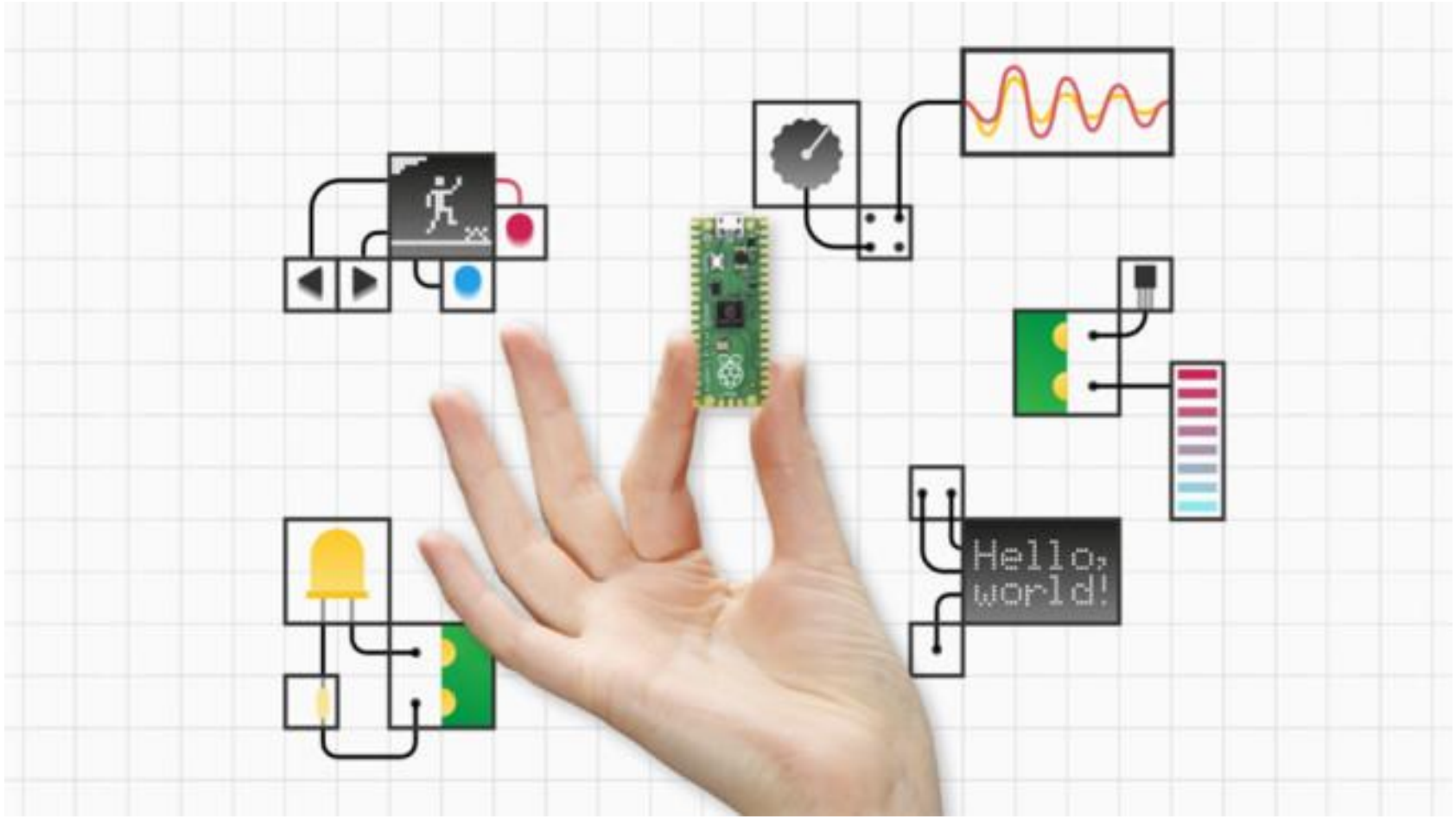
การเขียนโปรแกรม Raspberrypi Pico

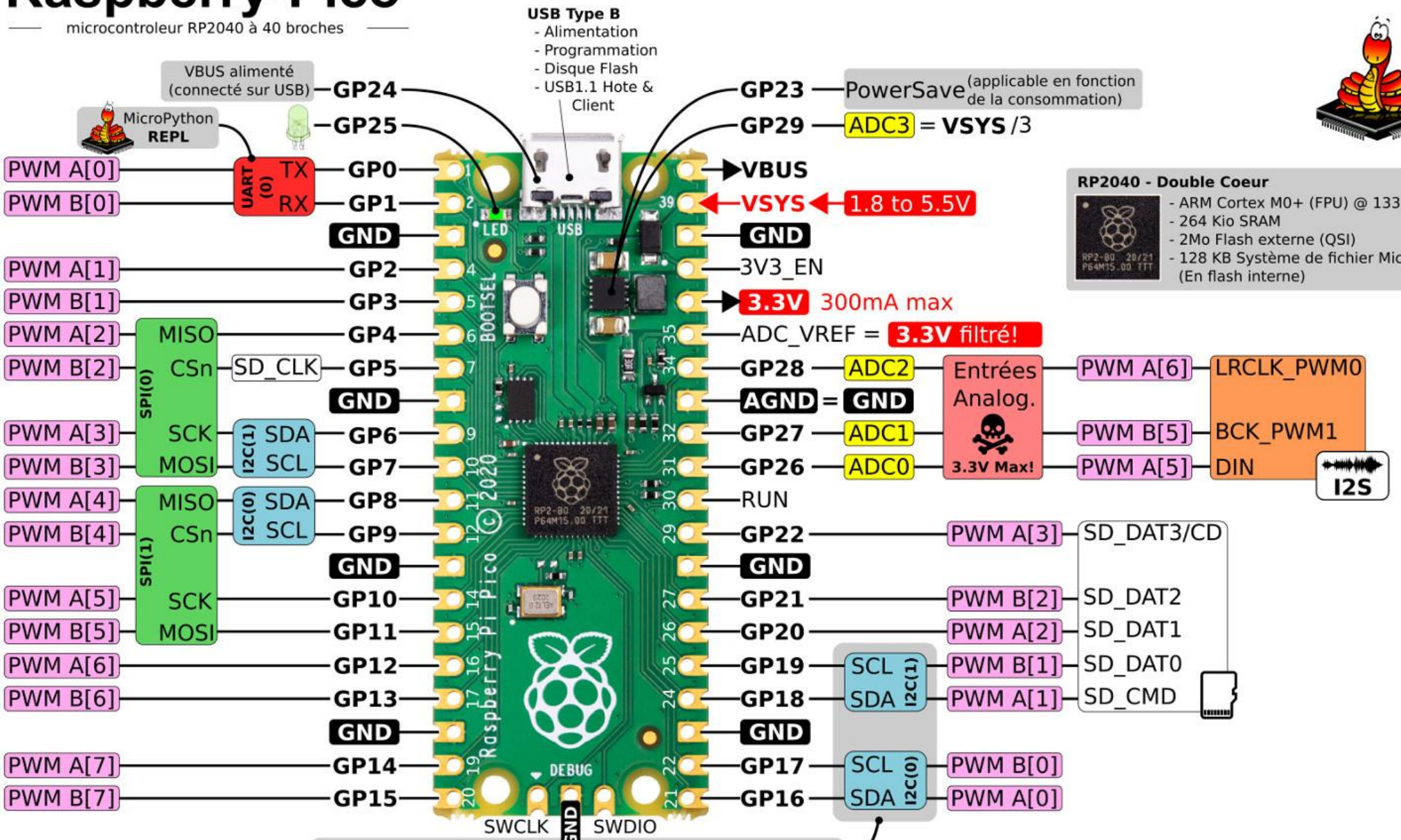
อ.เหน่ง + อ.หนึ่ง

What is Raspberry Pi Pico ?



Raspberry-Pico

microcontroleur RP2040 à 40 broches



RP2040 - Double Coeur

- ARM Cortex M0+ (FPU) @ 133 Mhz
- 264 Kio SRAM
- 2Mo Flash externe (QSI)
- 128 KB Système de fichier MicroPython (En flash interne)

Position alternative pour I2C

Voici une des nombreuses positions alternatives pour I2C(0) et I2C(1).
Un tel bus peut être créé en ajoutant les broches sda et scl souhaitées.

```
i2c_0 = I2C( 0, sda=Pin(16), scl=Pin(17) )
i2c_1 = I2C( 1, sda=Pin(18), scl=Pin(19) )
```

