

Übung 4

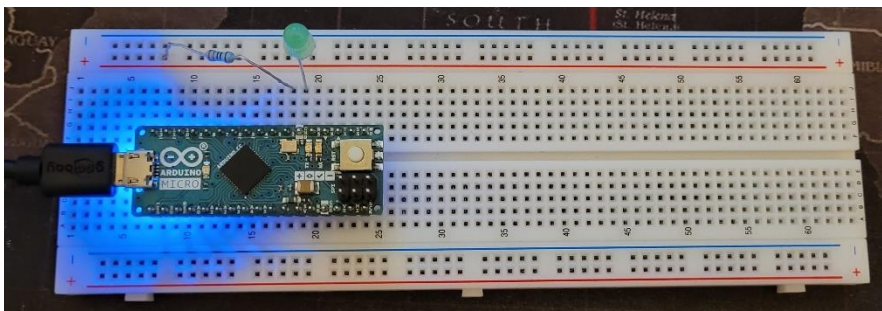


1. Die passenden Videos zu den Aufgaben 1.2/1.3/1.4 sind im Anhang.

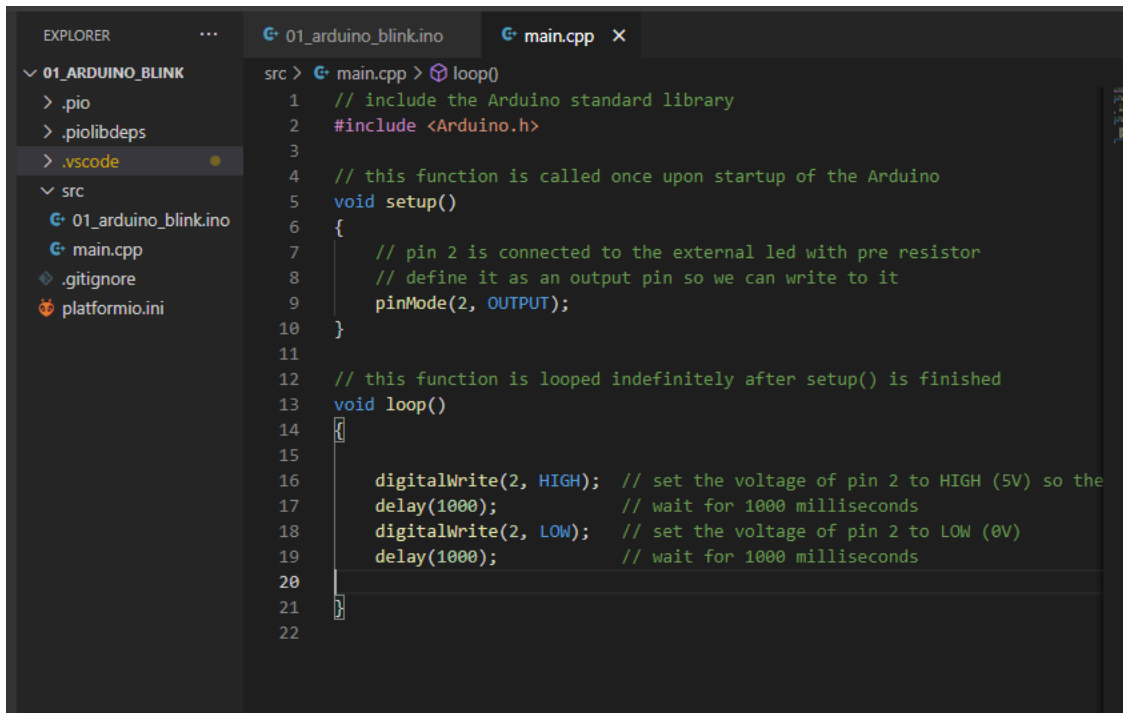
1.1. Code:

```
src > main.cpp > loop()
1 // include the Arduino standard library
2 #include <Arduino.h>
3
4 // this function is called once upon startup of the Arduino
5 void setup()
6 {
7 // pin 13 is connected to the internal LED of the Arduino
8 // define it as an output pin so we can write to it
9 pinMode(13, OUTPUT);
10 }
11
12 // this function is looped indefinitely after setup() is finished
13 void loop()
14 {
15 digitalWrite(13, HIGH); // set the voltage of pin 13 to HIGH (5V) so th
16 delay(1000); // wait for 1000 milliseconds
17 digitalWrite(13, LOW); // set the voltage of pin 13 to LOW (0V)
18 delay(1000); // wait for 1000 milliseconds
19 digitalWrite(13, HIGH); // set the voltage of pin 13 to HIGH (5V) so th
20 delay(100); // wait for 100 milliseconds
21 digitalWrite(13, LOW); // set the voltage of pin 13 to LOW (0V)
22 delay(1000); // wait for 1000 milliseconds
23 }
24
```

