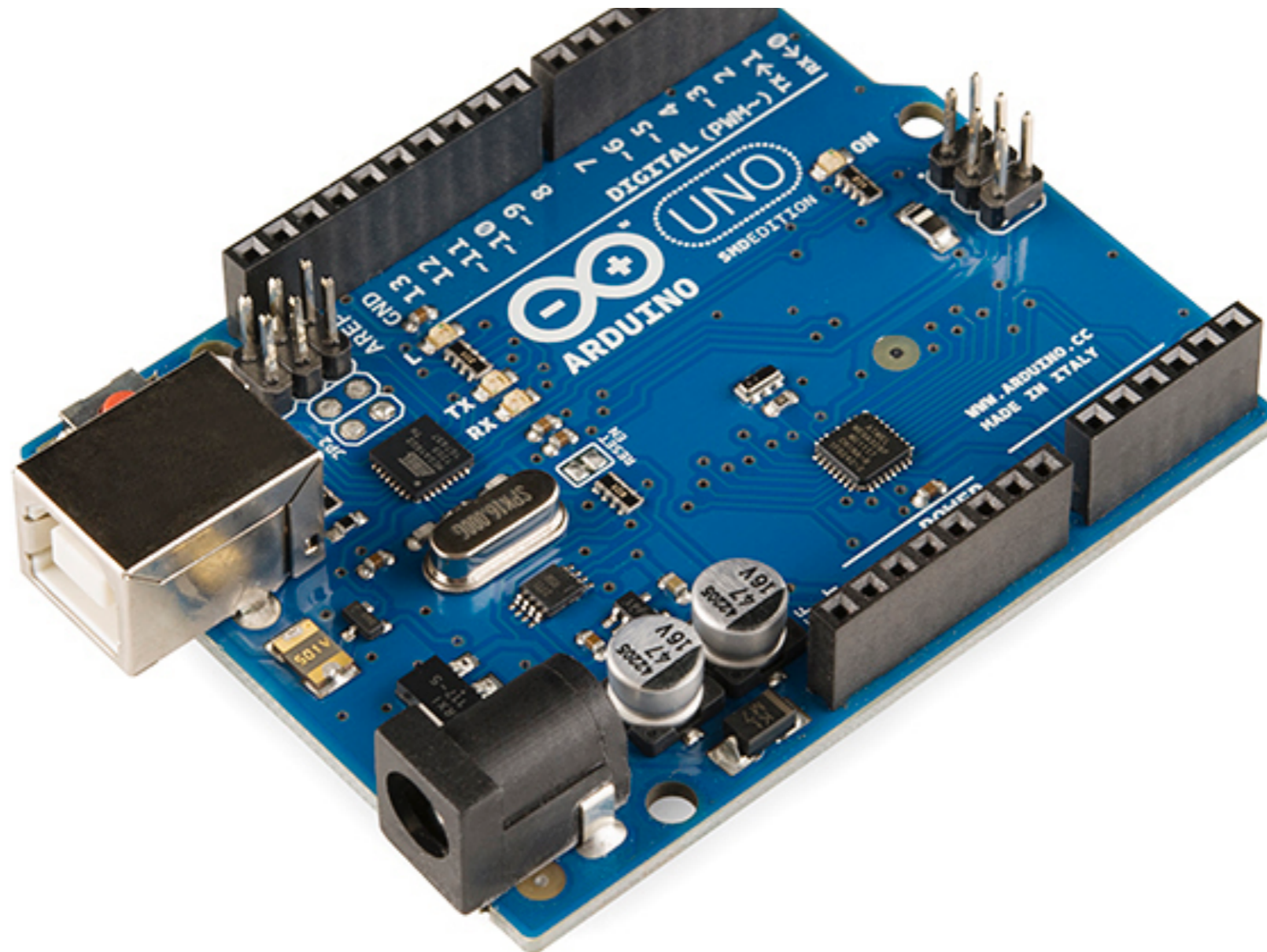




waag
wetlab amsterdam



BioHack Academy
Arduino



Digital electronics

0

Off

LOW

GND

False

1

On

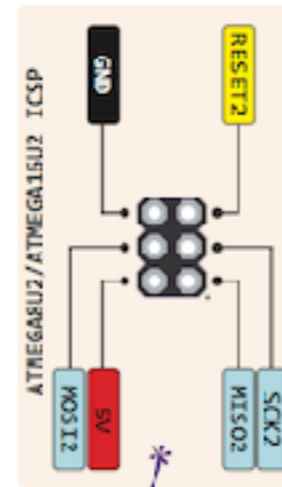
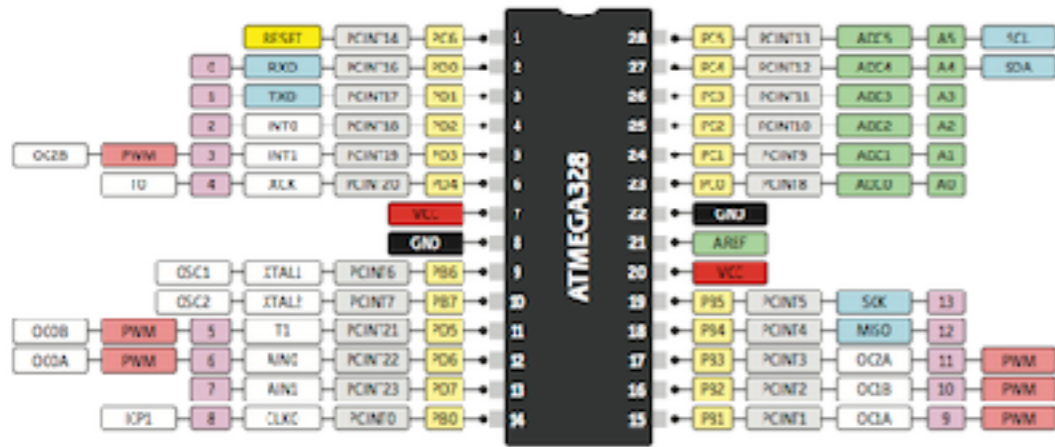
HIGH

VCC

True



Arduino is Open Source



THE DEFINITIVE
