LAB REPORT : 2

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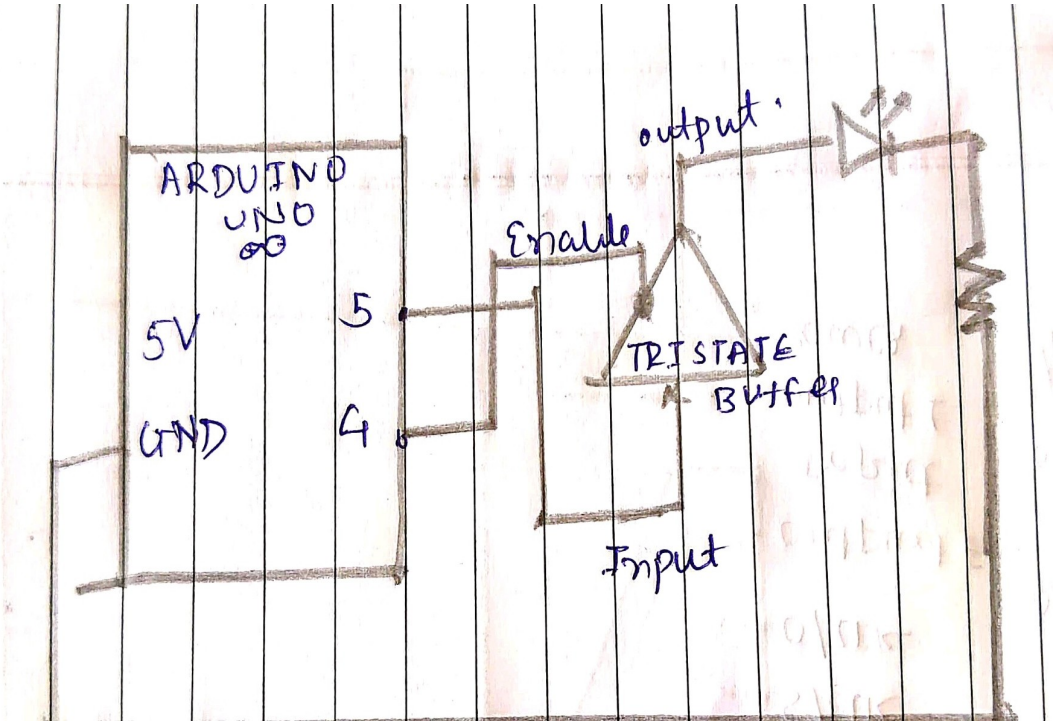
Part A:

AIM : To get familiar with working of tristate buffer and verify it's working .

Electricall components used : A circuit has already been given to us, we just need to take power supply and inputs from arduino and display output using LED. For this we will need Arduino , LED's, Wires .

Circuit Diagram:



Prodecude :

1.A circuit has already been given to us, we just need to take power supply and inputs from arduino and display output using LED.

2. Arduino pin5 acts as input for the Tristate buffer and pin 4 acts as enable. We also need to ground the circuit by connecting GND of Arduino to breadboard and 5v to positive terminall of breadboard.

3.Connect the output of Tristate buffer to LED to diaplay its output and then connect LED to resistor which has to be grounded.

4.Write the code .

```
int pin4 = 4;
int pin5 = 5;

void setup(){
        pinMode(pin4,OUTPUT);
        pinMode(pin5,OUTPUT);
  Serial.begin(9600);
}

void loop(){
        int x,y;

  Serial.print("\nInput : ");
  while(Serial.available()==0){}
  x = Serial.read();
  x=x-'0';
  Serial.println(x);

  Serial.print("\nEnable : ");
  while(Serial.available()==0){}
  y = Serial.read();
  y=y-'0';
  Serial.println(y);

  digitalWrite(pin5,x);
  digitalWrite(pin4,y);
}
```

Conclusion : Tristae buffer acts as expected :

Truth Table :

