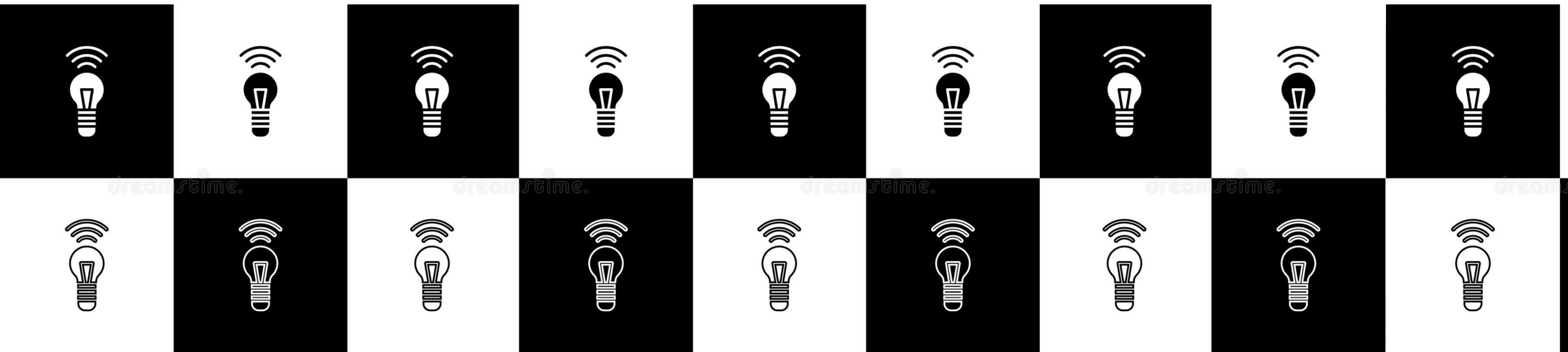
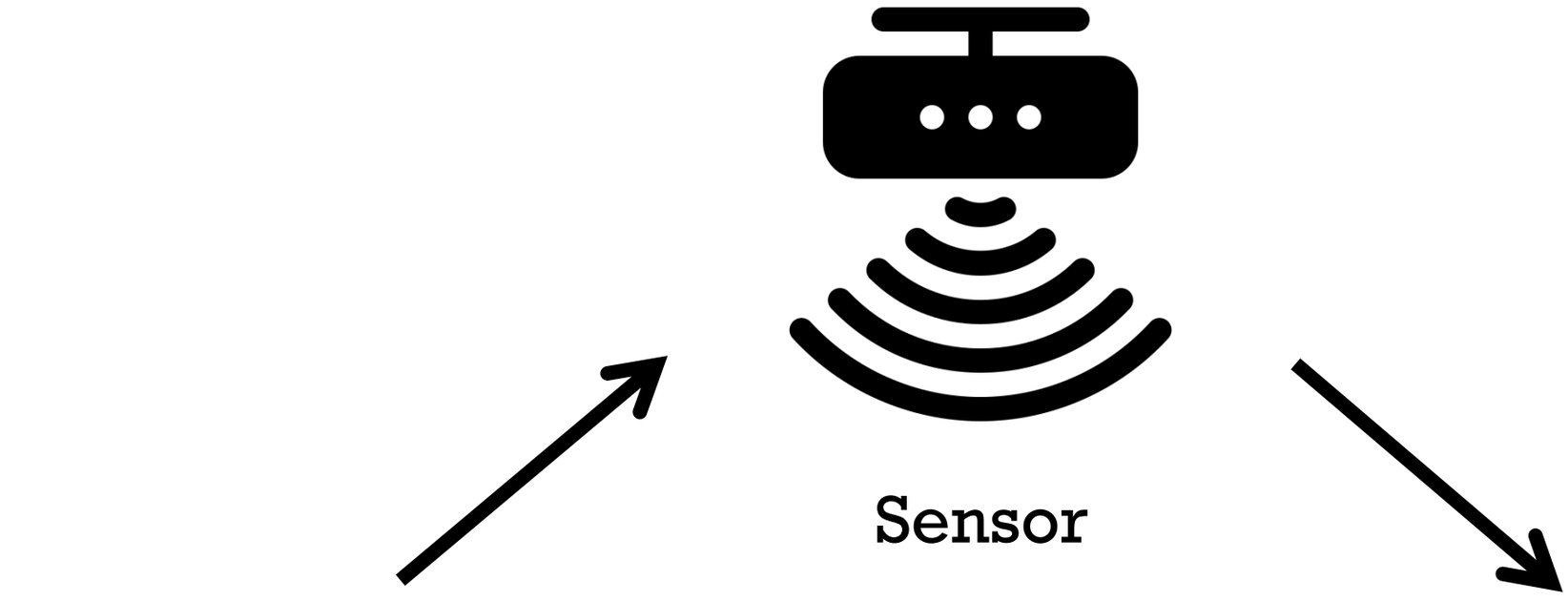
CODING WORKSHOP

Welcome!

DIY SMART LIGHTING SYSTEM




Sensor
RPi
Light

PROGRAM FOR TODAY

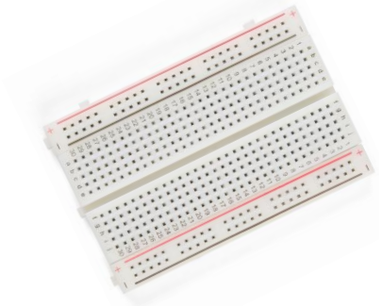
- Raspberry Pi & Circuit design
- Run Python on Pi
- Program the Smart Lighting System

HARDWARE BASICS

THE HARDWARE

- Rasberry Pi (RPi)

- Breadboard

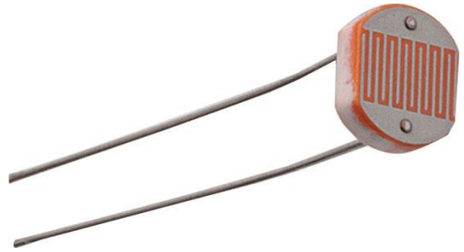


- Jumper Wires

- Light-Emitting Diode (LED)

- Resistor

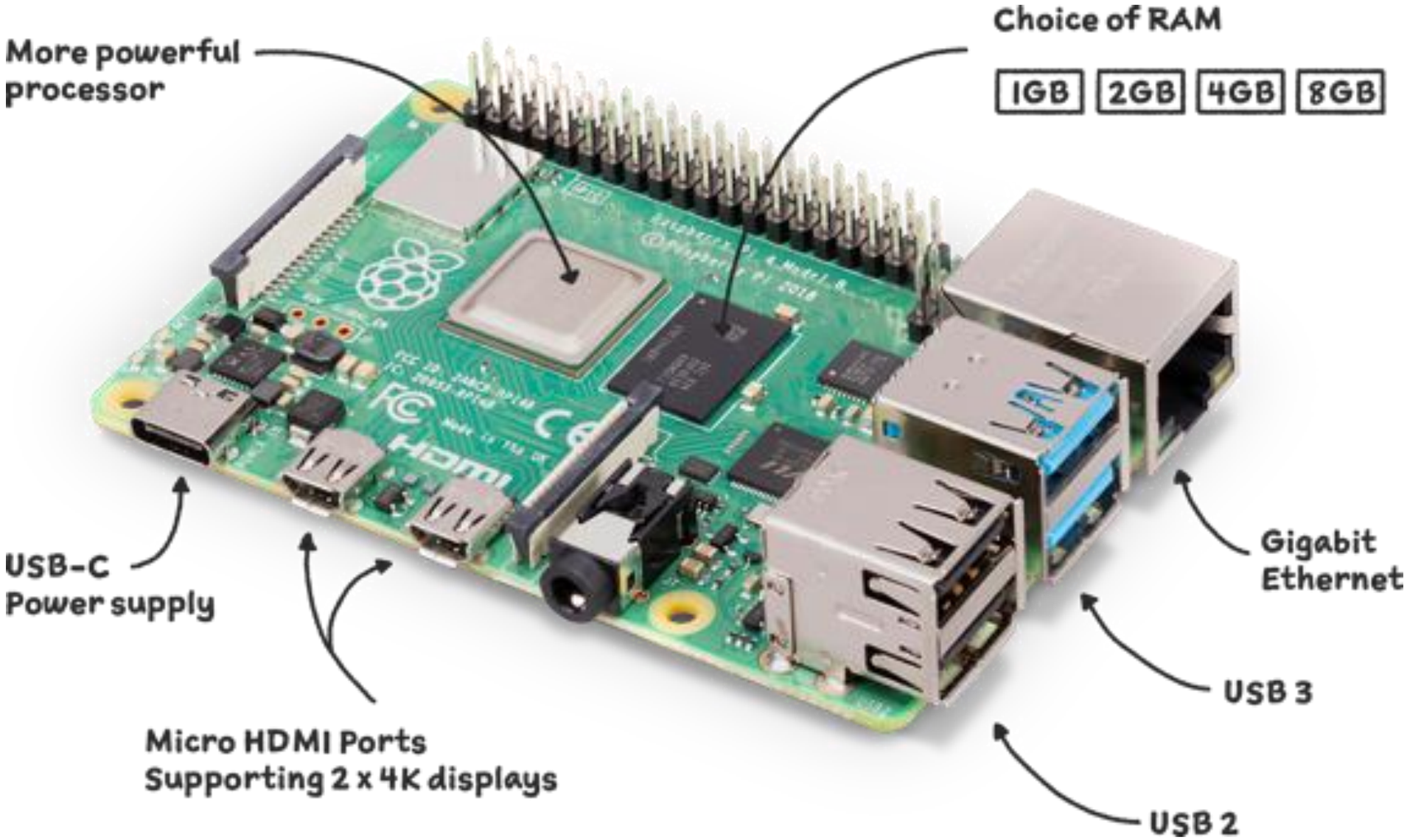
- Light Dependent Resistor (LDR)



