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Arduino Grove Beginner Kit



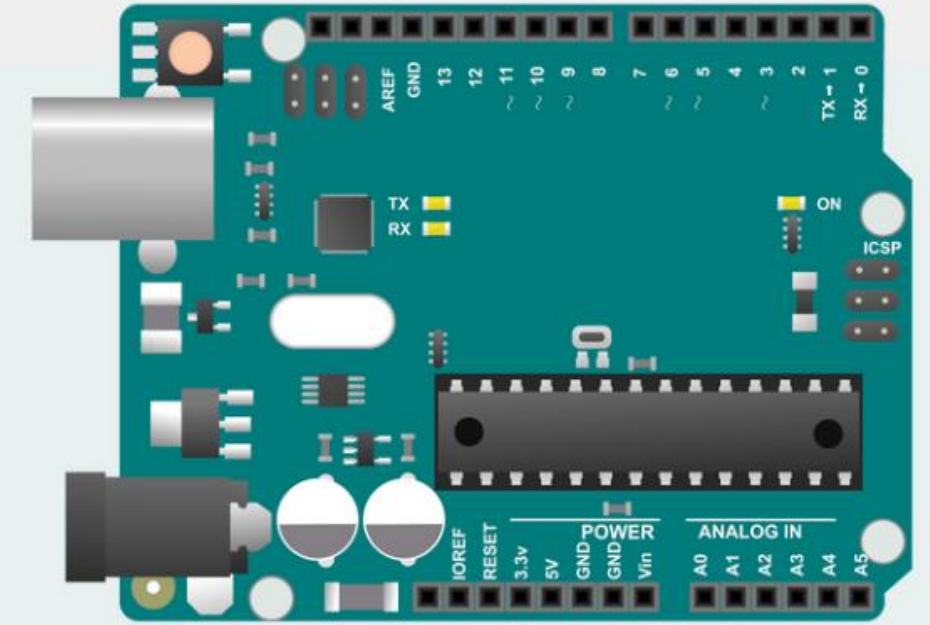
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What is an Arduino board?

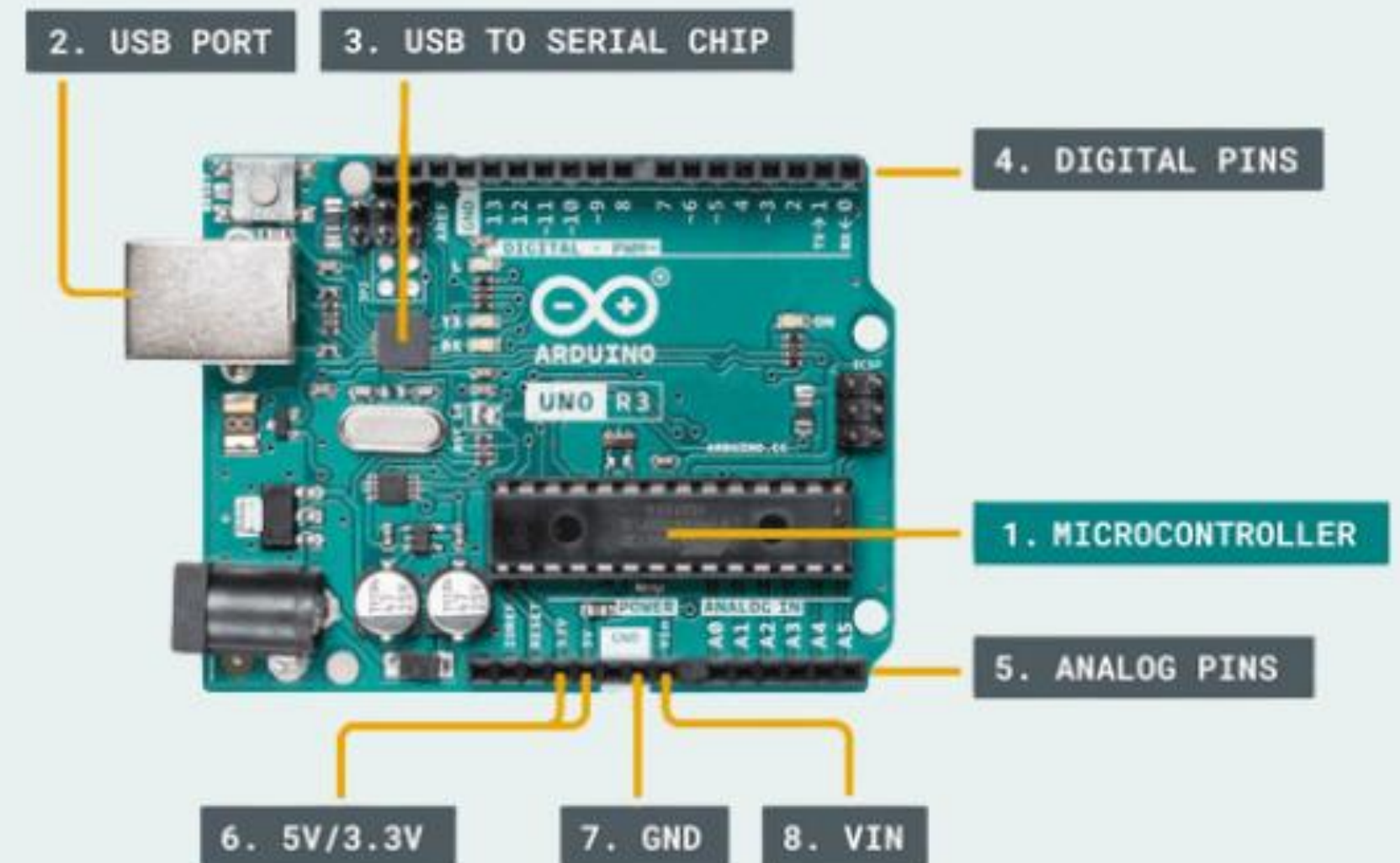
An Arduino board is an open-source **microcontroller** platform used for building digital devices and interactive objects that can sense and control the physical world.



