



WELCOME TO COMPSOC

WEEK 16 - INTRO TO HARDWARE

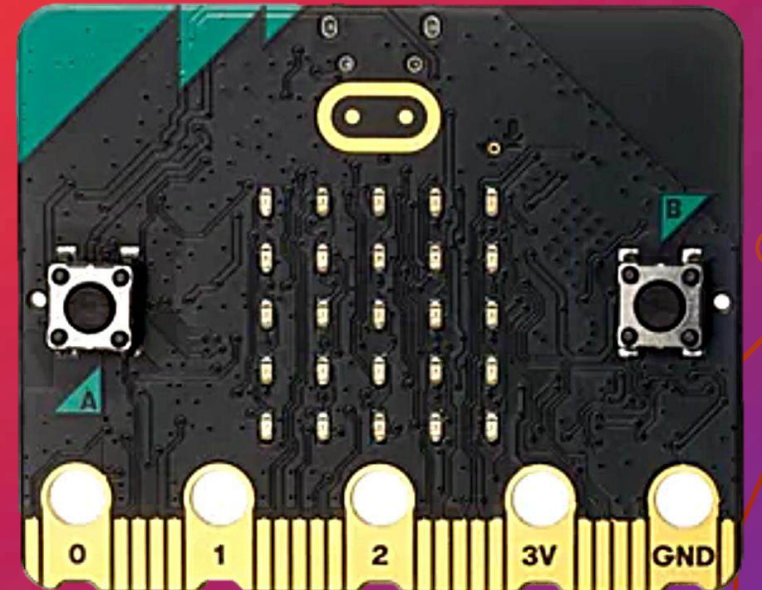
WHAT CAN I DO WITH THIS INFORMATION?

- DIY smart home devices
- Learn about electronic engineering
- Take on robot projects, large and small
- Create fun toys or movie props
- Firmware Developer
 - Accenture
 - Arm
 - BAE Systems
 - Jane Street
 - TPP
- Robotics Engineer
 - Amazon
 - Go-Teq
 - Leonardo
 - Royal Navy



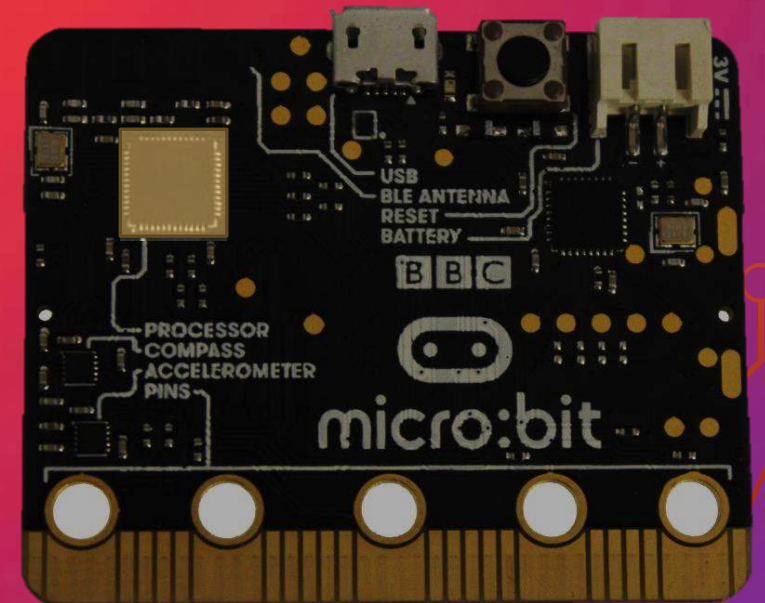


WHAT IS A MICROCONTROLLER?