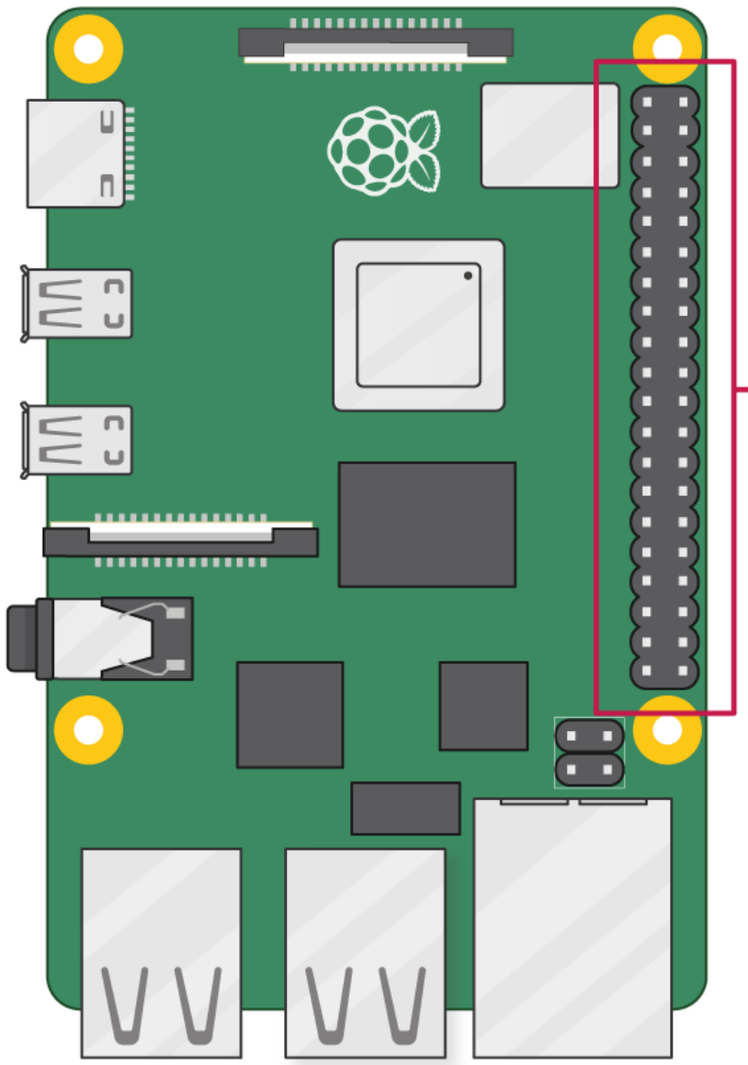
- Capacitor

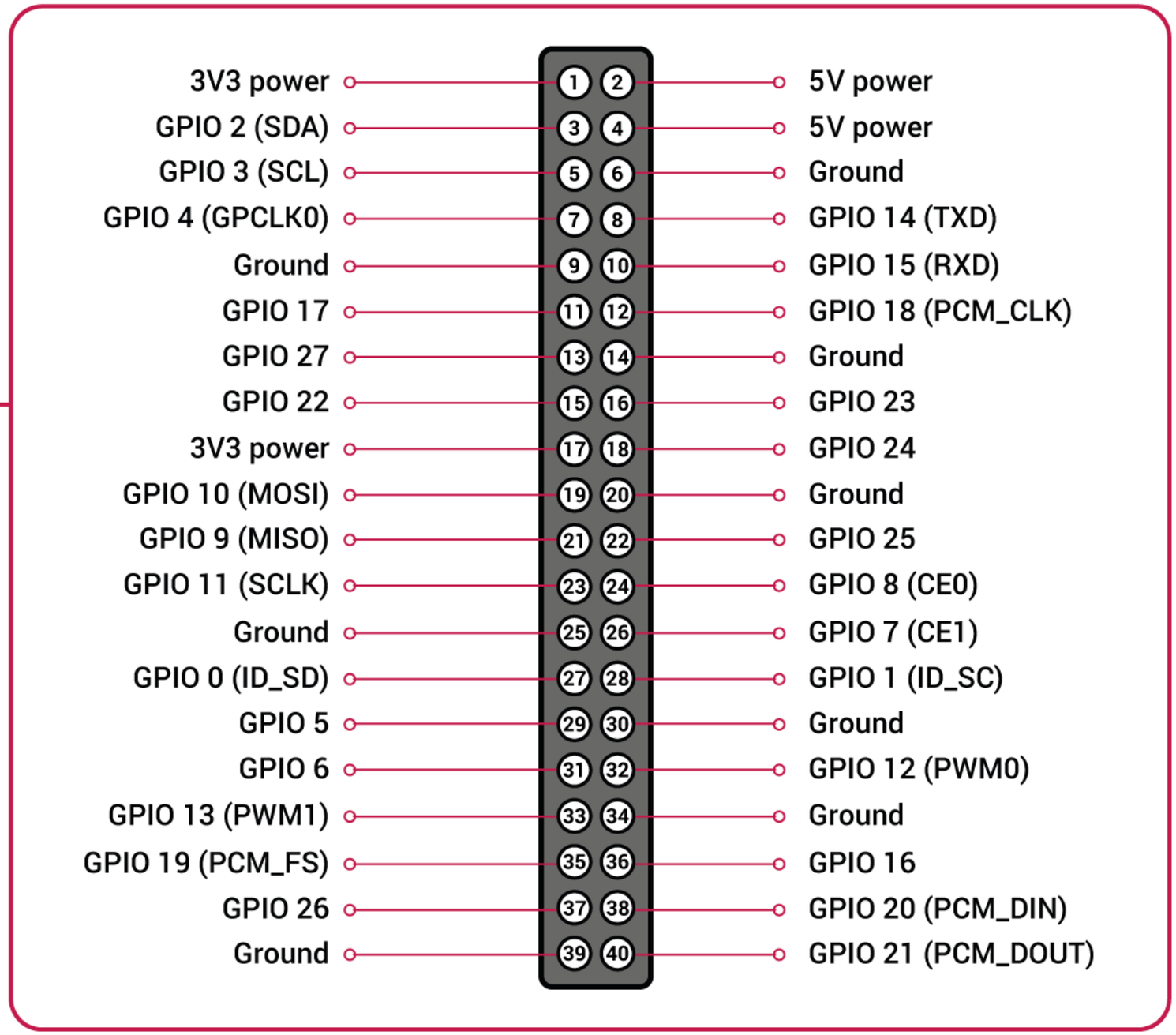
- Motion sensor (for bonus part)

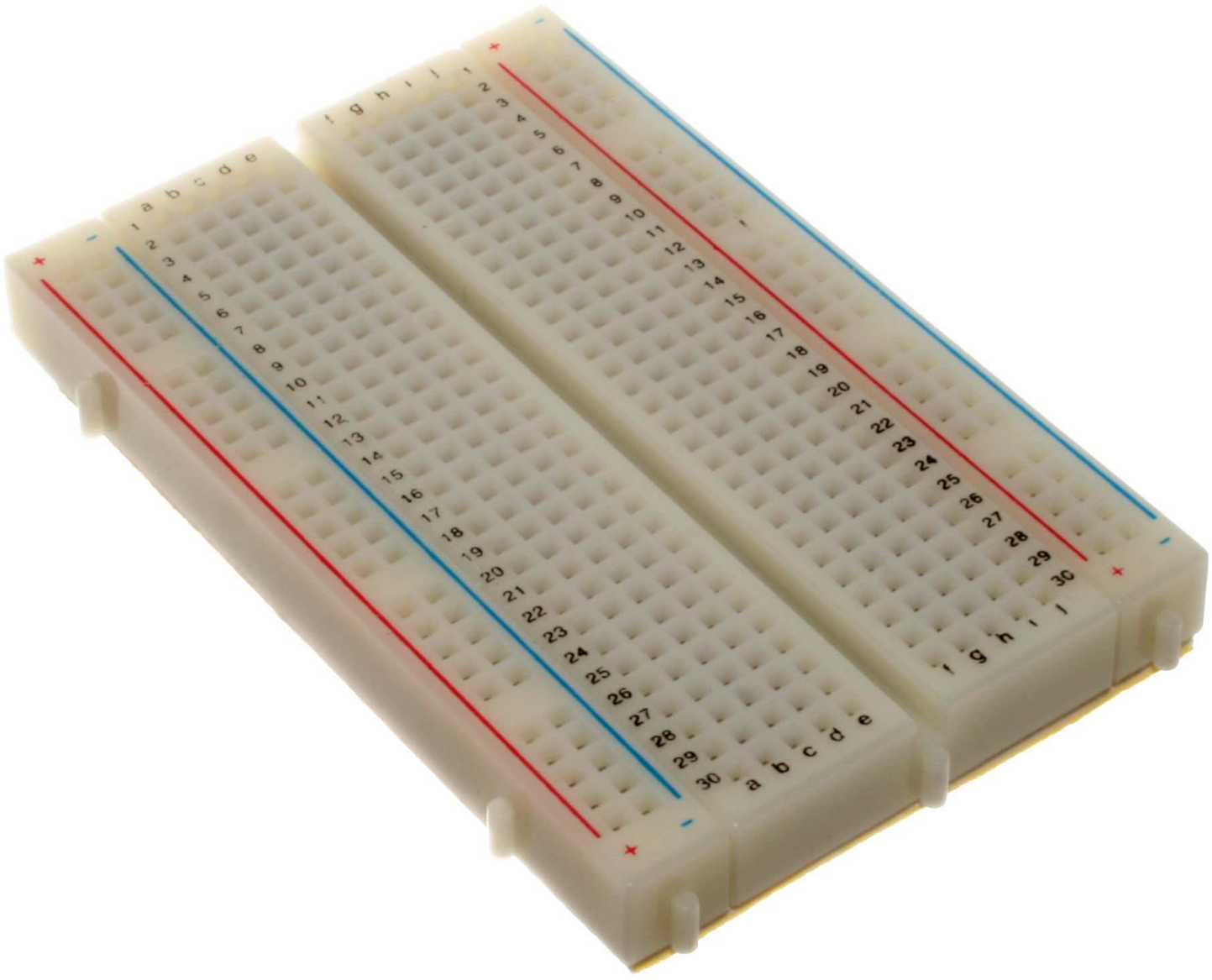
WHAT IS RASPBERRY PI?



