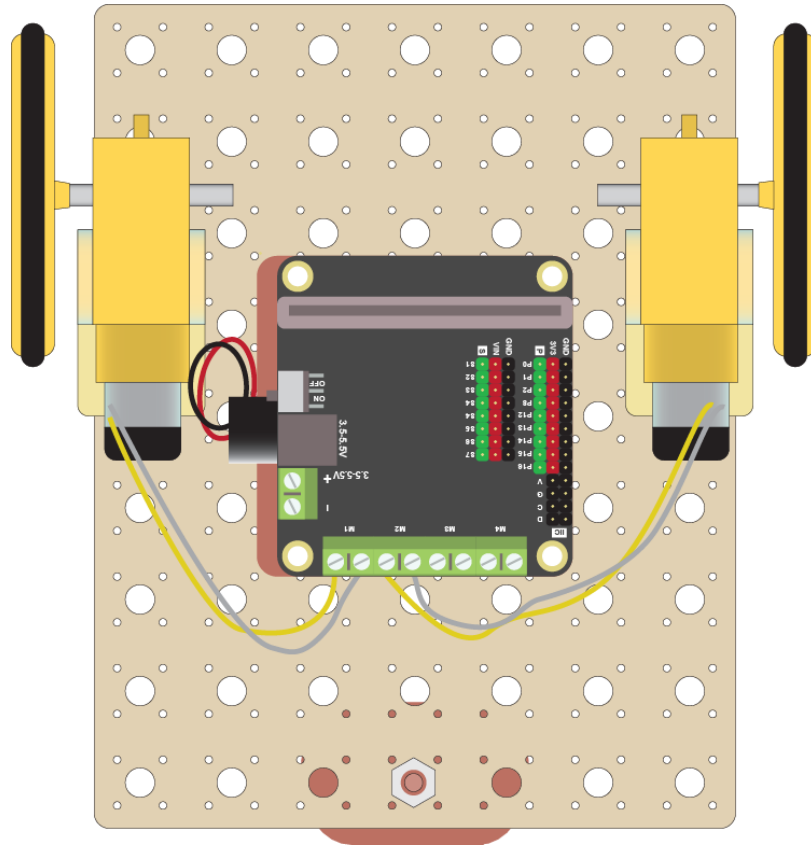


Build a Basic Robot

Project 1.01

In this workshop you will make a wheeled robot.



How it Works

The robot will have 3 wheels. Two large wheels will be driven by motors. The third wheel is a caster wheel, which is not driven, but will rotate in any direction that the other wheels demand.

