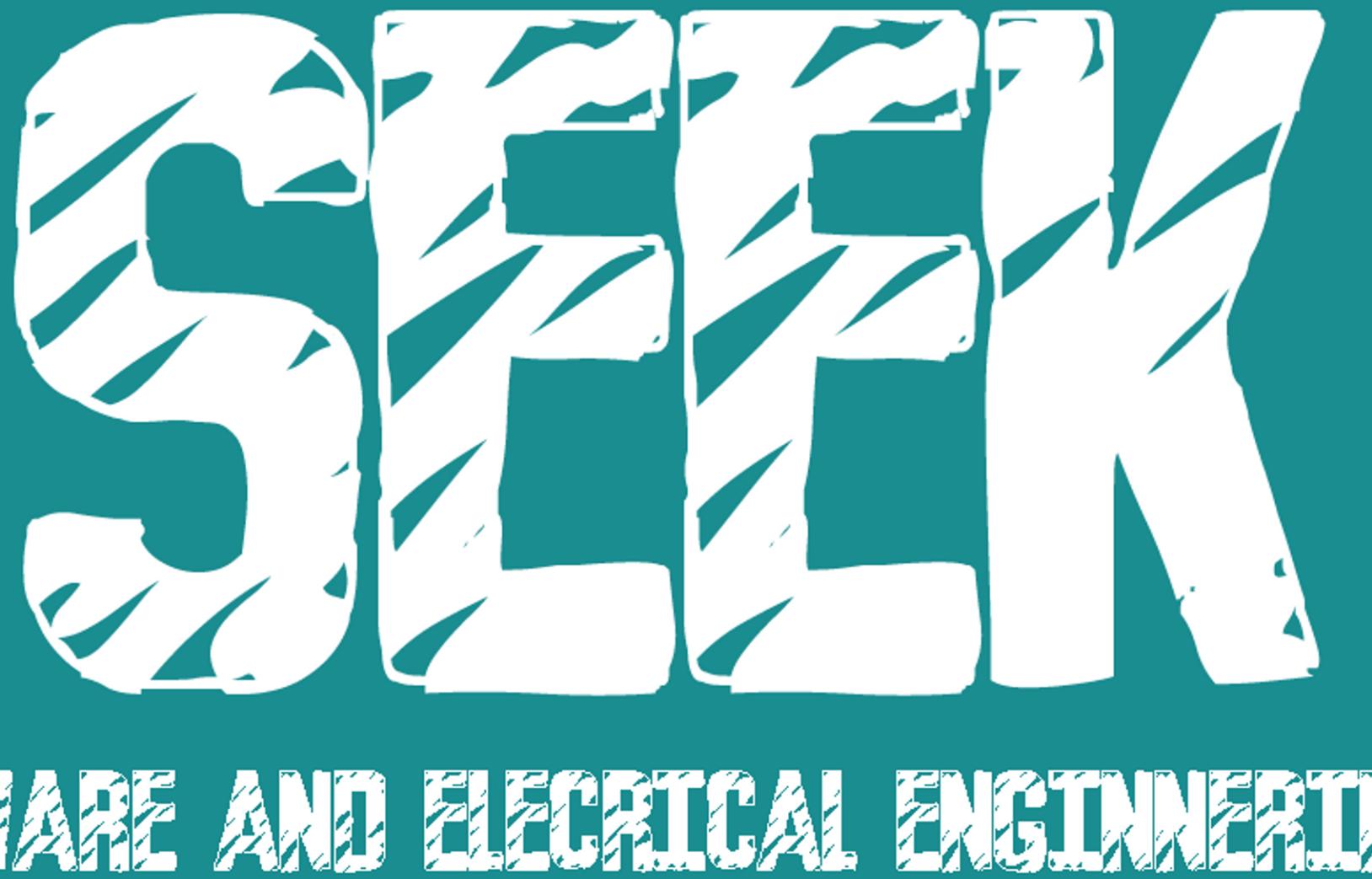
