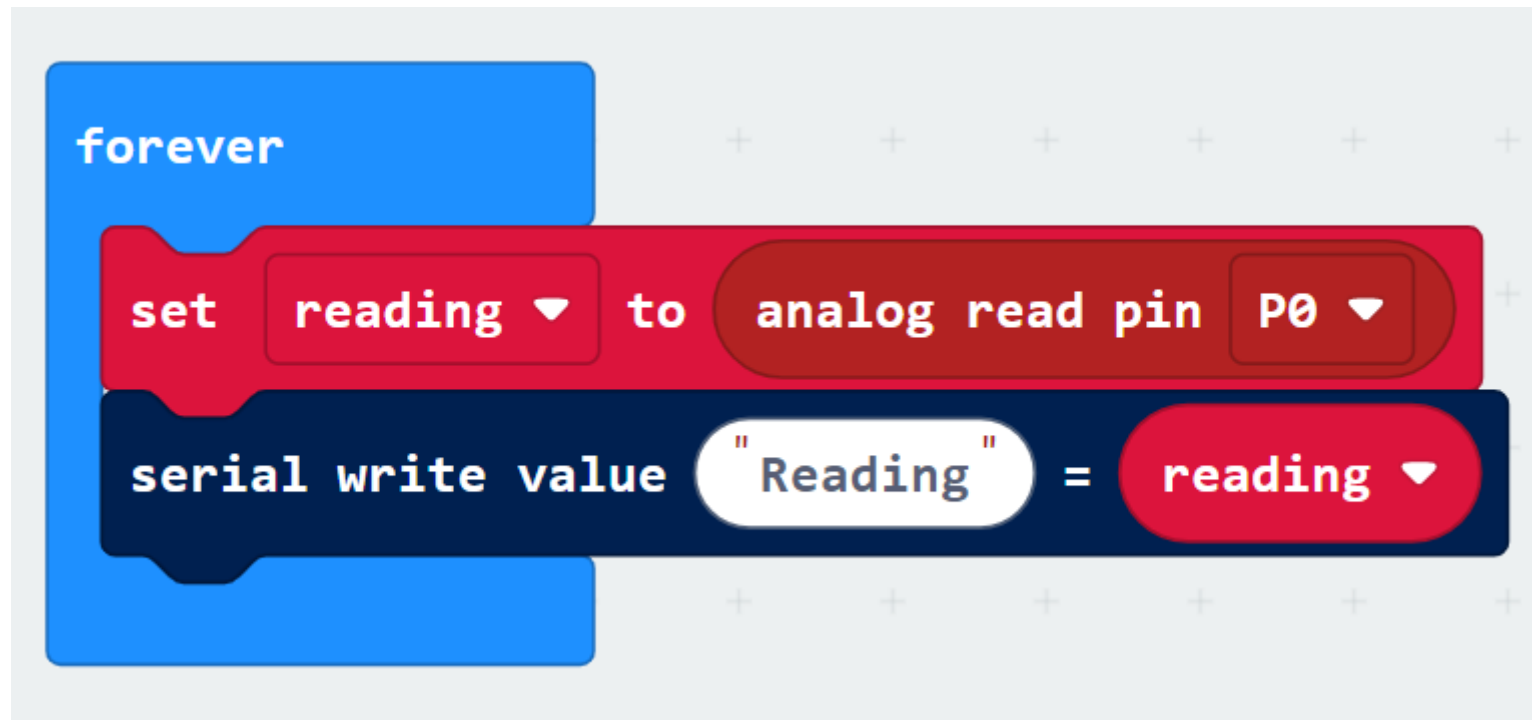


# Group 1

# Analog Input



```
forever
  set reading to analog read pin P0
  serial write value "Reading" = reading
```

The image shows a Scratch code editor snippet. A blue 'forever' loop block contains two blocks. The first is a red 'set' block with 'reading' as the variable and 'analog read pin P0' as the value. The second is a dark blue 'serial write value' block with the text '"Reading" =' and the 'reading' variable as the value to be written.

## Temperature Sensor

- Measures temperature
- Test idea: loosely hold the sensor inside your hands to warm it – do not squeeze/crush the sensor.

## Sound Sensor

- Measures sound level
- Test idea: Talk into it – remember, there will be background noise all the time.

