

Introduction to Arduino IDE and getting started with the ESP32 microcontroller

This webinar is aimed at providing an introduction to using the Arduino Integrated Development Environment (IDE) with the ESP32 microcontroller, and to investigate specific Input/Output (I/O) supported by the microcontroller that can be used to connect to external peripheral devices. The webinar duration is one hour and will cover the following topics:

1. Basics of the Arduino IDE:
 - a) Getting started with the Arduino IDE.
 - b) Using the ESP32 with the Arduino IDE.
 - c) Walkthrough example: on-board LED "Hello world".
2. Developing Arduino sketches with multiple files:
 - a) The basics of an Arduino sketch.
 - b) Folder and file structure.
 - c) Managing a project: folders and files. Importance of commenting and formatting code.
 - d) Walkthrough example: developing an Arduino sketch with multiple files.
3. Summary of the different pins on the microcontroller (power supply, digital GPIO, analogue I/O, UART/USART, SPI, I²C,) and their uses:
 - a. Connecting the microcontroller to external peripherals:
 - i. Power supply.
 - ii. Digital GPIO (General Purpose I/O).
 - iii. Analogue I/O.
 - iv. UART (Universal asynchronous receiver/transmitter) / USART (Universal Synchronous/Asynchronous Receiver/Transmitter).
 - v. SPI (Serial Peripheral Interface).
 - vi. I²C (Inter-Integrated Circuit (IC)).
 - b. I/O pins on the ESP32:
 - i. The available I/O pins.
 - ii. Serial communications: using the UART.
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:
 - a. The microcontroller receiving and sending serial data using serial communications (UART).
 - b. The microcontroller receiving strings.
 - c. The microcontroller extracting values from a string.
 - d. The microcontroller formatting and transmitting data.
 - e. Walkthrough example using the Arduino IDE Serial Monitor and then in Python.
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.