

Physical Computing

Tech Input Day 2

1st Semester HS25
BA Interaction Design
Johannes Reck & Duy Bui

Schedule

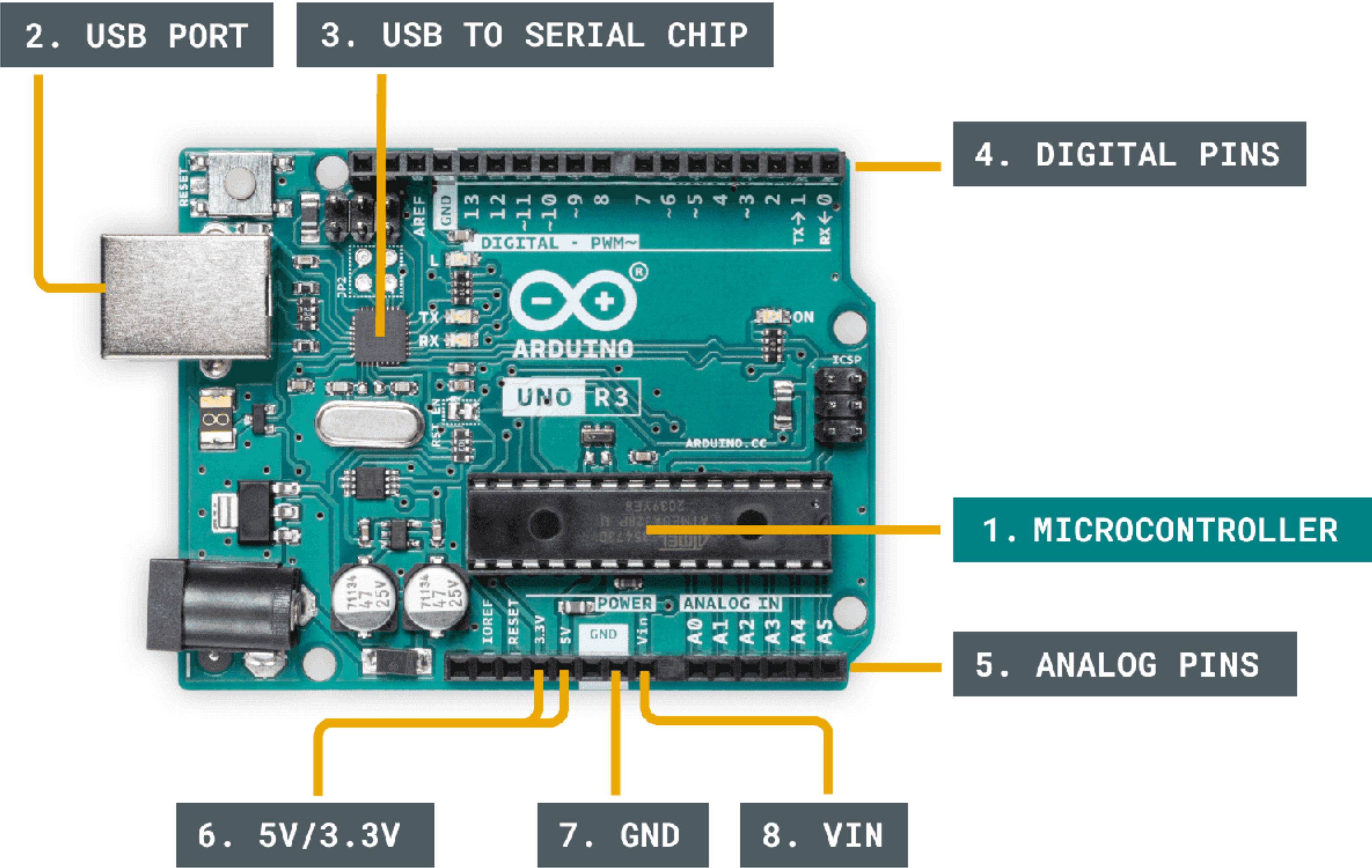
Digital Input

10:00 – 12:00

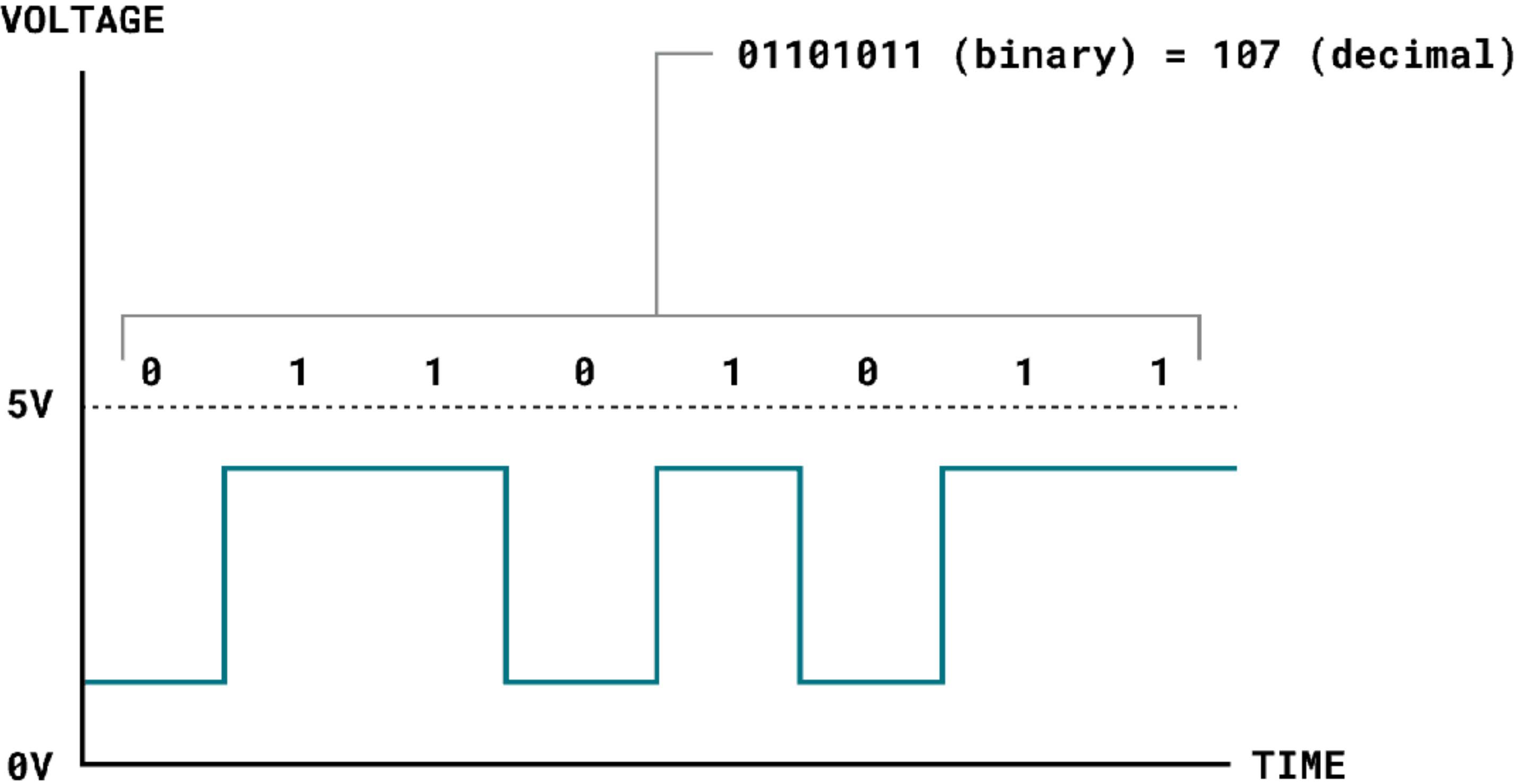
Analog Input & Analog Sensors

13:30 – 15:00

Digital Input

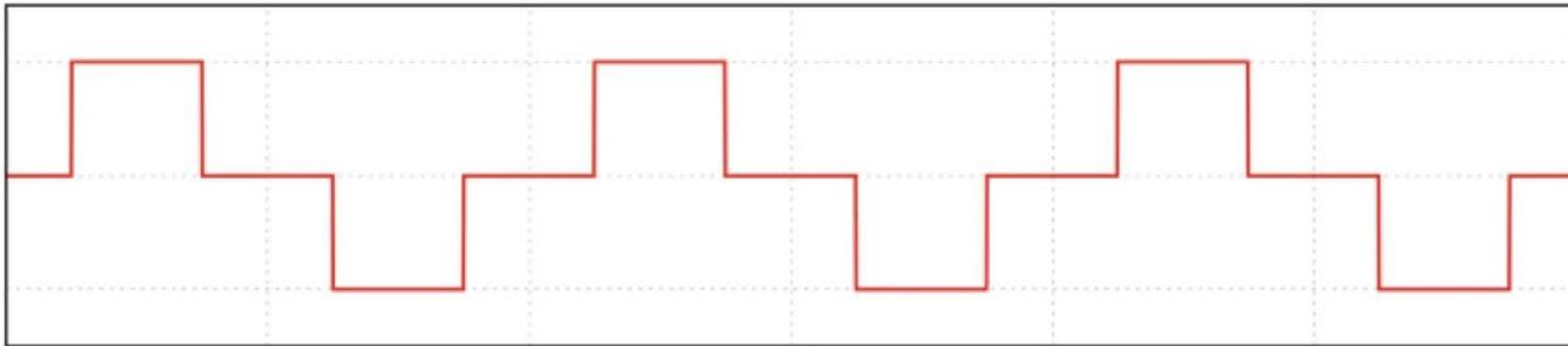
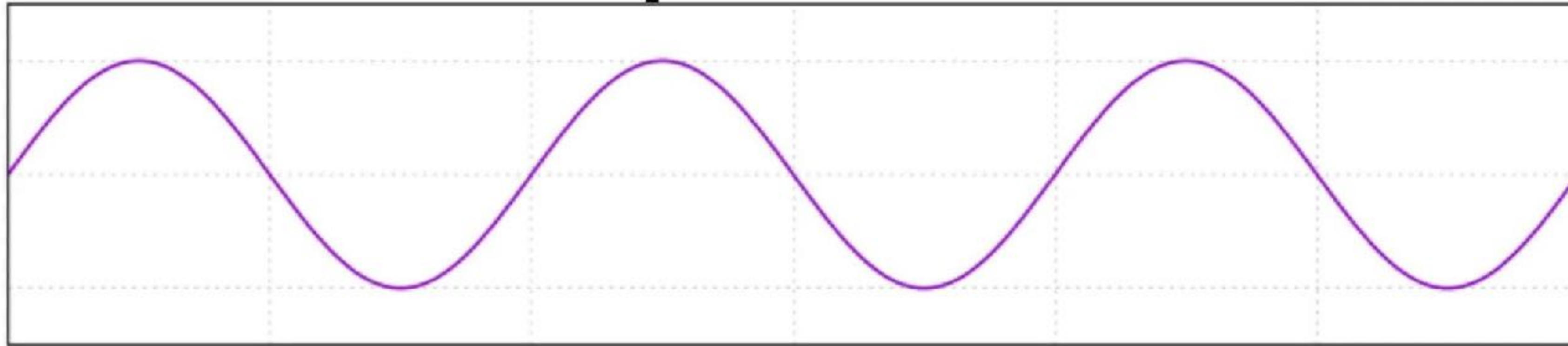