## Light Sensor

- Measures light level
- Test idea: Cover the sensor with your hand to make it darker.

## UV Light Sensor

- Measures the level of UV (Ultra-Violet) light.
- Test idea: Shine a UV torch onto the sensor

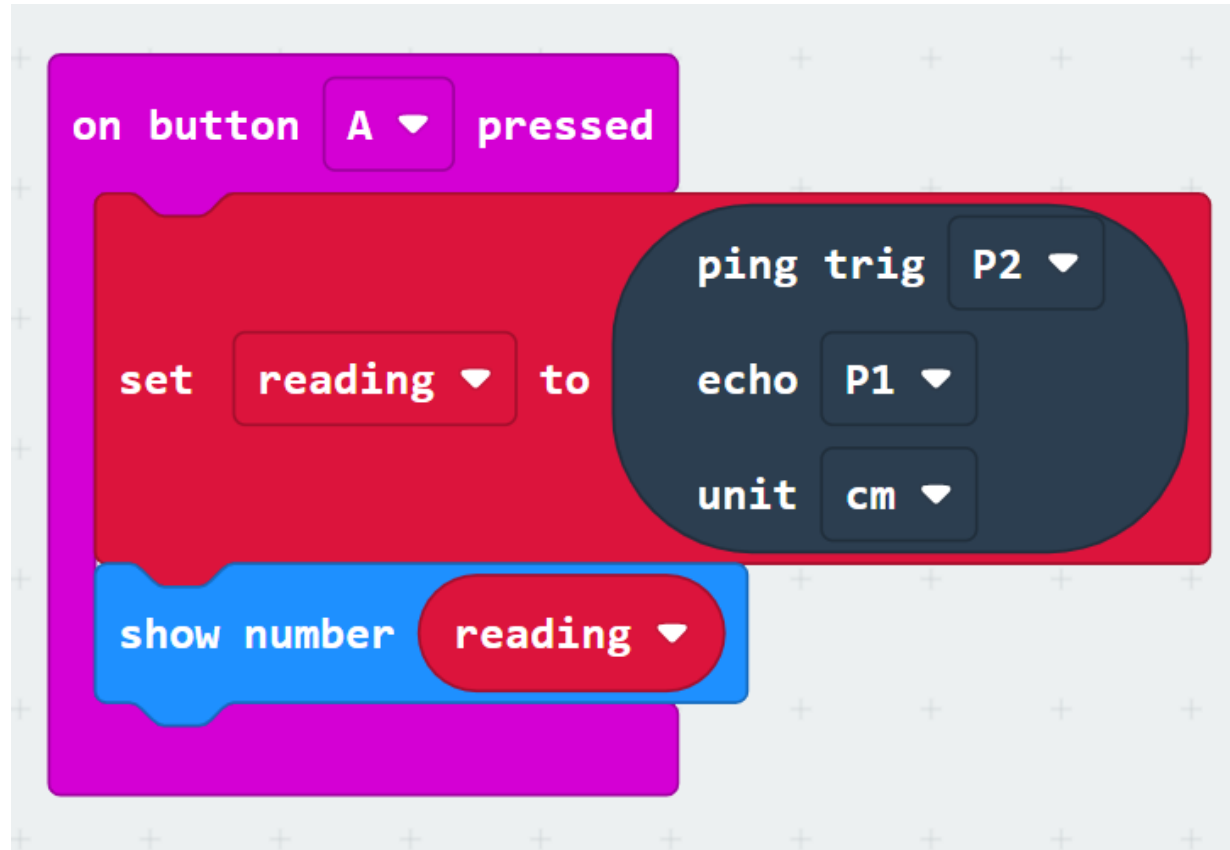
## Steam/Humidity Sensor

- Measures water in the air
- Test idea: We can 'trick' this sensor by putting a finger on it – your skin contains water.

