

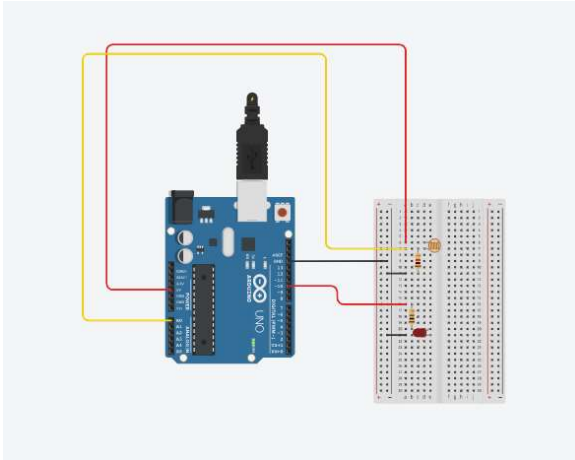
Name: Bhargavi Kamble
Student ID: 202051048

Practical-7

Aim 1:-

Write an Arduino code to interface LDR with Arduino UNO. Use A0 pin of the UNO board. Display the result on the serial terminal.

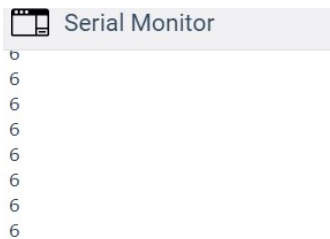
Circuit Diagram :- (if required)



Assembly / C Code :-

```
int sensorPin = A0;
int sensorValue = 0;
void setup()
{
  Serial.begin(9600);
}
void loop()
{
  sensorValue = analogRead(sensorPin);
  Serial.println(sensorValue);
  delay(100);
}
```

Result:- (Images/ Sentence's)

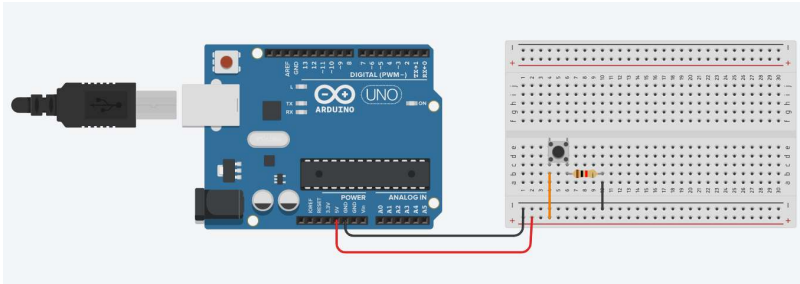


Practical-7

Aim 2:-

Write an Arduino code to interface the push button with Arduino UNO board. Count the switch press by the use and display the result on the serial terminal.

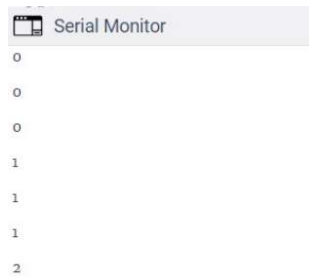
Circuit Diagram :-



Assembly / C Code :-

```
#define Button 2
int increment = 0;
void setup()
{
  Serial.begin(9600);
  pinMode(13, OUTPUT);
  pinMode(2, INPUT_PULLUP);
  attachInterrupt(digitalPinToInterrupt(Button), Count, FALLING);
}
void loop()
{
  Serial.println(increment);
  delay(600);
}
void Count()
{
  increment++;
}
```

Result:- (Images/ Sentence's)



Practical-7

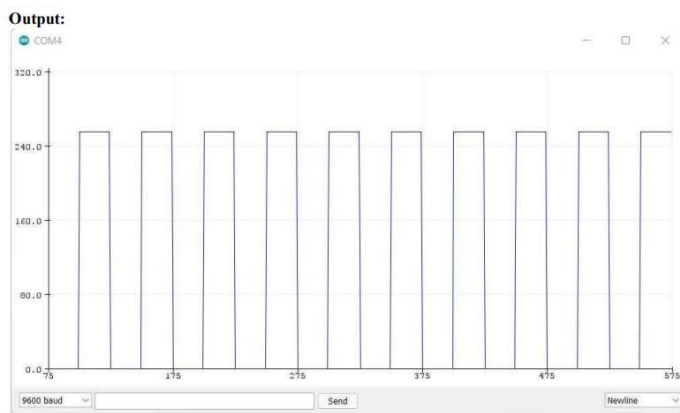
Aim 3:-

Write a code to generate Square wave on the serial plotter of Arduino UNO.

