



**waag society**

institute for art, science and technology



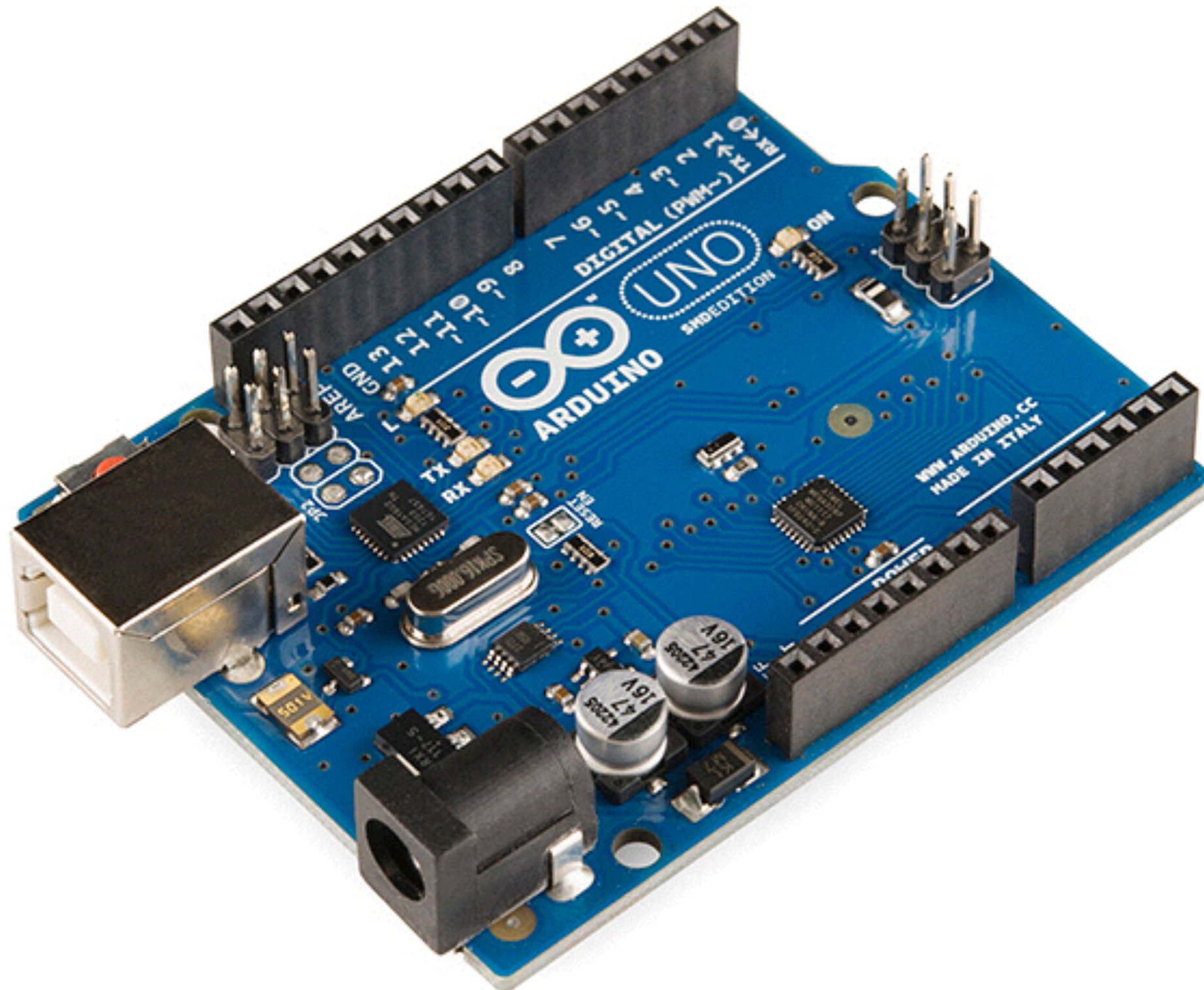
# BioHack Academy

## Arduino



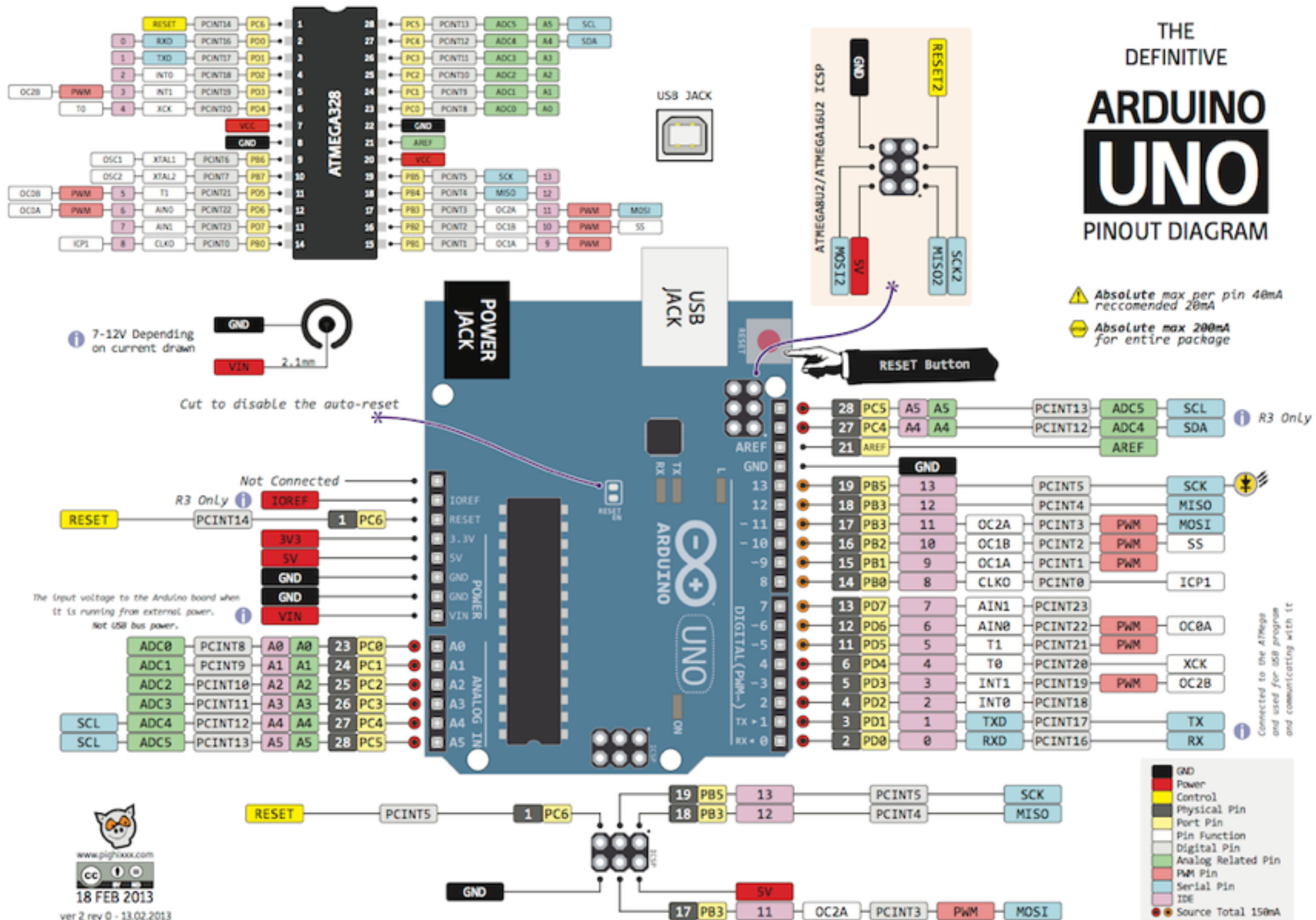


# Arduino





# Arduino is Open Source







# Programming

- Arduino IDE
- Setup() function
- Loop() function

The screenshot shows the Arduino IDE window titled 'sketch\_feb04a | Arduino 1.5.8'. The interface includes a toolbar with icons for checking, running, saving, and uploading. Below the toolbar is a tab labeled 'sketch\_feb04a §'. The main text area contains the following code:

```
void setup() {  
  // put your setup code here, to run once:  
}  
  
void loop() {  
  // put your main code here, to run repeatedly:  
}
```

At the bottom of the window, there is a status bar showing the number '2' on the left and the text 'Arduino Uno on /dev/cu.usbserial-AM01VCF6' on the right.



# Variables

- char: 1 byte character value
