Maqueen 4.1-MakeCode Graphical Programming Tutorial

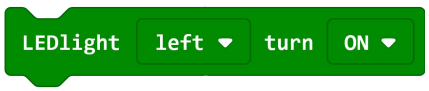
1. Maqueen 4.1-MakeCode Programming Block Function Description

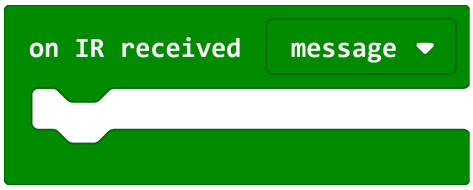
Load the Maqueen Library:

A: Search "dfrobot" at the extension in Makecode and select "Maqueen".

B: Input the following library address at the search bar of Extension:

https://github.com/DFRobot/pxt-maqueen

	**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).
	**Stop Motor** Motor: left, right, all Function: stop the motor, similar to the function of setting motor speed to 0.
	**Control LED** Motor: left, right Status: on, off Function: turn Maqueen's 2 LEDs on/off.
	**Control Servo** Port: S1, S2 Angle: 0~180 degrees Function: control the rotation angle of the servo connected with port S1 or S2.
	**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.

	**Read IR-remote Controller Key Value** Return Value: decimal integer (read the last two digits of the hexadecimal key value of the remote control and convert it to a decimal number). Protocol Type: NEC
	**On IR Received (Event trigger block)** Data Type: decimal integer (read the last two digits of the hexadecimal key value of the remote controller and convert it into a decimal number). Protocol Type: NEC Function: when there is IR data received, store the data into the variable "message" and execute all the codes inside this block.
	**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.

2. Tutorial 01-Motor Controlling

1) Program Effect: Maqueen moves forward 1 second, turn left 1 second, turn right 1 second, move backward and turn right 1 second.

2) Program Link: https://makecode.microbit.org/_MA5ithJL3LMA

3) Graphical Blocks:

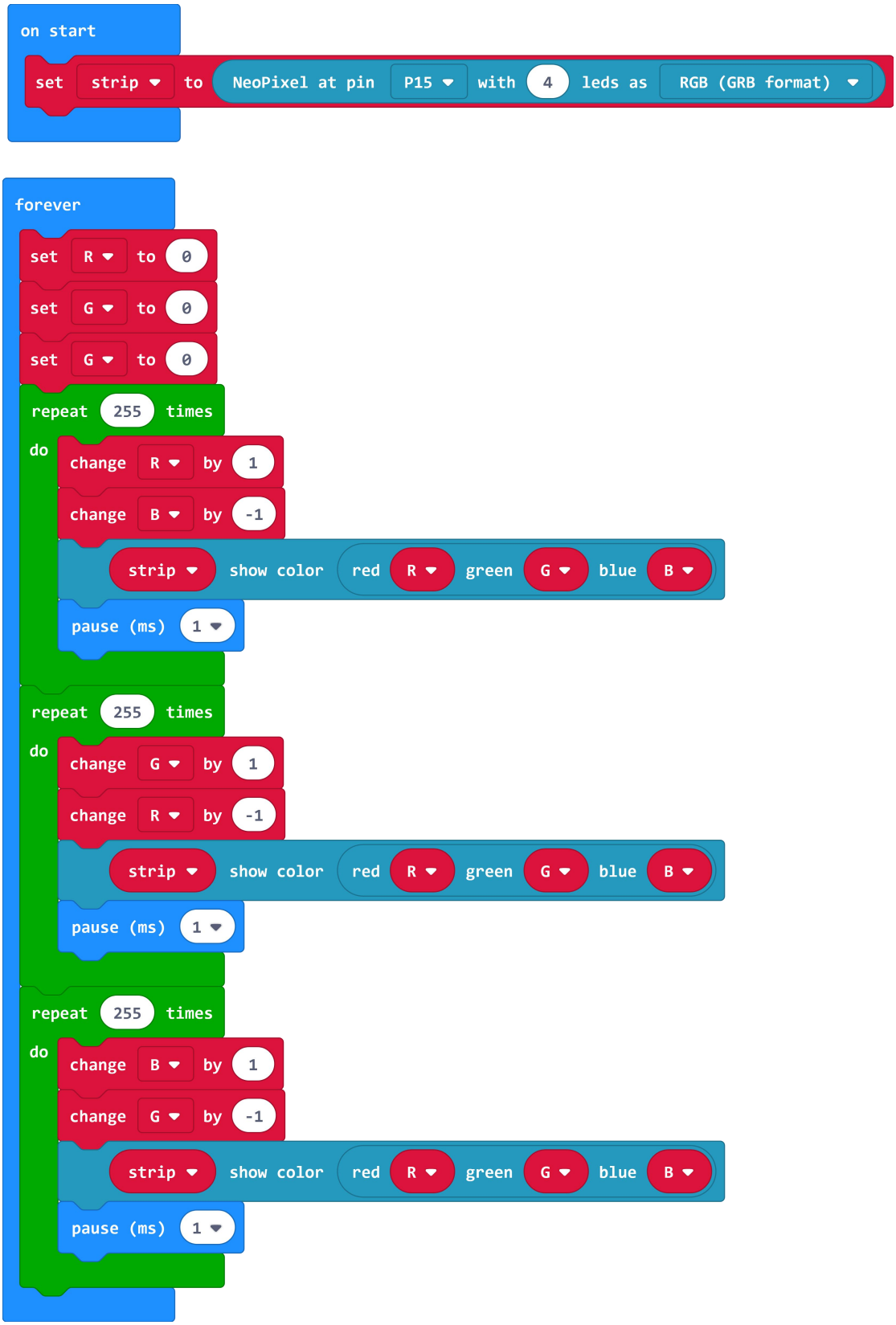
3. Tutorial 02-RGB Colorful Breathing LEDs

