Lab Report

Course number: EE101	**Lab Section: A04**
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Lab GTA:	**Lab TA: Hannah, Artur**

TA ONLY

Lab Objectives	OK	NOK	**Points Earned**	0 - Wholly inadequate. 1 - An attempt, but missing many pieces, unprofessional parts, missed the point. 2 – More than one unsatisfactory section. 3- One unsatisfactory section. 4 - Spot on. All sections delivered as required. Professional
Materials	OK	NOK		
Exercise Req/Proc	OK	NOK		
Conclusions	OK	NOK		

Lab Title: Arduino digital input/output

Section A: Lab Objectives

In your own words list the objectives of this lab.

Using a serial to parallel shift register HC595 we can effectively turn two digital outputs from microcontroller into 8 outputs. We utilize a series of LEDs attached to the shift register and the persistence of the Human eye to create a few interesting visual effects. Learn the basics of serial to parallel data conversion. Interface a 74HC595 serial to parallel converter circuit to your RoboRed microcomputer given a schematic. Output a set of patterns to LEDs attached to the parallel outputs of the HC595.

Section B: Equipment and component materials used

Electronics measurement equipment, power supply, electronics components, etc. Only what you used for this lab.

- Arduino Programming book (Blum)

- 74HC595 serial to parallel converter (in kit) + Datasheet for 74HC595
- A view of: https://www.youtube.com/watch?v=c4M-GAS4cWE
- A couple articles on POV: Persistence of Vision

- Optional
- O-scope
- Power Supply.

Section C: Reference works and soft materials used

Text book sections, Datasheets, On-line sources, Code snippets, etc. Be thorough and give credit where due.

Dr.Gallagher(.n.d), Arduino digital input/output. Department of Electrical Engineering. Accessed 02/28/2020

Section D: Exercises

Exercises have unique requirements that are met by your "unique" solutions. Multiple exercises fulfill our lab objectives. List the lab exercise requirements here.

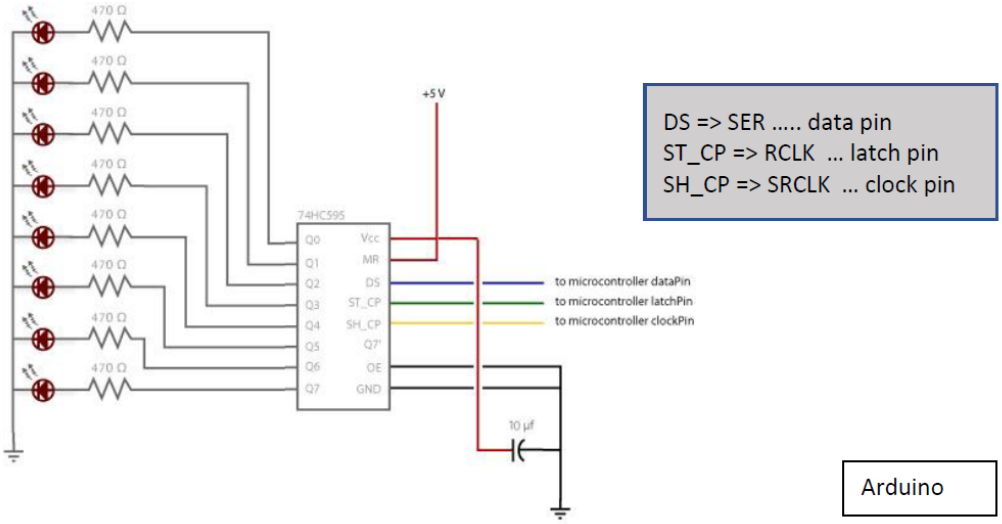
Requirements:

Procedure:

Part1:

Build circuit

build the circuit shown in Figure 3. Use the schematic below to construct serial to parallel converter LED light bar.

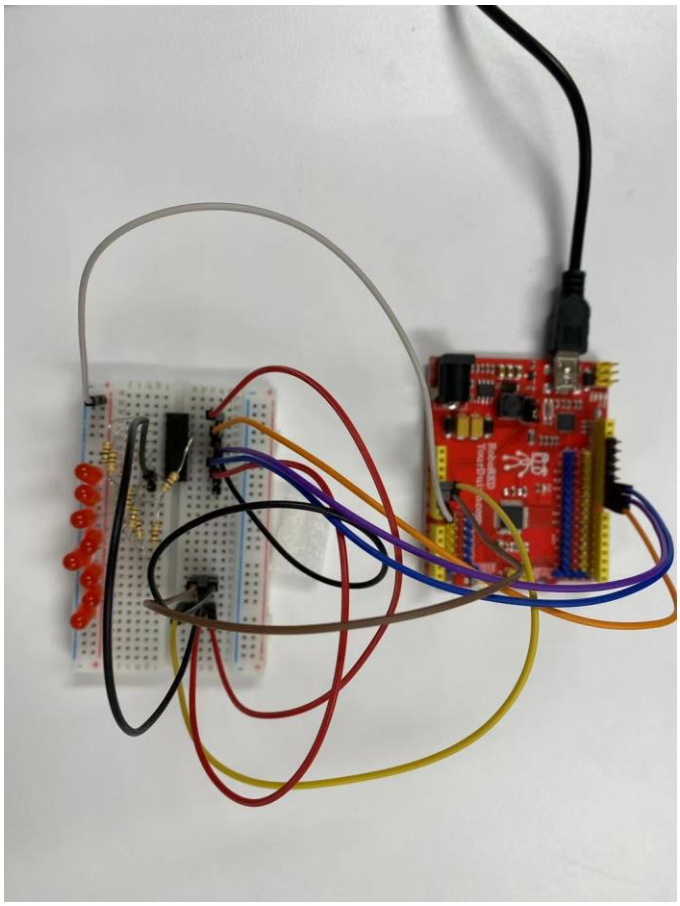


Part 2. Test your circuit. Ping pong

Demonstrate a single illuminated LED "ping-ponging" across the 8 LED string. Use an input from the serial monitor input to vary the rate at which the ping pongs (4Hz - .25 Hz).

Solution/Procedure:

What did you do to fulfill the exercise requirements?



Breadboard schematic of the pingpong circuit

Code:

File Edit Sketch Tools Help

pingpong

```
byte array[]={
B10000000,
B01000000,
B00100000,
B00010000,
B00001000,
B00000100,
B00000010,
B00000001,
B00000010,
B00000100,
B00001000,
B00010000,
B00100000,
B01000000,
B10000000,
};

int counter =0;
int size_=15;
void setup() {

  pinMode(8, OUTPUT);
  pinMode(9, OUTPUT);
  pinMode(10, OUTPUT);

}


void loop(){

digitalWrite(9, LOW);
shiftOut(8, 10,MSBFIRST, array[counter]);
digitalWrite(9,HIGH);
delay(50);
counter++;

if (counter > size_){
  counter = 0;
}
}
```

Done uploading.

Section E: Lab Conclusion

In this lab, the first part of the lab introduces me to breadboarding and how to use a serial to parallel shift registaer HC59 so I can easily turn two digital outputs from microcontroller into 8 outputs. The second part is to code the pingpong circuit so the LED will be able to flash in order and repeat back. It is important to set an if function in the end to dictate the circuit to get back to the beginning.