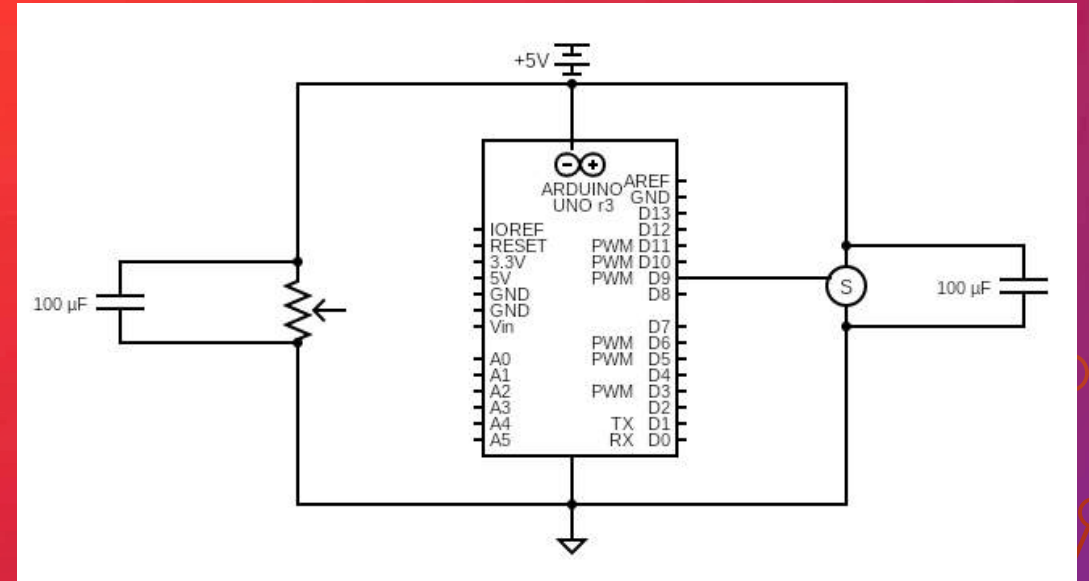
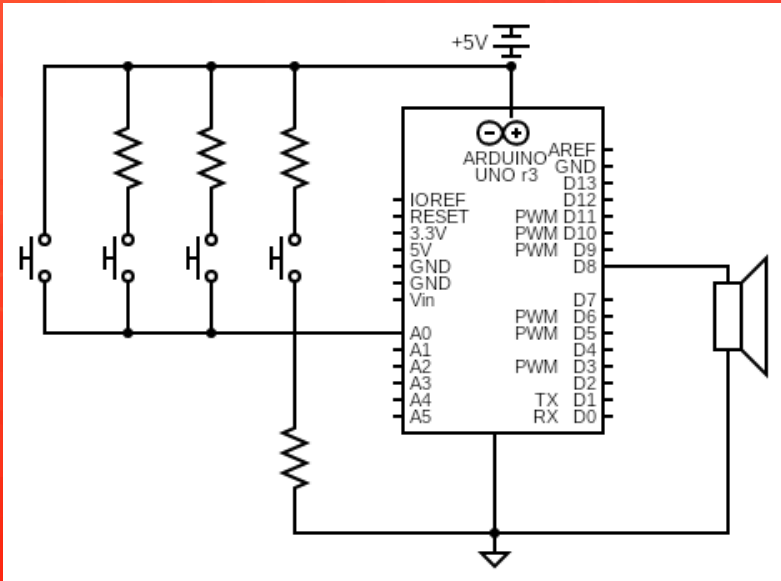
WHAT IS A MICROCONTROLLER?