1) Program Effect: the RGB ambient lights at the bottom of the Maqueen show a variety of colors to present breathing effect.

2) Load the LED strip library: click "Setting" -> "Extension" -> "Neopixel".

Program Link:: https://makecode.microbit.org/_7t0HFXHesULM

3) Graphical Blocks:

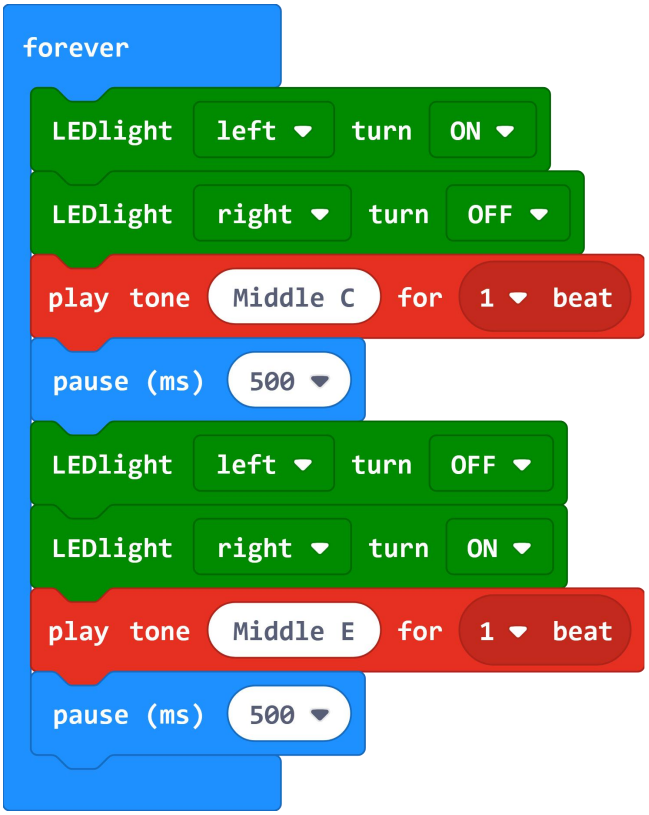

on start
set strip to NeoPixel at pin P15 with 4 leds as RGB (GRB format)
forever
set R to 0
set G to 0
set G to 0
repeat 255 times
do
change R by 1
change B by -1
strip show color red R green G blue B
pause (ms) 1
repeat 255 times
do
change G by 1
change R by -1
strip show color red R green G blue B
pause (ms) 1
repeat 255 times
do
change B by 1
change G by -1
strip show color red R green G blue B
pause (ms) 1

4. Tutorial 03-Flash LED lights

1) Program Effect: the left and right LEDs flash alternately at an interval of 0.5 second. Meanwhile, the buzzer makes two different tones with the flashing frequency.

