



Brunel
University
London



GetME Out: Robotics Programming

CS Athena Swan Outreach Lead

Nadine Aburumman

**Innovative
Inclusive
Diverse**

GetME Out Workshop: Robotics Programming with micro: Maqueen

The **GetME** Out Workshop is a Hands-On Experience

The objectives:



An opportunity for all of you to gain knowledge of computer science.



An introduction to fundamental concepts and applications of computer science.



The **GetME** Out Workshop is a Hands-On Experience

The objectives:



Run a range of activities that focus on physical computing, featuring things that move, buzz, or light up.



Having fun with coding while also learning.



Hardware Equipment

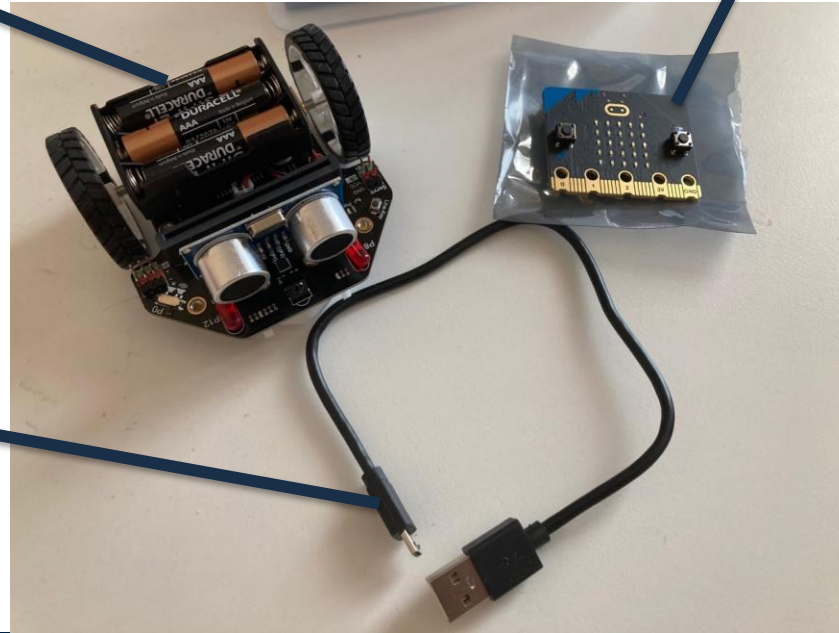


Hardware Equipment

micro: Maqueen

micro: bit

USB cable



Software