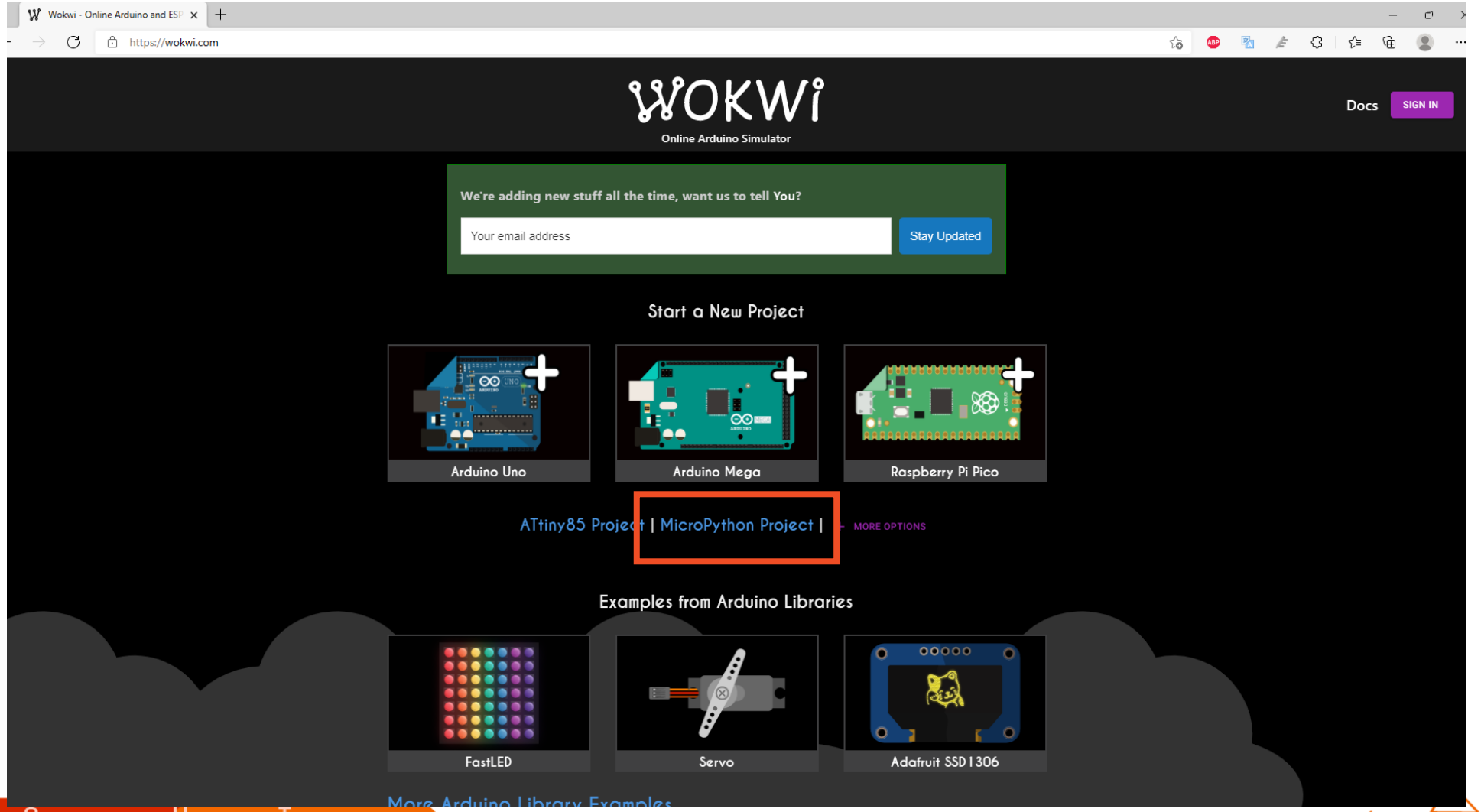

shop.mchobby.be

V0.2

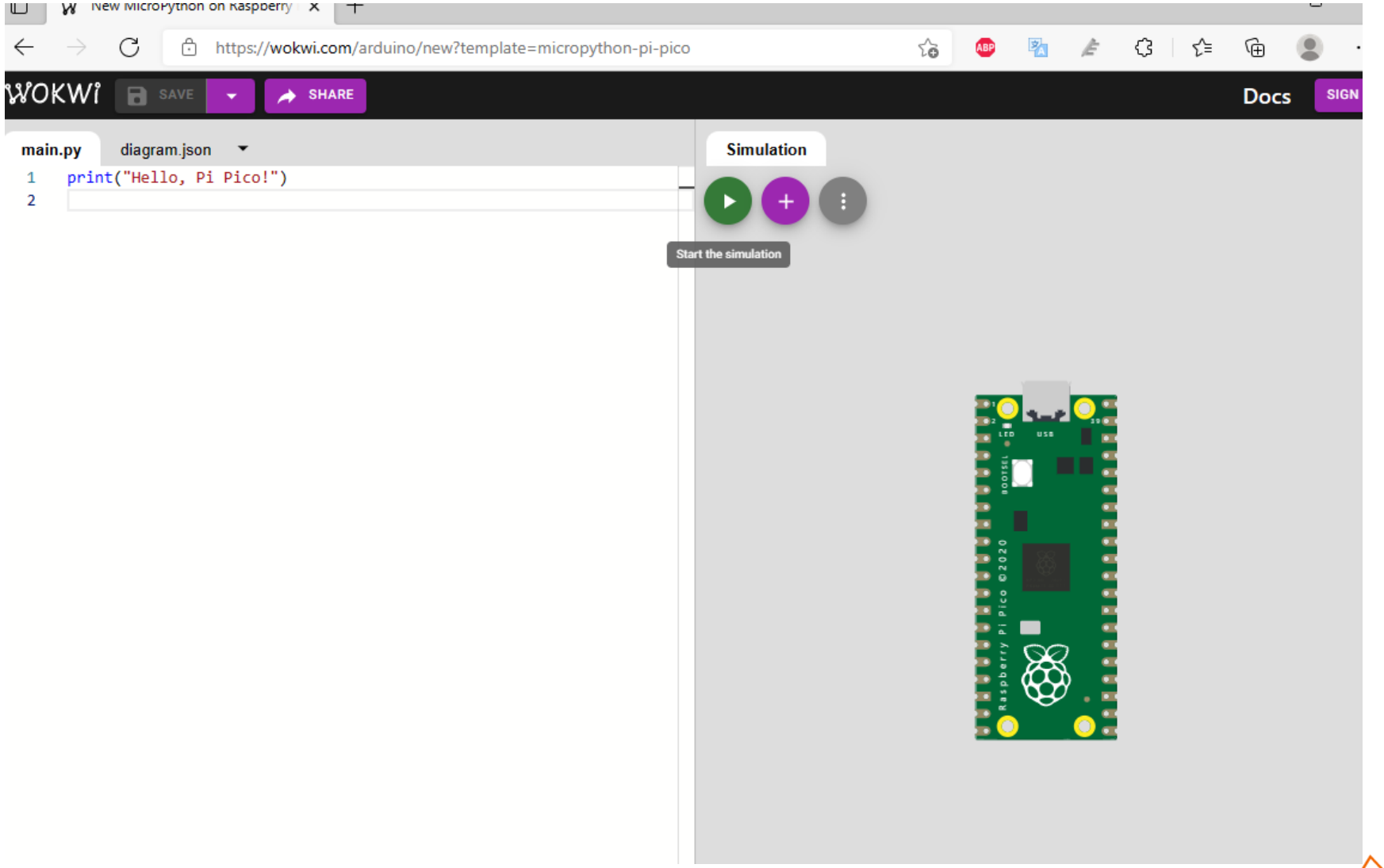
Laboratory 1

การใช้งาน Raspberry Pi Pico Simulation ด้วย MicroPython บน Wokwi

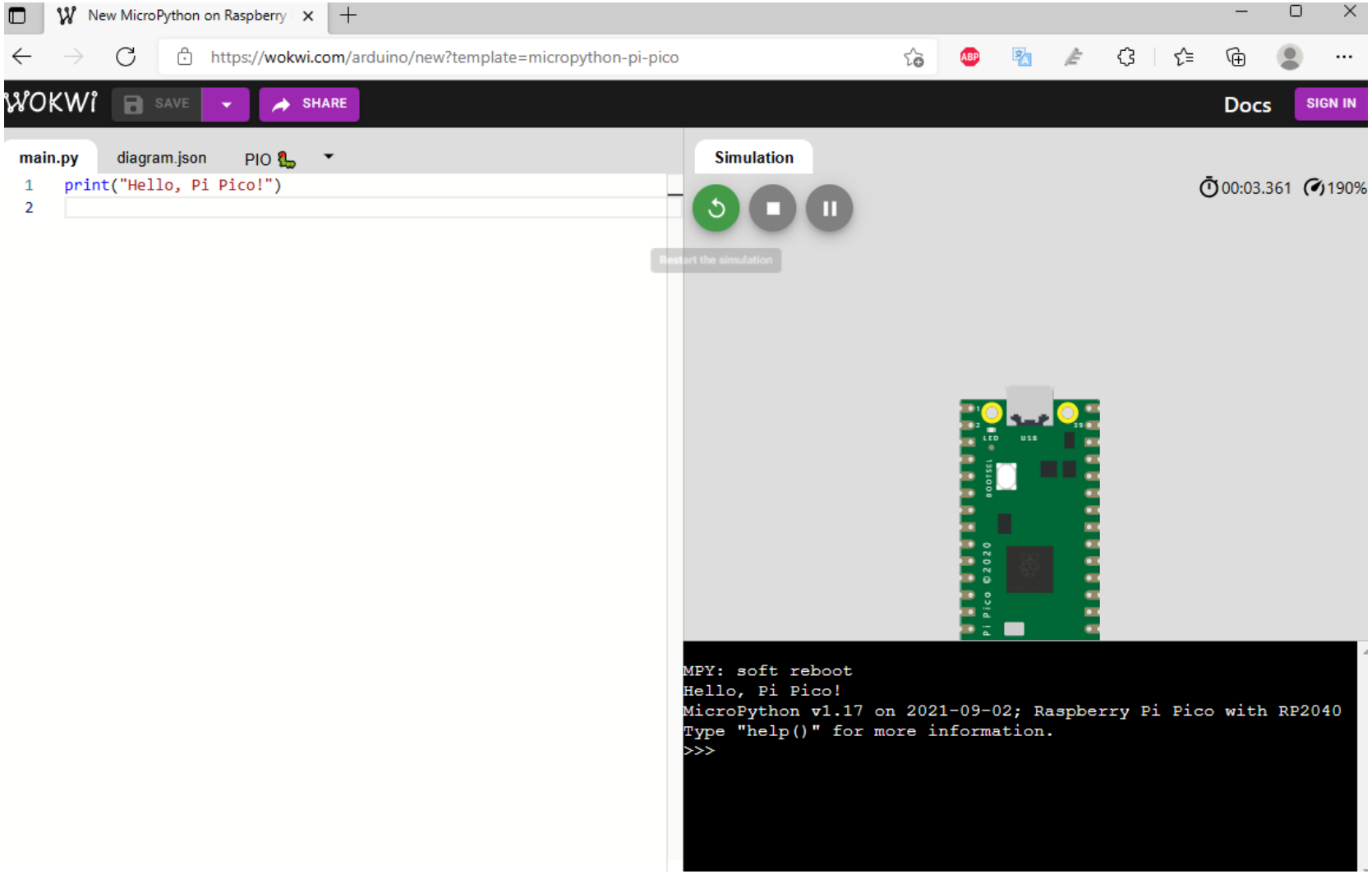
Wokwi Simulator ไปที่เว็บไซต์ www.wokwi.com จากนั้นเลือก "MicroPython Project"



