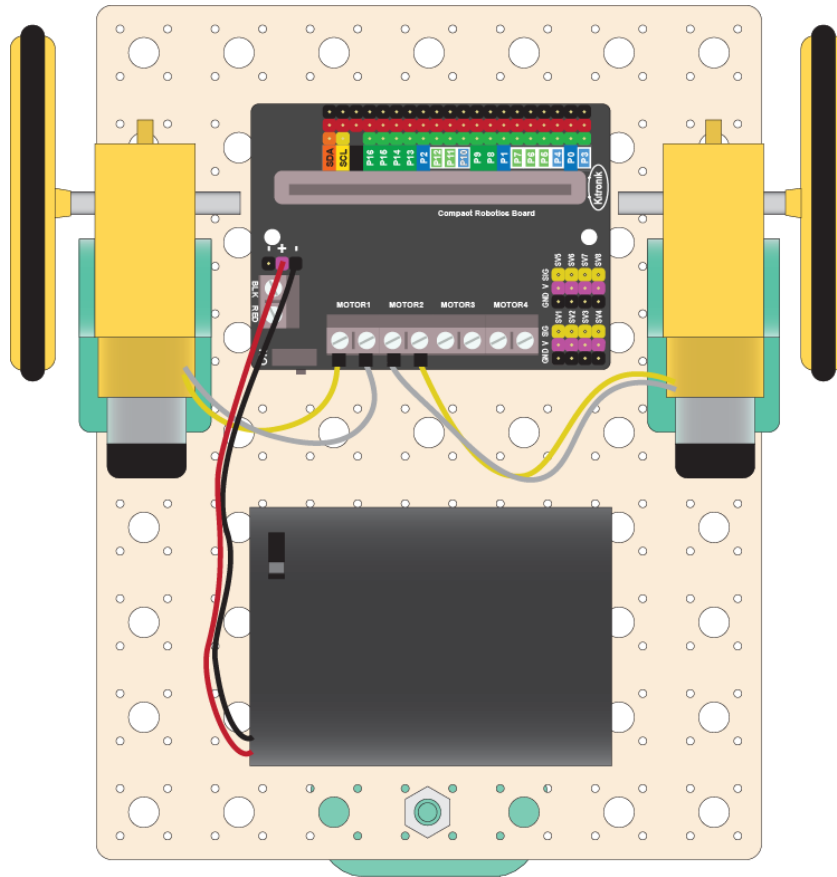# Build a Basic Robot

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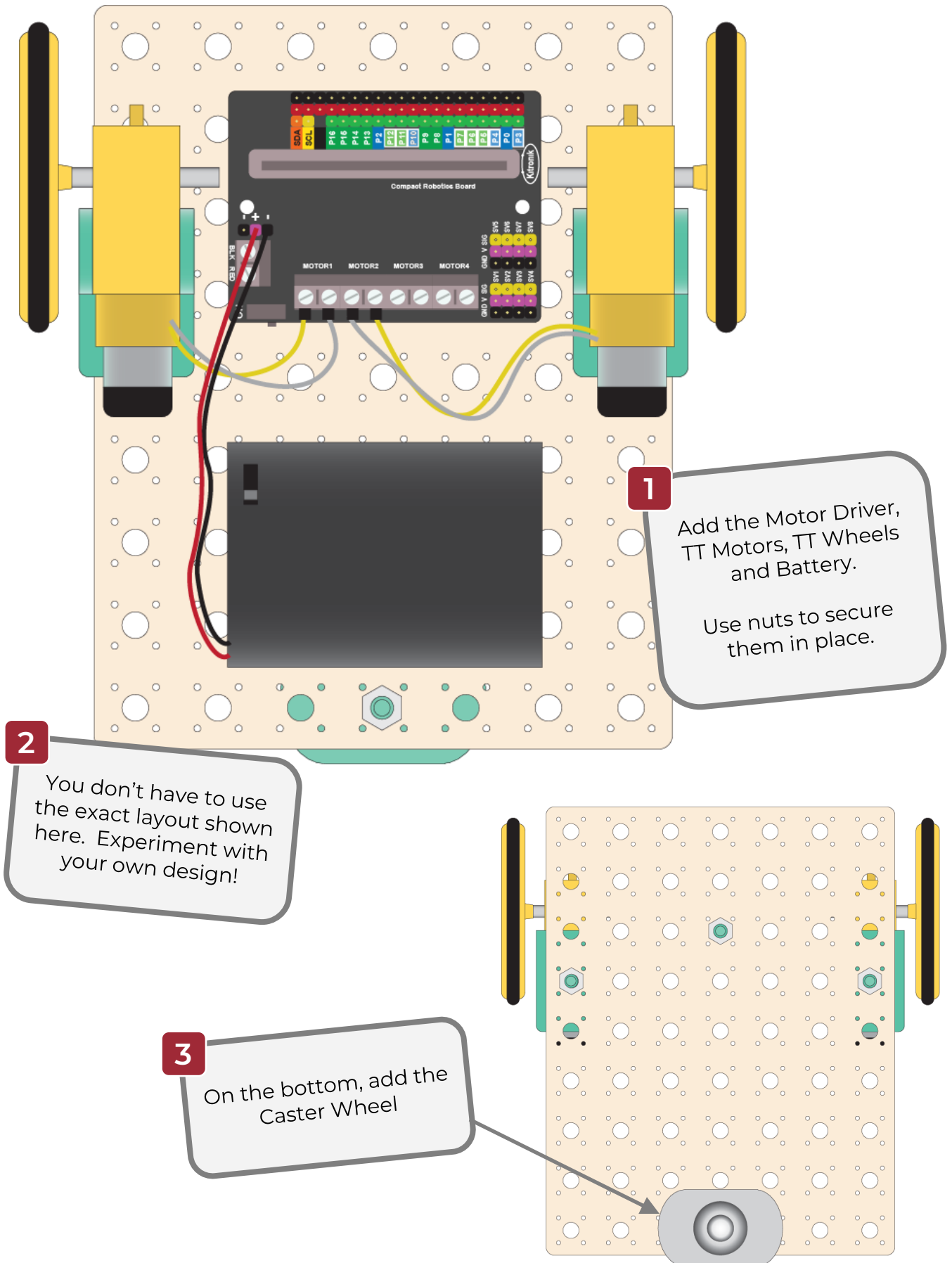
A Microbit will be coded to make whatever movements you want.

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!
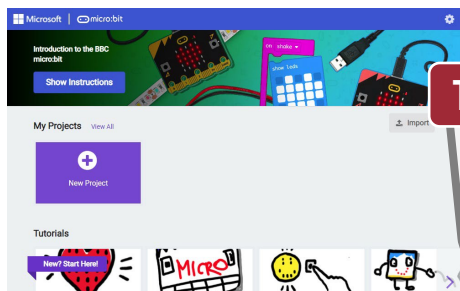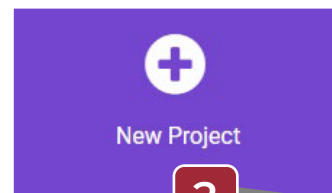
Assemble the Robot

Find and Connect the Parts

1 Add the Motor Driver, TT Motors, TT Wheels and Battery.

Use nuts to secure them in place.

2 You don't have to use the exact layout shown here. Experiment with your own design!

3 On the bottom, add the Caster Wheel