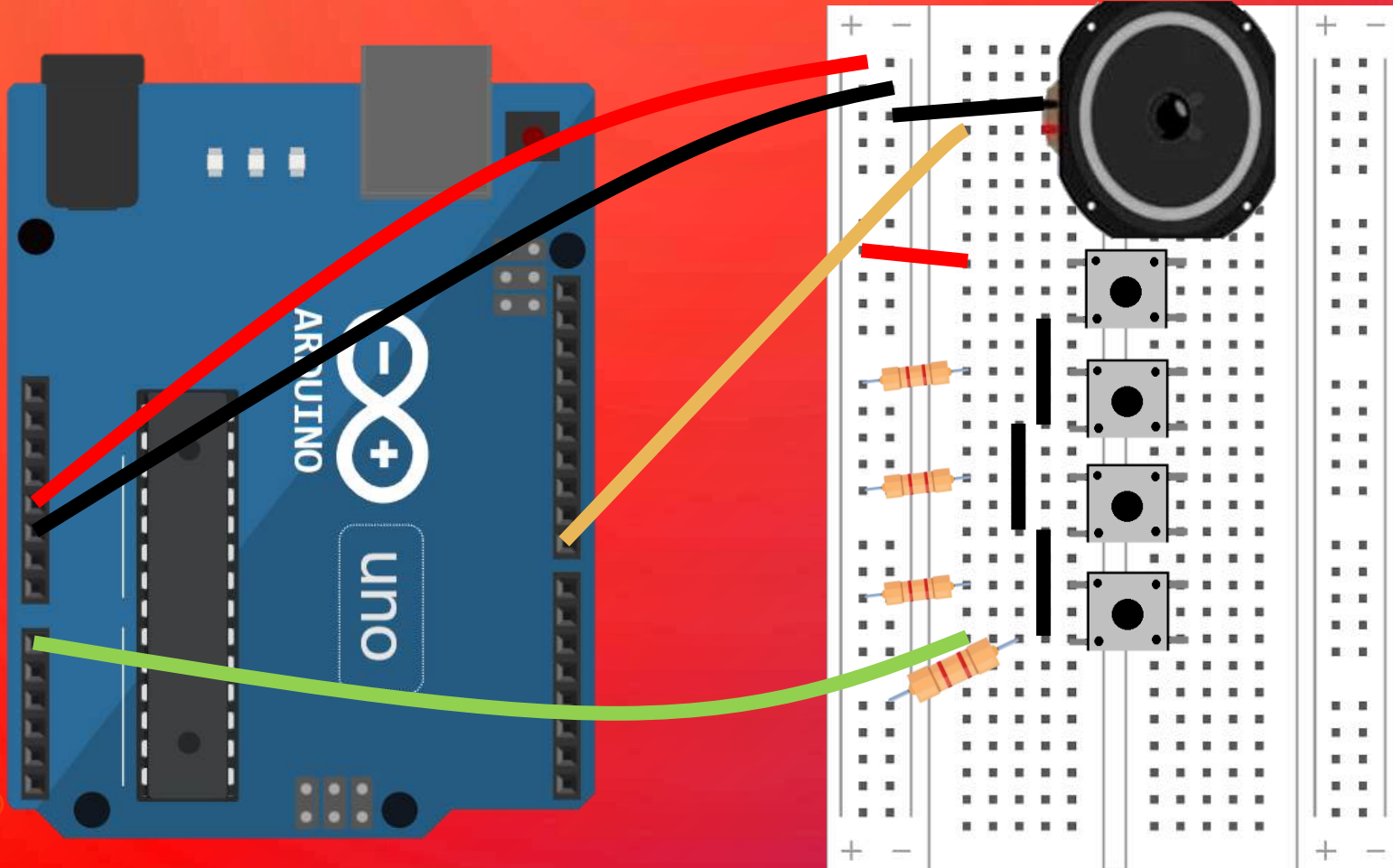
ELECTRONIC PIANO

CONTROLLED SERVO





ELECTRONIC PIANO





ELECTRONIC PIANO

```
int buttons[6];  
int notes[ ] = {262, 294, 330, 349};
```

```
void setup() {  
  Serial.begin(9600);  
  buttons[0] = 2;  
}
```

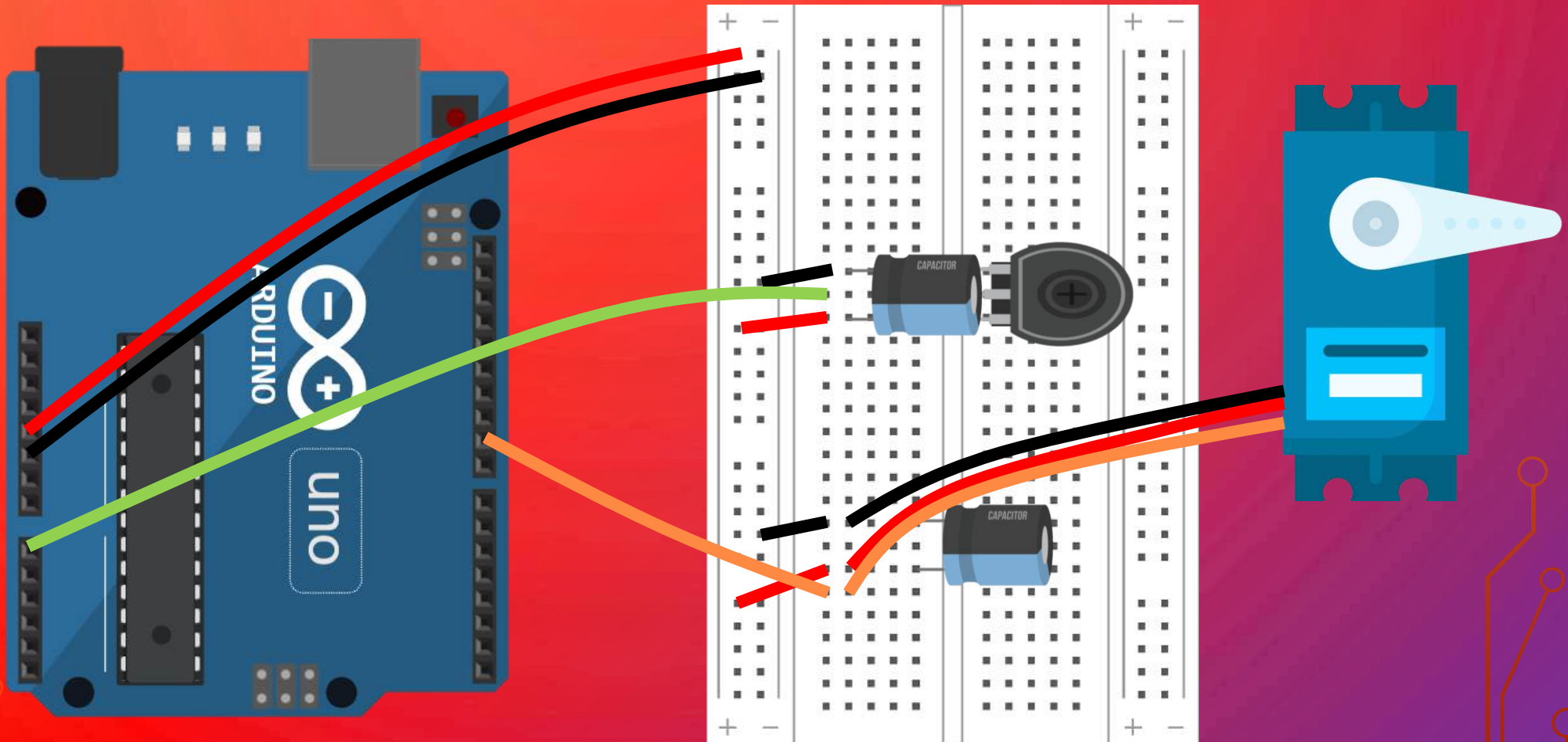
Note	Frequency
C	262
D	294
E	330
F	349
G	392
A	440
B	494

```
void loop() {  
  int KeyVal = analogRead(A0);  
  Serial.println(KeyVal);
```

```
  if (KeyVal > 1000) {  
    tone(8, notes[0]);  
  }  
  else if (KeyVal > 26) {  
    tone(8, notes[1]);  
  }  
  else if (KeyVal > 6) {  
    tone(8, notes[2]);  
  }  
  else if (KeyVal > 1) {  
    tone(8, notes[3]);  
  }  
  else {  
    noTone(8);  
  }  
}
```



