Arduino Lesson (   )

Use of Active & Passive Buzzer Modules

Name: _____ (   ) Class: _____ Date: _____

**Objectives**: At the end of this lesson, you would be able to

1. Apply basic circuitry to the Arduino microcontroller and other basic hardware
2. Write sketches for an active buzzer module & a passive buzzer module

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Apparatus:
- 01 Arduino UNO microcontroller
- 01 USB cable
- 05 male-female jumper wires (or combinations)

- 01 Active buzzer module
  e.g. KY-012
- 01 Passive buzzer module
  e.g. KY-006

Specifications

	Active Buzzer Module KY-012 Arduino module • It consists of an active piezoelectric buzzer • It generates a sound of approximately 2.5 kHz when signal is high. • Carries a white sticker "Remove seal after washing" • **2nd model** • *An active buzzer will generate a tone using an internal oscillator, so all that is needed is a DC voltage.*
	Passive Buzzer Module KY-006 Arduino module • It consists of a passive piezoelectric buzzer • It can generate tones between 1.5 to 2.5 kHz by switching it on and off at different frequencies either using delays or PWM (pulse-width-modulation) • *A passive buzzer requires an AC signal to make a sound.*

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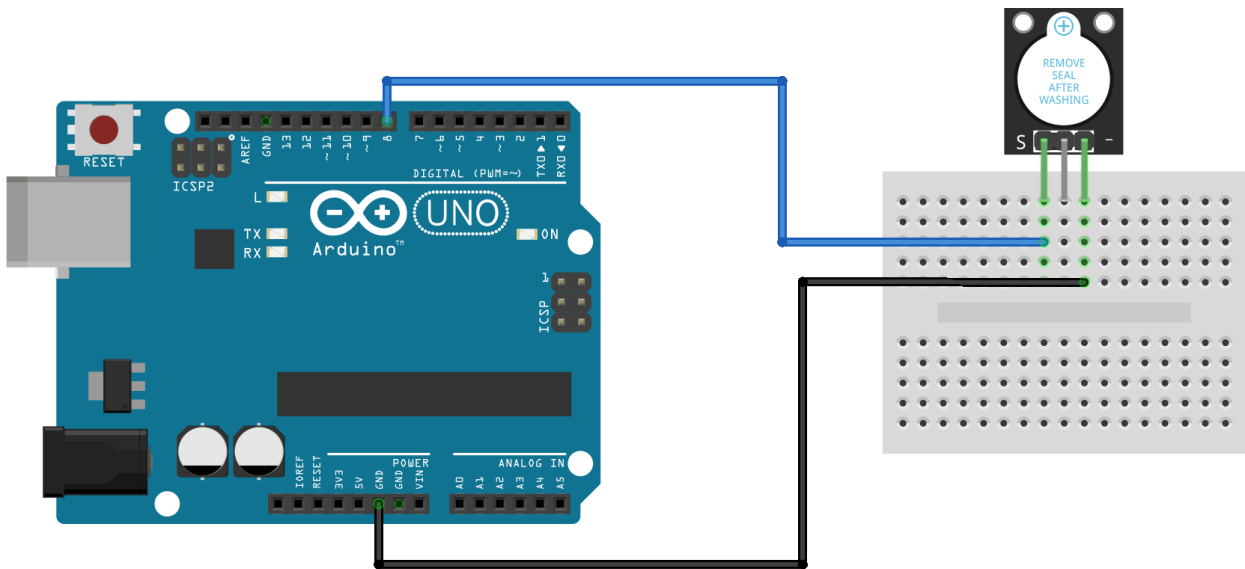
Reference: https://arduinomodules.info/ky-012-active-buzzer-module/

<u>Assignment 1</u>: Set up and use an active buzzer module

1. Connect the circuit as shown in the diagram above.

2. Make the following connections from the active buzzer module to the microcontroller:

<u>Active buzzer module</u>   <u>Arduino Uno</u>

- pin S   to   digital pin 8
- pin – (negative)   to   GND
- the middle pin is not used

Note: *If using 2nd model, connect i/o pin to digital pin 8, as well as two other pins.*

3. Upload the sketch below.

4. This will continually turn the buzzer on and off generating a series of **short high-pitched beeps**. You may remove the sticker.