ปรากฏหน้าต่าง Wokwi Simulator สำหรับ Pi Pico มา

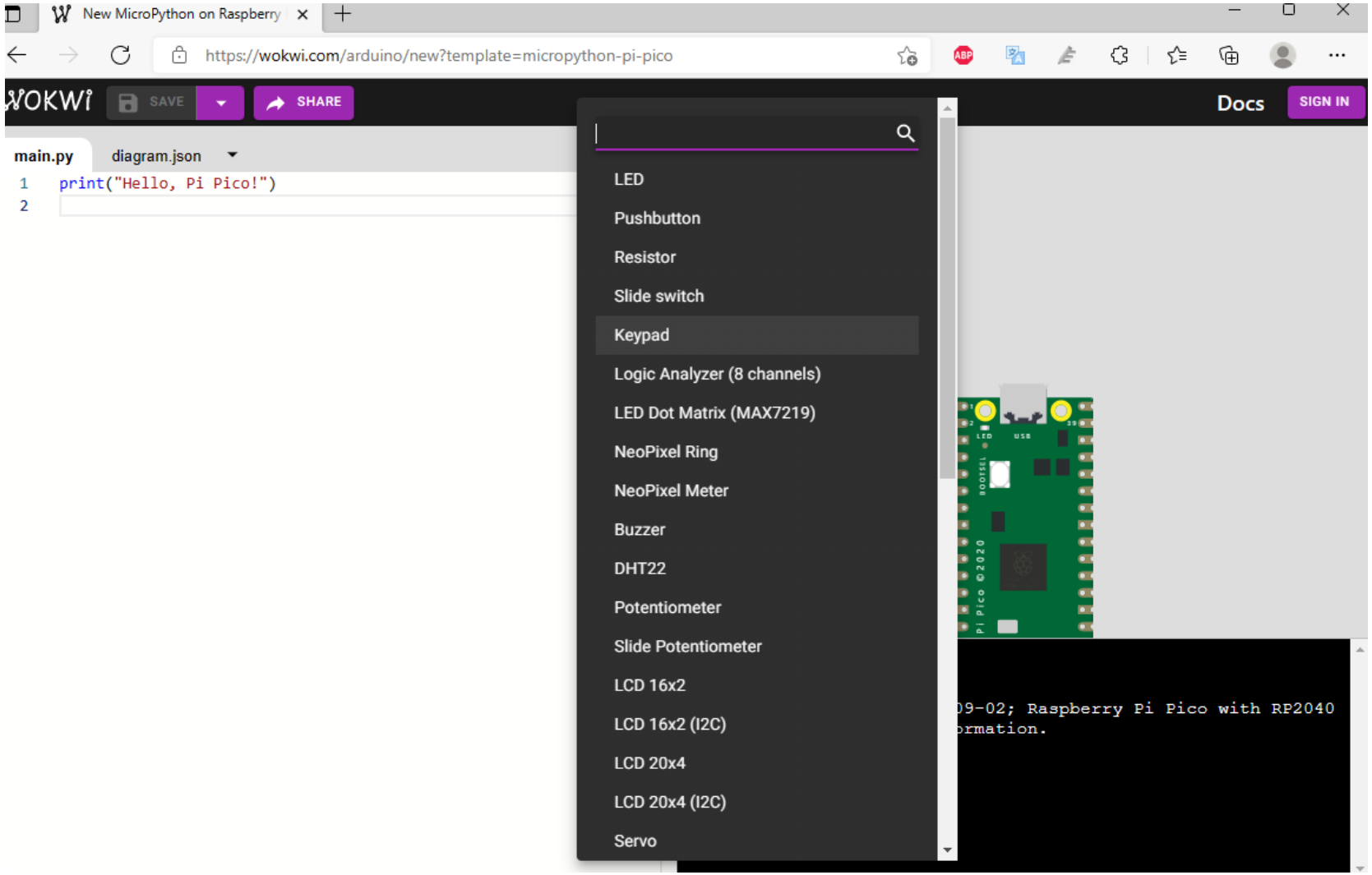


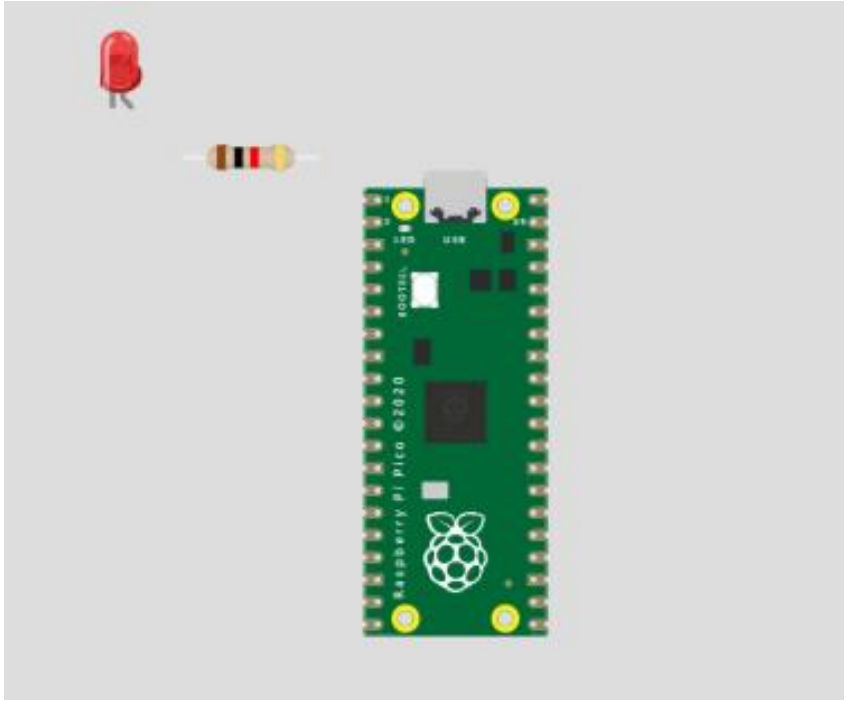
ทดลองกดปุ่ม Play เพื่อทำการรันโค้ด

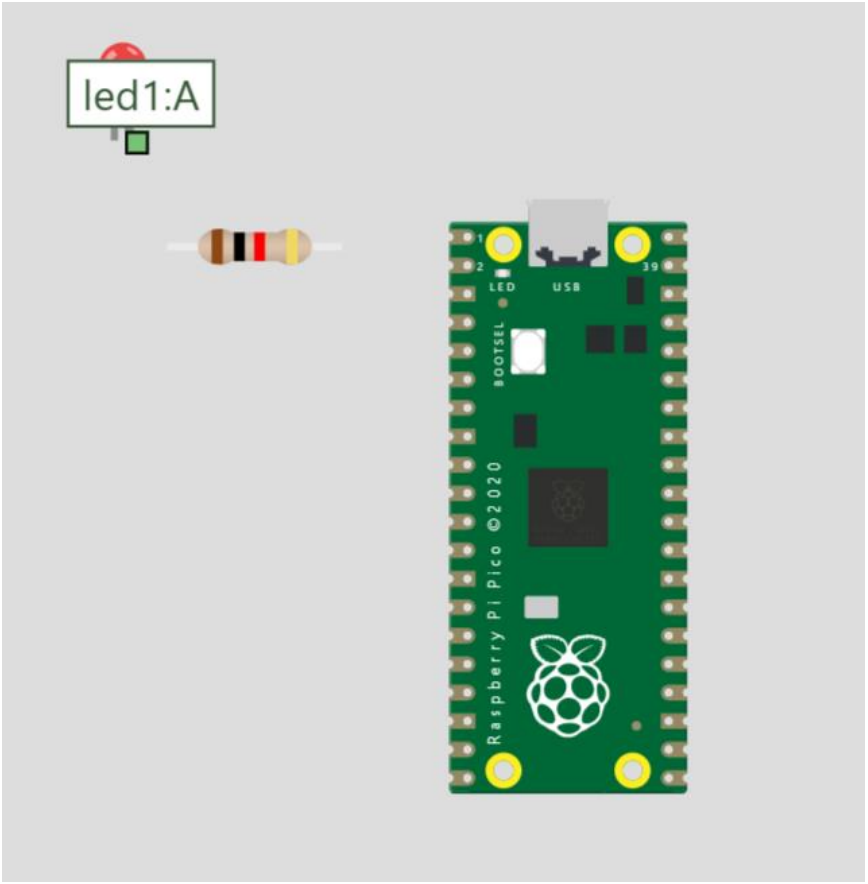


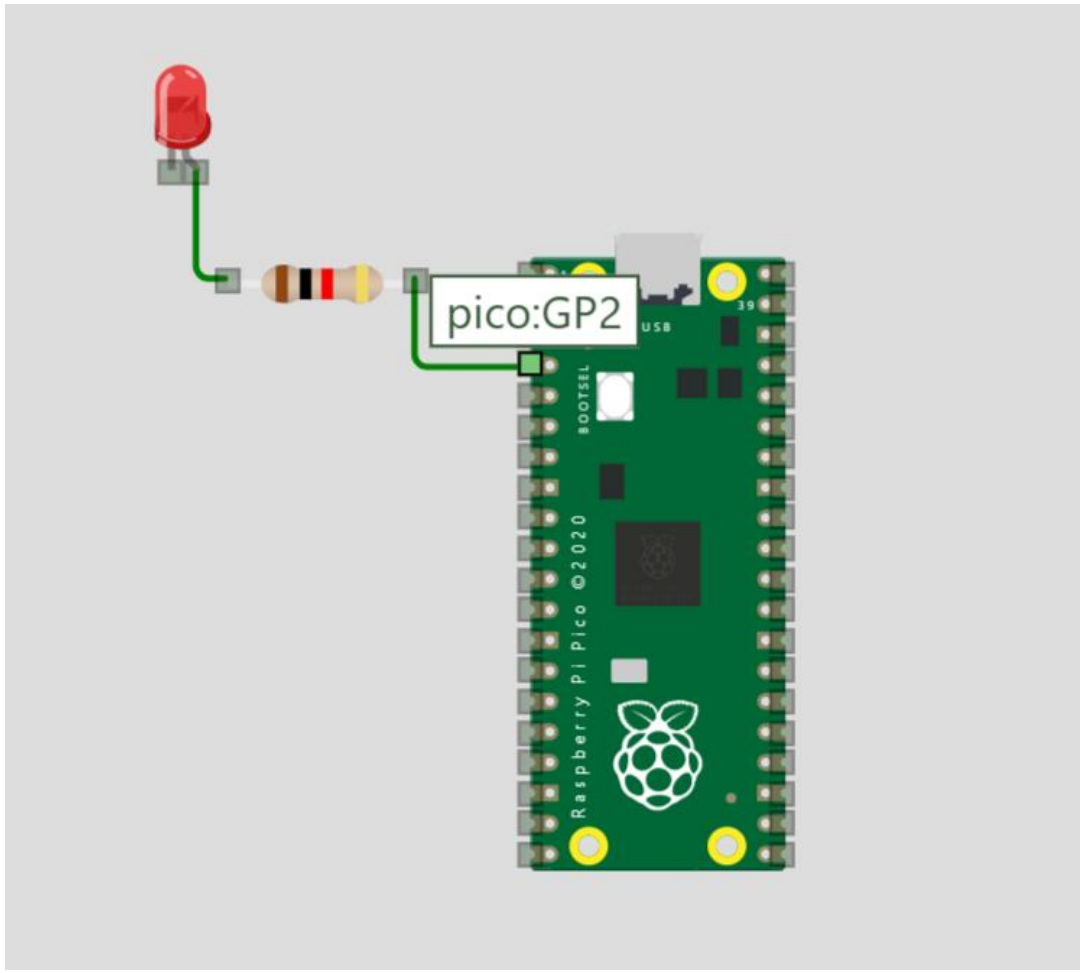
ทดลอง Print แนะนำตัวเอง

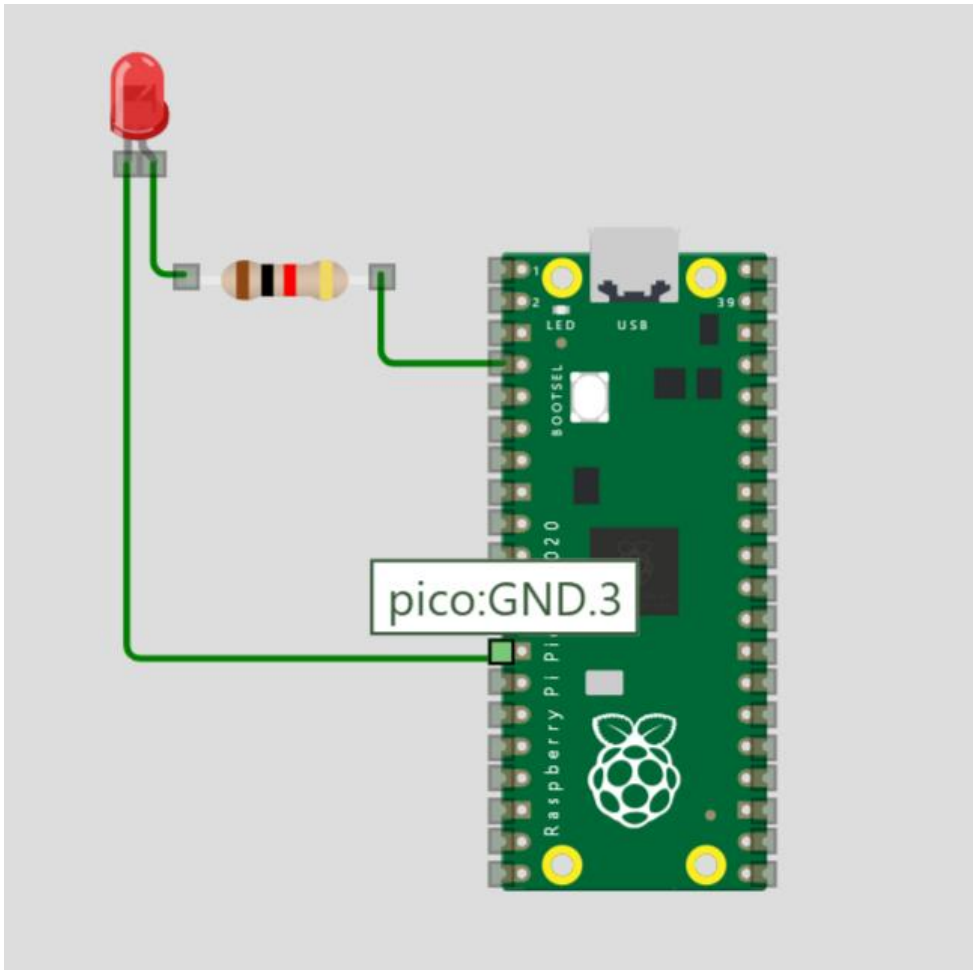
Wokwi Simulator




LED
USB
BOOTSEL
Raspberry Pi Pico ©2020

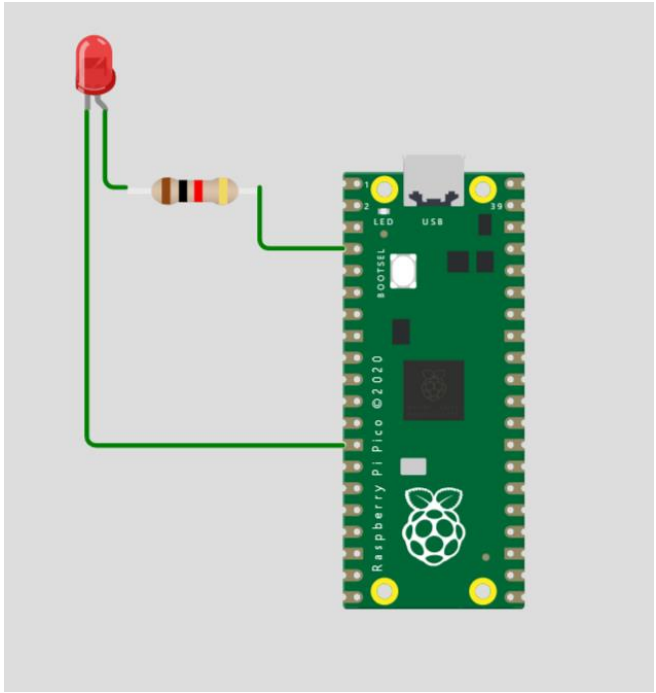

led1:A
LED
USB
BOOTSEL
Raspberry Pi Pico ©2020