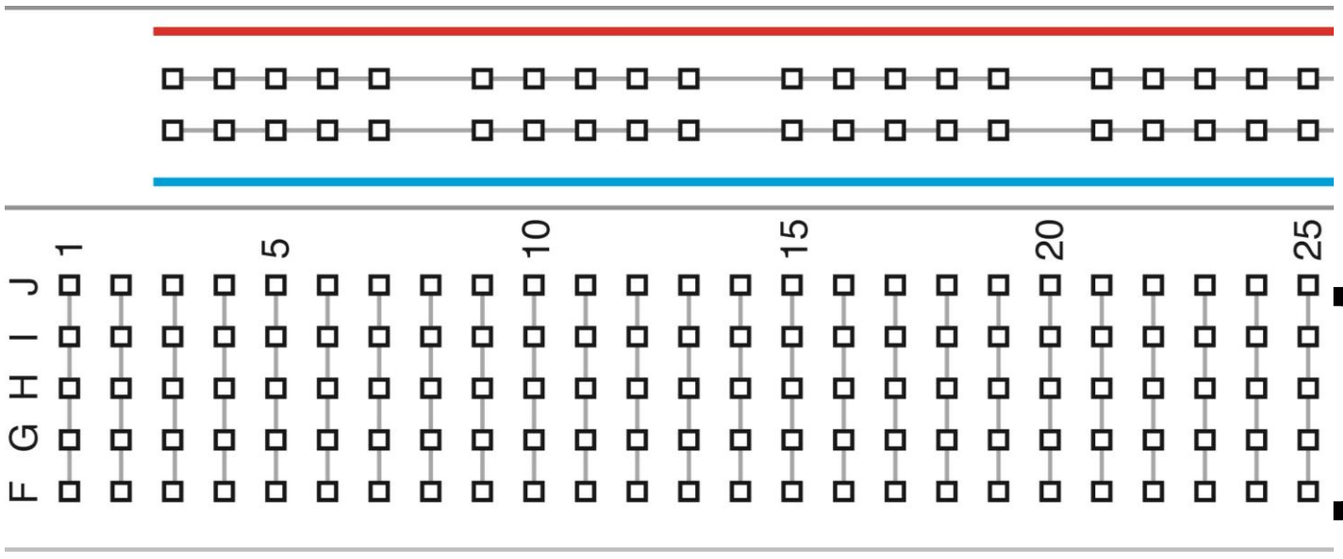
GPIO PIN CONVENTIONS







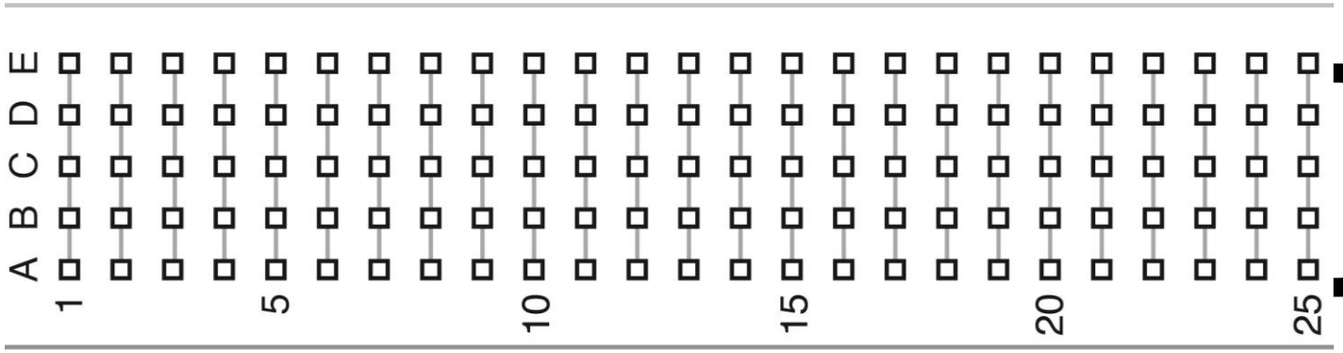
SOLDER-LESS BREAD BOARD



↙All the holes in this row are connected

↖All the holes in this row are connected

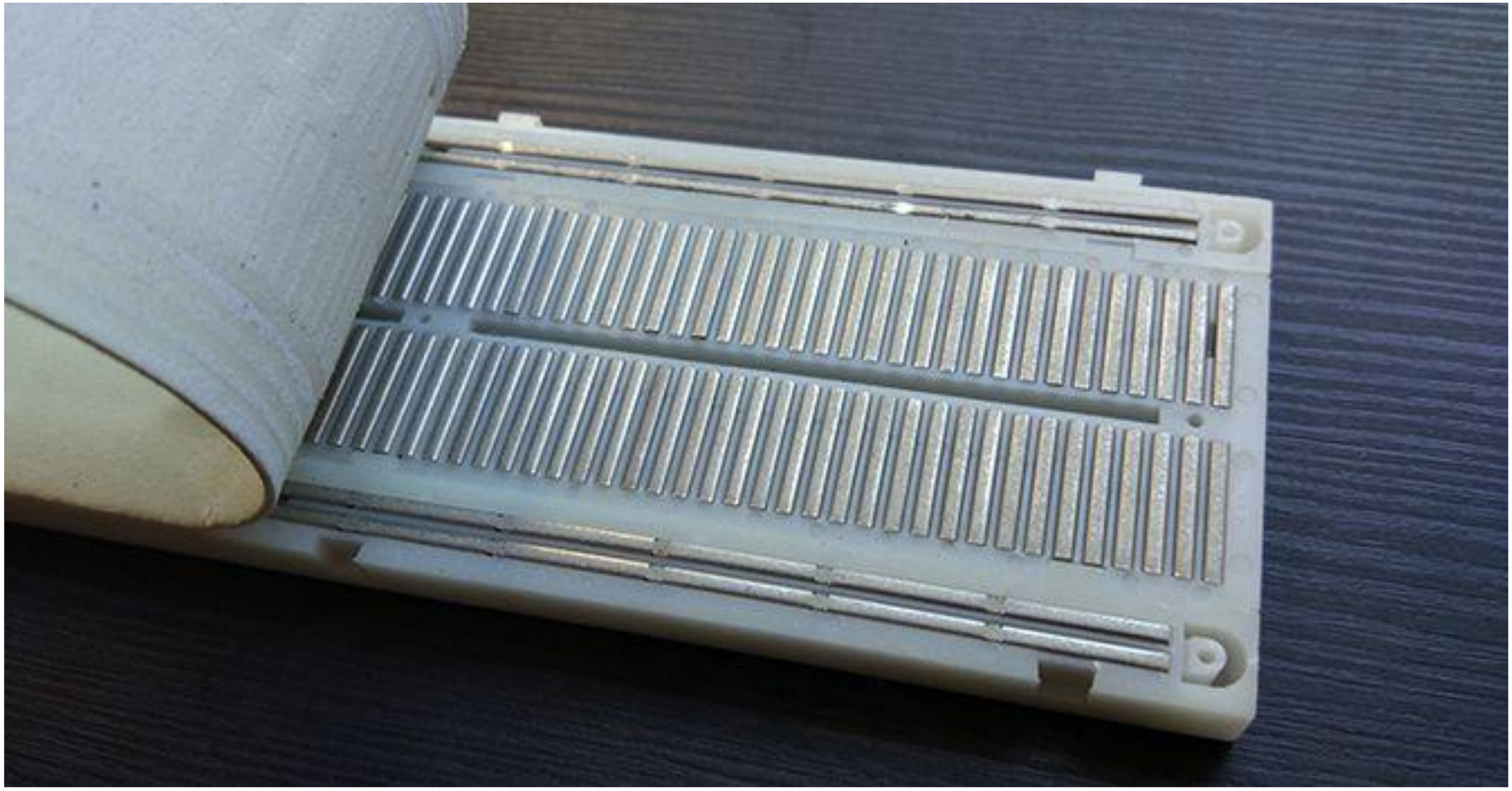
