



Interfacing laboratory

Report 2

Introduction to LabVIEW

LabVIEW interface for Arduino (LIFA)

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Abstract

In these experiments we learned how to deal with LabVIEW and how to connect it with Arduino.

First, we practiced on LabVIEW and how to connect circuits on it, then, we worked with it and with Arduino.

In the report we are going to give a brief introduction about the LabVIEW and LIFA, a description about the procedure we followed in the lab and a conclusion.

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1. Introduction

1.1 What is LabVIEW?

A software that gives the engineers and scientists the ability to build and code systems which help them in their work. It is a graphical programming so the user can visualize the system. This software can be used with other softwares like Arduino.



Figure 1.1.1 LabVIEW

1.2 LabVIEW interface for Arduino (LIFA)

The LabVIEW Interface for Arduino (LIFA) allows the user to connect arduino with LabVIEW. The data is acquired from arduino, then processed in the system built in the LabVIEW, finally the desired output will appear.

This interface is compatible with many operating systems such as windows, Linux and mac.

2. Procedure and Discussion

2.1 Design a simple alarm system

We started with this circuit since it's a simple one. An alarm will happen when the temperature exceeds 100c or pressure exceeds 15Kps.

We followed the instructions in the experiment to draw the circuit, the following screenshot shows what we draw:

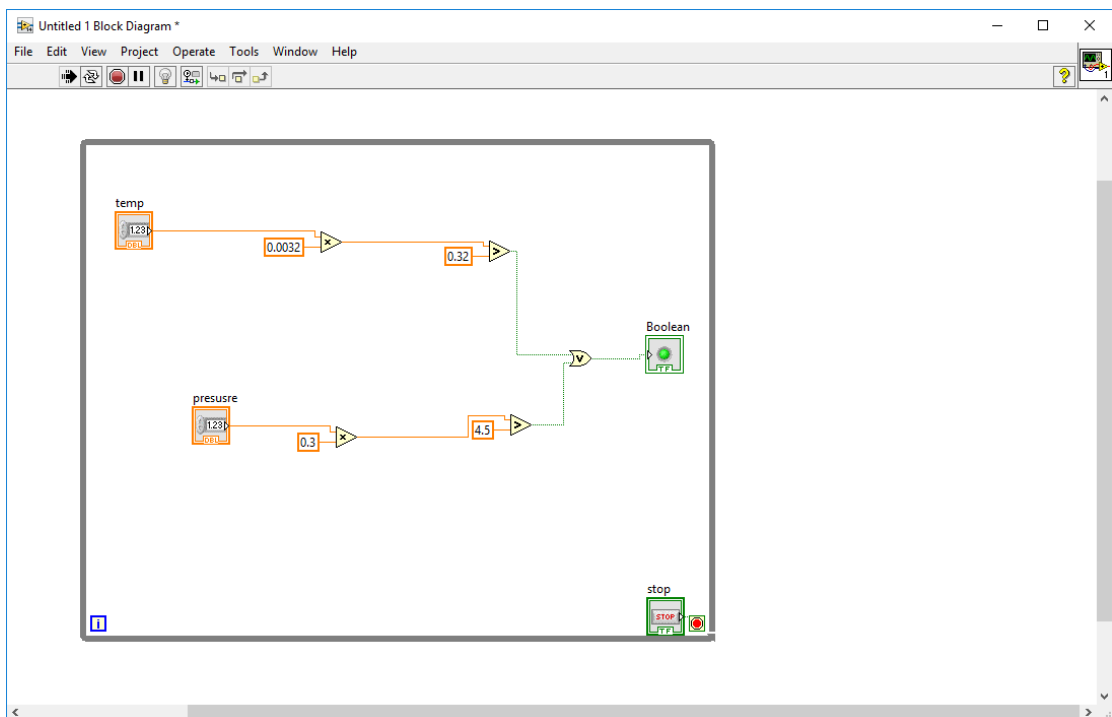


Figure 2.1.1 Alarm system block diagram

We put the components in a loop to check continuously for the conditions, the system checks the two inputs the temperature and pressure if one of them at least exceeds the value so it give an alarm and light the led.

In the following screenshot an alarm is given when the pressure exceeds the value:

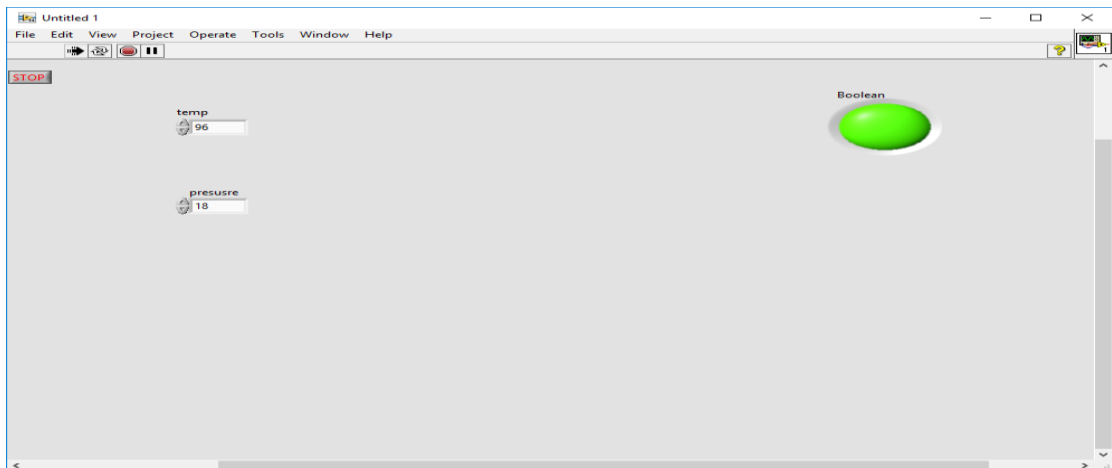


Figure 2.1.2 Alarm system

2.2 Simple liquid store system

In this part, we built a circuit contains a tank and thermometer, when the liquid in the tank exceeds 6 liters or the temperature exceeds 60c and the enables for volume and temperature are on a red led will be turned on and a message will be showed for the user.