Assembly / C Code :-

```
void setup()
{
  Serial.begin(9600);
  pinMode(13,OUTPUT);
}
void loop() {
  for(int i=0;i<25;i++)
  {
    Serial.println(255);
  }
  delay(1000);
  for(int i=0;i<25;i++) {
    Serial.println(0);
  }
  delay(1000);
}
```

Result:- (Images/ Sentence's)



Practical-8

Aim 1:-

Write an ATmega328P code to interface 16x2 LCD with Arduino UNO board. Display your Name and Enrollment number on the LCD Display.

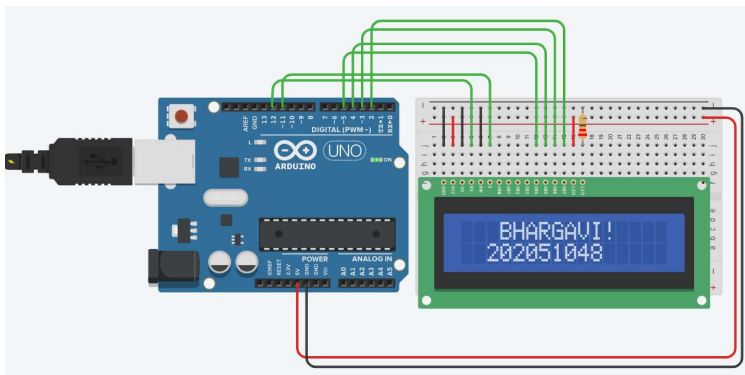
Assembly / C Code :-

```
#include<LiquidCrystal.h>

LiquidCrystal lcd(12, 11, 5, 4, 3, 2);
void setup()
{
  lcd.begin(16, 2);
}

void loop()
{
  lcd.setCursor(0,0);
  lcd.print("Bhargavi Kamble");
  lcd.setCursor(2,1);
  lcd.print("202051048");
}
```

Result:- (Images/ Sentence's)

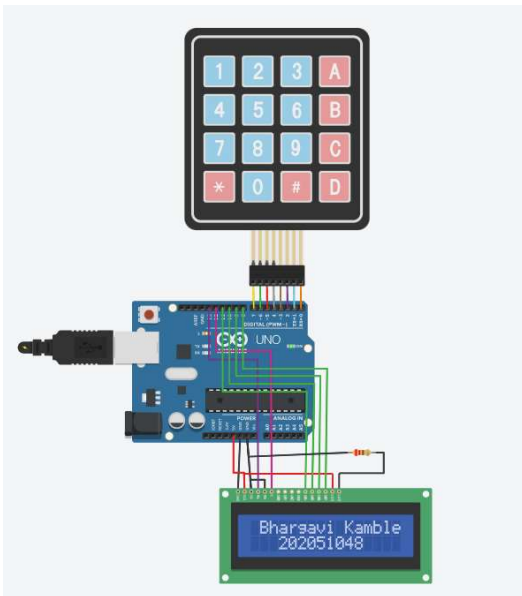


Practical-8

Aim 2:-

Write an Atmega328P code to interface 4x4 hex keypad with Arduino UNO board. Display the pressed key on the serial terminal.

Circuit Diagram :- (if required)



