

DIY WITH ARDUINO - EVERY ENGINEER'S FIRST PROJECT

Made By
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[Link to Project is on Last Page](#)

- **Aim and Objective:** The students learn the design process to create Arduino-based applications that perform specific functions with the following objectives,
- Understand the design process of Arduino-based sensors.
 - Apply the TinkerCAD based simulation to real-time implementations.

1. Problem Statement

Control, Automation and better Energy Efficiency of the devices in response to the temperature of surrounding or device in order to increase the ease of people and better safety with precision.

2. Identification of the Need

Sometimes, while performing some experiments in lab or while operating an electronic device, we generally come up with a problem of heating. Moreover, we do not realize the sudden fire, which can be very dangerous. Even daily tasks (which not only kill productivity but lead to energy wastage also), like: turning on A.C., heater, geyser; setting refrigerator temperature, etc. This problem can easily be sorted out with the help of THERMOSTAT.

3. Study of the Pre-Existing Solutions

The existing thermostats are just analog and can give only the Temperature details or at most it gives a small indication, which can't be the solution to our problem.

4. Compare the Need with the Existing Solutions

Our Thermostat made with Arduino can be used to make automated devices like smart home devices, automatic fire alarm, and automation of A.C./Heater turning on/off or setting a specific temperature by doing the needful after getting the information from our Thermostat. Not only this, but in electrical panels or electronic devices, coolant system can be automated to turn off/on, on identifying the need for it by its temperature details.

Experimental Learning Activity (B. Tech. – IInd Semester)

5. Identify the Required Skills and Specifications

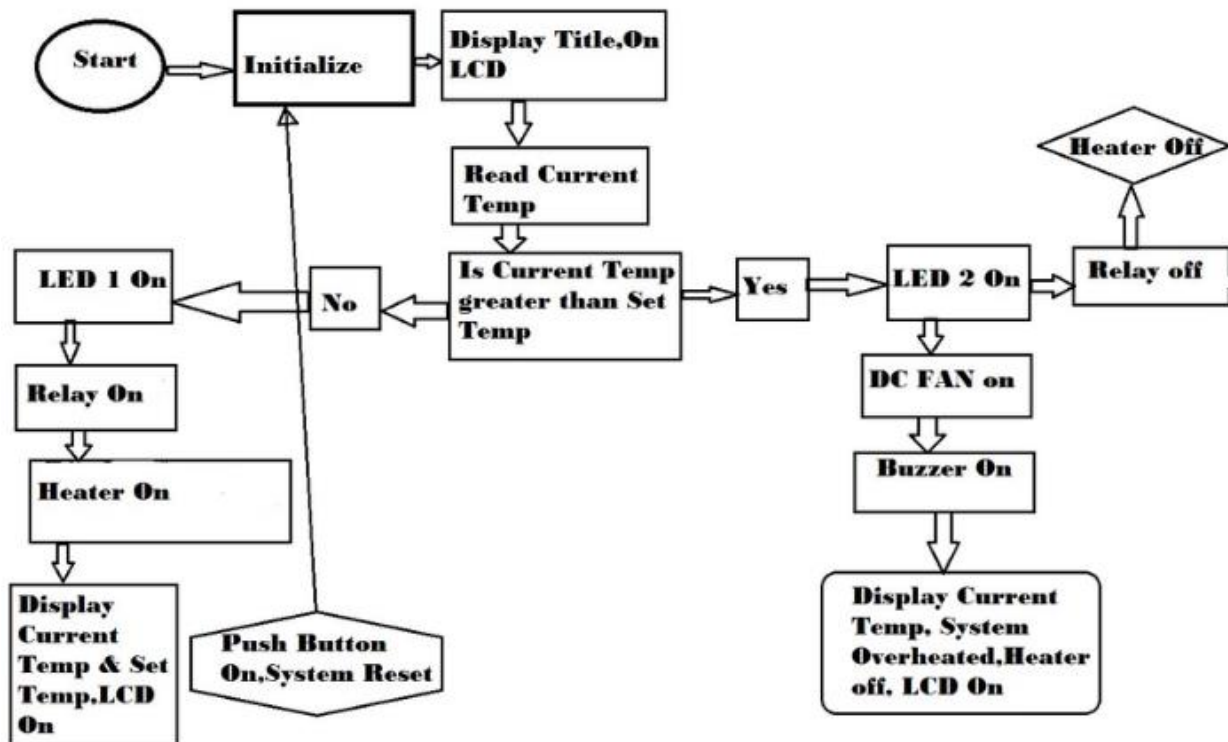
- A Laptop/P.C. for Arduino Programming
- Internet Connection
- TinkerCAD Account
- Moderate Proficiency in Arduino Programming (C or C++ Language)
- Knowledge on how Arduino works

