Arduino workshop 2

In this workshop, we will learn how to collect data from the USB port (transmitted by the microcontroller) without the help of the arduino IDE.

1 Refresher

Program the microcontroller (from scratch) to do the following:

1. Sample an analog signal from pin $A0$.
2. Transmit the sample on to the serial port in the format "<time_in_milliseconds>,input_value" at baud rate 9600.
3. Each sample must be in a new line
4. delay 500 milliseconds after each sample

Connect the center tap of a potentiometer to $A0$, upload the code, and display the changing voltage values using the Arduino IDE.

2 Accessing USB com port

The python "serial" package gives you access to serial port which the operating system creates to connect to the microcontroller. The following code can be used to set up a connection:

```
ser = serial.Serial() #opening a serial communication object
ser.port = 'COM9' #setting the port number
ser.baudrate = 19200 #setting the baud rate
ser.open() #open the connection
ser.flushInput() #clear the data received until now
```

After the setup, the object `ser` can be used as if it is a file object. Write a python program which:

1. reads 20 samples from the serial port, and plots the samples with time on x axis and values on the y axis.

Test your code:

1. Upload the code in the previous section to the arduino and keep it connected to the computer
2. Run the python code you wrote (note that it should run for 10 seconds)
3. Turn the potentiometer up and down during these 10 seconds
4. See if the plot matches what you did.