

What Will You Learn?

In this activity you will use an LED to send messages by using Morse code.

Why Should You Learn This?

Morse code was an early form of communication that used a series of dots and dashes as a code for letters. Often the code was sent over a wire as sound and then translated by someone on the other end, but the code could also be transmitted using light. Today's challenge will extend your knowledge of making an LED blink and will push you to make the LED blink in a specific pattern.

Here's What You'll Need:

Arduino Microcontroller

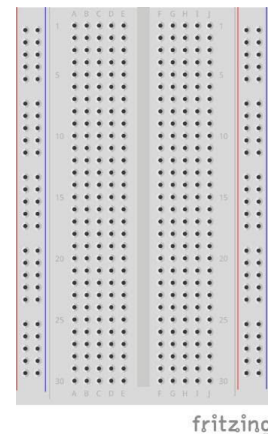


LED



Notice that one of the wires of the LED is slightly longer than the other, the long leg is the positive side and the short leg is the negative side. This will be important when you go to plug in our LED.

Breadboard



Red Wire



Black Wire



A to B USB Cable



A to B USB Cable
You will power the Arduino through the USB cord.

Resistor



Use a range of 100 – 400 ohms, (see "LED Circuit" activity to see why).

Time to Write Some Code!

First, you need to know what an 'S' and 'O' look like in Morse code. S is 3 dots and O is three dashes. Since you are using light, you need to decide how long a dash is and how long a dot is. It is recommended to make a dash 1 second (delay = 1000 ms) and a dot about 1/3 of a second (delay = 300 ms). Next, think about having the light off for a short time (use 300 ms again) between each dot and dash, and off for a longer time (use 2000 ms) between letters.

STOP here and try to figure out how to write the program yourself. Start by opening the blink code (in File > Examples > Basics > Blink) and then modify the code to make the light blink an SOS pattern in Morse code. If you get stuck, come back and read some of the hints below.

HINT 1: You may make mistakes when you are typing the same lines of code over and over again. To avoid any typos, copy (Ctrl + C) and paste (Ctrl + V) a set of 4 lines of code to turn the LED on and off. Just remember that all your lines of code in the loop must stay between the open and closed brackets. Once you've copied the code to turn an LED on and off, you can change the values of the delays in each line to make a sequence of flashes that stands for SOS.

HINT 2: Below is the code to make the "S" in Morse code followed by a space before the "O":

```
void setup() {
  pinMode(13, OUTPUT);
}

void loop() {
  digitalWrite(13, HIGH);           //First dot in the "S" code
  delay(300);
  digitalWrite(13, LOW);           //Delay between dots/dashes
  delay(300);
  digitalWrite(13, HIGH);          //Second dot in the "S" code
  delay(300);
  digitalWrite(13, LOW);           //Delay between dots/dashes
  delay(300);
  digitalWrite(13, HIGH);          //Third dot in the "S" code
  delay(300);
  digitalWrite(13, LOW);           //Long delay after letters
  delay(2000);
}
```