

The UNIVERSITY of MINDANAO

College of Engineering Education

Microprocessor Systems

Plate # 2

Temperature Monitoring with Control System

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Date Submitted	MAY 10, 2021		

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Score

Plate No. 2

I. Course Outcome:

Implement microcontroller-based system using different levels of implementation.

II. Objective:

To be able to design and implement a temperature monitoring with control system using microcontroller and the output will be displayed in an LCD.

III. Statement of the Problem:

Temperature is very essential not only for humans but for plants and animals as well, monitoring the temperature will help us understand that it helps a lot for us to be comfortable and make our mood at ease. In this plate you are going to design a system that will monitor the temperature at the same time you are going to control the it by using a fan or a heater, below are the following scenario:

1. NORMAL Temperature – If the temperature is NORMAL, the temperature range is from 20-35 degrees Celsius. In this case a GREEN LED will turn ON indicating that the temperature is in NORMAL range. In the LCD display look at the OUTPUT below.

Temperature Monitoring
Temp. Reading : 28 °C

Green LED : Turn ON, the green LED will only turn OFF if the temperature is HOT or COLD.

2. HOT Temperature – If the Temperature is HOT the temperature is 36 °C above. Then a motor having a fan will turn on to cool down the temperature and a RED LED will turn ON.

Temperature Monitoring
Temp. Reading : 39 °C , The Fan is ON

RED LED is turn ON and the FAN motor is turn ON as well. For the motor you can use dynamo motor and for the temperature to cool down you can attach the LM35 in an ice cube or cool fan. The LED will only turn off if the temp. is Normal or Cold.

3. COLD Temperature – The temperature range is 19 degrees and below and a BLUE LED will turn ON and another motor which is a heater that will turn ON that will control the temperature to go back to Normal.

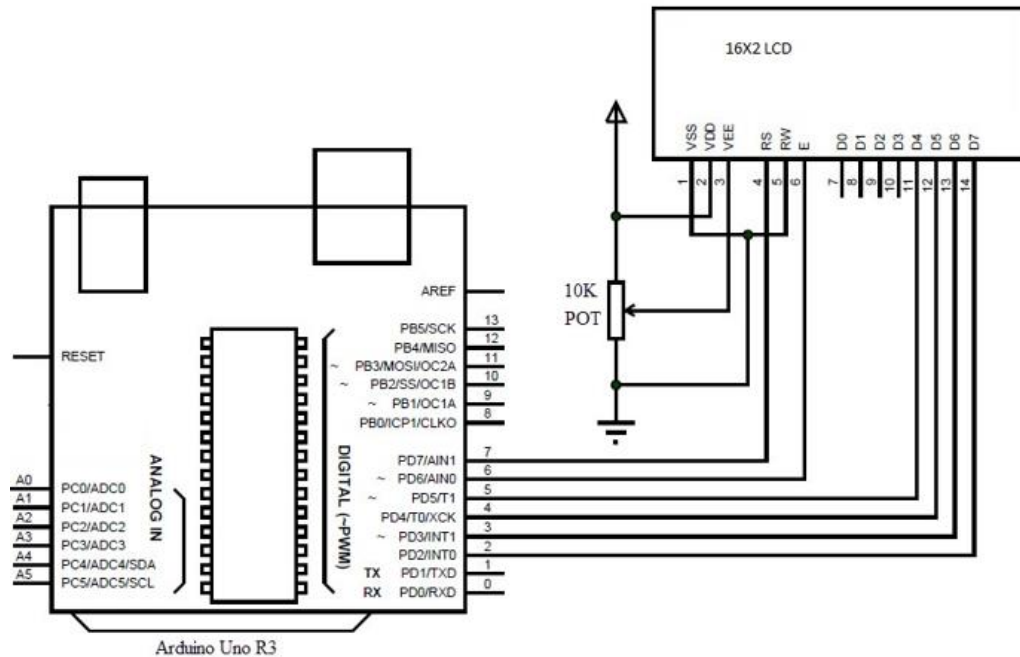
Temperature Monitoring
Temp. Reading : 10 °C , The Heater is ON

Blue Led will turn ON and the heater will turn On (dynamo motor 2). In order to turn the temperature HIGH use a Lighter to heat the temperature sensor.