Assembly / C Code :-

```
#include <Keypad.h>
#include <Wire.h>
#include <LiquidCrystal.h>

LiquidCrystal lcd(13, 12, 11, 10, 9, 8);

long first = 0;
long second = 0;
double total = 0;

char customKey;
const byte ROWS = 4;
const byte COLS = 4;

char keys[ROWS][COLS] = {
  {'1', '2', '3', '+'},
  {'4', '5', '6', '-'},
```

```

    {'7','8','9','*'},
    {'C','0','=','/'}
};
byte rowPins[ROWS] = {7,6,5,4};
byte colPins[COLS] = {3,2,1,0};

Keypad customKeypad = Keypad( makeKeymap(keys), rowPins, colPins, ROWS, COLS);

void setup()
{
  Serial.begin(9600);
  lcd.begin(16, 2);
  for(int i=0;i<=3;i++);
  lcd.setCursor(0,0);
  lcd.print(" Bhargavi Kamble");
  lcd.setCursor(0,1);
  lcd.print(" 202051048");
  delay(6000);
  lcd.clear();
  lcd.setCursor(0, 0);
}

void loop()
{
  customKey = customKeypad.getKey();
  switch(customKey)
  {
    case '0' ... '9': // This keeps collecting the first value until a operator
is pressed "+-*/"
    lcd.setCursor(0,0);
    first = first * 10 + (customKey - '0');
    lcd.print(first);
    break;

    case '+':
    first = (total != 0 ? total : first);
    lcd.setCursor(0,1);
    lcd.print("+");
    second = SecondNumber();
    total = first + second;
    lcd.setCursor(0,3);
    lcd.print(total);
    first = 0, second = 0;
    break;

    case '-':

```

```

    first = (total != 0 ? total : first);
    lcd.setCursor(0,1);
    lcd.print("-");
    second = SecondNumber();
    total = first - second;
    lcd.setCursor(0,3);
    lcd.print(total);
    first = 0, second = 0;
    break;

case '*':
    first = (total != 0 ? total : first);
    lcd.setCursor(0,1);
    lcd.print("*");
    second = SecondNumber();
    total = first * second;
    lcd.setCursor(0,3);
    lcd.print(total);
    first = 0, second = 0;
    break;

case '/':
    first = (total != 0 ? total : first);
    lcd.setCursor(0,1);
    lcd.print("/");
    second = SecondNumber();
    lcd.setCursor(0,3);

    second == 0 ? lcd.print("Invalid") : total = (float)first / (float)second;

    lcd.print(total);
    first = 0, second = 0;
    break;

case 'C':
    total = 0;
    lcd.clear();
    break;
}
customKey = customKeypad.getKey();
if(customKey){
    Serial.println(customKey);
}
}

long SecondNumber()
{
    while( 1 )

```

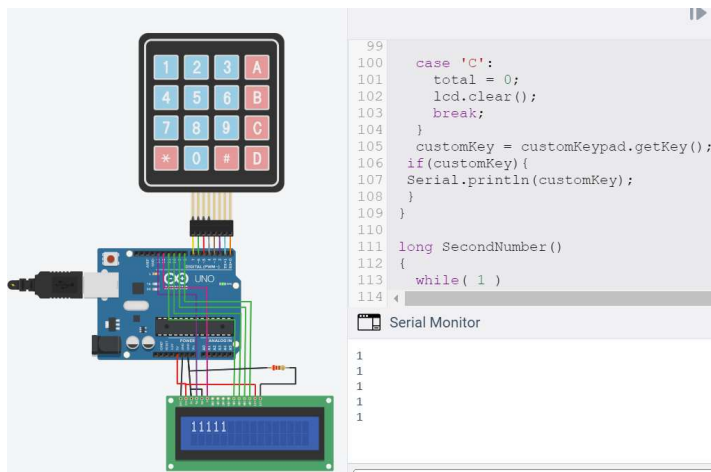
```

{
  customKey = customKeypad.getKey();
  if(customKey >= '0' && customKey <= '9')
  {
    second = second * 10 + (customKey - '0');
    lcd.setCursor(0,2);
    lcd.print(second);
  }

  if(customKey == '=') break;
}
return second;
}

```

Result:- (Images/ Sentence's)