The following screenshot shows block diagram for the system:

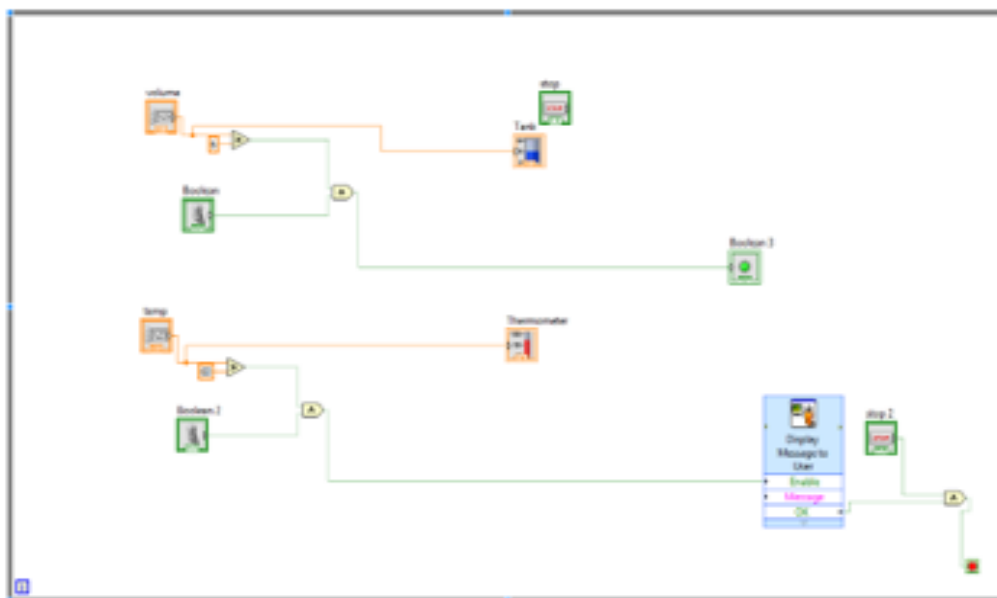


Figure 2.2.1 Tank system block diagram

The following screenshot shows the output:

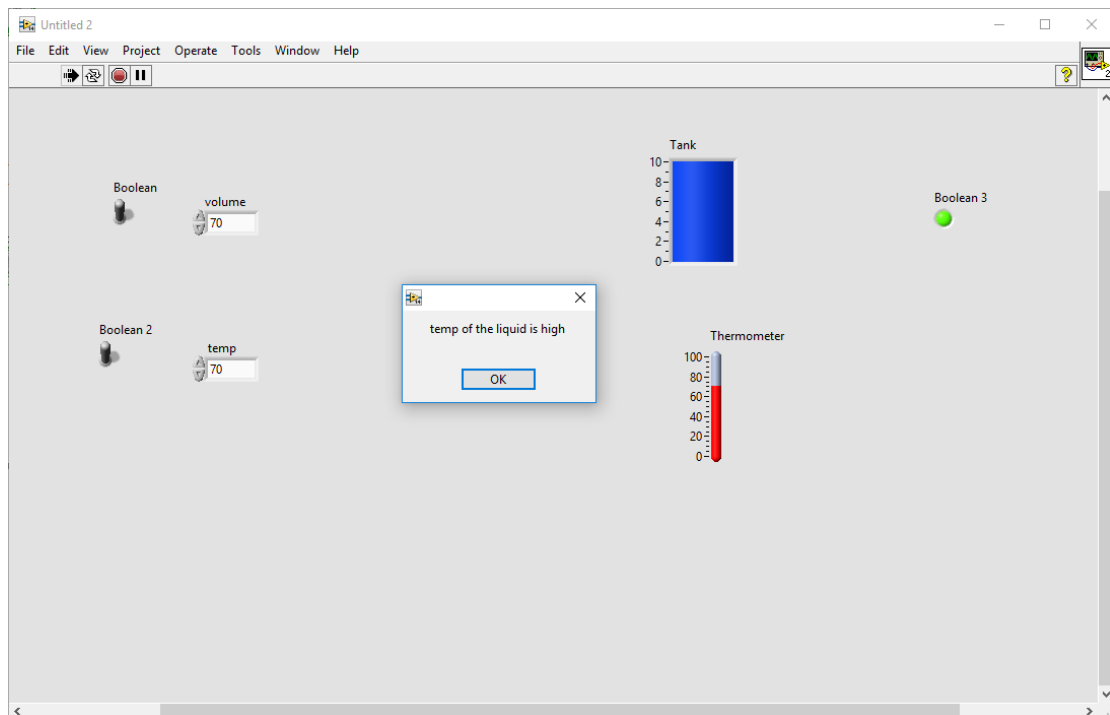


Figure 2.2.2 Tank system

2.3 Low pass and high pass filters in time domain

Here we will use a low pass and high pass filter with a certain cut off frequency. An input signal will be given and showed in the screen and how does it become after applying it to the low pass and high pass filter.