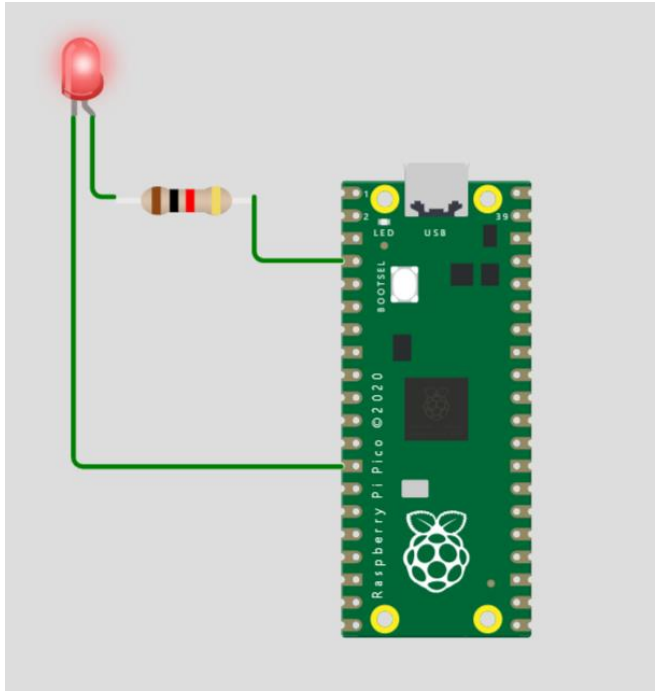

pico:GP2
USB
BOOTSEL
Raspberry Pi Pico ©2020


pico:GND.3
LED
USB
BOOTSEL

ทำการเขียนโค้ดลงไปที่ main.py ดังนี้

```
from machine import Pin
import utime
led = Pin(2,Pin.OUT)
while True:
    led.on()
    utime.sleep(1)
    led.off()
    utime.sleep(1)
```



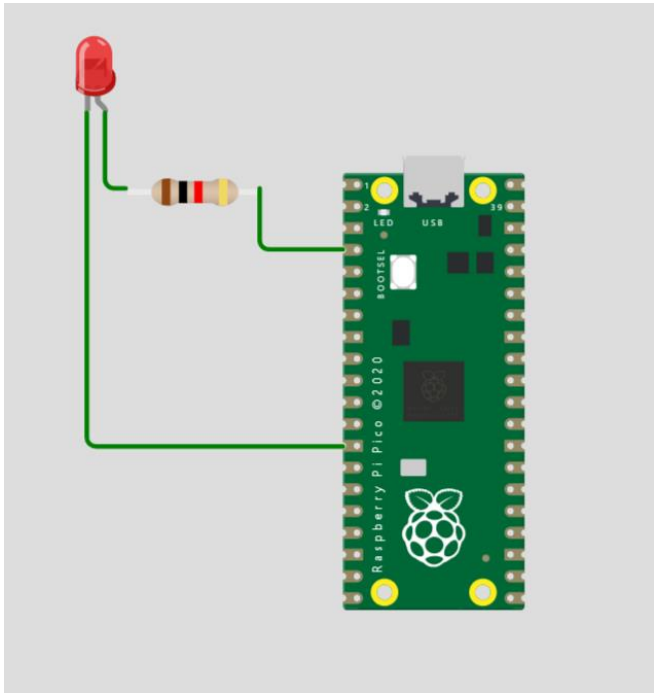


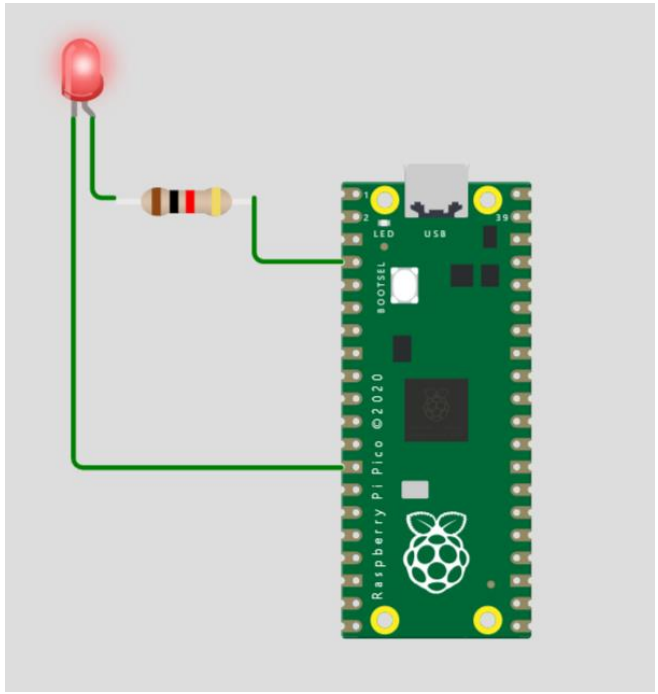
จากนั้นกดปุ่ม Play เพื่อ Start Simulation

หากต้องการให้กะพริบถี่ขึ้น หรือช้าลง จะต้องทำอย่างไร ?

