



Microcontrollers & Applications

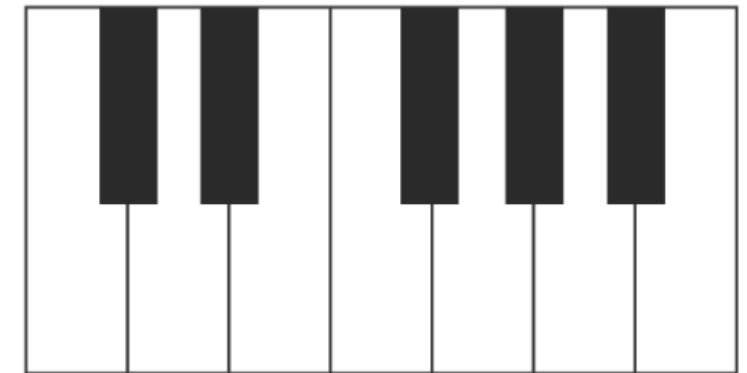
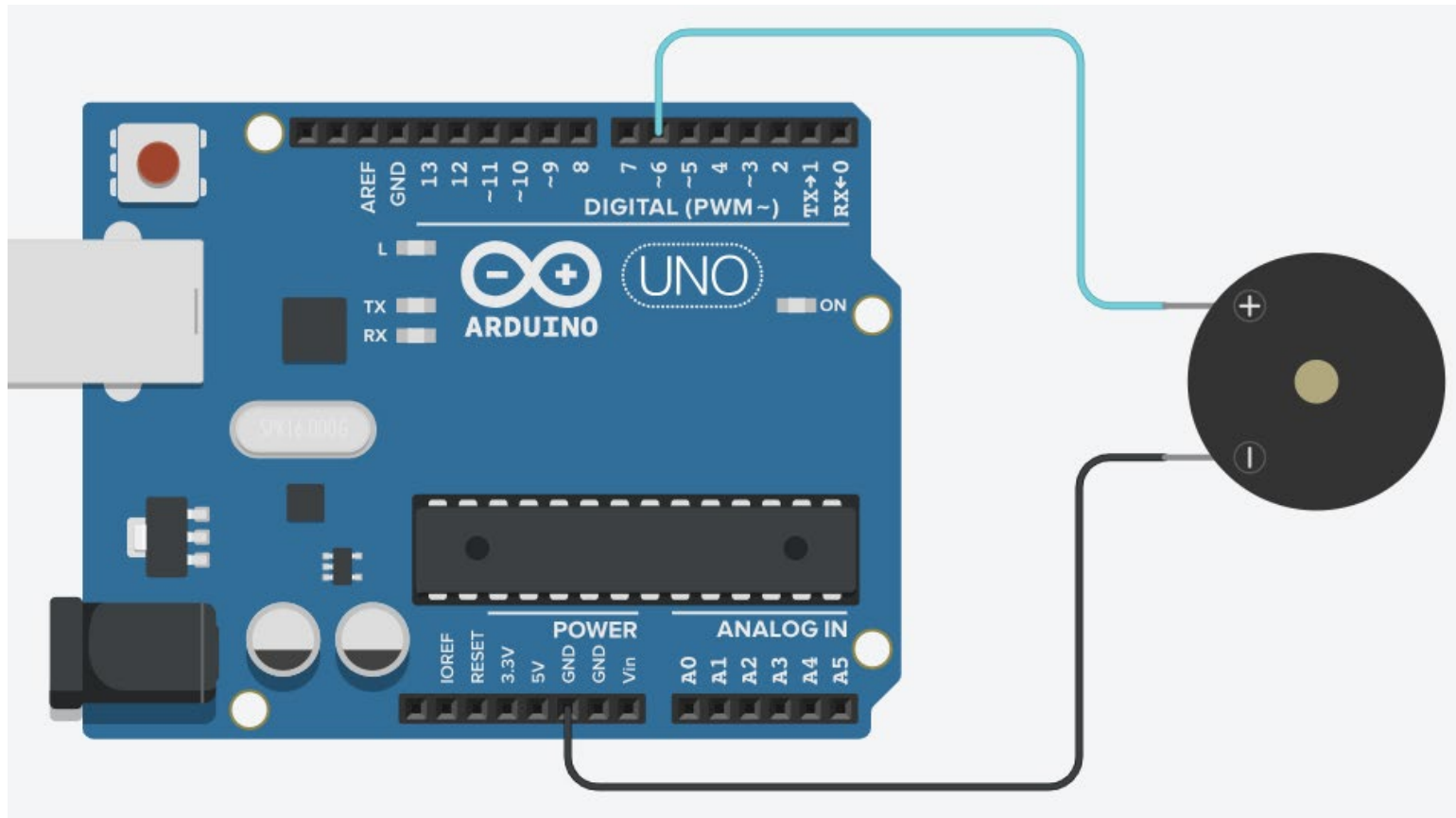
Lecture 7.3: Buzzer