4. Submit the documentation separate from the video presentation.
5. This word file will be your documentation just follow what you need to fill-in. Convert this word file into PDF file after you finalize the documentation.
6. The video will only be at a maximum time of 10 minutes but not less than 5 minutes. What you are going to video is the Proteus Simulation which includes the Circuit making and the

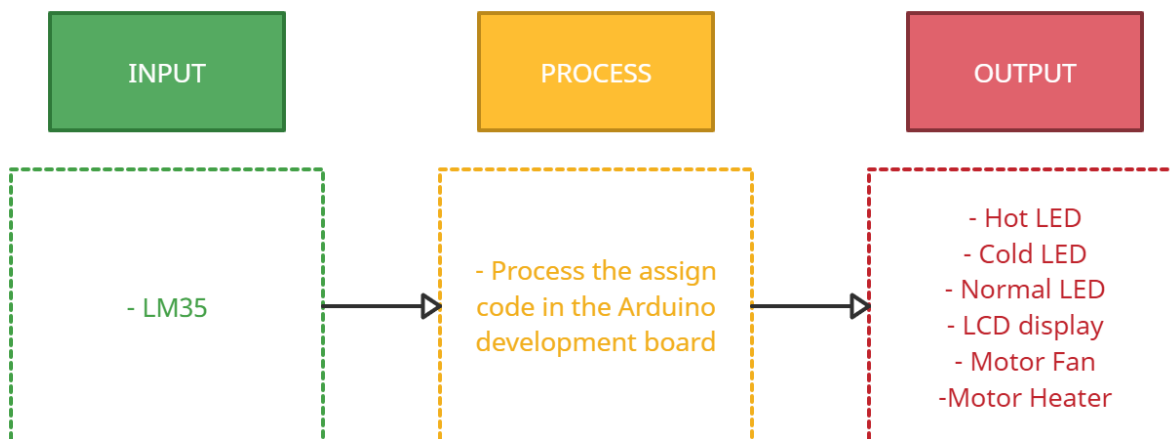
Programming in the Arduino Software. The first part and the last part which is function test SHOULD not be time lapsed. You can time lapsed the middle of the presentation.