All the holes each column are connected

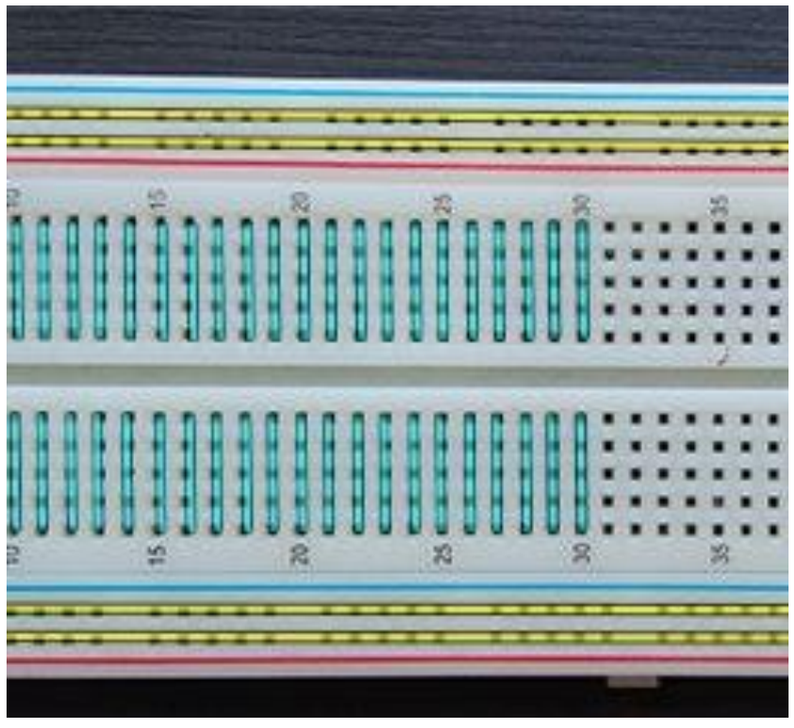


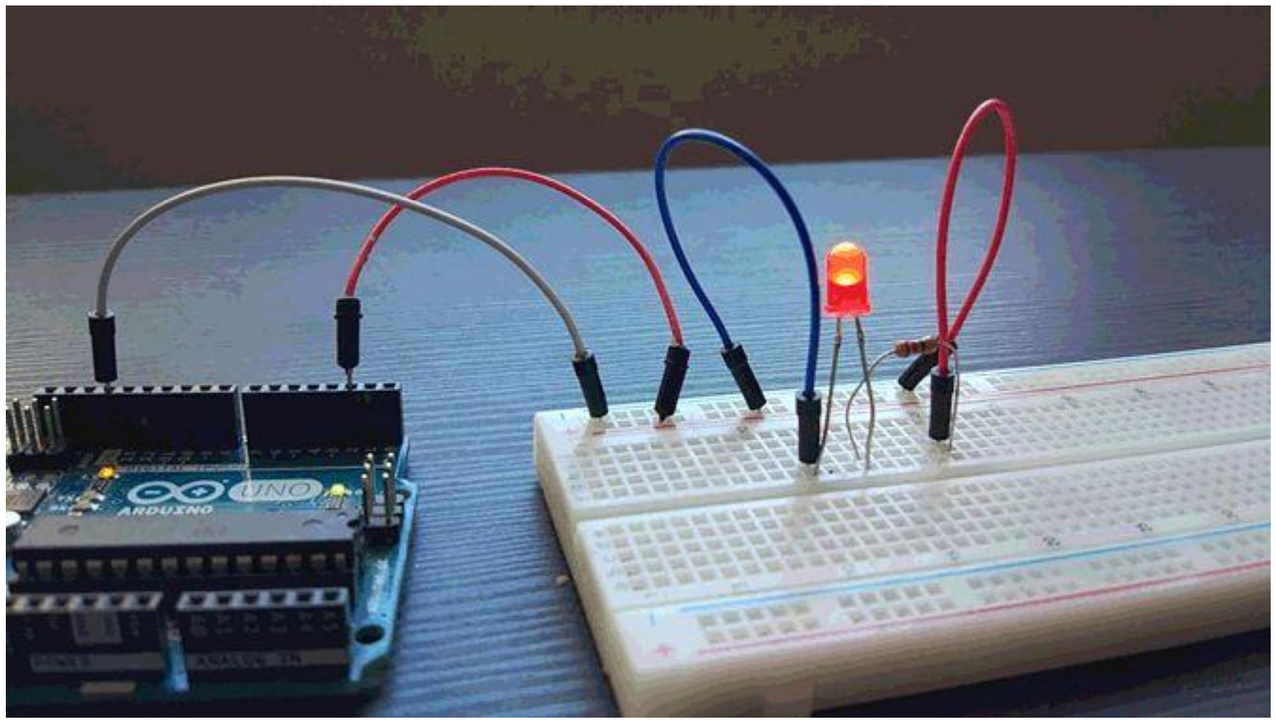
All the holes each column are connected

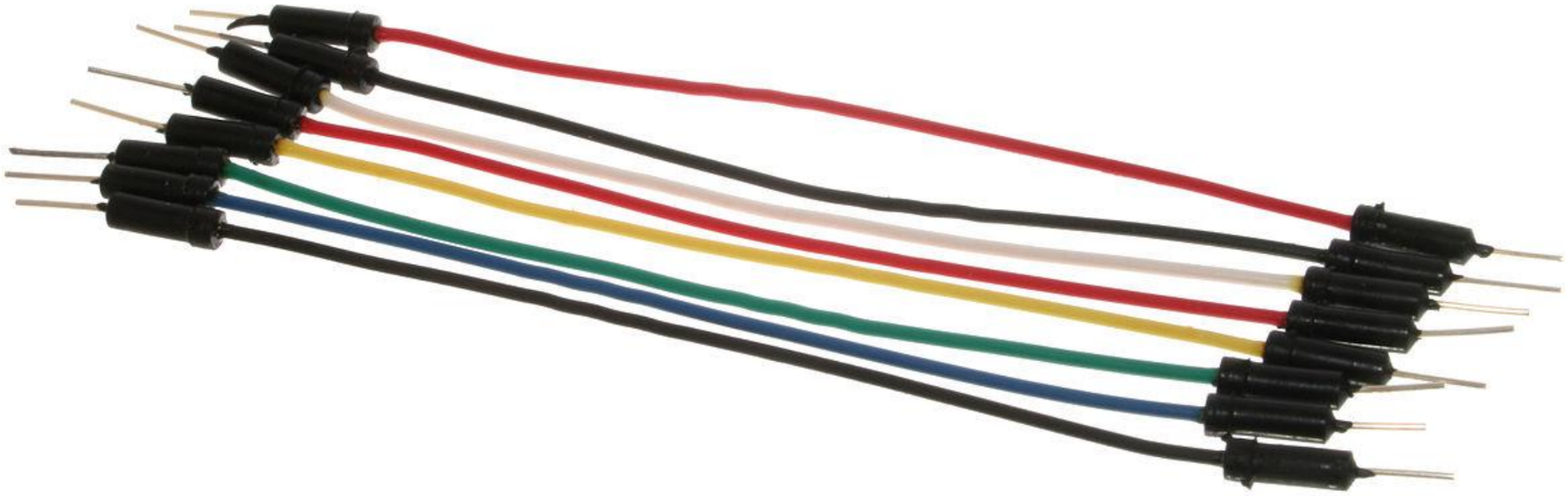
↙All the holes in this row are connected