# Group 2



# Ultrasonic Sensor

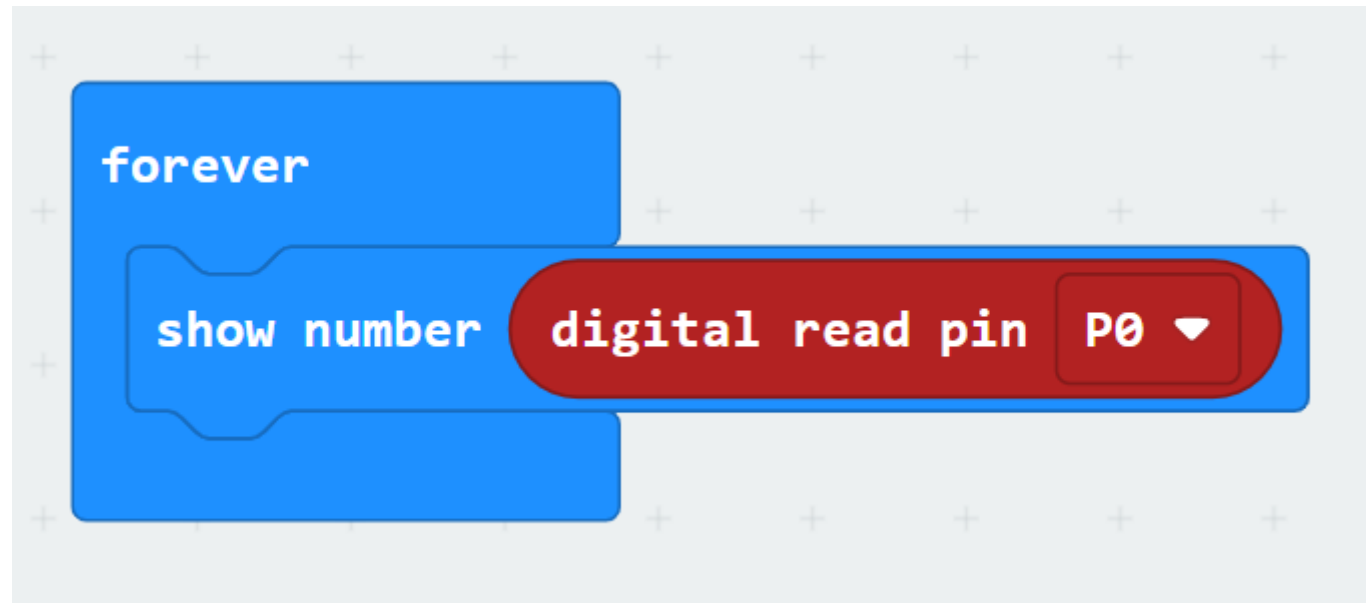


Needs sonar extension

## Ultrasonic Sensor

- Uses sound to measure distance to obstacles
- Test idea: Have the sensor facing down at the table at different heights.

# Digital Input



## PIR Sensor

- Detects if there is movement.
- Test idea: Have the sensor on the table, then move it, and repeat to see reading changes. This component is slow to respond.

## IR (Infra-Red) Sensor

- Detects if there is an obstacle.
- Test idea: Point the sensor at the table, move it closer and further from the table to see readings change. It is set to see objects closer than approximately 10cm.

## Shake Sensor

- Detects if it is shaken.
- Test idea: Carefully shake the sensor, then put it down to reset. Repeat to see the readings change.

