# AUTOMATIC
# ROOM TEMPERATURE CONTROLLER USING ARDUINO

by

RAJAN SINGH – 20BCE1780
DEVARINTI DHAPATLA PUNEETH REDDY – 20BCE1852
SANJIL K C – 20BCE1855

A project report submitted to

**RALPH THANGARAJ**

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**CSE2006 - MICROPROCESSOR AND INTERFACING**

in

**B. Tech. COMPUTER SCIENCE AND ENGINEERING**


VIT®
Vellore Institute of Technology
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**Vandalur – Kelambakkam Road**

**Chennai – 600127**

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## BONAFIDE CERTIFICATE

Certified that this project report entitled "**AUTOMATIC ROOM TEMPERATURE CONTROLLER USING ARDUINO"** is a bonafide work of **RAJAN SINGH-20BCE1780, DEVARINTI DHAPATLA PUNEETH REDDY-20BCE1852 and SANJIL K C -20BCE1855 who** carried out the Project work under my supervision and guidance for **CSE2006 - MICROPROCESSOR AND INTERFACING**

**RALPH THANGARAJ**

Associate Professor

School of Computer Science and Engineering (SCOPE),

VIT University, Chennai

Chennai – 600 127.

# ABSTRACT

The “Automatic room temperature control and monitoring system using Arduino”.

In this process the room temperature is maintained constantly. In which the value is set by the user the heater and Ac turned on or off. The system will always get the temperature from the DHT11 temperature sensor. The DHT11 temperature sensor measures both the temperature and humidity of the room. The value of temperature and humidity is displayed in Liquid Crystal Display (LCD). The entire system was controlled by the Arduino Microcontroller. The Microcontroller senses the temperature and it compares the data value set by the user. The controller turns on the AC when the current temperature is higher than the required data temperature and the controller turns on the heater when the current temperature is lower than the required temperature.

# ACKNOWLEDGEMENT

We wish to express our sincere thanks and deep sense of gratitude to our project guide, **RALPH THANGARAJ,** Associate Professor, School of Computer Science and Engineering (SCOPE),for her consistent encouragement and valuable guidance offered to us in a pleasant manner throughout the course of the project work.

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We thank our parents, family, and friends for bearing with us throughout the course of our project and for the opportunity they provided us in undergoing this course in such a prestigious institution.

**NAME WITH SIGNATURE**

RAJAN SING

DEVARINTI DHAPATLA PUNEETH REDDY

SANJIL K C

# TABLE OF CONTENTS

# 1. INTRODUCTION

## 1.1 OBJECTIVES AND GOALS :-

- The main objective of this project is to display the temperature and when it goes beyond certain limit then control it to bring it back into desired level and reduce waste of energy. And also, to assist people who are disabled and are unable to control the speed of fan. It may also be used for monitoring changes in environment. In near future, it can also be used in different industries and electronic devices. Another objective is to study and build an automatic system using microcontroller and its interfacing with other device.
- Nowadays Arduino becomes more popular because of its many advantages like simple programming and compact in size. It supports many device, so that our goal is to achieve ability to do programming and get idea about the Arduino system

## 1.2 APPLICATIONS: -

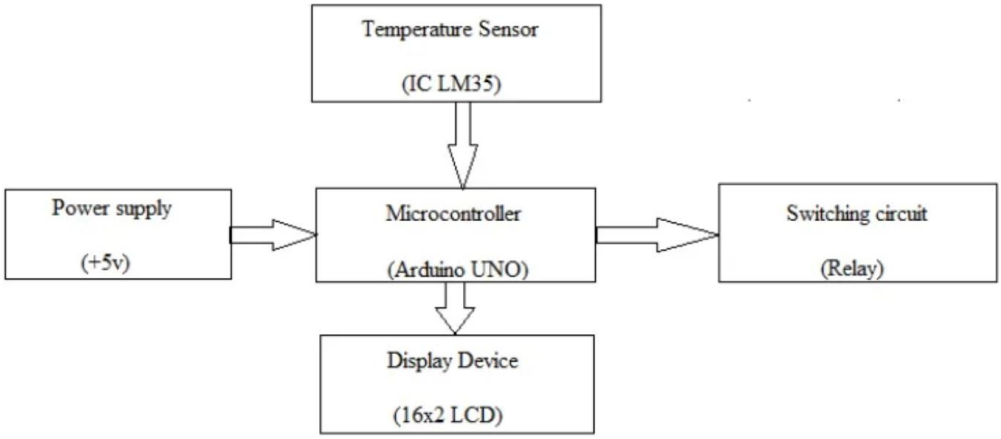
Automatic temperature control system is an important application used in almost all modern gadgets and smart homes. The system for controlling temperature automatically is achieved by using Arduino Uno-based microcontroller system. Arduino Uno due to its increased popularity finds its varied range of applications. Temperature sensor LM35 and Arduino Uno are the hardware used interfaced with computer, and the temperature is controlled in the room.