- byte: 8-bit unsigned number, from 0 to 255
- int: store 6-bit (2-byte) value, from -32,768 to 32,767
- unsigned int
- long: store 32 bits (4 bytes), from -2,147,483,648 to 2,147,483,647.
- unsigned long
- float: number that has a decimal point, 32 bits (4 bytes) from  $-3.4028235E+38$  to  $-3.4028235E+38$
- boolean: (8 bit) – simple logical true/false



# Function definition

```
[return type] [function name] ({arguments})  
{  
[ Code to execute ]  
}
```

```
int multiply(int num1, int num2)  
{  
int result;  
result = num1 * num2;  
return result;  
}
```



# Programming

## Blinking an LED

- pinMode()
- digitalWrite()
- delay()

The screenshot shows the Arduino IDE interface with the 'Blink' example code loaded. The title bar reads 'Blink | Arduino 1.5.8'. The code is as follows:

```
/*
 * Blink
 * Turns on an LED on for one second, then off for one second, repeatedly.
 *
 * Most Arduinos have an on-board LED you can control. On the Uno and
 * Leonardo, it is attached to digital pin 13. If you're unsure what
 * pin the on-board LED is connected to on your Arduino model, check
 * the documentation at http://arduino.cc
 *
 * This example code is in the public domain.
 *
 * modified 8 May 2014
 * by Scott Fitzgerald
 */

// the setup function runs once when you press reset or power the board
void setup() {
  // initialize digital pin 13 as an output.
  pinMode(13, OUTPUT);
}

// the loop function runs over and over again forever
void loop() {
  digitalWrite(13, HIGH); // turn the LED on (HIGH is the voltage level)
  delay(1000);             // wait for a second
  digitalWrite(13, LOW);  // turn the LED off by making the voltage LOW
  delay(1000);             // wait for a second
}
```

The bottom status bar indicates '16' and 'Arduino Uno on /dev/cu.usbserial-AM01VCF6'.

