How to interface Arduino with Python?

Here are some simple steps for interfacing...

To open Arduino IDE, open terminal (Ctrl + Alt + T) and type $sh\ ard.sh$

1.1 – *Run the following code in Arduino:*

```
int val=0;
void setup()
{
    Serial.begin(9600);
    pinMode(13,OUTPUT);
}
void loop()
{
    val=Serial.read();  //Reads for incoming data & stores in val
    for (int i=0;i<val;i++)
{
    digitalWrite(13,HIGH); // Blink an LED if you receive da
    delay(500)
    digitalWrite(13,LOW);
    delay(500);
}
```

1.2- *Connections*

Connect one LED to pin number 13 of Arduino. **Note down** the Arduino port number from here.

> Tools -> serial port.

1.3.*Interfacing with Python*

Open python IDLE.

> File -> new file

Type the following code in the new window:

```
import serial
ser = serial.Serial("/dev/ttyACM2",9600)  # Enter your current serial port number here
while(1):            #infinite loop
         ser.write('1') #sends data to arduino
```

Now save the file

> File -> save file as

After saving the file,Next step is to Run the code.

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1.4 -*Run the python code*

> Run -> Run module (F5)

Note:Now Open the serial monitor in the Arduino IDE (Ctrl+m) to observe the OUTPUT.

1.5- *Observations*

1.When the python code is executed you observe some data in the serial monitor which is sent from the python code.

2.Also visually you will see the LED blinking.

Task 2-(Using IR sensor)

2.1-*Run the following code in Arduino:*

```
void setup()
{
    Serial.begin(9600);
    pinMode(13,OUTPUT);
}

void loop()
{
    int test = analogRead(A0); //Reads analog value
    Serial.println(test); // sends serial data
    if(Serial.available())
    {
         digitalWrite(13,OUTPUT); // Glow an LED if you receive anything
    }
    digitalWrite(13,LOW);
}
```

2.2-*Connections*

Connect an **IR sensor** to pin number **A0** . Connect one LED to pin number **13** . **Note down** the Arduino port number from here,

> Tools -> serial port.

2.3-*Interfacing with Python*

Open python IDLE.

> File -> new file

Type the following code in the new window:

```
import serial
import sys
ser = serial.Serial("/dev/ttyACM0",9600)  # Enter your current serial port number here
while(1):
       m = ser.readline()     #reads serial data from arduino
       print m                #prints the data
       ser.write(m)           #sends back data to arduino
```

Now save the file

> File -> save file as

2.4-*Run the python code*

> Run -> Run module (F5)

2.5-*Observations*

1.The sensor gives the readings depending on the distance. The values get decreased with increase in distance.

First round of output is observed in the Arduino IDE.

2.Next, when the python code is executed (Run), the same sensor values will be printed in the python terminal. This means the data is successfully received by the Python script.

For now, python code sends the same sensor data without applying any kind of processing on it. Here is where you need to think about implementing the Kalman filter.