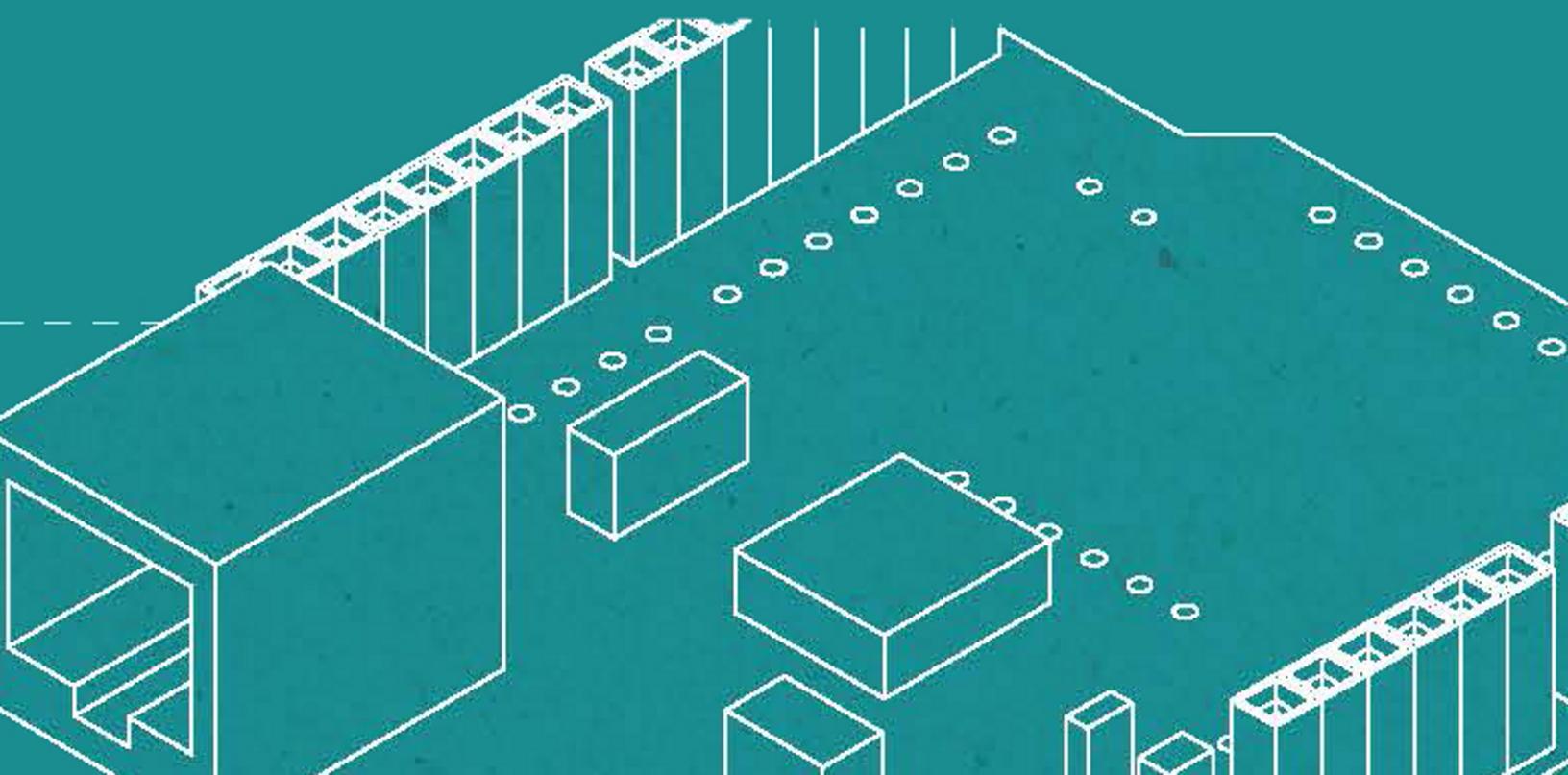


