**Temperature Sensor**

A mini-project report submitted for

**Internet of Things (Semester V)**

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As the partial fulfillment of the requirement for the degree of Bachelor in Information Technology

Guided by

Prof. Mitchell D’Silva



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Mumbai – 400 056

2018 - 2019



CERTIFICATE

This is to certify that the following students have submitted the report for the project titled

**Temperature Sensor**

At D. J. Sanghvi College of Engineering, Mumbai as a partial fulfillment of the requirement for the degree of Information Technology (Semester V) of University of Mumbai in the year 2018 – 2019.

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**Declaration**

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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 (Name of student and SAP ID)                                                 (Signature)

Date:

**Acknowledgement**

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We express our sincere heartfelt gratitude to each of the individuals who helped us in successfully developing our project within the prescribed time.

**Abstract**

Air consists of gas molecules, which are combinations of two or more atoms. Although you cannot see them with your eyes, the molecules are constantly moving this way and that at very high speeds. As they move, they collide with one another and with solid surfaces. The temperature of the air is a measure of how quickly the molecules are moving. The more energy of motion the molecules have, the higher the temperature you feel in the air. Air temperature is generally measured using thermometers, usually in degrees Fahrenheit or in degrees Celsius. Temperature is one of the most important measurement parameters that is used for monitoring and control in various industries. It can be measured with the help of a diverse temperature measurement devices. This system is an easy to make, portable IOT project that can measure temperature, and chart it on a graph.

**List of Figures**

|  |  |  |
| --- | --- | --- |
| **Serial No.** | **Figure Name** | **Page Number** |
| **1** | **System Architecture** | **8** |
| **2** | **Circuit Diagram(Overview)** | **9** |
| **3** | **Implementation Code** | **9** |
| **3** | **Screenshots** | **10** |

**List of Tables**

|  |  |  |
| --- | --- | --- |
| **Serial No.** | **Table Name** | **Page Number** |
| **1** | **Implementation Schedule** | **7** |
| **2** | **Testing** | **13** |

**Table of Contents**

**1.      Analysis**

1.1.   Motivation

1.2.   Problem Definition

1.3.   Scope

**2.      Planning**

2.1.   Computing environment

2.2.   Project implementation schedule

**3.      Design**

3.1.   Construction and Design

3.1.1.      System Architecture

3.1.2.      Database Design

3.1.3.    Circuit Diagram

**4.      Implementation**

4.1. Implementation Code

4.2. Screenshots

**5.      Testing and Deployment**

**6.      Maintenance**

**7.      References**

1. **Analysis**
   1. **Motivation**

This post will discuss how temperature measurement is important in different industries. Temperature measurement, also known as thermometry, describes the process of measuring a current local temperature for immediate or later evaluation. Datasets consisting of repeated standardized measurements can be used to assess temperature trends.

* 1. **Problem Definition**

Measuring temperature can help predict the weather and can be a vital feature in weather systems. With this system we aim to create an easy IoT based system for monitoring the temperature and predicting the weather. This system makes use of a LM35 sensor, Arduino Uno board and Arduino Integrated Development Environment to monitor the surrounding temperature. It predicts the weather after monitoring the temperature.

* 1. **Scope**

This system can be further used in a weather station to predict the weather. Measuring temperature is very important in medicine. A number of diseases are characterised by a change in body temperature. With other illnesses, the course of the disease can be followed by measuring body temperature. This allows the doctor to analyse the effectiveness of treatments based on body temperatures.

**Features of System:**

***General***

* Monitoring the Temperature using LM35 Sensor, Arduino Uno & Arduino IDE.

***Analytics***

* Predicting the weather by monitoring the temperature.
* Displaying temperature using Serial Monitor on Arduino IDE.
* Plotting the average temperature graph using Serial Plotter on Arduino IDE.

2. **Planning**

The following section discusses the computing environment and the project implementation schedule.

