| **Course Name:** | **Sensors in Augmented and Virtual Reality** | **Semester:** | **IV** |
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| **Date of Performance:** | **10 Feb 23** | **Batch No:** |  |
| **Faculty Name:** | **Megha Sharma** | **Roll No:** | **16010121110** |
| **Faculty Sign & Date:** |  | **Grade/Marks:** |  |

**Experiment No: 6**

**Title: Interfacing of Temperature sensor LM35 module with Arduino**

| **Aim and Objective of the Experiment:** |
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| **To learn how to interface Temperature sensor with Arduino** |

| **COs to be achieved:** |
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| **CO1: Study basic sensors used in Augmented reality systems**  **CO2: Gain basic knowledge sensors in Virtual reality headsets**  **CO3: Understand advanced sensors and actuators used in Virtual reality hardware**  **CO5: Interface sensors and actuators to AR and VR systems** |

| **Theory:**   * The LM35 is an inexpensive, precision Centigrade temperature sensor made by Texas Instruments. It provides an output voltage that is linearly proportional to the Centigrade temperature and is, therefore, very easy to use with the Arduino. * The sensor does not require any external calibration or trimming to provide accuracies of ±0.5°C at room temperature and ±1°C over the −50°C to +155°C temperature range.     **LM35 pinout**  The LM35 comes in 4 different packages, but the most common type is the 3-pin TO-92 transistor package.  TO-92 package  The pinout of the sensor is as follows:  LM35 analog temperature sensor pinout  Note that pin 1 (+VS) is the leftmost pin when the flat side of the sensor (with the text printed on it) is facing towards you. |
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| **Stepwise-Procedure:** |
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| Connect Circuit diagram  Type code in Arduino and run  // the setup routine runs once when you press reset:  void setup() {  // initialize serial communication at 9600 bits per second:  Serial.begin(9600);  }  // the loop routine runs over and over again forever:  void loop() {  // read the input on analog pin 0:  int sensorValue = analogRead(A0);  // print out the value you read:  Serial.println(sensorValue);  delay(1); // delay in between reads for stability  }  const int lm35\_pin = A1; /\* LM35 O/P pin \*/  void setup() {  Serial.begin(9600);  }  void loop() {  int temp\_adc\_val;  float temp\_val;  temp\_adc\_val = analogRead(lm35\_pin); /\* Read Temperature \*/  temp\_val = (temp\_adc\_val \* 4.88); /\* Convert adc value to equivalent voltage \*/  temp\_val = (temp\_val/10); /\* LM35 gives output of 10mv/°C \*/  Serial.print("Temperature = ");  Serial.print(temp\_val);  Serial.print(" Degree Celsius\n");  delay(1000);  } |

| **Output:** |
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| **Results:** |
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| Temperature is in range 26-30 degrees |

| **Post Lab Subjective/Objective type Questions:** |
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| 1. Explain how temperature sensor can be used in ARVR   An augmented reality (AR) device comprises a transparent display, a thermal sensor, a depth sensor, and a processor. The thermal sensor generates thermal data related to physical objects detected by the AR device. A thermal baseline identification engine forms a thermal baseline using data from infrared imaging and depth profiling sensors, thermal data of the physical objects in a mapped 3D space, thermal context of the objects both spatially and based on their operating status, and their thermal parameters. A thermal anomaly identification engine identifies a thermal anomaly based on the established thermal baseline and the real time measurements, and generates a warning notification in response to the identified thermal anomaly. |

| **Conclusion:** |
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| Thus we have understood how to interface temperature sensor LM35 with arduino uno board. We also understood its application in AR VR. |

| **Signature of faculty in-charge with Date:** |
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