ทำการเขียนโค้ดลงไปที่ main.py ดังนี้

```
from machine import Pin
import utime
led = Pin(2,Pin.OUT)
while True:
    led.on()
    utime.sleep(1)
    led.off()
    utime.sleep(1)
```



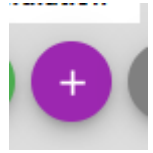


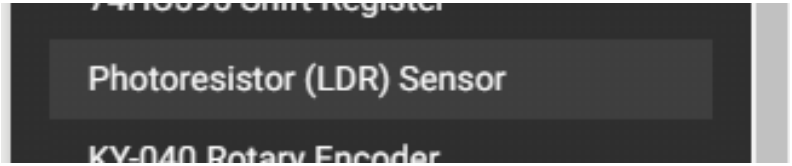
จากนั้นกดปุ่ม Play เพื่อ Start Simulation

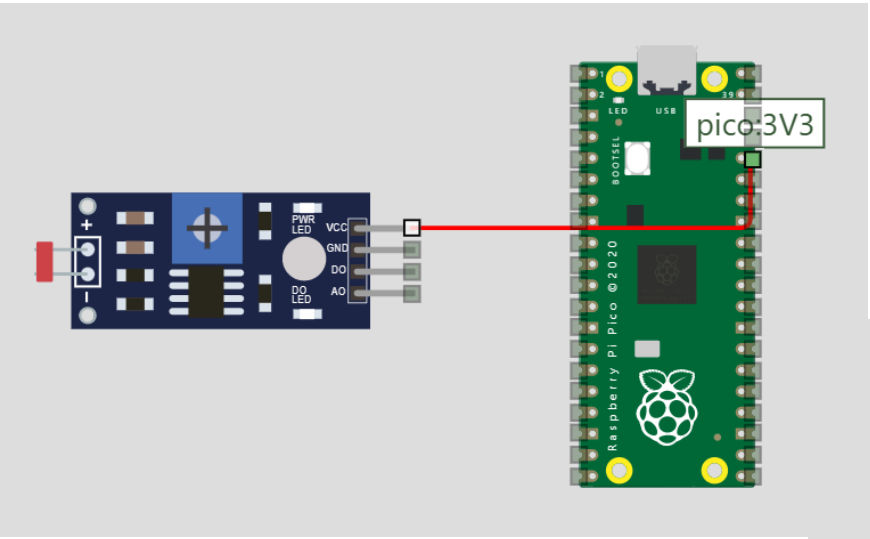
Laboratory 2

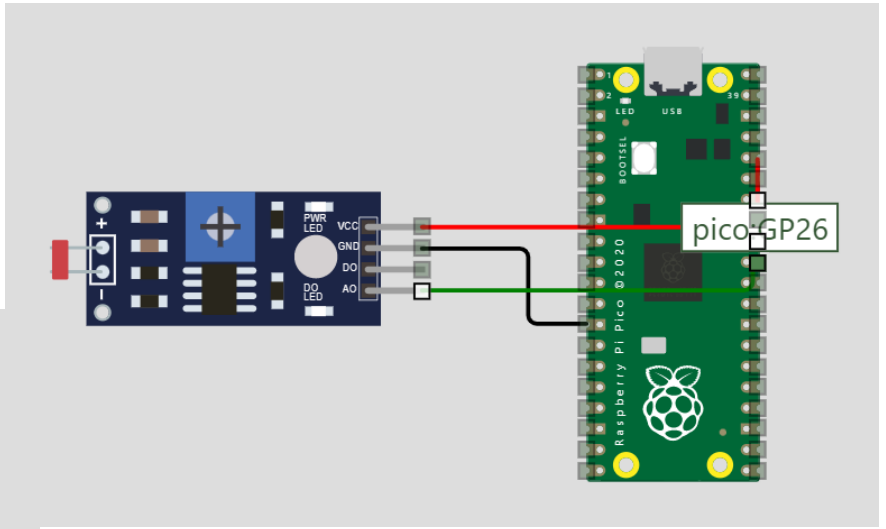
การใช้งาน Sensor

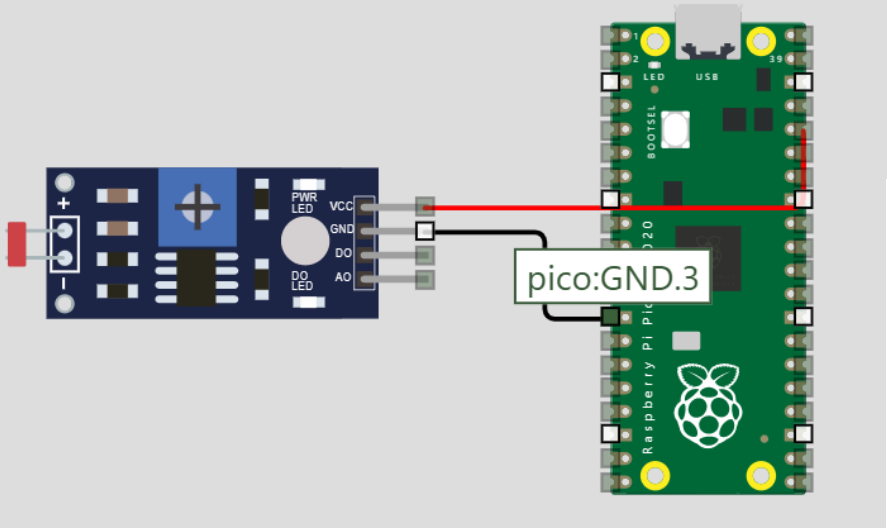
Light Sensor (เซ็นเซอร์แสง)





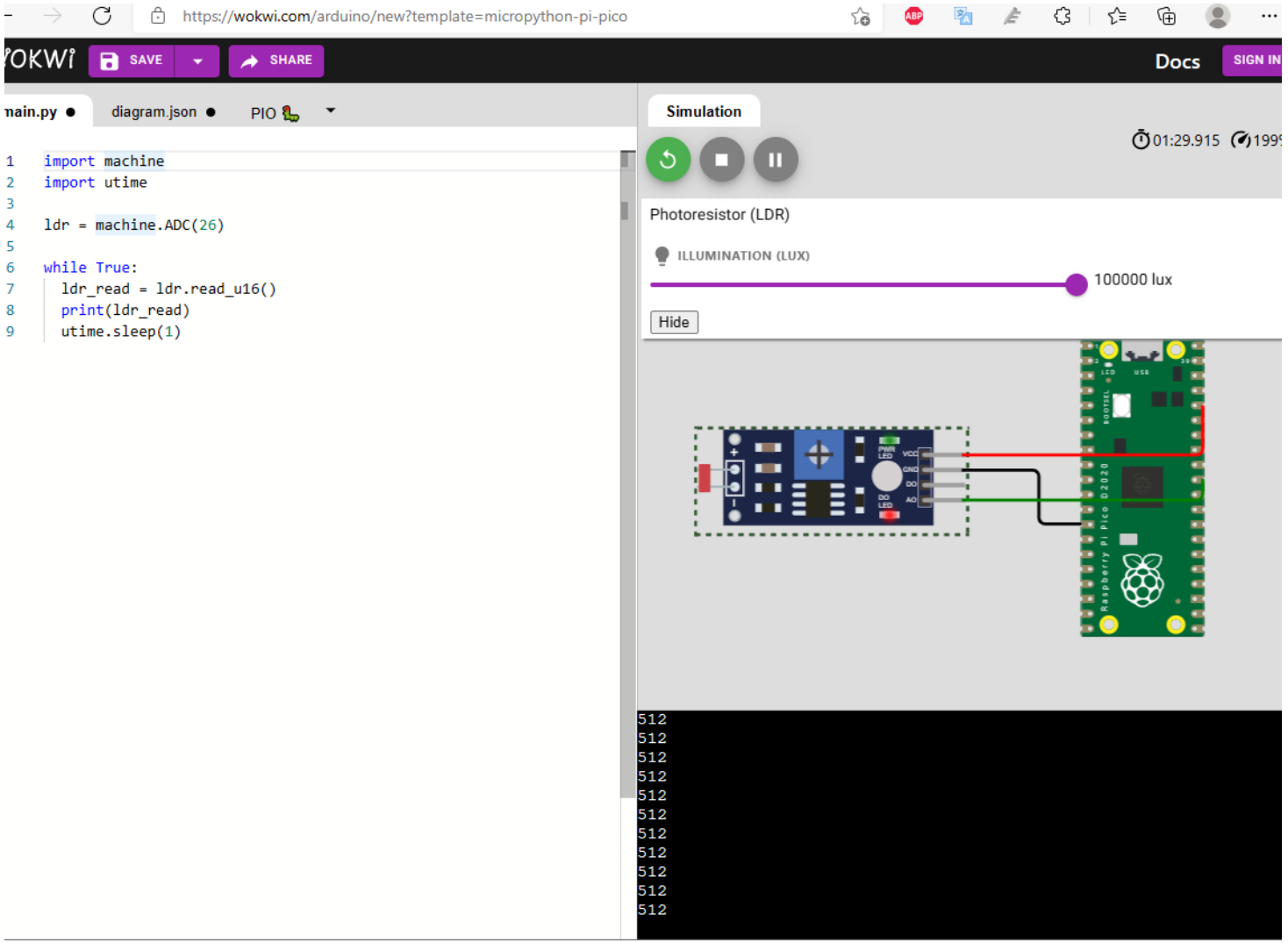






เขียนโค้ดดังนี้

```
import machine
import utime
ldr = machine.ADC(26)
while True:
    ldr_read = ldr.read_u16()
    print(ldr_read)
    utime.sleep(1)
```