## 1.2 APPLICATIONS: -

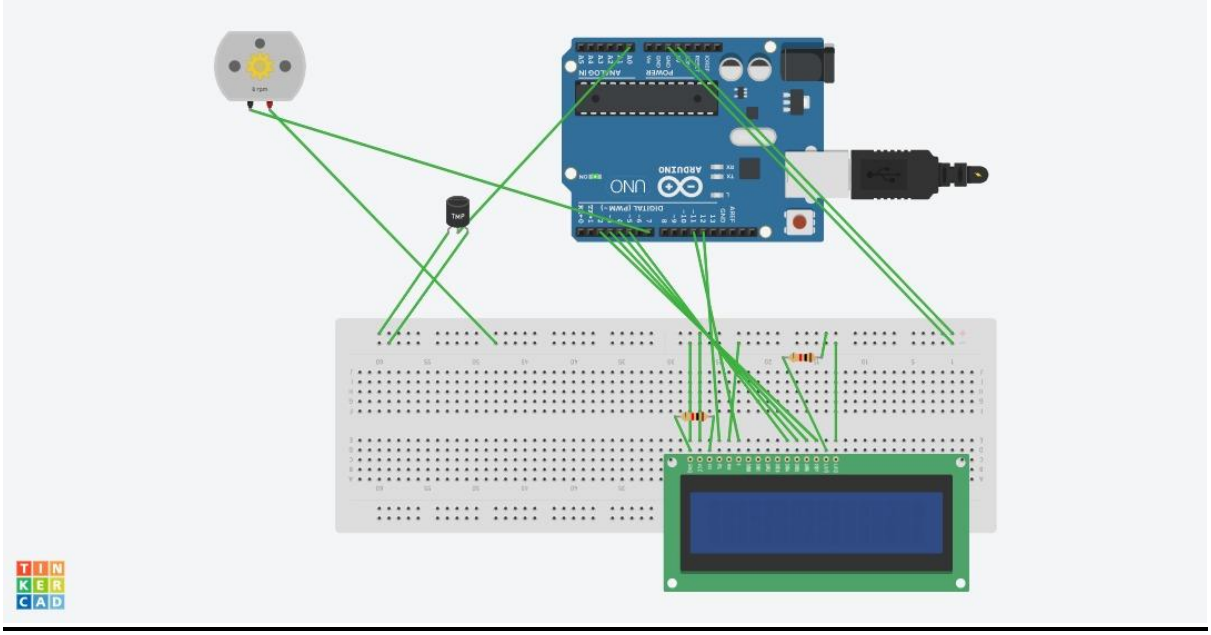
The program is written in Arduino IDE and facilitates the display of temperature in degree centigrade. The Arduino Uno board facilitates the temperature measurements input to the fan and cooling system ON/OFF that is automatically done based on varied values of temperature.

# 2.DESIGN

## 2.1 BLOCK DIAGRAM: -




## CIRCUIT DIAGRAM: -



## 2.2 HARDWARE ANALYSIS :-

Hardware implementation was obtained on Arduino IDE interfaced with P-IV computer. Data flow of the hardware implementation are shown in Figs. 1 respectively. Figures 1 are simple and self-explanatory where temperature sensors are connected with the help of Arduino and LCD display of 16 2 matrix. The fan was additionally connected for cooling mechanism so that automatic control could be achieved which is main objective of the proposed work. The hardware design is very simple without any circuit complexity (Fig 2). We used temperature sensor IC LM35 that helps in generating a small voltage for detecting the change in temperature across the temperature sensor.

