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MAIoT Lab Assignment 2

Problem statement: To interface sensors such as temperature or ultrasonic or gas sensors with raspberry pi / beagle bone black board / Tinker CAD Arduino, etc and display readings on console.

Objectives:

Interface LM35 sensor with arduino board

1. To read the temperature
2. To display the temperature in Celsius.

Theory:

1. Write the algorithm in step for temperature sensing.
→
 - 1] Power on the temperature sensor
 - 2] Initialize the sensor and set the measurement range
 - 3] Wait for the sensor to stabilize, typically a few ms.
 - 4] Read the temp. value from sensor.
 - 5] Convert the sensor output to a temperature value using the sensors calibration parameters.
 - 6] Process the temperature value as required (eg. store it in memory or display it.)
 - 7] Repeat steps 3 to 6 as necessary.
 - 8] Power off the sensor when it is no longer needed.

2. Write a code to read the temperature.

```
→ int sensorPin = A0;  
float temperature = 0;
```

```
void setup() {  
    serial.begin(9600);  
}
```

```
void loop() {  
    int sensorValue = analogRead(sensorPin);  
    temperature = (sensorValue * 5.0 / 1023 - 0.5) * 100 ;
```

```
    Serial.print("Temperature");  
    Serial.print("temperature");  
    Serial.print("C");
```

```
    delay(1000);  
}
```

FAQ's.

1) What is the ~~reading~~ working principle of LM35 Temp. Sensor.

Ans. The LM35 temp. sensor works on the principle of voltage output being directly proportional to temp. It has an internal circuit that produces voltage output that is proportional to the temp. in Celsius. This voltage output is linearly proportional to the temp with a sensitivity of 10 mV per degree Celsius.

Thus, by measuring the voltage output from the LM35, we can determine the temp. to which the sensor is exposed. It is a highly accurate and stable temperature sensor, and can be used in a variety of applications.

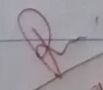
2. How to measure temperature using LM35 sensor?

Ans → To measure temp using LM35 sensor, we will use the code written in theory.

In the code 'sensorPin' is the analog input pin connected to the LM35 sensor, and 'temperature' is the variable to store the temp value. The 'analogRead()' function reads the voltage output from the LM35 and the conversion factor '0.48828125' is used to convert the sensor output to temp. in Celsius. The temp. value is then printed to serial monitor using 'Serial.print()'; finally the 'delay()' function is used to wait for 1 second before taking another reading.

Conclusion:

In this experiment we interfaced sensors such as temp sensor with Tinker CAD, Arduino. We displayed the reading on the console.


29/3/23

MAIoT Assignment 02

```
// C++ code //
void setup() {

  Serial.begin(9600);

  pinMode(A1,INPUT);

  pinMode(6,OUTPUT);

  pinMode(10,OUTPUT);

  pinMode(11,OUTPUT);

  pinMode(13,OUTPUT);

}

void loop() {

  int sensorValue = analogRead(A1);

  Serial.print("Gas sensor reading = ");

  Serial.println(sensorValue);

  if(sensorValue > 800){

    digitalWrite(13,HIGH);

    digitalWrite(11,LOW);

    digitalWrite(10,LOW);

    digitalWrite(6,HIGH);

  } else{

    digitalWrite(13,LOW);

    digitalWrite(11,LOW);

    digitalWrite(10,HIGH);
```

```
digitalWrite(6,LOW);
```

```
} }
```

Snapshot of Implementation:

