Lab 1 – Serial communication and GUI application

ESW Monsoon 2025

Step 1: Serial communication with USB

- ESP32/Arduino boards support serial communication over USB.
- Connect a sensor to the ESP32 (DHT22, ultrasonic, LDR etc.), and program it to provide sensor data over serial.
- The data is sensed and communicated using serial print, continuously within the loop.
- Check the serial communication on your system using Arduino serial monitor. It can also be seen using third-party software like Putty.

Step 2: Import this data into MATLAB or Python

- Interface the serial data stream with a scripting platform
- Write a program to import this data stream into your script and output the information as text

Step 3: Make a GUI application using your preferred platform to show the data

- The app should ask for the serial stream COM port and baud rate.
- The app can be a simple GUI with continuous text information.

Step 4 (optional): If done with the above:

- Make plots, graphs, inferences, moving averages, minmax and other stats using the data stream
- What information will the user be interested in?
- Check the highest sampling rate you can get using this configuration
- Put some configuration in the stream so that the app can automatically recognize your COM stream compared to other COM ports and connect seamlessly.
- Can you automatically detect the baud rate?