1.2. Breadboard-Aufbau:

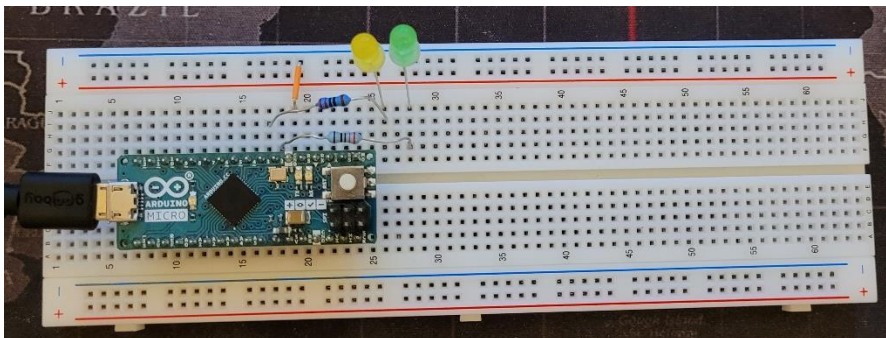


Code:

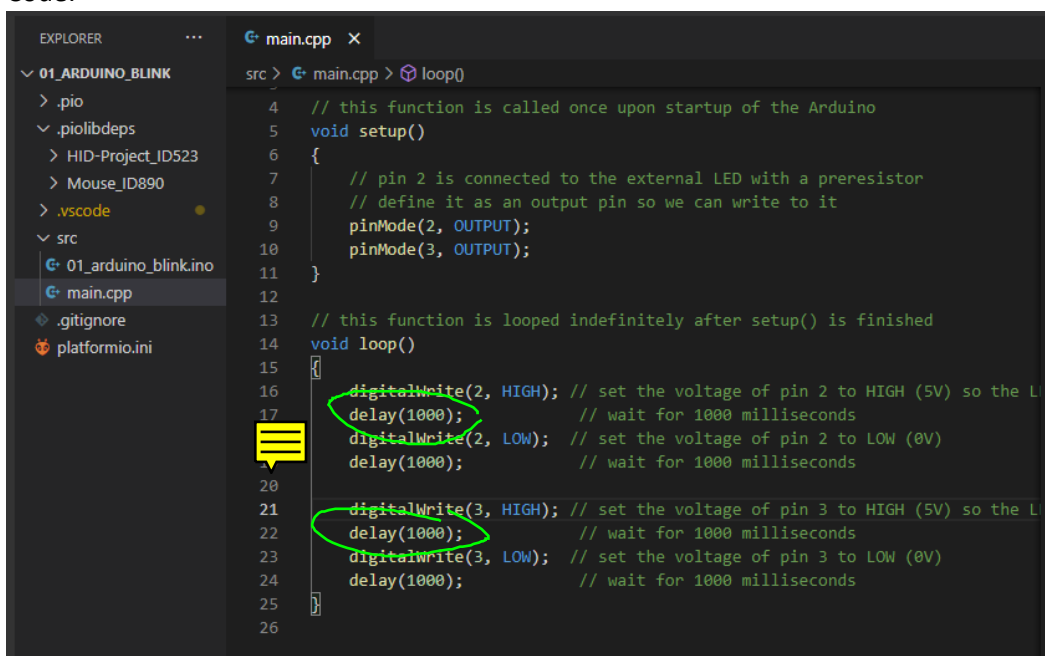


```
src > main.cpp > loop()
1 // include the Arduino standard library
2 #include <Arduino.h>
3
4 // this function is called once upon startup of the Arduino
5 void setup()
6 {
7     // pin 2 is connected to the external led with pre resistor
8     // define it as an output pin so we can write to it
9     pinMode(2, OUTPUT);
10 }
11
12 // this function is looped indefinitely after setup() is finished
13 void loop()
14 {
15
16     digitalWrite(2, HIGH); // set the voltage of pin 2 to HIGH (5V) so the
17     delay(1000);           // wait for 1000 milliseconds
18     digitalWrite(2, LOW);  // set the voltage of pin 2 to LOW (0V)
19     delay(1000);           // wait for 1000 milliseconds
20 }
21
22
```