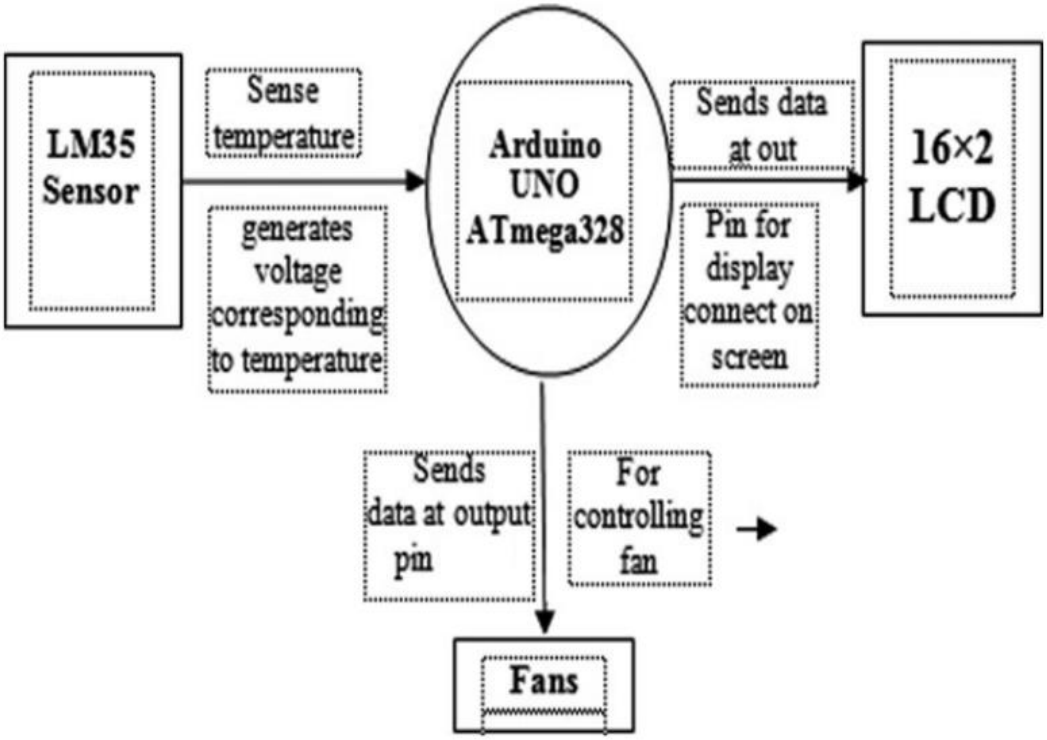



**Fig. 1** Data flow in hardware implementation