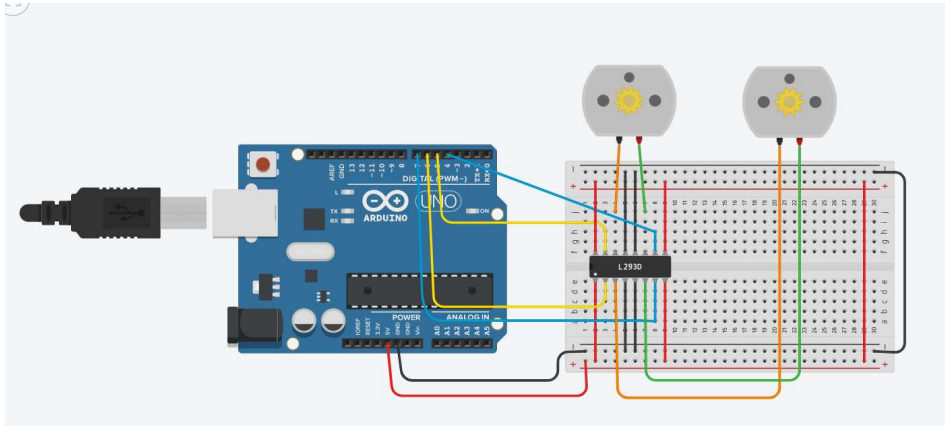


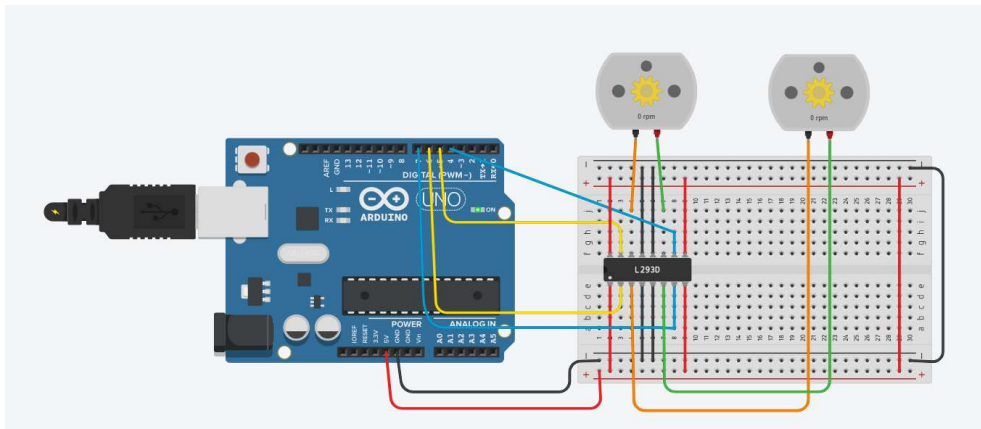
Practical-9

Aim 1:-

Write a DC motor interface code using ATmega328P and L293D.

Circuit Diagram :- (if required)



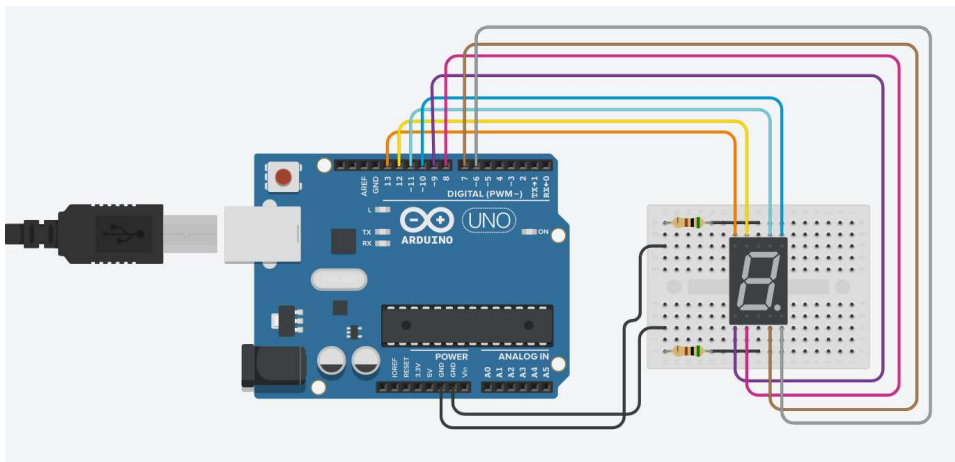


Practical-9

Aim 2:-

Write a code to interface 7 Segment with the Arduino Uno Board.