1.3. Breadboard:

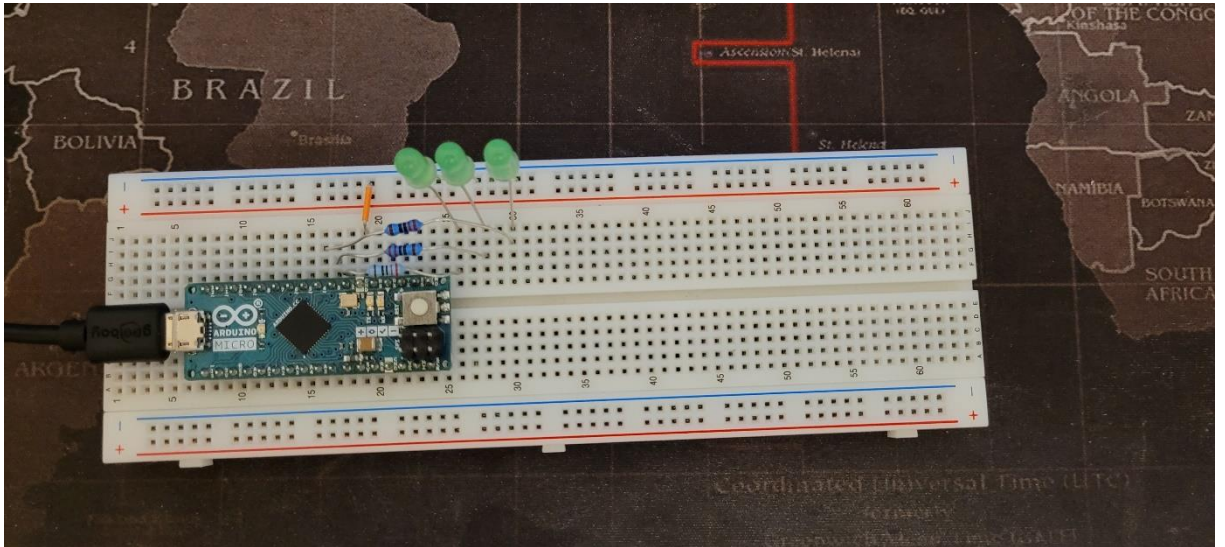


Code:



```
src > main.cpp > loop()
4 // this function is called once upon startup of the Arduino
5 void setup()
6 {
7     // pin 2 is connected to the external LED with a preresistor
8     // define it as an output pin so we can write to it
9     pinMode(2, OUTPUT);
10    pinMode(3, OUTPUT);
11 }
12
13 // this function is looped indefinitely after setup() is finished
14 void loop()
15 {
16     digitalWrite(2, HIGH); // set the voltage of pin 2 to HIGH (5V) so the L
17     delay(1000);           // wait for 1000 milliseconds
18     digitalWrite(2, LOW);  // set the voltage of pin 2 to LOW (0V)
19     delay(1000);           // wait for 1000 milliseconds
20
21     digitalWrite(3, HIGH); // set the voltage of pin 3 to HIGH (5V) so the L
22     delay(1000);           // wait for 1000 milliseconds
23     digitalWrite(3, LOW);  // set the voltage of pin 3 to LOW (0V)
24     delay(1000);           // wait for 1000 milliseconds
25 }
26
```