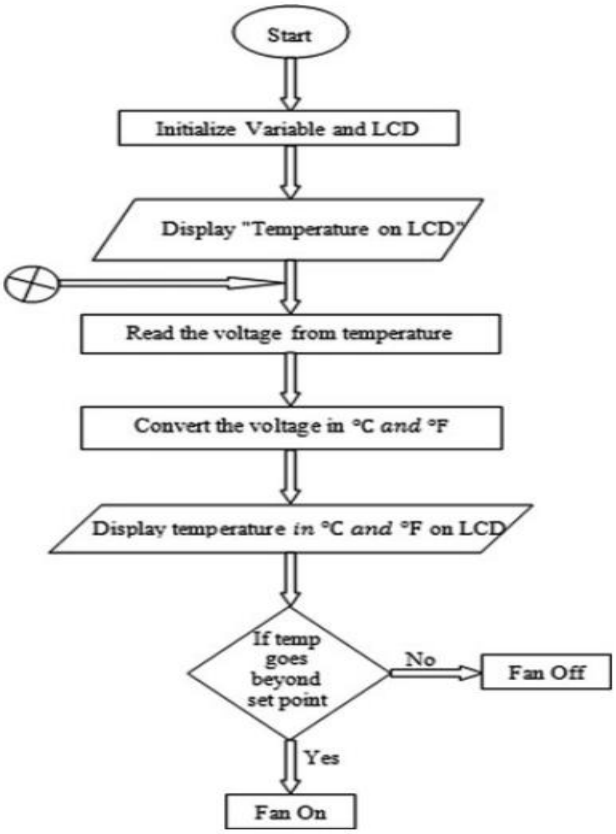
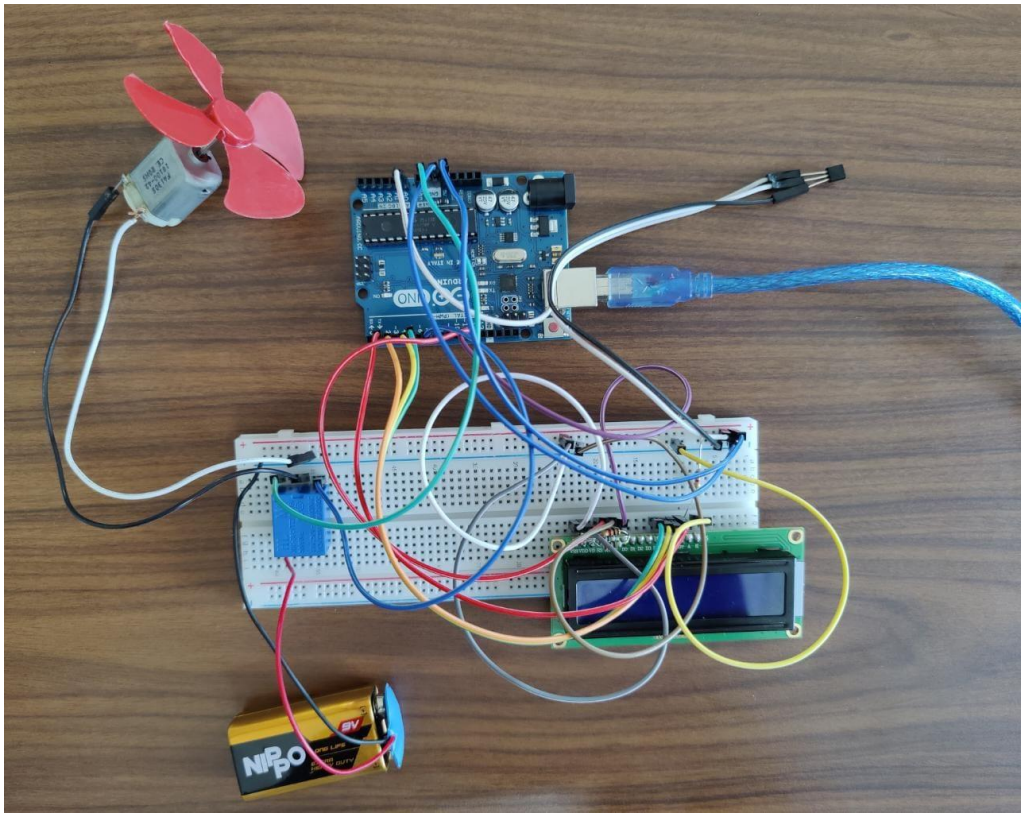
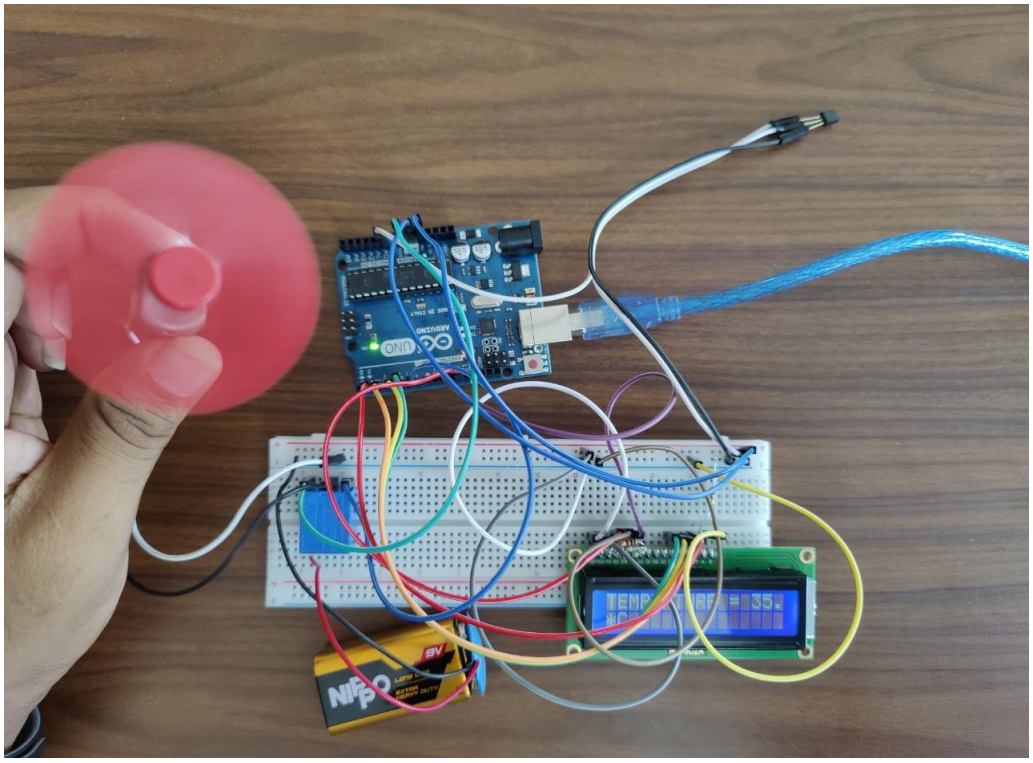

