The Green STEAM Incubator Project

INTRODUCTION TO MICROCONTROLLERS (WHAT IS A MICROCONTROLLER, WHAT IS ARDUINO AND TYPES OF ARDUINOS, HOW TO USE ARDUINO IDE)

Green STEAM Incubator

Partners

THE CONSORTIUM

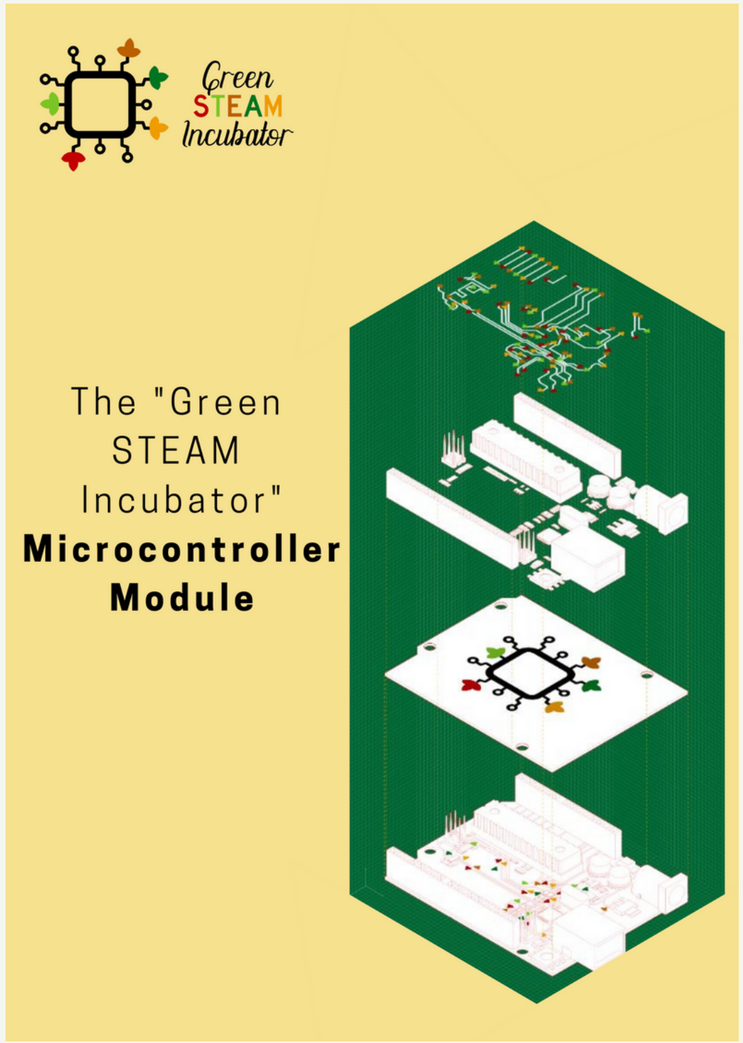
CITIZENS IN POWER

Center for Social Innovation

LogoPsyCom

GSPC

Objectives and Results of IO3



✔ Enable young people to acquire knowledge on how to design and promote holistic, high-tech solutions for sustainable communities, that stem from STEAM sector.

How?

With an introductory 30-hour module on Microcontrollers and a Handbook, containing eco-friendly projects providing high-tech green solutions in the form of non-formal workshops.

- Introduce learners to microcontrollers
- Development of smart solutions for agriculture with Arduino microcontrollers
- Development of new ideas in the field of agriculture and green entrepreneurship