Arduino is widely used in hobbyist projects, educational environments, and professional applications due to its **simplicity, versatility**, and extensive **community support**. The primary language used to program Arduino boards is **C/C++**, which includes easy-to-use functions for interacting with hardware. It can also be programmed through **graphical programming software using scratch**, such as TinkerGen.

Arduino board features:

- 1. Microcontroller:** the brain of an Arduino, and is the component that we load programs into
- 2. USB port:** used to connect your Arduino board to a computer.
- 3. USB to Serial chip:** it helps translate data that comes from a computer to the on-board microcontroller.
- 4. Digital pins:** that use digital logic (0,1 or LOW/HIGH). Commonly used for switches and to turn on/off an LED.



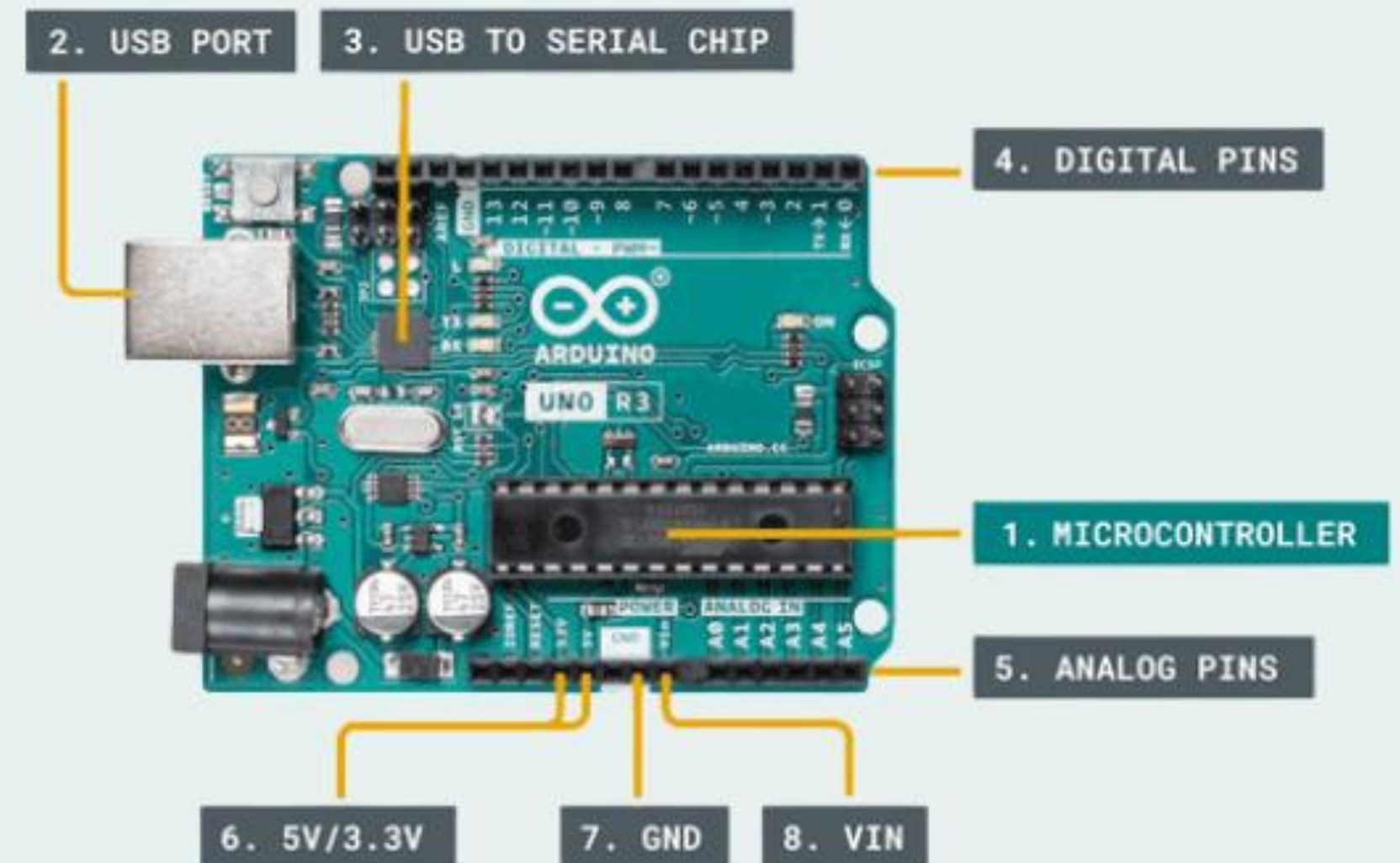
Arduino board features:

5. Analog pins: that can read analog values in a 10 bit resolution (0-1023).

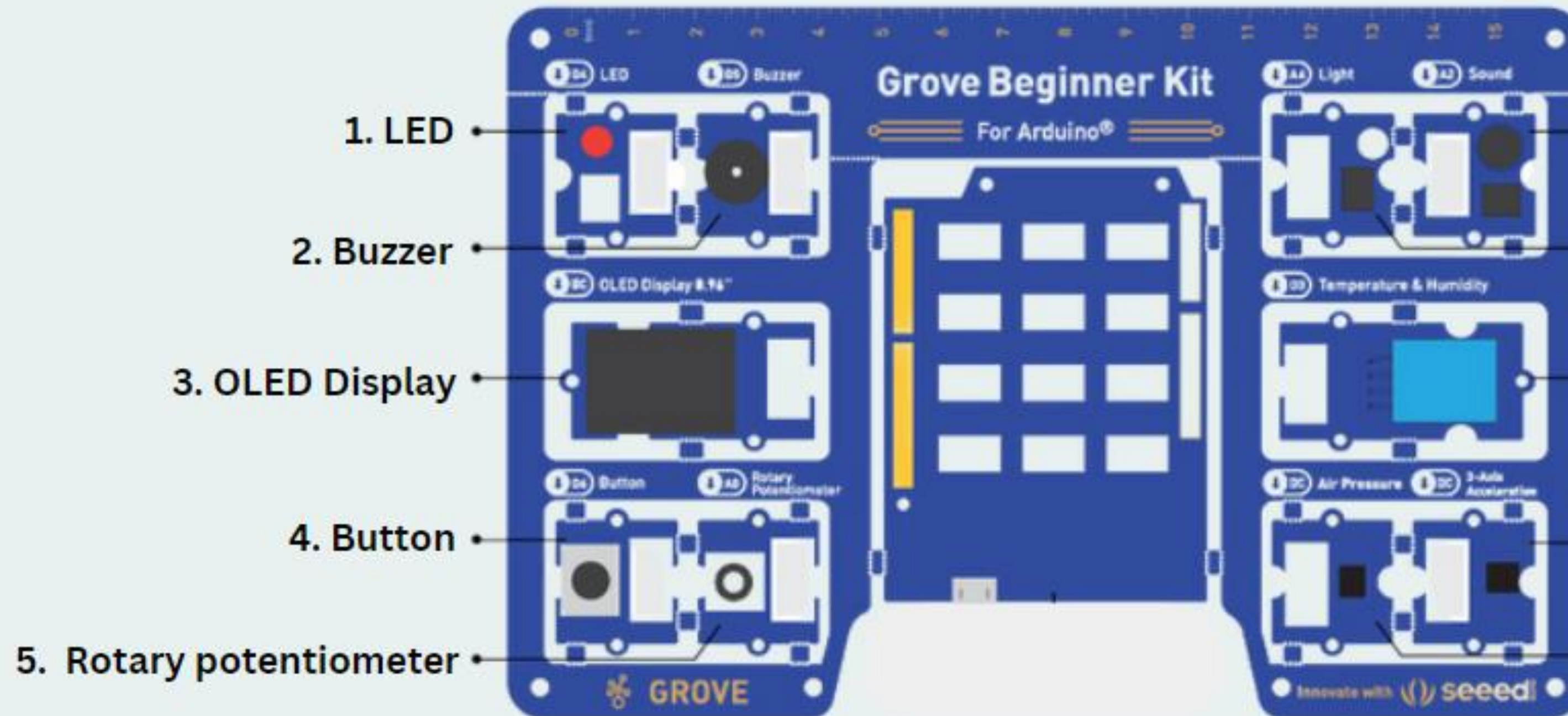
6. 5V / 3.3V pins: used to power external components.

7. GND: also known as ground, negative