



Faculty of Information Technology  
Computer Systems Engineering Department

ENCS412, INTERFACING LABORATORY

EXP #3&4 .Report

**Introduction to Lab View**

**&**

**LabVIEW Interface for Arduino(LIFA)**

**Name : Ra'fat Ahmad**

**ID: 1120521**

**Section#: 1**

**Dr. Wasel Ghanem**

**TA. Eng. Mohammed Mudalal**

**Date: 2/12/2016**

## ● **Abstract**

in this report I illustrate about Lab view how it's work and for what purpose we need it and why Lab View then I show you how it work with Arduino.

## ● **Introduction & Theory**

### **1. Introduction**

In this report we will discuss the Increasing familiarity and experimenting with Lab- View by implementing different systems by using Lab-View, and by trying different components in it.

And becoming familiar with LabVIEW Interface for Arduino (LIFA) Toolkit which is a package that allows developers to acquire data from the Arduino microcontroller and process it in the LabVIEW Graphical Programming environment.

### **2. Theory**

#### **LAB-VIEW:**

Laboratory Virtual Instrument Engineering Workbench (LabVIEW) is a system-design platform and development environment for a visual programming language from National Instruments.

The graphical language is named "G"; not to be confused with G-code. Originally released for the Apple Macintosh in 1986, LabVIEW is commonly used for data acquisition, instrument control, and industrial automation on a variety of operating systems (OSs), including Microsoft Windows, various versions of Unix, Linux, and mac OS. The latest version of LabVIEW is 2016, released in August 2016.



## • Procedure and Discussion

### Design a Simple Alarm System:

Here we design a control system with the following specifications:

- 1-The system has two inputs: pressure and temperature.
- 2-There is an alarm when the temperature exceeds  $100^{\circ}\text{C}$  or the pressure exceeds  $15\text{KPa}$ .
- 3-The transfer function of the temperature and pressure transducers are  $3.2\text{mV}/^{\circ}\text{C}$ ,  $0.3\text{V}/\text{KPa}$  respectively .

Temp

102

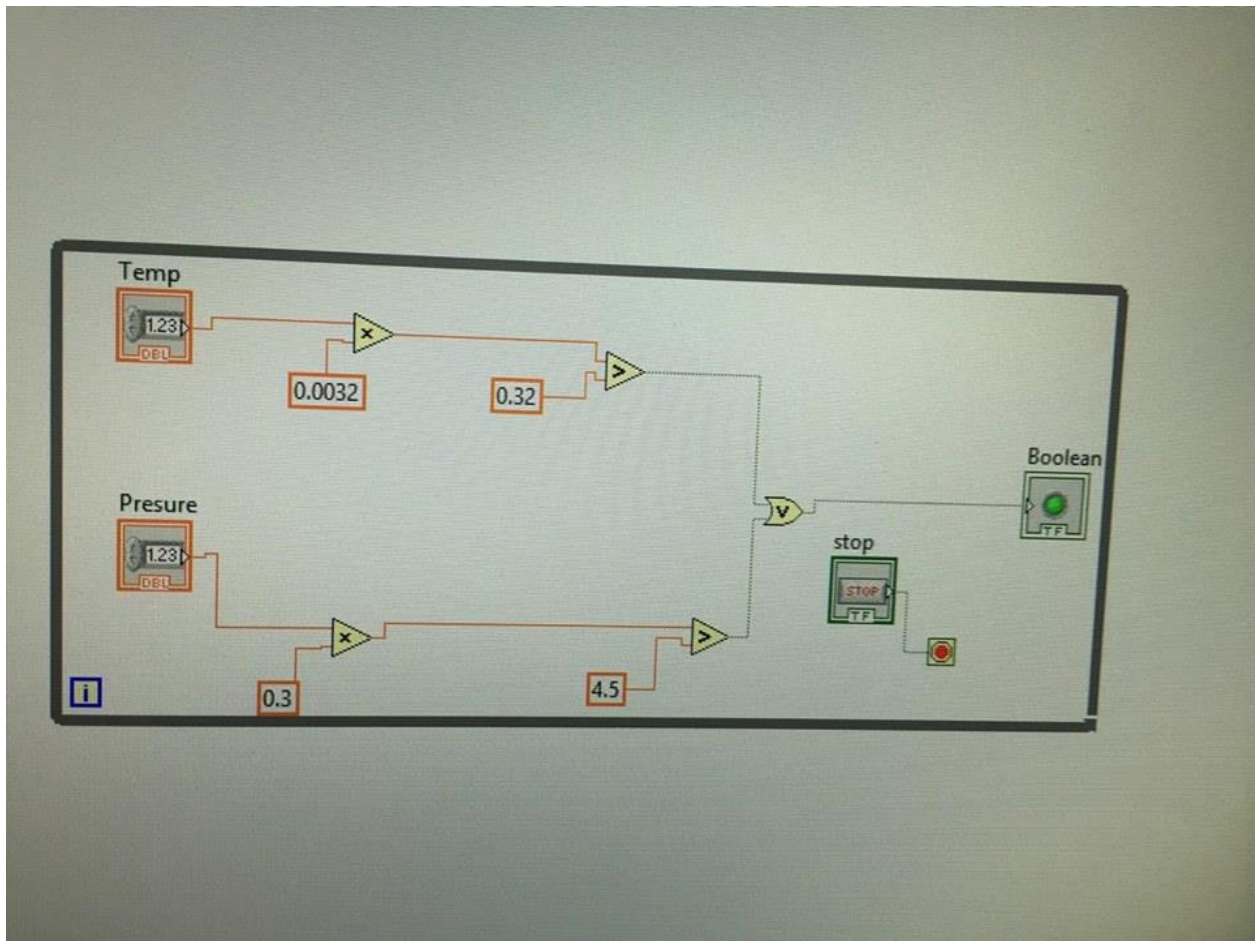
+

Boolean



Pressure

12



The block diagram consists of a while loop which contains the components that change their values while the program is running.

## Exercise: Simple Liquid Store System

Here we design a simple liquid store system in the LABVIEW with the following specifications:

- 1-The system has four inputs (volume of the liquid, temperature of the liquid and two enables) and two outputs (led and screen).
- 2-When the volume of the liquid exceeds 6 liters and led enable is on, the led will turn into Red color.
- 3- When the temperature of the liquid exceeds  $60^{\circ}\text{C}$  and temperature enable is on, the message "The temperature of the liquid is high" should be displayed on the screen.