# SOFTW

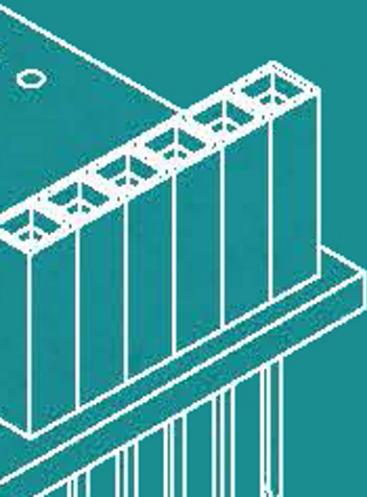
**Shields:** Are add-ons which can expand the functionality with Ethernet, Wi-Fi, Bluetooth, sensors, LCD-screens, buttons, motor control etc.



SCHOOL OF COMPUTER AND ELECTRICAL ENGINEERING



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## AN EXAMPLE ARDUINO - SKETCH:

```

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

```

*COMMENTS ARE IGNORED*

```

int buttonState = 0; // variable for reading the pushbutton status

```

← DON'T FORGET!

```

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

```

} } *SETUP IS RUN ONLY ONCE*

```

void loop() {
    // read the state of the pushbutton value:
    buttonState = digitalRead(buttonPin);

```

← ASSIGNMENT

```

    // 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);
    }
}

```

① ← COMPARISON : == EQUAL  
!= NOT EQUAL  
< LESS THAN  
> GREATER THAN  
<= LESS OR EQUAL TO  
>= GREATER OR EQUAL TO  
&& AND  
|| OR  
!

