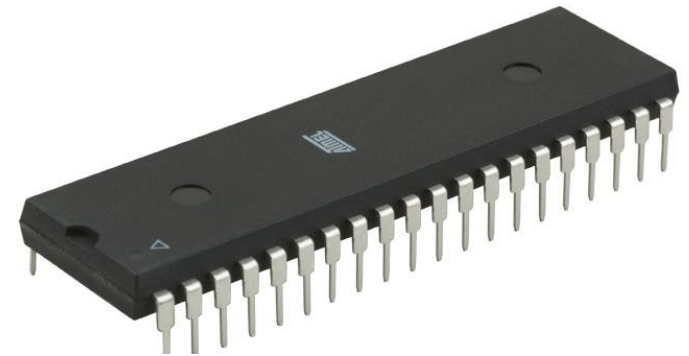


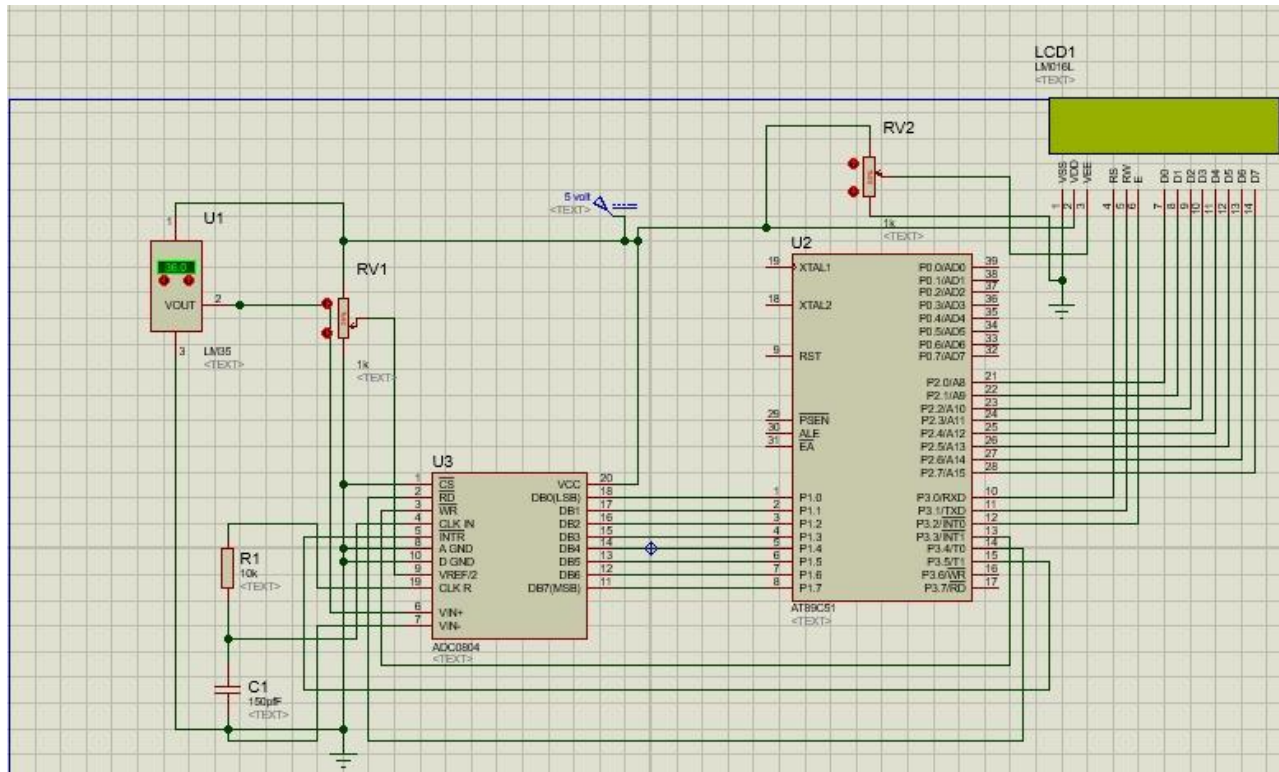
MICROCONTROLLERS LAB PROJECT

**DIGITAL THERMOMETER USING 8051
MICROCONTROLLER**



DONE BY

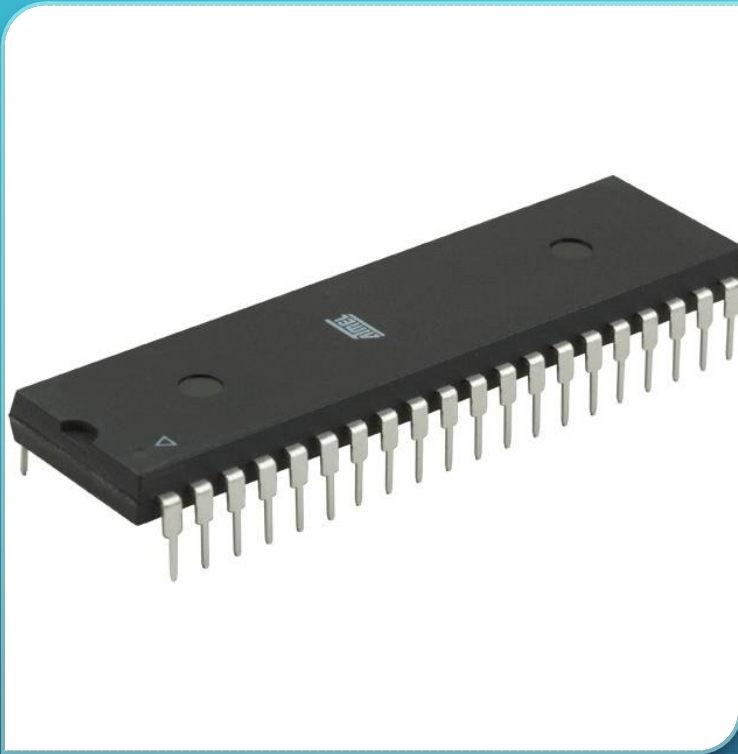
5	Mithra Varun	220906284
6	Harikishanthini K	220906286
7	Ayush Chandra	220906300
8	Shruthi Ramprasad	220906308