↖All the holes in this row are connected

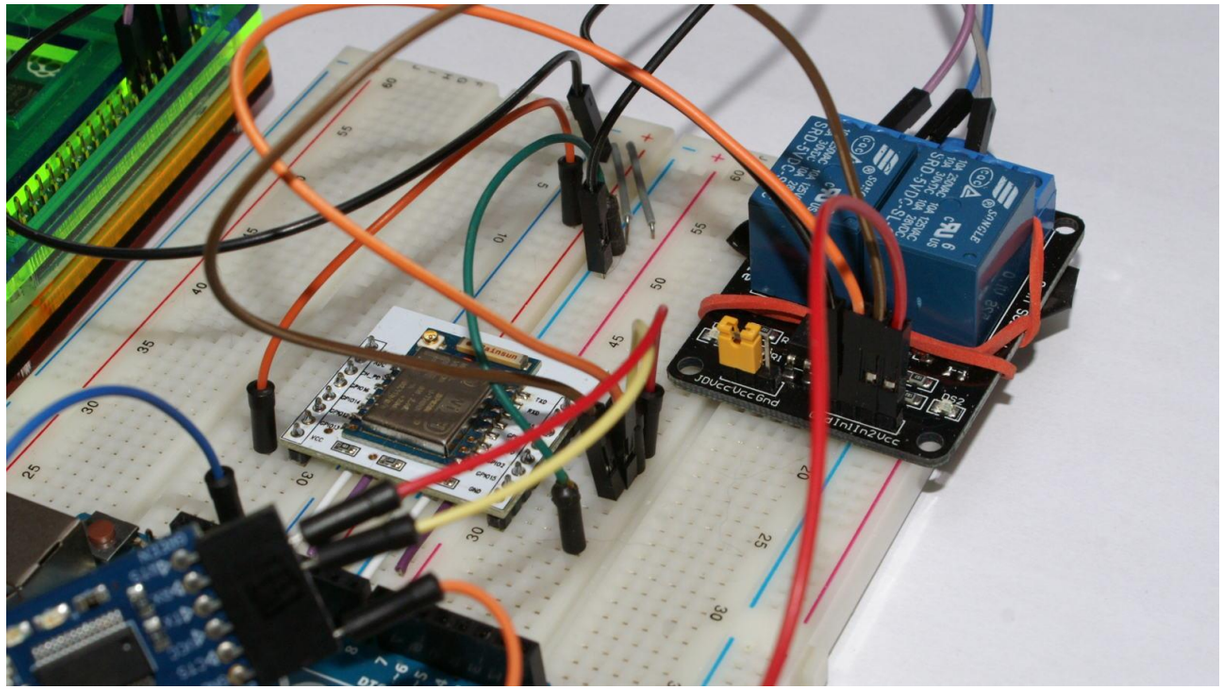



10
15
20
25
30
35


UNO
ARDUINO

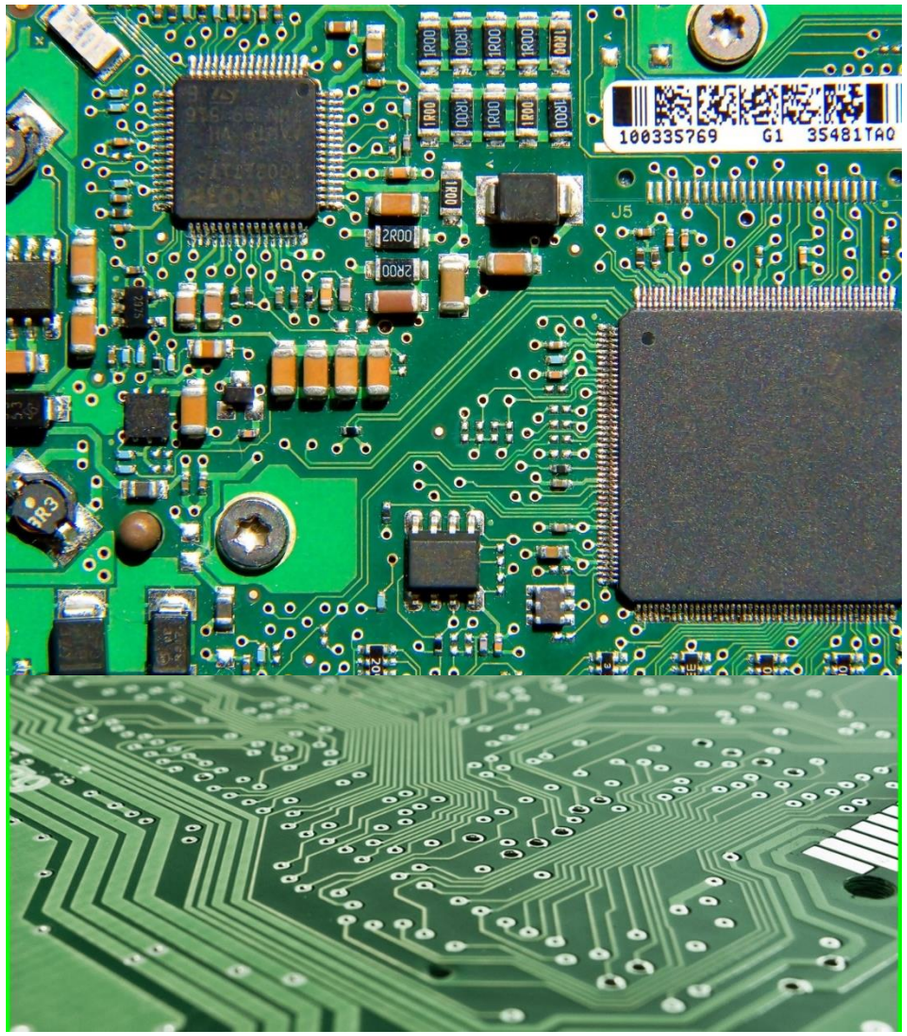


JUMPER WIRE



Breadboard Prototype

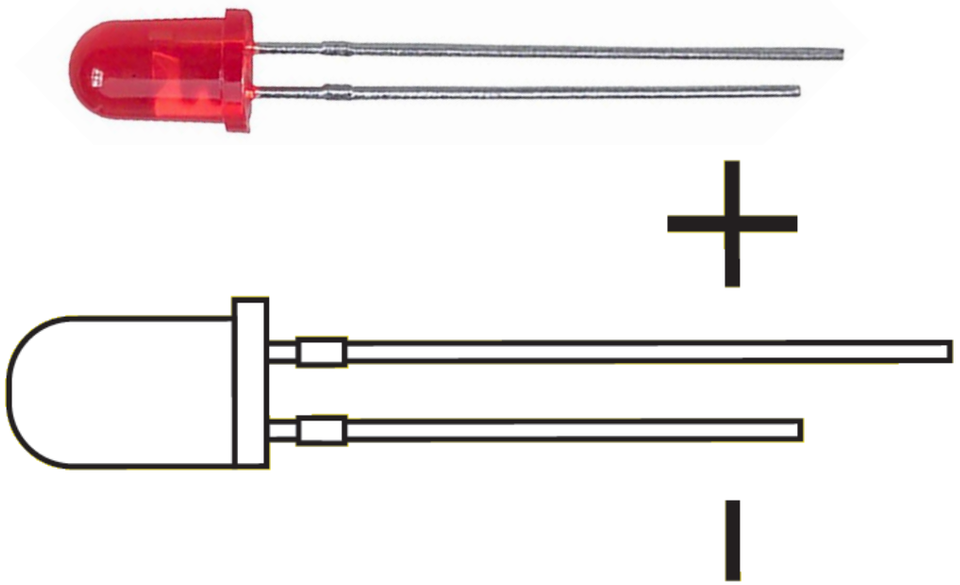
Soldered Breadboard



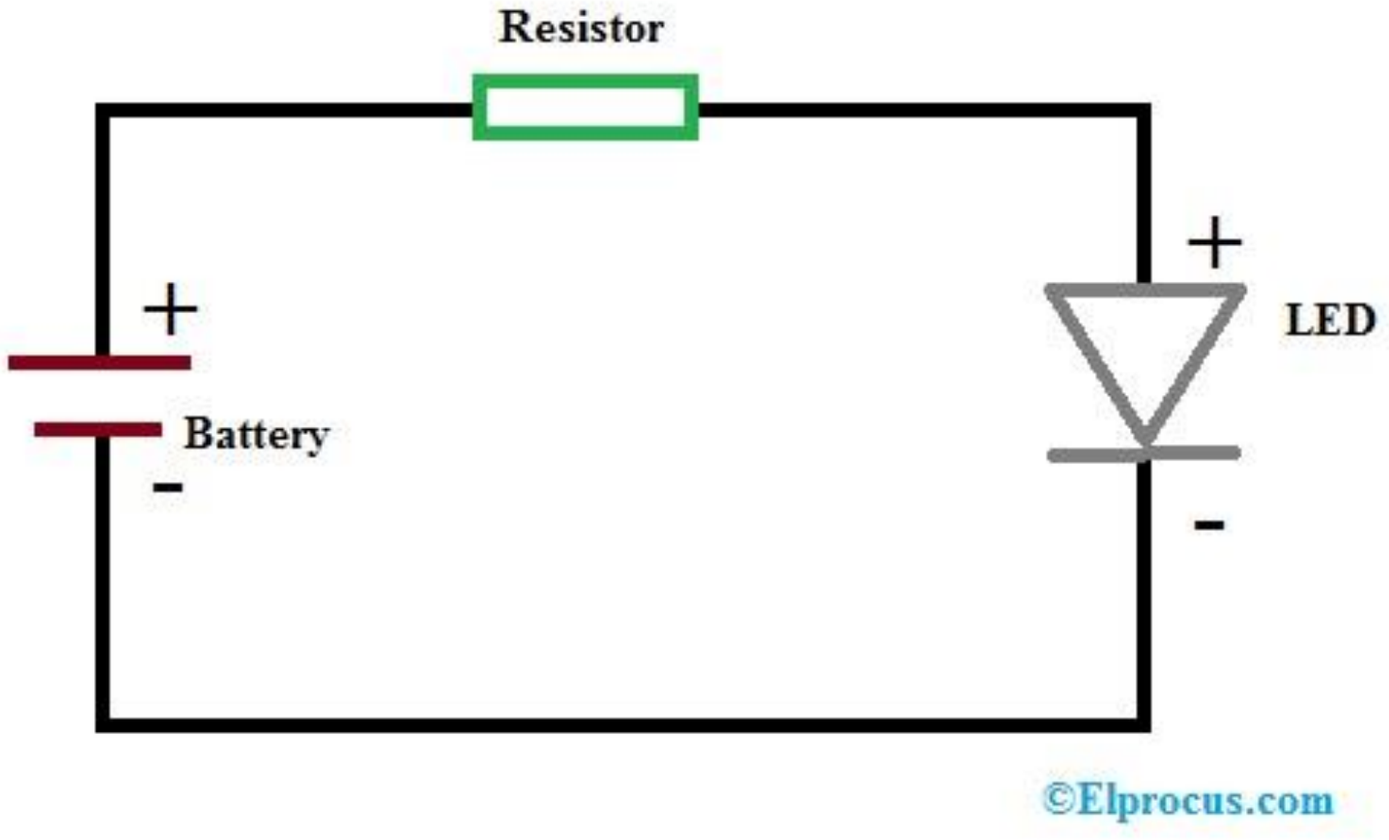
Printed Circuit Board

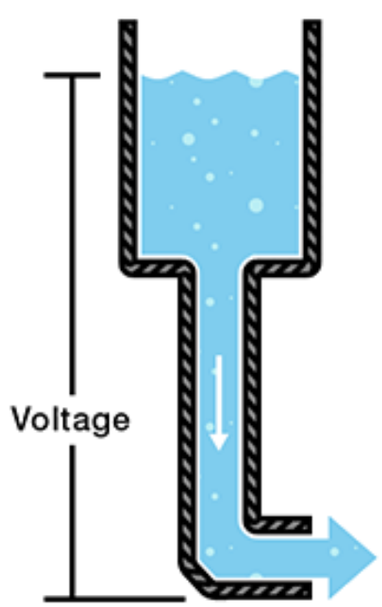
LIGHT-EMITTING DIODE (LED)