Circuit Diagram :- (if required)



Assembly / C Code :-

```
unsigned const int A = 13;
unsigned const int B = 12;
unsigned const int C = 11;
unsigned const int D = 10;
unsigned const int E = 9;
unsigned const int F = 8;
unsigned const int G = 7;
unsigned const int H = 6;
```

```

void setup(void)
{
    pinMode(A, OUTPUT);
    pinMode(B, OUTPUT);
    pinMode(C, OUTPUT);
    pinMode(D, OUTPUT);
    pinMode(E, OUTPUT);
    pinMode(F, OUTPUT);
    pinMode(G, OUTPUT);
    pinMode(H, OUTPUT);
}

//My Functions

void zero(void) {
    digitalWrite(A, LOW);
    digitalWrite(B, HIGH);
    digitalWrite(C, HIGH);
    digitalWrite(D, HIGH);
    digitalWrite(E, HIGH);
    digitalWrite(F, HIGH);
    digitalWrite(G, HIGH);
    digitalWrite(H, LOW);
}

void one(void) {
    digitalWrite(A, LOW);
    digitalWrite(B, LOW);
    digitalWrite(C, LOW);
    digitalWrite(D, HIGH);
    digitalWrite(E, LOW);
    digitalWrite(F, LOW);
    digitalWrite(G, HIGH);
    digitalWrite(H, LOW);
}

void two(void) {
    digitalWrite(A, HIGH);
    digitalWrite(B, LOW);
    digitalWrite(C, HIGH);
    digitalWrite(D, HIGH);
    digitalWrite(E, HIGH);
    digitalWrite(F, HIGH);
    digitalWrite(G, LOW);
    digitalWrite(H, LOW);
}

void three(void) {

```

```

    digitalWrite(A, HIGH);
    digitalWrite(B, LOW);
    digitalWrite(C, HIGH);
    digitalWrite(D, HIGH);
    digitalWrite(E, LOW);
    digitalWrite(F, HIGH);
    digitalWrite(G, HIGH);
    digitalWrite(H, LOW);
}

void four(void) {
    digitalWrite(A, HIGH);
    digitalWrite(B, HIGH);
    digitalWrite(C, LOW);
    digitalWrite(D, HIGH);
    digitalWrite(E, LOW);
    digitalWrite(F, LOW);
    digitalWrite(G, HIGH);
    digitalWrite(H, LOW);
}

void five(void) {
    digitalWrite(A, HIGH);
    digitalWrite(B, HIGH);
    digitalWrite(C, HIGH);
    digitalWrite(D, LOW);
    digitalWrite(E, LOW);
    digitalWrite(F, HIGH);
    digitalWrite(G, HIGH);
    digitalWrite(H, LOW);
}

void six(void) {
    digitalWrite(A, HIGH);
    digitalWrite(B, HIGH);
    digitalWrite(C, HIGH);
    digitalWrite(D, LOW);
    digitalWrite(E, HIGH);
    digitalWrite(F, HIGH);
    digitalWrite(G, HIGH);
    digitalWrite(H, LOW);
}

void seven(void) {
    digitalWrite(A, LOW);
    digitalWrite(B, LOW);
    digitalWrite(C, HIGH);
    digitalWrite(D, HIGH);

```

```
    digitalWrite(E, LOW);  
    digitalWrite(F, LOW);  
    digitalWrite(G, HIGH);  
    digitalWrite(H, LOW);  
}
```