**2.1 Computing Environment**

**Software Requirements:**

1. Arduino Integrated Development Environment (IDE)

**Hardware Requirements:**

1. Arduino Uno Board

1. Arduino Uno Cable
2. Breadboard
3. Temperature Sensor - LM35
4. Wi-Fi Module
5. Jumper Cables

***2.2 Project Implementation Schedule***

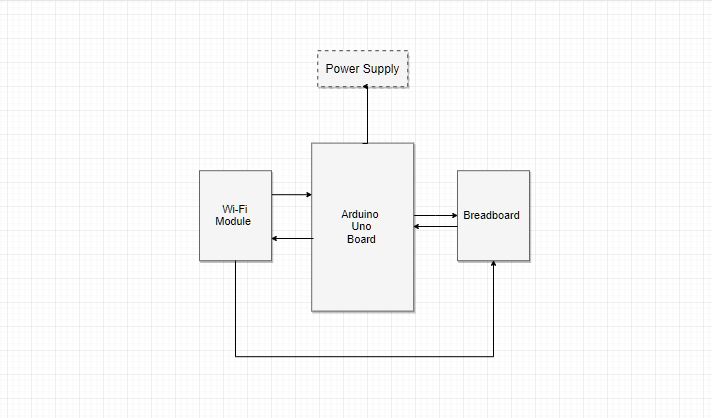
|  |  |  |
| --- | --- | --- |
| ***Task*** | ***Start*** | ***Finish*** |
| ***1)Project Idea*** | ***22/08/18*** | ***25/08/18*** |
| ***2)Implementation planning*** | ***28/08/18*** | ***1/09/18*** |
| ***3)Identifying requirements*** | ***3/09/18*** | ***6/09/18*** |
| ***4)Components Quotation and Budget*** | ***8/09/18*** | ***28/09/18*** |
| ***5) Begin Implementation*** | ***18/10/18*** | ***10/10/18*** |
| ***6) Use Of Temperature***  ***Sensor*** | ***20/10/18*** | ***21/10/18*** |
| ***7)Final Implementation*** | ***22/10/18*** | ***23/10/18*** |
| ***8)Testing*** | ***24/10/18*** | ***25/10/18*** |

**3. Design:**

The architectural design is shown in this section.