Microsoft MakeCode

an online learn-to-code platform

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

Download



Hour of Code



Activity 1: MakeME WALK



Motors

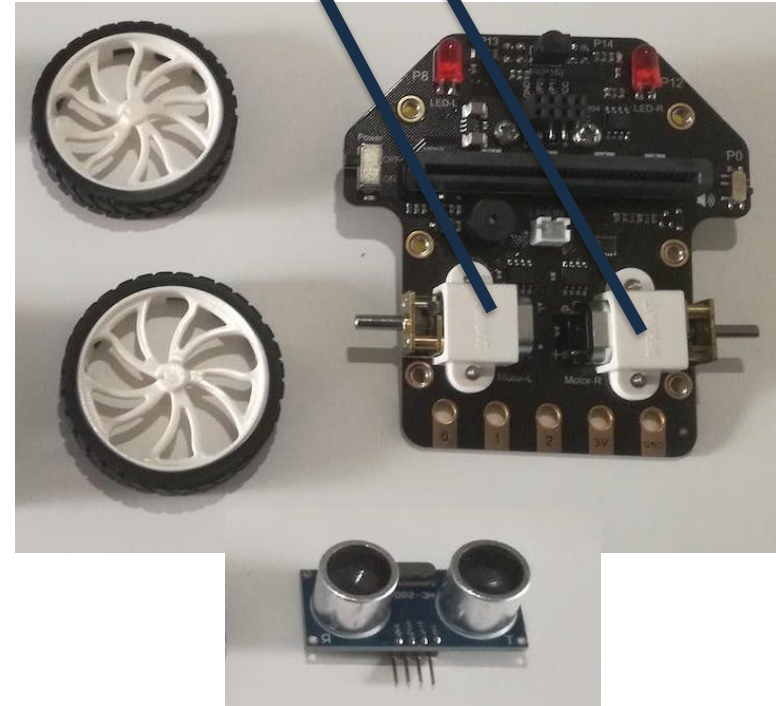
Control Motor

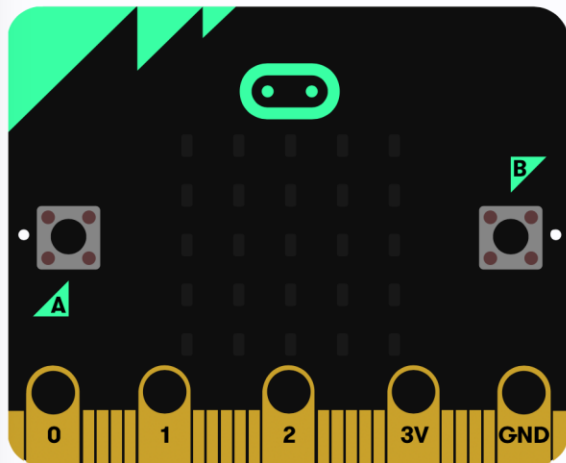
Motor: left, right, all

Rotate Direction: forward, backward

Speed: 0~255

Function: control the Maqueen' s speed and movement (forward/backward, turn left/right, stop).





Search...



Basic

Input

Music

Led

Maqueen

IR

Radio

Loops

Logic

Variables

Math

Extensions

Advanced

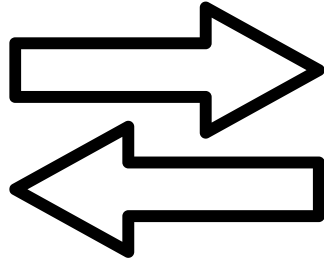
forever

motor all move Forward at speed 255

Task 1: 5 Minutes

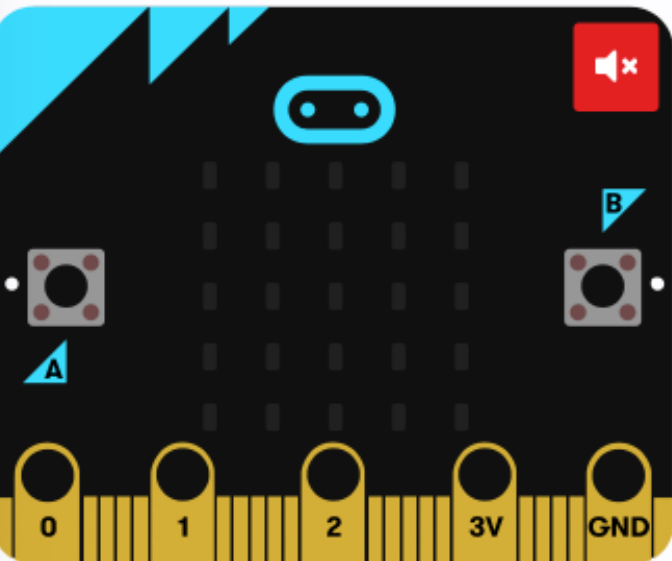


**1 person
is coding**



**3 people are
observing and assisting**





Search...