Buzzer: Structure



- Two pins to connect + and – terminals.

Buzzer: Arduino Example (1)



Tone	Frequency (Hz)	Delay
Do (C)	261.63	1915 μ s
Re (D)	293.66	1700 μ s
Mi (E)	329.63	1519 μ s
Fa (F)	349.23	1432 μ s
Sol (G)	392.00	1275 μ s
La (A)	440.00	1136 μ s
Si (B)	493.88	1014 μ s

Buzzer: Arduino Example (2)

```
int buzzerPin = 6;
```

```
int numTones = 8;
```

```
#define NOTE_C4 262
```

```
#define NOTE_D4 294
```

```
#define NOTE_E4 330
```

```
#define NOTE_F4 349
```

```
#define NOTE_G4 392
```

```
#define NOTE_A4 440
```

```
#define NOTE_B4 494
```

```
#define NOTE_C5 523
```

```
int melody[] = {NOTE_C4 , NOTE_D4 , NOTE_E4, NOTE_F4, NOTE_G4,  
NOTE_A4, NOTE_B4, NOTE_C5};
```

```
void setup()
```

```
{
```

```
  pinMode(buzzerPin, OUTPUT);
```

```
  for (int i = 0; i < numTones; i++) {
```

```
    tone(buzzerPin, melody[i]);
```

```
    delay(500);
```

```
    noTone(buzzerPin);
```

```
    delay(20);
```

```
  }
```