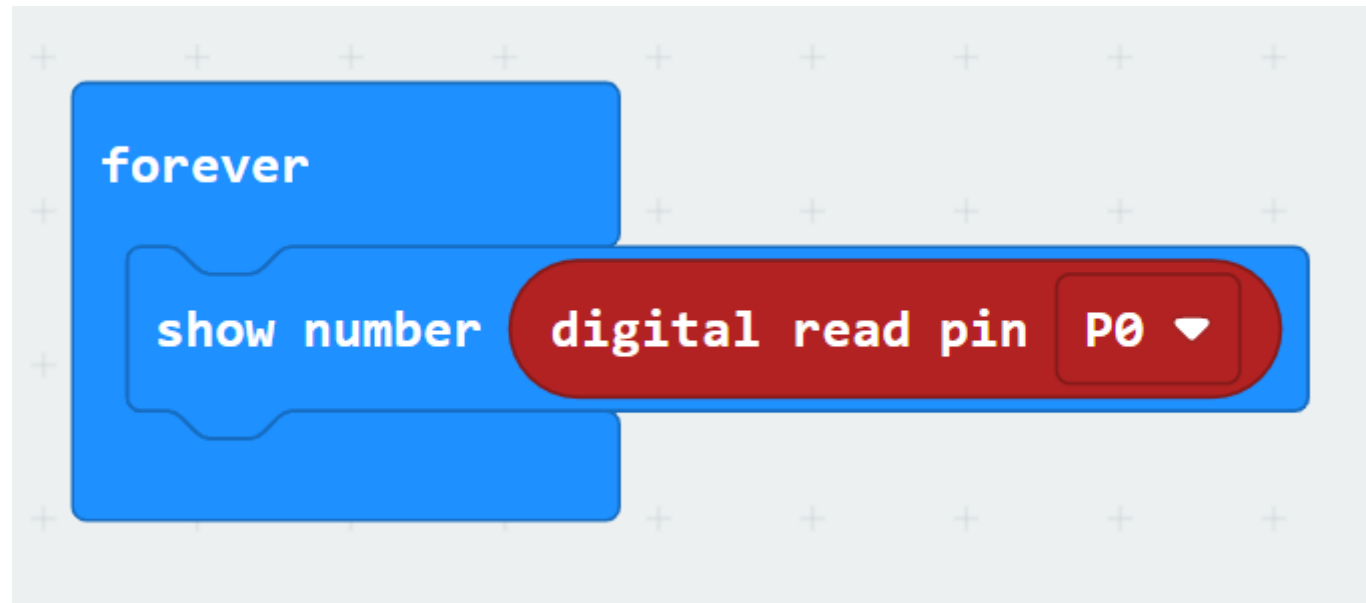
## Tilt Sensor

- Detects if it is tilted in one direction.
- Test idea: Hold the sensor level, then tilt and hold in different positions. The readings will change to show you which way the tilt sensor works.

# Group 3



# Digital Input



## Crash/Bumper Sensor

- Detects if the sensor has touched an obstacle
- Test idea: Press your finger on and off the sensor to see the readings.

# Analog Input

```
forever  
  set reading to analog read pin P0  
  serial write value "Reading" = reading
```

## Pressure Sensor

- Measures how hard you press the sensor
- Test idea: Lay the sensor on the table and watch the graph as you press on it and let go.

## Touch Button Sensor

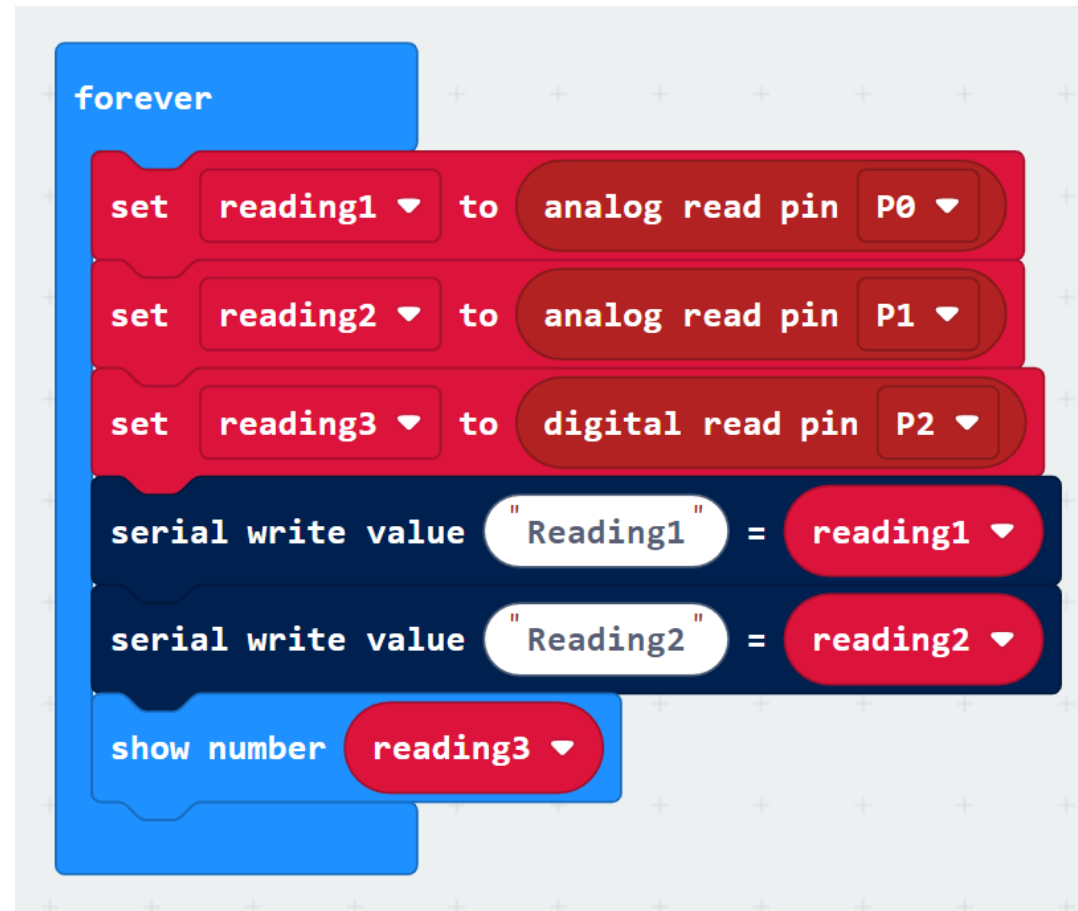
- Detects if the sensor is touched
- Test idea: Press your finger on and off the sensor to see the readings.