Digital Input



Digital Input

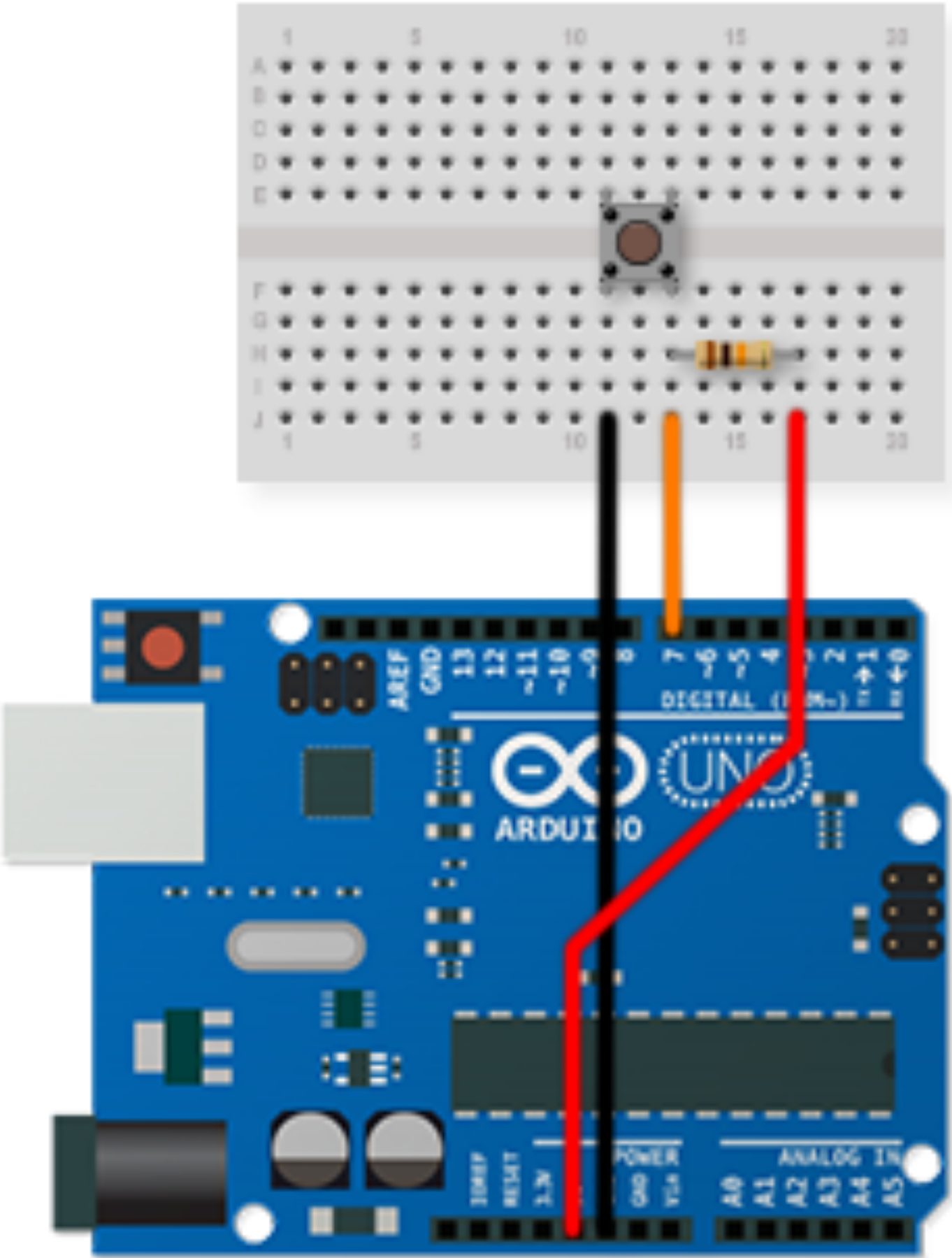
Uncompressed WAV



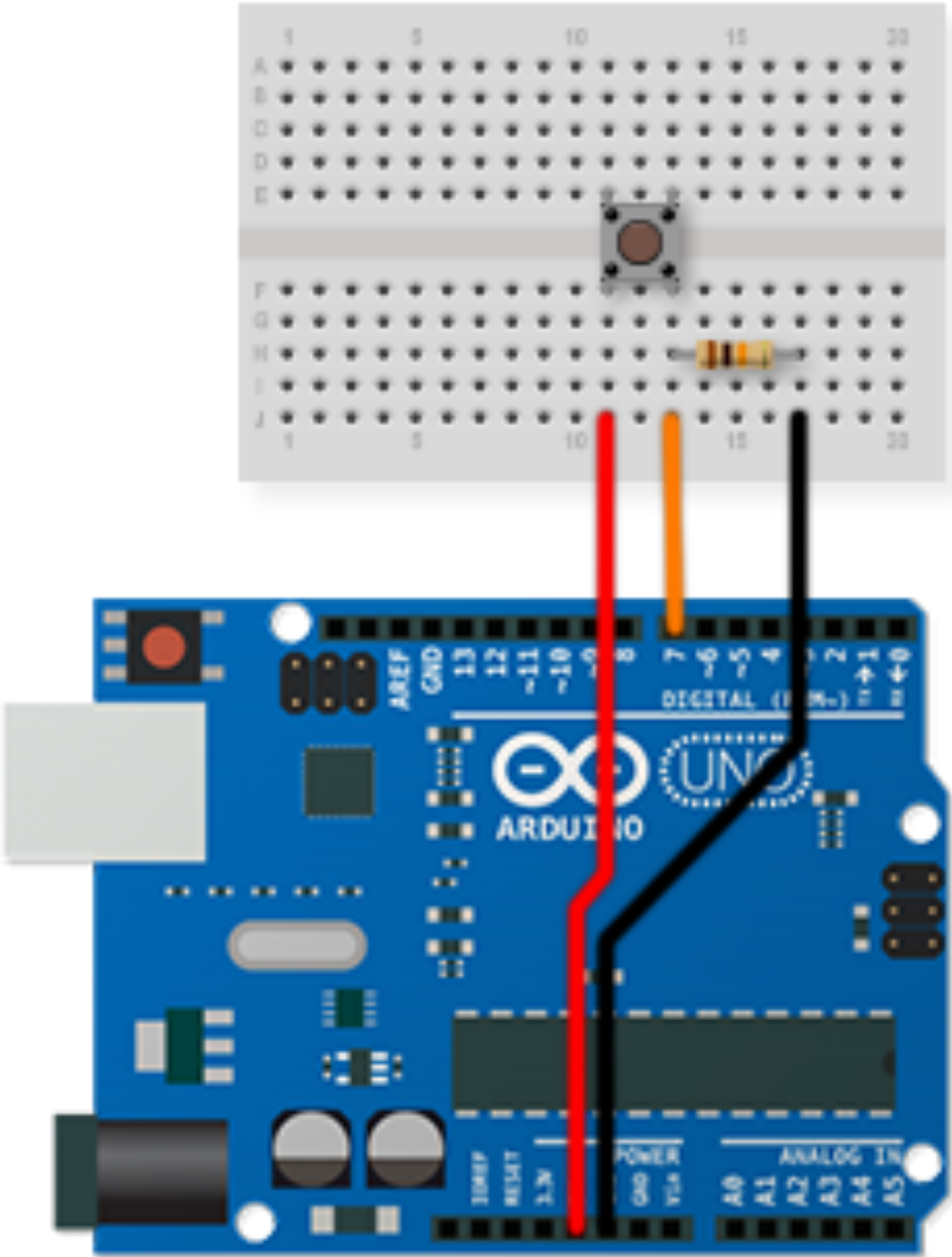
Lossy MP3

Digital Input

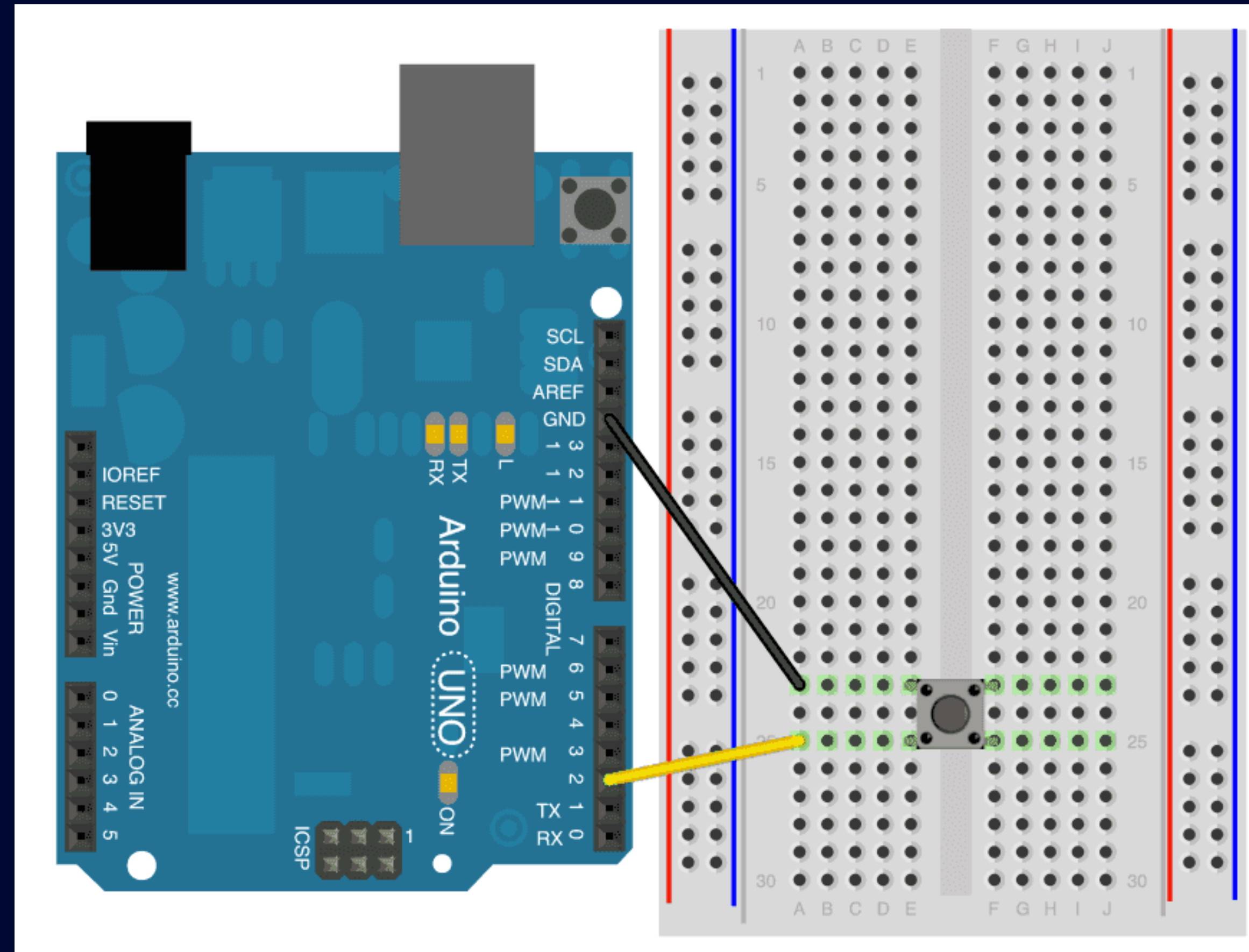
Negative Logik



Positive Logik



PullUp

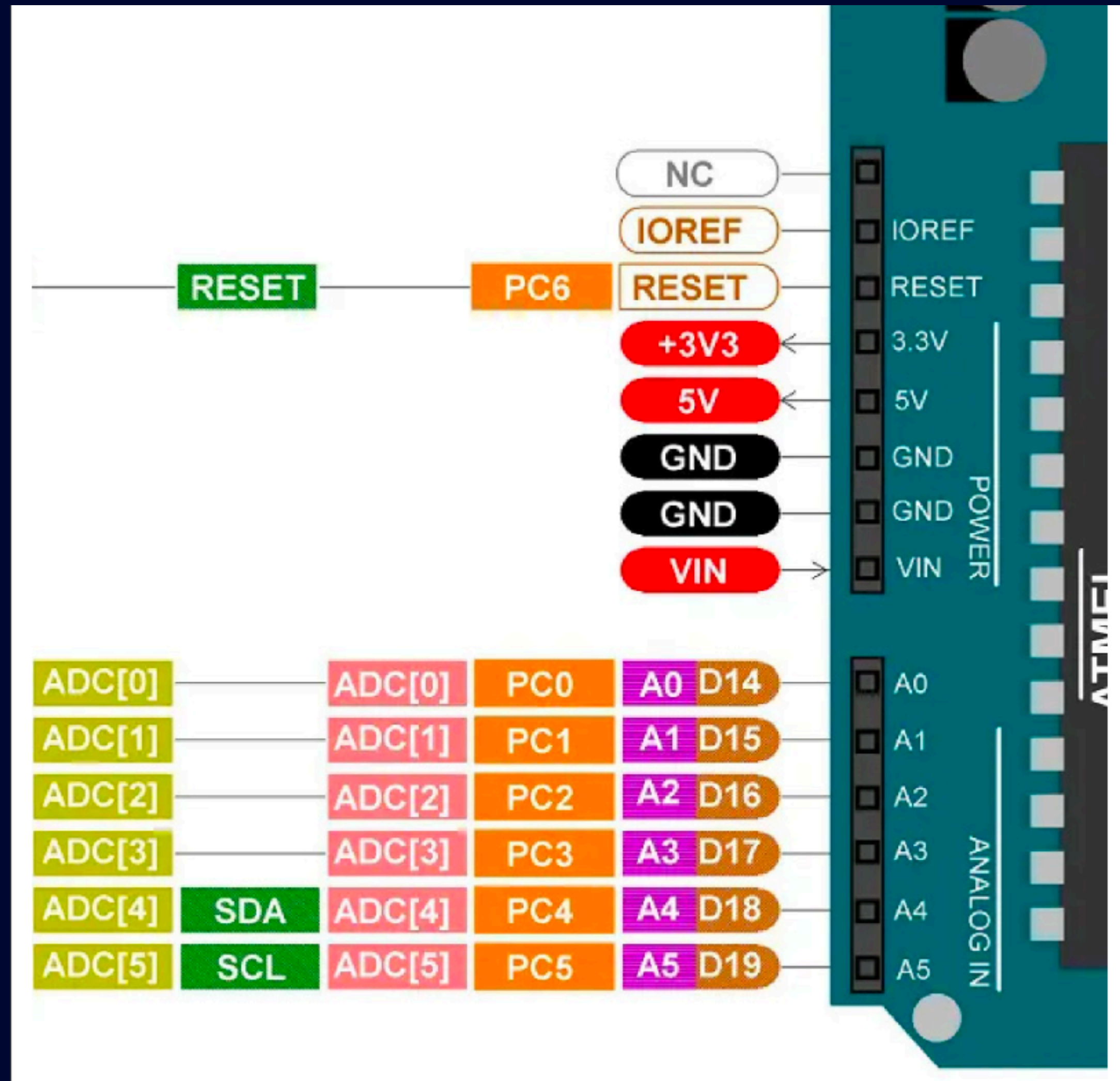


```
pinMode(2, INPUT_PULLUP);
```