- Basic
- Input
- Music
- Led
- Maqueen
- IR
- Radio
- Loops

forever

motor all move Forward at speed 255

pause (ms) 1000

motor left move Forward at speed 255

motor right move Forward at speed 0

pause (ms) 1000

Go to this website
<https://makecode.microbit.org/>

Activity 2: MakeME SENSE

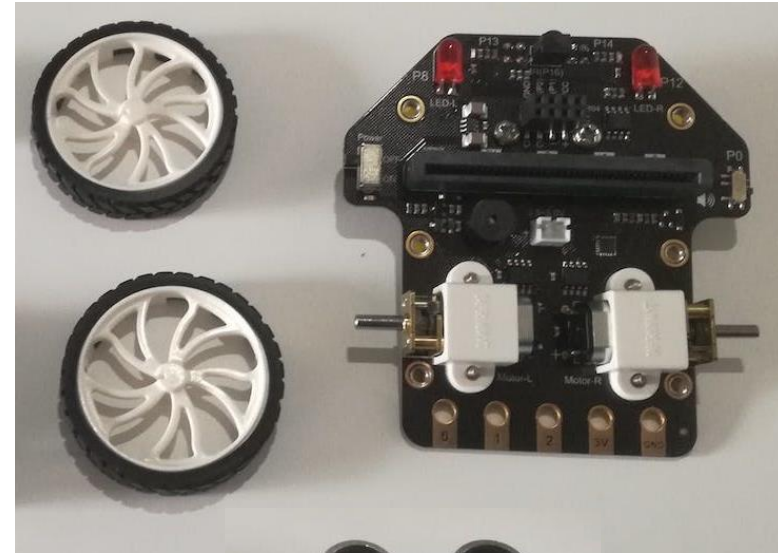


Read Ultrasonic Sensor

Return Value: decimal integer

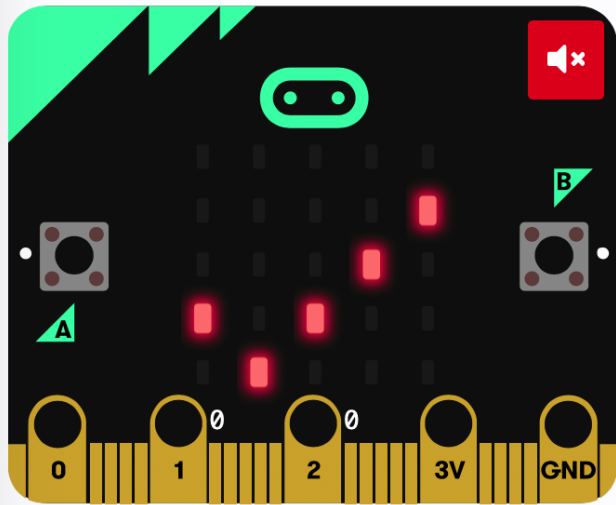
Unit: cm

Function: read the distance of the sensor and obstacle ahead. The sensor provides a 2~400cm detection range, and 1cm~3cm error. The output will be more accurate in 20cm~80cm. The return value will be 0 when exceeding 400cm.



Ultrasonic sensor





Search...

- Basic
- Input
- Music
- Led
- Maqueen
- IR
- Radio
- Loops
- Logic
- Variables

forever

```

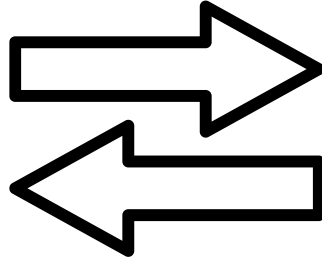
if < read ultrasonic sensor > cm < ≤ > 30 < then
  show icon [ 1x1 grid ]
  motor all stop
else
  show icon [ 3x3 grid ]
  motor all move Forward at speed 255
  