## Magnetic Sensor

- Detects if the sensor is near a magnet
- Test idea: Move the sensor towards the red part of the magnet. You will need to get very close but try not to touch it.

# Group 4

# Joystick



```
forever
  set reading1 to analog read pin P0
  set reading2 to analog read pin P1
  set reading3 to digital read pin P2
  serial write value "Reading1" = reading1
  serial write value "Reading2" = reading2
  show number reading3
```

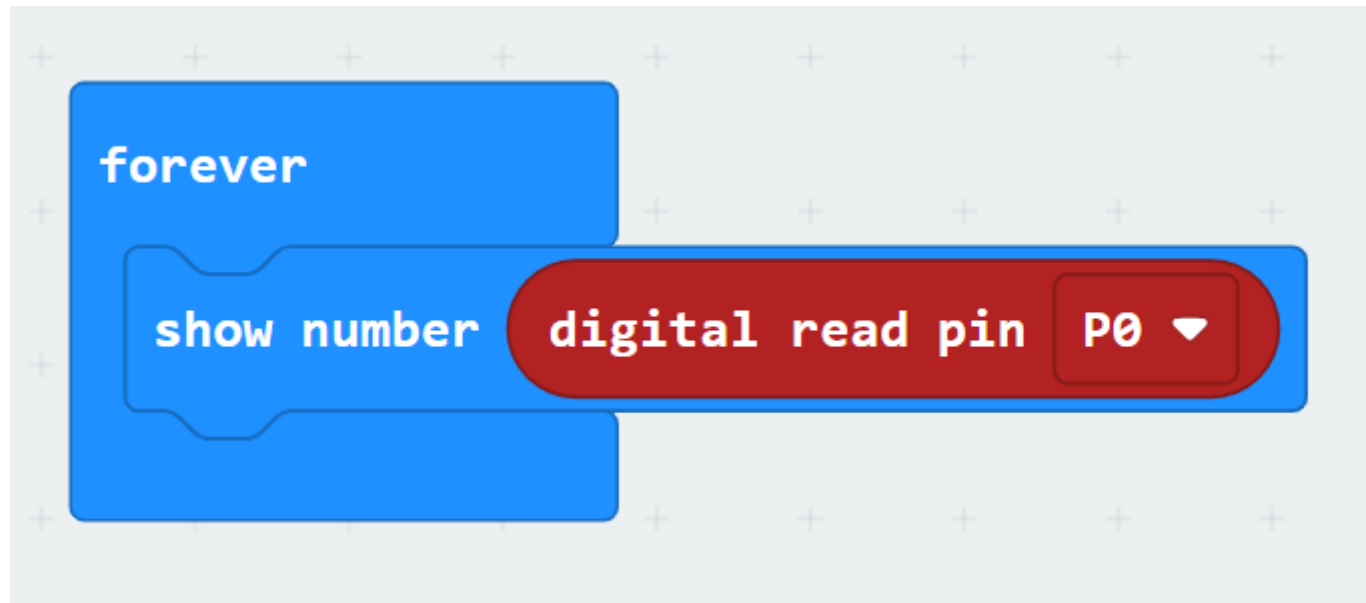
The image shows a Scratch code block for a joystick. It is a 'forever' loop containing several blocks: three 'set' blocks for 'reading1', 'reading2', and 'reading3', two 'serial write value' blocks, and one 'show number' block. The 'set' blocks use 'analog read pin' for P0 and P1, and 'digital read pin' for P2. The 'serial write value' blocks use the 'reading1' and 'reading2' variables. The 'show number' block uses the 'reading3' variable.