Code the Basic Movements 1

Create a Project for the Robot

https://makecode.microbit.org/

1 Go to the Makecode website

2 Click on New Project

New Project

Create a Project 🤩🤩🤩

Give your project a name.

robot

> Code options

Create ✓

3 Give the project a name (whatever name

Add the Motor Driver Extension

1 Select this block

➕ Extensions

Extensions

kitronik

2 Search for Kitronik

kitronik-robotics-board

Custom blocks for
www.kitronik.co.uk/5641 All-in-one

Learn more
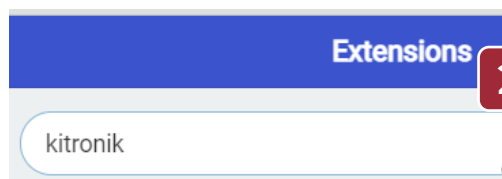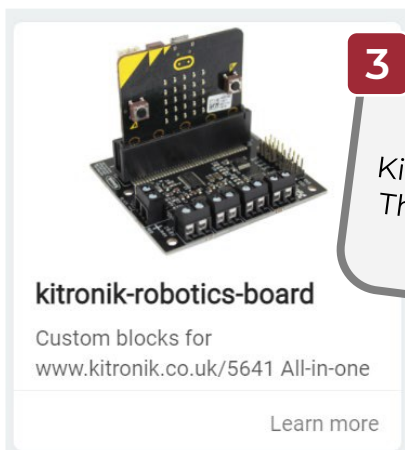
3 Make sure you select the right Kitronik extension. There are a few of them!