or simply - used to complete a circuit, where the electrical level is at 0 volt.

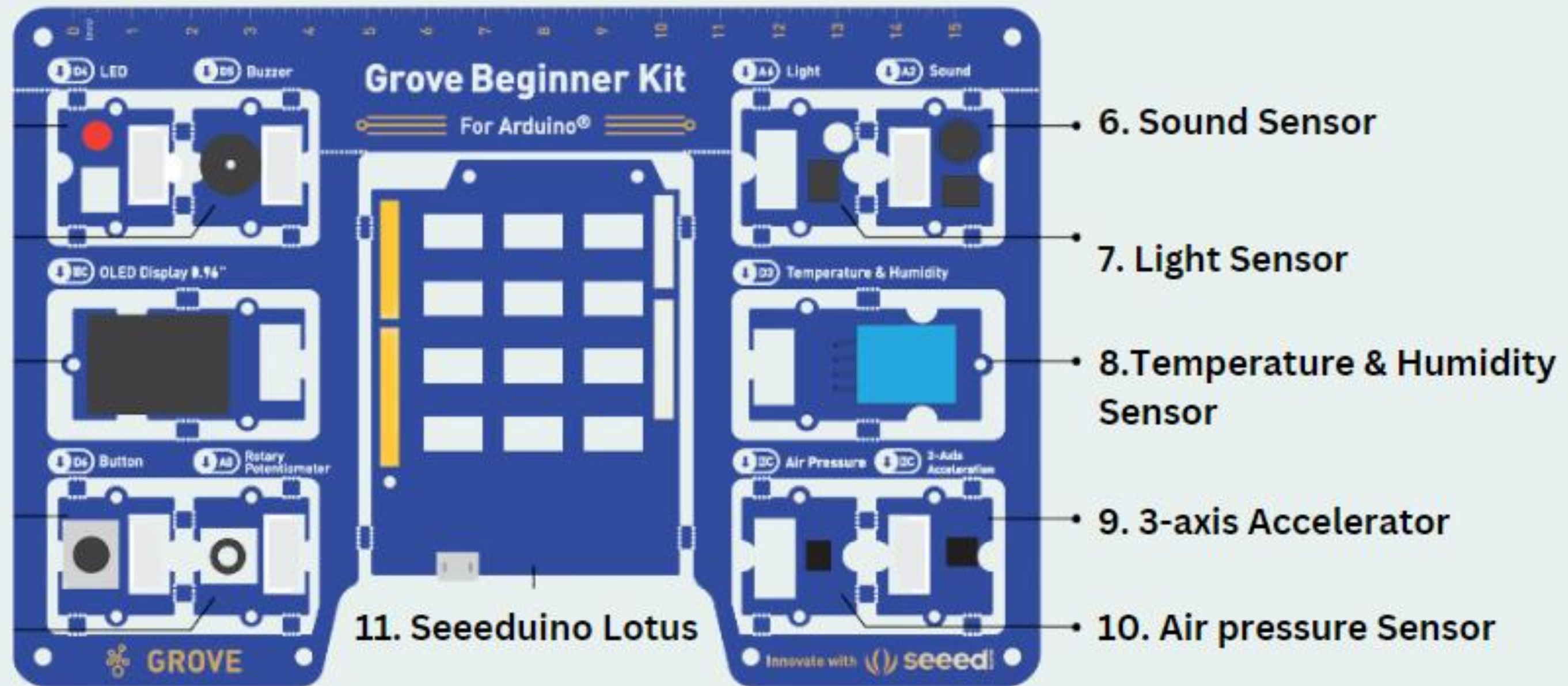
8. VIN: stands for Voltage In, where you can connect external power supplies.



Grove beginner Kit features:



Grove beginner Kit features:

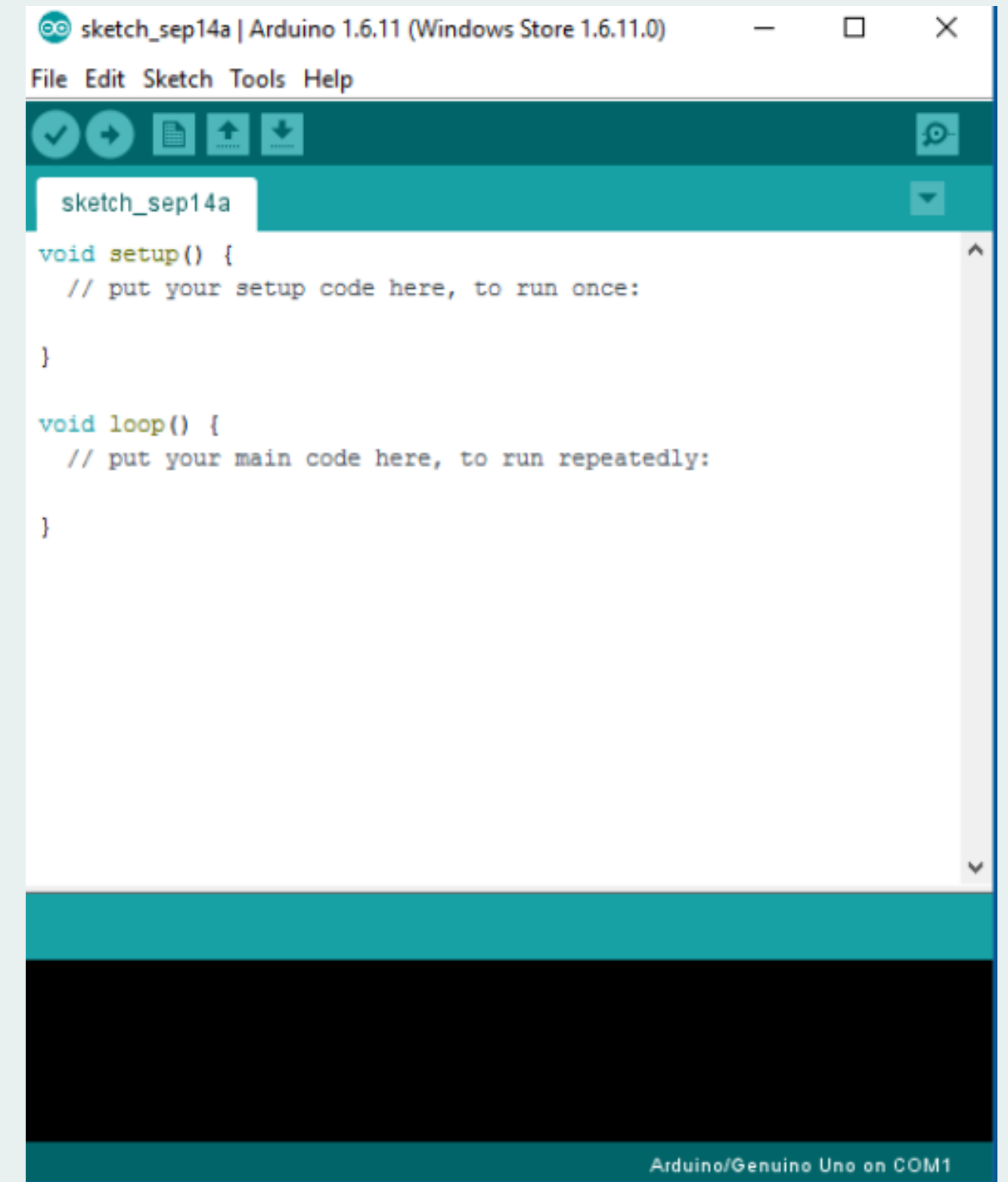


What is Arduino IDE?

- User-friendly
- Open-source software
- designed for coding and programming education.
- C/C++ language for writing sketches (programs).

Key Features:

- **Code Editor** with syntax highlighting and auto-indentation
- **Board and Port Selection** for easy configuration
- **Library Manager** for easy integration of additional libraries
- **Serial Monitor** for debugging and communication
- **Serial Plotter** to visualize real-time data from sensors and other inputs.
- <https://www.arduino.cc/>



What is Arduino IDE?

← → ↺

arduino.cc/en/software

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ARDUINO

Arduino IDE 2.3.2

The new major release of the Arduino IDE is faster and even more powerful! In addition to a more modern editor and a more responsive interface it features autocompletion, code

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<input type="checkbox"/>	Name ↑	Device	Visibility	Last modified
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Grove Kit activities

Unit #1: Introduction to OUTPUTS

Unit #2: Introduction to INPUTS

And then combine!



Grove Kit activities – Intro to OUTPUTS

Introduce key functions:

- **void setup()** – is called when a sketch starts. Use it to initialize variables, pin modes, start using libraries, etc and runs only once.
- **void loop()**– loops consecutively, allowing your program to change and respond.
- **digitalWrite()** – Write a HIGH or a LOW value to a digital pin.
- **pinMode()** – Configures the specified pin to behave either as an input or an output.
- **delay()**– Pauses the program for the amount of time (in milliseconds) specified as parameter.
(There are 1000 milliseconds in a second.)

blinking_led.ino

```
1 void setup() {  
2   // initialize digital pin4 of the led as an output.  
3   pinMode(4, OUTPUT);  
4 }  
5  
6 // the loop function runs over and over again forever  
7 void loop() {  
8   digitalWrite(4, HIGH); // turn the LED on (HIGH is the voltage level)  
9   delay(1000);           // wait for a second  
10  digitalWrite(4, LOW);  // turn the LED off by making the voltage LOW  
11  delay(1000);           // wait for a second  
12 }
```

Grove Kit activities – Intro to INPUTS

Introduce key functions:

- **Serial.begin()** – sets the data rate in bits per second (baud) for serial data transmission, for communicating with the Serial Monitor.
- **Serial.print()** – prints data to the serial port

```
moisture_sensor.ino
1  int sensorPin = A2;
2  int sensorValue = 0;
3  float moisture_percentage= 0.0 ;
4
5  void setup() {
6      Serial.begin(9600);
7  }
8  void loop() {
9      // read the value from the sensor:
10     sensorValue = analogRead(sensorPin);
11     moisture_percentage = ( ( sensorValue/1023.00) * 100 ) ;
12     Serial.print("Moisture = " );
13     //Serial.print(moisture_percentage);
14     // Serial.println(" %" );
15     //Serial.print("Moisture = " );
16     Serial.print(sensorValue);
17     if (sensorValue<=300){Serial.println(", DRY " );}
18     else if (sensorValue>300 && sensorValue<=700){Serial.println(", HUMID " );}
19     else if (sensorValue>700 && sensorValue<=950){Serial.println(", WET " );}
20     delay(500);
}
```