## Joystick

- Measures direction of joystick both up/down and left/right. Can also be pressed like a button.

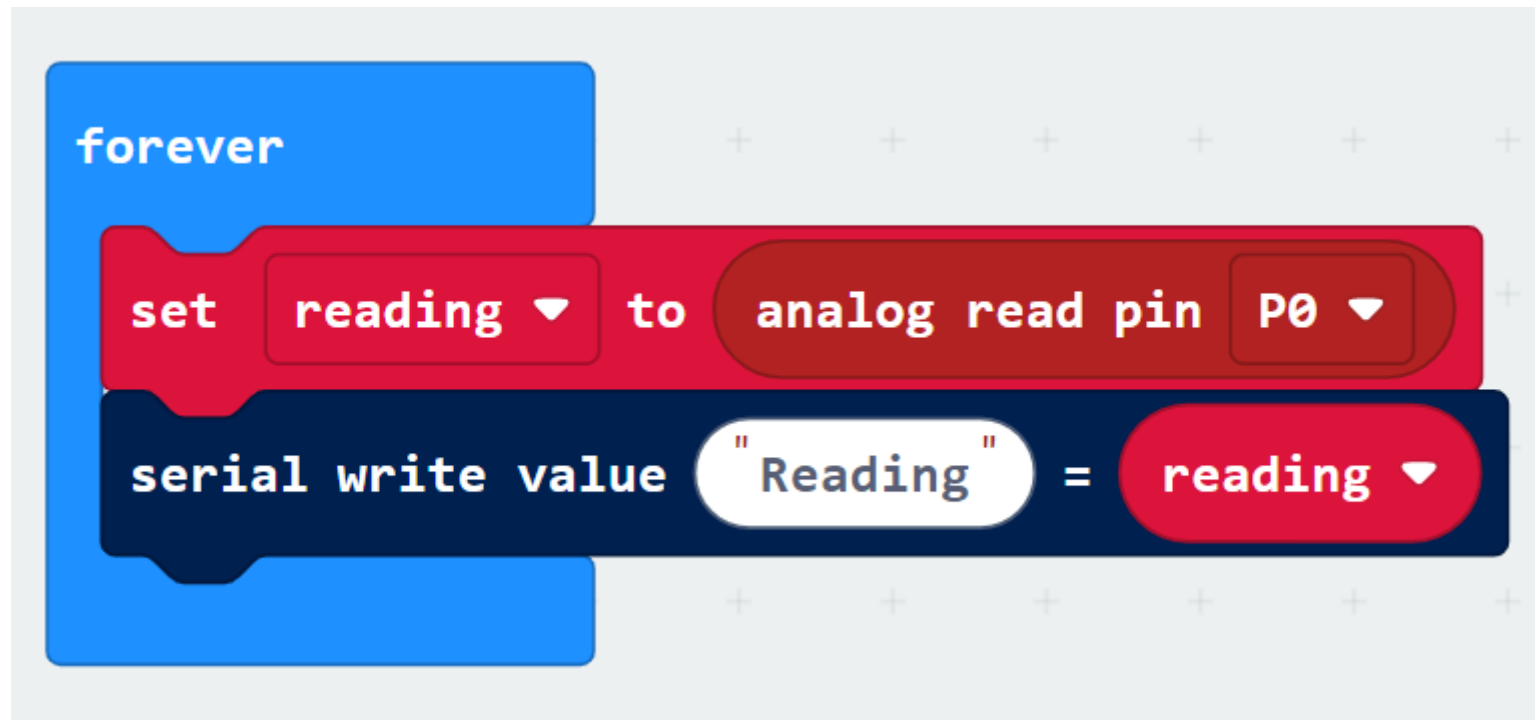
# Digital Input



## Button

- Detects if it is pressed down or not.

# Analog Input



```
forever
  set reading to analog read pin P0
  serial write value "Reading" = reading
```

The image shows a Scratch code editor snippet. A blue 'forever' loop block contains two blocks. The first is a red 'set' block with 'reading' as the variable and 'analog read pin P0' as the value. The second is a dark blue 'serial write value' block with the text '"Reading" = reading'.

