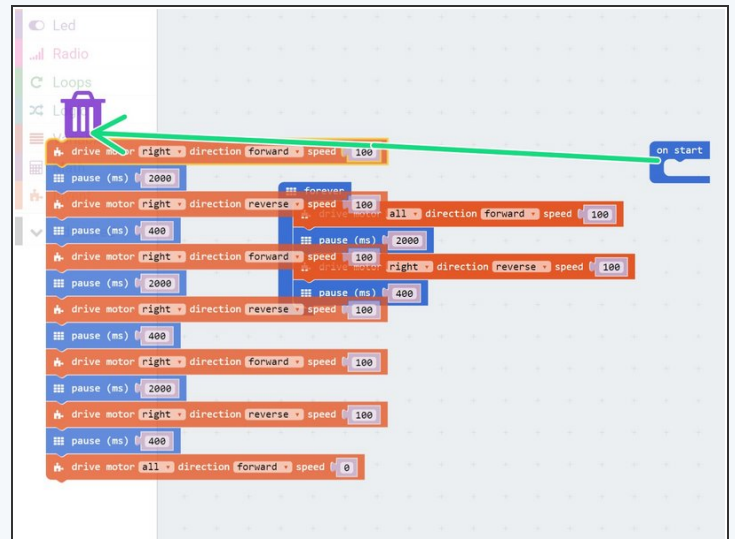
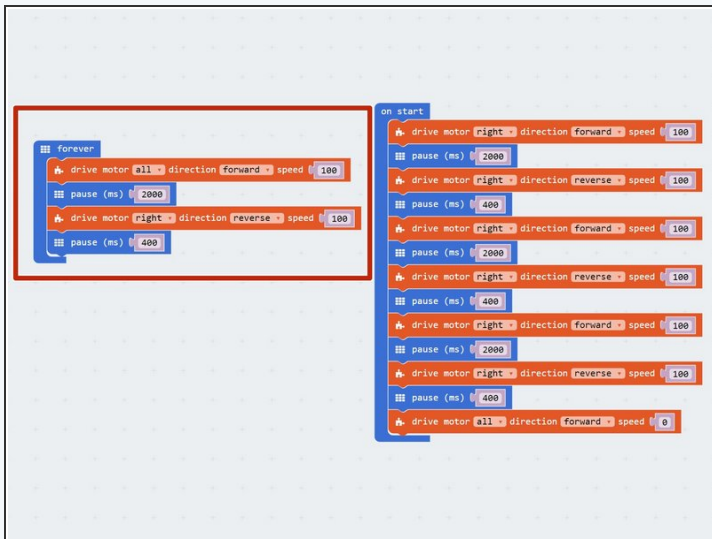
Using a Loop

- Making that last program took a while - and the robot was just doing the same things **over and over again**.
- Say we wanted to drive in a square 10 times - that would take **ages to program!**
- Driving in a square was doing the **same thing 4 times:**
 - Drive forward
 - Pause
 - Turn
 - Pause
- We can use a **loop** to get the computer to repeat these steps for us!



Step 5

Do Forever Loop



- One of the most useful loops is the **forever** loop - we have this block in every program, next to the '**on start**' block - we just haven't used it yet!
- Anything inside this loop is just repeated forever.
- Let's use this to make our robot move in a square forever.
- **Move** some blocks into the **forever** block, to make the robot drive forwards, then turn 90 degrees, like in the picture.
- **Delete** the rest of the code in the **on start** block by dragging it into the left menu - we don't need this anymore.
- **Upload** the code to your robot - it should move in a square forever!

Step 6

Loop, but not forever



- What if we don't want to move in a square forever?
- Luckily, there are other types of loops we can use that can loop things in different ways.
- Click on the **Loops** menu, and drag in a **repeat 4 times** loop. This block will repeat any code inside it, but only the number of times that you tell it to!
- Put the new loop block into the **on start** block, and move the other code from the **forever** loop into the new **repeat 4 times** loop, like the picture.
- Now your robot should move in a square once, then **stop!**