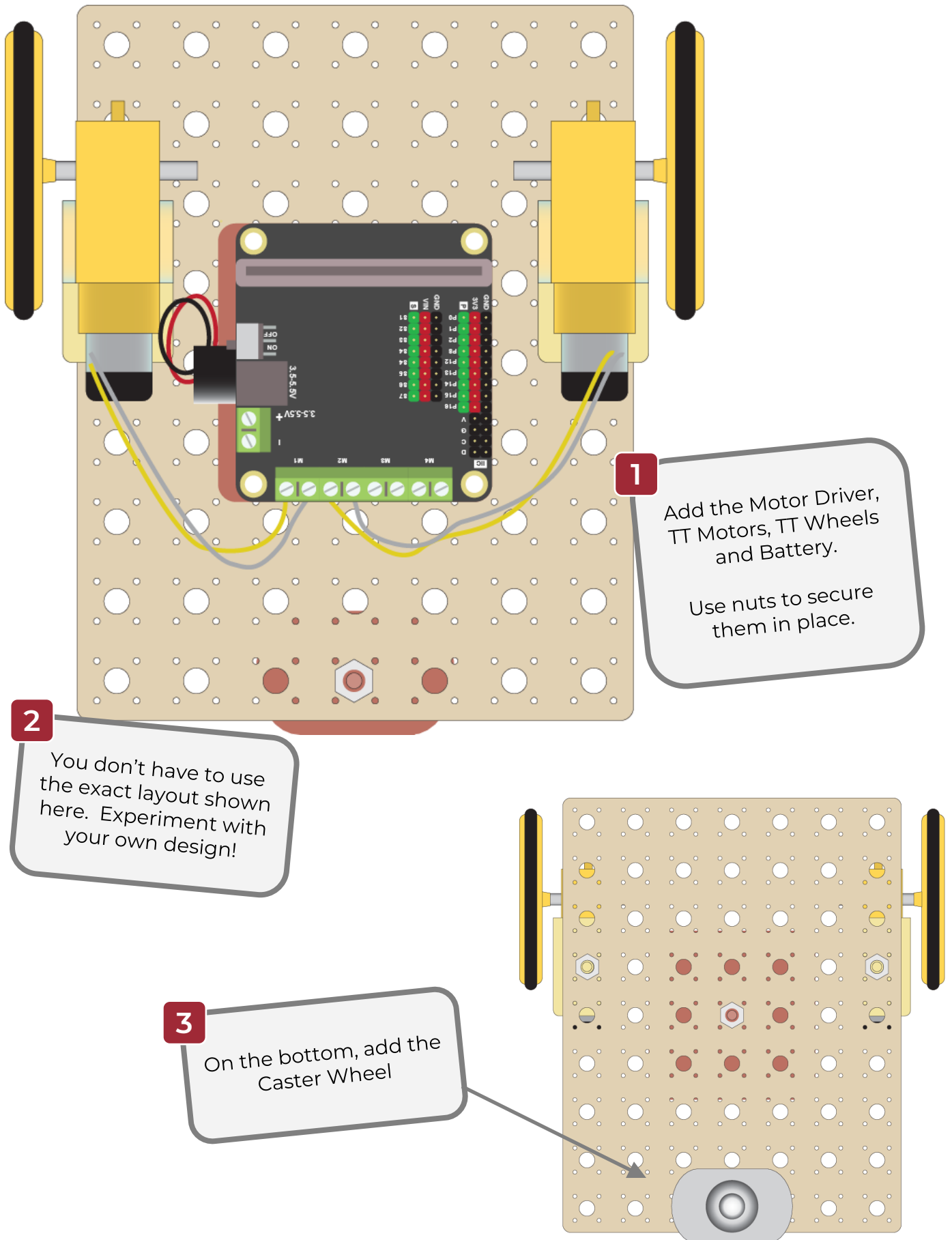
The Motor Controller is used to drive the motors. It turns on the current when you want the motor to spin and turns it off when you want the motor to stop. You can also change the speed and direction of the motor.

A Microbit will be coded to make whatever movements you want.

What to do

- Follow this worksheet to build and code the basic forwards movement of the robot.
- Attempt the challenges to get other movements—backwards, turning, dancing, or whatever you want!

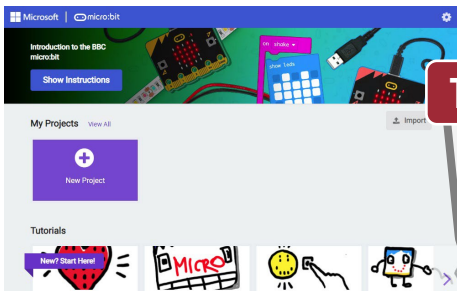
Assemble the Robot



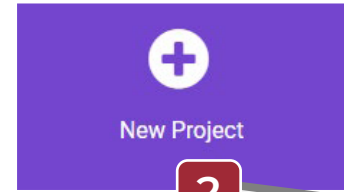
Build a Basic Robot: Code the Basic Movements

Create a Project for the Robot

<https://makecode.microbit.org/>



1 Go to the Makecode website



2 Click on New Project

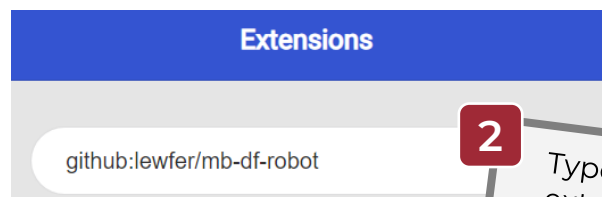
A 'Create a Project' dialog box with a title bar containing three smiley face emojis. It prompts the user to 'Give your project a name.' with a text input field containing the word 'robot'. Below the input field is a link for 'Code options'. At the bottom right is a green 'Create' button with a checkmark icon.