Volume Enable



Volume

6

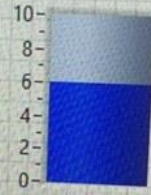
Temperature Enable



Temperature

70

Tank



Led



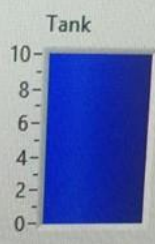
Thermometer



Volume Enable



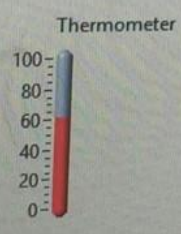
Volume  
56



Temprature Enable



Temprature  
61



Volume Enable



Volume

56

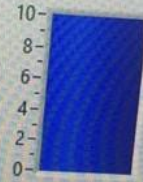
Temperature Enable



Temperature

61

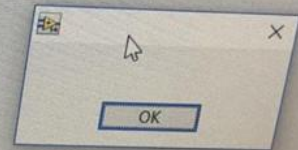
Tank



Led



Thermometer





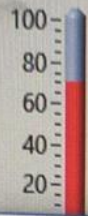
Enable

Temperature

70



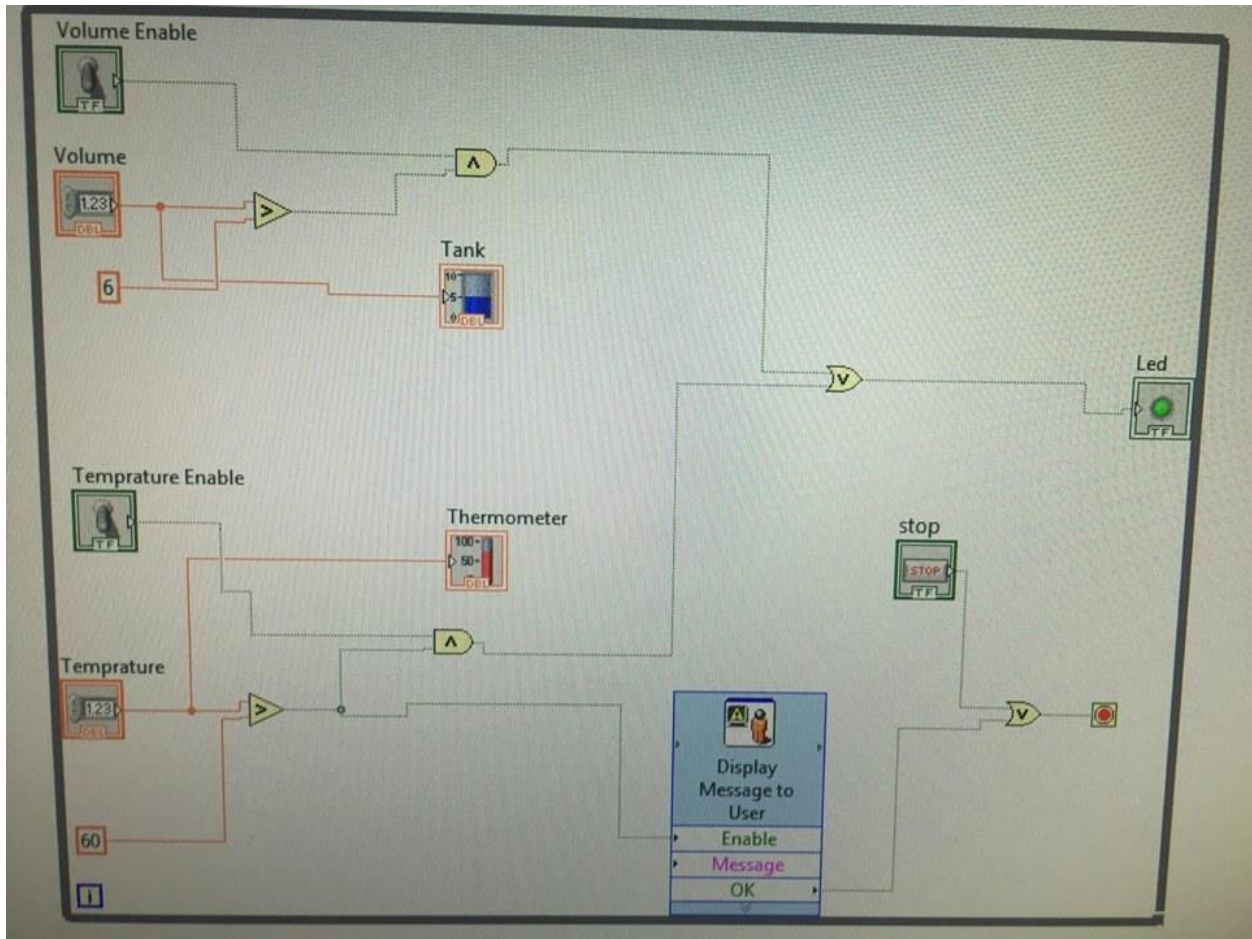
Thermometer



Liquid

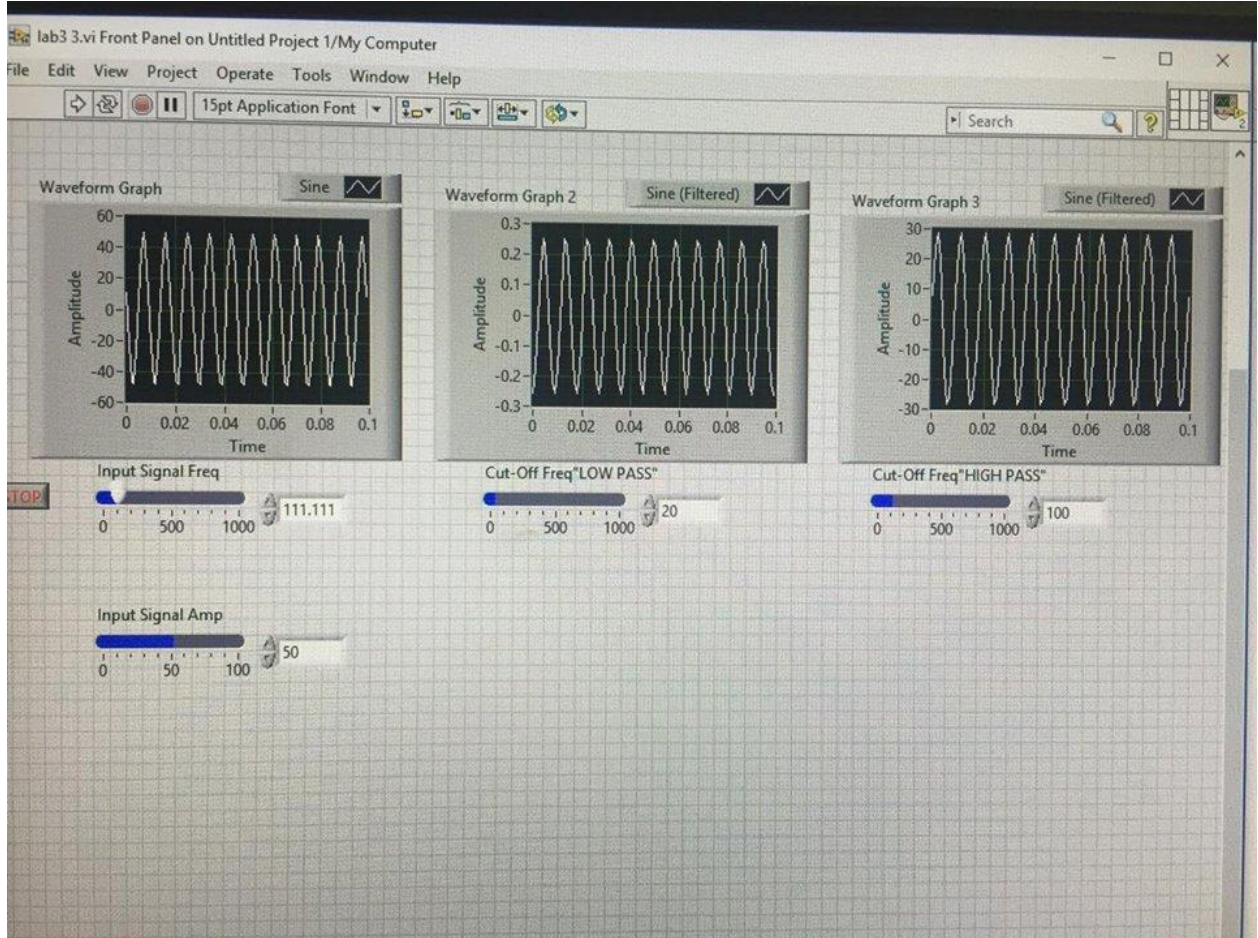
OK

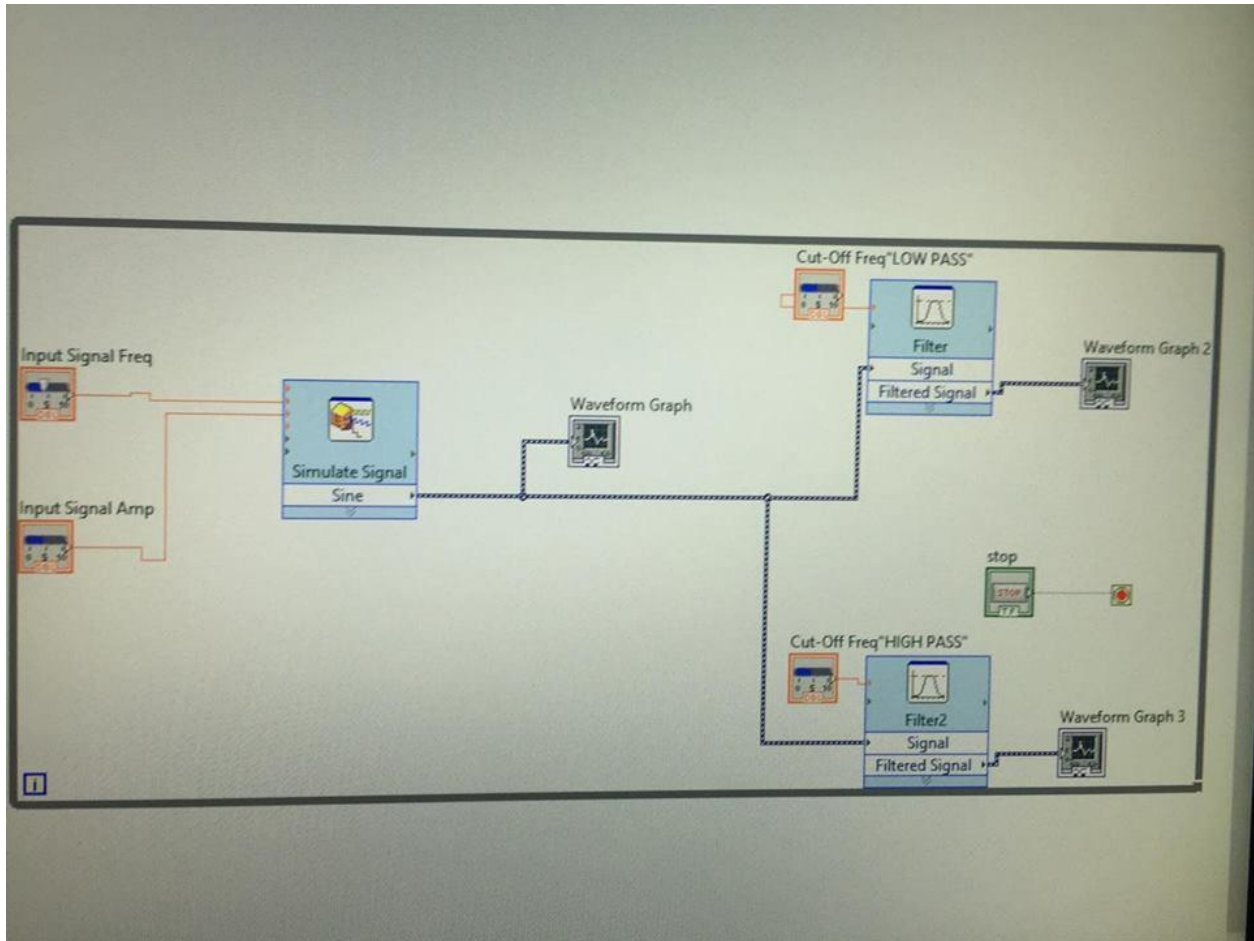




## Low pass and High pass filters in time domin:

We have built the front panel for the AM modulation system, using 3 (Waveform) graphs to display the (Carrier signal) and the (Modulated Signal).