1.4. Breadboard:



Code:

```
EXPLORER  ...  main.cpp x
01_ARDUINO_BLINK
> .pio
> .pio\libdeps
> HID-Project_ID523
> Mouse_JD890
> .vscode
> src
  01_arduino_blinkino
    main.cpp
    editorconfig
    .gitignore
    platformio.ini

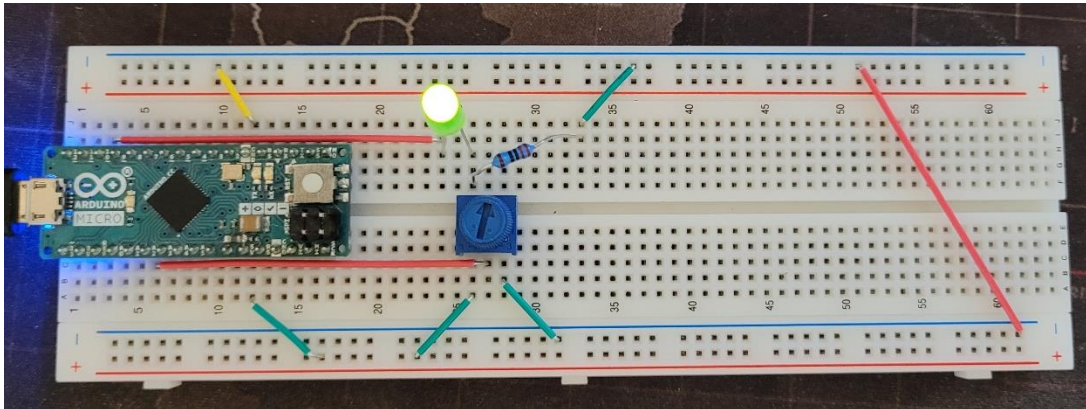
src > main.cpp > loop()
1 // include the Arduino standard library
2 #include <Arduino.h>
3
4 short binRep[3] = {}; // array for the binary representation
5 short num = 0, helperNum = 0; // var to store numbers on each loop
6
7 // this function is called once upon startup of the Arduino
8 void setup()
9 {
10 // pin 2, 3, 4 are connected to external LEDs with a presistor. define it as an output pin so we can write to it
11 pinMode(2, OUTPUT);
12 pinMode(3, OUTPUT);
13 pinMode(4, OUTPUT);
14 }
15
16 // this function is looped indefinitely after setup() is finished
17 void loop()
18 {
19 if (num == 0)
20     num = 0;
21
22     helperNum = num;
23
24     //calculate binary representation
25     for (int j = 0; j < sizeof(binRep); j++)
26     {
27         binRep[j] = helperNum % 2;
28         helperNum = helperNum / 2;
29     }
30
31     if (binRep[0] == 1)
32         digitalWrite(4, HIGH); // set the voltage of pin 2 to HIGH (5V) so the LED turns on
33
34     if (binRep[1] == 1)
35         digitalWrite(3, HIGH); // set the voltage of pin 3 to HIGH (5V) so the LED turns on
36
37     if (binRep[2] == 1)
38         digitalWrite(2, HIGH); // set the voltage of pin 3 to HIGH (5V) so the LED turns on
39
40     delay(1000); // wait for 1000 milliseconds
41     digitalWrite(2, LOW); // set the voltage of pin 2 to LOW (0V)
42     digitalWrite(3, LOW); // set the voltage of pin 3 to LOW (0V)
43     digitalWrite(4, LOW); // set the voltage of pin 4 to LOW (0V)
44     delay(1000); // wait for 1000 milliseconds
45
46     num++;
47 }
```

2. Die Funktion zum Abspielen von Tönen ist `tone(pin, frequency, duration)`. Nach ein bisschen Spielerei, habe ich ein cooles Tutorial zum Abspielen von Songs gefunden: [TUTORIAL](#). Als Star Wars Fan habe ich das Tutorial für eine Umsetzung vom Cantina-Band-Song genutzt. Die Noten habe ich aus der `pitches-Library` kopiert. **Das Ergebnis ist auf dem Video zu hören. Der Code (ob der Länge) ist außerdem im Ordner.**

3.

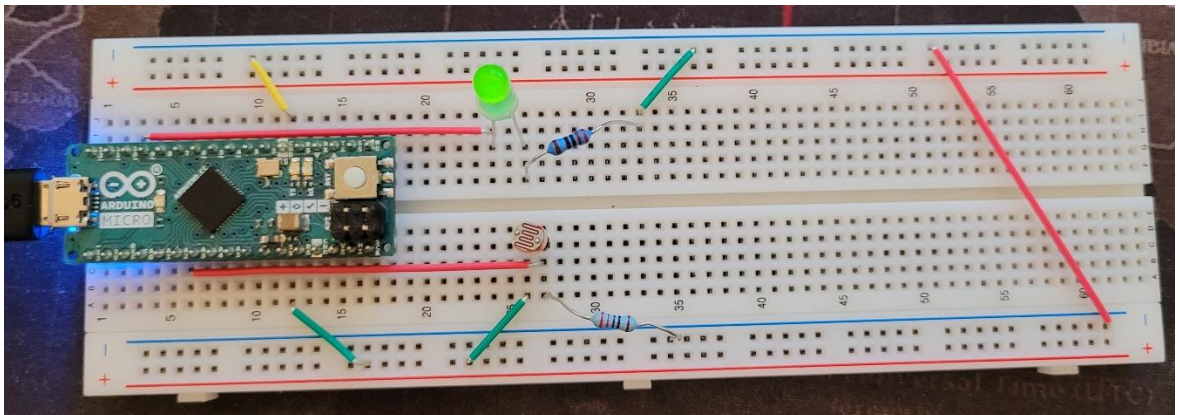
3.1.

Breadboard:



Problem: Im Code Sample fehlte das Mapping von `AnalogRead` (Werte 0-1023) auf `AnalogWrite` (Werte 0-255). Nachträglich anhand der [Dokumentation](#) verbessert und den Wert einfach durch 4 geteilt. ✓

- 3.2. Damit die Schaltung mit Photowiderstand funktioniert, brauchen wir einen Spannungsteiler.
Breadboard:



4.

4.1.

4.2.