The next photo shows the block diagram for this system:

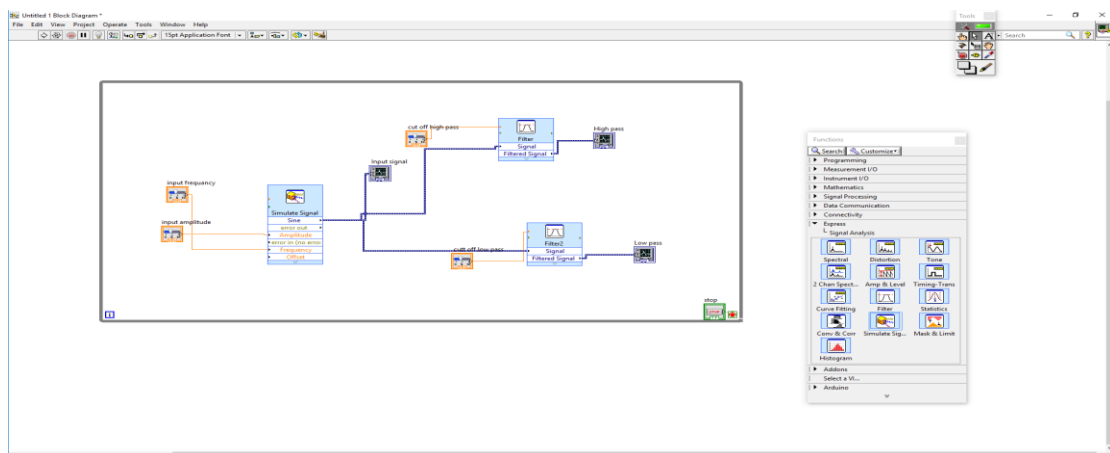


Figure 2.3.1 Low pass and high pass filter clock diagram

The output of this system is:

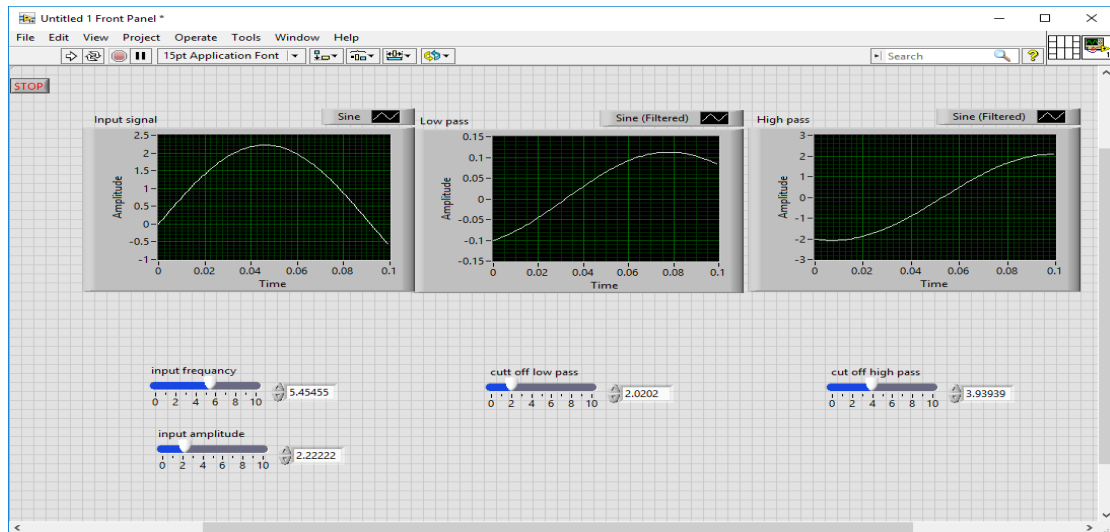


Figure 2.3.2 Low pass and high pass filters

2.4 Experiment 3 Todo

In this to-do we read a waveform, give it as input to the filters in the previous parts and then we played the waveform, finally, we draw it in the middle screen as in the photo:

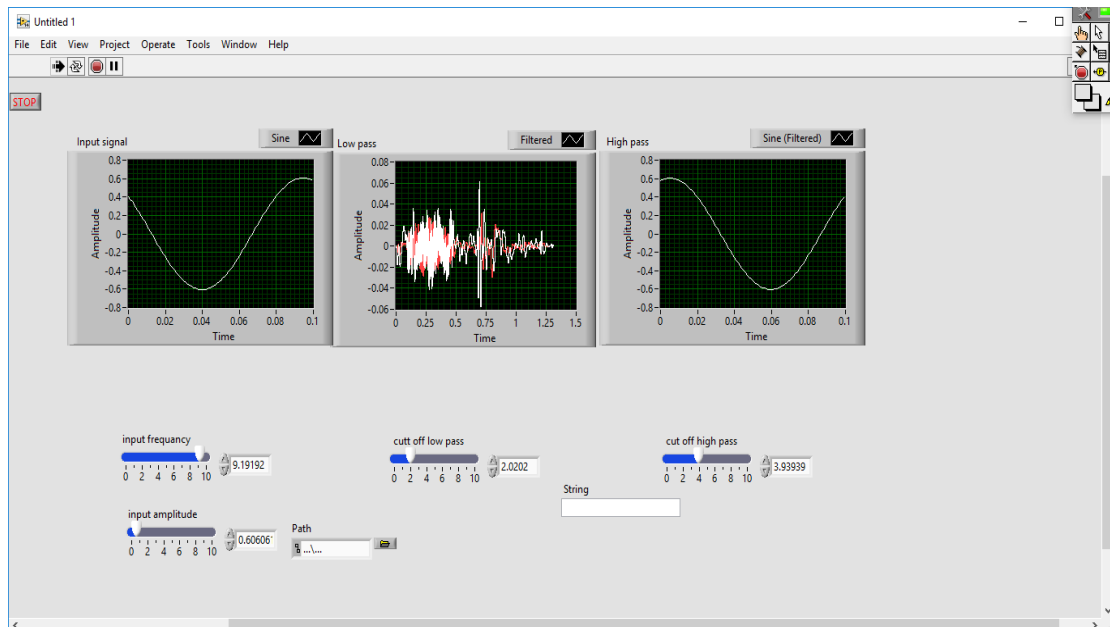


Figure 2.4.1 Waveform signal

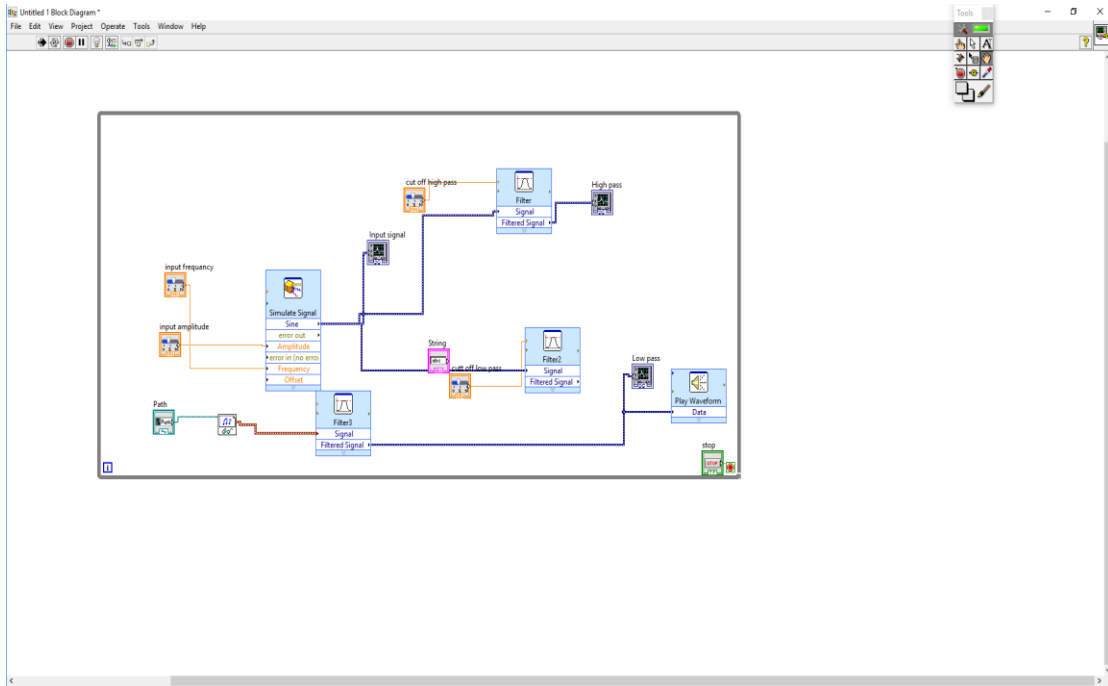


Figure 2.4.2 TODO block diagram

2.5 Arduino RGB Led

Here we just loaded a ready example, in the photo is the front panel:

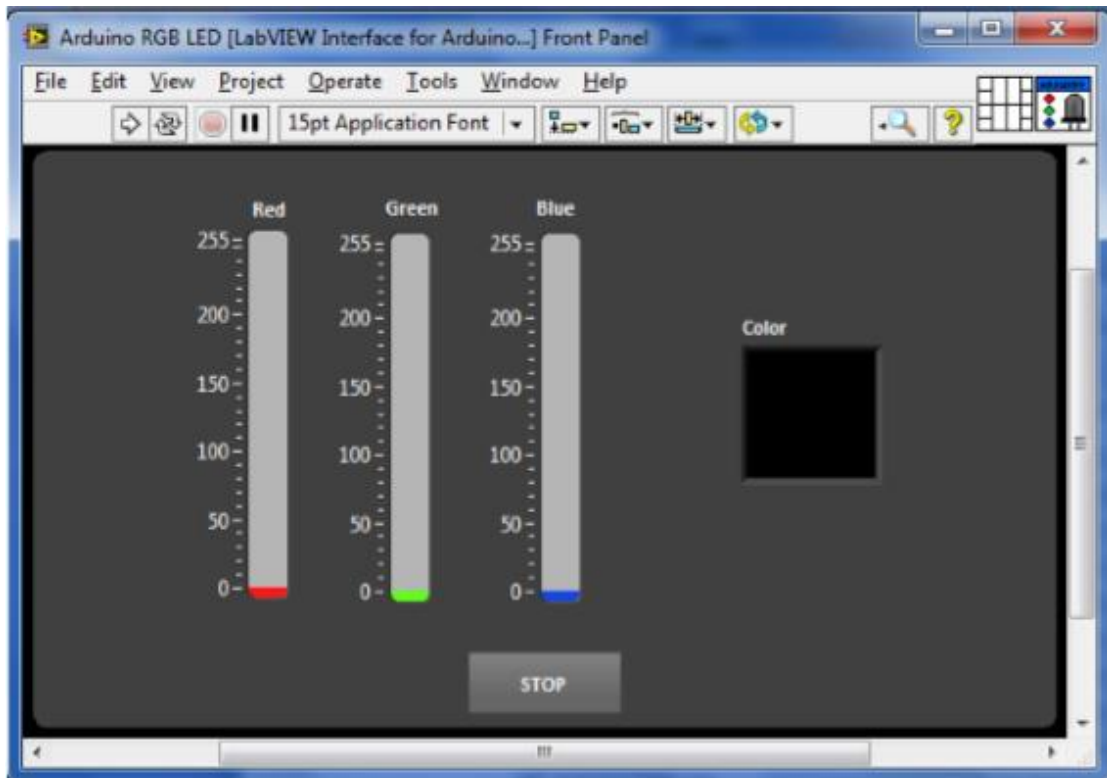


Figure 2.5.1 Front panel example

Also, the example shows how to connect the arduino circuit not the LabVIEW only, as in the screenshot:

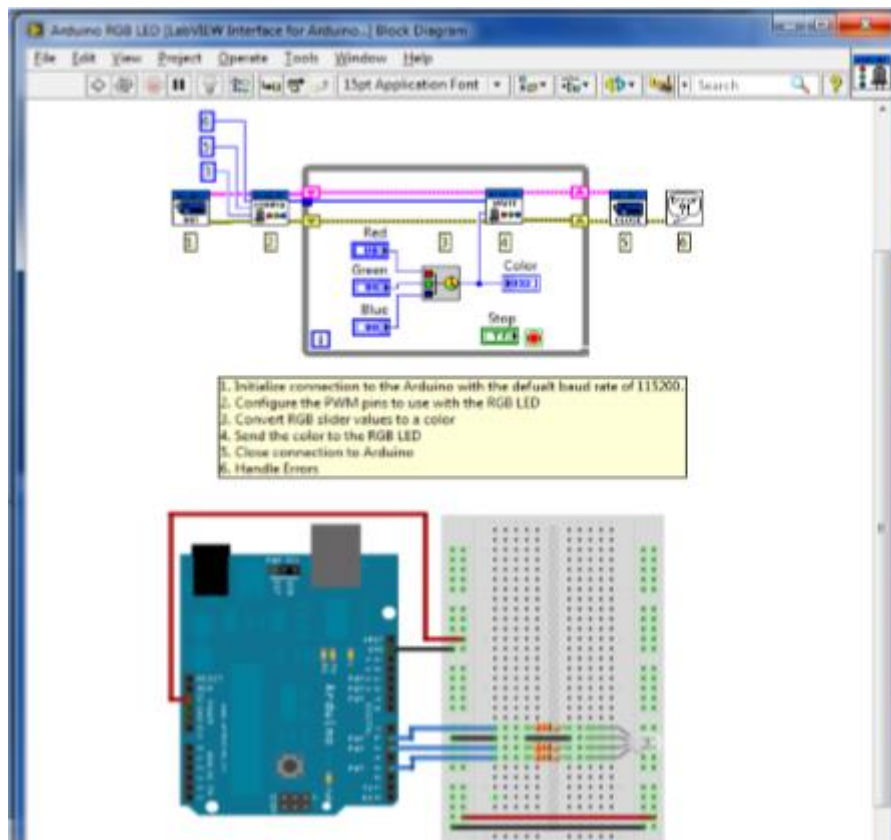


Figure 2.5.2 Example block diagram

As the previous screenshot shows a LED with three pins is used but because we don't have one in the lab we used three LEDs instead, we started by connecting one LED and test it. The following pictures show the first test with one LED and with three LEDs in order:

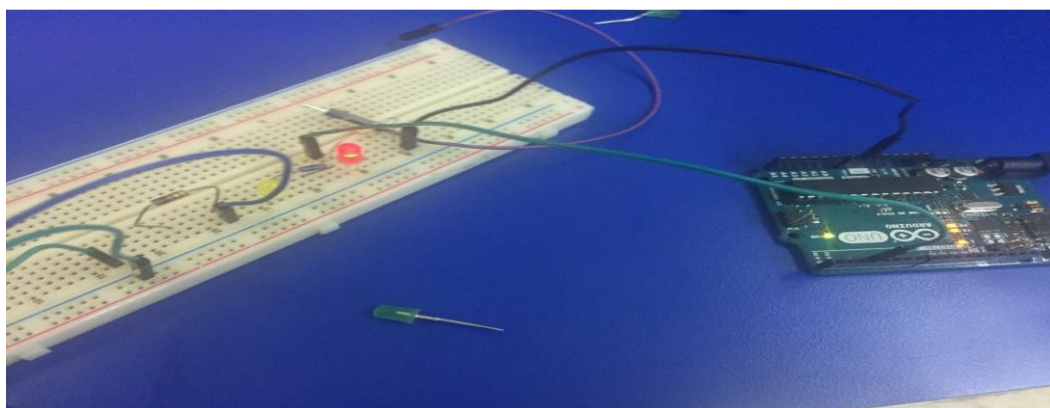


Figure 2.5.3 One LED on

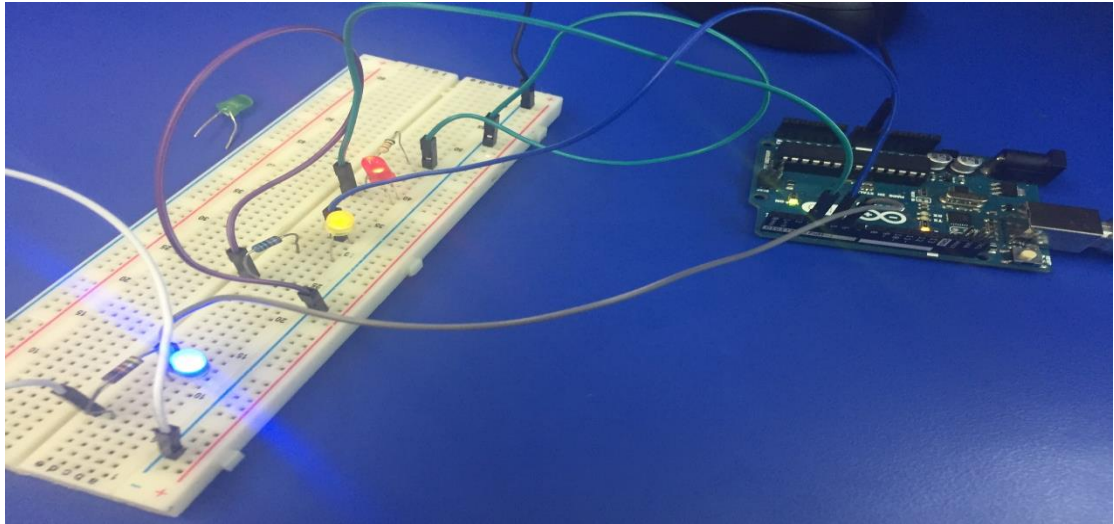


Figure 2.5.4 Three LEDs on

2.6 Read analog value (LDR)

In this part we will connect LDR with Arduino, read its value and then show it on the LabVIEW screen. The following screenshot shows the block diagram on the LabVIEW and the next picture shows the connection with Arduino:

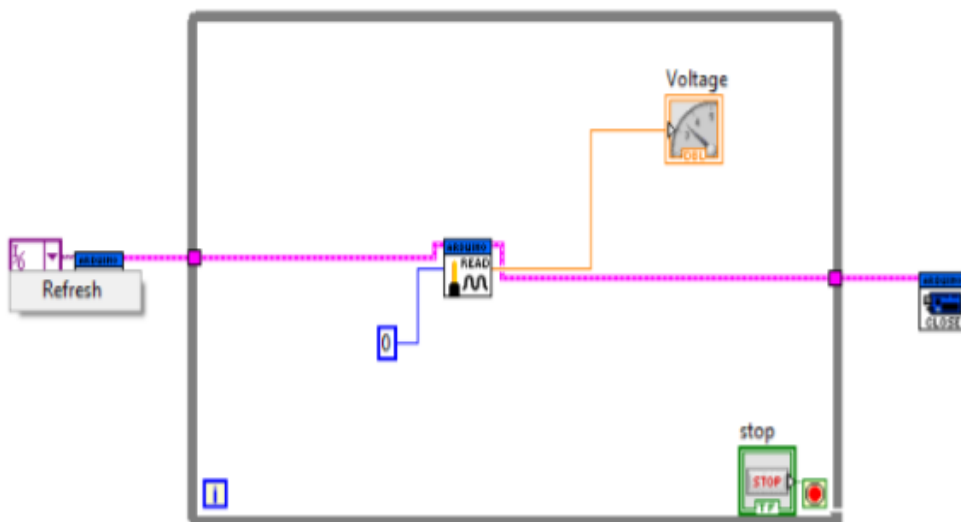


Figure 2.6.1 Block diagram for LDR

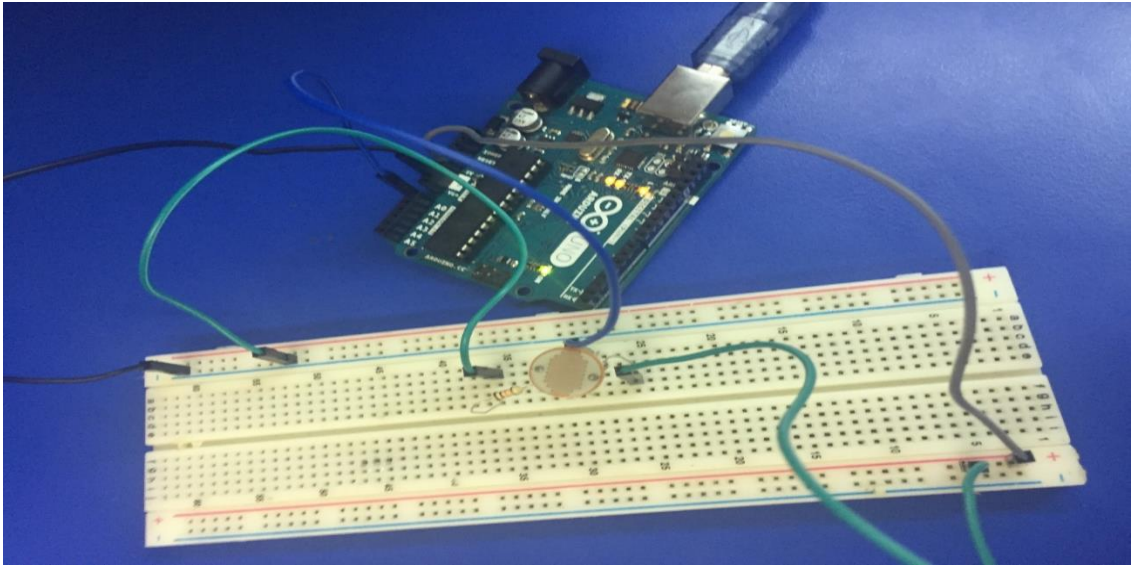


Figure 2.6.2 Arduino connection

The following screenshot shows the Gauge reading the value of LDR:

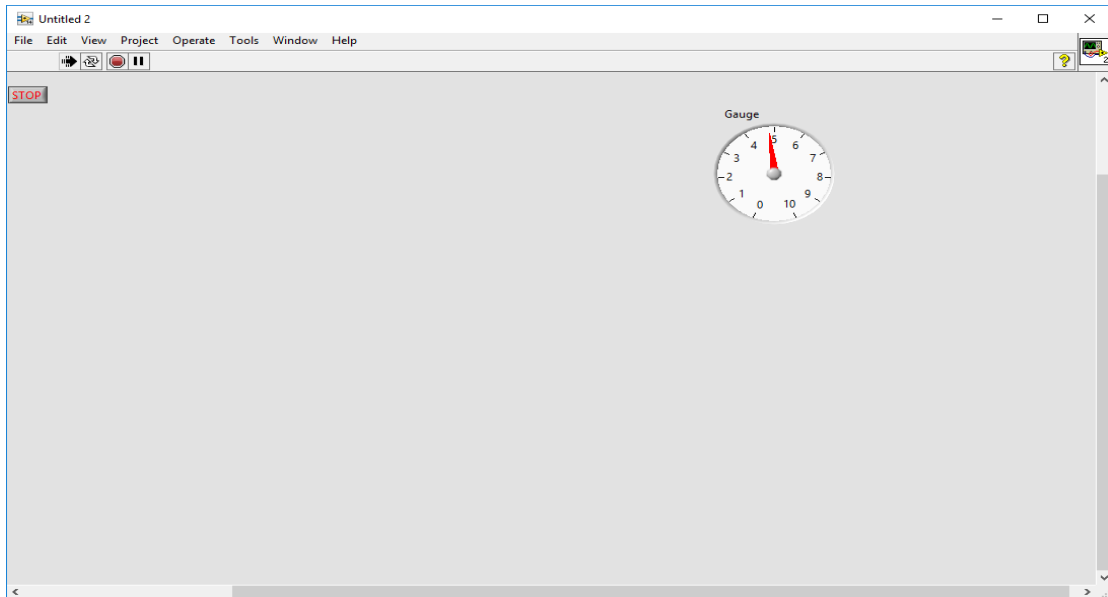


Figure 2.6.3 Output

2.7 Experiment 4 Todo

In this todo was asked to enter a password to a led array on the LabVIEW and enter a password using the push button connected with Arduino, read the two passwords, compare them and if they are equal light the LEDs.

The following screenshot shows the block diagram:

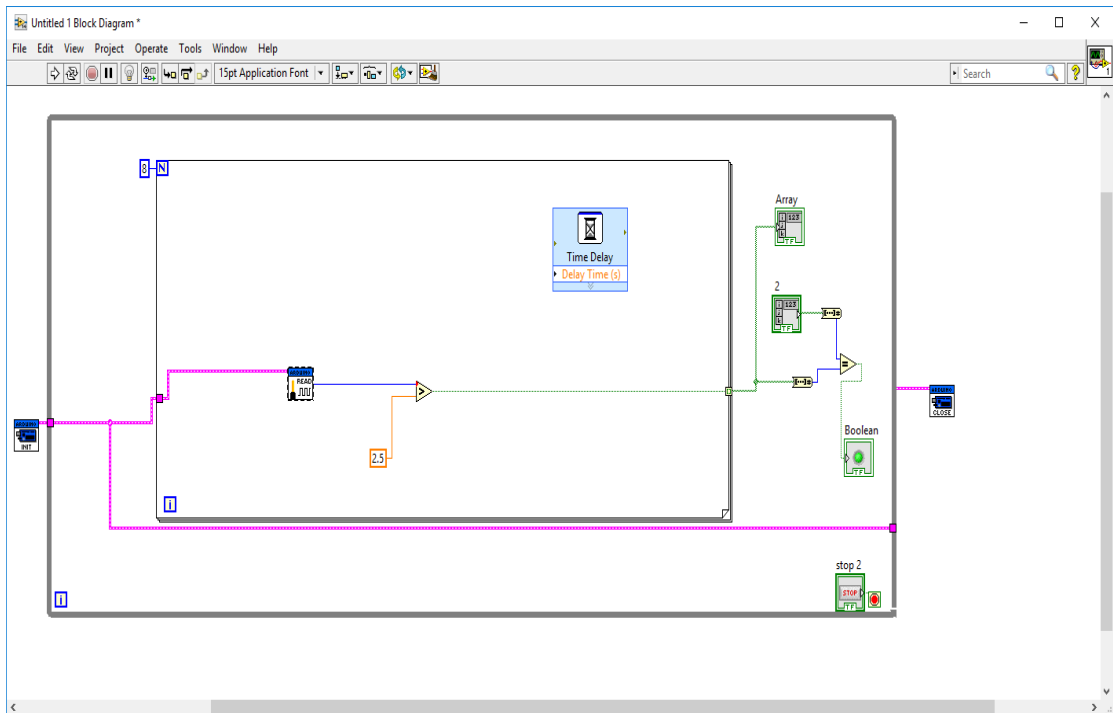


Figure 2.7.1 lock diagram

The following photos shows the front panel for the LabVIEW and the Arduino connection:

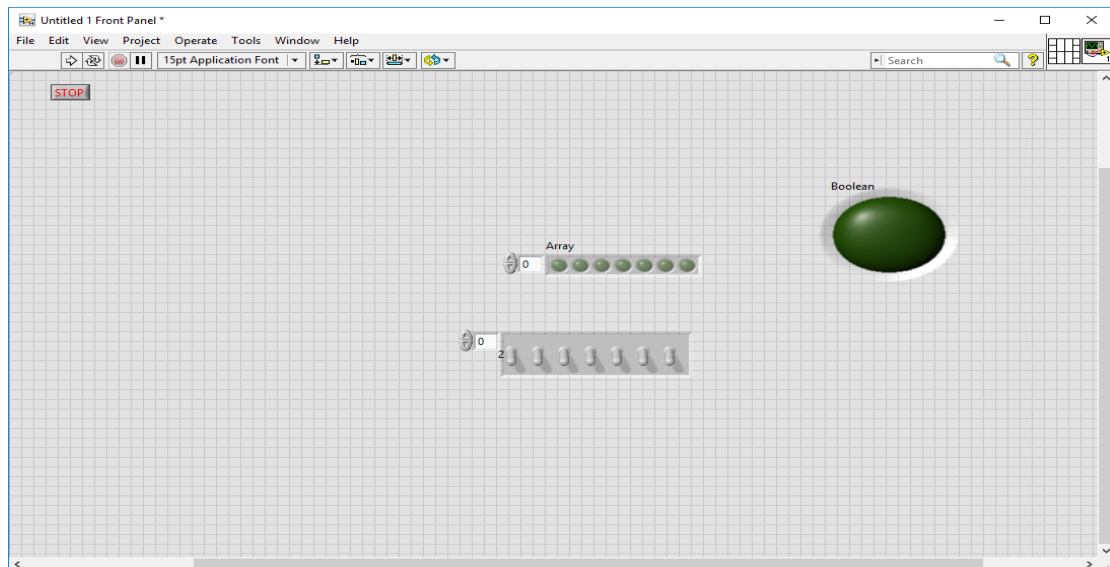


Figure 2.7.2 TODO Front panel

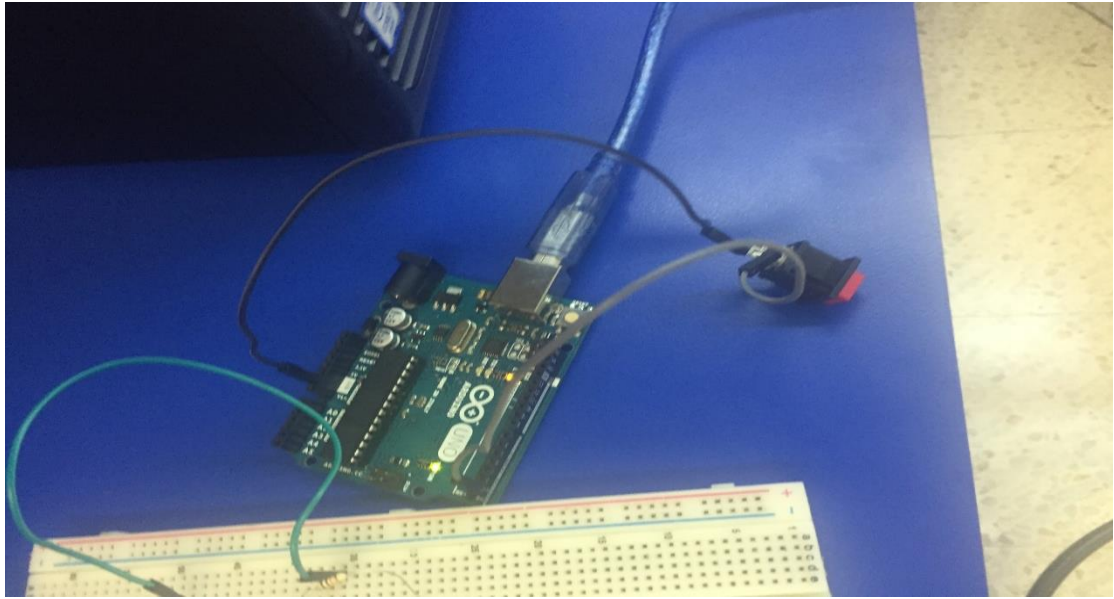


Figure 2.7.3 Arduino connection

At first the circuit didn't work because we read the push button wrongly but then we fixed it and everything worked.

3. Conclusion

The LabVIEW is a good tool to use because we can build circuits using it and we connect it to Arduino too.

Many components in the lab need to be changed since it's not working because this takes time from the time we supposed to do the experiment in.

4. References

[1] LabVIEW System Design Software - National Instruments. (n.d.). Retrieved October 22, 2016, from <http://www.ni.com/labview/>

[2]

Community: LabVIEW Interface for Arduino FAQ - National ... (n.d.). Retrieved October 22, 2016, from <https://decibel.ni.com/content/docs/DOC-16024>

[3] LabVIEW - Wikipedia. (n.d.). Retrieved October 22, 2016, from <https://en.wikipedia.org/wiki/LabVIEW>