

Introduction to Arduino IDE and getting started with the ESP32 microcontroller

Introduction

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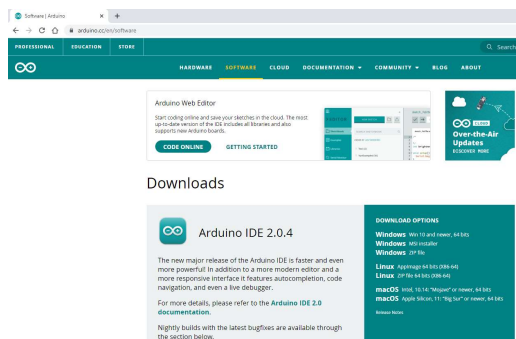


Introduction

- This one-hour webinar is aimed at providing an introduction to:
 1. Using the Arduino Integrated Development Environment (IDE) with the ESP32 microcontroller.
 2. Investigate specific Input/Output (I/O) supported by the microcontroller that can be used to connect to external peripheral devices.
- Arduino IDE 2 (any version) will be used:
 - <https://www.arduino.cc/en/software>



```
1 void setup() {  
2   // put your setup code here, to run once:  
3  
4 }  
5  
6 void loop() {  
7   // put your main code here, to run repeatedly:  
8  
9 }  
10
```



Don't panic

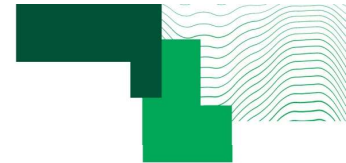
- We will cover a lot of material in the one-hour.
- It is not necessary to immediately understand everything covered.
- It is a progressive learning experience.
- Take time to understand and ... **don't panic**
 - *With reference to the Hitchhiker's Guide to the Galaxy*

Webinar topic 1

- Basics of the Arduino IDE:
 1. Getting started with the Arduino IDE.
 2. Using the ESP32 with the Arduino IDE.
 3. Walkthrough example: on-board LED “Hello world”.

Webinar topic 2

- Developing Arduino sketches with multiple files:
 1. The basics of an Arduino sketch.
 2. Folder and file structure.
 3. Managing a project: folders and files. Importance of commenting and formatting code.
 4. Walkthrough example: developing an Arduino sketch with multiple files.



Webinar topic 3

- Summary of the different pins on the microcontroller (power supply, digital GPIO, analogue I/O, UART/USART, SPI, I²C,) and their uses:

1. Connecting the microcontroller to external peripherals:

- a) Power supply.
- b) Digital GPIO (General Purpose I/O).
- c) Analogue I/O ... including PWM (Pulse Width Modulation).
- d) UART (Universal asynchronous receiver/transmitter) / USART (Universal Synchronous/Asynchronous Receiver/Transmitter).
- e) SPI (Serial Peripheral Interface).
- f) I²C (Inter-Integrated Circuit (IC)).

2. I/O pins on the ESP32:

- a) The available I/O pins.
- b) Serial communications: using the UART.



Webinar topic 4

- Receiving strings from the computer and string manipulation to extract values from the string. Walkthrough example.
- Send the extracted values back to the PC:
 1. The microcontroller receiving and sending serial data using serial communications (UART).
 2. The microcontroller receiving strings.
 3. The microcontroller extracting values from a string.
 4. The microcontroller formatting and transmitting data.
 5. Walkthrough example using the Arduino IDE Serial Monitor and then in Python.



Webinar topic 5

- Performing a calculation within a calculation function using values received from the serial port and transmitting the results back to the PC.
- Student exercise to modify the walkthrough example developed in part 4.
- Video example of using Python instead of the Arduino Serial Monitor.



Any questions?



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