

Introduction to Arduino



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What's an Arduino

- Open-source electronics platform.
- Based on easy-to-use hardware and software.
- Designed for makers, hobbyists, and educators.



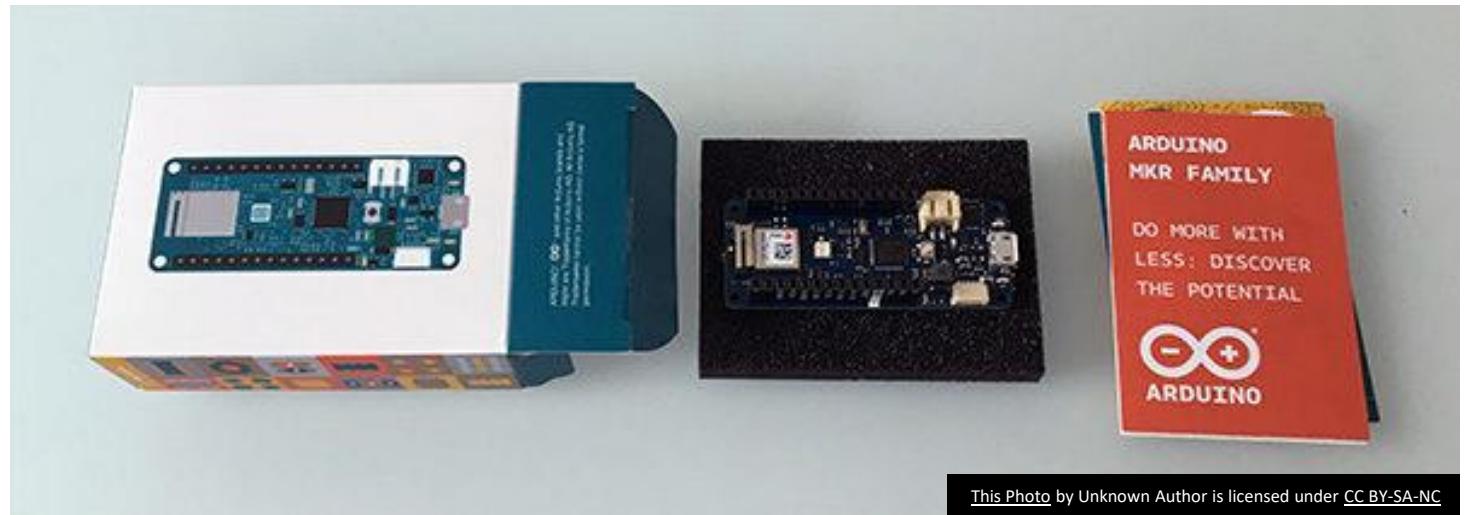
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Why Arduino

- **Versatility:** Suitable for various applications, from simple to complex.
- **Community:** Large supportive community, countless tutorials, and resources.
- **Affordability:** Budget-friendly for both beginners and experts.

Arduino MKR WiFi 1010

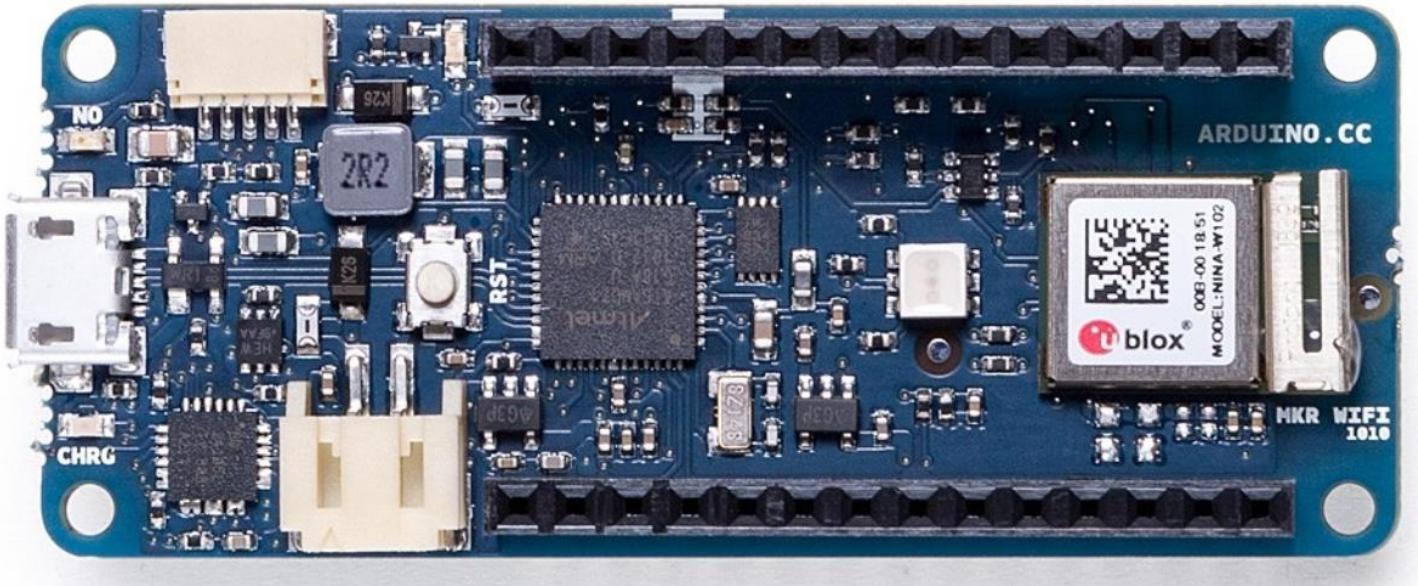
- Compact form factor designed for IoT projects.
- Integrated WiFi & Bluetooth connectivity.
- Based on the SAMD21 Cortex-M0+ 32bit low power ARM MCU.



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MKR WiFi 1010 Features

- On-board IMU (Inertial Measurement Unit).
- Secure ECC508 crypto chip for secure connection to Wi-Fi.
- Battery operation with solar panel charging provision.



Getting Started with Arduino

1. Download and install the Arduino IDE.
2. Connect Arduino to PC via USB.
3. Select the correct board and port in the IDE.

4. Demo...



Hello World!

- Create a new sketch in the Arduino IDE.
- Write a simple program (e.g., Blink an LED).
- Compile and upload to the board.



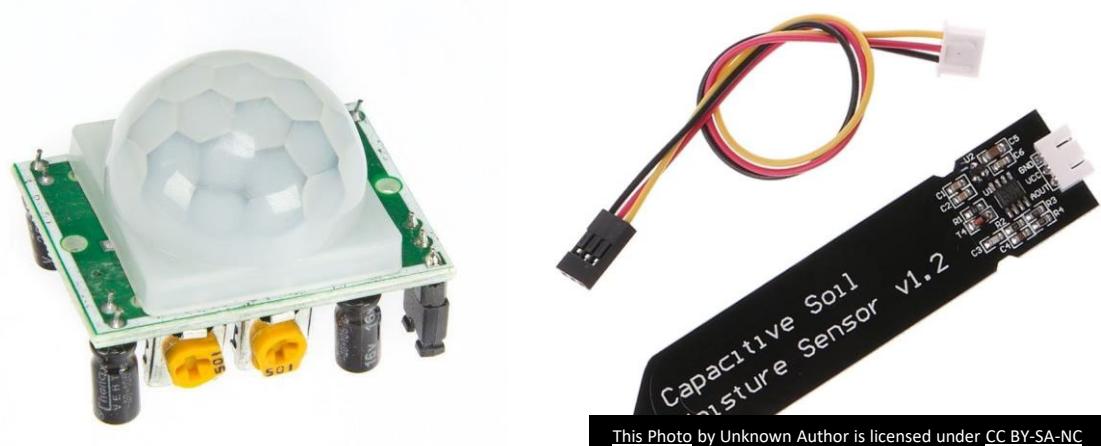
The screenshot shows the Arduino IDE interface with the title bar "LED_Blink | Arduino IDE 2.2.1" and the board selected as "Arduino MKR WiFi 1010". The code editor displays the "LED_Blink.ino" sketch:

```
1 #include <Arduino_MKRIoTCarrier.h>
2 MKRIoTCarrier carrier;
3
4 void setup() {
5   carrier.begin();
6 }
7
8 void loop() {
9   carrier.leds.setPixelColor(0, 0, 255, 0);
10  carrier.leds.show();
11  delay(500);
12  carrier.leds.setPixelColor(0, 0, 0, 0);
13  carrier.leds.show();
14  delay(500);
15  // Increment, reset tail index
16 }
17
```

The code uses the `Arduino_MKRIoTCarrier.h` library to control the LEDs on the MKR WiFi 1010 board. It initializes the carrier in the setup function and enters a loop where it sets the first LED to red (255, 0, 0), shows the update, waits 500ms, then turns it off and repeats the cycle.

Sensors Actuators

- Use libraries to enhance functionality.
- Connect sensors, actuators, and modules.
- Create interactive projects, home automation, and more



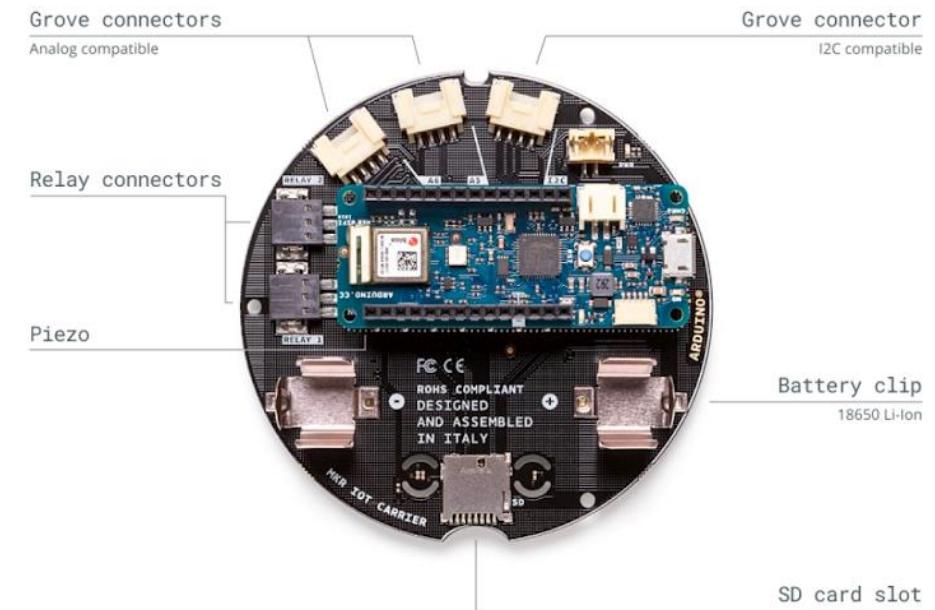
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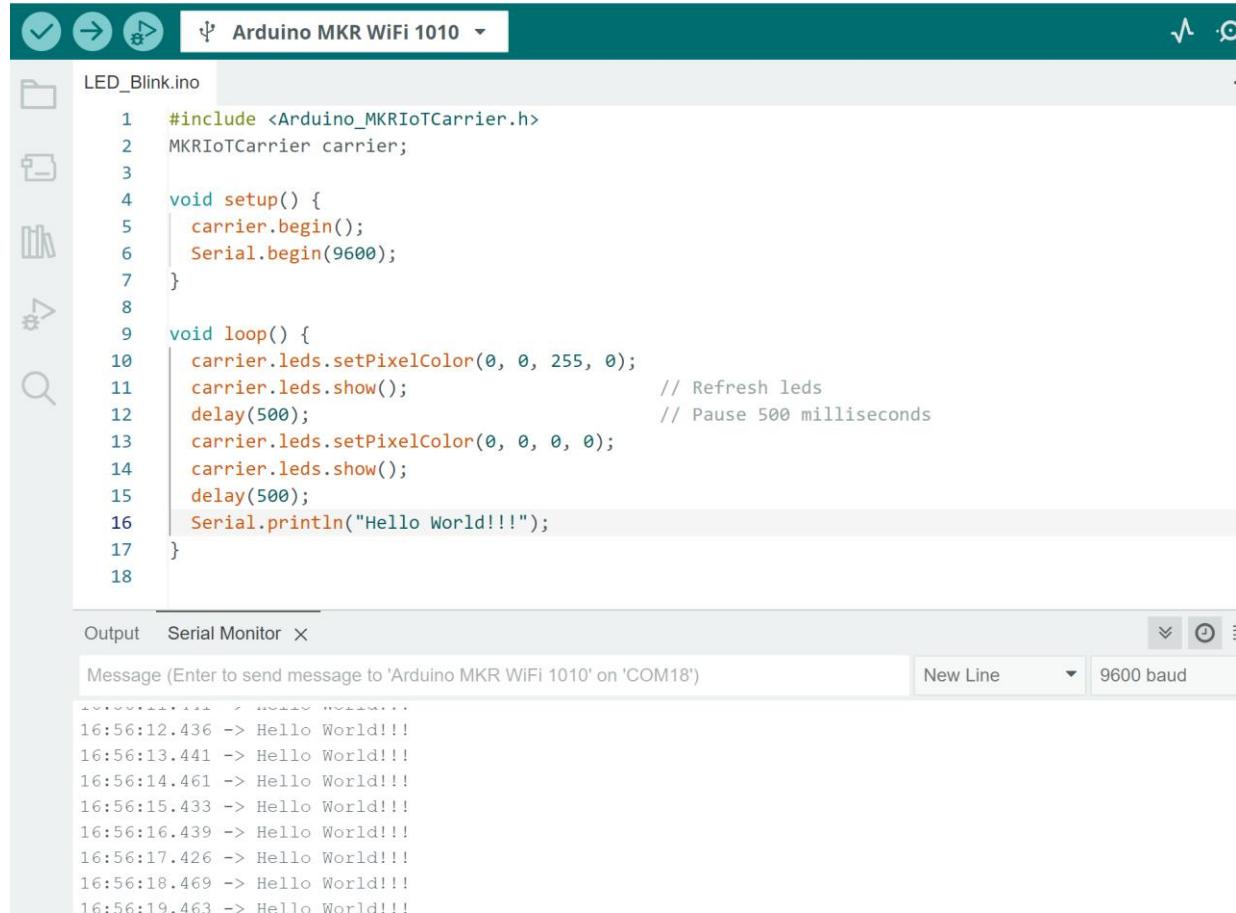
MKR Carrier

- Hardware On Top
- “The sensors, circuits and display integrated on the MKR IoT Carrier leave you free to focus on prototyping and programming your next IoT projects.”



What could possibly go wrong?

- As with any development cycle, there will be bugs
- Using the Serial Monitor for debugging.
- Common issues: Incorrect connections, wrong board settings, software compatibility.
- Community forums and online resources for help.



The screenshot shows the Arduino IDE interface. The top bar indicates the board is an "Arduino MKR WiFi 1010". The left sidebar shows the file structure with "LED_Blink.ino" selected. The main code area contains the following:

```
1 #include <Arduino_MKRIoTCarrier.h>
2 MKRIoTCarrier carrier;
3
4 void setup() {
5     carrier.begin();
6     Serial.begin(9600);
7 }
8
9 void loop() {
10    carrier.leds.setPixelColor(0, 0, 255, 0);
11    carrier.leds.show();                                // Refresh leds
12    delay(500);                                         // Pause 500 milliseconds
13    carrier.leds.setPixelColor(0, 0, 0, 0);
14    carrier.leds.show();
15    delay(500);
16    Serial.println("Hello World!!!");
17 }
18
```

Below the code, the "Serial Monitor" tab is open, showing the output:

```
Message (Enter to send message to 'Arduino MKR WiFi 1010' on 'COM18')
16:56:12.436 -> Hello World!!!
16:56:13.441 -> Hello World!!!
16:56:14.461 -> Hello World!!!
16:56:15.433 -> Hello World!!!
16:56:16.439 -> Hello World!!!
16:56:17.426 -> Hello World!!!
16:56:18.469 -> Hello World!!!
16:56:19.463 -> Hello World!!!
```