## Rotational Switch/Dial

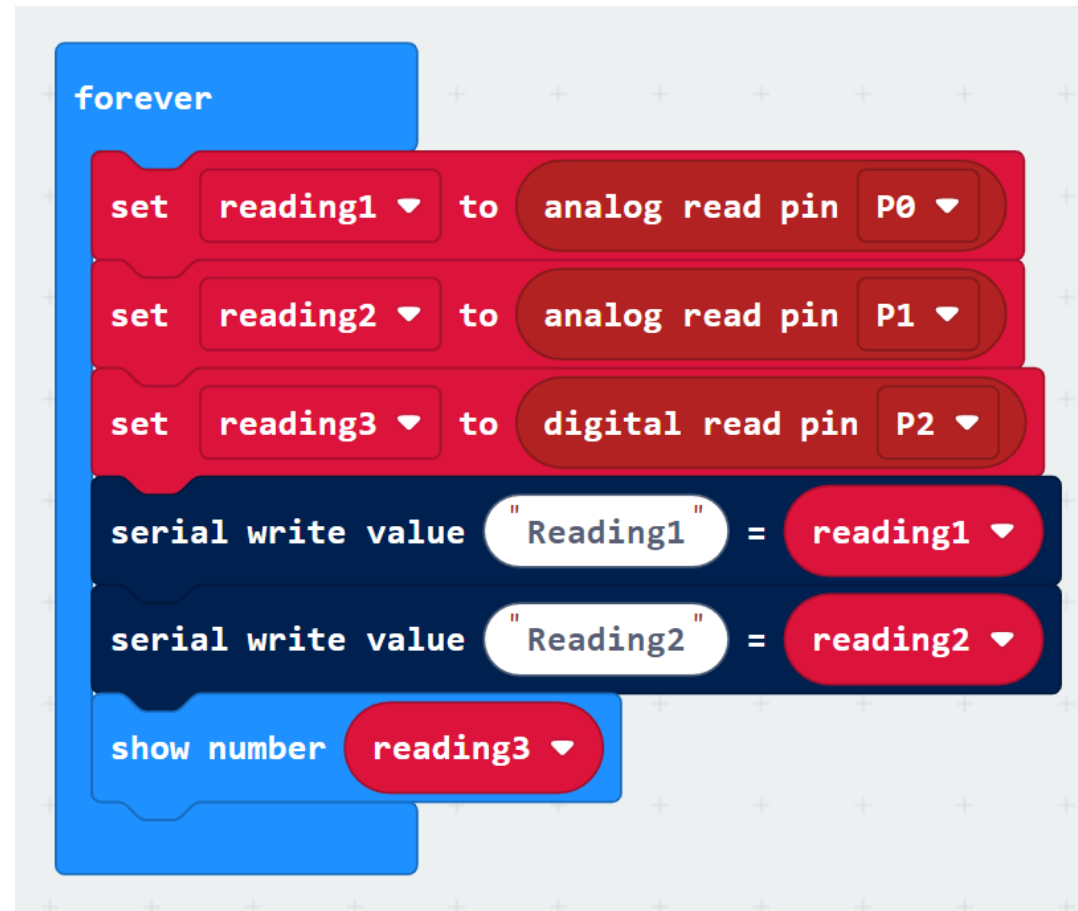
- Measures how far the dial/switch has been rotated.
- Test idea: Turn the switch to different positions to see the change in readings.

# Reed Sensor / Magnetic Switch

- Detects a magnetic field
- Test idea: Hold either side of the magnet near to the component – remember, they don't need to touch.

# Group 5

## RGB LED



```
forever
  set reading1 to analog read pin P0
  set reading2 to analog read pin P1
  set reading3 to digital read pin P2
  serial write value "Reading1" = reading1
  serial write value "Reading2" = reading2
  show number reading3
```

The image shows a Scratch code editor with a 'forever' loop block. Inside the loop, there are three 'set' blocks: 'set reading1 to analog read pin P0', 'set reading2 to analog read pin P1', and 'set reading3 to digital read pin P2'. Below these are two 'serial write value' blocks: 'serial write value "Reading1" = reading1' and 'serial write value "Reading2" = reading2'. At the bottom of the loop is a 'show number reading3' block.