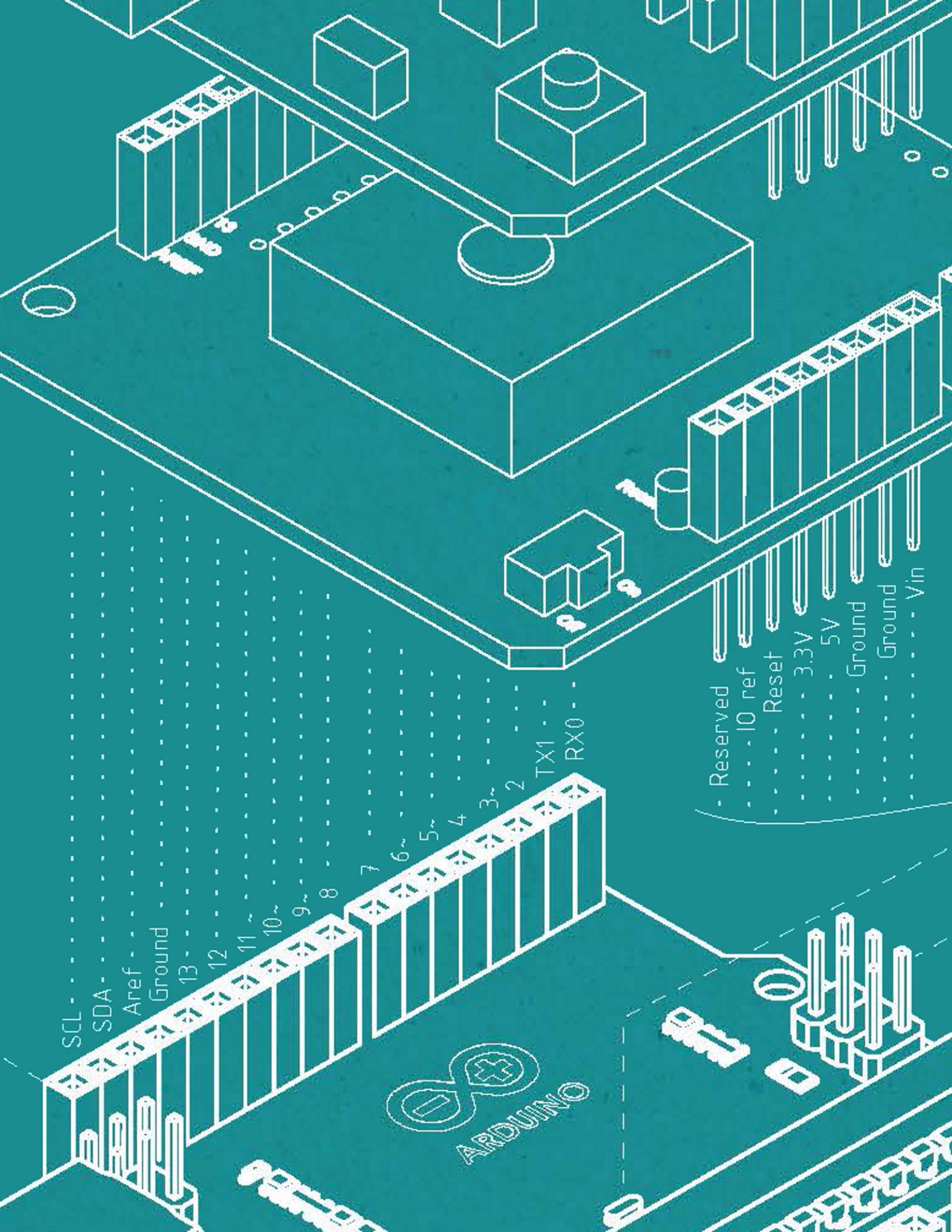
= 1      = Ø

① ALSO DON'T FORGET!

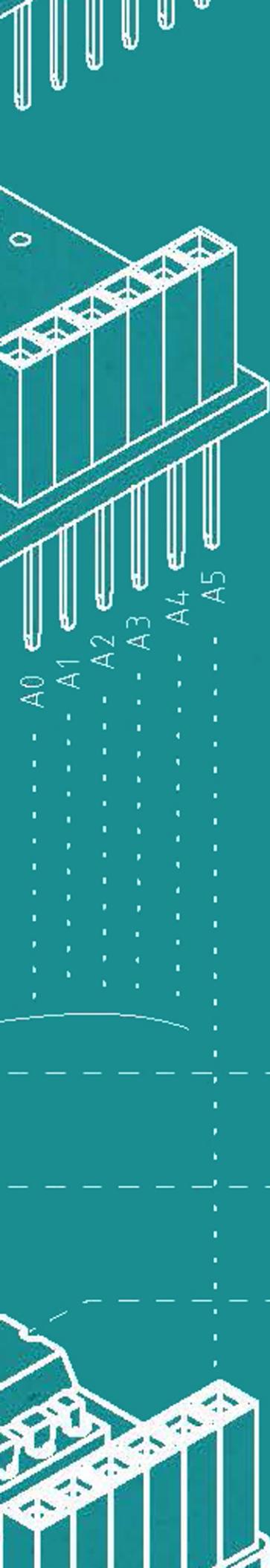
Digital pins

Reset button

**Software:** The Arduino IDE is a simple to use programming environment. It allows a user to write code, to test & compile and to upload the program into the microcontroller on an Arduino platform.



```
// select the input pin for the potentiometer  
int sensorPin = A0;  
// variable to store the value coming from the sensor  
int sensorValue = 0;  
//Read a value (0-1023) from "sensorPin"  
sensorValue = analogRead(sensorPin);
```



Blink | Arduino 1.0.5

Blink

Turns on an LED on for one second, then off for one second, repeatedly.

This example code is in the public domain.

```
// Pin 13 has an LED connected in most Arduino boards.
// give it a name:
int led = 13;

// the setup routine runs once when you press reset:
void setup() {
  // initialize the digital pin as an output:
  pinMode(led, OUTPUT);
}

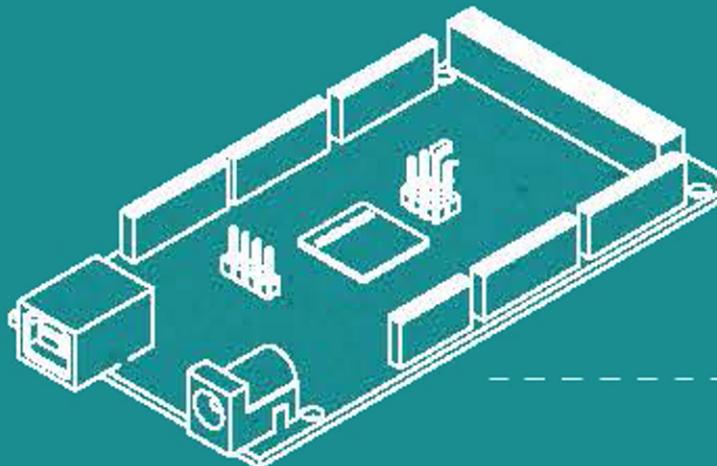
// the loop routine runs over and over again forever:
void loop() {
  digitalWrite(led, HIGH); // turn the LED on (HIGH is the voltage level)
  delay(1000); // wait for a second
  digitalWrite(led, LOW); // turn the LED off by making the voltage LOW
  delay(1000); // wait for a second
}
```