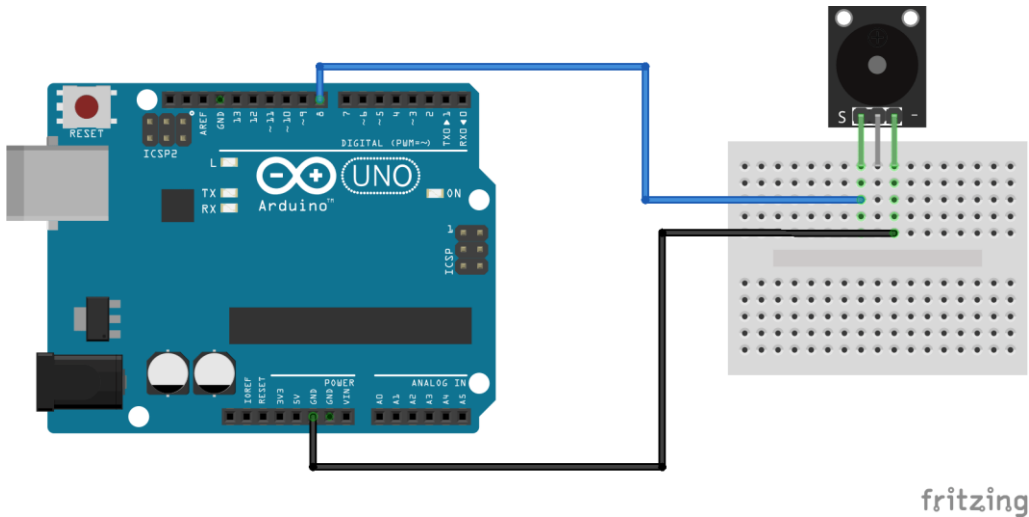**<u>Assignment 1:   Sample sketch</u>**

```
/*Using Active Buzzer with KY-012 module
 */
int buzzerPin = 8;   // use digital pin 8 to control buzzer

void setup ()
{
  pinMode (buzzerPin, OUTPUT);
}

void loop ()
{
  digitalWrite (buzzerPin, HIGH);   // turn on the buzzer
  delay (500);                              // delay 0.5 second
  digitalWrite (buzzerPin, LOW);    // turn off the buzzer
  delay (500);                              // delay 0.5 second
}
```

Assignment 2: Set up and use a passive buzzer module

1. Connect the circuit as shown in the diagram above.

2. Make the following connections from the passive buzzer module to the microcontroller:

Passive buzzer module   Arduino Uno

- pin S   to   digital pin 8
- pin – (negative)   to   GND

5. Upload the sketch below.

6. This will **generate two different tones** by turning on and off the passive buzzer at different frequencies using a delay.

Assignment 2: Sample sketch

```
/* Using Passive buzzer with KY-006 module
 */
int buzzer = 8;     // set the buzzer control digital IO pin

void setup() {
 pinMode(buzzer, OUTPUT);     // set pin 8 as output
}

void loop() {
 for (int i = 0; i < 80; i++) {       // make a sound
  digitalWrite(buzzer, HIGH);     // send high signal to buzzer
  delay(1);                       // delay 1ms
  digitalWrite(buzzer, LOW);      // send low signal to buzzer
  delay(1);
 }
 delay(50);
 for (int j = 0; j < 100; j++) {       //make another sound
  digitalWrite(buzzer, HIGH);
  delay(2);                       // delay 2ms
  digitalWrite(buzzer, LOW);
  delay(2);
 }
 delay(100);
}
```

Additional Resources:

1. Play a melody using a passive buzzer module

   Reference: https://microcontrollerslab.com/buzzer-interfacing-arduino-sound-code/

2. Play Morse code dots and dashes

   Reference: https://www.instructables.com/How-to-Interface-With-Active-Buzzer-Sensor-Module/

3. Active vs Passive buzzers

   Reference: https://design.goeszen.com/active-vs-passive-buzzer.html