Introduce control structures:

- **If..else** – statement is used to make decisions in your code based on certain conditions. It allows your program to perform different actions depending on whether a condition is true or false

Grove Kit activities

And then combine different inputs and outputs for a complete Arduino program!

moisture_sensor_and_alarm.ino

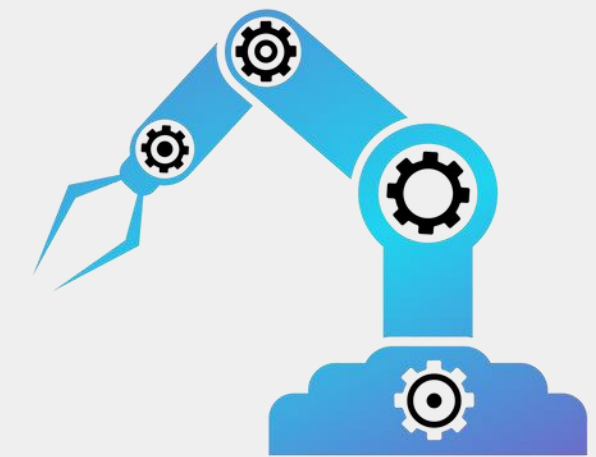
```
1  int sensorPin = A2;
2  int sensorValue = 0;
3  float moisture_percentage= 0.0 ;
4
5  void setup() {
6      Serial.begin(9600);
7      pinMode(buzzer, OUTPUT); // Set buzzer - pin 9 as an output
8  }
9  void loop() {
10     // read the value from the sensor:
11     sensorValue = analogRead(sensorPin);
12     moisture_percentage = ( ( sensorValue/1023.00) * 100 ) );
13     Serial.print("Moisture = " );
14     //Serial.print(moisture_percentage);
15     // Serial.println(" %" );
16     //Serial.print("Moisture = " );
17     Serial.print(sensorValue);
18     if (sensorValue<=300){
19         Serial.println(", DRY " );
20         pinMode(buzzer, OUTPUT); // Set buzzer - pin 9 as an output
21         delay(1000);           // ...for 1 sec
22         noTone(buzzer);       // Stop sound...
23         delay(1000);          // ...for 1sec
24     }
25     else if (sensorValue>300 && sensorValue<=700){Serial.println(", HUMID " );}
26     else if (sensorValue>700 && sensorValue<=950){
27         Serial.println(", WET " );
28         pinMode(buzzer, OUTPUT); // Set buzzer - pin 9 as an output
29         delay(500);             // ...for 0.5 sec
30         noTone(buzzer);         // Stop sound...
31         delay(500);             // ...for 0.5 sec
32     }
33     delay(500);
34 }
```

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www.learn.restela.eu or www.class365.eu



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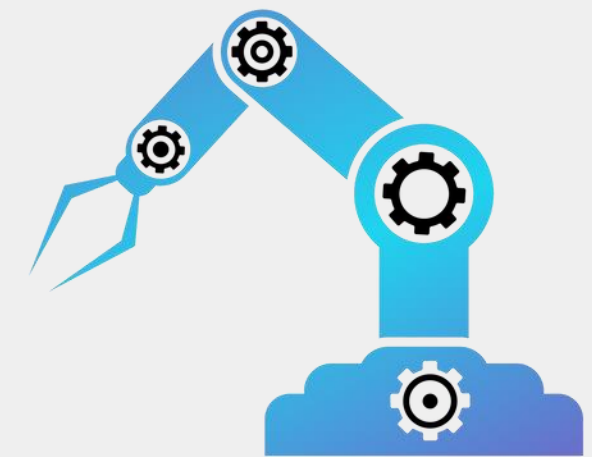
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