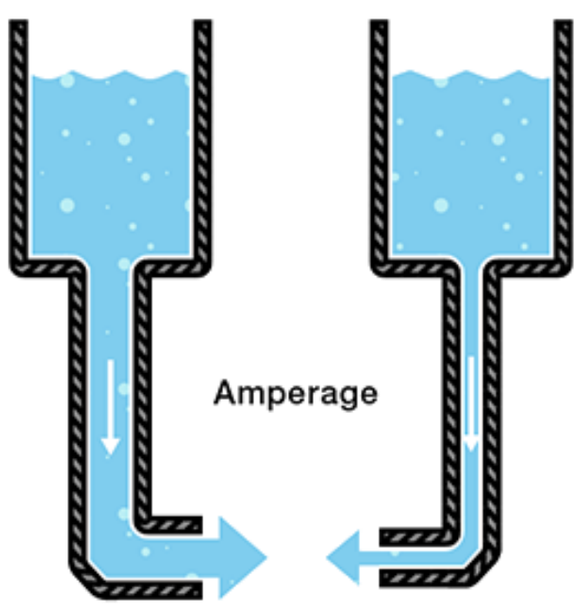

Jhakaswallpaper.com

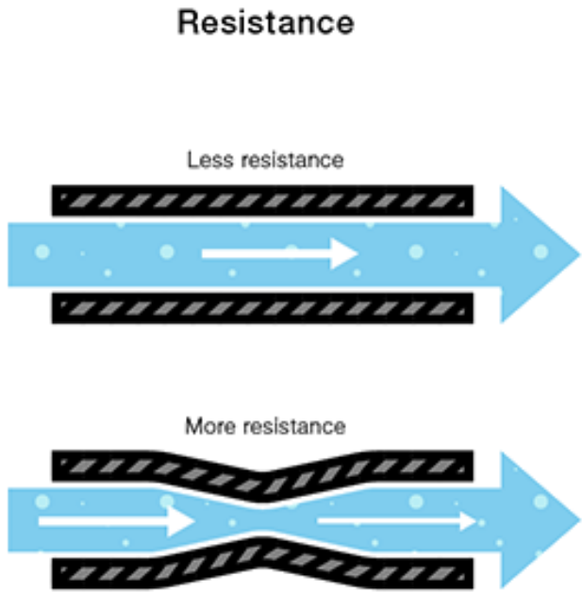


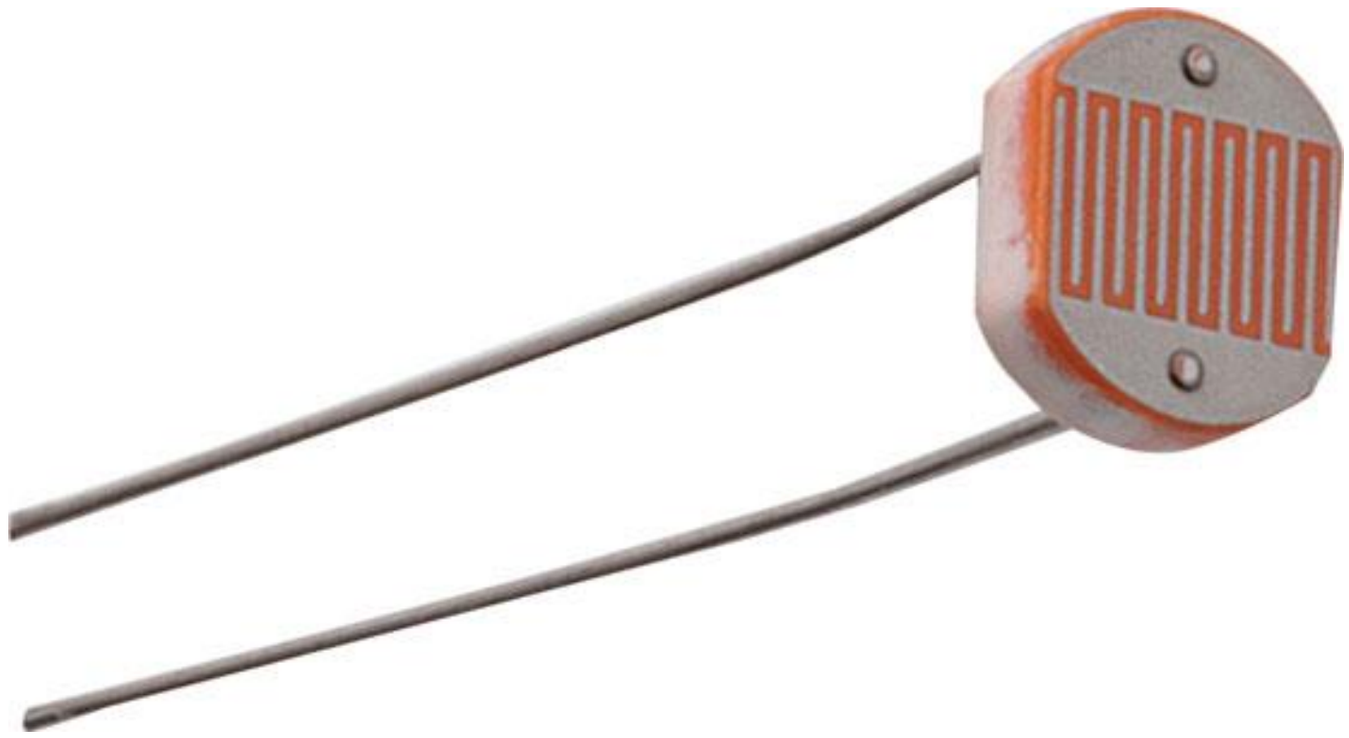
RESISTOR


Resistor
+
Battery
-
+
LED
-
©Elprocus.com

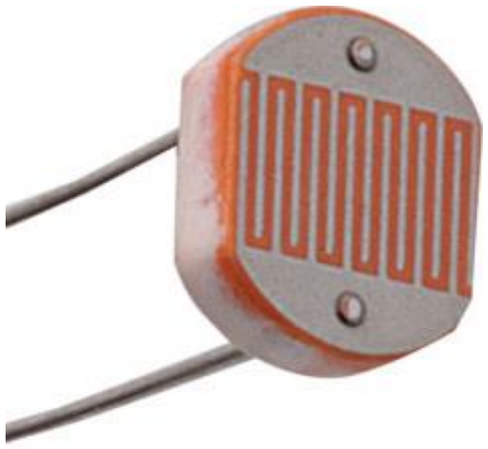

Voltage

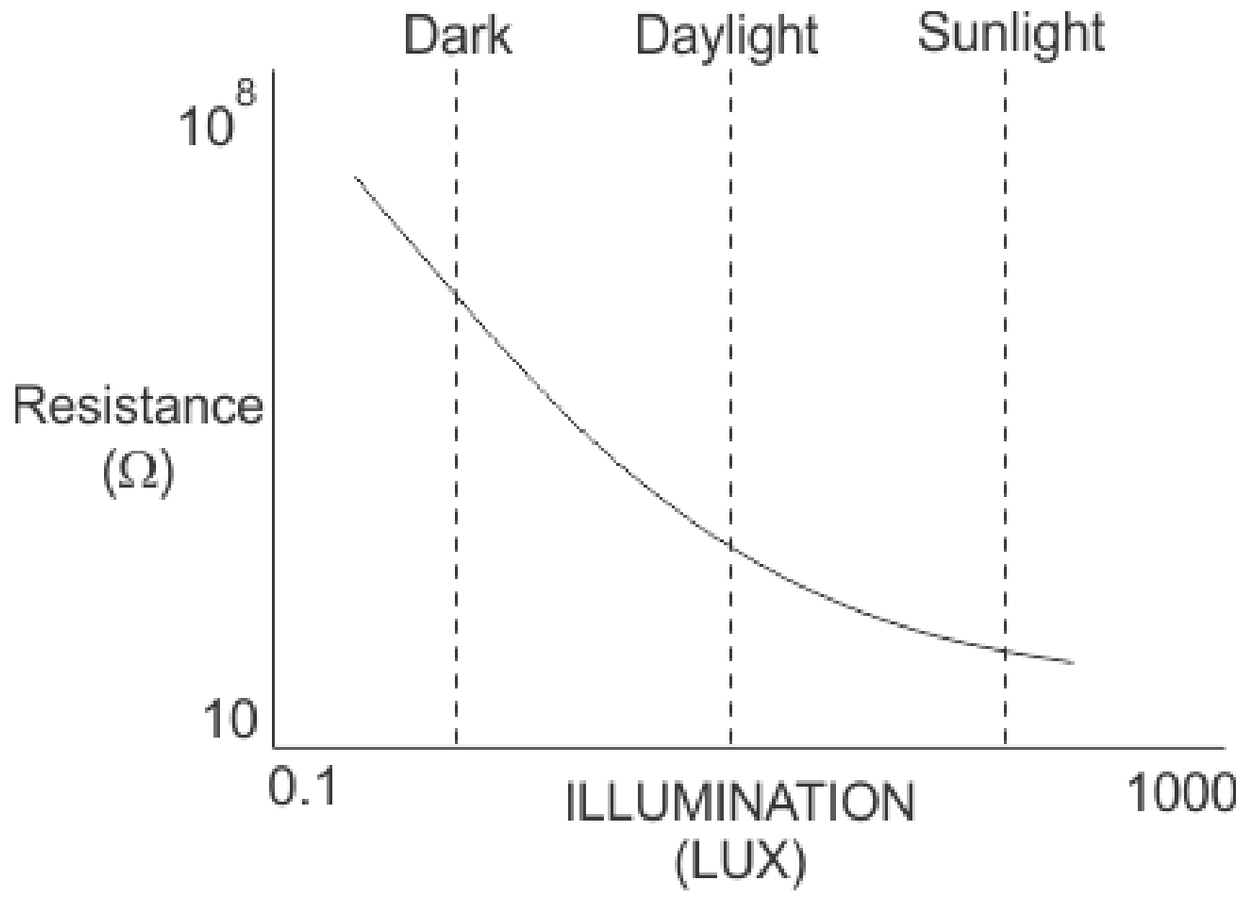

Amperage
More
Less

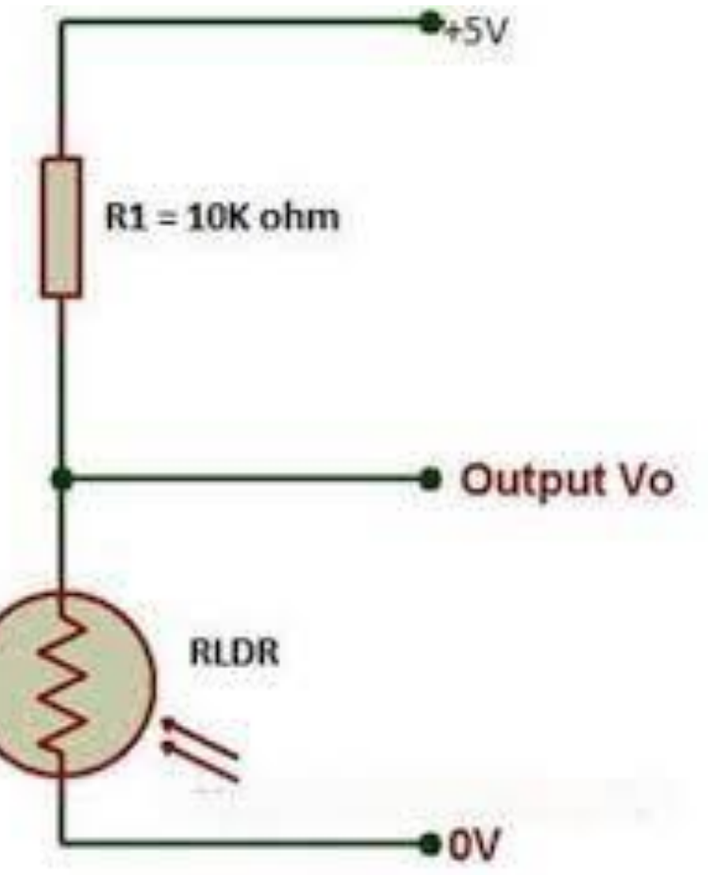

Resistance
Less resistance