Input	Enable	Output
0	0	0
1	0	0
0	1	0
1	1	1

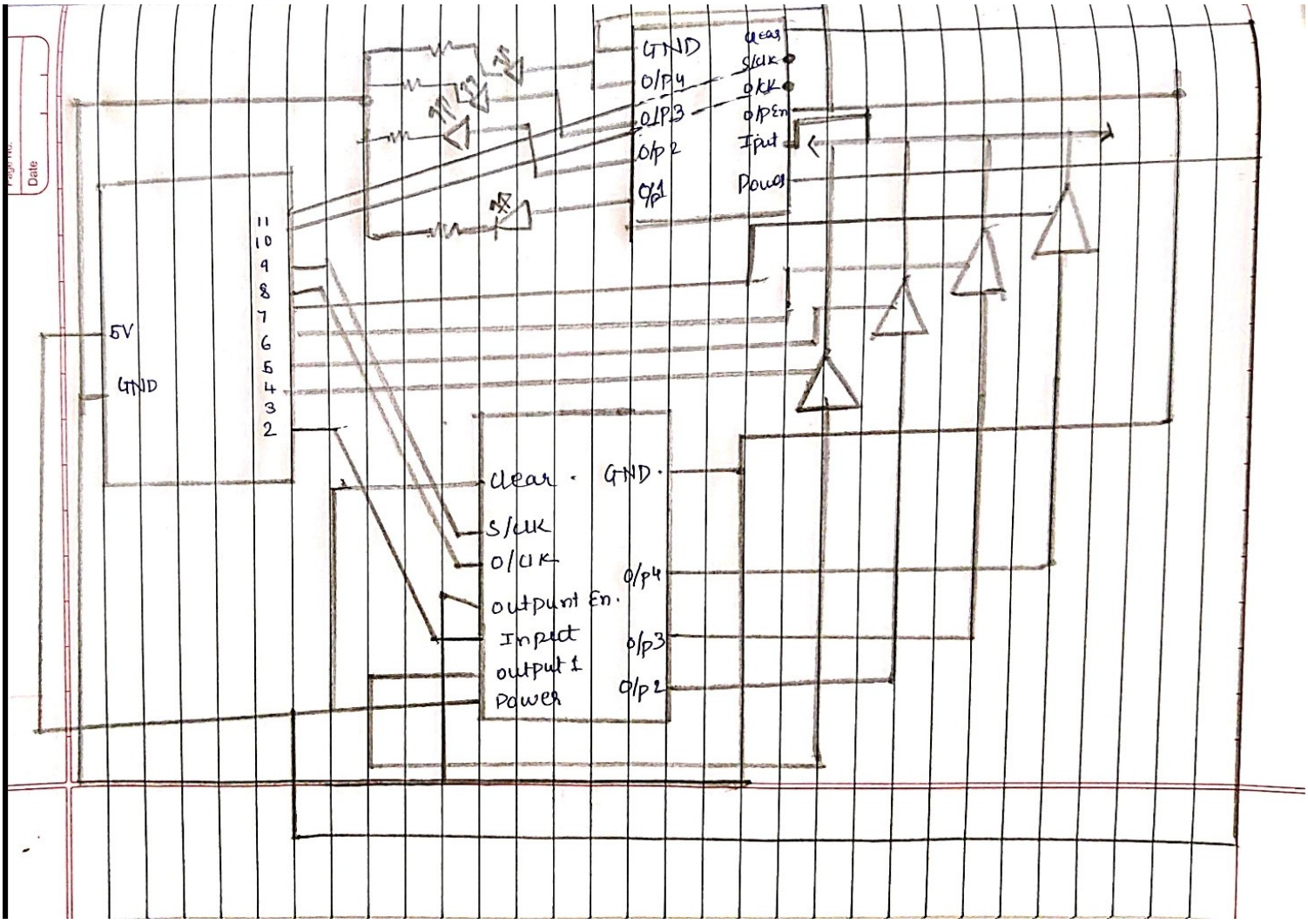
Link to the tinkercad circuit ::
https://www.tinkercad.com/things/5yJkdCNQlhu

Part B:

AIM : Our objective is to get data flow from one shift register to another by bus which has tri state buffers.

Electricall components : A circuit is already given containing 4 tri-state buffers,we just need to add Arduino to the circuit,make required connections.We also need 2 shift registers(74HC595) , LEDs, resistores .

