VISA R/W
NI-VISA Serial Port: basic exercises

1. INTRODUCTION

One of the many applications that LabView has is an I/O software known as VISA (Virtual Instrument System Architecture). A standard tool to create interfaces that allow us to control (configure, program, debug) instruments/equipment or acquire data from external sensors. All the above tasks are done through any communication port like Ethernet, GPIB, USB, and more.

2. GOAL

Follow the directions to complete all exercises using the advantages of VISA to control and communicate with an external device (ARDUINO). After completing this activity, you will be able to connect, acquire, and send data through the USB serial port with the LabView program.

3. MATERIAL

- LabView software
- Arduino UNO + USB Cable
- Protoboard
- Jumper Kit
- Resistors (120W)
- Push-Button

4. METHODOLOGY

Use the knowledge acquired in the previous sessions:
Creating an interface in the front panel, variables, data processing and error handling.

Previous and Autonomous tasks:
Exercises 6.1-6.4 from NI-VISA Write and NI-VISA Read

5. CHALLENGES

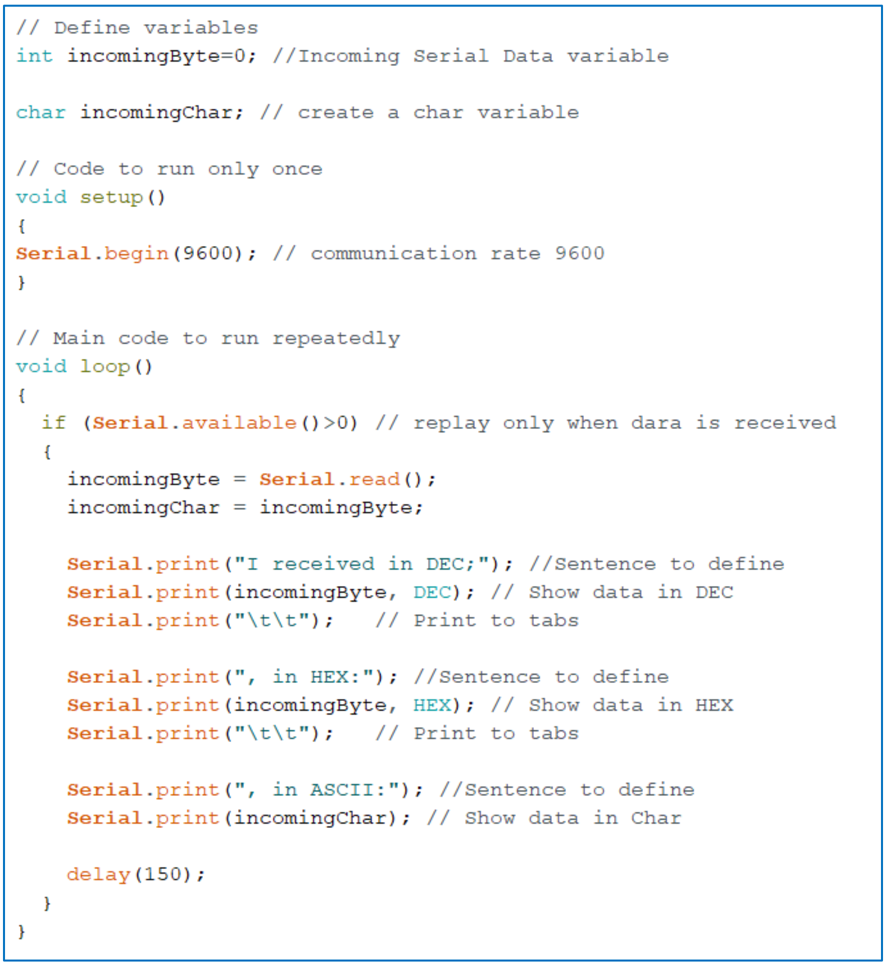
Digital Input: Visa Read Function

In this challenge you will learn how to use the Serial Port to communicate with your hardware (Arduino board) and software (LabView) through the USB Serial Port.

✓ Exercise 6.5

The goal of this task is to receive a character string from the Arduino via the serial port and display it on your front panel or LabView user interface.
A virtual button (LabVIEW) will activate the data transfer through the Serial Port.

1.- Open a new Arduino Sketch, type the following code, verify it there are any errors and upload the code to the board:

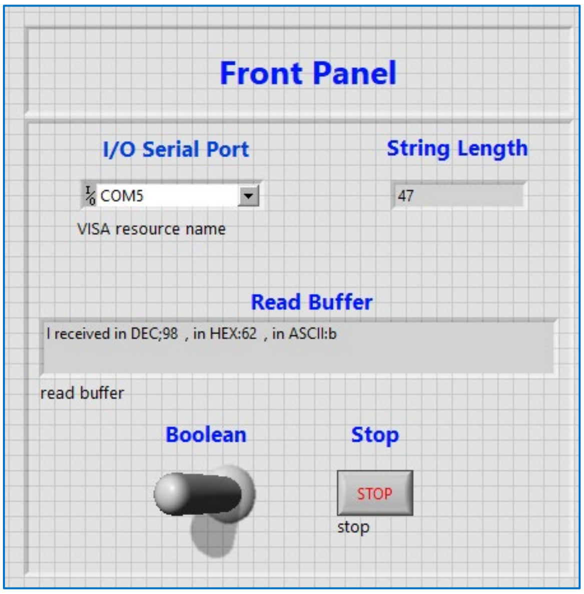


```
// Define variables
int incomingByte=0; //Incoming Serial Data variable

char incomingChar; // create a char variable

// Code to run only once
void setup()
{
Serial.begin(9600); // communication rate 9600
}

// Main code to run repeatedly
void loop()
{
  if (Serial.available()>0) // replay only when dara is received
  {
    incomingByte = Serial.read();
    incomingChar = incomingByte;

    Serial.print("I received in DEC;"); //Sentence to define
    Serial.print(incomingByte, DEC); // Show data in DEC
    Serial.print("\t\t");   // Print to tabs

    Serial.print(", in HEX:"); //Sentence to define
    Serial.print(incomingByte, HEX); // Show data in HEX
    Serial.print("\t\t");   // Print to tabs

    Serial.print(", in ASCII:"); //Sentence to define
    Serial.print(incomingChar); // Show data in Char

    delay(150);
  }
}
```

Figure 1. Arduino Sketch code

This code reads if there is any data available on the Serial Port. If so, it reads the data and send it through in decimals, hexadecimal, and ASCII chars.

2.- Open a new project in LabView and create the user interface. (*Figure 2)*



Front Panel

I/O Serial Port: COM5

VISA resource name

String Length: 47

Read Buffer: I received in DEC;98 , in HEX:62 , in ASCII:b

read buffer

Figure 2. Front Panel view

3.- On the Block Diagram: *(Figure 3)*

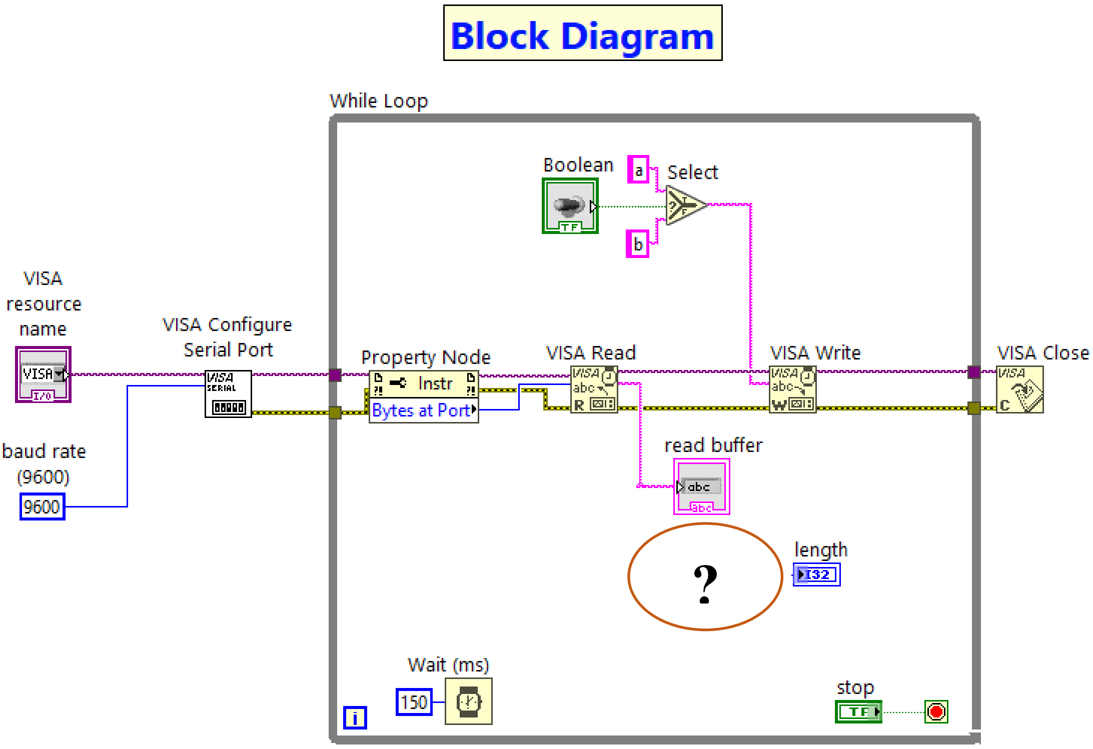


Figure 3. Block Diagram view

3.1 Configure de Serial Port by indicating the resource name and the baud rate.

3.2 Use the Property Node "Number of Bytes at Serial Port" to know the number of bytes currently available to read.

3.3 Read and Write data through the Serial Port ("VISA Read" and "VISA Write")

3.4 **Use the "String Length" function to know in Length the number of characters in the sting from the buffer.**

3.5 Close the VISA.

4.- Run the program and change the switch to get the String Length, and print the data coming from the Serial Port.

5.- Upload the VI to the "Campus Virtual".