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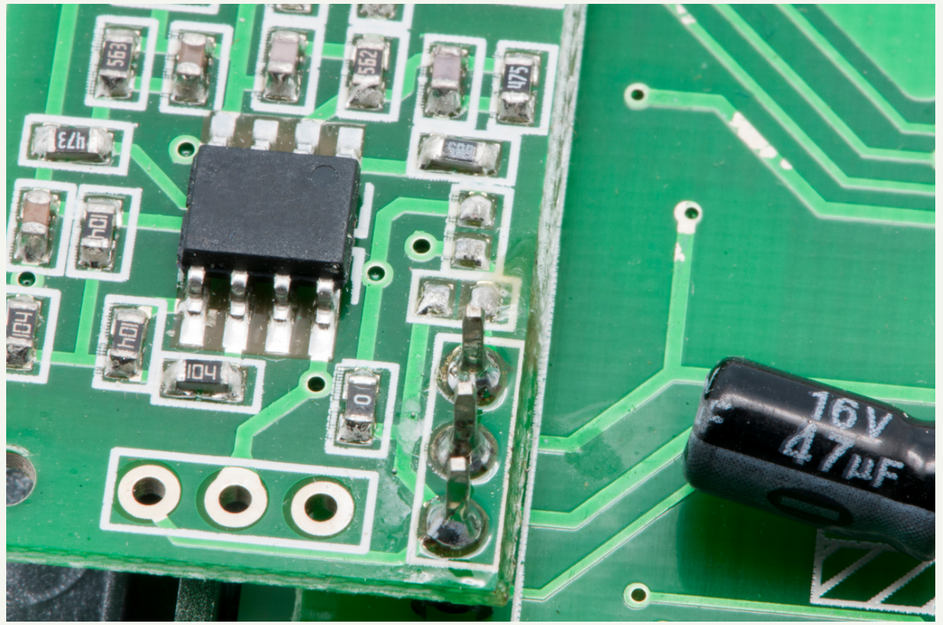
Introduction to microcontrollers

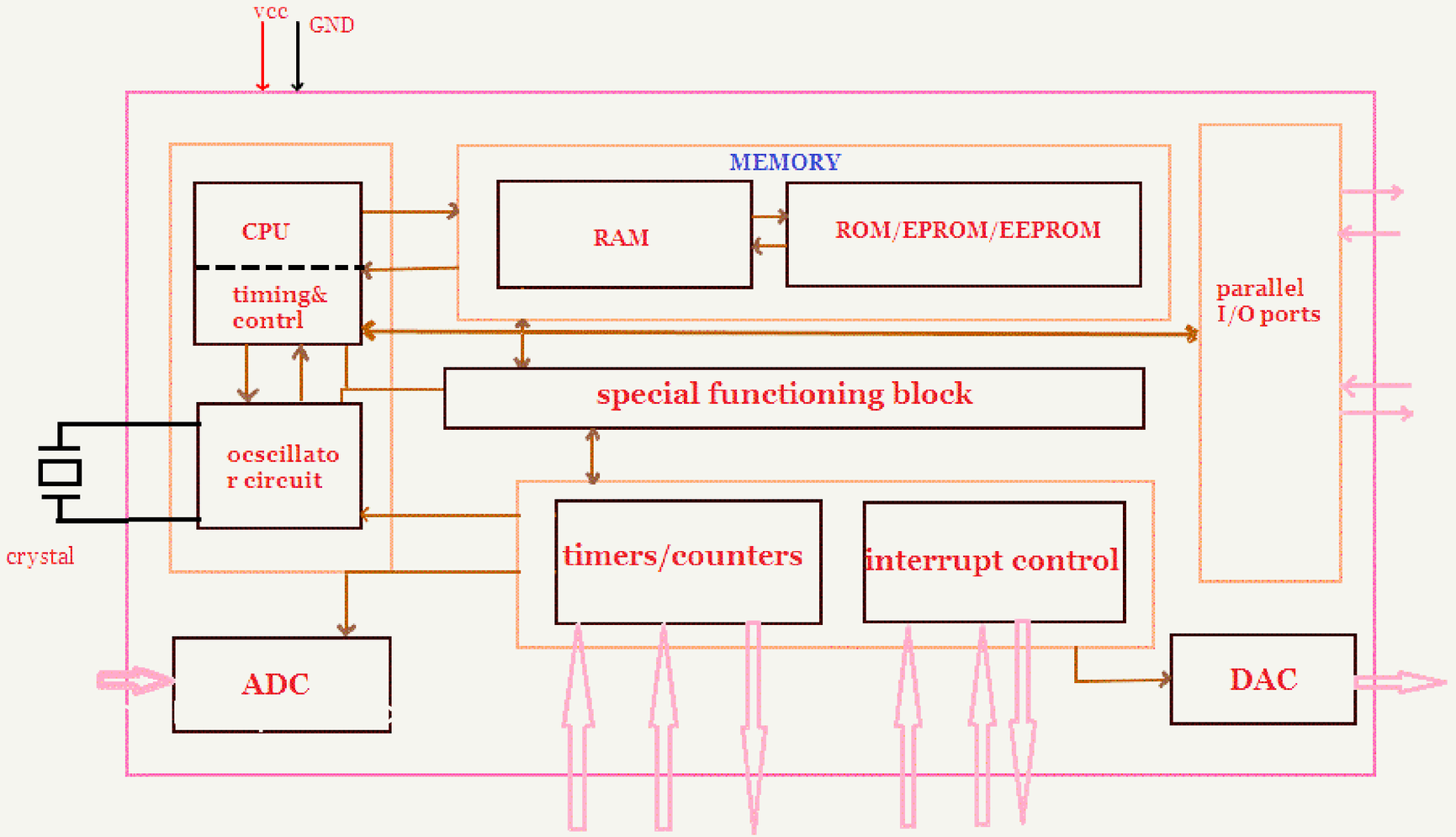
Have you ever looked at some gadget and wondered how it worked? Maybe it was a remote-control boat, the system that controls an elevator, a vending machine, or an electronic toy? Or have you wanted to create your own robot or electronic signals for a model railroad, or perhaps you would like to capture and analyze weather data over time?