2) Program Link: https://makecode.microbit.org/_Uk2F3W4Yt3vD

3) Graphical Blocks:

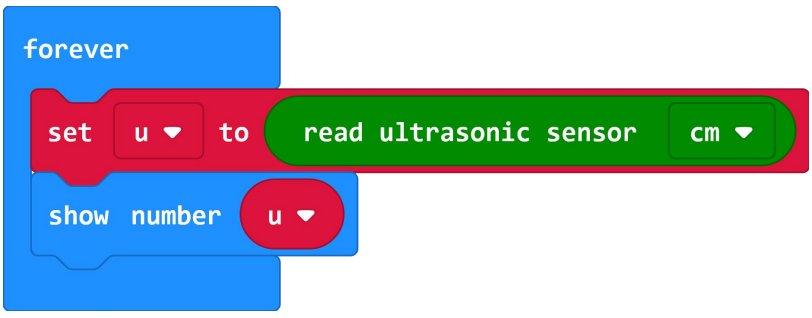


5. Tutorial 04-Ultrasonic Distance Measurement

1) Program Effect: detect the distance between the sensor and obstacle ahead, and display the data on the LED Matrix (unit: cm).

2) Program Link: https://makecode.microbit.org/_F1aHEWVaHgs3

3) Graphical Blocks:

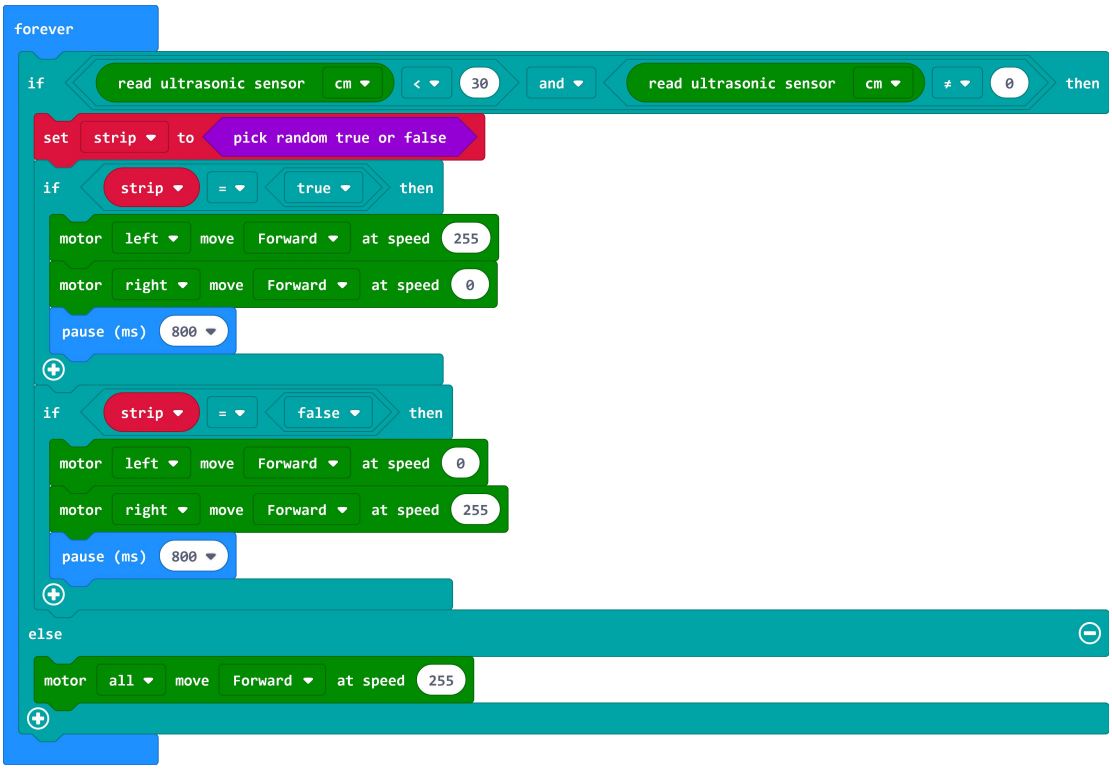


6. Tutorial 05-Ultrasonic Obstacle Avoidance

1) Program Effect: the ultrasonic sensor constantly detect the distance between the Maqueen and obstacle ahead, if it is smaller then 30cm, Maqueen randomly turns left or right to avoid the obstacle.