Exercise

1. Use a button to switch between two LEDs.
2. Write the code so that the change only takes place after pressing the button 3 times.

Analog Input

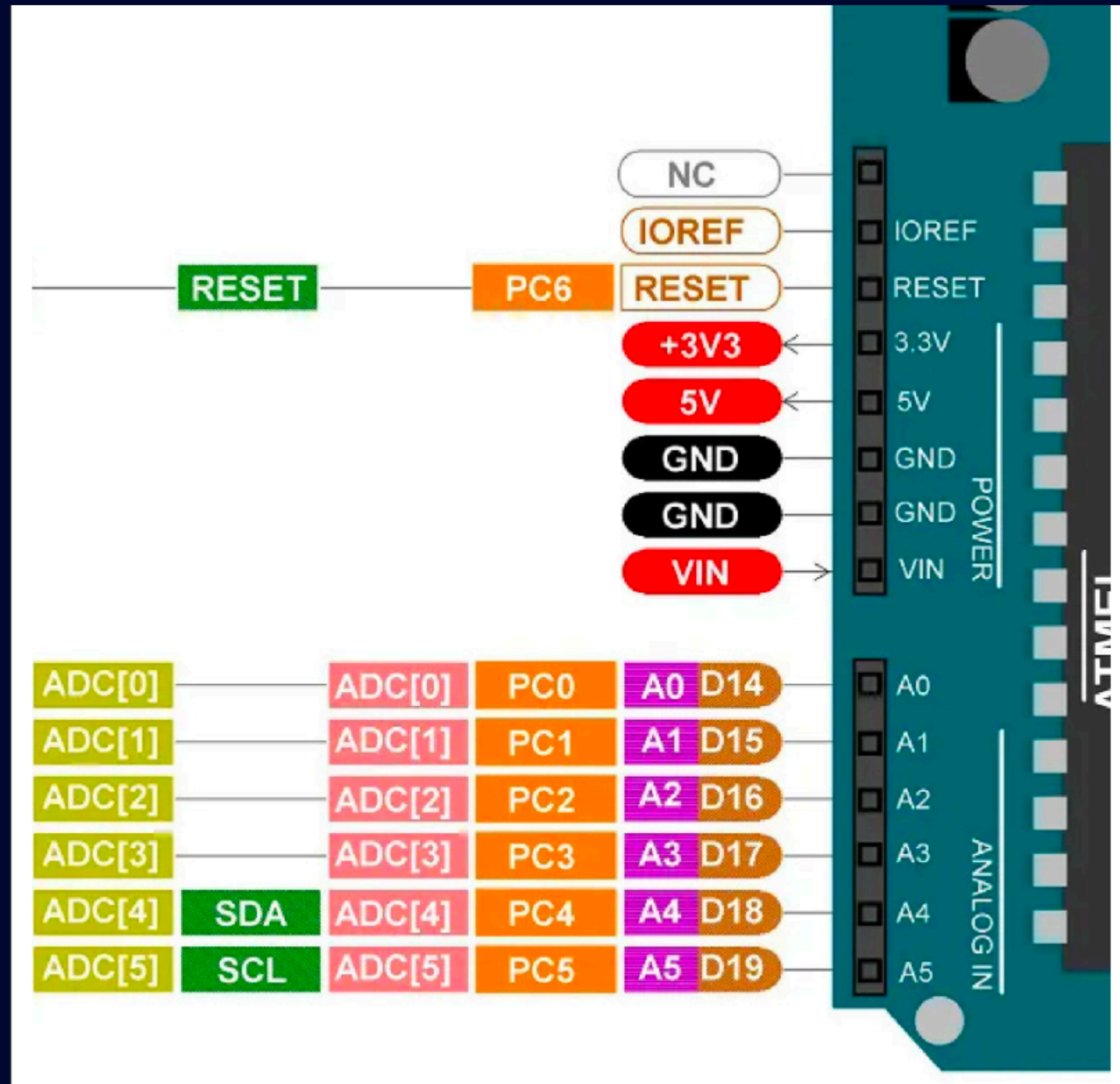


10-Bit:
0 - 5 V / 1024 Steps

```
pinMode(Pin_Number, Mode)
analogRead(Pin_Number)
analogWrite(Pin_Number, Value)
```