ARDUINO UNO
PINOUT DIAGRAM

- ⚠ Absolute max per pin 40mA recommended 20mA
- ⚡ Absolute max 200mA for entire package



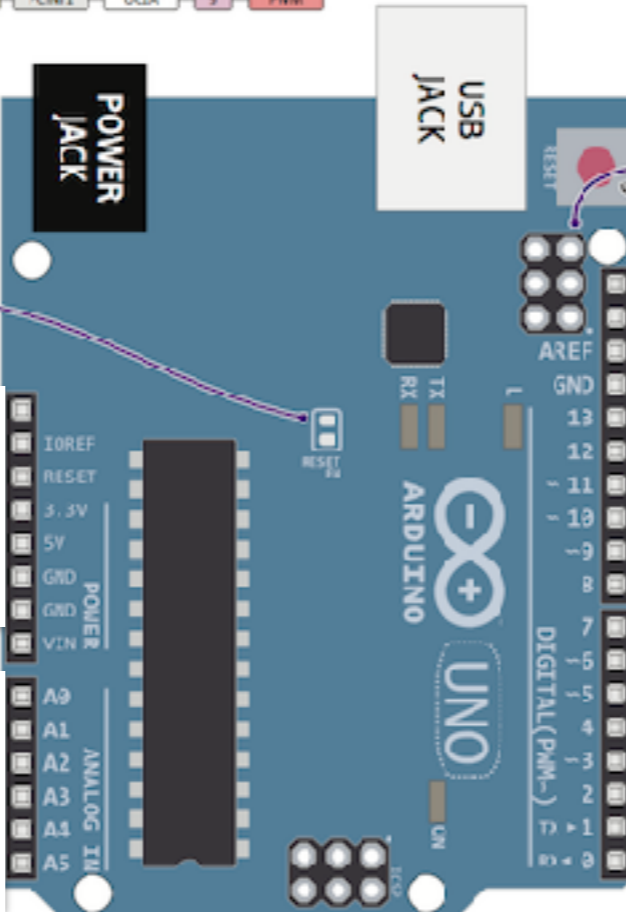
Cut to disable the auto-reset

Power

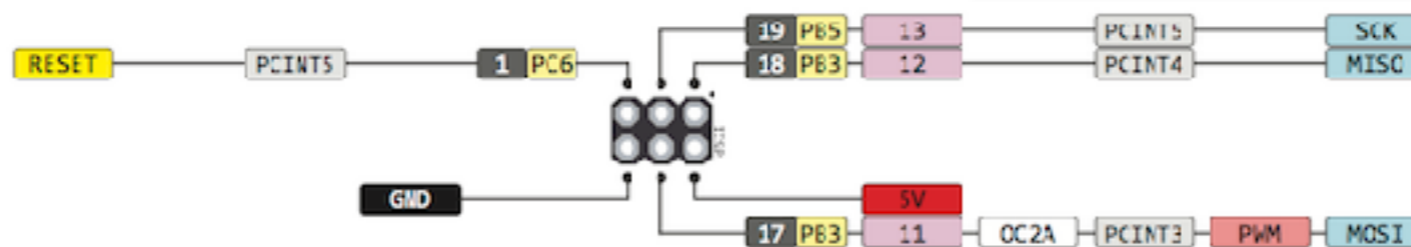
It is running from external power. Not USB bus power.