Where and how do you start?

- Microcontrollers can help you find some of the answers to the mysteries of electronics in a hands-on way.
- A microcontroller is embedded inside of a system to control a singular function in a device. It does this by interpreting data it receives from its I/O peripherals using its central processor.
- Microcontrollers are used in a wide array of systems and devices.



The core elements of a microcontroller



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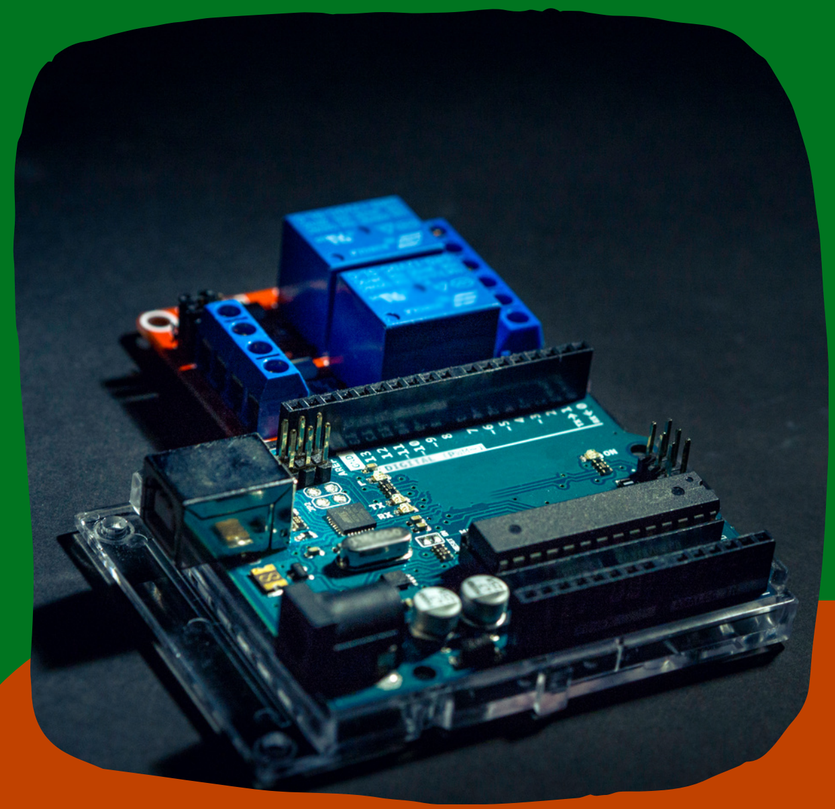
Arduino and types of Arduinos

Arduino is a prototype platform (open-source) based on easy-to-use hardware and software. It consists of a circuit board, which can be programed (referred to as a microcontroller), and a ready-made software called Arduino IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical board.