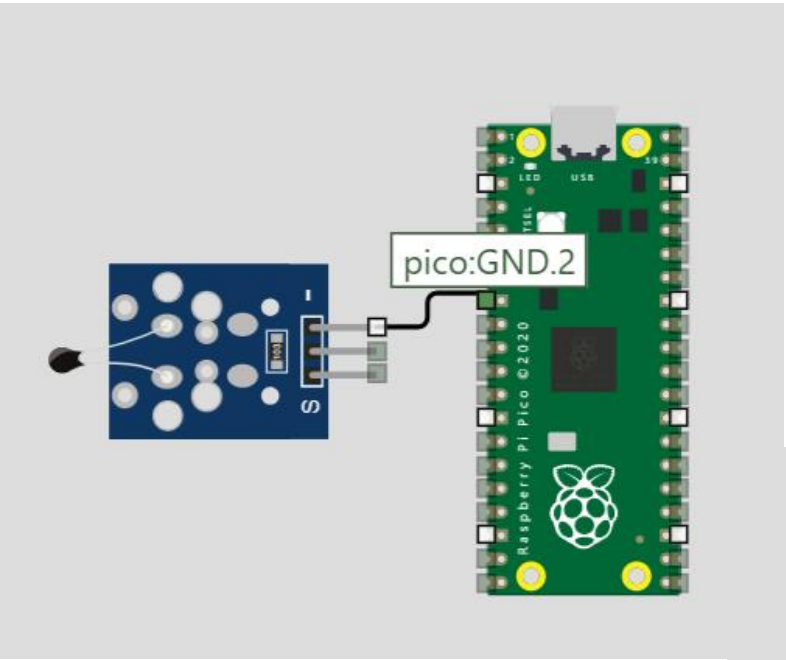
0.1 lux คือค่า 65007

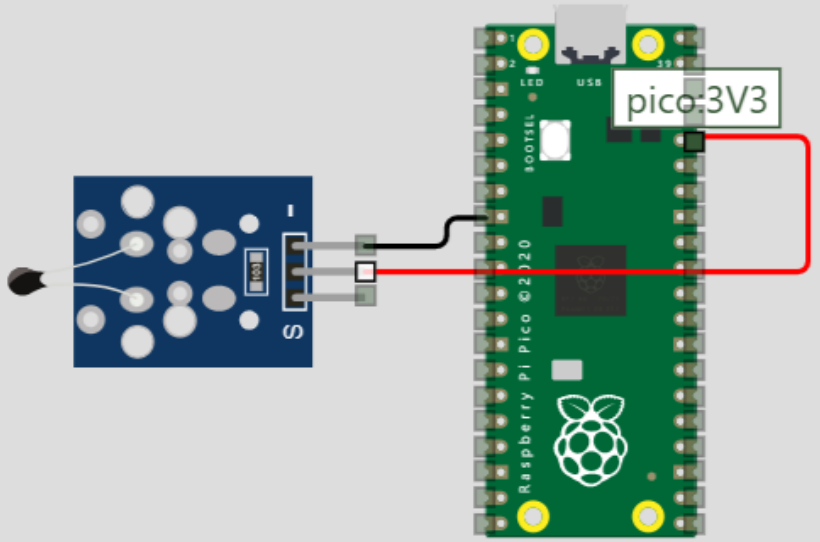
100000 lux คือค่า 512

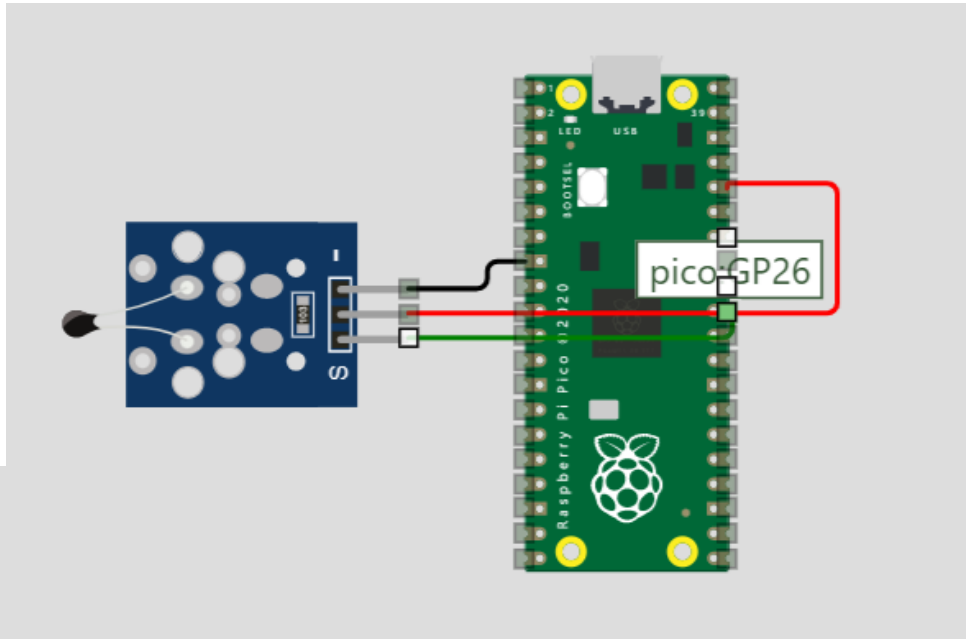
ทำอย่างไรจึงจะแสดงผลค่าความสว่างจากการ print ที่ถูกต้อง ?

Temperature Sensor

Analog Temperature Sensor (NTC)

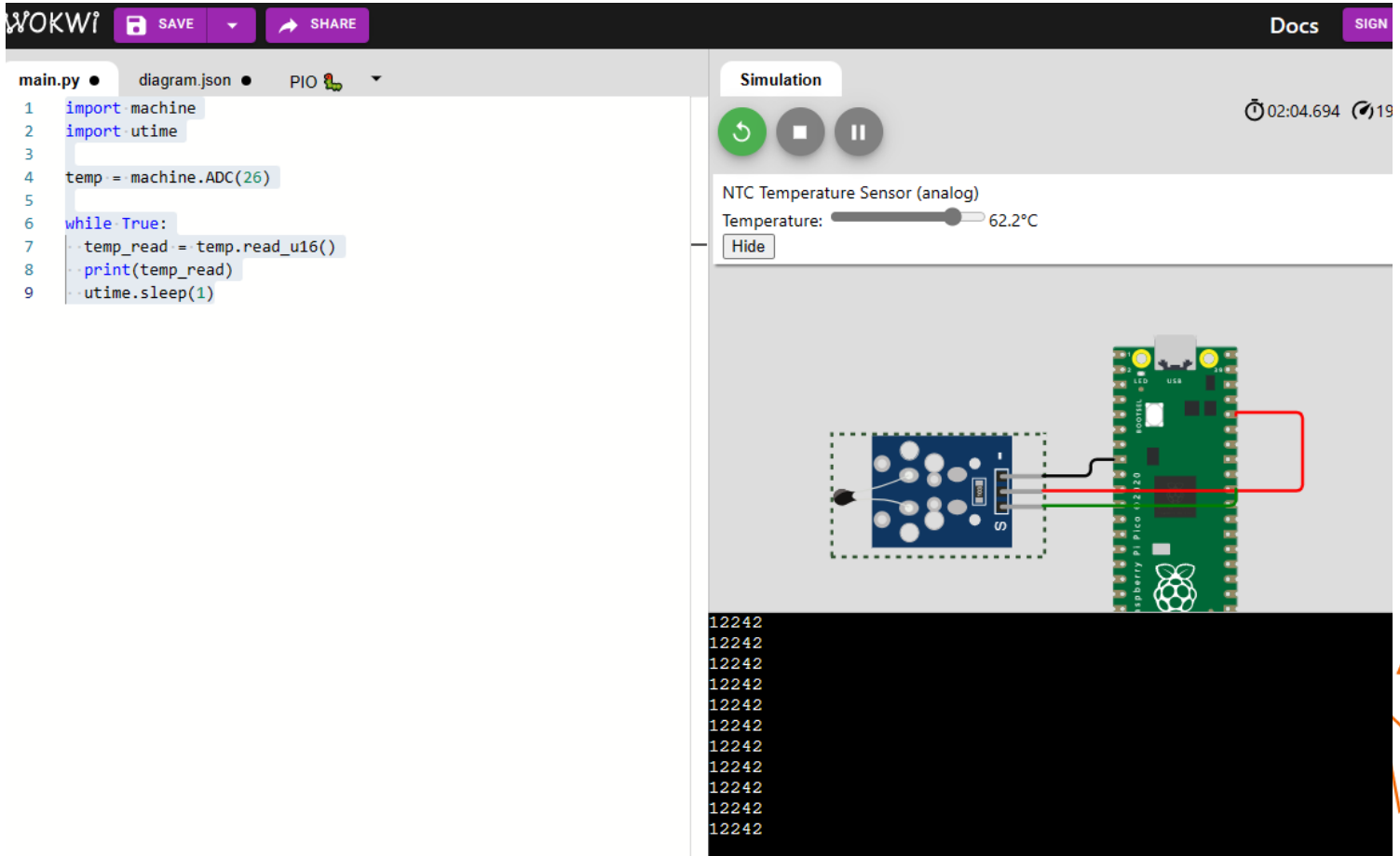






เขียนโค้ดดังนี้

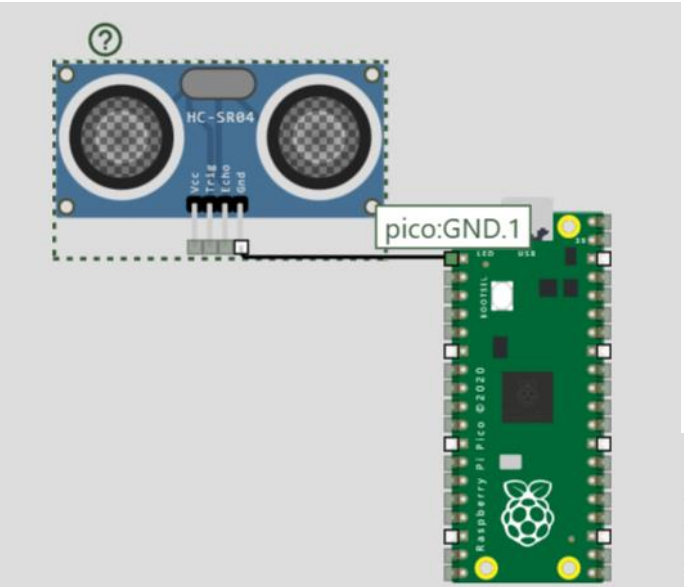
```
import machine
import utime
temp = machine.ADC(26)
while True:
    temp_read = temp.read_u16()
    print(temp_read)
    utime.sleep(1)
```

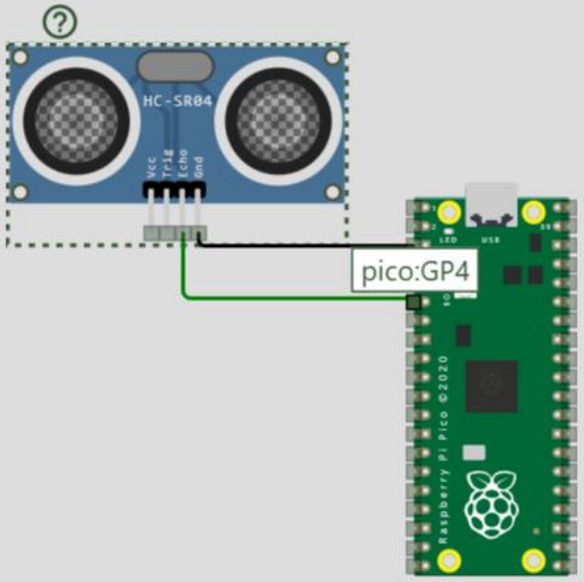


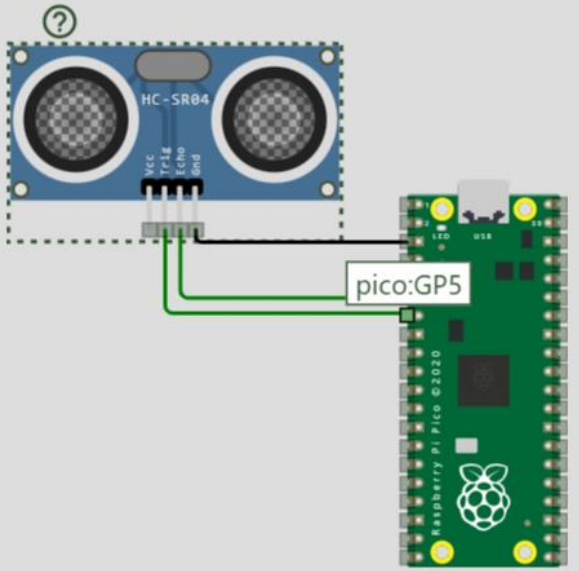
ทำอย่างไรจึงจะแสดงผลค่าอุณหภูมิจากการ print ที่ถูกต้อง ?