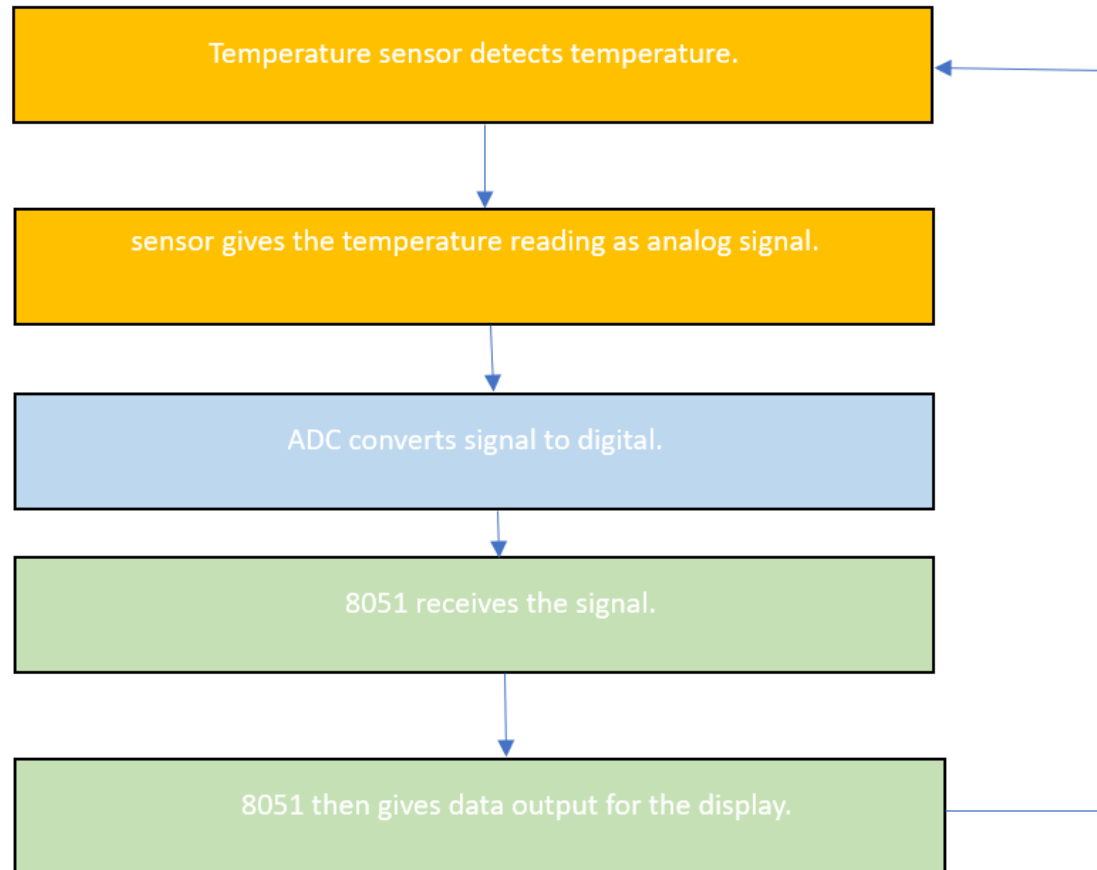
OBJECTIVE OF THE PROJECT

- The primary objective of this project is to design and implement a digital thermometer system using the 8051 microcontroller. This system will accurately measure temperature and display it on an output interface, providing an efficient and user-friendly solution for temperature monitoring.