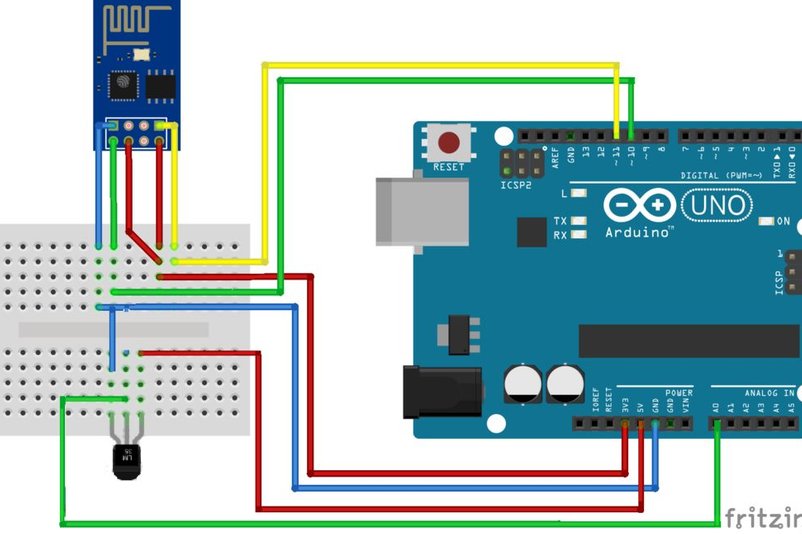
**3.1 Construction and Design**

**3.11 *System Architecture***



***Figure 1***

***3.12 Circuit Diagram***



***Figure 2***

**4. Implementation**

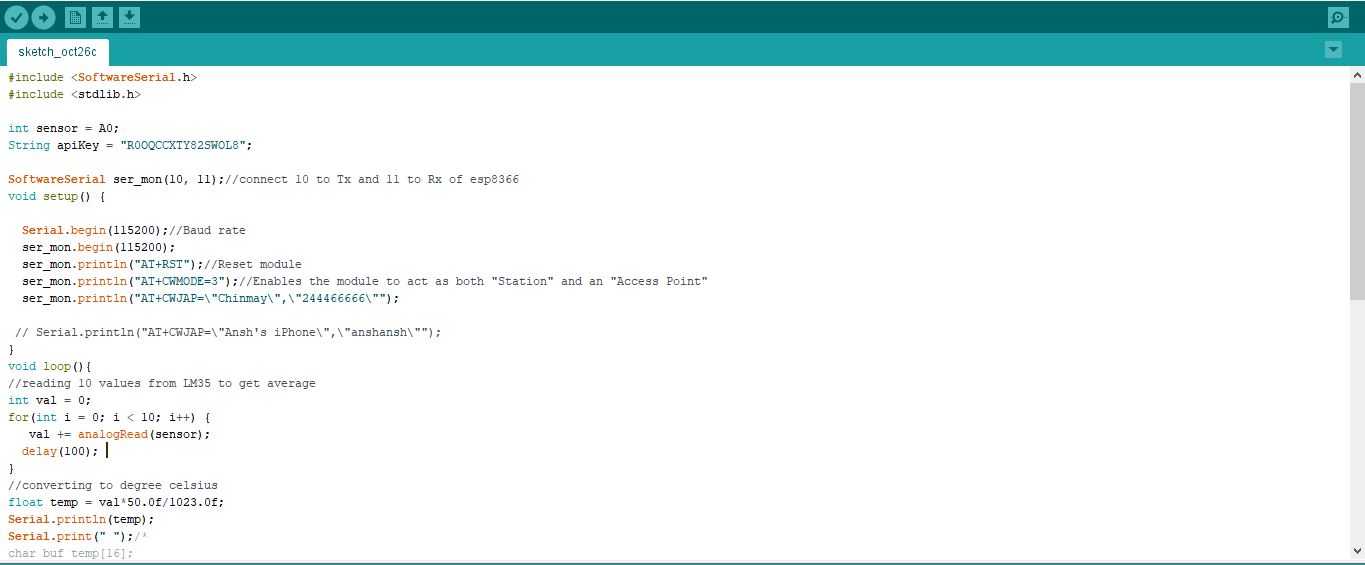
**4.1. Implementation Code**

**Implementing the code to sense the temperature using the Arduino Integrated Development Environment (IDE)**

|  |
| --- |
| #include <SoftwareSerial.h>  #include <stdlib.h>    int sensor = A0;  String apiKey = "R0OQCCXTY82SWOL8";  SoftwareSerial ser\_mon(10, 11);//connect 10 to Tx and 11 to Rx of esp8366  void setup() {    Serial.begin(115200);//Baud rate  ser\_mon.begin(115200);  ser\_mon.println("AT+RST");//Reset module  ser\_mon.println("AT+CWMODE=3");//Enables the module to act as both "Station" and an "Access Point"  ser\_mon.println("AT+CWJAP=\"Chinmay\",\"244466666\"");    // Serial.println("AT+CWJAP=\"Ansh's iPhone\",\"anshansh\"");  }  void loop(){  //reading 10 values from LM35 to get average  int val = 0;  for(int i = 0; i < 10; i++) {  val += analogRead(sensor);  delay(100);  }  //converting to degree celsius  float temp = val\*50.0f/1023.0f;  Serial.println(temp);  Serial.print(" ");  Serial.print(" ");  if ( temp >34)  {  Serial.print("Weather Prediction : It's a very hot day!");  }  if ( temp <= 34 && temp >= 27)  {  Serial.print("Weather Prediction : It's a hot day!");  }  if ( temp < 27 && temp >=20 )  {  Serial.print("Weather Prediction : It's a warm day!");  }  if ( temp <20 )  {  Serial.print("Weather Prediction : It's a cold day!");  }  delay(10);  } |