Arduino Uno (Rev 1.0) (hardware rev 1.1)

USB:  
Programming, data & power

Power:

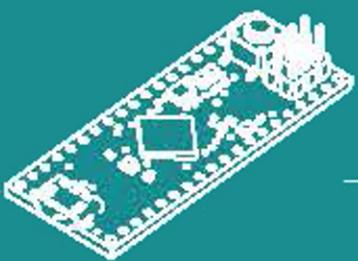
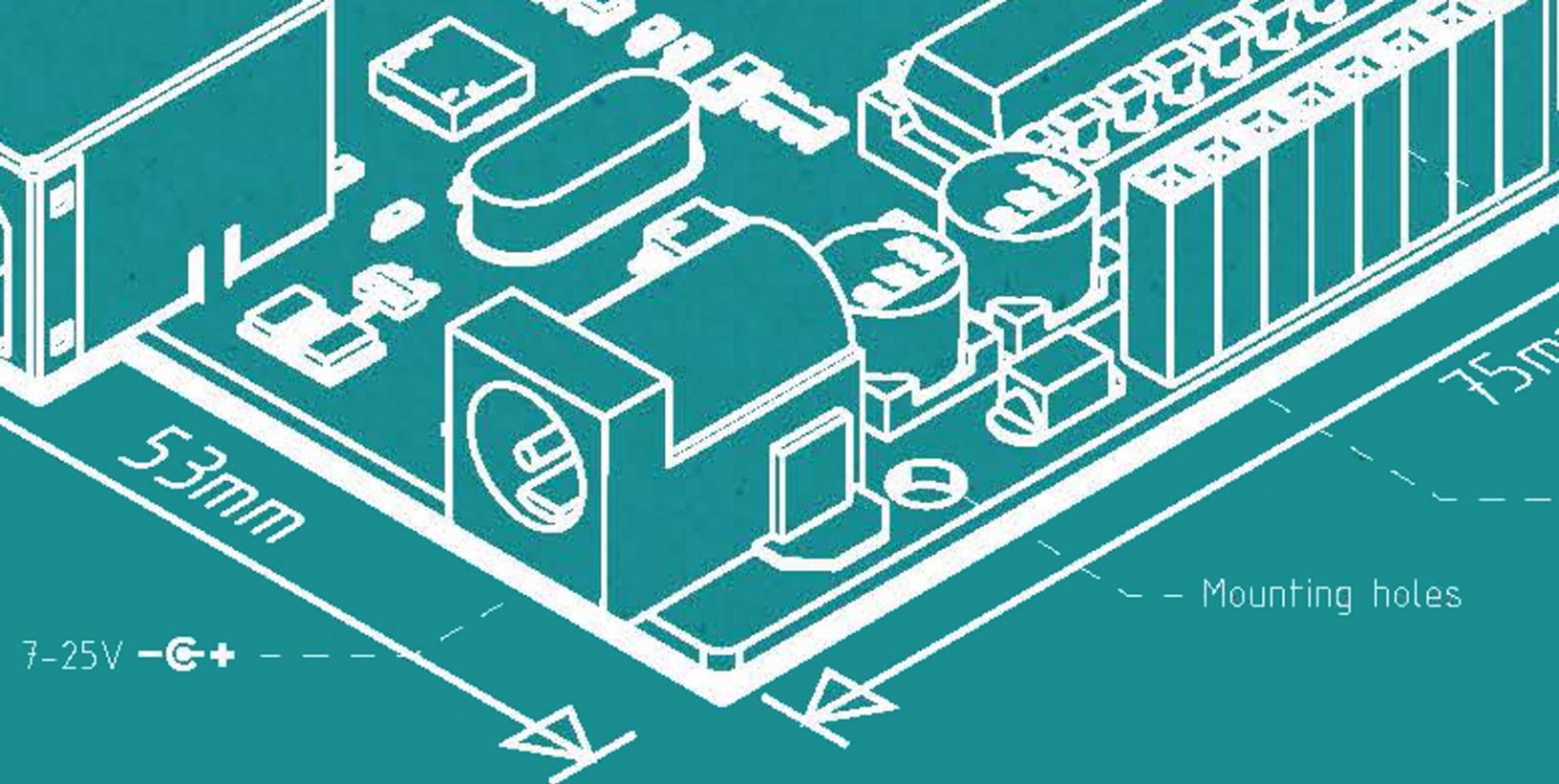
Arduino Open-Source Boards come in various forms, made by Arduino and others supporting the community.