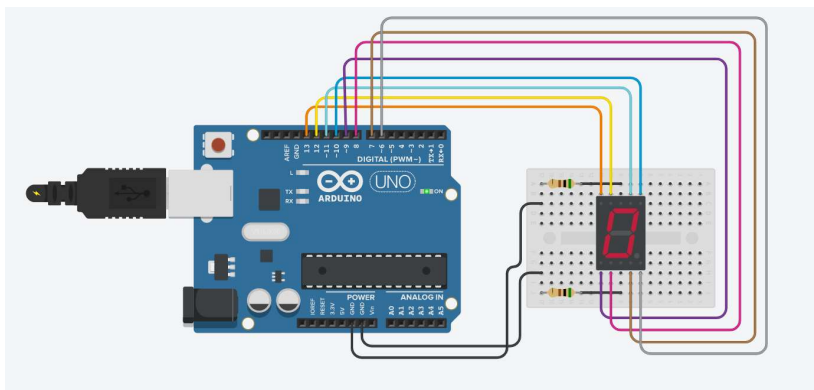
```
void eight(void) {  
    digitalWrite(A, HIGH);  
    digitalWrite(B, HIGH);  
    digitalWrite(C, HIGH);  
    digitalWrite(D, HIGH);  
    digitalWrite(E, HIGH);  
    digitalWrite(F, HIGH);  
    digitalWrite(G, HIGH);  
    digitalWrite(H, LOW);  
}
```

```
void nine(void) {  
    digitalWrite(A, HIGH);  
    digitalWrite(B, HIGH);  
    digitalWrite(C, HIGH);  
    digitalWrite(D, HIGH);  
    digitalWrite(E, LOW);  
    digitalWrite(F, HIGH);  
    digitalWrite(G, HIGH);  
    digitalWrite(H, LOW);  
}
```

```
// Start  
void loop(void)  
{  
    zero();  
    delay(1000);  
  
    one();  
    delay(1000);  
  
    two();  
    delay(1000);  
  
    three();  
    delay(1000);  
  
    four();  
    delay(1000);  
  
    five();  
    delay(1000);  
}
```

```
six();  
delay(1000);  
  
seven();  
delay(1000);  
  
eight();  
delay(1000);  
  
nine();  
delay(1000);  
}
```

Result:- (Images/ Sentence's)



“IIT Vadodara”

“Computer Science”

2022-23

Mini PROJECT REPORT

FOR

B.Tech. 5th SEMESTER

**“Design an ATmega328P based system that monitor
temperature of the boiler.**

**System should fire alarm when boiler temperature crosses
the threshold. System
must have a capability to modify temperature threshold
using serial terminal.”**

A Mini PROJECT REPORT

Submitted By

**“202051043 AYUSH SONI,202051044 AYUSHI SHUKLA ,202051045
BANOTHU GAGAN CHANDRA,202051047 BHAGAT ADITYA
DIPCHAND,202051048 BHARGAVI AKASH KAMBLE”**

**In partial fulfilment for the award of the degree
Of
BACHELOR OF ENGINEERING
In
Department Of Electronics and Communication Engineering**



“IIIT Vadodara”

AIM: “Design an ATmega328P based system that monitor temperature of the boiler.

System should fire alarm when boiler temperature crosses the threshold. System must have a capability to modify temperature threshold using serial terminal.”

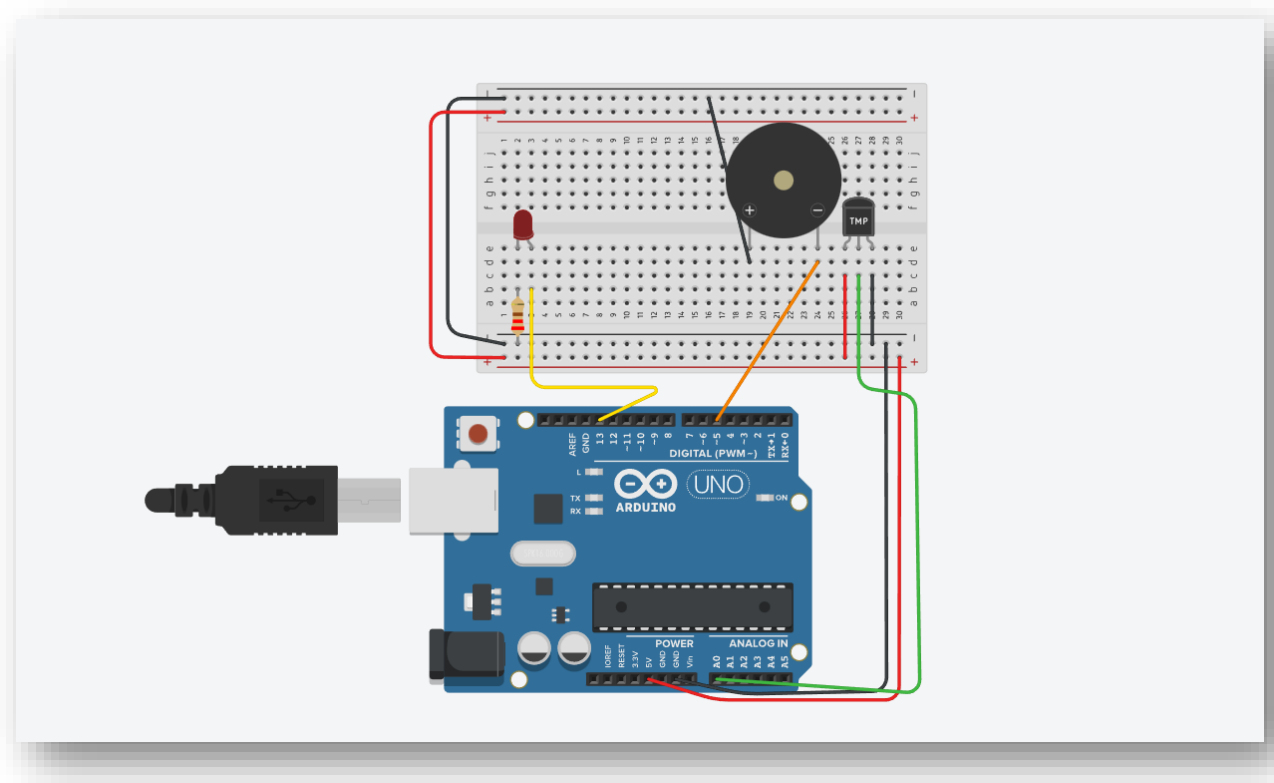
Theory: ”For the given aim we will need an Arduino Uno R3,LED,Piezo, Temperature sensor(TMP36) and a resistor. The basic principle is that temperature sensor will detect the temperature and we will set a threshold value. If the temperature exceeds the threshold value detected by temperature sensor then the alarm will ring and LED will glow, otherwise if the temperature is less than threshold value then the alarm will not ring and LED will not glow.”