VIN

Analog



Digital



- Power
- Control
- Physical Pin
- Port Pin
- Pin Function
- Digital Pin
- Analog Related Pin
- PWM Pin
- Serial Pin
- TRST
- Source Total 150mA



Programming

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

A screenshot of the Arduino IDE interface. The window title is "sketch_feb04a | Arduino 1.5.8". The toolbar shows icons for check, run, upload, and download. The sketch editor contains the following code:

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

The bottom status bar shows "2" on the left and "Arduino Uno on /dev/cu.usbserial-AM01VCF6" on the right.



Output

Blinking an LED

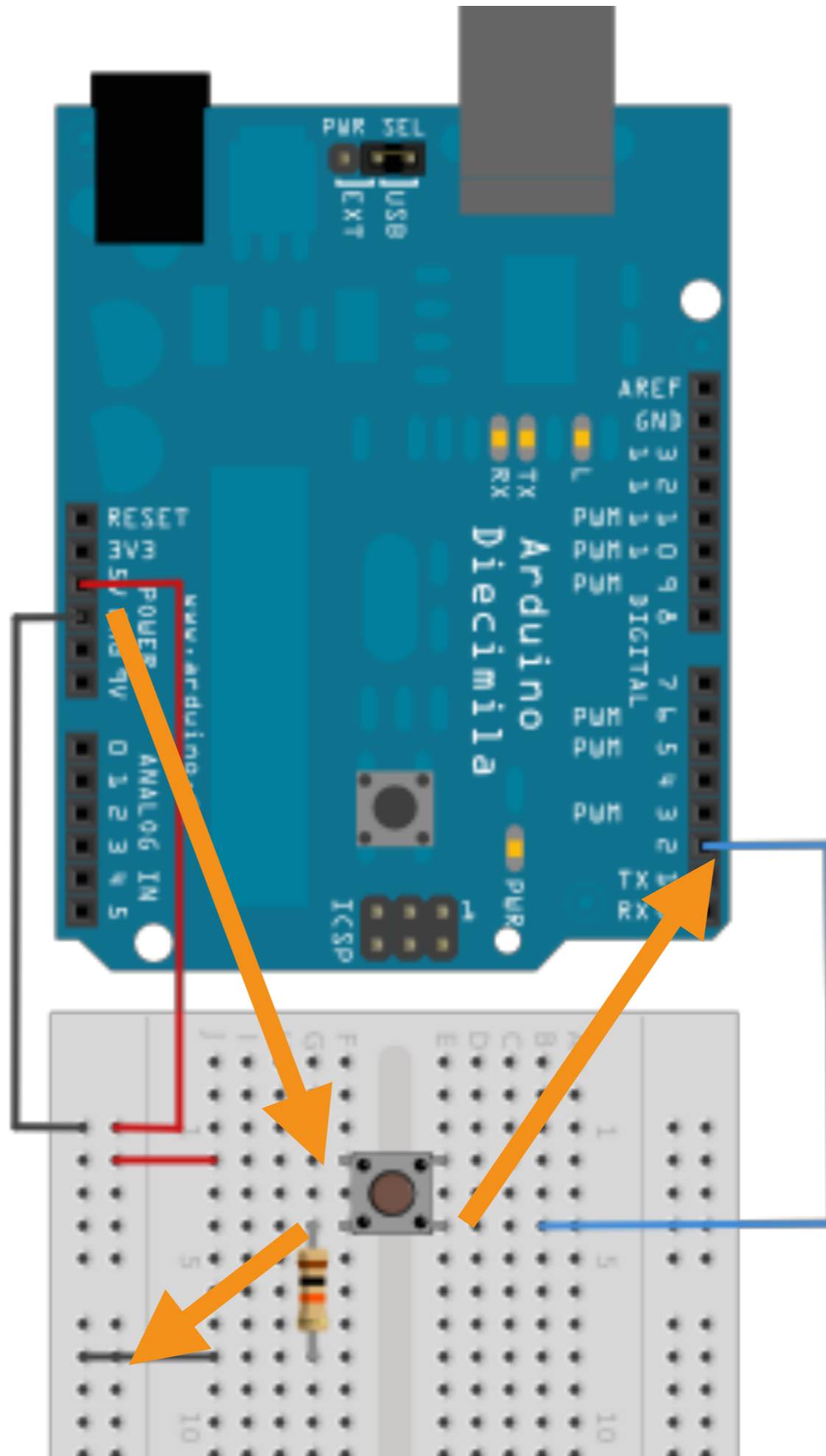
- pinMode()
- digitalWrite()
- delay()

```
// 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(9, HIGH); // turn the LED on (HIGH is the voltage level)
  delay(1000);           // wait for a second
  digitalWrite(9, LOW); // turn the LED off by making the voltage LOW
  delay(1000);          // wait for a second
}
```