Circuit Diagram :



Procedure :

5V, Ground of the Arduino are connected to respective lanes of the circuits given. The two shift registers are taken on one breadboards,in which we have to transfer data from one to other.The tri state buffers are connected and it is given as input to 2nd register.As we have used Arduino in the circuit,the following code is used in order to get the circuit to work.It is obvious that latch pin has to be made 0.

The input to the first shift register is given by the arduino,but the input to the second shift register is taken from the outputs of all the 4 tri state buffers.For giving input,through the arduino,we have used shiftOut to the datapin using MSBfirst. Latchpin is made 0 while entering the input,but after that it is made 1 so that input gets latched to 1st shift register.

Code :

```
int datapin = 2;
int latchpin1 = 8;
int clockpin1 = 9;
int latchpin2 = 10;
int clockpin2 = 11;
int enable1 = 4;//lsb
int enable2 = 5;
int enable3 = 6;
int enable4 = 7;//msb

void setup(){
  pinMode(datapin,OUTPUT);
  pinMode(clockpin1 , OUTPUT);
  pinMode(latchpin1 , OUTPUT);
  pinMode(clockpin2 , OUTPUT);
  pinMode(latchpin2 , OUTPUT);
  pinMode(enable1,OUTPUT);
  pinMode(enable2,OUTPUT);
  pinMode(enable3,OUTPUT);
  pinMode(enable4,OUTPUT);

  Serial.begin(9600);
  Serial.println("\nGET  READY !!!");
```

```
  int i=0;
  while(i<20){
    delay(100);
    Serial.print("=");
    i++;
  }
}

void loop(){
  int n;
  Serial.print("\nPlease Enter a Number : ");
  while (Serial.available() == 0){}
  n = Serial.parseInt();
  Serial.println(n);

  digitalWrite(latchpin1 , LOW);
  shiftOut(datapin, clockpin1, MSBFIRST, n);
  digitalWrite(latchpin1 , HIGH);

  digitalWrite(enable1,HIGH);
  digitalWrite(enable2,LOW);
  digitalWrite(enable3,LOW);
  digitalWrite(enable4,LOW);

  digitalWrite(clockpin2 , HIGH);
  delay(1);
  digitalWrite(clockpin2 , LOW);
  delay(1);
  digitalWrite(latchpin2,HIGH);
  delay(1);
  digitalWrite(latchpin2,LOW);

  digitalWrite(enable1,LOW);
  digitalWrite(enable2, HIGH);
  digitalWrite(enable3,LOW);
  digitalWrite(enable4,LOW);

  digitalWrite(clockpin2 , HIGH);
```

```
delay(1);
digitalWrite(clockpin2 , LOW);
delay(1);
digitalWrite(latchpin2,HIGH);
delay(1);
digitalWrite(latchpin2,LOW);

digitalWrite(enable1,LOW);
digitalWrite(enable2, LOW);
digitalWrite(enable3,HIGH);
digitalWrite(enable4,LOW);

digitalWrite(clockpin2 , HIGH);
delay(1);
digitalWrite(clockpin2 , LOW);
delay(1);
digitalWrite(latchpin2,HIGH);
delay(1);
digitalWrite(latchpin2,LOW);

digitalWrite(enable1,LOW);
digitalWrite(enable2,LOW);
digitalWrite(enable3,LOW);
digitalWrite(enable4,HIGH);

digitalWrite(clockpin2 , HIGH);
delay(1);
digitalWrite(clockpin2 , LOW);
delay(1);
digitalWrite(latchpin2,HIGH);
delay(1);
digitalWrite(latchpin2,LOW);
digitalWrite(enable1,LOW);
digitalWrite(enable2,LOW);
digitalWrite(enable3,LOW);
digitalWrite(enable4,LOW);

Serial.print("THE NUMBER DRIVEN AND DISPLAYED IS: \n");
      Serial.print(n);
```

```
        Serial.print("\n");
}
```

Conclusion :
We have successfully prepared the circuit require to transfer data from one register to another register using a system bus which is made up of tristate. Buffers . Input given through Serial Monitor is being successfully transfered to output of 2nd shift register , and its bits are correctly dispalyed via LED’s.

Link to the tinkercad circuit :

https://www.tinkercad.com/things/lL0j1GjfBK0