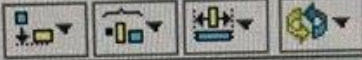


## Exercise: Applying Low pass & High pass Filters on Your Voice

Here we use a file with extinction .wav to apply low pass & high pass on it as follow:

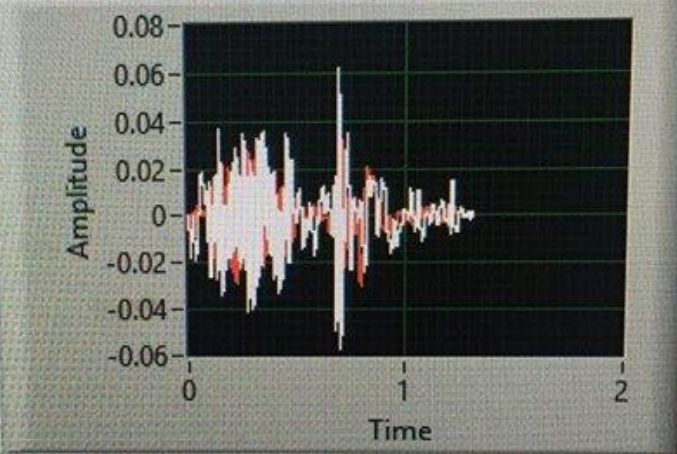
operate Tools Window Help

Application Font



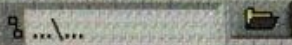