```

Go to this website
<https://makecode.microbit.org/>

Task 2: 5 Minutes

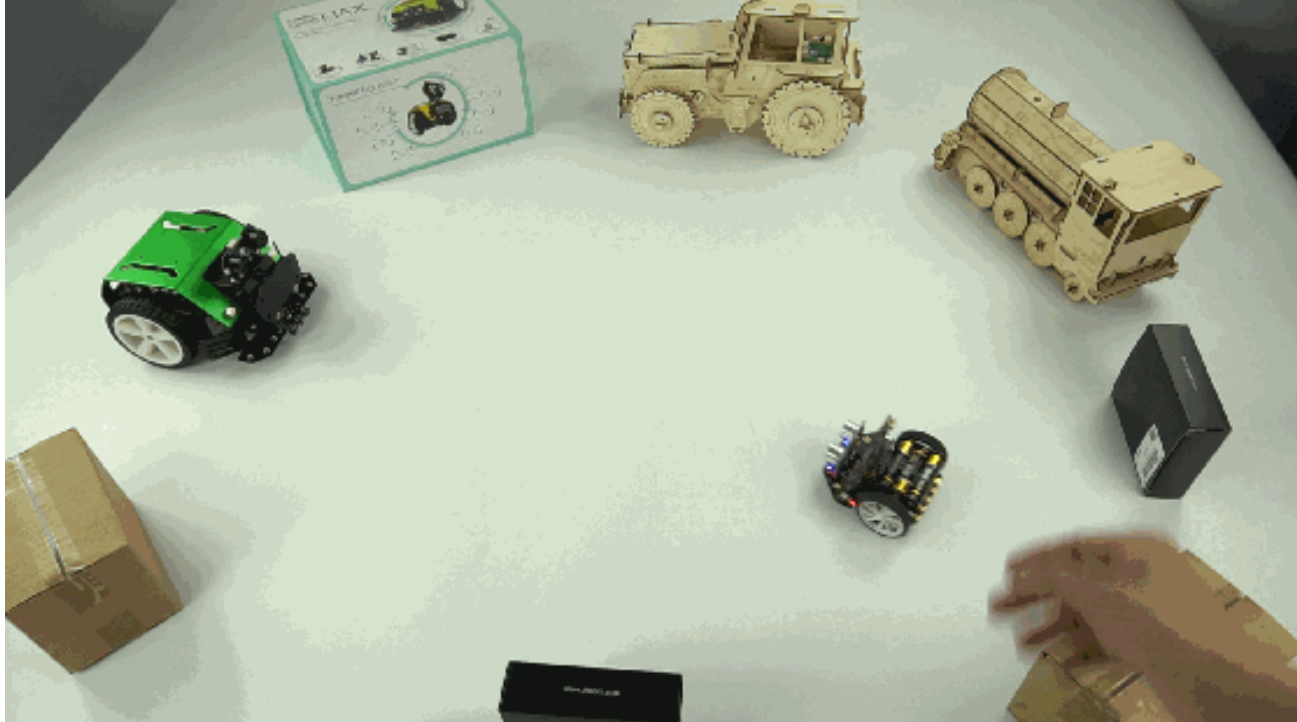


**1 person
is coding**



**3 people are
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Task: write a simple program that makes the robot keep moving, unless it faces obstacles, then changes direction and avoid the obstacles

Activity 3: MakeME SEE



Read Line-tracking Sensor

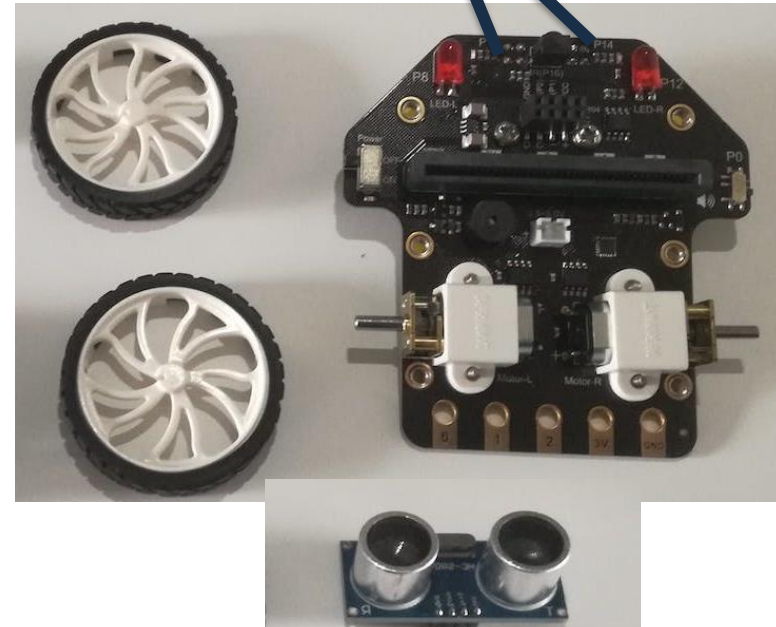
Sensor: left, right

Return Value: 0, 1

Function: read the value of line-tracking sensor on the bottom of Maqueen car.