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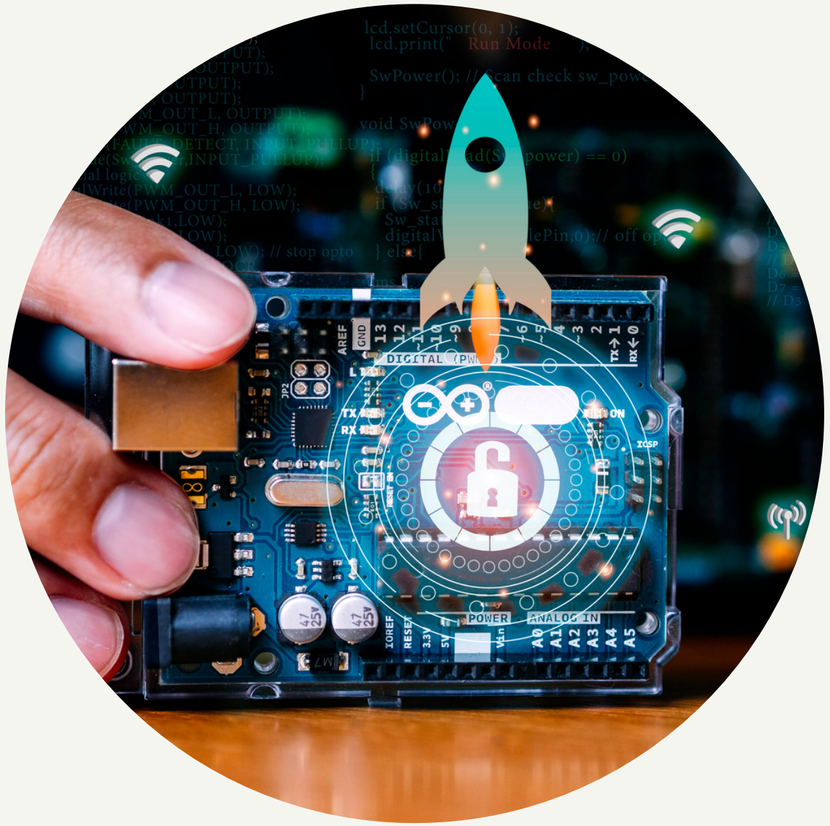
The main Arduino components are listed below:

- software - used to compose your programs and communicate with the hardware
- hardware - refers to the boards themselves (e.g. Arduino Uno).
- programming language - the Arduino programming language uses a simplified version of C++.



Types of Arduino

- Various kinds of Arduino boards are available depending on the different microcontrollers used.
- The differences are based on the number of inputs and outputs, speed, operating voltage, form factor, etc.
- Some boards are designed to be embedded and have no programming interface (hardware). Some can run directly from a 3.7V battery, others need at least 5V.
- They are programed through the Arduino IDE.

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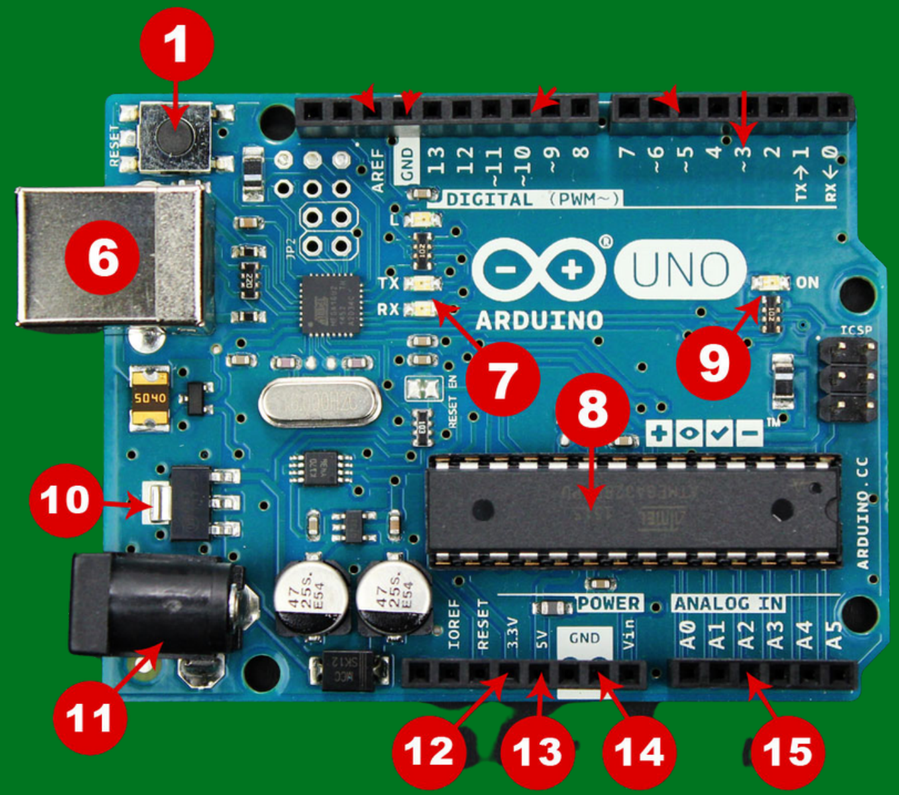
1. Reset Button
2. AREF
3. Ground Pin
4. Digital Input/Output – Pins 0-13 can be used for digital input or output
5. PWM – The pins marked with the (~) symbol can simulate analog output
6. USB Connection
7. TX/RX
8. ATmega Microcontroller
9. Power LED Indicator
10. Voltage Regulator
11. DC Power Barrel Jack
12. 3.3V Pin
13. 5V Pin
14. Ground pins
15. Analog Pins