CONTROLLED SERVO





CONTROLLED SERVO

```
#include <Servo.h>
```

```
Servo servo;
```

```
int const potPin = A0;
```

```
int potVal;
```

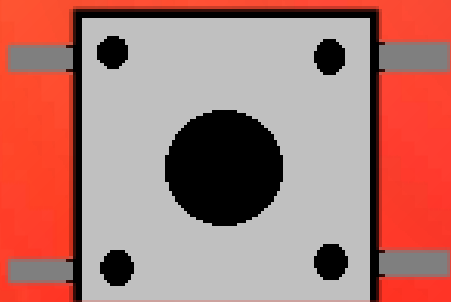
```
int angle;
```

```
void setup( ) {  
  servo.attach(9);  
  Serial.begin(9600);  
}
```

```
void loop() {  
  potVal = analogRead(potPin);  
  angle = map(potVal, 0, 1023, 0, 180);  
  
  Serial.print("Potentiometer Value: ");  
  serial.print(potVal); Serial.print(", Angle: ");  
  Serial.println(angle); servo.write(angle);  
  
  angle delay(15);  
}
```

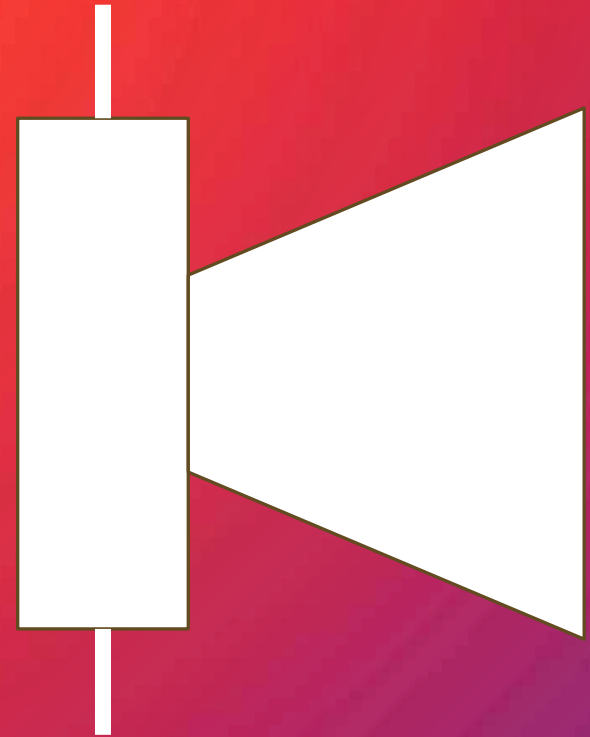


BUTTON





BUZZER / SPEAKER





RESISTOR

Color	Band 1	Band 2	Band 3	Multiplic.	Tolerance
Black	0	0	0	10^0 (1 Ω)	
Brown	1	1	1	10^1 (10 Ω)	$\pm 1\%$
Red	2	2	2	10^2 (100 Ω)	$\pm 2\%$
Orange	3	3	3	10^3 (1k Ω)	
Yellow	4	4	4	10^4 (10k Ω)	
Green	5	5	5	10^5 (100k Ω)	$\pm 0.5\%$
Blue	6	6	6	10^6 (1M Ω)	$\pm 0.25\%$
Purple	7	7	7	10^7 (10M Ω)	$\pm 0.1\%$
Gray	8	8	8	10^8 (100M Ω)	$\pm 0.05\%$
White	9	9	9	10^9 (1G Ω)	
Gold				10^{-1} (100m Ω)	$\pm 5\%$
Silver				10^{-2} (10m Ω)	$\pm 10\%$





RESISTOR

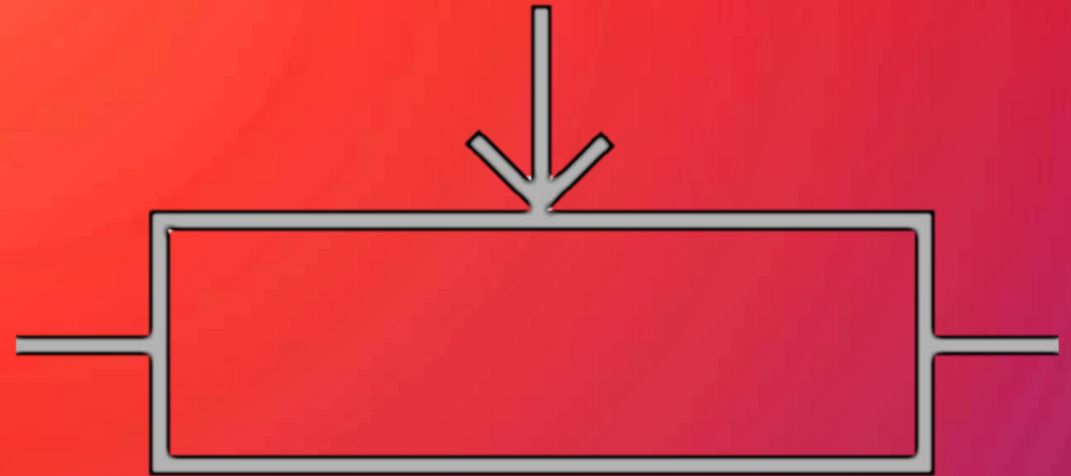
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5.1K Ω



POTENTIOMETER



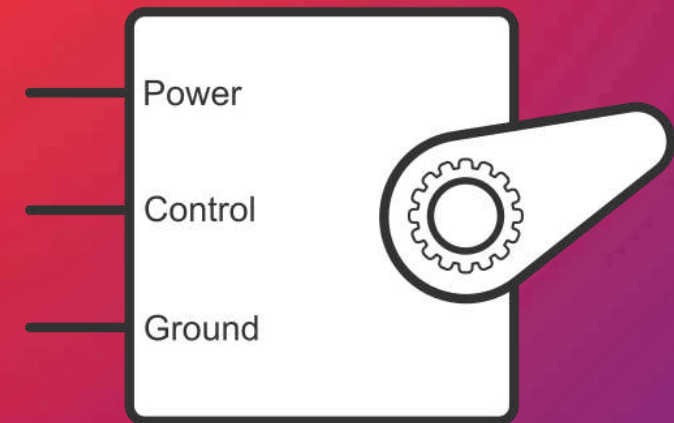


CAPACITOR





SERVO



I LEARNED EVERYTHING FROM THESE GUYS, PLEASE CHECK THEM OUT!



ARDUINO

- [ARDUINO.CC](https://www.arduino.cc)
- ARDUINO PROJECTS BOOK

NEW CITY COLLEGE

- ANTOINE MARIUCCI

LANCASTER UNIVERSITY

- STEVE HODGES
- STEVE MONK

OTHER

- [WOKWI.COM](https://www.wokwi.com)



GOOD LUCK!!!

ALL COMPONENTS BECAME GOOD FRIENDS ONCE THEY FOUND THEIR COMMON GROUND