College of Science and Computer Engineering

Department of Computer Science & Artificial Intelligence

CCAI 321

Advanced Topics in Artificial Intelligence

Lab# 8

Reading a Temperature Sensor

Lab Objectives:
The aim of this LAB experiment is to teach students how to interface a temperature sensor to the Arduino board and display the read temperature on the Arduino environment's built-in serial monitor.

Hardware Required:

1. Arduino Uno Board.
2. Breadboard
3. TMP36 temperature sensor.

Circuit:
The circuit to be implemented in this experiment is a simple interface of the TMP36 Tempe- rature sensor to the Arduino board. The schematic of the circuit is shown in Figure 8.1. The implementation of this interface using Virtual Breadboard software is show in Figure 8.2.

To build this circuit follow the steps discussed in Experiments 1 and 2 to place and connect the following components:

1. Arduino Uno Board.

2. Breadboard

3. TMP36 temperature sensor.

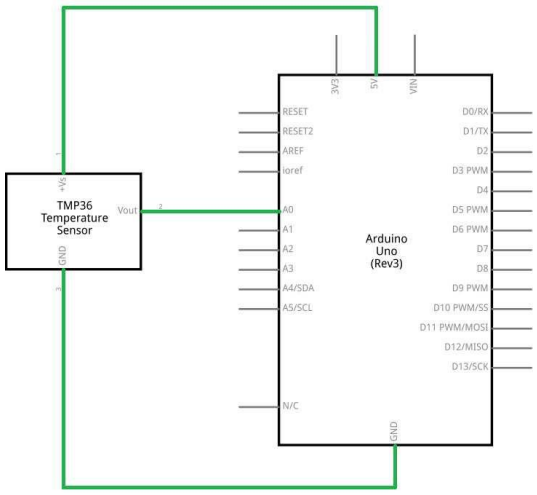

Figure 8.1 – The schematic of the TMP36 temperature sensor circuit

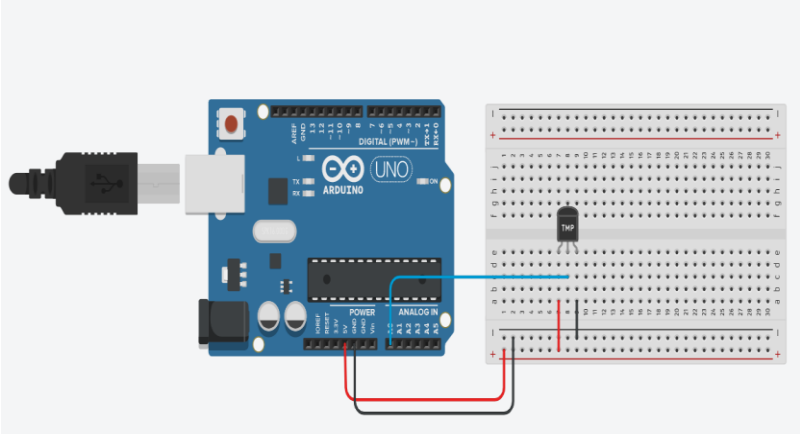

Figure 8.2 – The TMP36 temperature sensor circuit implement

Program:

In this part, you will write a program to reads the output of a temperature sensor, computes the corresponding temperature and displays it on the Arduino environment's built-in serial monitor.

Writing The Code:

```
                float temp;
                int tempPin = 0;
                void setup() {
                  Serial.begin(9600);
                }
                void loop() {
                  temp = analogRead(tempPin);
                  // read analog volt from sensor and save to variable temp
                  temp = temp * 0.48828125;
                  // convert the analog volt to its temperature equivalent
                  Serial.print("TEMPERATURE = ");
                  Serial.print(temp);
                  Serial.print("*C");
                  Serial.println();
                  delay (1000);
}
```

Program 8.1 TMP36 temperature sensor.

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➢ Lab Implementation:

To validate your design, you need first to build the source code and then run the emulator. On the Debug Toolbar, locate and click the Build button to build your code. If there are no errors in the compilation process, emulate your program by clicking the run button located on the Application Toolbar. Observe the displayed temperature value.