Waveform Graph 2

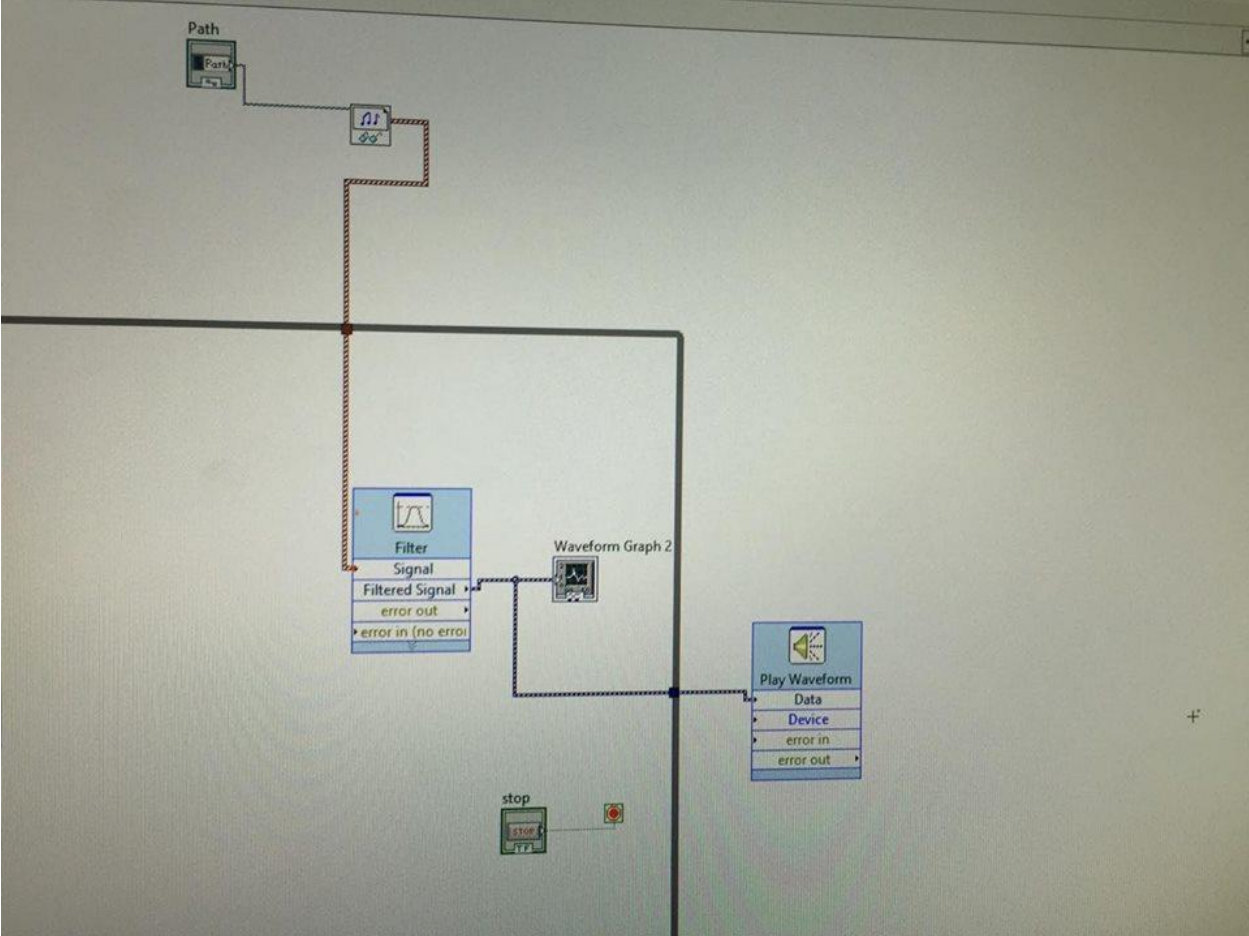
Filtered



STOP

Path



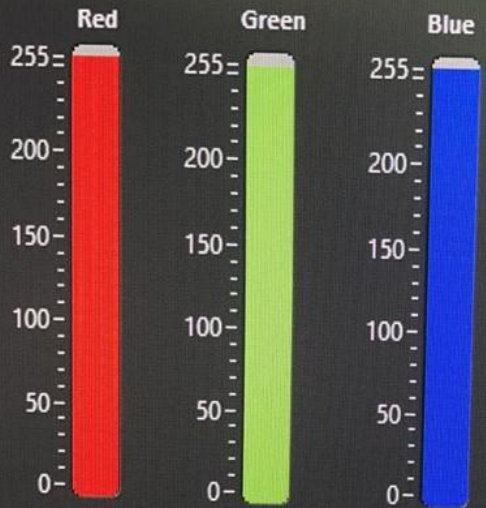


## **Load example in order to be more familiar with LIFA**

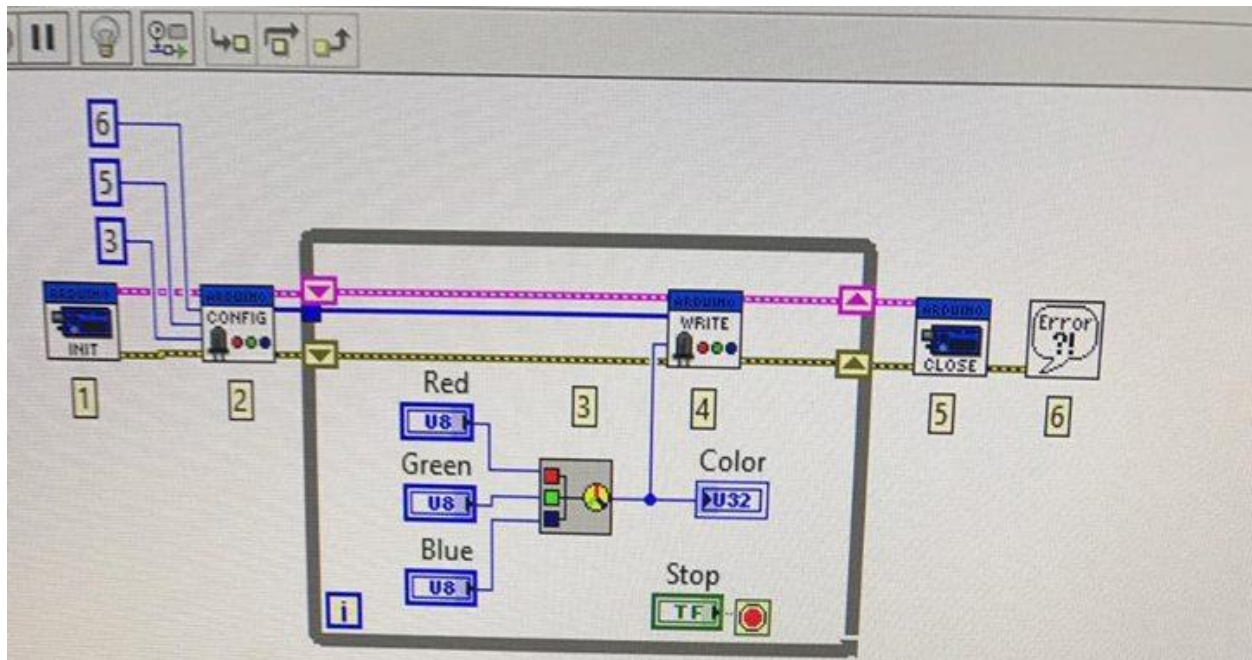
Here we load a full project to get familiar with LIFA and we get this