Calculation: “voltage = (float (sensor Value) / 1023) * 5

temperature = (voltage - 0.5) * 100

if temperature >= threshold value then the alarm will ring, else the alarm will not ring.”

Circuit Diagram:”



”

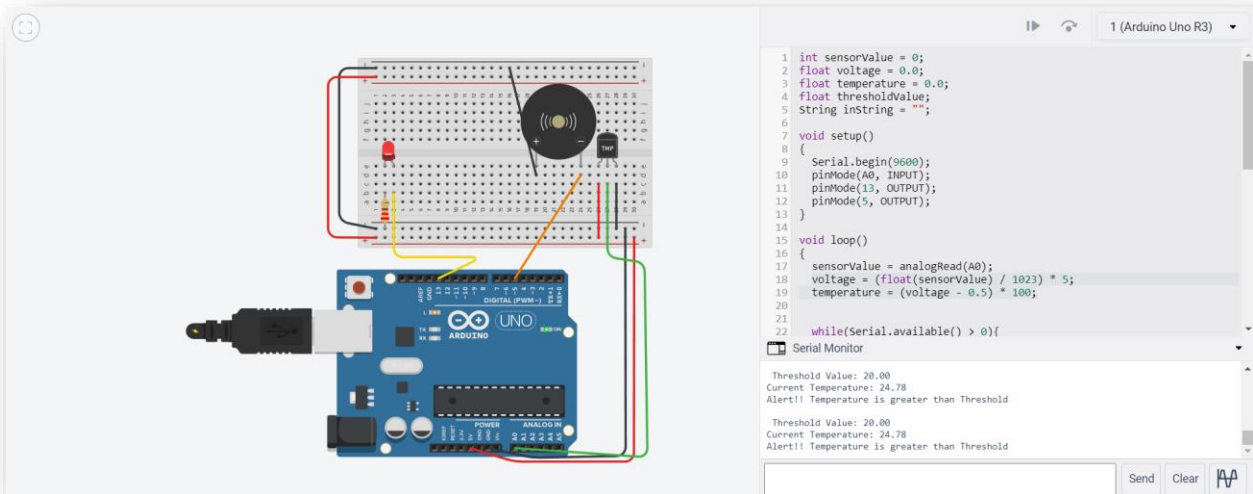
Result:

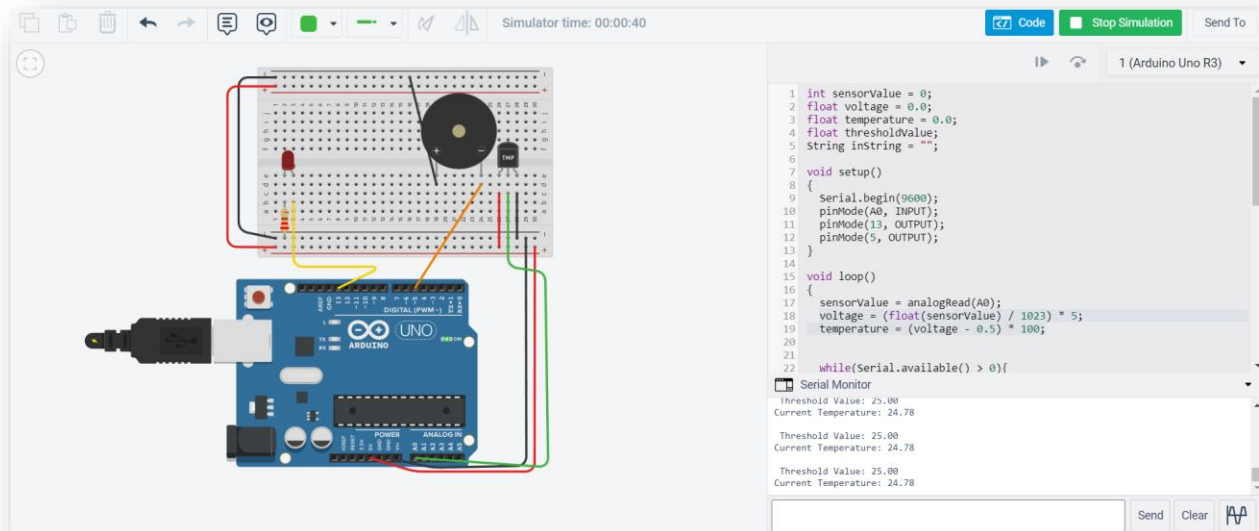
```
1  int sensorValue = 0;
2  float voltage = 0.0;
3  float temperature = 0.0;
4  float thresholdValue;
5  String inString = "";
6
7  void setup()
8  {
9      Serial.begin(9600);
10     pinMode(A0, INPUT);
11     pinMode(13, OUTPUT);
12     pinMode(5, OUTPUT);
13 }
14
15 void loop()
16 {
17     sensorValue = analogRead(A0);
18     voltage = (float(sensorValue) / 1023) * 5;
19     temperature = (voltage - 0.5) * 100;
20
21
22     while(Serial.available() > 0){
23         int inChar = Serial.read();
24         if(isDigit(inChar) || inChar == '.'){
25             inString += (char)inChar;
26         }
27         thresholdValue = inString.toFloat();
28     }
29
30     inString = "";
31     Serial.print("\n Threshold Value: ");
32     Serial.println(thresholdValue);
33 }
```

```

35 //Serial.println(temperature);
36 //Serial.println(sensorValue);
37
38 if(thresholdValue > 0 && temperature >= thresholdValue)
39 {
40     digitalWrite(13, HIGH);
41     digitalWrite(5, HIGH);
42     Serial.print("Current Temperature: ");
43     Serial.println(temperature);
44     Serial.println("Alert!! Temperature is greater than Threshold");
45 }else{
46     digitalWrite(13, LOW);
47     digitalWrite(5, LOW);
48     Serial.print("Current Temperature: ");
49     Serial.println(temperature);
50 }
51
52 delay(2000);
53 }

```





“As we can see above that threshold value is 20 and the current temperature value is 24.78. Hence the temperature is greater than the threshold value, alarm is ringing and LED is glowing and on serial monitor it is showing alert. But in the next output the threshold value is greater than the temperature value, so the alarm will not ring and LED will not glow. Hence the system will not show any alert.”

What you Learn: “We have learnt that the Arduino board makes it easy to interface with the pins on the ATmega328P while adding extra features that don't come with the standalone microcontroller, including a USB serial interface and 16 MHz clock. The tinkercad platform allows us to build circuits effectively and provides assistance to code easily .”

Conclusion: “The system will alarm the user when the temperature exceeds the threshold value. The Arduino board makes it easy to interface with the pins on the ATmega328P. Hence the system is fully functional and is not prone to error.”