# Add Crash Sensors to your Robot Project 1.03

In this workshop you will add some crash sensors to your robot. These will detect when the robot has crashed into a wall or another robot. You can use these to take evasive action, such as turning around or making a noise.



v29.09.2024

#### How it Works

The crash sensors are a type of switch called a microswitch. We will use a digital input to detect when the switch is hit, which closes the switch.

Each switch will be connected to a pin on the Microbit. When the switch is open, the pin will read HIGH, corresponding to a value of 1. When the switch is closed, the pin will be set LOW, corresponding to a value of 0. We can use code to read to 0 and 1 values and respond accordingly.

The crash sensors need to be connected to the Microbit using GS cables, which have 2 wires. G is ground, which is the black wire. S is signal, which is the green wire and connects to the pin on the Microbit.



#### What to do

- If you haven't already done so, build the robot by referring to the previous worksheet
- Then follow this worksheet to add two crash sensors and make your robot stop when it crashes
- Finally, attempt the challenges to make your robot respond to a crash in different ways by following the coding instructions in this worksheet

### Add the Crash Sensors



### Code the Crash Sensors 1



### Add the Motor Driver Extension



### Code the Crash Sensors 2

Code a Random Robot
First we will code a robot that moves at random speeds. By turning each wheel at a random speed, the robot will keep changing direction.
Image: Second system Add this code   Image: Second system The pick random block chooses a speed between 0 and 100
Motor M1 - direction Forward - speed pick random 0 to 100 Motor M2 - direction Forward - speed pick random 0 to 100
pause (ms) 1000 The second sec

### Set up the Crash Sensors

Now we will start to code the crash sensors. First we need to tell the Microbit that the pins should be set to HIGH when the switches are not pressed.



## Code the Crash Sensors 3



www.thinkcreatelearn.co.uk

### Challenges

### Your challenge!

Try these challenges:

- Instead of just stopping, can you get your robot to turn around when it hits a wall?
- Get the robot to flash its lights when it crashes (if you haven't added lights go back to the worksheet **Adding Lights to your Robot**.

# Add Crash Sensors to your Robot: Solutions 1

Turning Around
This is one way to get your robot to turn around when it hits something. You may
come up with a different way.
if digital read pin P15 ▼ = ▼ 0 or ▼ digital read pin P16 ▼ = ▼ 0 then
play tone Low C for 2 • beat until done • Motor M1 • direction Reverse • speed 50
Motor M2 V direction Reverse V speed 50 Reverse straight
Motor M1 V direction Reverse V speed pick random 0 to 100 Reverse randomly
Motor M2 V direction Reverse V speed pick random 0 to 100 pause (ms) 1000 V
else
Motor M1 - direction Forward - speed pick random 0 to 100 Noton M2 - direction Forward - speed pick random 0 to 100 Forward randomly

### Solutions 2

### Lights

This code will flash this lights while the robot is crashed. forever digital read pin (P15 💌 = - (0) digital read pin 🛛 P16 💌 = 🔻 🛛 🔘 or 🔻 then play tone Low C for 2 veat until done 💌 digital write pin (P13 💌 ) to 🚺 Turn lights on digital write pin (P14 💌 to 🚺 pause (ms) 500 🔻 digital write pin P13 💌 to 🛛 0 Turn lights off digital write pin (P14 💌 to 🛛 🖉  $\Theta$ else Motor M1 - direction Forward - speed pick random 0 to 100 pick random ( 0 ) to ( 100 Motor M2 🔻 direction Forward 🔻 speed  $\bigcirc$ pause (ms) 1000 🔻