<http://www.makeuseof.com/tag/getting-started-with-arduino-a-beginners-guide/>



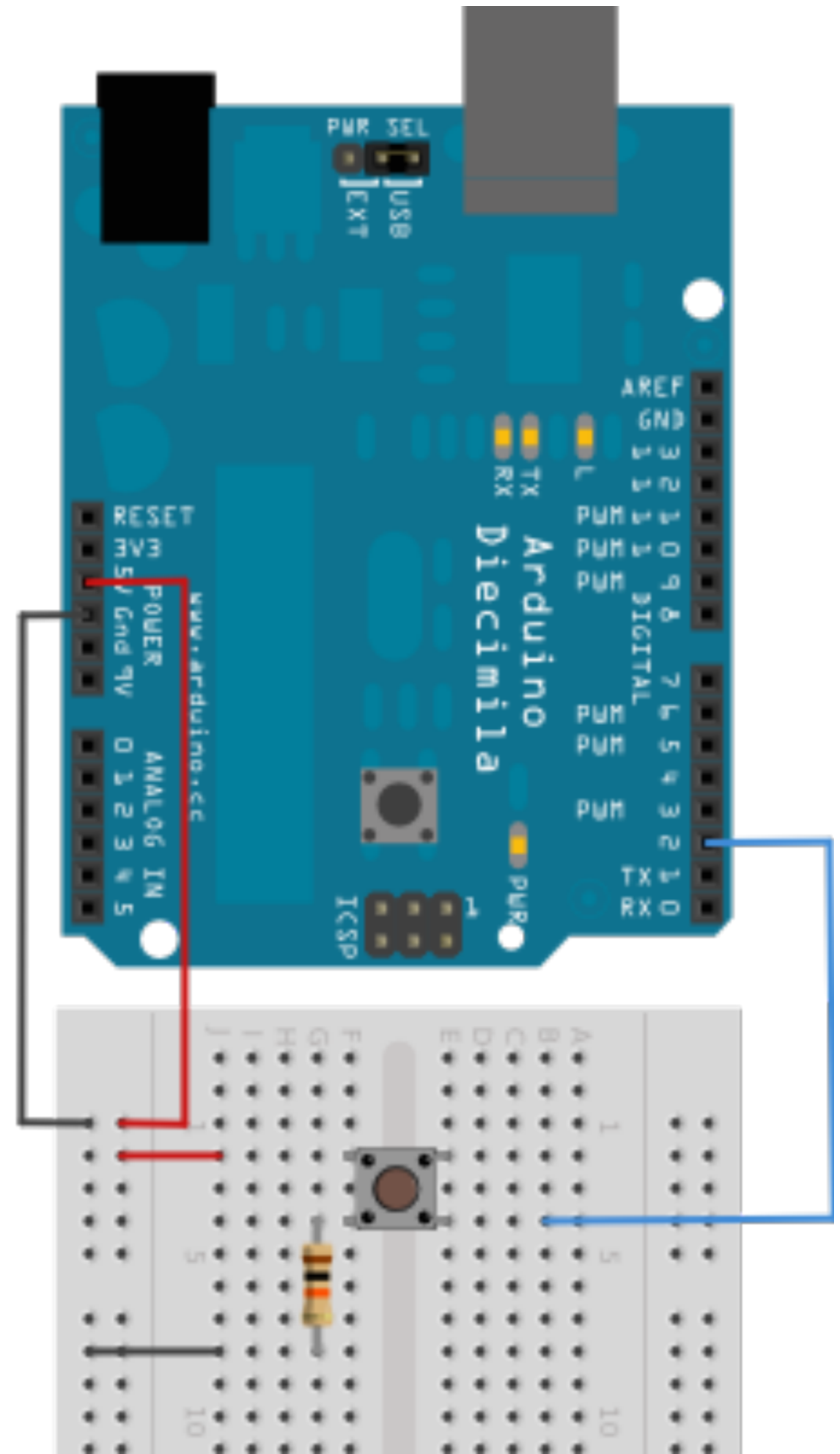
# Button

```
// set pin numbers:  
const int buttonPin = 2;    // the number of the button  
const int ledPin = 13;     // the number of the LED pin
```

```
// variables will change:  
int buttonState = 0;        // variable for reading the  
button
```

```
void setup() {  
  // initialize the LED pin as an output:  
  pinMode(ledPin, OUTPUT);  
  // initialize the pushbutton pin as an input:  
  pinMode(buttonPin, INPUT);  
}
```

```
void loop() {  
  // read the state of the pushbutton value:  
  buttonState = digitalRead(buttonPin);  
  
  // check if the pushbutton is pressed.  
  // if it is, the buttonState is HIGH:  
  if (buttonState == HIGH) {  
    // turn LED on:  
    digitalWrite(ledPin, HIGH);  
  } else {  
    // turn LED off:  
    digitalWrite(ledPin, LOW);  
  }  
}
```







**some  
rights  
reserved**

These slides are published by Waag  
Society under CC-BY-SA 4.0 license