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

🔧 Robotics

Code the Basic Movements 2

Add Code to Move the Motors
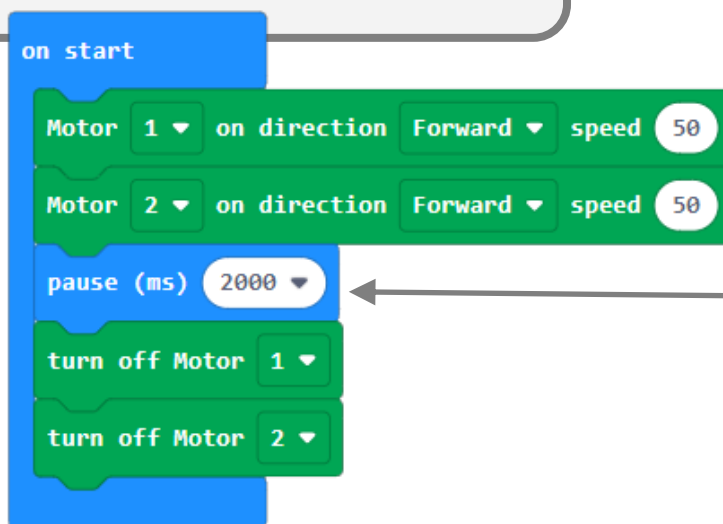
1 Find these code blocks

Robotics
••• Servos
••• Motors
••• Settings

Basic

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

on start

Motor 1 ▾ on direction Forward ▾ speed 50

Motor 2 ▾ on direction Forward ▾ speed 50

pause (ms) 2000 ▾

turn off Motor 1 ▾

turn off Motor 2 ▾

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.
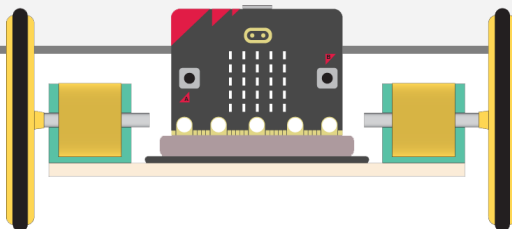
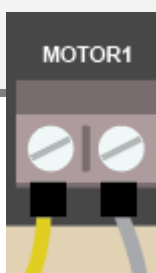**3** Download the code to the Microbit

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 the motor

MOTOR1

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!

Solutions

Moving Backwards

Use the "Reverse" direction to move backwards

Motor 1 ▼ on direction Reverse ▼ speed 50

Motor 2 ▼ on direction Reverse ▼ speed 50

Changing Speed

Click on the speed to adjust it

Motor 1 ▼ on direction Forward ▼ speed 80

Speed 80

Turning

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

Gentle Turn

Motor 1 ▼ on direction Forward ▼ speed 100

Motor 2 ▼ on direction Forward ▼ speed 60

Sharp Turn

Motor 1 ▼ on direction Forward ▼ speed 100

Motor 2 ▼ on direction Forward ▼ speed 0

Spin

Motor 1 ▼ on direction Forward ▼ speed 50

Motor 2 ▼ on direction Reverse ▼ speed 50

Square

on start

repeat 4 times
do
  Motor 1 ▼ on direction Forward ▼ speed 50
  Motor 2 ▼ on direction Forward ▼ speed 50
  pause (ms) 1000 ▼

straight

  Motor 1 ▼ on direction Forward ▼ speed 50
  Motor 2 ▼ on direction Reverse ▼ speed 50
  pause (ms) 500 ▼

turn

turn off Motor 1 ▼
turn off Motor 2 ▼

Dance!

on start

repeat 4 times
do
  Motor 1 ▼ on direction Reverse ▼ speed 50
  Motor 2 ▼ on direction Forward ▼ speed 50
  pause (ms) 500 ▼

wiggle one way

  Motor 1 ▼ on direction Forward ▼ speed 50
  Motor 2 ▼ on direction Reverse ▼ speed 50
  pause (ms) 500 ▼

wiggle other way

turn off Motor 1 ▼
turn off Motor 2 ▼