**Arduino Mega 2560**  
More pins and speed

NE

People who are really serious



**Arduino Micro**  
Smaller size



**Arduino Lilypad**  
For wearable electronics

**PROJECT.CA/S**  
... about software should make the



-- Power pins

## Arduino Uno

```
// Useful functions
+ - / *
delay(1000)                                // arithmetic
millis()                                     // wait for one second (1000 milliseconds)
constrain(value, low, high)                  // returns the time since start
map(value, fromLow, fromHigh, toLow, toHigh) // constrains a value
Serial.begin(9600)                            // Re-maps a number from one range to another
Serial.print()                               // Opens a serial port with a 9600 baudrate
Serial.write()                               // Writes human-readable text to the serial port
Serial.read()                                // More advanced alternative
                                            // Read one byte from the serial port
```

EEK

ir own hardware—Alan Kay

# SEEK

SOFTWARE AND ELECTRICAL ENGINEERING KLUK

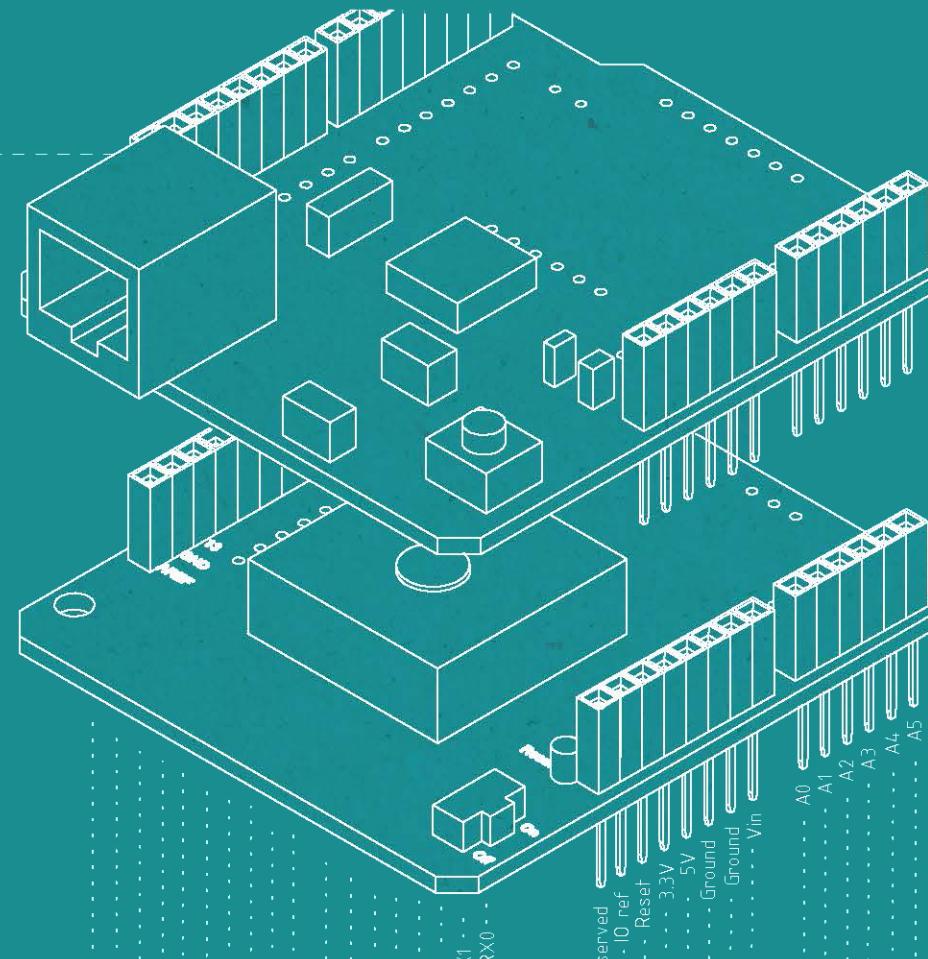
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int ledPin = 13; // the number of the LED pin