Modes:
OUTPUT, INPUT, INPUT_PULLUP

Analog Input

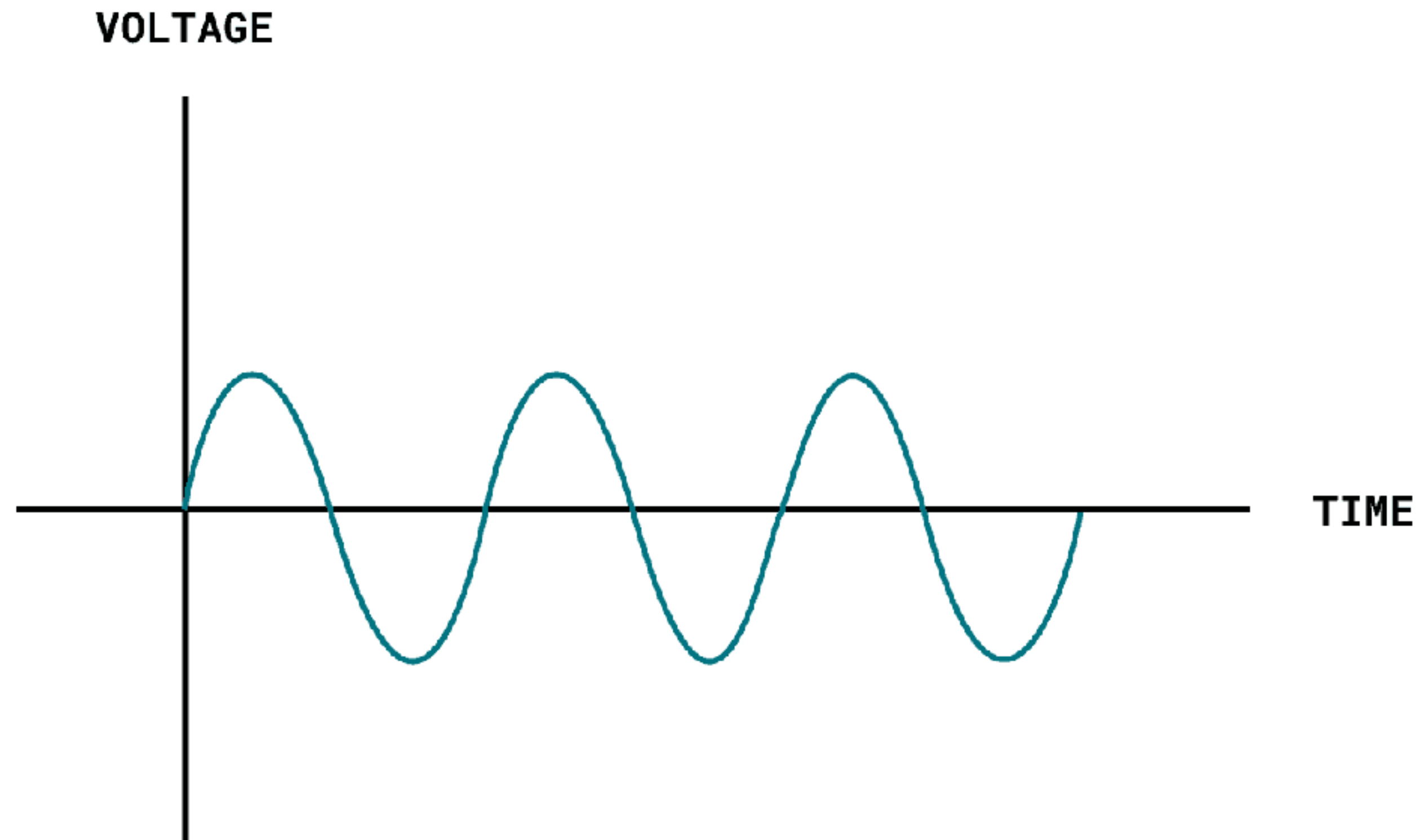


10-Bit:
0 - 5 V / 1024 Steps

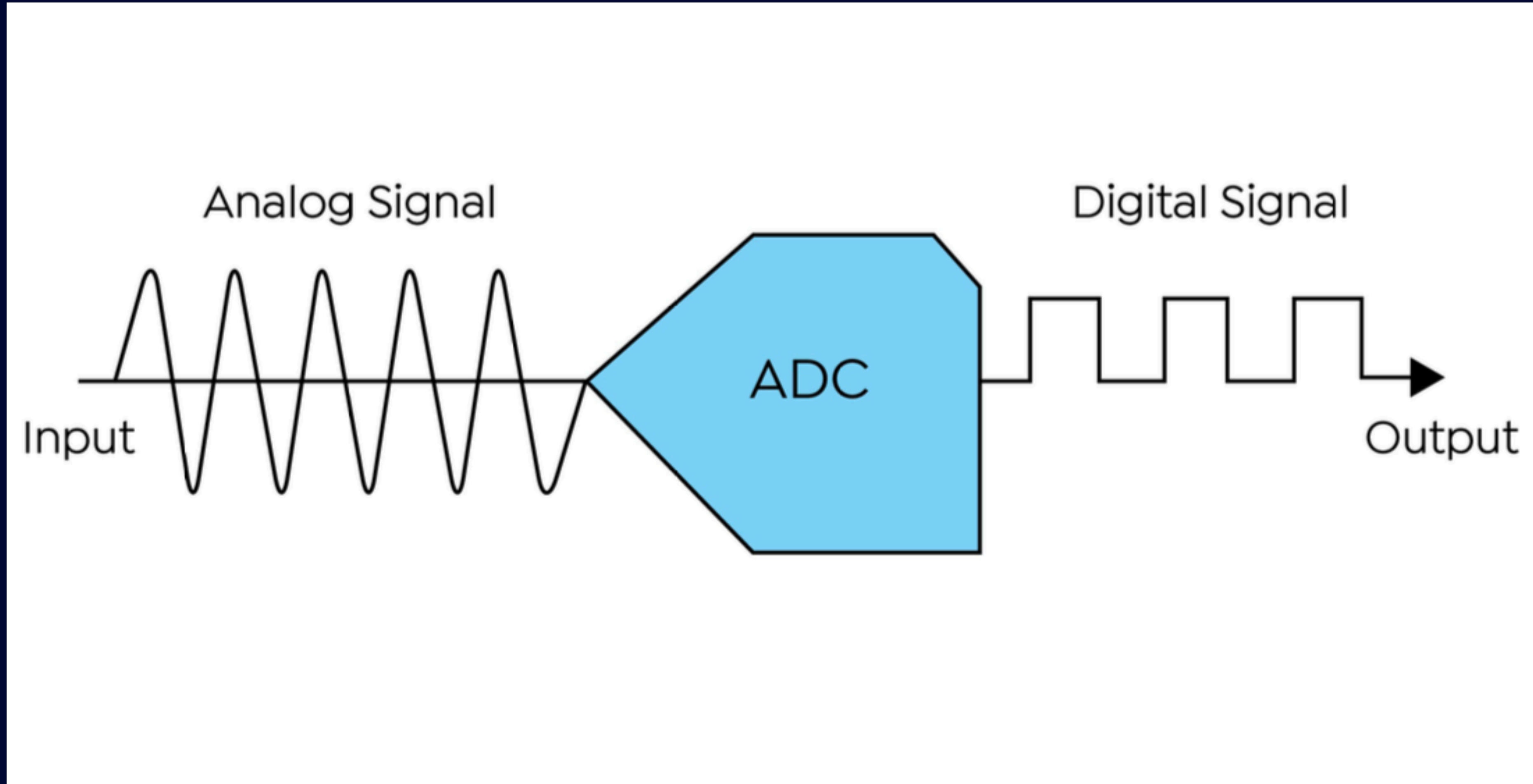
```
pinMode(Pin_Number, Mode)
analogRead(Pin_Number)
analogWrite(Pin_Number, Value)
```

Modes:
OUTPUT, INPUT, INPUT_PULLUP

Analog Input

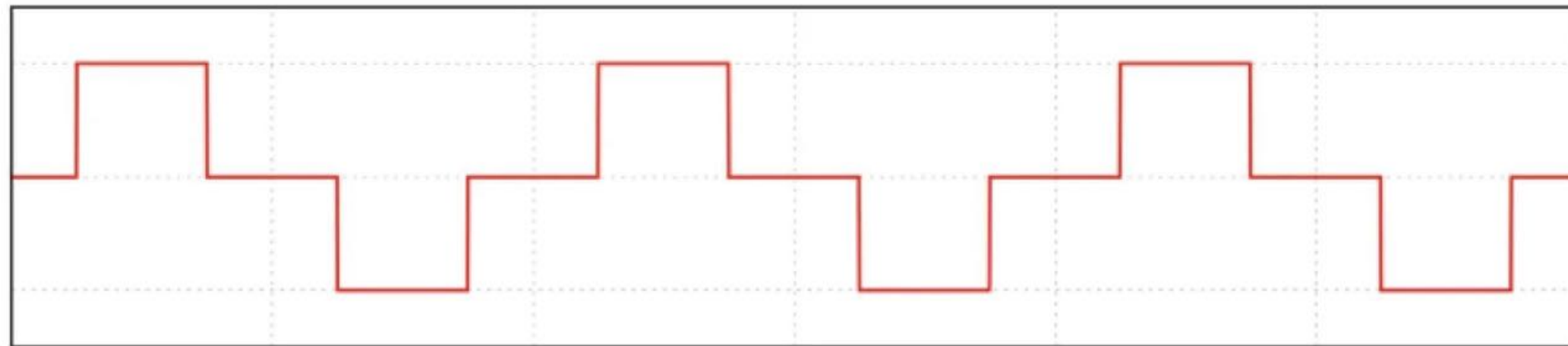
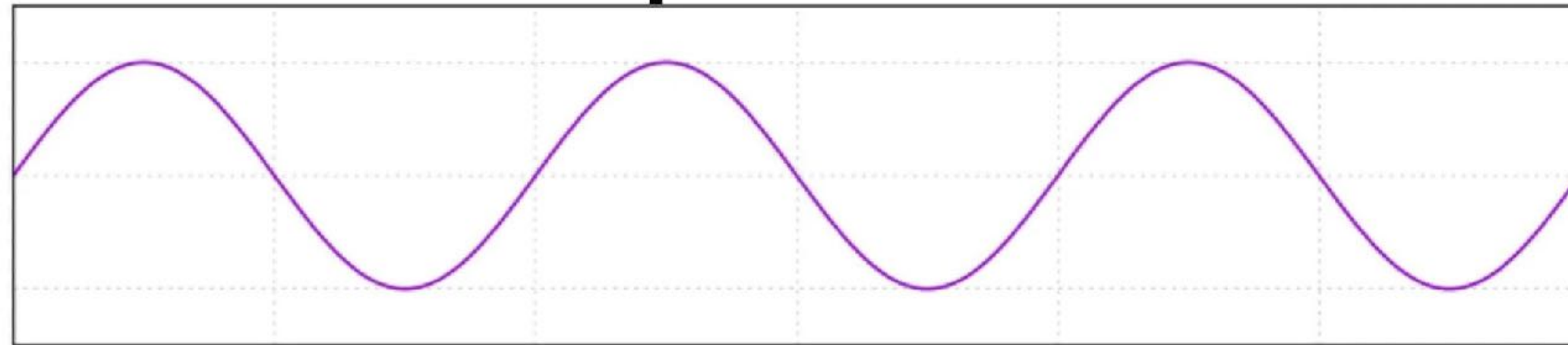