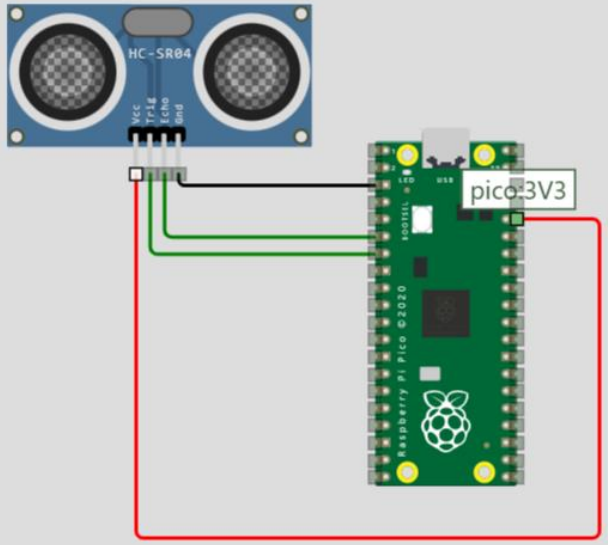
Ultrasonic Sensor

HC-SR04 Ultrasonic Distance Sensor



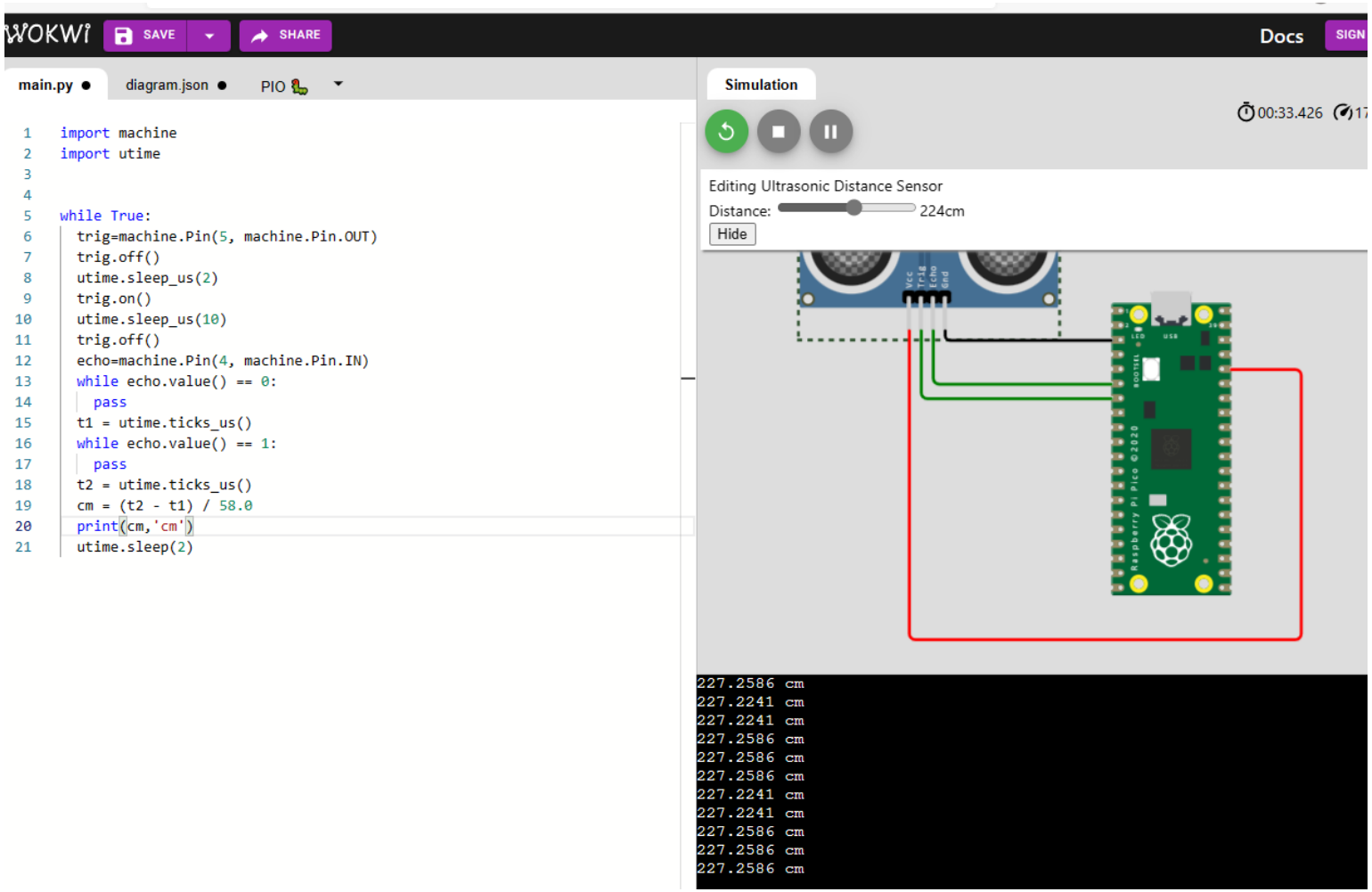






เขียนโค้ดดังนี้

```
import machine
import utime
while True:
  trig=machine.Pin(5, machine.Pin.OUT)
  trig.off()
  utime.sleep_us(2)
  trig.on()
  utime.sleep_us(10)
  trig.off()
  echo=machine.Pin(4, machine.Pin.IN)
  while echo.value() == 0:
    pass
  t1 = utime.ticks_us()
  while echo.value() == 1:
    pass
  t2 = utime.ticks_us()
  cm = (t2 - t1) / 58.0
  print(cm,'cm')
  utime.sleep(2)
```



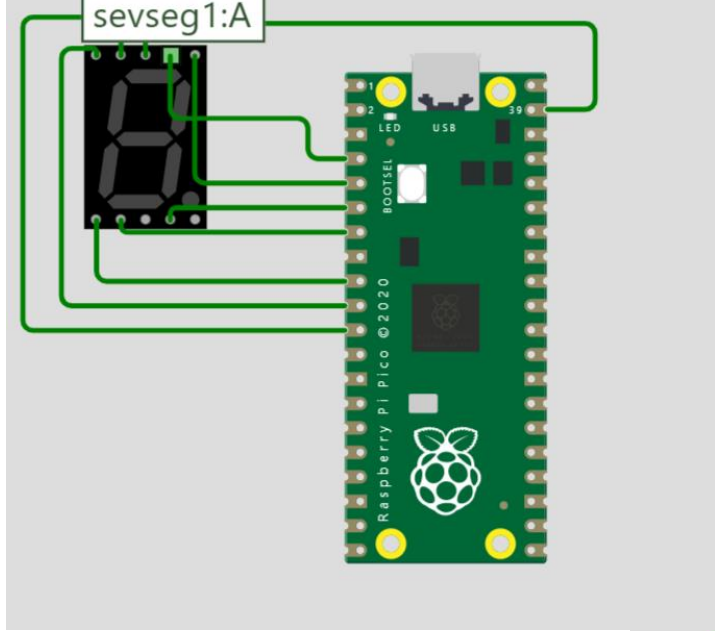
อยากให้แสดงผลเป็นหน่วยนิ้ว ต้องทำอย่างไร ?