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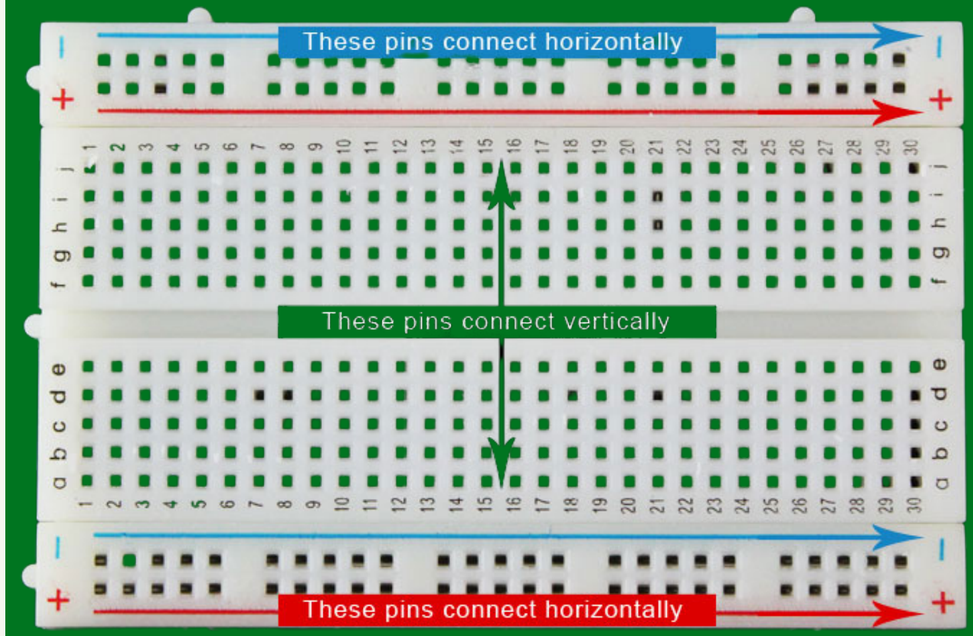
Power Source

- The Arduino Uno needs a power source in order for it to operate and can be powered in a variety of ways.
- You can connect the board directly to your computer via a USB cable.
- If you want your project to be mobile, consider using a 9V battery pack to give it juice.
- The last method would be to use a 9V AC power supply.

The breadboard

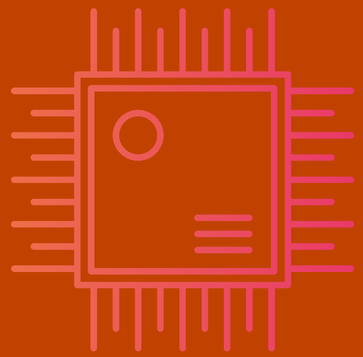
- Create temporary prototypes and experiment with different circuit designs You can connect the board directly to your computer via a USB cable.
- Inside the holes (tie points) of the plastic housing are metal clips connected by strips of conductive material.
- The breadboard needs to be powered from the Arduino board using jumper wires.



How to use Arduino IDE

☞ Download the software here:
https://www.arduino.cc/en/software

ARDUINO™



Let's Take A COFFEE Break


GUEST SPEAKER