Start
Initialize Variable and LCD
Display "Temperature on LCD"
Read the voltage from temperature
Convert the voltage in °C and °F
Display temperature in °C and °F on LCD
If temp goes beyond set point
No
Fan Off
Yes
Fan On

**Fig. 2**

## 2.3 SNAPSHOTS OF PROJECT: -





# 3. SOFTWARE

## 3.1 SOFTWARE –CODING AND ANALYSIS

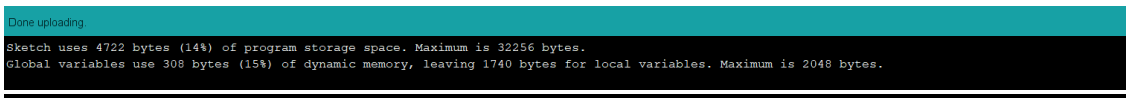
```
 #include<LiquidCrystal.h>
 LiquidCrystal lcd(12,11,5,4,3,2);
 int val;
int tempPin = A0;
int fan=7 ;
void setup()
{
  lcd.begin(16,2);
Serial.begin(9600);
pinMode(fan,OUTPUT);
digitalWrite(fan,LOW);
lcd.setCursor(0,0);
  lcd.print("Welcome TO");
  lcd.setCursor(0,2);
  lcd.print("CSE2006 PROJECT");
  delay(2000);
  lcd.clear();
  lcd.setCursor(0,0);
  lcd.print("Temp controlled");
  lcd.setCursor(0,2);
  lcd.print("cooling System");
  delay(2000);
  lcd.clear();
}

void loop()
{
val = analogRead(tempPin);
float mv = ( val/1024.0)*5000; //conversion system of LM35 (temperature sensor) in Celsius for Arduino
float cel = mv/10;
lcd.setCursor(0,0);
lcd.print("TEMPRATURE = ");
lcd.print(cel);
lcd.setCursor(0,2);
lcd.print("*C");
delay(1000);
lcd.clear();

if(cel>35)
{
  digitalWrite(fan,HIGH);
}
else
{ digitalWrite(fan,LOW);
}

}
```

# 3.2 SNAPSHOTS OF RESULTS



# 4. CONCLUSION AND FUTURE WORK

## 4.1 CONCLUSION :-

An automatic room temperature control system was designed and implemented successfully. The system can easily regulate the temperature within a room containing a fan and heater. The system is fairly efficient and robust. The system is simple and could be practically implemented in temperature control in home, offices and other places.

**Possible future modifications to improve the system:**

● Other sensors like humidity sensors can be installed to make it efficient.

● We can add the feature of remote access by using IOT which can further enhance utility of the system.

## 4.2. FUTURE WORK COST

1. We can monitor more parameters like humidity, light and at the same time control them.

2. We can send this data to a remote location using mobile or internet.

3. We can draw graphs of variations in these parameters using computer.

4. When temperature exceeds the limit, a call will be dialed to the respective given number by an automatic Dialer system.

