This lesson will teach you how to use a Condenser Microphone with the Intel Galileo to detect claps that will later correspond to toggling LED’s.

This same lesson can contribute to eventually turning on and off household items around your home with proper hardware.

We will begin by building the circuit for the microphone to the Galileo.

What we will need is the following:

- Condenser Microphone
- (2) 10K Resistors
- 100K Resistor
- 1µF Capacitor
- PN2222 NPN Transistor

**The Circuit**
# Testing Circuit

We will begin by testing the microphone to see if our circuit is correct and we are able to read values.

Open the Arduino IDE. Copy, paste, and compile the following code:

```cpp
const int mic = A5;
int value = 0;

void setup() {
  Serial.begin(9600);
  pinMode(mic, INPUT);
}

void loop() {
  value = analogRead(mic);
  Serial.println(value);
  delay(500);
}
```

Upload the code to the Intel Galileo and open the Serial Monitor to observe what values we receive.

If the circuit is correct, you should receive a stable value of some sort. Rubbing or tapping on the microphone should raise the values but talking or clapping to the microphone might not give you the results you want because of the delay in our main loop.

# Testing Claps

We will test the clapping threshold by replacing the main loop code with the following:

```cpp
void loop() {
  value = analogRead(mic);
  if(value > threshold){
    Serial.println(value);
  }
}
```

Where ‘threshold’ is a variable that is a number approximately 20+ of the stable value. This variable should be tested and set towards whichever best detects your claps.

**Notice:** For every clap, you’ll receive multiple print statements. Adding a delay(100) inside the if statement will help reduce the multiple prints and can possibly also help with the exercises.
Prepare a couple of LED’s and resistors and we will be ready to begin our exercises.

**Exercise**

**Demonstration Video:** [https://youtu.be/6HeqMoMWRm0](https://youtu.be/6HeqMoMWRm0)

1. An LED is connected to A0 which is initially off. For very clap, the LED will flick on and off.

   **Note:** Using a delay will help keep the LED from flicking multiple times from one clap.

2. Another LED is connected to A1 which is initially off. Two claps will toggle A1 while still flickering the LED from exercise one. Make sure that this exercise is implemented so that these two claps are within an interval of one second.

   **Note:** Arduino has a built in function `millis()` that returns the number of milliseconds that have passed since the restart of the Intel Galileo. This can be taken advantage by saving this integer into a variable and comparing it with the same function in a future tense.

   **For Example:**

   ```
   sec = millis();
   
   void loop{
     if(sec + 1000 < millis()){
       // do something
     }
   }
   ```

   The conditional statement will run once one second has passed from the time ‘sec’ was given its new `millis()` value.

3. A third LED is connected to A2 which is initially off. Three claps will toggle A2, while two claps toggles A1, while A0 flickers at every clap. Make sure that either the three claps or two claps are in an interval of one second.