More resistance



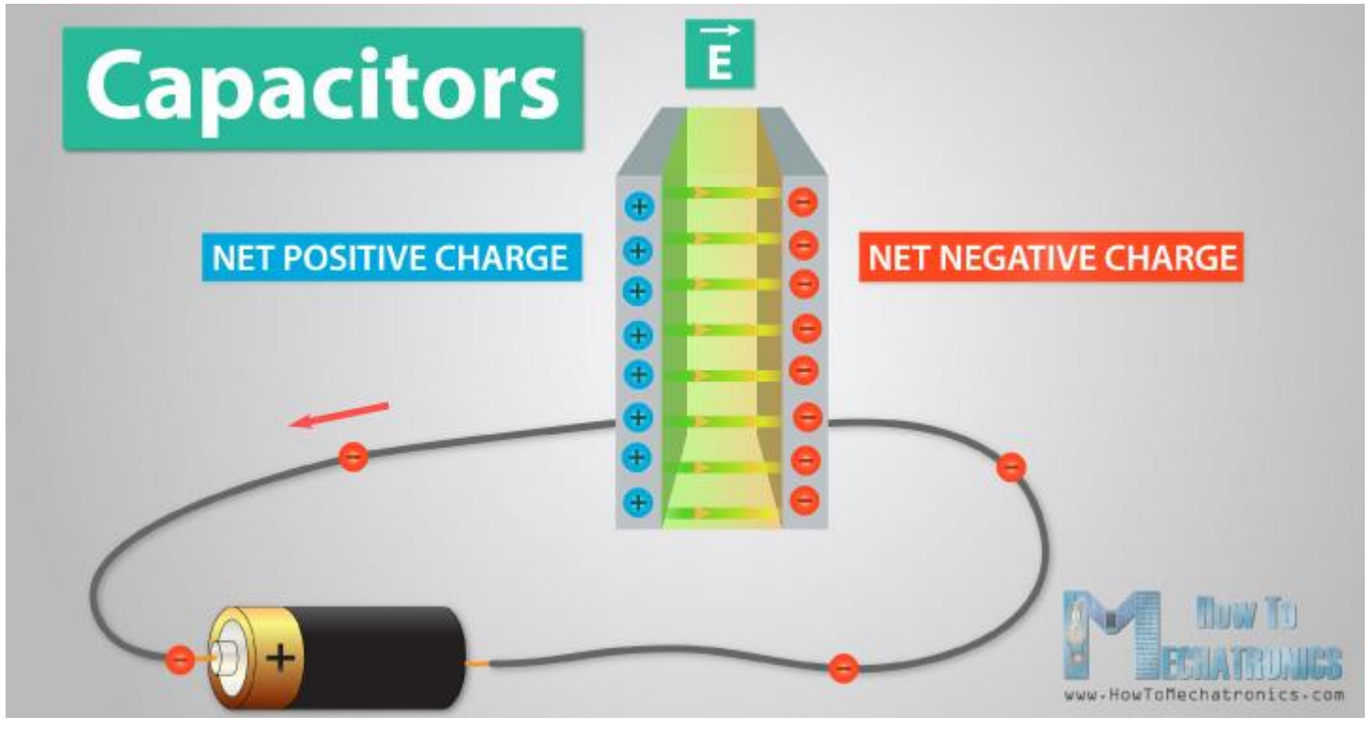
LIGHT DEPENDENT RESISTOR (LDR)

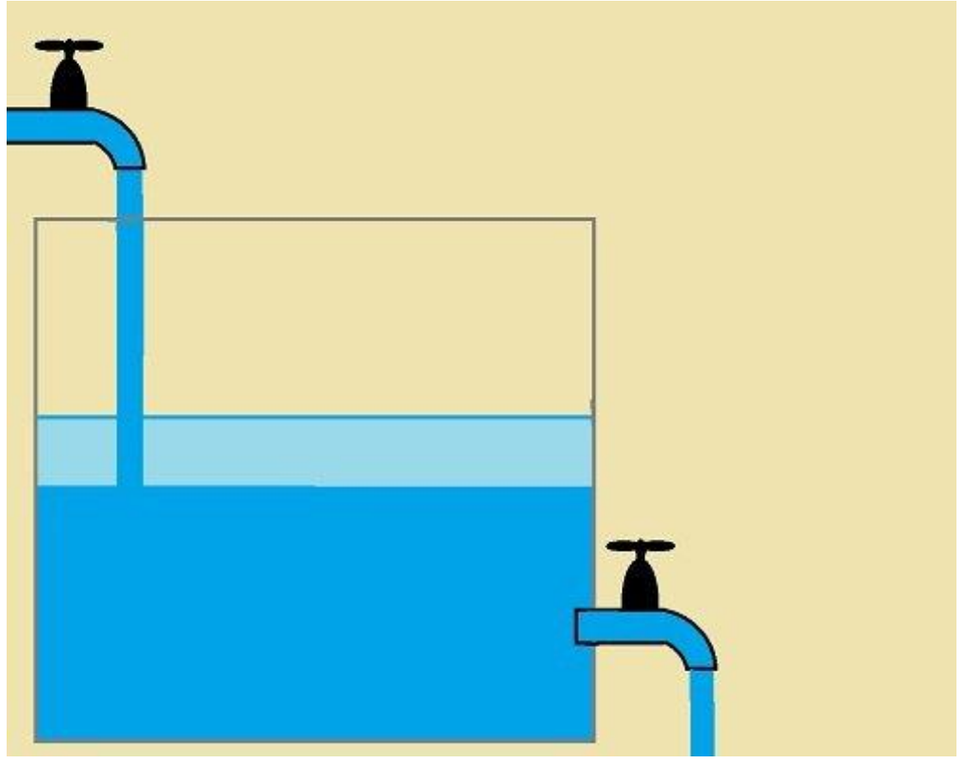


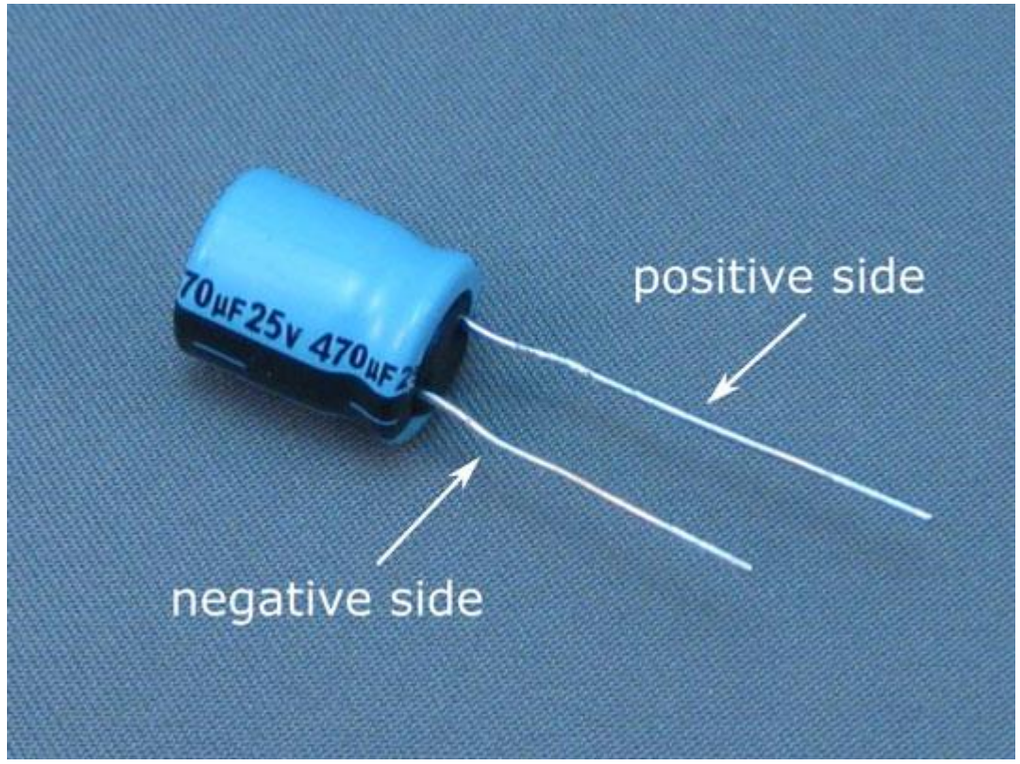

Dark
Daylight
Sunlight
10^8
Resistance
(Ω)
10
0.1
ILLUMINATION
(LUX)
1000


+5V
R1 = 10K ohm
Output Vo
RLDR
0V

CAPACITOR


Capacitors
E
NET POSITIVE CHARGE
NET NEGATIVE CHARGE
How To Mechatronics
www.HowToMechatronics.com