Analog Input

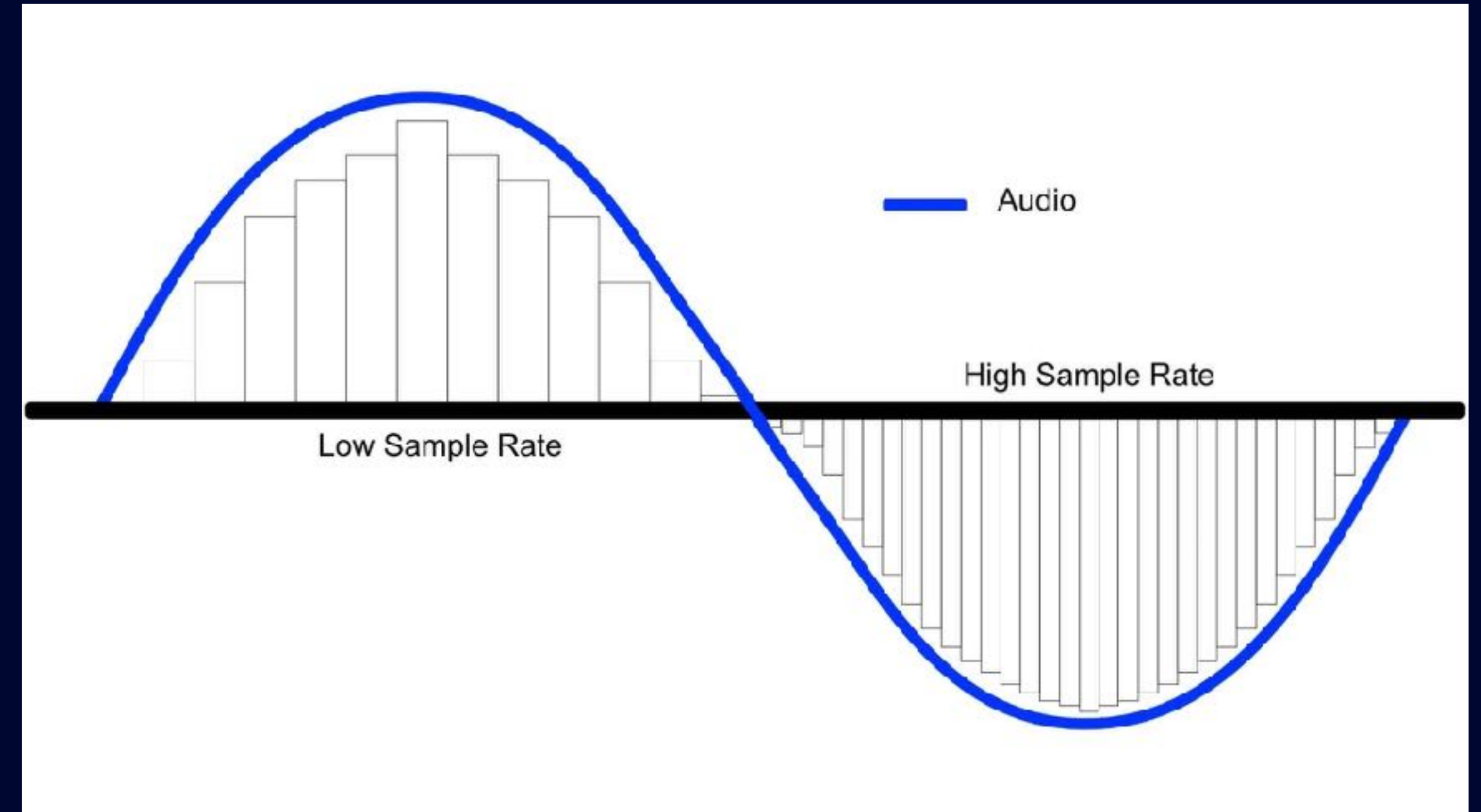


Analog Input

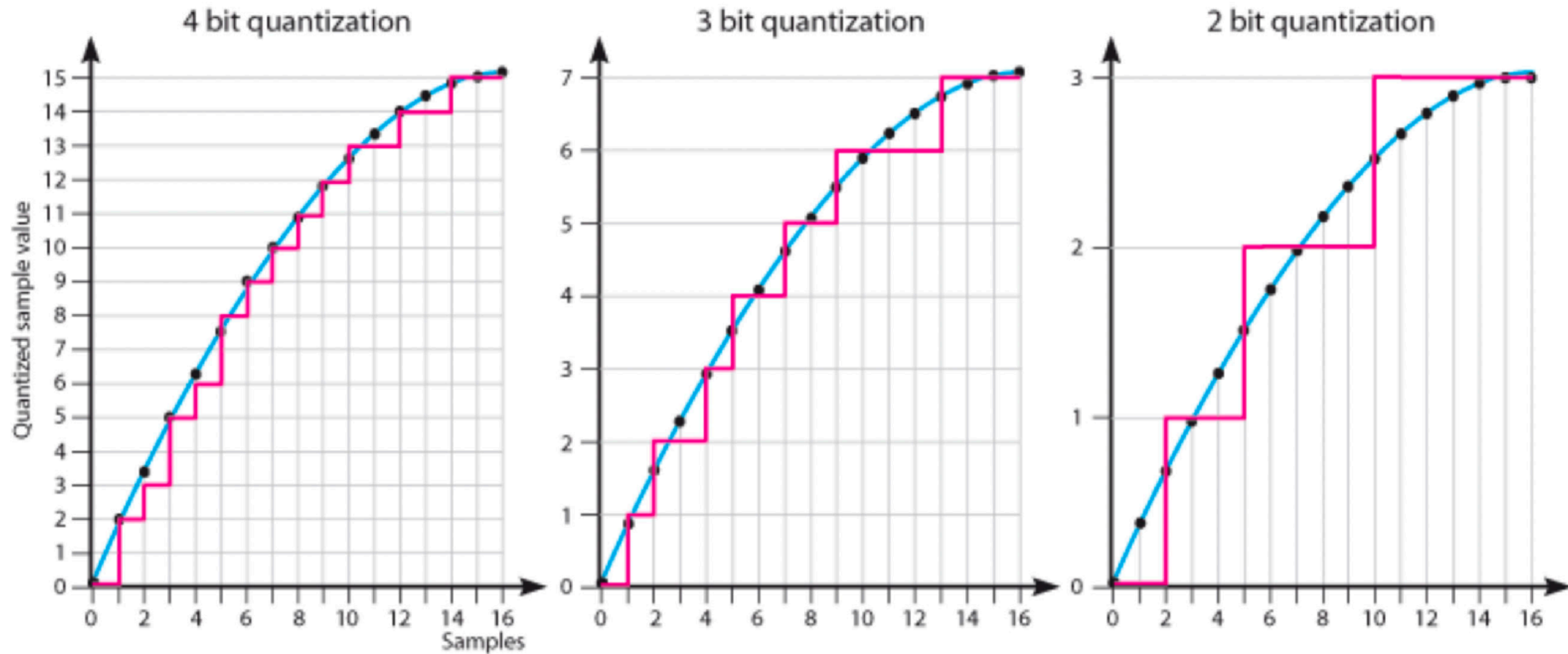
Uncompressed WAV



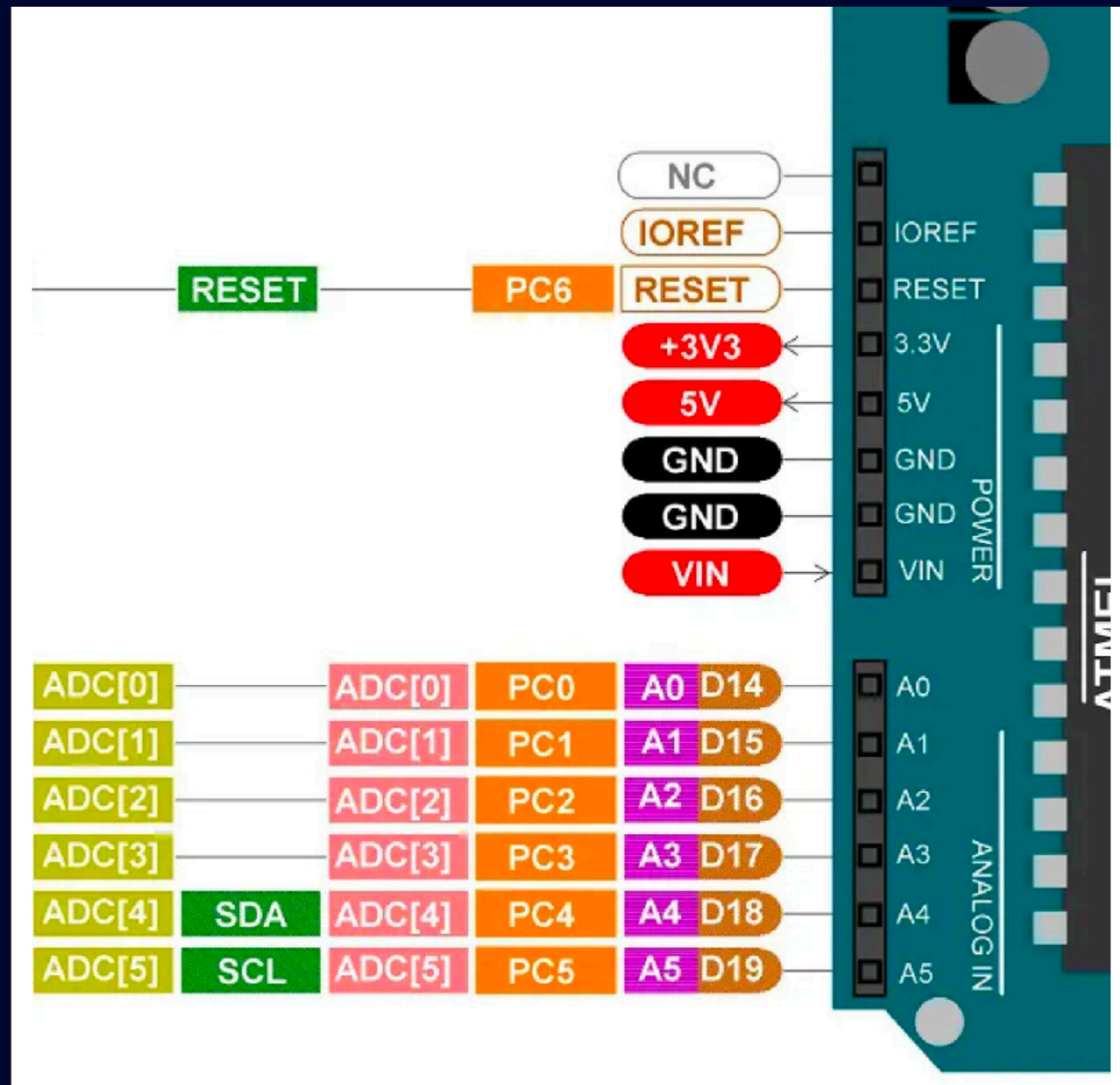
Lossy MP3



Analog Input



Analog Input



10-Bit:
0 - 5 V / 1024 Steps

```
pinMode(Pin_Number, Mode)
analogRead(Pin_Number)
analogWrite(Pin_Number, Value)
```

Modes:
OUTPUT, INPUT, INPUT_PULLUP

Analog Sensors

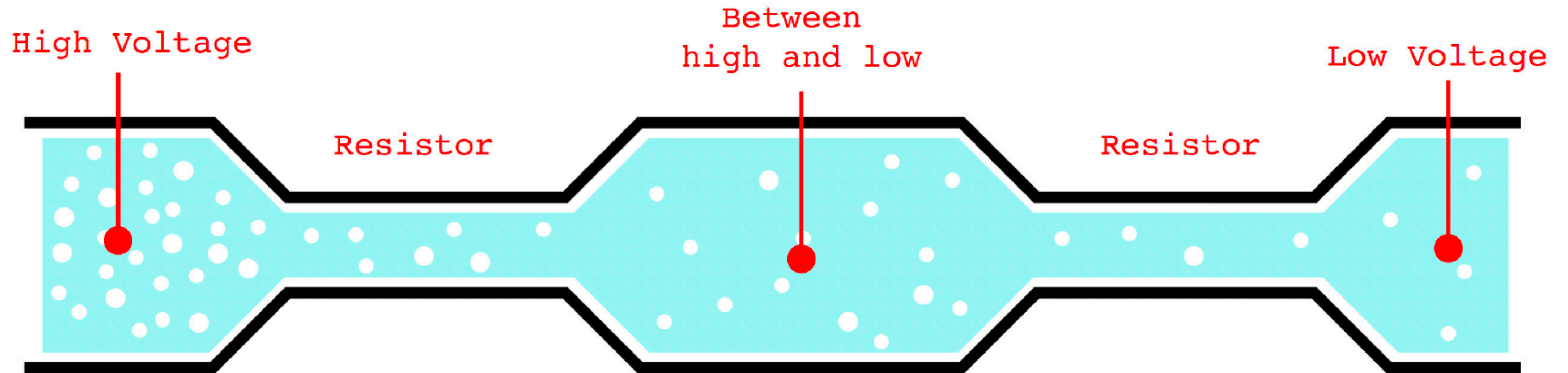
1 bit $\rightarrow$ 0 or 1 $\rightarrow$ 2 (2^1)

2 bit $\rightarrow$ 00, 01, 10, 11 $\rightarrow$ 4 (2^2)

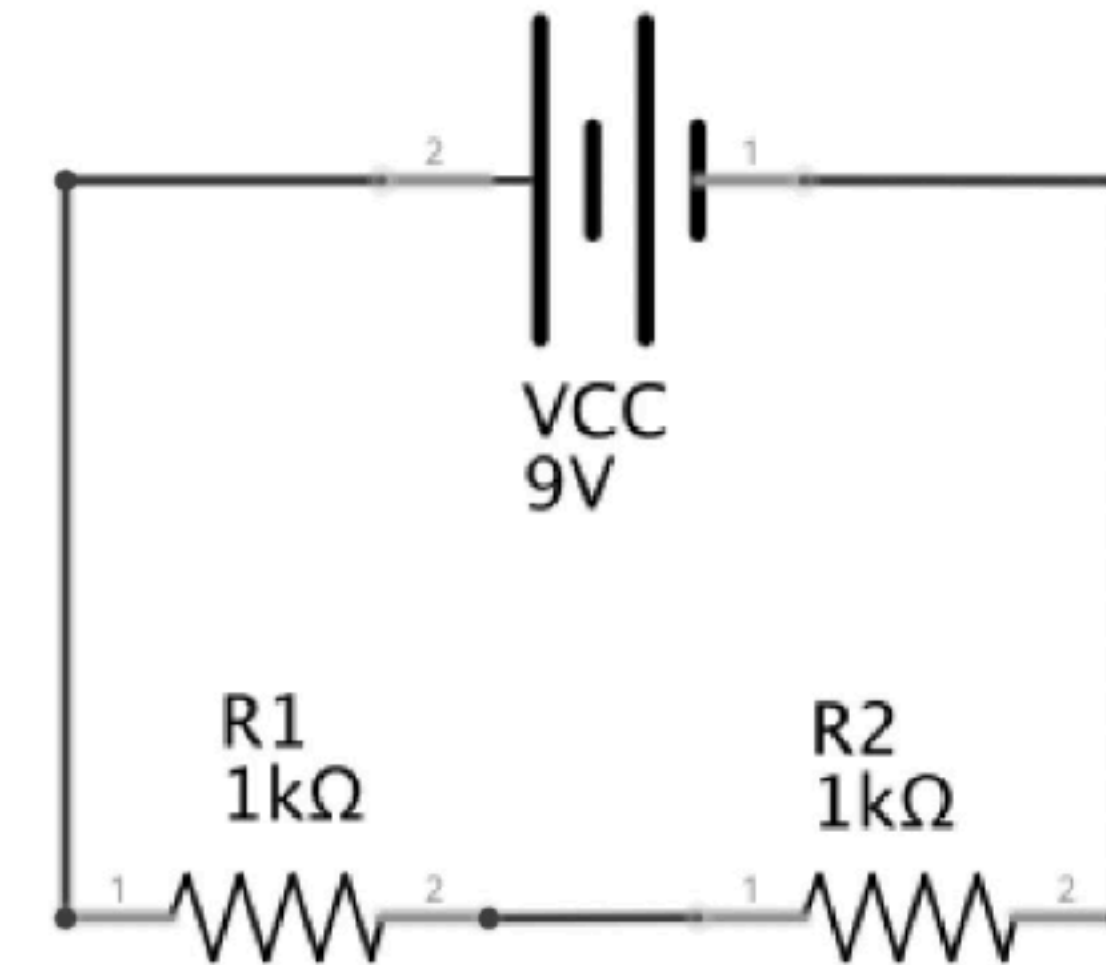
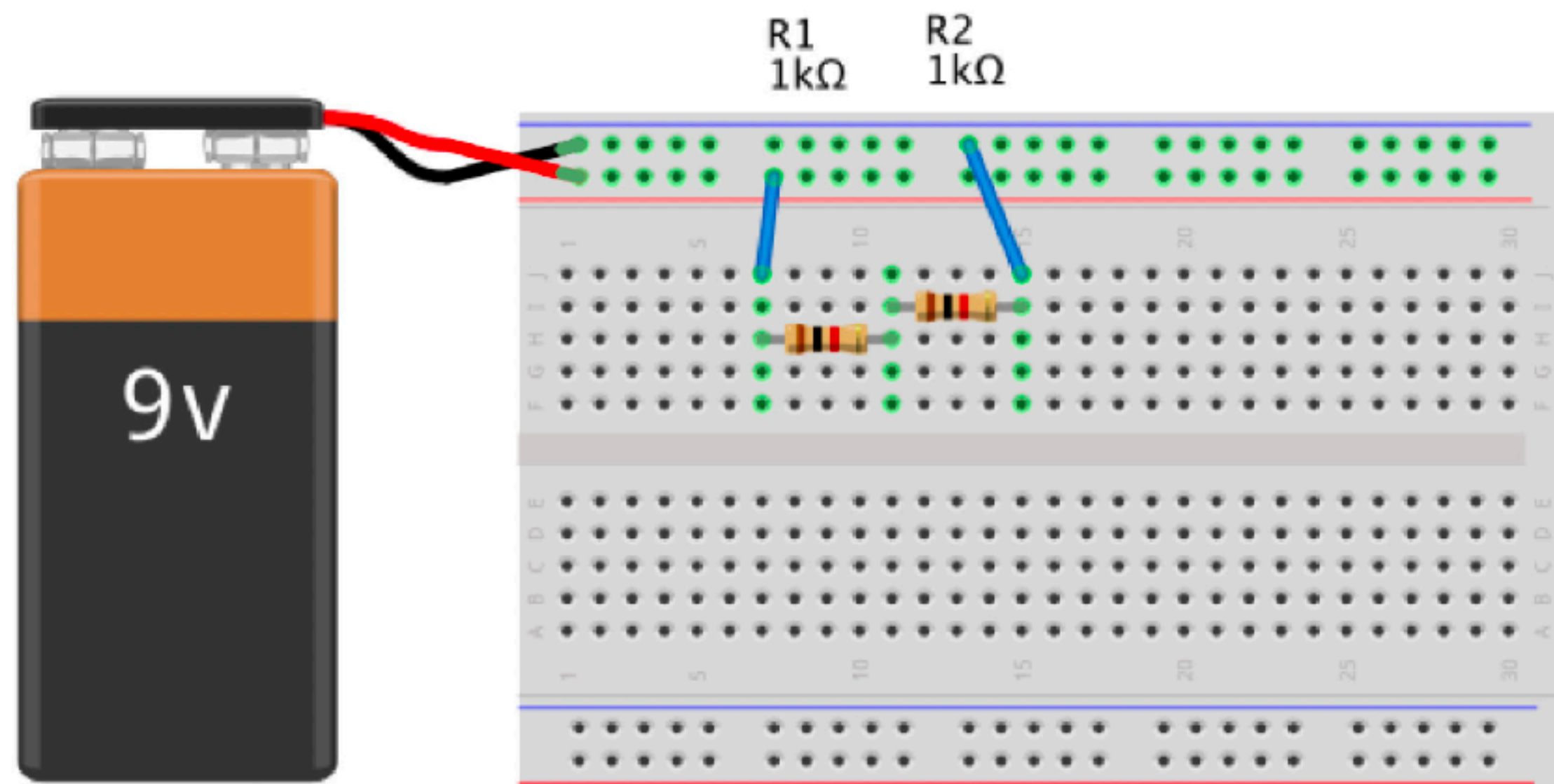
3 bit $\rightarrow$ 000, 001, 010, 011, 100, 101, 110, 111 $\rightarrow$ 8 (2^3)