2) Program Link: https://makecode.microbit.org/_FxFPvxDzVR8P

3) Graphical Blocks:

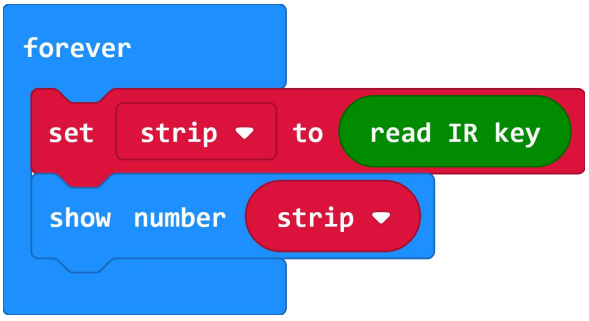


7. Tutorial 07-Read IR key Value

1) Program Effect: press any key on the IR remote controller, the key value that corresponds to the pressed key will be displayed on the LED matrix (show the last two digits of key value in decimal).

2) Program Link: https://makecode.microbit.org/_JUM2X88rJKdv

3) Graphical Blocks:



4. Key Value List

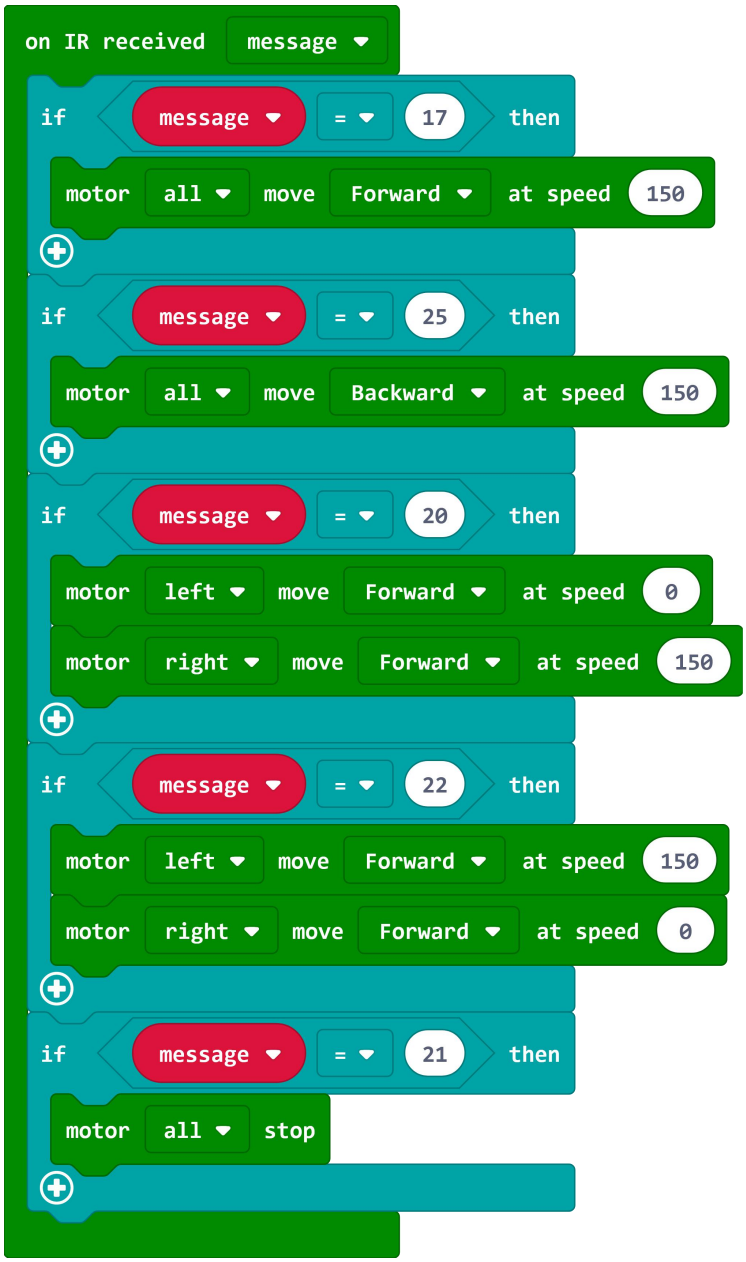
Key	Value (In hexadecimal)	Value (In decimal)
Red Key	0xff00	0
VOL+	0xfe01	1
FUNC/STOP	0xfd02	2
Left Arrow	0xfb04	4
Pause	0xfa05	5
Right Arrow	0xf906	6
Down Arrow	0xf708	8
VOL-	0xf609	9
Up Arrow	0xf50a	10
0	0xf30c	12
EQ	0xf20d	13
ST/REPT	0xf10e	14
1	0xef10	16
2	0xee11	17
3	0xed12	18
4	0xeb14	20
5	0xea15	21
6	0xe916	22
7	0xe718	24
8	0xe619	25
9	0xe51a	26