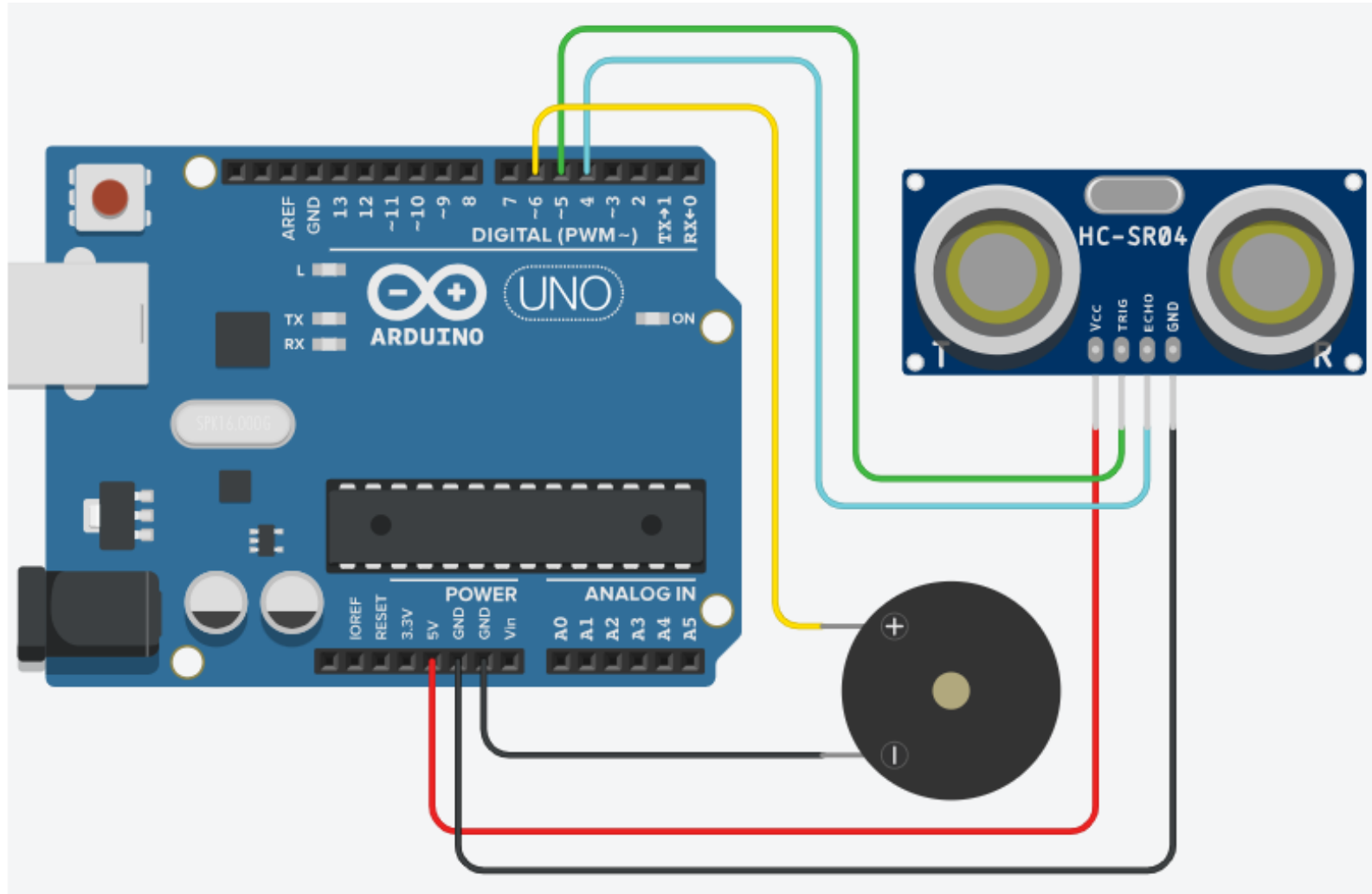
```
  noTone(buzzerPin);
```

```
}
```

```
void loop() {
```

```
}
```

Buzzer: Arduino Example (3)



Buzzer: Arduino Example (4)

```
/*
@2024 by Yalcin Isler

This sketch determines distance to the
closest object in range. To do this, it sends a
pulse (TRIG) to the sensor to initiate a reading,
then listens for a pulse to return (ECHO). The
length of the returning pulse is proportional to the
distance of the object from the sensor.
It can detect objects from 20 cm to 3.3 meters.

The circuit:
* Vcc attached to +5V
* GND attached to ground (GND)
* TRIG attached to digital pin 4
* ECHO attached to digital pin 5
* BUZZER attached to digital pin 6

*/

#define BUZZER 6

int cm = 0;

long readUltrasonicDistance(int triggerPin, int echoPin) {
  pinMode(triggerPin, OUTPUT); // Clear the trigger
  digitalWrite(triggerPin, LOW);
  delayMicroseconds(2);
  // Sets the trigger pin to HIGH state for 10 microseconds
  digitalWrite(triggerPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(triggerPin, LOW);
  pinMode(echoPin, INPUT);
  // Reads the echo pin until it reaches HIGH in microseconds
  return pulseIn(echoPin, HIGH);
}

void setup() {
  pinMode(BUZZER, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  // measure the ping time in cm
  cm = 0.01723 * readUltrasonicDistance(5, 4);
  // convert to inches by dividing by 2.54
  if (cm >20 && cm < 330) {
    Serial.print("Nearest object in ");
    Serial.print(cm);
    Serial.println("cm");
  } else {
    Serial.println("No object in the range.");
  }

  if (cm < 50) tone(BUZZER, 1000);
  else noTone(BUZZER);

  delay(100); // Wait for 100 millisecond(s)
}
```

Left to Students

- Happy Birthday Song at <https://www.tinkercad.com/things/cYq55Je6MfA-arduino-happy-birthday-song>
- Develop the previous Arduino-Based Car Parking Alarm by adding sound indicator in addition to LED indicators.



Thanks for
listening 😊

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