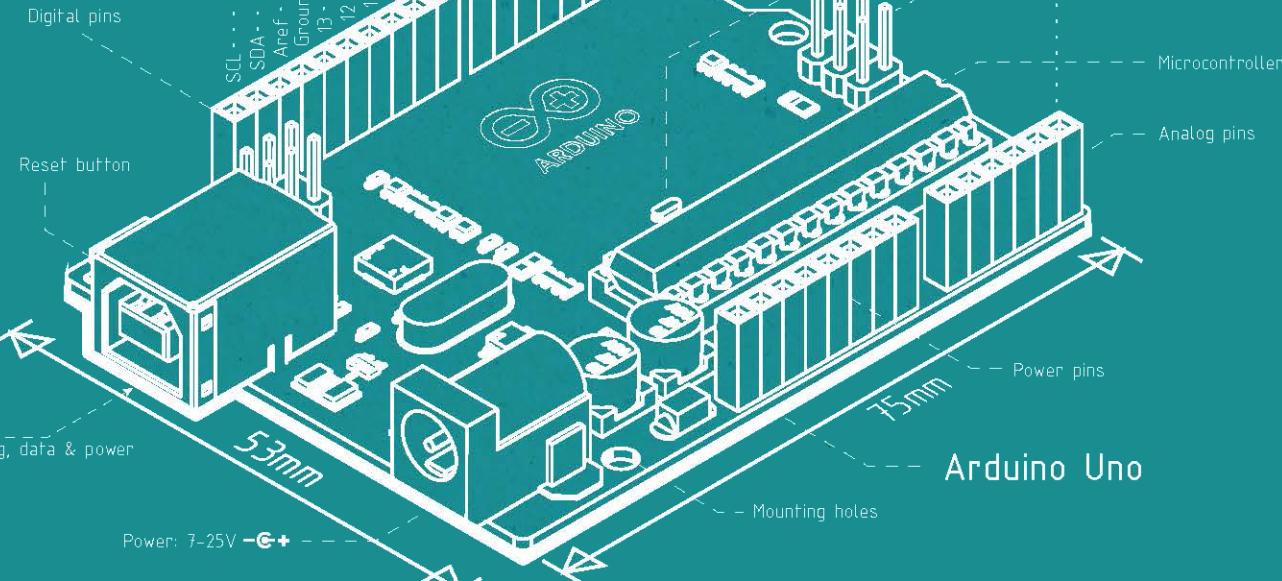
int buttonState = 0; // variable for reading the pushbutton status
// DON'T FORGET!
void setup() {
    // initialize the LED pin as an output:
    pinMode(ledPin, OUTPUT);
    // initialize the pushbutton pin as an input:
    pinMode(buttonPin, INPUT);
}

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) {
        // COMPARISON: == EQUAL
        // != NOT EQUAL
        // < LESS THAN
        // > GREATER THAN
        // <= LESS OR EQUAL TO
        // >= GREATER OR EQUAL TO
        // & AND
        // || OR
        // !
    }
    else {
        // turn LED off:
        digitalWrite(ledPin, LOW);
    }
}
// ALSO DON'T FORGET!
```

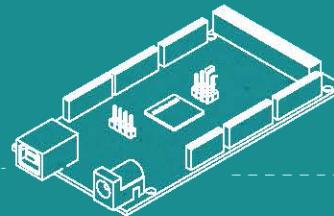


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Serial.write()
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// arithmetic
// wait for one second (1000 milliseconds)
// returns the time since start
// constrains a value
// Re-maps a number from one range to another
// Opens a serial port with a 9600 baudrate
// Writes human-readable text to the serial port
// More advanced alternative
// Read one byte from the serial port
```

# NEXTPROJECT.CA/SEEK

People who are really serious about software should make their own hardware — Alan Kay