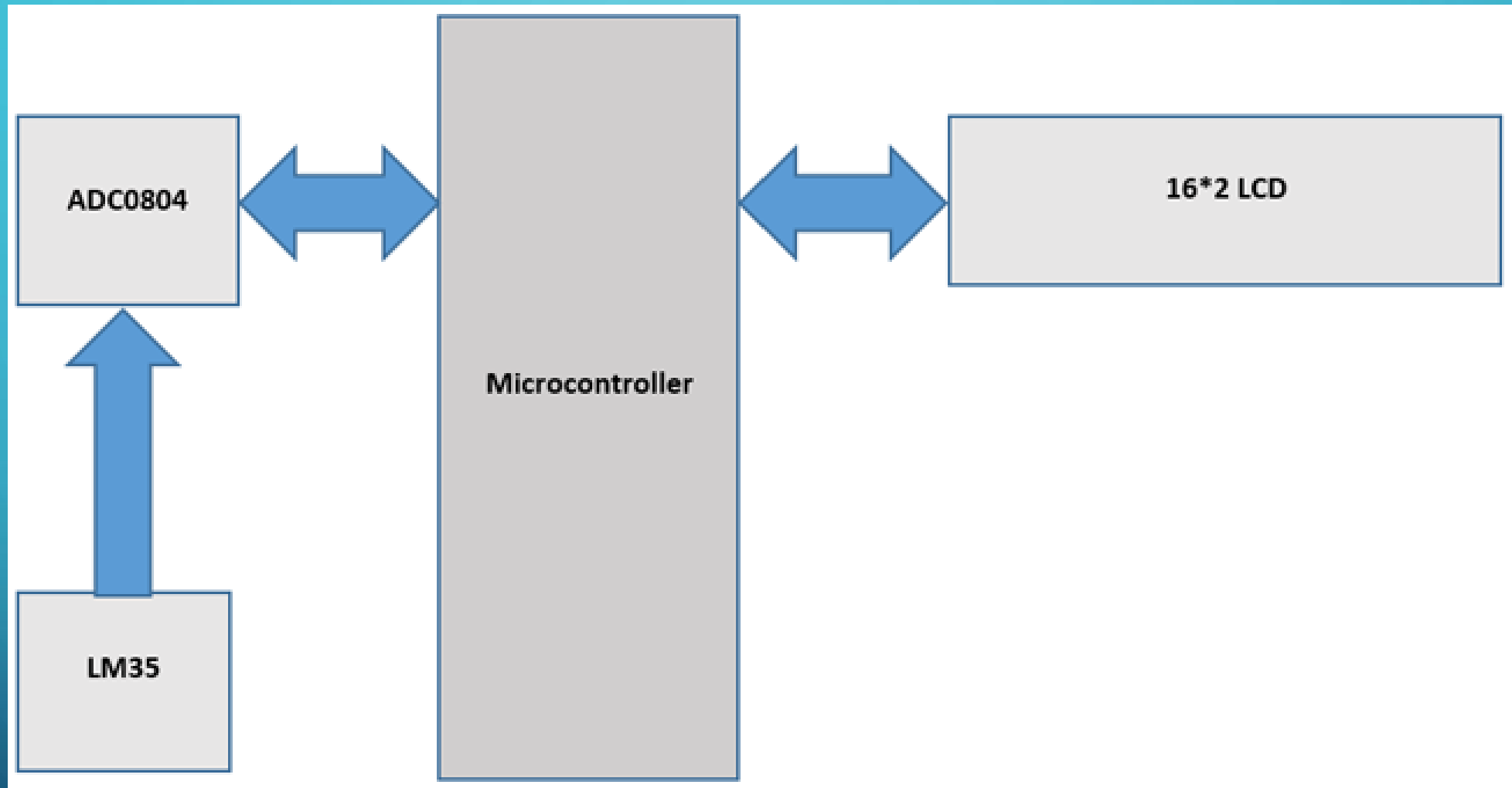
INTRODUCTION TO THE PROJECT



- Digital thermometers have become essential for various applications, from healthcare to industrial settings. The significance of this project lies in its practicality, offering a precise and reliable means of temperature measurement. This report will discuss the methodology, hardware and software requirements, implementation, and the impact of this project on society and the environment.