10 bit $\rightarrow$ 1024

Voltage Divider



Voltage Divider



$$V_{res} = V_{cc} \times \frac{R_2}{(R_1 + R_2)}$$

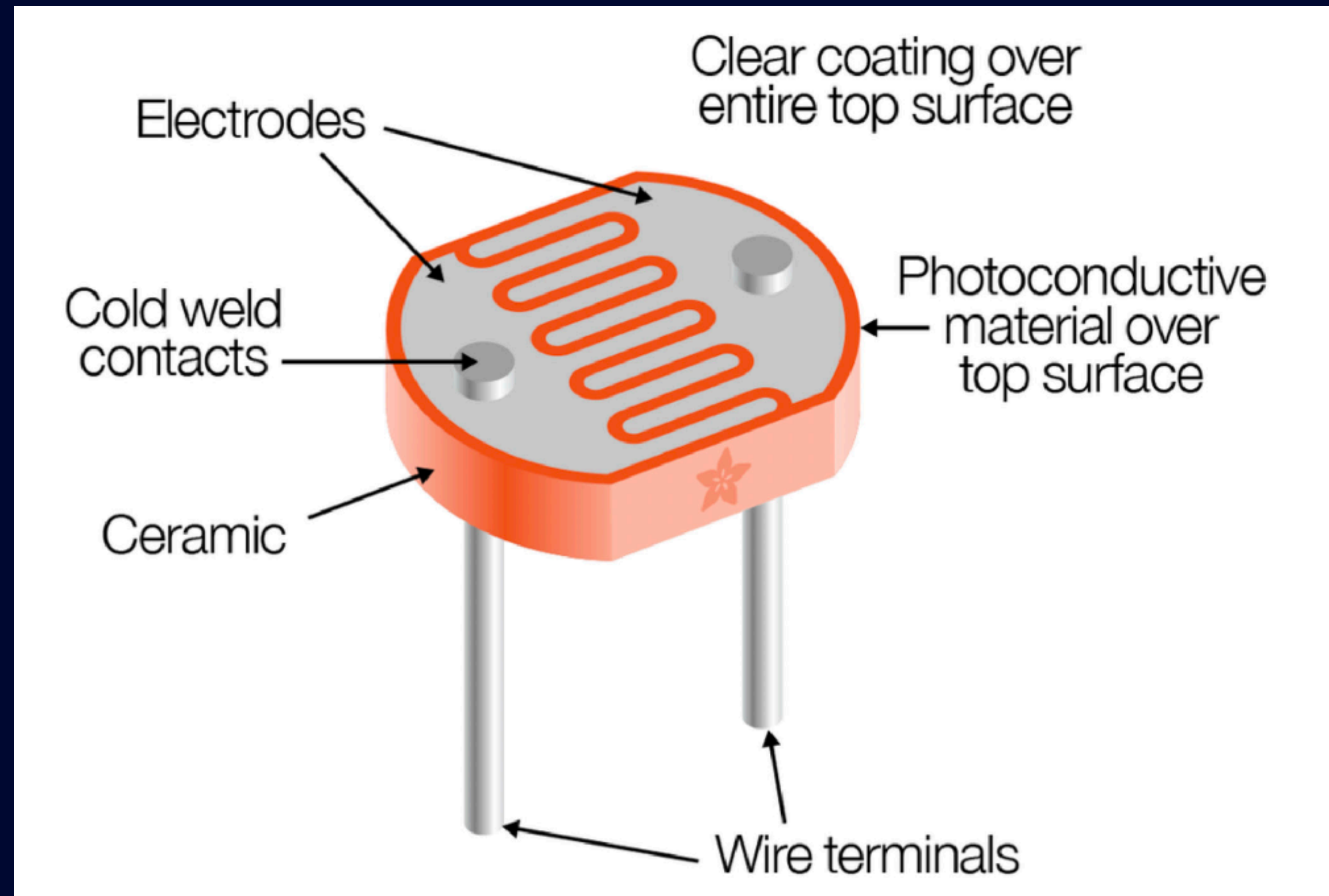
Vres = resulting voltage

Vcc = applied voltage (9V)

R1 = first resistor (1000 ohm)

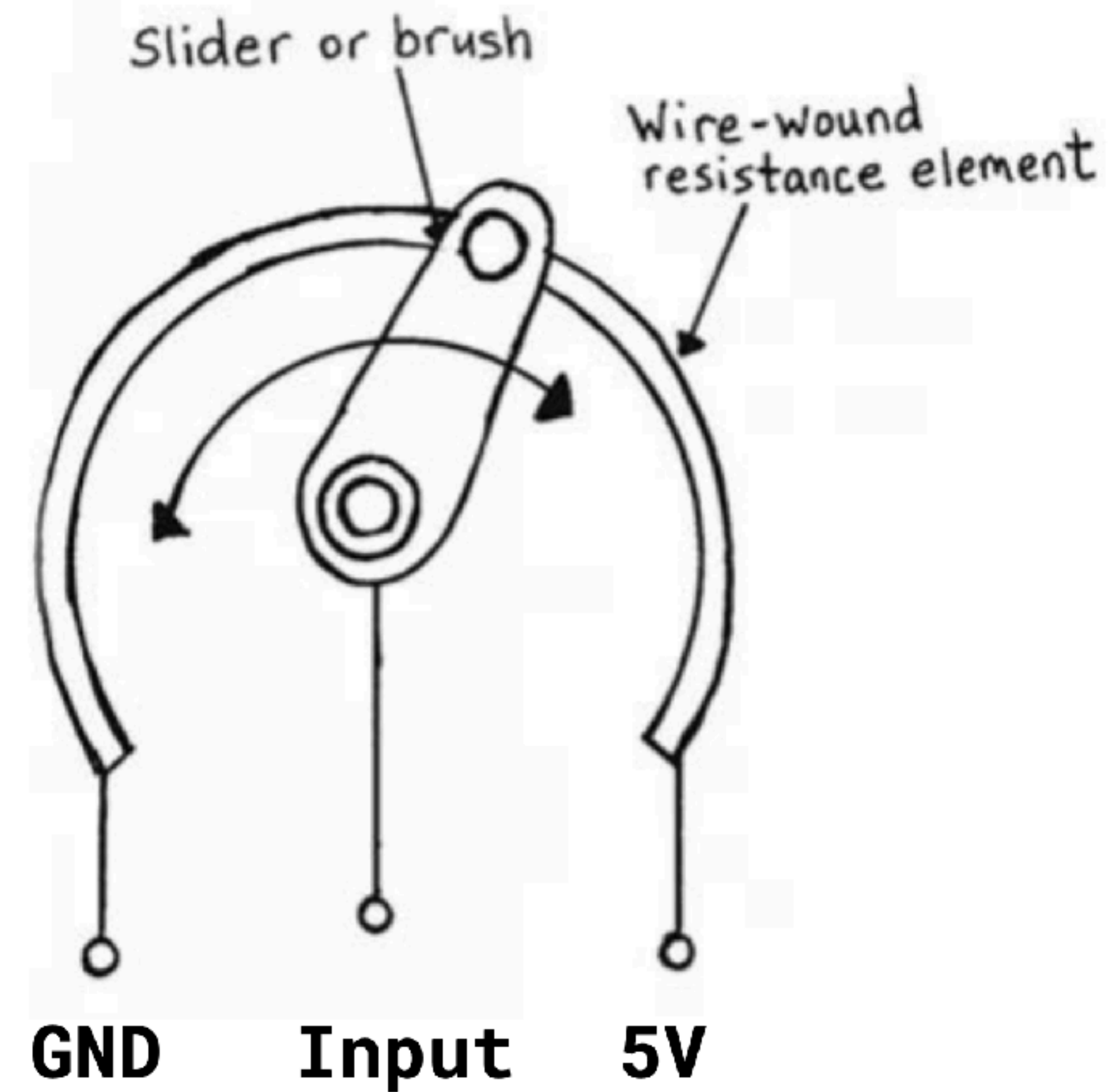
R2 = second resistor (1000 ohm)