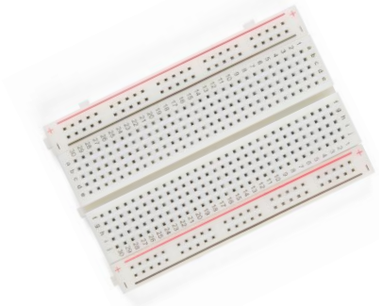



positive side
negative side

THE HARDWARE

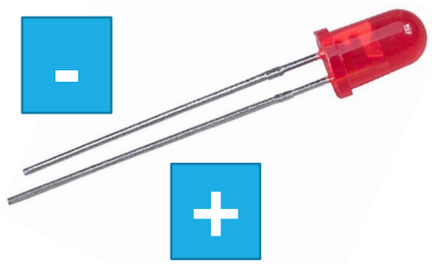
- Rasberry Pi (RPi)

- Breadboard



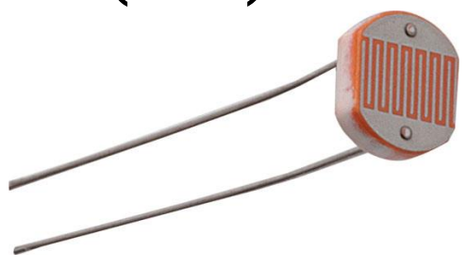
- Jumper Wires

- Light-Emitting Diode (LED)

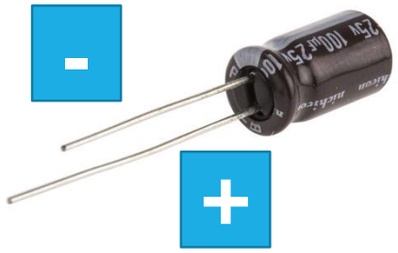


- Resistor

- Light Dependent Resistor (LDR)



- Capacitor

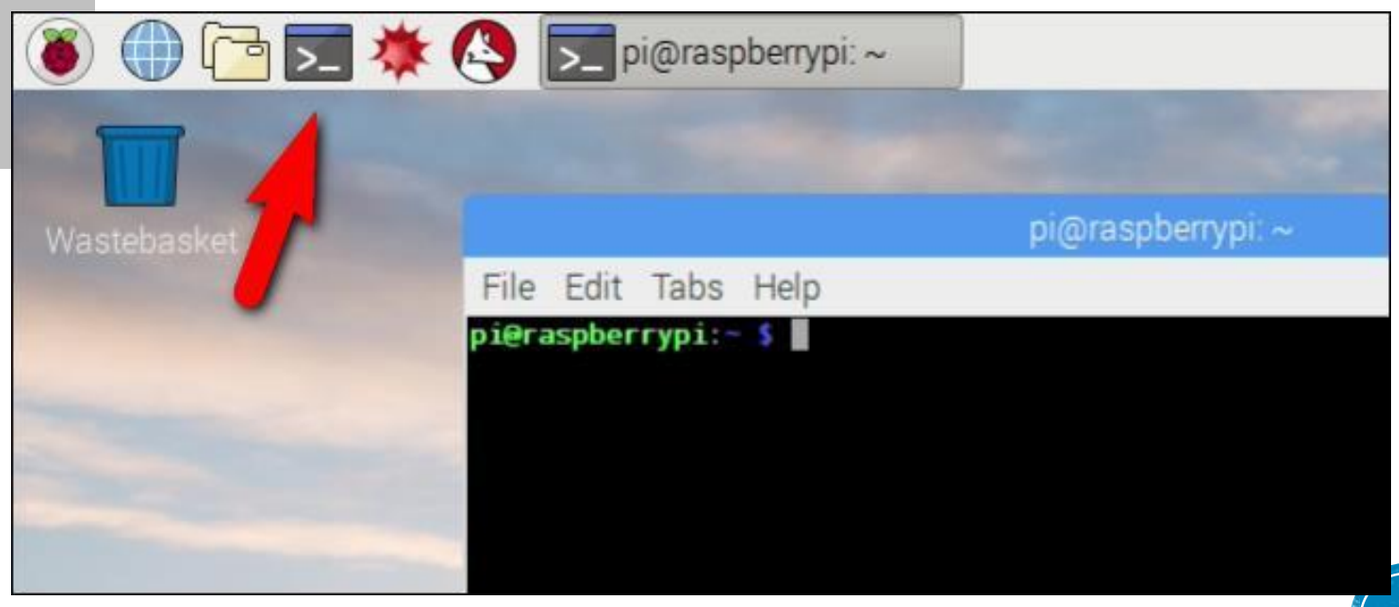


- Motion sensor (for bonus part)

PYTHON BASICS

PYTHON PROGRAMMING ON RPI


```
cd Desktop
cd CodingWorkshop
python helloworld.py
```



PYTHON BASICS

- Print statement

```
print("Hello, World!")
```

- Comment

```
#This is a comment
```

- Variables

```
x = 5
y = "John"
print(x)
print(y)
```

https://www.w3schools.com/python/trypython.asp?filename=demo_variables1

PYTHON BASICS

- If…Else block

```
a = 200
b = 33
if b > a:
  print("b is greater than a")
elif a == b:
  print("a and b are equal")
else:
  print("a is greater than b")
```

==	Equal	x == y
!=	Not equal	x != y
>	Greater than	x > y
<	Less than	x < y
>=	Greater than or equal to	x >= y
<=	Less than or equal to	x <= y

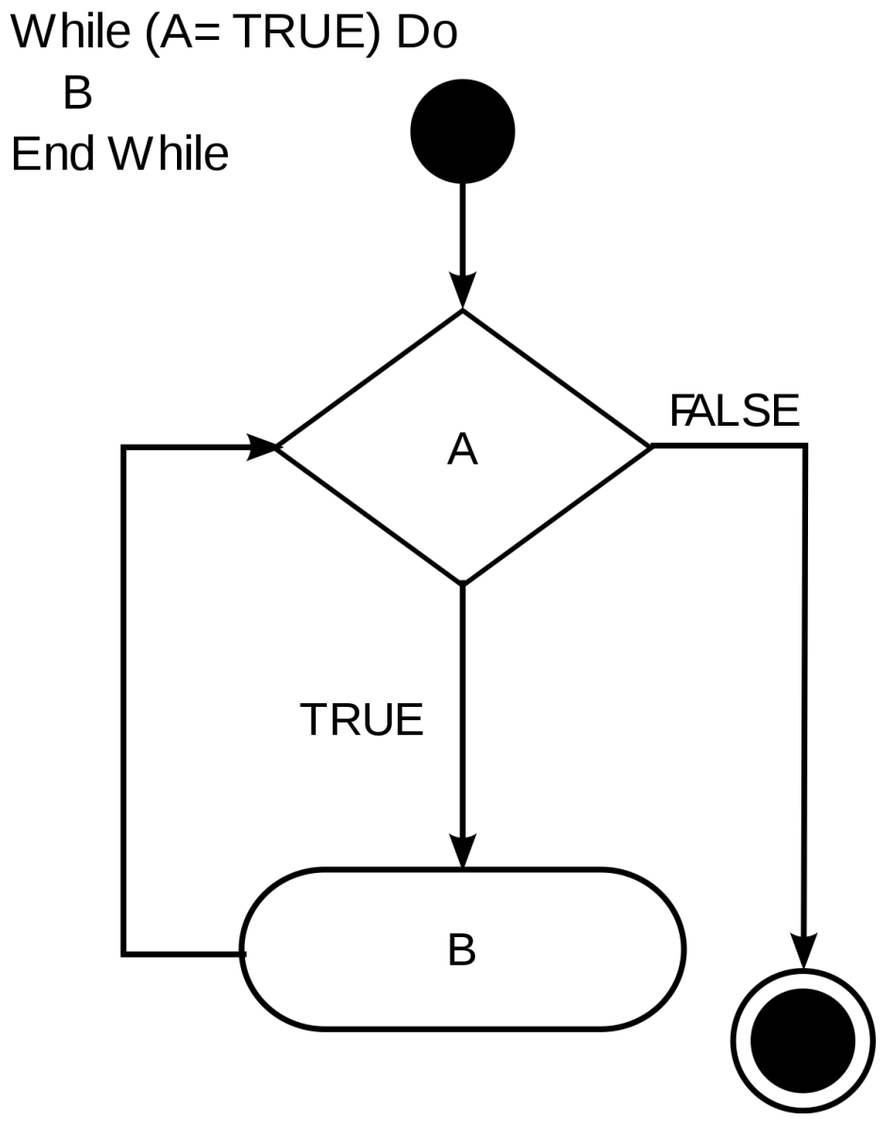
https://www.w3schools.com/python/trypython.asp?filename=demo_if_else

PYTHON BASICS

- While loop

```
i = 1
while i < 6:
  print(i)
  if i == 3:
    break
  i += 1
```

https://www.w3schools.com/python/trypython.asp?filename=demo_while_break



PYTHON BASICS

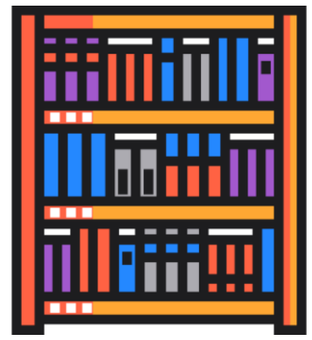
- Library imports

```
from gpiozero import LED
from time import sleep

led = LED(17)

while True:
    led.on()
    sleep(1)
    led.off()
    sleep(1)
```

https://gpiozero.readthedocs.io/en/stable/api_input.html



Library/Module

Imports

Your code program