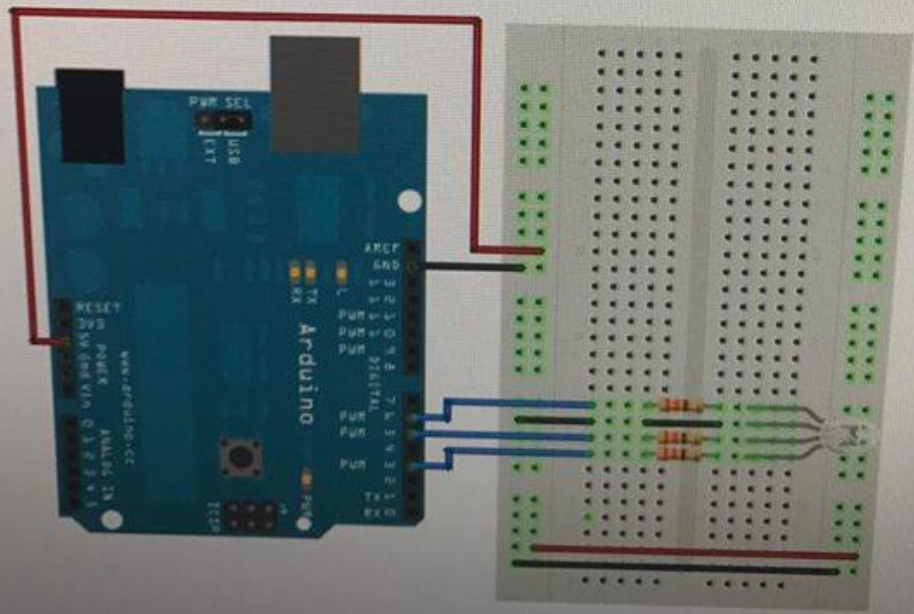


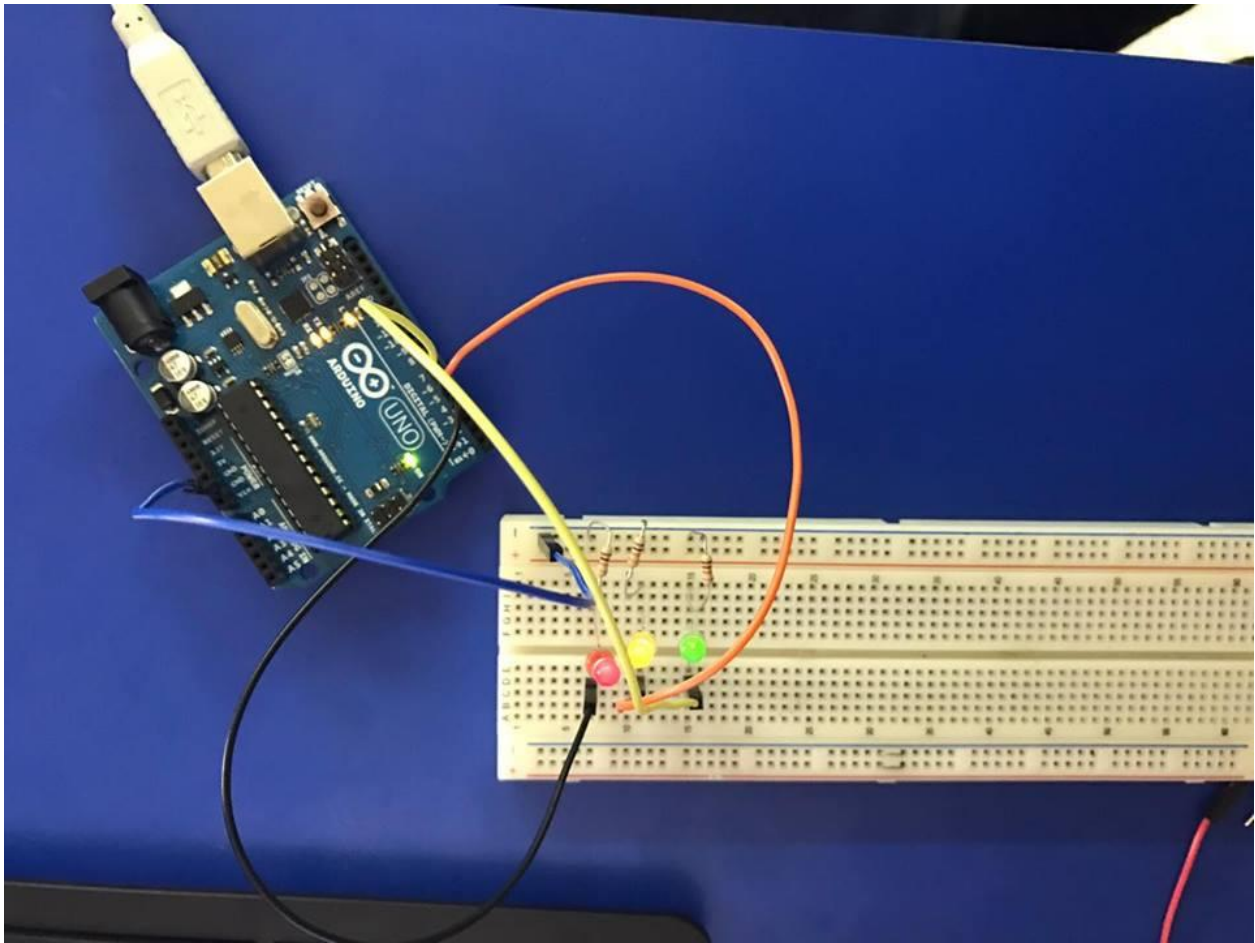


STOP



1. Initialize connection to the Arduino with the default baud rate of 115200.
2. Configure the PWM pins to use with the RGB LED
3. Convert RGB slider values to a color
4. Send the color to the RGB LED
5. Close connection to Arduino
6. Handle Errors