6. Find the related Software/Hardware

- TinkerCAD – Online Version
- Laptop/P.C. (At least 2GB of RAM-A 64-bit processor-Windows 7 or higher, or macOS 10.12 or higher)
- Arduino UNO – R3
- Breadboard
- Connecting Wires
- Temperature Sensor (TMP36)
- Resistor (200 Ohm)
- LED Light (Right)

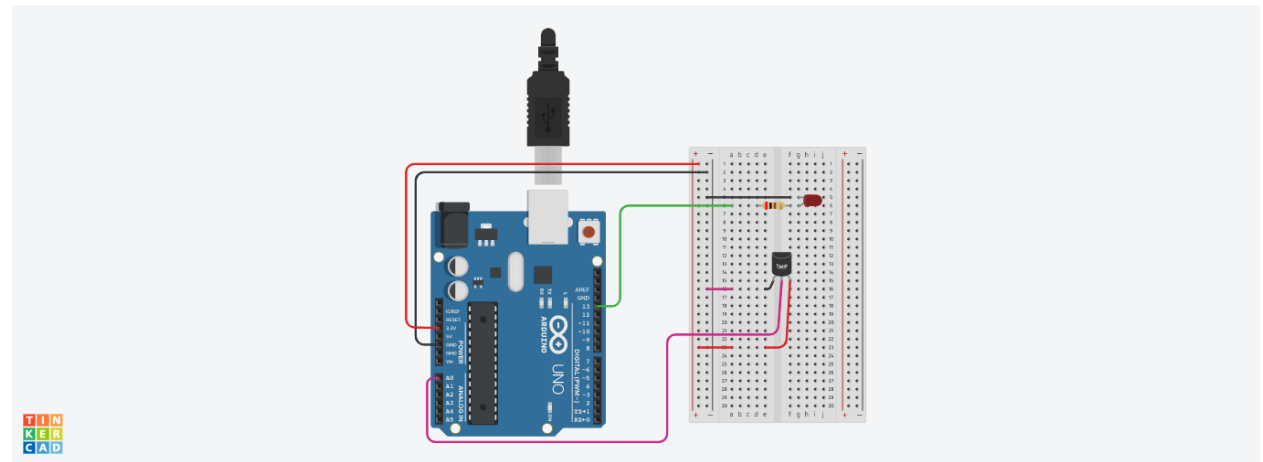
IN CASE OF ACTUAL IMPLEMENTATION

7. Sketch the design process (Flowchart/Process Diagram)

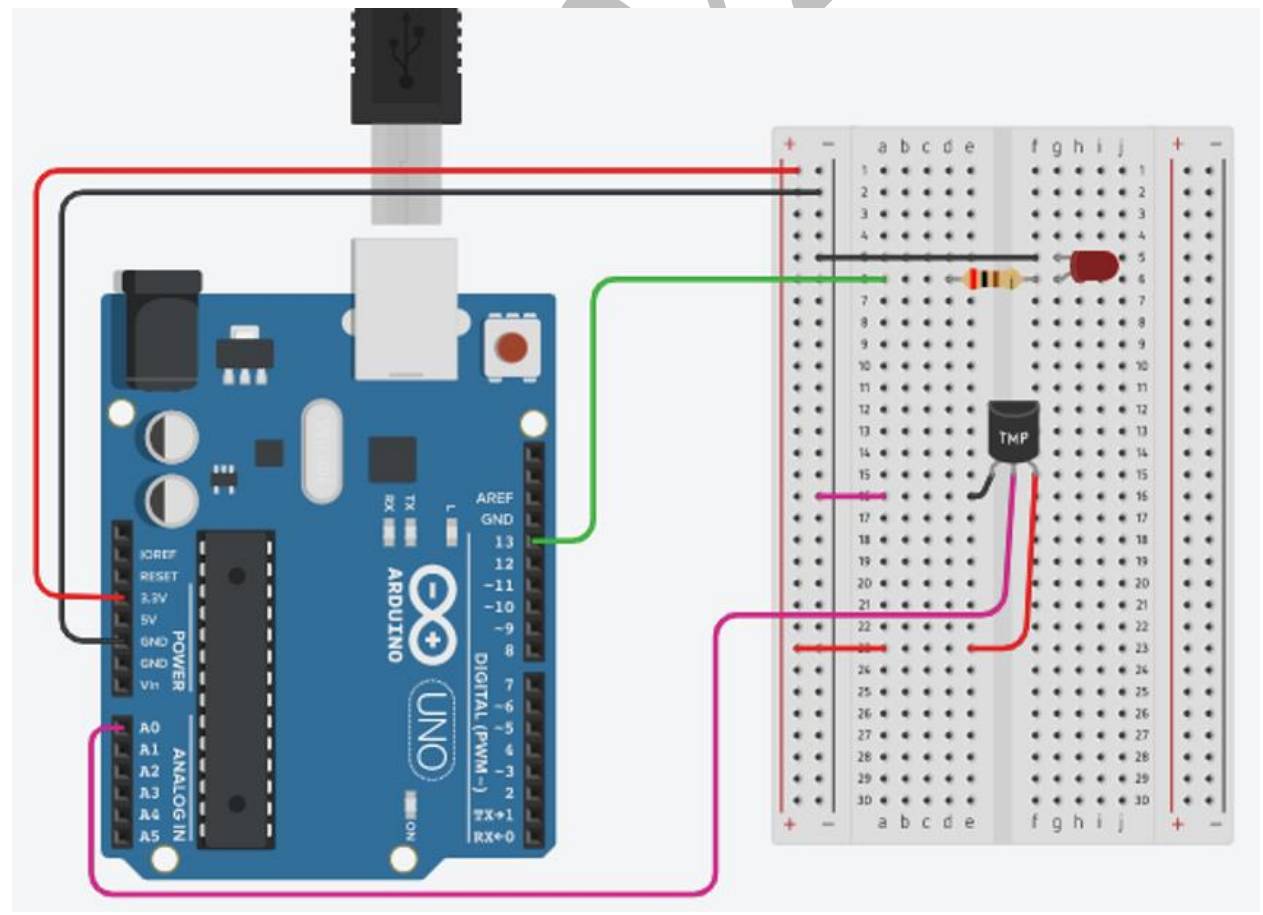


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8. Draw the Interfaces

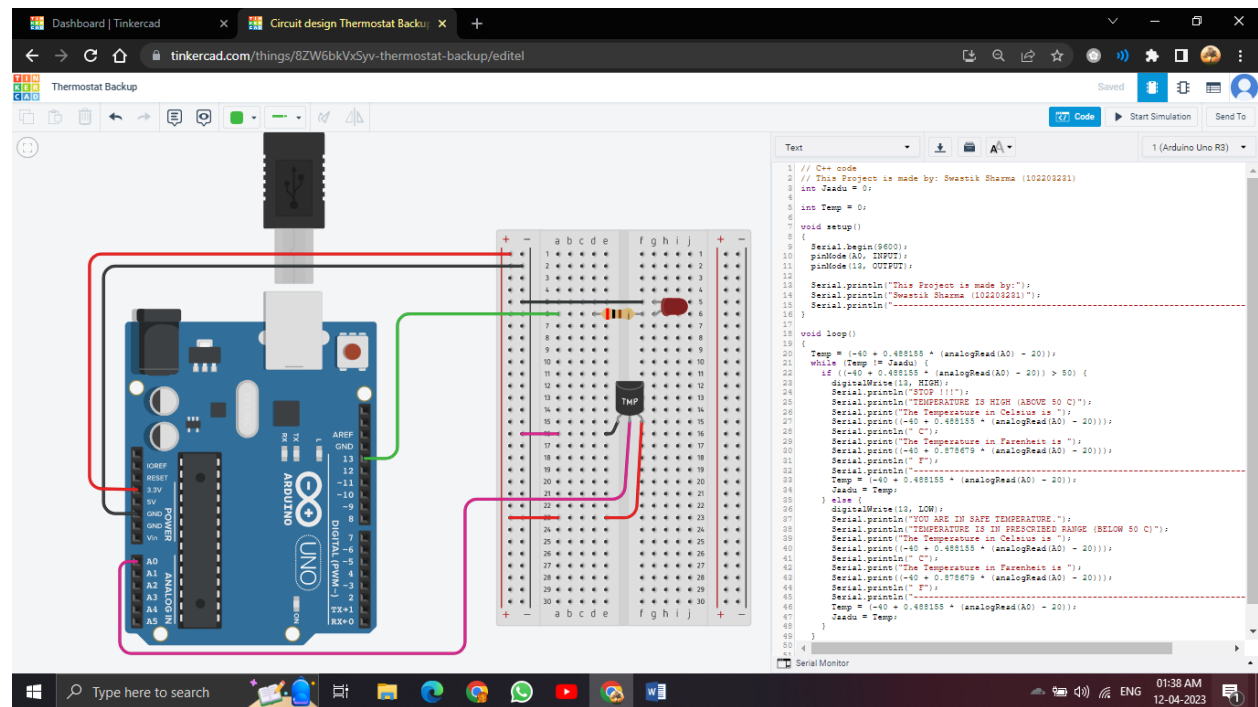


ZOOMED VIEW:



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9. Coding/Implementation



CODE:

```
// C++ code
// This Project is made by: Swastik Sharma (102203231)
int Jaadu = 0;

int Temp = 0;

void setup()
{
  Serial.begin(9600);
  pinMode(A0, INPUT);
  pinMode(13, OUTPUT);

  Serial.println("This Project is made by:");
  Serial.println("Swastik Sharma (102203231)");
  Serial.println("-----");
}
```

// REST IS ON NEXT PAGE

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```
void loop()
{
  Temp = (-40 + 0.488155 * (analogRead(A0) - 20));
  while (Temp != Jaadu) {