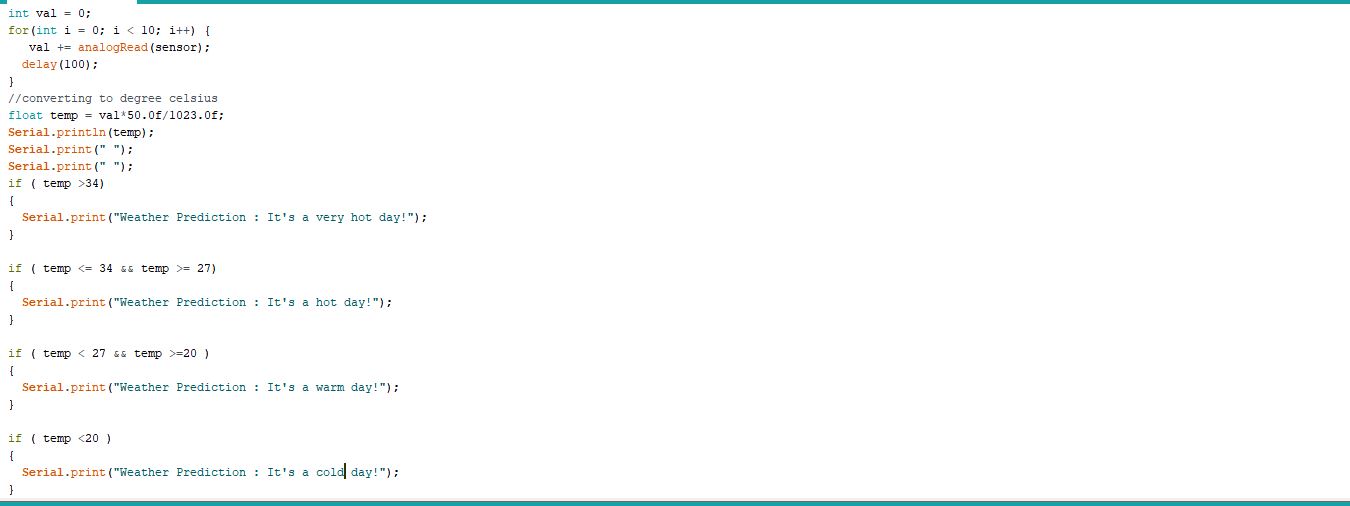
**4.2. Screenshots**

**Arduino IDE Code:**

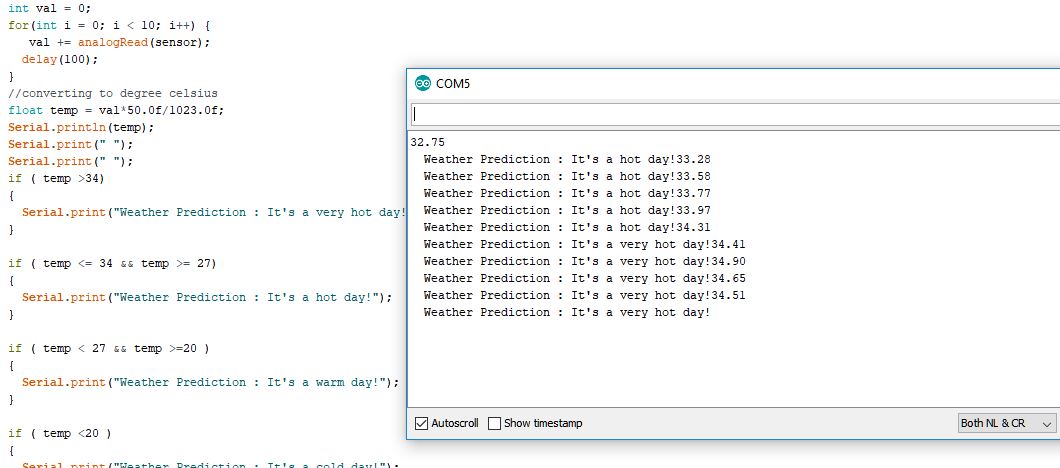




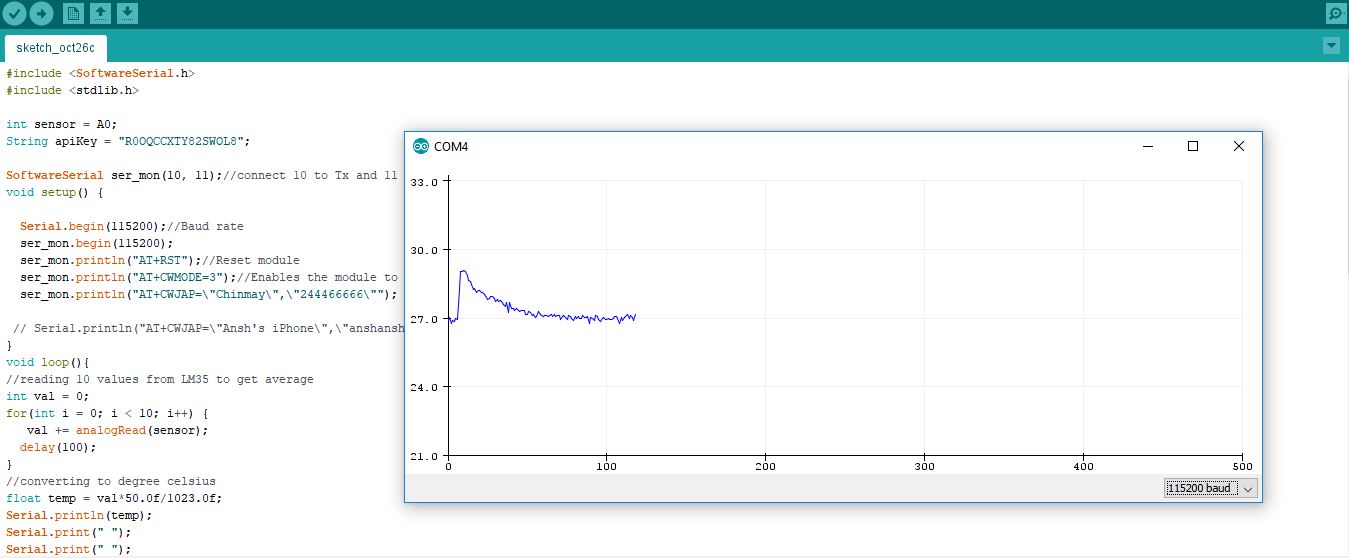
**Predicting the weather:**



**Monitoring the temperature:**



**Plotting the temperature graph:**

****

**5. Testing and Deployment**

|  |  |  |
| --- | --- | --- |
| **Serial No** | **Component Tested** | **Result** |
| 1 | LM35 Temperature  Sensor | PASS |
| 2 | Entire Implementation | PASS |

**6. Maintenance**

* **User Manual Maintenance**

1. Make sure all the wires are connected properly.
2. The Arduino USB cable must be connected to AC Power Supply
3. Handle the delicate components with care.
4. Make sure that the sensor is connected properly.

**7. References**

<https://www.instructables.com/id/IoT-Based-Temperature-Monitoring-System/>