Microcontroller

6.S063 Engineering Interactive Technologies

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You already know that
We used Pins 3V & G
We used Pins G & 3V
A0, RST, VIN, RX ?!?!?!?!?!
D0 – D8
D0 – D8 : Digital Pins (0 or 1)
RX, TX : Serial Communication
RX, TX: Serial Communication or Digital Pins (0 or 1)
A0 : Analog Pin (0 – 1023)

Smoke Detector
VU : 5V Output (from USB)
S0 – S3, SC, SK : Communication (Bus, ...)

The image shows a close-up of a microcontroller board with various components labeled, including S0 through S3, SC, and SK, which are part of the communication hardware.
EN : Enable ESP8266 if HIGH
RST : Reset ESP8266 if LOW
VIN : Voltage In to power ESP8266 (max. 6V)
Sensors
DHT 11 (temperature & humidity sensor) plug & play
only one analog Pin! <30 sec>
Easy 😊
Look at the data sheet!
... or search online!
Let’s get practical
What does it do? <30 sec>
Ultrasonic Sensor (measure distance)
sonic burst
sonic burst
reflection
detector
sonic burst
time between sonic burst & detection of reflection
590 microseconds
How to calculate distance?
<30 sec>
speed of sound = ~340 m/s
speed of sound = \sim 340 \text{ m/s} \\
= 0.034 \text{ cm/micros}
speed of sound = \sim 340 \text{ m/s}

= 0.034 \text{ cm/micros}

0.034 \text{ cm/micros} \times 590 \text{ micros} = 20 \text{ cm}
speed of sound = ~340 m/s
= 0.034 cm/micros
0.034 cm/micros * 590 micros = 20 cm

right?
2x distance
import machine
import utime

trigger = machine.Pin(12, machine.Pin.OUT)
echo = machine.Pin(14, machine.Pin.IN)
trigger.value(0)
strftime.sleep_us(2)

while True:
    trigger.value(1)
    strftime.sleep_us(10)
    trigger.value(0)

    time = 0

    while echo.value() == 0:
        pass

    while echo.value() == 1:
        time += 1
        strftime.sleep_us(1)

distance = 0.034 * time
print(str(distance))
What does it do? <30 sec>
PIR Motion Sensor (Passive InfraRed)
PIR Sensor
Sensitivity (\(<= 7m\))

How long should output be HIGH when object was detected?
import machine

input_pin = machine.Pin(14, machine.Pin.IN)

while True:
    if input_pin.value() == 1:
        print("movement detected")
What does it do? <30 sec>
Water Level Sensor
import machine

input_Pin = machine.ADC(0)

while True:
    print(str(input_pin.read()))
end.