7. Below is the Circuit Diagram of Arduino to LCD. The Rest is yours to make.

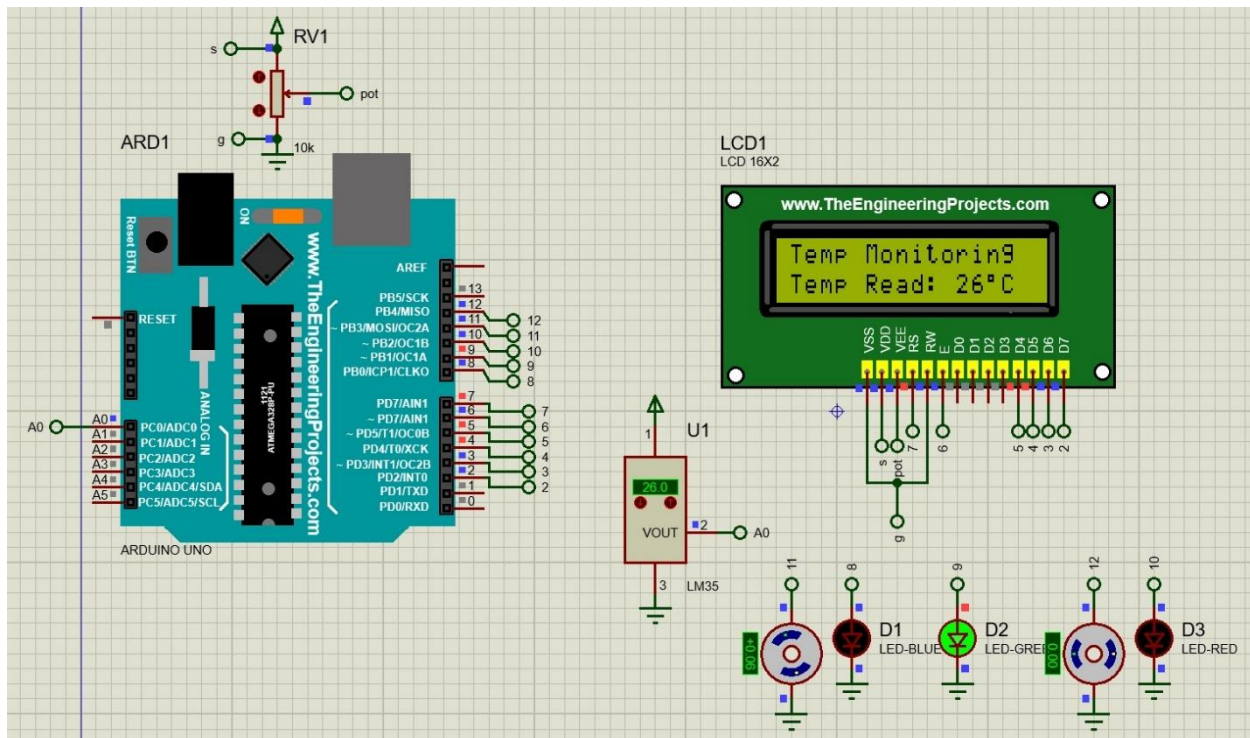


8. You will be graded according to the following criteria.
- Functionality – 50%
 - Programming Skills – 30 %
 - Submitted Complete Documents – 10%
 - Video Presentation – 10%

IV. Conceptual Framework:



V. Circuit Diagram:



VI. Source Code:

/*made by me: I Earl John B. Masaga BSECE student

~Temperature Monitoring with Control System~

LAST MODIFIED: MAY 8, 2021*/

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

```
LiquidCrystal lcd(7,6,5,4,3,2);
```

```
//setting variables for I/O
```

```
const int isSensor = A0;
```

```
const int isLedBlue = 8;
```

```
const int isLedGreen = 9;
```

```
const int isLedRed = 10;
```

```
const int isHeater = 11;
```

```
const int isFan = 12;
```

```
void setup(){
```

```
  lcd.begin(16,2);
```

```
  lcd.clear();
```

```
  pinMode(isSensor,INPUT);
```

```
  pinMode(isLedBlue,OUTPUT);
```

```
  pinMode(isLedGreen,OUTPUT);
```

```
  pinMode(isLedRed,OUTPUT);
```

```
  pinMode(isHeater,OUTPUT);
```

```
  pinMode(isFan,OUTPUT);
```

```
}
```

```

//set function prototype
int isWrite(int b, int g, int r, int h, int f);

void loop(){
  int tempC = (analogRead(isSensor) * 500.0 / 1024.0)+0.5;
  lcd.setCursor(0,0);
  lcd.print("Temp Monitoring");
  lcd.setCursor(0,1);
  if(tempC>=20 && tempC<=35){
    lcd.print(String("Temp Read: ")+String(tempC)+String("\337C"));
    isWrite(0,1,0,0,0);
  }else if(tempC<=19){
    lcd.print(String(tempC)+String("\337C, Heater: ON"));
    isWrite(1,0,0,1,0);
  }else if(tempC>=36){
    lcd.print(String(tempC)+String("\337C, Fan: ON"));
    isWrite(0,0,1,0,1);
  }
  delay(100);
  lcd.clear();
}

//display of outputs
int isWrite(int b, int g, int r, int h, int f){
  digitalWrite(isLedBlue, b);
  digitalWrite(isLedGreen, g);
  digitalWrite(isLedRed, r);
  digitalWrite(isHeater, h);
  digitalWrite(isFan, f);
  return 0;
}

```

VII. Materials and Costs:

Materials		Quantity	Cost
Arduino Uno		1	1147.5 php
LCD 16x2		1	160 php
LED		3	178.2 php
Potentiometer		1	30 php
Motor		2	150 php
LM35		1	79.8 php
			Total Cost
			1745.5 php

➤ In Figure 1, it is shown that the lcd display is at normal temperature reading. Normal temperature reading range is from 20-35 degrees Celsius. You can see that the green led is on, indicating that the temperature is normal and there is no need for a fan or heater.