Button





Input

```
// digital pin 2 has a pushbutton attached to it. Give it a name:  
int pushButton = 2;
```

```
// the setup routine runs once when you press reset:
```

```
void setup() {  
  // initialize serial communication at 9600 bits per second:  
  Serial.begin(9600);  
  // make the pushbutton's pin an input:  
  pinMode(pushButton, INPUT);  
}
```

```
// the loop routine runs over and over again forever:
```

```
void loop() {  
  // read the input pin:  
  int buttonState = digitalRead(pushButton);  
  // print out the state of the button:  
  Serial.println(buttonState);  
  delay(1);          // delay in between reads for stability  
}
```



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

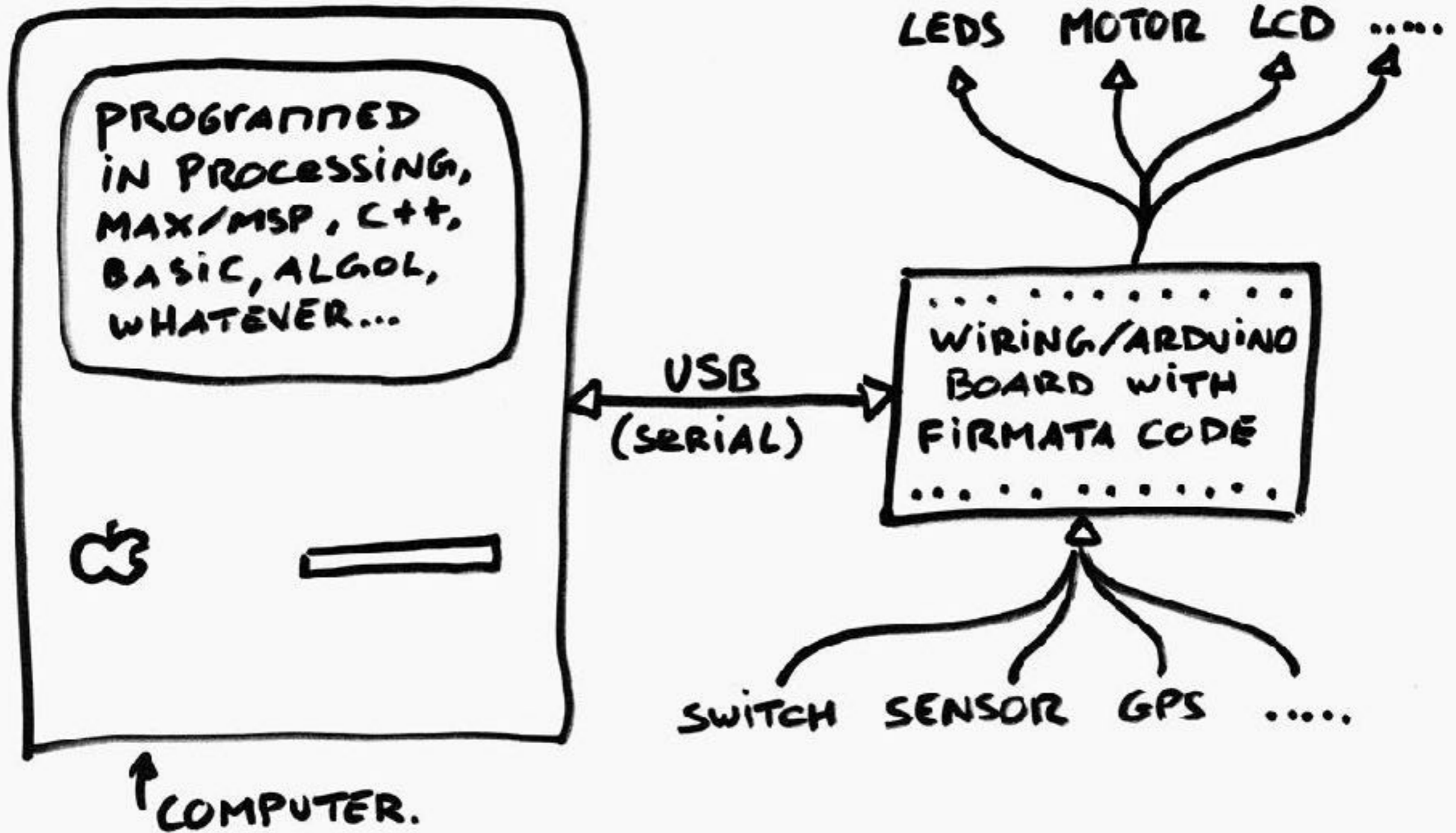
```
[return type] [function name] (arguments) {  
    [ Code to execute ]  
}
```

Example:

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



Alternative Arduino programming: Firmata





some

rights

reserved