When detected a black line, Maqueen indicator turns off, the sensor outputs 0;
When detected white color, the indicator turns on, and output 1.

Line tracking sensors



Search...



Basic



Input



Music



Led



Maqueen



IR



Radio



Loops



Logic



Variables



Math



Extensions



Advanced

forever

if

read left line tracking sensor

=

0

and

read right line tracking sensor

=

0

then

motor

all

move

Forward

at speed

50

else

motor

all

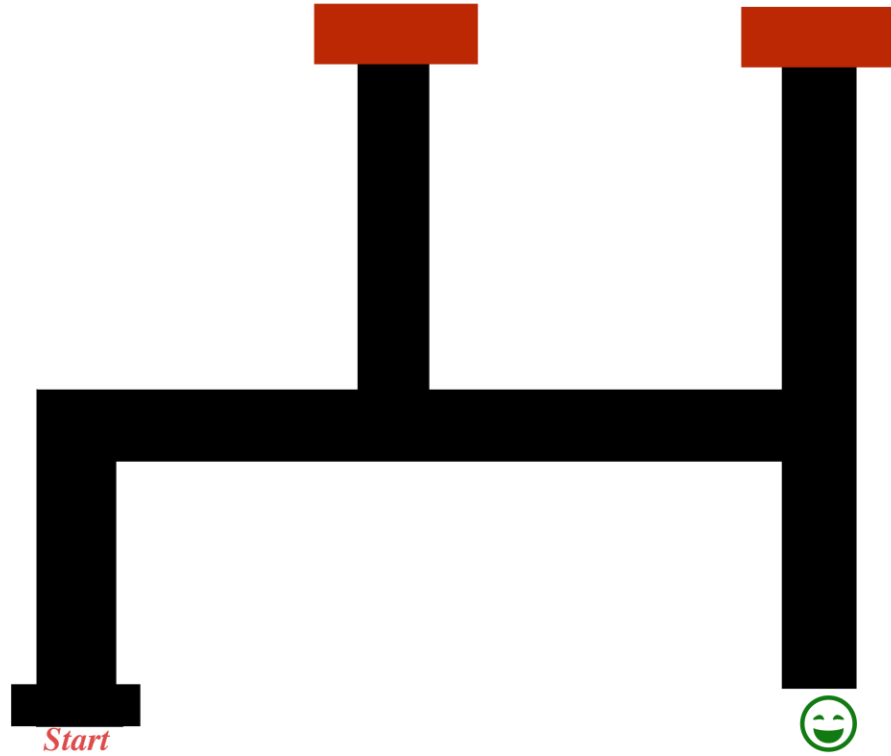
stop

Challenge: 15-20 Minutes



Work together on this

Challenge: GetME Out



Challenge: GetME Out

Challenge Support Sheet



Hint 1: In the code block below, when the Maqueen's line-tracking sensors (left and right) detect the black line, then Maqueen's motor is put to move forward at speed 70. Therefore, when both sensors detect a black line, the robot moves forward at a speed of 70

```
if read left - line tracking sensor == 1 and read right - line tracking sensor == 1 then
  motor all - move forward - at speed 70
```

Hint 2: In the code block below, when the Maqueen's left line-tracking sensor detects white and the right sensor detects the black line, then Maqueen's left motor put to move forward at a speed of 70 and the right motor is put to move forward at speed 0. This means that if the robot detects white on the left sensor and black on the right sensor, then the robot rotates to the left.