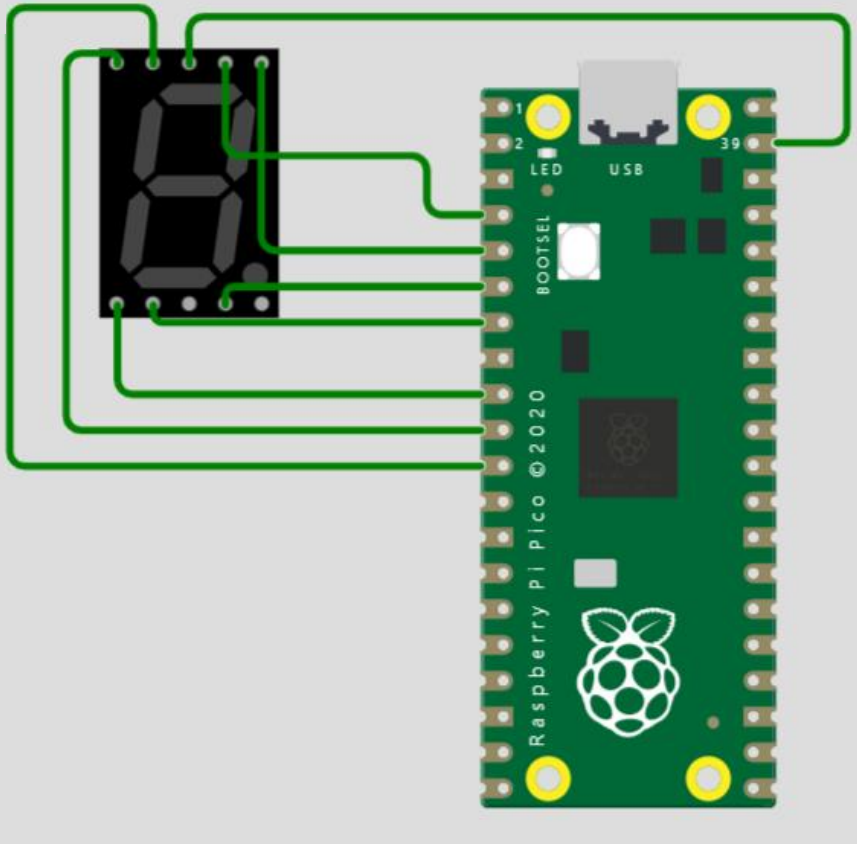
Laboratory 3

การแสดงผลและควบคุมอุปกรณ์

Seven Segment

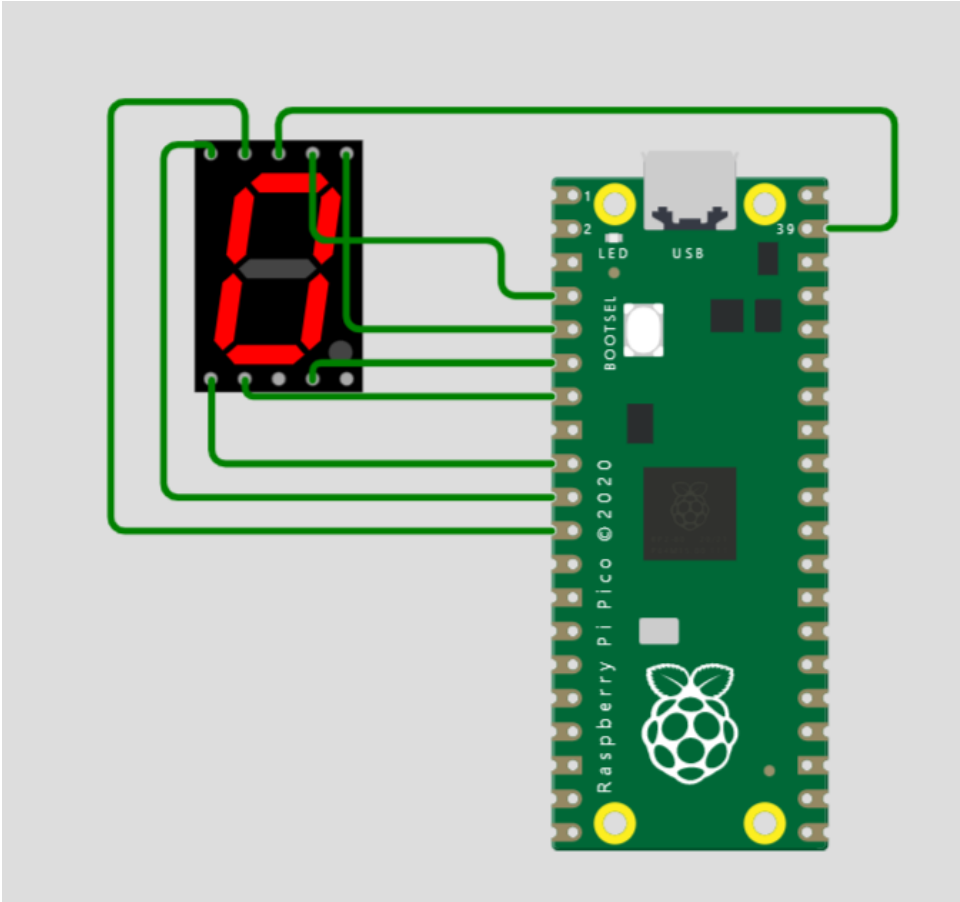
```
Pin(2, Pin.OUT), # A
Pin(3, Pin.OUT), # B
Pin(4, Pin.OUT), # C
Pin(5, Pin.OUT), # D
Pin(6, Pin.OUT), # E
Pin(8, Pin.OUT), # F
Pin(7, Pin.OUT), # G
```



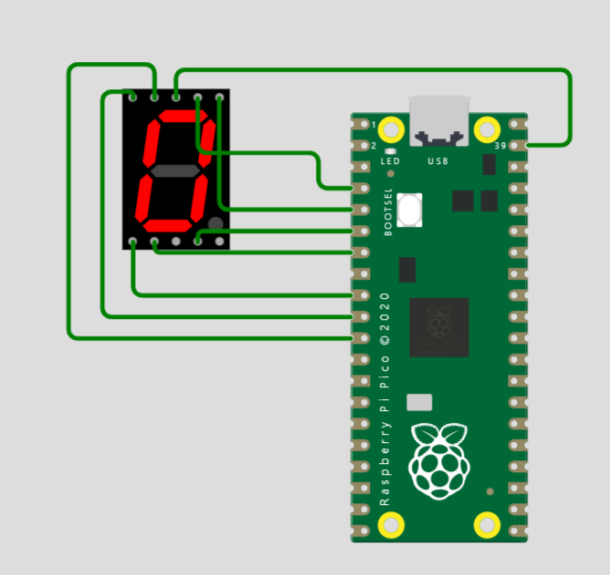


เขียนโค้ดดังนี้

```
from machine import Pin
from utime import sleep

#       A
#      ---
#  F |  G  | B
#      ---
#  E |     | C
#      ---
#       D

A = Pin(2,Pin.OUT) # A
B = Pin(3,Pin.OUT) # B
C = Pin(4,Pin.OUT) # C
D = Pin(5,Pin.OUT) # D
E = Pin(6,Pin.OUT) # E
F = Pin(8,Pin.OUT) # F
G = Pin(7,Pin.OUT) # G

while True:
      G.on()
      sleep(1)
```



เขียนโค้ดดังนี้




```
from machine import Pin
from utime import sleep
pins = [
  Pin(2, Pin.OUT), # A
  Pin(3, Pin.OUT), # B
  Pin(4, Pin.OUT), # C
  Pin(5, Pin.OUT), # D
  Pin(6, Pin.OUT), # E
  Pin(8, Pin.OUT), # F
  Pin(7, Pin.OUT), # G
  Pin(0, Pin.OUT) # DP (not connected)
]
digits = [
  [0, 0, 0, 0, 0, 0, 1, 1], # 0   [1, 0, 0, 1, 1, 1, 1, 1], # 1
  [0, 0, 1, 0, 0, 1, 0, 1], # 2    [0, 0, 0, 0, 1, 1, 0, 1], # 3
  [1, 0, 0, 1, 1, 0, 0, 1], # 4   [0, 1, 0, 0, 1, 0, 0, 1], # 5    [0, 1, 0, 0, 0, 0, 0, 1], #6
  [0, 0, 0, 1, 1, 1, 1, 1], #7    [0, 0, 0, 0, 0, 0, 0, 1], # 8 [0, 0, 0, 1, 1, 0, 0, 1], # 9
  [0, 0, 0, 1, 0, 0, 0, 1], # a    [1, 1, 0, 0, 0, 0, 0, 1], # b
  [0, 1, 1, 0, 0, 0, 1, 1], # C   [1, 0, 0, 0, 0, 1, 0, 1], # d [0, 1, 1, 0, 0, 0, 0, 1], # E
  [0, 1, 1, 1, 0, 0, 0, 1], # F
]
```

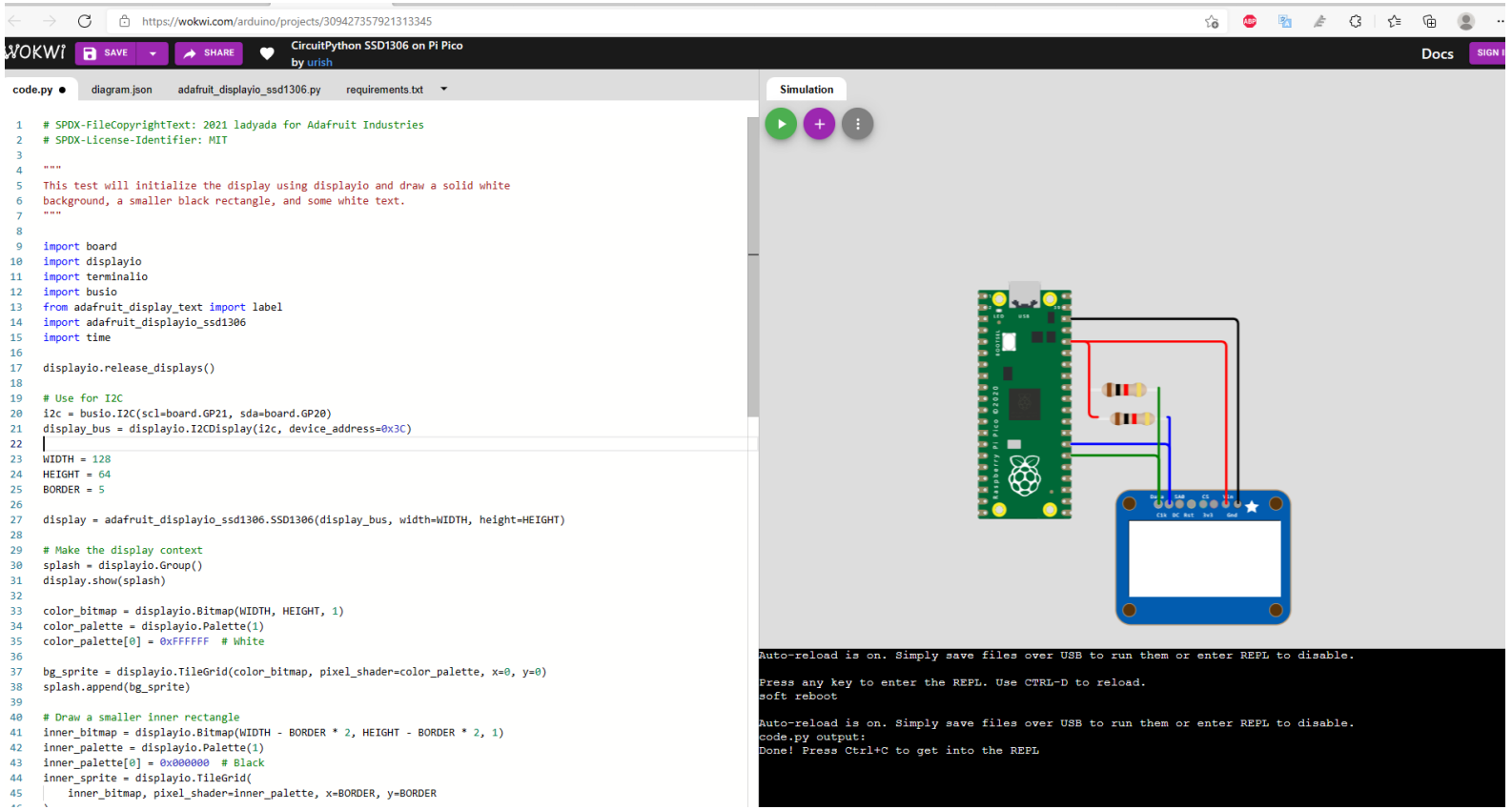
```
def reset():
  for pin in pins:
    pin.value(1)

reset()

switch = Pin(11, Pin.IN)
while True:
    for i in range(len(digits)):
      if switch.value() == 0:
        break;
      for j in range(len(pins) - 1):
        pins[j].value(digits[i][j])
      sleep(1.5)
```

OLED Display

https://docs.wokwi.com/guides/circuitpython

Project examples

- Blink with CircuitPython
- CircuitPython SSD1306 Example



PROJECT

KMITL
สถาบันเทคโนโลยี
พระจอมเกล้า
เจ้าคุณทหารลาดกระบัง

KMITL
FIGHT

Futurist · Ignite · Greatness · Honor · Team Spirit