Example: Light Sensor



Example: Light Sensor

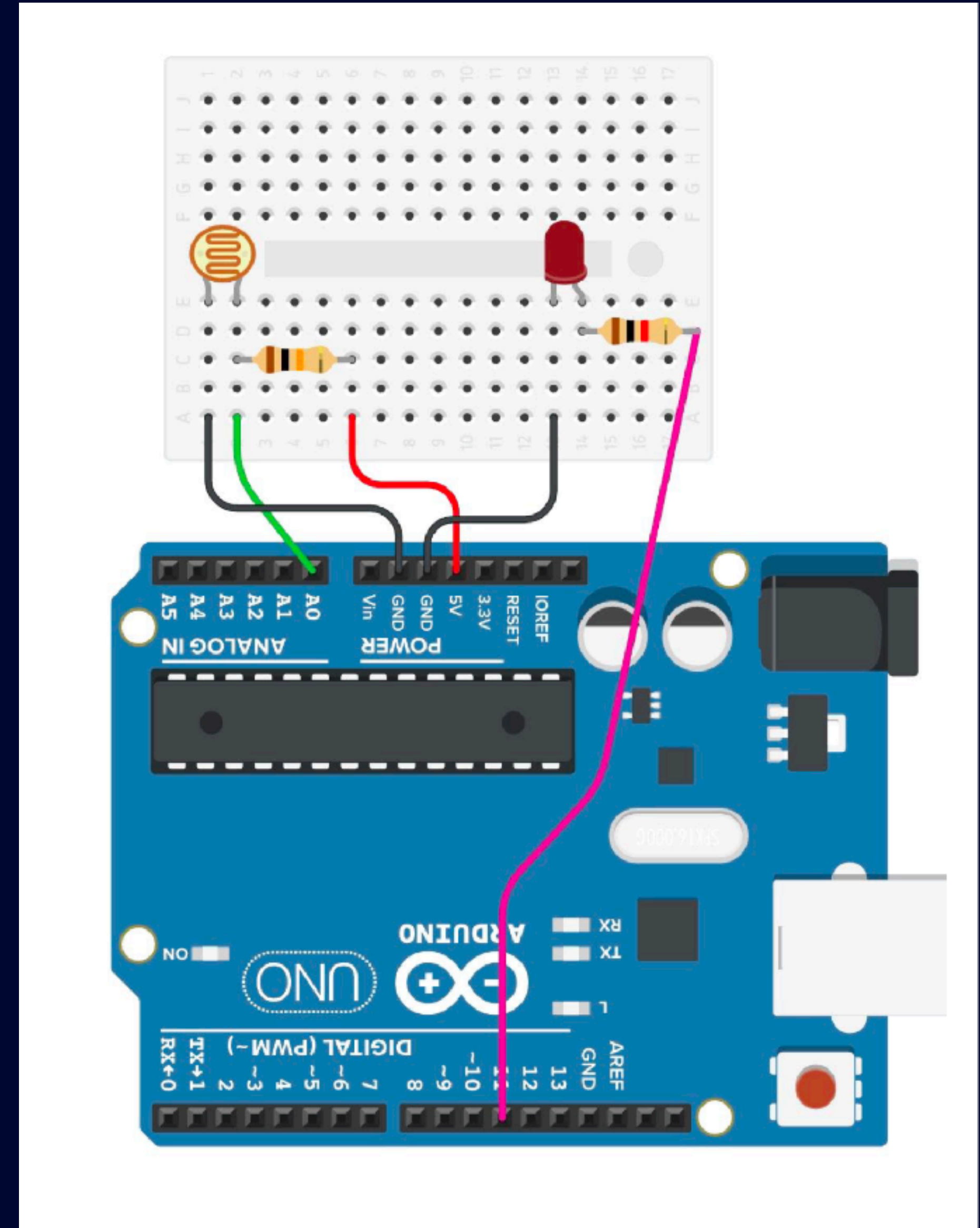
**A Potentiometer
is also a voltage
divider!**



Exercise

Build a circuit and code it to turn on an LED when it gets dark using a Photoresistor.

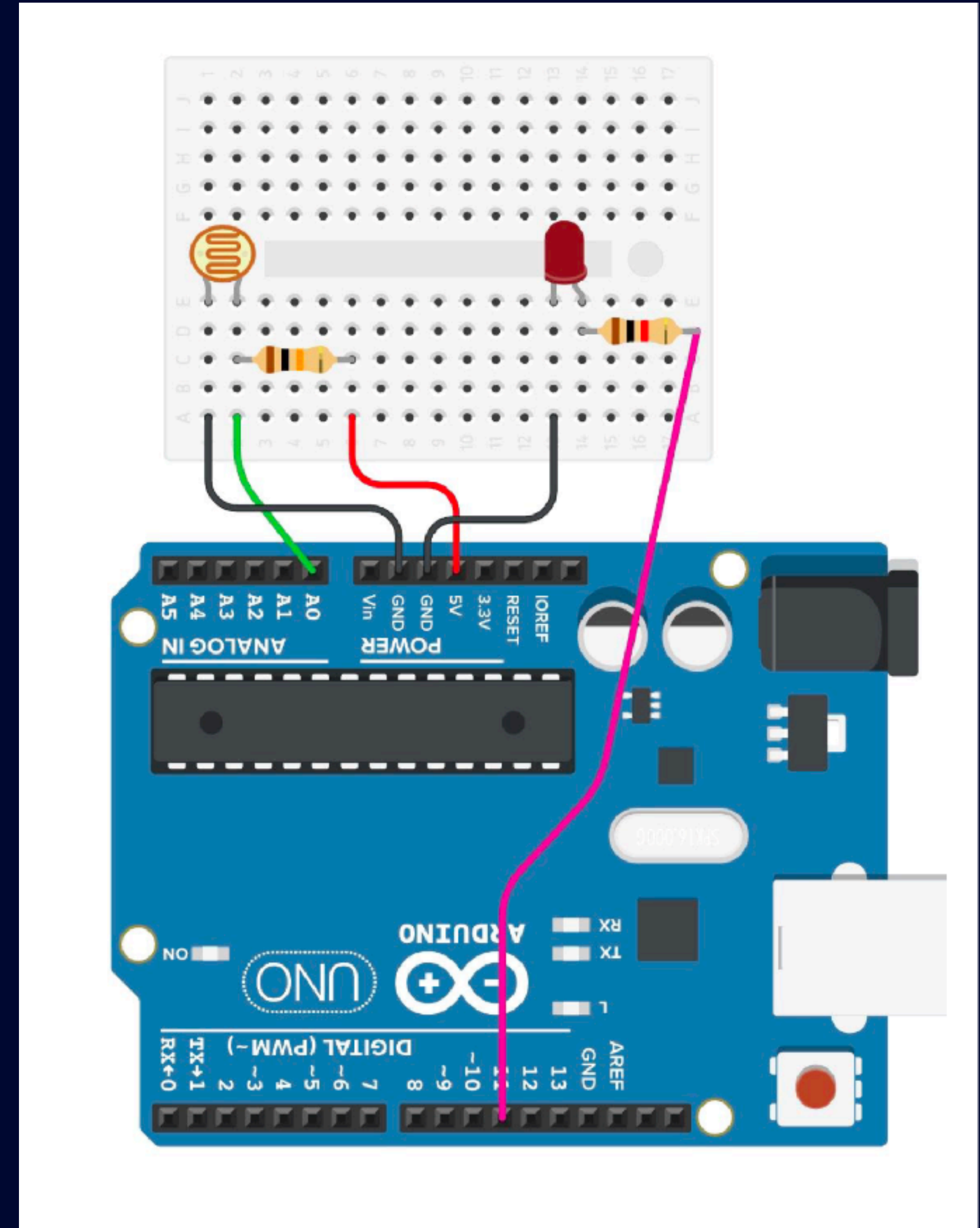
Optional: code it so the LED fades smoothly between dark and light states.



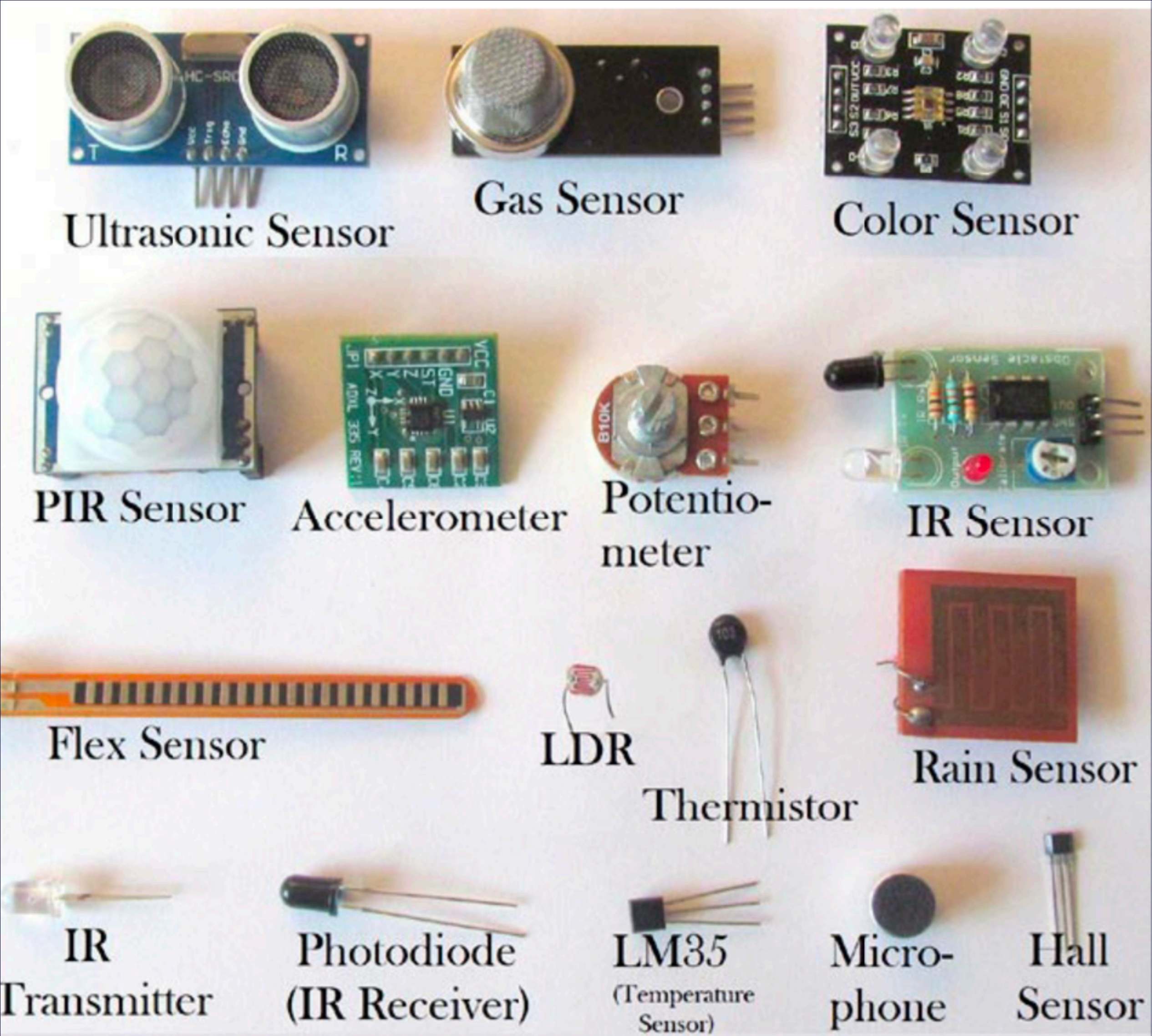
Exercise

Build a circuit and code it to turn on an LED when it gets dark using a Photoresistor.

Optional: code it so the LED fades smoothly between dark and light states.



Analog Sensors



Analog Sensors