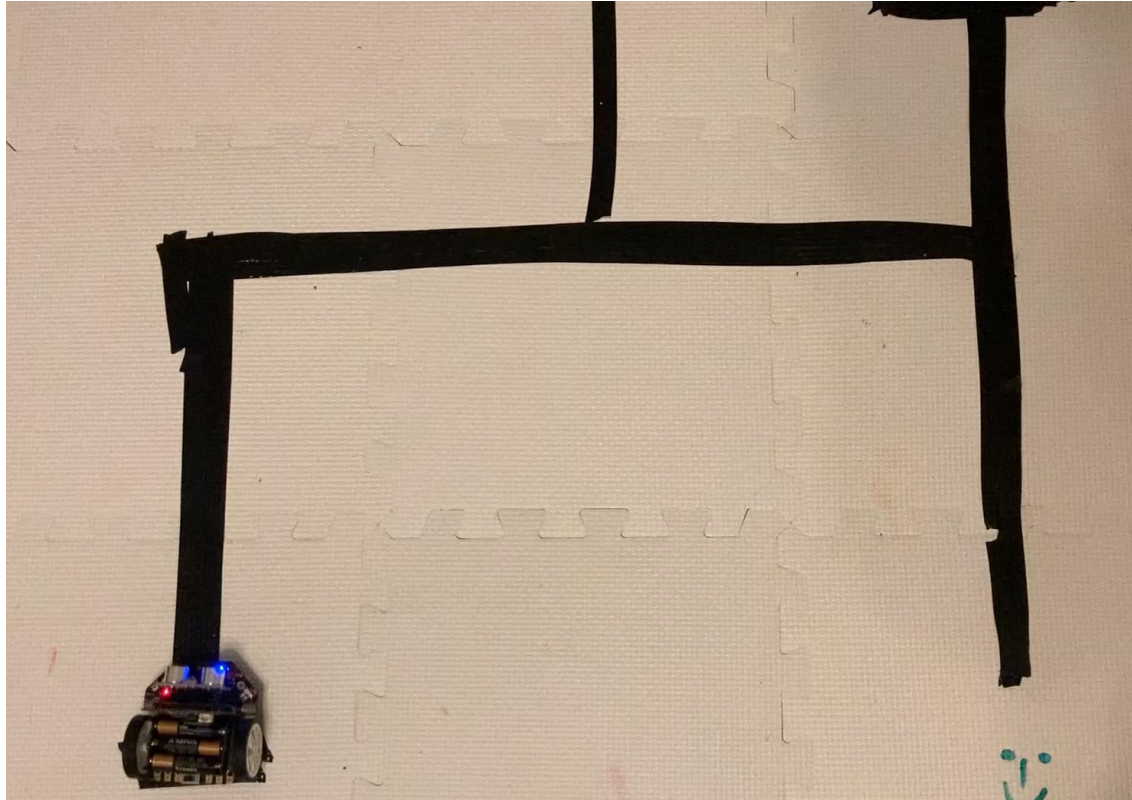
```
if read left - line tracking sensor == 1 and read right - line tracking sensor == 0 then
  motor left - move forward - at speed 70
  motor right - move forward - at speed 0
```

Hint 3: In the code block below, when Maqueen's right line-tracking sensor detects white and the left sensor detects the black line, then Maqueen's right motor put to move forward at a speed 70 and the left motor is put to move forward at speed 0. This means that if the robot detects white on the right sensor and black on the left sensor, then the robot rotates to the right.

```
if read right - line tracking sensor == 1 and read left - line tracking sensor == 0 then
  motor right - move forward - at speed 70
  motor left - move forward - at speed 0
```

Hint 4: In the code block below, when Maqueen's line-tracking right sensor detects white and the left sensor detects white, then maqueen's left motor put to move forward at a speed of 30 and the left motor is put to move backward at speed -30. This means that if the robot detects white on both sensors, then the robot stays in the same place and rotates.

```
if read left - line tracking sensor == 1 and read right - line tracking sensor == 1 then
  motor left - move forward - at speed 30
  motor right - move backward - at speed -30
```



Any Questions?