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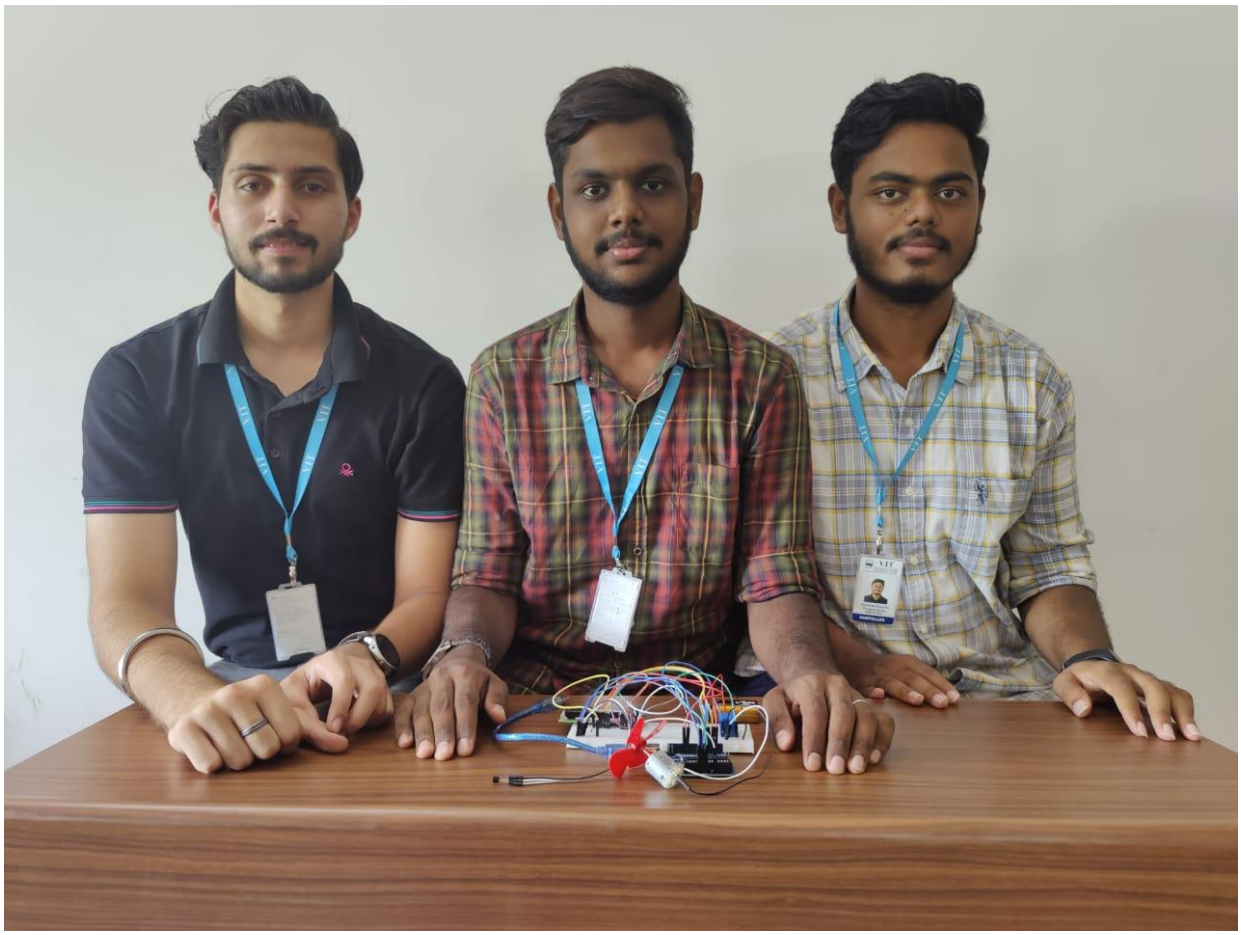
3. https://www.ijnrd.org/papers/IJNRD1704020.pdf

# 6.PHOTO GRAPH OF THE PROJECT ALONG WITH THE TEAM MEMBERS



# BIODATA

Name : RAJAN SINGH

Mobile Number : 9876983813

E-mail : rajan.singh2020@vitstudent.ac.in

Permanent Address: : S/O TRASEM SING POST OFFICE BARANDA, BARANDA(27) TEHSIL NUPRUP, KANGRA, 176201, HIMACHAL PRADESH, INDIA

Name : DEVARINTI DHAPATLA PUNEETH REDDY

Mobile Number : 9493964004

E-mail : dhapatla.puneethreddy2020@vitstudent.ac.in

Permanent Address : GANGI REDDY GARI PALLI (V), YELLAMANDA (P), YERRAVARI PALEM (M), CHITTOOR, ANDHRA PRADESH - 517214

Name : SANJIL K C

Mobile Number : 7598355520

E-mail : sanjil.kc2020@vitstudent.ac.in

Permanent Address : 2/86, P.KARATUPPALAYAM, THIPPAMPALAYAM POST,PUNJAI PALATHOLUVU, PERUNDURAI TK, ERODE, 638751, TAMIL NADU.