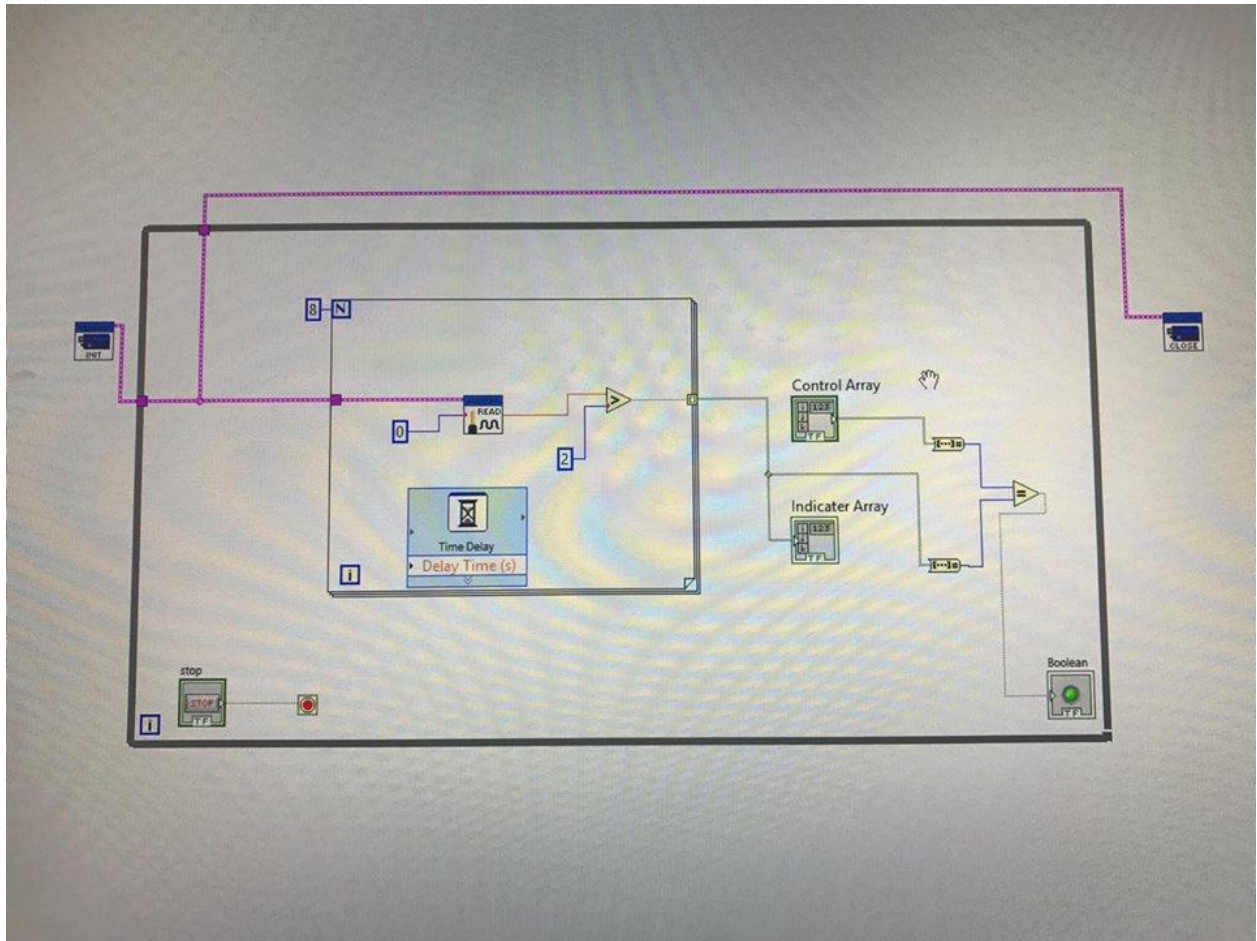




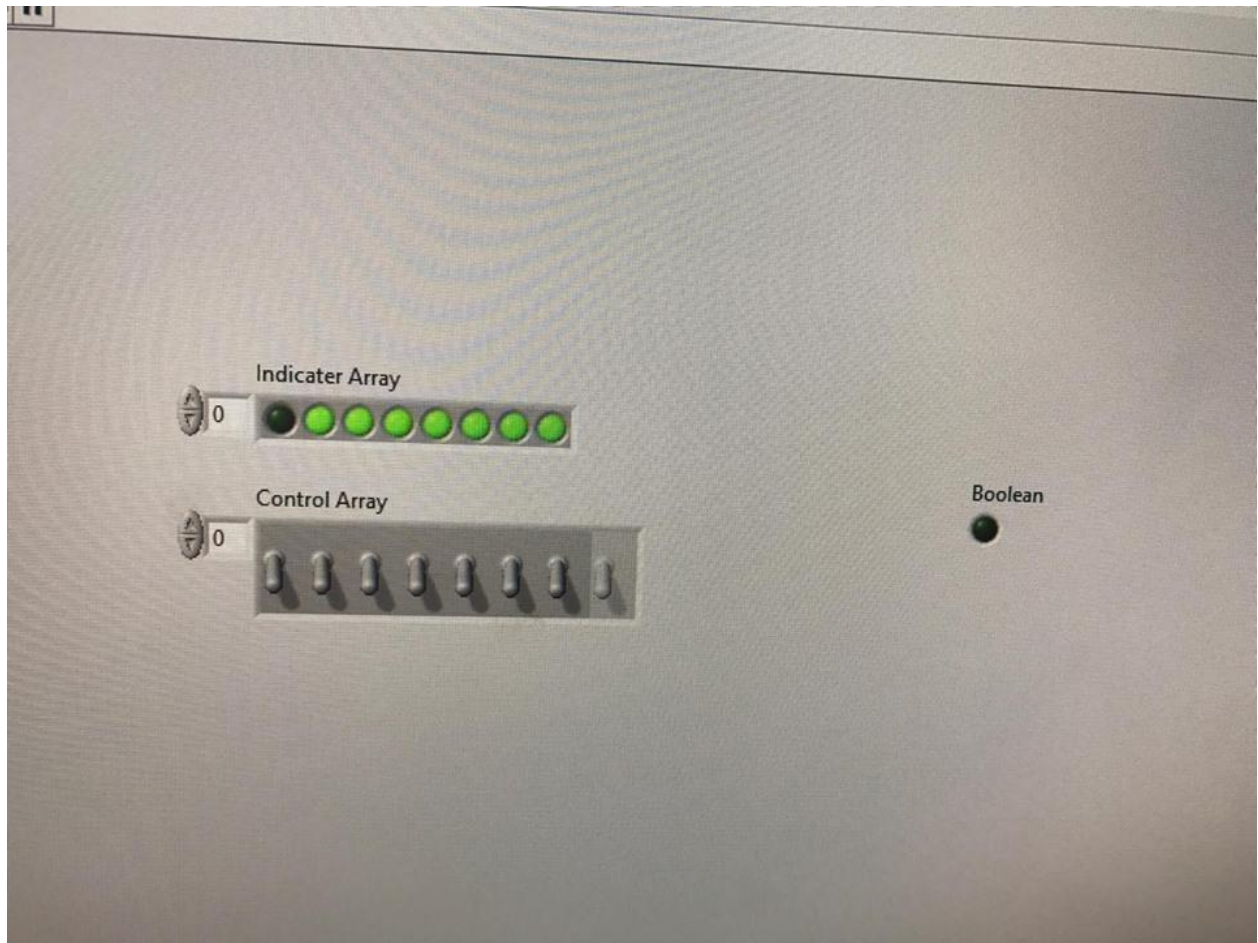
We note that the TX and Rx LED start blinking, which means there is a communication start with Arduino.

### **Array example:**

In this part we will build two binary arrays, one of them as indicator and the other as controller, the block diagram is:

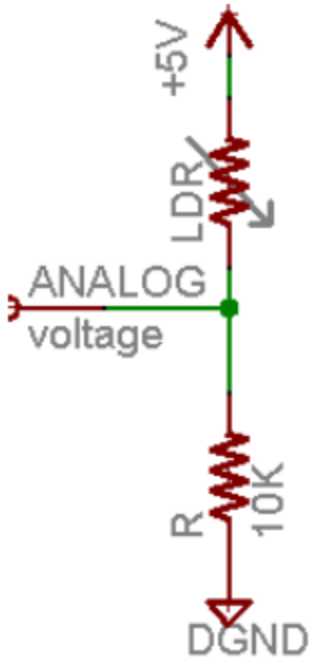


And the front panel shows when the array switch is on the corresponding led is on:

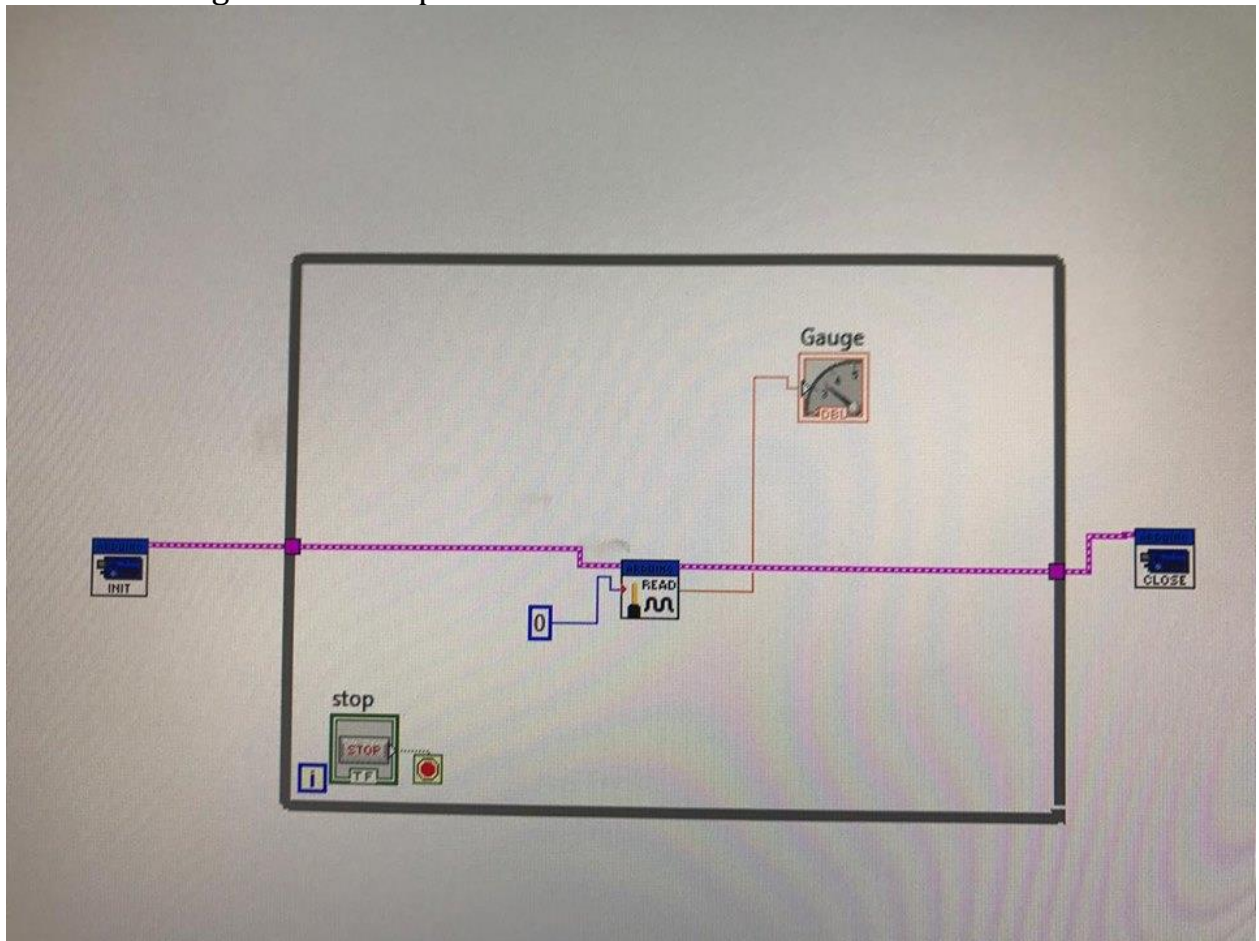


## Read analog value (LDR)

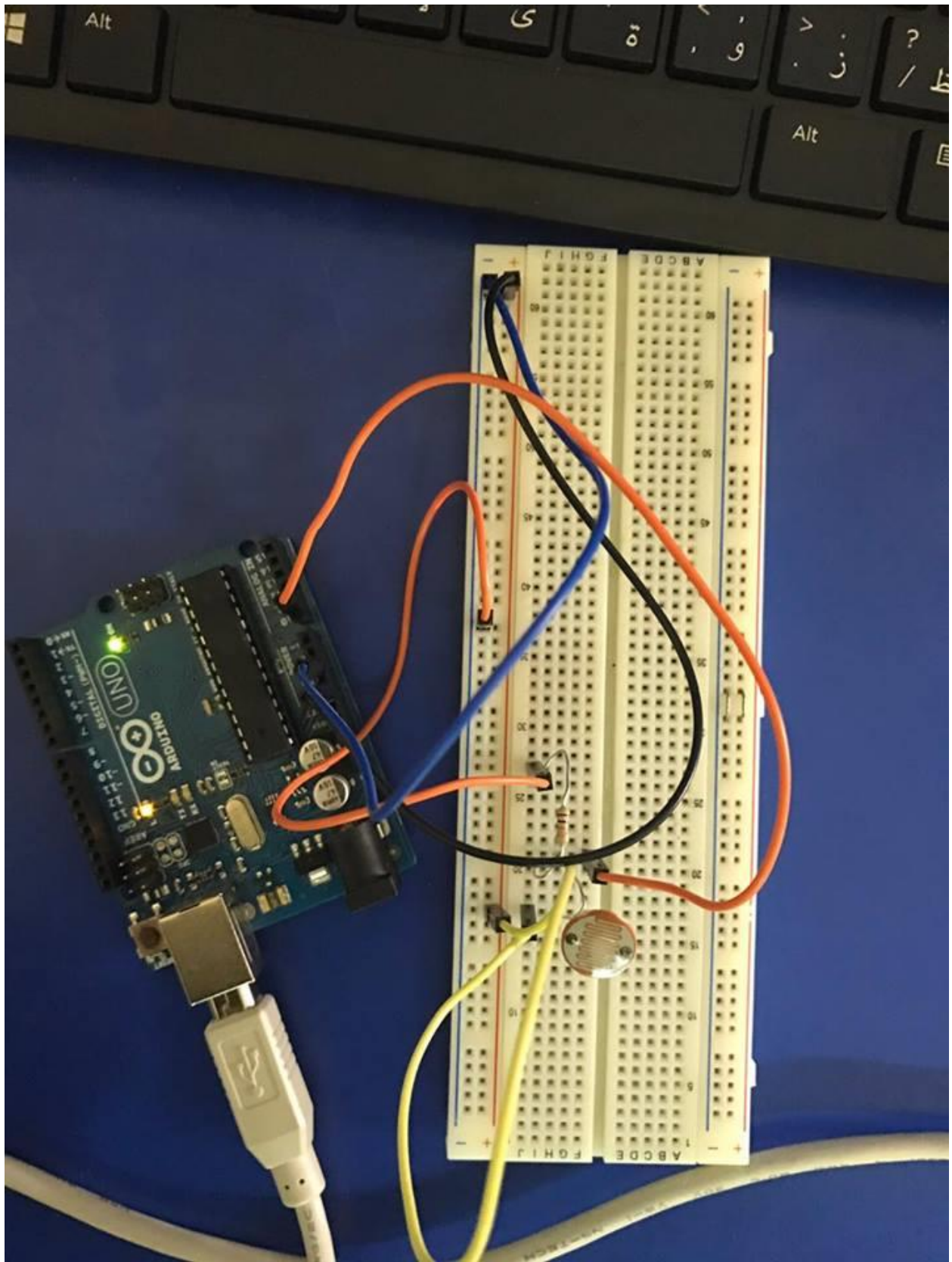
In this part we will read LDR voltage from the connected analog Pin0, which is connected to the voltage divider circuit:



The block diagram for this part is:









## • **Conclusion:**

In the first part of the experiment we have introduced to lab view environment in the next part we learn how to use LIFA (labview Interface for Arduino) which is used to interact with hardware system using GUI built in labview which make the process of building and development of projects easier and make the complex hardware programming easier and the customization provided by the Labview is capable to build any logic needed for specific task .

in the last part of the experiment we become familiar with LIFA library. In LabView software, we build a user interface, or front panel, with controls and indicators. Controls are knobs, push buttons, dials, and other input mechanisms. Indicators are graphs, LEDs, and other output displays. After we build the user interface, we add circuits and structures to control the front panel objects. The block diagram contains this stuff.

So at the end we can conclude from our experience in labview we now can make any system which deal and interface with external signal and build fully functional unit to process the external signal and view several measures like frequency domain spectrum and voltage values or converting values to give specific meanings .

## ● References:

1. Manual Report.
2. <https://en.wikipedia.org/wiki/LabVIEW>

Accessed on 2-12-2016 ,10:8 PM