METHODOLOGY (FLOWCHART)



Hardware Interfacing Diagram

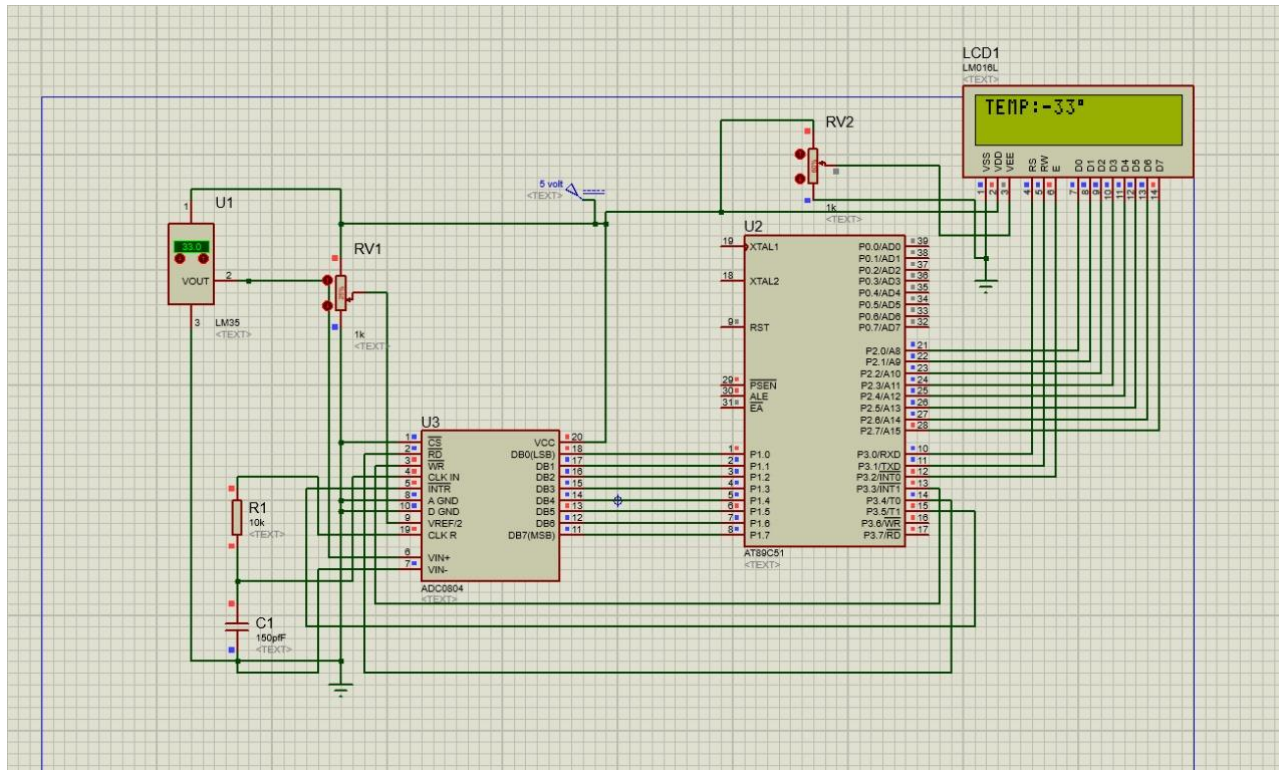
HARDWARE DESIGN REQUIREMENTS SPECIFICATIONS

8051	x1
Adc 804	x1
wires	As needed
16*2 LCD display	x1
LM -35 (temp sensor)	x1
potentiometer	x2
resistors	x14
crystal oscillator	x1



SOFTWARE DESIGN REQUIREMENTS

KEIL: WE USED KEIL
TO WRITE AND
COMPILE THE CODE.
PROTEUS: PROTEUS
WAS UTILIZED FOR
SIMULATION



IMPLEMENTATION CIRCUIT

CODING

```
#define    HEX2ASCII  00E3B0H
```

```
//LABEL OPCODE OPERAND
```

```
ORG 0000H
```

```
LJMP MAIN
```

```
ORG 0030H
```

```
LOOP: MOV R0,#0FFH //delay program
```

```
B0: MOV R1,#0FFH
```

```
B1: DJNZ R1,B1
```

```
DJNZ R0,B0
```

```
RET
```