3 Give the project a name (whatever name)

Add the Motor Driver Extension

1 Select this block

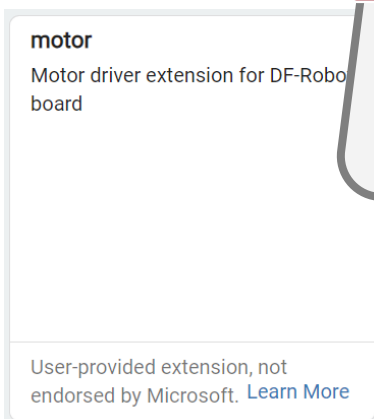
+ Extensions



2 Type in the extension name

github:lewfer/mb-df-robot

3 Select the motor extension that appears



4 If all goes well you will see this new menu appear

 Motors

Add Code to Move the Motors

1

Find these code blocks



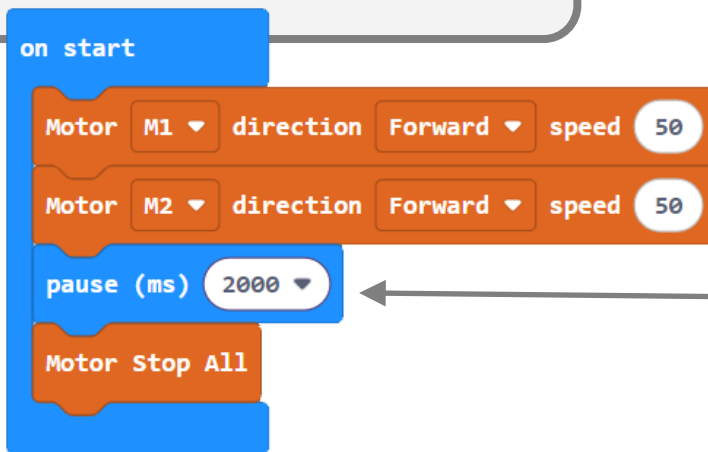
Motors



Basic

2

Add this code. This moves the robot forward at 50% speed for 2 seconds and then stops.



The pause tells the robot how long to carry on doing the previous thing. In this case this says how long the robot will keep moving forwards. The number is the time in milliseconds. There are 1000 milliseconds in 1 second.

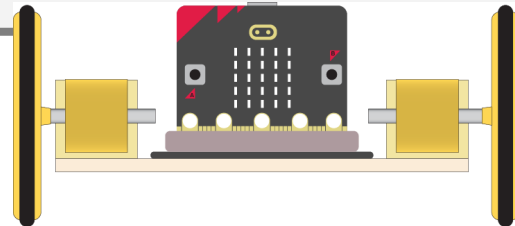
3

Download the code to the Microbit

Download

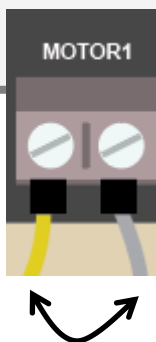
4

Insert the Microbit into the Motor Controller board



5

Check that the robot runs correctly. If one or both of the wheels is turning the wrong way, swap the wires on motor



Your challenge!

Get your robot to perform different movements:

- How can you get the robot to move backwards?
- How can you change the speed of the robot?
- How can you get the robot to turn?

Then try these:

- Get your robot to dance!
- Get your robot to make a perfect square!
- Design your own challenge for your robot!

Build a Basic Robot: Solutions

Moving Backwards

Use the “Reverse” direction to move backwards

```
Motor M1 direction Reverse speed 50
Motor M2 direction Reverse speed 50
```

Changing Speed

Click on the speed to adjust it

Motor M1 direction Reverse speed 74

Speed 74

Turning

Adjust the speed of each motor to make a turn. Switch the speeds to turn the other way

Sharp Turn

```
Motor M1 direction Forward speed 100
Motor M2 direction Forward speed 0
```

Gentle Turn

```
Motor M1 direction Forward speed 100
Motor M2 direction Forward speed 60
```

Spin

```
Motor M1 direction Forward speed 50
Motor M2 direction Reverse speed 50
```

Square

on start

repeat 4 times

do

Motor M1 direction Forward speed 50

Motor M2 direction Forward speed 50

pause (ms) 1000

Motor M1 direction Forward speed 50

Motor M2 direction Reverse speed 50

pause (ms) 500

Motor Stop All

straight

turn

Dance!

on start

repeat 4 times

do

Motor M1 direction Reverse speed 50

Motor M2 direction Forward speed 50

pause (ms) 500

Motor M1 direction Forward speed 50

Motor M2 direction Reverse speed 50

pause (ms) 500

Motor Stop All

wiggle one way

wiggle other way