8. Tutorial 07-IR-controlled Maqueen

1) Program Effect: use the key 2, 8, 4, 6, and 5 on the IR remote controller to operate Maqueen.

2) Program Link: https://makecode.microbit.org/_MxDWYC2bKCtu

3) Graphical Blocks:

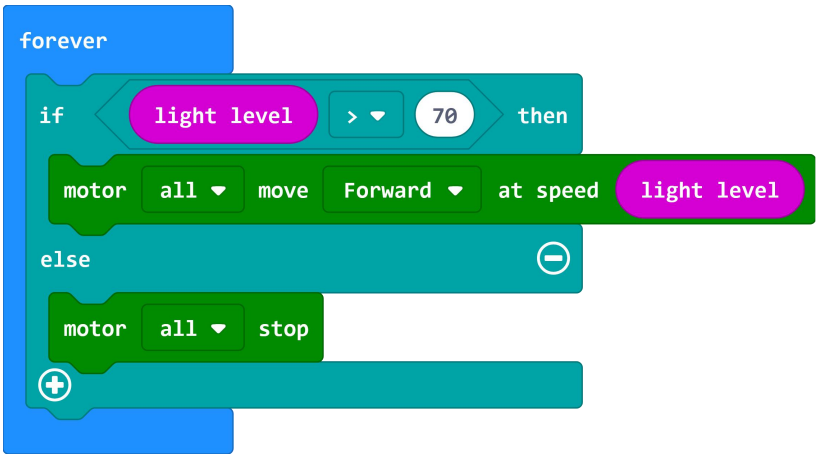

on IR received message
if message = 17 then
motor all move Forward at speed 150
if message = 25 then
motor all move Backward at speed 150
if message = 20 then
motor left move Forward at speed 0
motor right move Forward at speed 150
if message = 22 then
motor left move Forward at speed 150
motor right move Forward at speed 0
if message = 21 then
motor all stop

9. Tutorial 08-Light-operated Sprite

1) Program Effect: as the flashlight illuminates the LEDs on Maqueen, the vehicle starts to move forward. The brighter the light is, the faster Maqueen moves.

2) Program Link: https://makecode.microbit.org/_UsUV6KDWvfcz

3) Graphical Blocks:

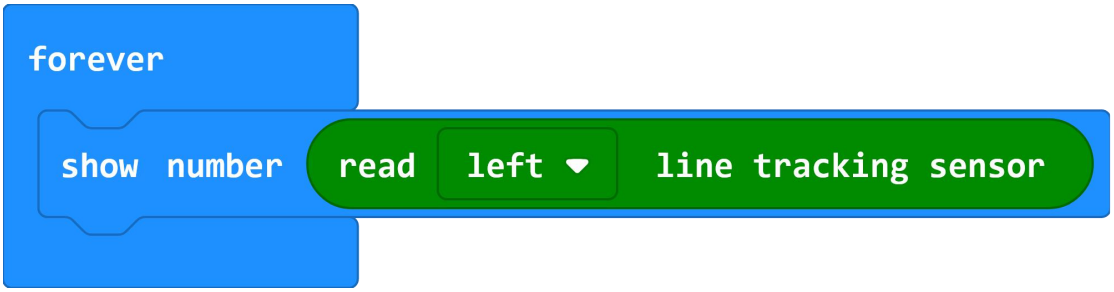


10. Tutorial 09-Read Line-tracking Sensor

1) Program Effect: when Maqueen’ s line-tracking sensor is put on the black line, the sensor outputs 0, and display 0 on the micro:bit LED matrix; if put on white area, output 1 and display 1 on the LED matrix.