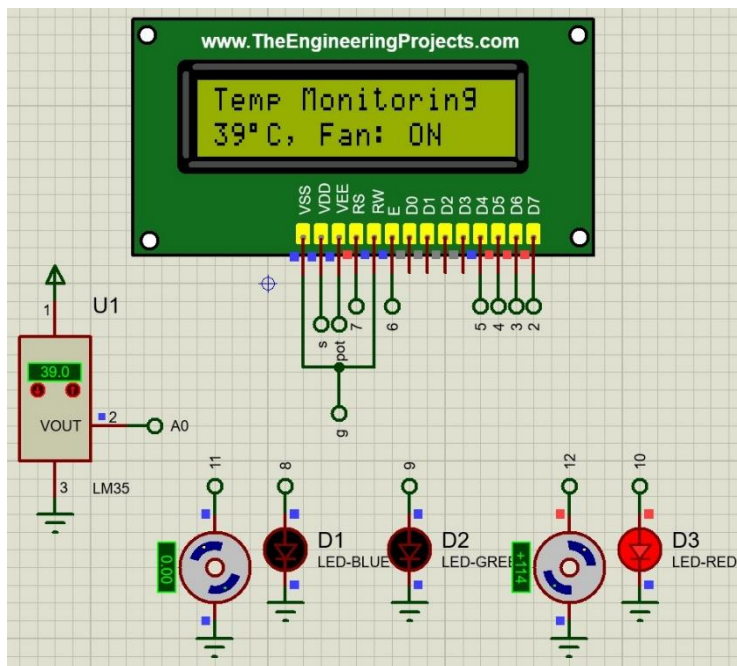


Figure 2 – Hot Temperature

- In Figure 2, it is shown that the lcd display is at hot temperature reading and displays that the fan motor is turned on. Hot temperature reading range is 36 degrees Celsius and above. Also, the red LED is on indicating that the temperature is HOT.

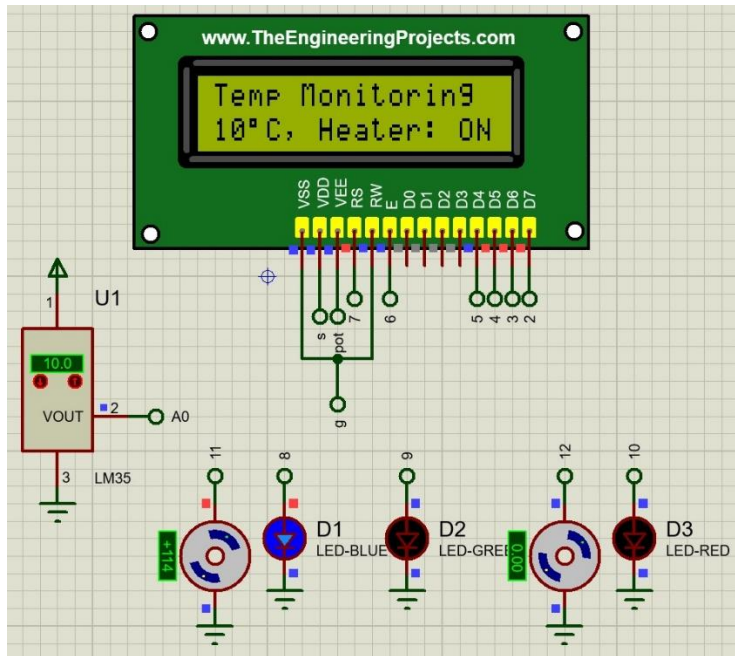


Figure 3 – Cold Temperature

- In Figure 3, it is shown that the lcd display is at cold temperature reading and displays that the heater motor is turned on. Cold temperature reading range is 19 degrees Celsius and below. Also, the blue LED is on indicating that the temperature is COLD.

Conclusions:

In conclusion, manipulating the temperature to cool down after getting hot is fun. I haven't had any problems so far because I seem to be used to programming on Arduino. On such plates, only time is needed because you can't program very quickly because programming is like solving puzzles. About the device it is good at homes and it is more important when summer is especially at noon. It's also really nice to have a device to monitor room temp to prevent heatstroke.