    if ((-40 + 0.488155 * (analogRead(A0) - 20)) > 50) {
      digitalWrite(13, HIGH);
      Serial.println("STOP !!!");
      Serial.println("TEMPERATURE IS HIGH (ABOVE 50 C)");
      Serial.print("The Temperature in Celsius is ");
      Serial.print((-40 + 0.488155 * (analogRead(A0) - 20)));
      Serial.println(" C");
      Serial.print("The Temperature in Farenheit is ");
      Serial.print((-40 + 0.878679 * (analogRead(A0) - 20)));
      Serial.println(" F");
      Serial.println("-----");
      Temp = (-40 + 0.488155 * (analogRead(A0) - 20));
      Jaadu = Temp;
    } else {
      digitalWrite(13, LOW);
      Serial.println("YOU ARE IN SAFE TEMPERATURE.");
      Serial.println("TEMPERATURE IS IN PRESCRIBED RANGE {BELOW 50 C}");
      Serial.print("The Temperature in Celsius is ");
      Serial.print((-40 + 0.488155 * (analogRead(A0) - 20)));
      Serial.println(" C");
      Serial.print("The Temperature in Farenheit is ");
      Serial.print((-40 + 0.878679 * (analogRead(A0) - 20)));
      Serial.println(" F");
      Serial.println("-----");
      Temp = (-40 + 0.488155 * (analogRead(A0) - 20));
      Jaadu = Temp;
    }
  }
  delay(10); // Delay a little bit to improve simulation performance
}
```

Experimental Learning Activity

(B. Tech. – IInd Semester)

10. Your Learning

- a. To control a servo using an Arduino.
- b. To control a servo and read its position on the LCD module attached, using an Arduino.
- c. Arduino coding/programming and connections. Understand the programming language that Arduino uses.
- d. Design a project using Arduino. Arduino can be used to create many useful project. It can be one tool for integration of many equipments.
- e. Understand different hardware components that are used in our daily lives.
- f. Make a practical application using the components available on TinkerCAD. TinkerCAD can be used to virtually assemble the components of our project and can take our projects through various checks without the fear of damaging the equipments. It also help us reduce the cost of actual implementation.

Experimental Learning Activity
(B. Tech. – IInd Semester)

LINK TO THE PROJECT MADE BY ME :

[ELC PROJECT LINK - CLICK HERE](#)

Or

https://www.tinkercad.com/things/8ZW6bkVxSyv?sharecode=ZzJdpWgNgG0PEYcJN3_i-b-DOS_gIVlws55uDvCeTe0

Note - The output will be displayed on Serial Monitor under Code Tab during simulation