2) Program Link: https://makecode.microbit.org/_38mPyj9Rq69q

3) Graphical Blocks:

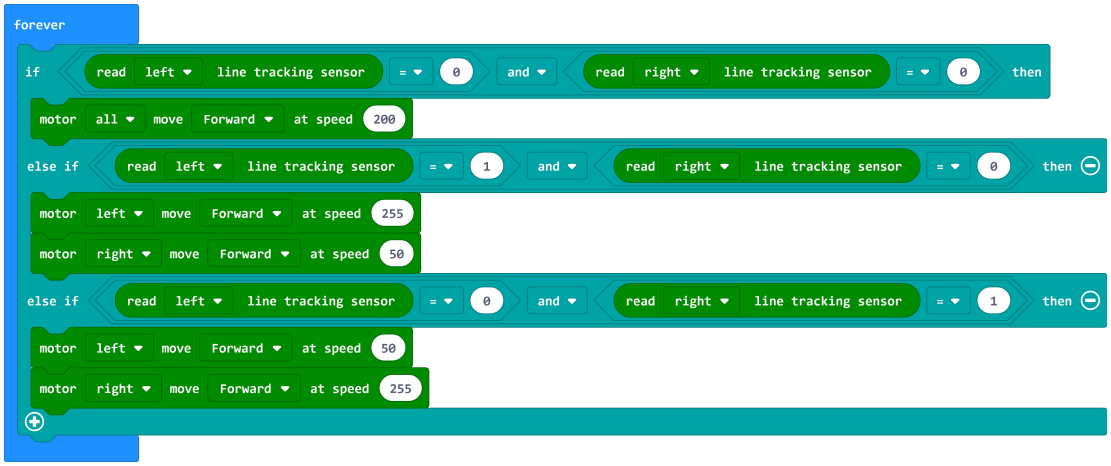


11. Tutorial 10-Line Tracking

1) Program Effect: Maqueen drives along the black line on the map. If you don’ t have a map, you can make one using black adhesive tape.

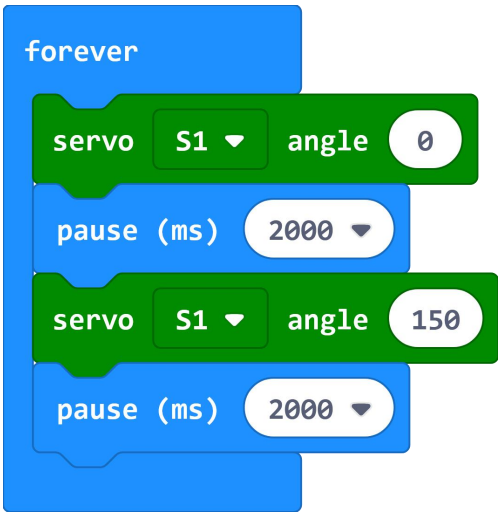
2) Program Link: https://makecode.microbit.org/_CWxe2mRJ2KPF

3) Graphical Blocks:

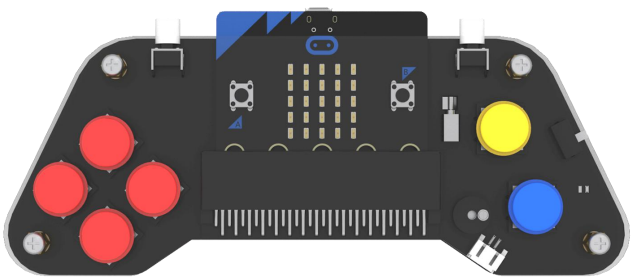


12. Tutorial 11-Driving Servo

1) Program Effect: the servo repeatedly rotates from 0 to 150 degrees.
2) Program Link: https://makecode.microbit.org/_5Te7D33q3UoL
3) Graphical Blocks:



13. Tutorial 12-Micro:bit GamePad



1) Program Effect: use the micro:bit gamePad to operate Maqueen.

Load the gamePad library: https://github.com/DFRobot/pxt-gamePad

Program for gamePad: https://makecode.microbit.org/_49mJKYK4V8c0

Program for Maqueen: https://makecode.microbit.org/_d4D02s0uX6da