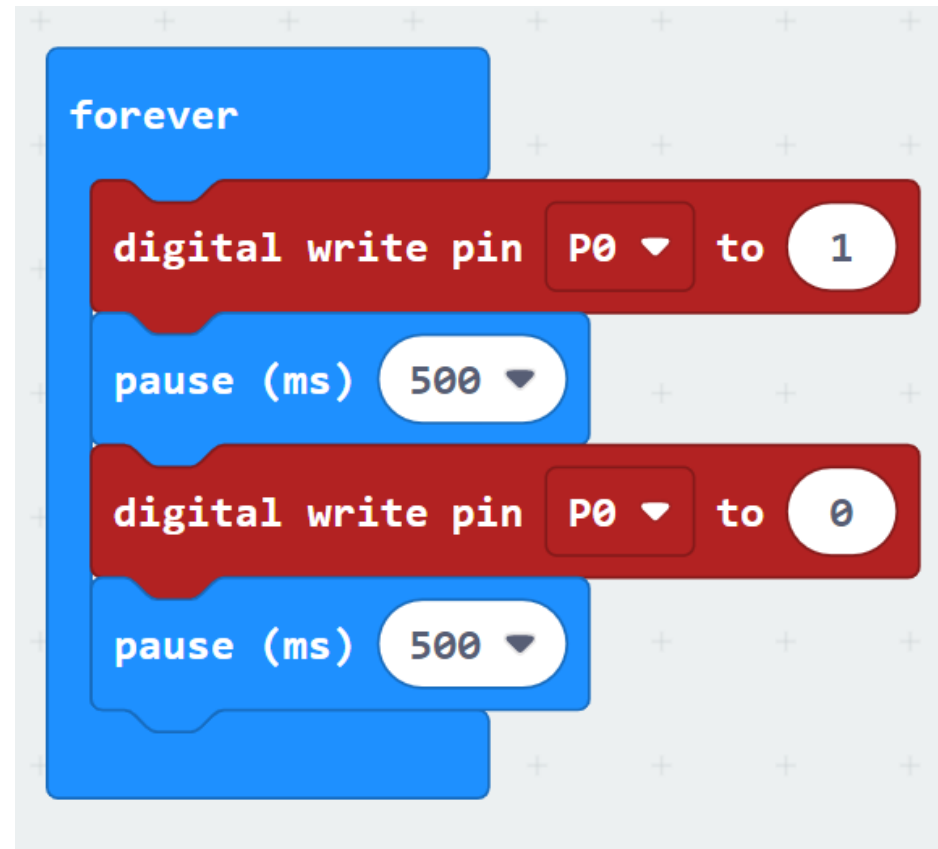
## RGB LED

- A light that can be set to different colours.

# Analog Output



# Digital Output



```
forever
  digital write pin P0 to 1
  pause (ms) 500
  digital write pin P0 to 0
  pause (ms) 500
```

The image shows a Scratch code editor snippet. It features a blue 'forever' loop block containing four blocks: a red 'digital write pin' block with 'P0' selected in a dropdown and '1' in a circle; a blue 'pause (ms)' block with '500' in a circle; another red 'digital write pin' block with 'P0' selected and '0' in a circle; and a final blue 'pause (ms)' block with '500' in a circle. The background is a light gray grid.

# White LED

- Can only produce a white light.

# Red LED

- Can only produce a red light.

# Super Bright LED

- Can only produce a yellow/white light.
- **WARNING:** Very bright – do not look at directly.

## Buzzer

- Can produce sound.
- Can be VERY loud so do not hold it near your ear.

# Servo



```
forever
  set servo P0 angle to 0°
  pause (ms) 2000
  set servo P0 angle to 90°
  pause (ms) 2000
  set servo P0 angle to 180°
  pause (ms) 2000
  set servo P0 angle to 90°
  pause (ms) 2000
```

The image shows a Scratch code block for a servo motor. It is a 'forever' loop containing a sequence of 'set servo' and 'pause (ms)' blocks. The servo is set to 0 degrees, paused for 2000ms, then 90 degrees, paused for 2000ms, then 180 degrees, paused for 2000ms, then 90 degrees, and finally paused for 2000ms. The servo is identified as 'P0'.

Group 5

Needs servo extension



## Servo

- This has a rotating arm
- Most servos can rotate between  $0^\circ$  and  $180^\circ$ .