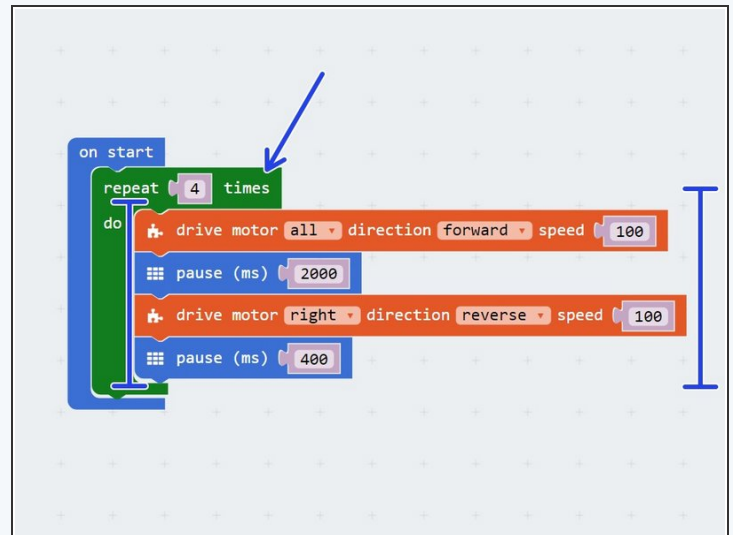
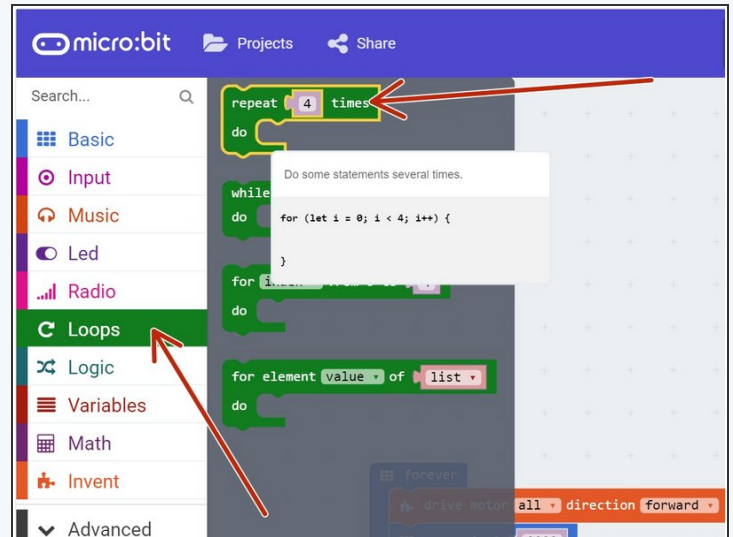
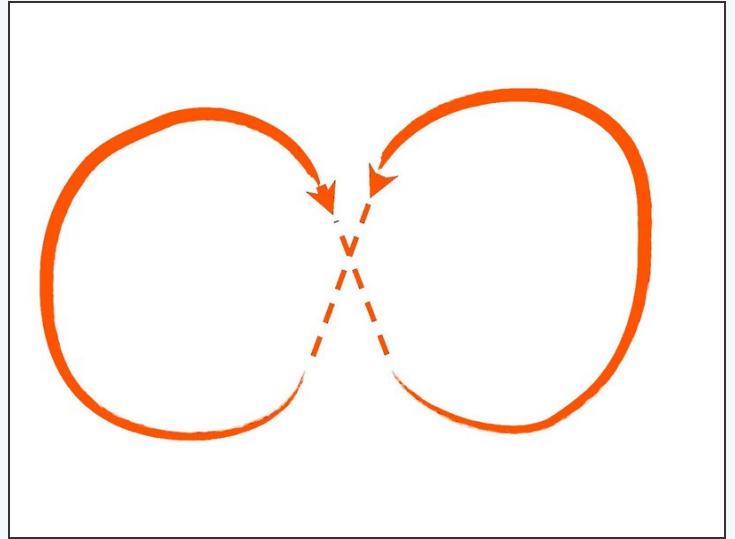


Figure of 8

**Extension
Challenge!**



- Now your robot can drive in a square using a loop, let's **change the code** so it will drive in a **figure of 8**.
- Have a look at the picture if you don't know what a **figure of 8** is.
- Try to split the shape up into **2 sections**, and use a **do _ times** loop to reduce the length of your sequence.