CODING

READY: SETB P2.7 // checking lcd status

CLR P3.0

SETB P3.1

WAIT: CLR P3.2

NOP

SETB P3.2

JB P2.7, WAIT

RET

CODING

CMD: ACALL READY // lcd command input

CLR P3.0

CLR P3.1

MOV P2, A

SETB P3.2

NOP

CLR P3.2

RET

CODING

DAT: ACALL READY //lcd data input

SETB P3.0

CLR P3.1

MOV P2, A

SETB P3.2

NOP

CLR P3.2

RET

CODING

ORG 0200H

MAIN: MOV P1,#0FFH // defining P1 as input port

MOV P2,#00H

MOV P3,#00100111B // initializing ADC0804

SETB P3.4

CLR P3.3

NOP

SETB P3.3

NOP

CLR P3.4

MOV A, #38H // initializing LCD

ACALL CMD

MOV A, #0EH

ACALL CMD

CODING

MOV A, #01H

ACALL CMD

MOV A, #10H

ACALL CMD

MOV A, #0CH

ACALL CMD

MOV A, #80H

ACALL CMD

NOP

MOV A, #'T' //inputting data into LCD

ACALL DAT

CODING

MOV A, #'E' //inputting data in LCD

ACALL DAT

MOV A, #'M'

ACALL DAT

MOV A, #'P'

ACALL DAT

MOV A, #':'

ACALL DAT

MOV A, #'-'

ACALL DAT

MOV A,P1 //taking data from ADC0804

CODING

SWAP A

ANL A,#0FH

LCALL HEX2ASCII

ACALL DAT // sending data values in ASCII format from ADC to LCD

ACALL LOOP

MOV A,R2

ANL A,#0FH

LCALL HEX2ASCII

ACALL DAT

MOV A, #0DFH

ACALL DAT

ACALL LOOP

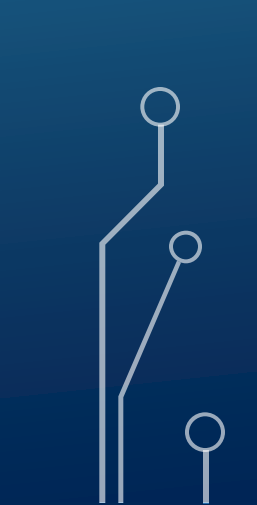
SJMP MAIN

END

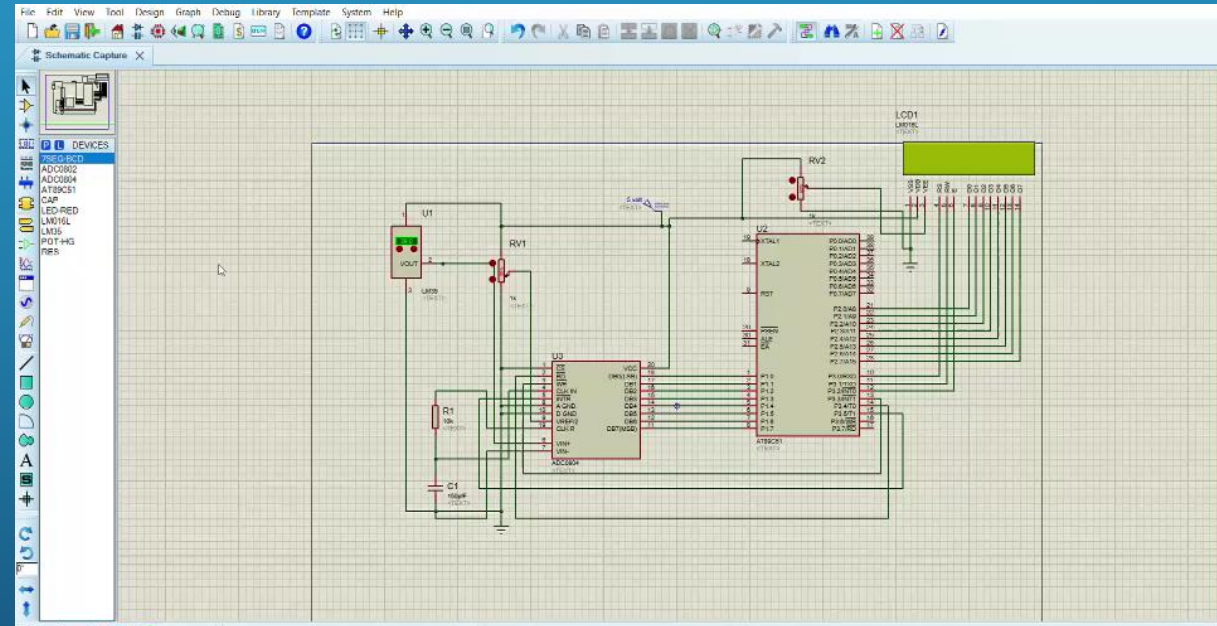


RESULTS AND INFERENCES

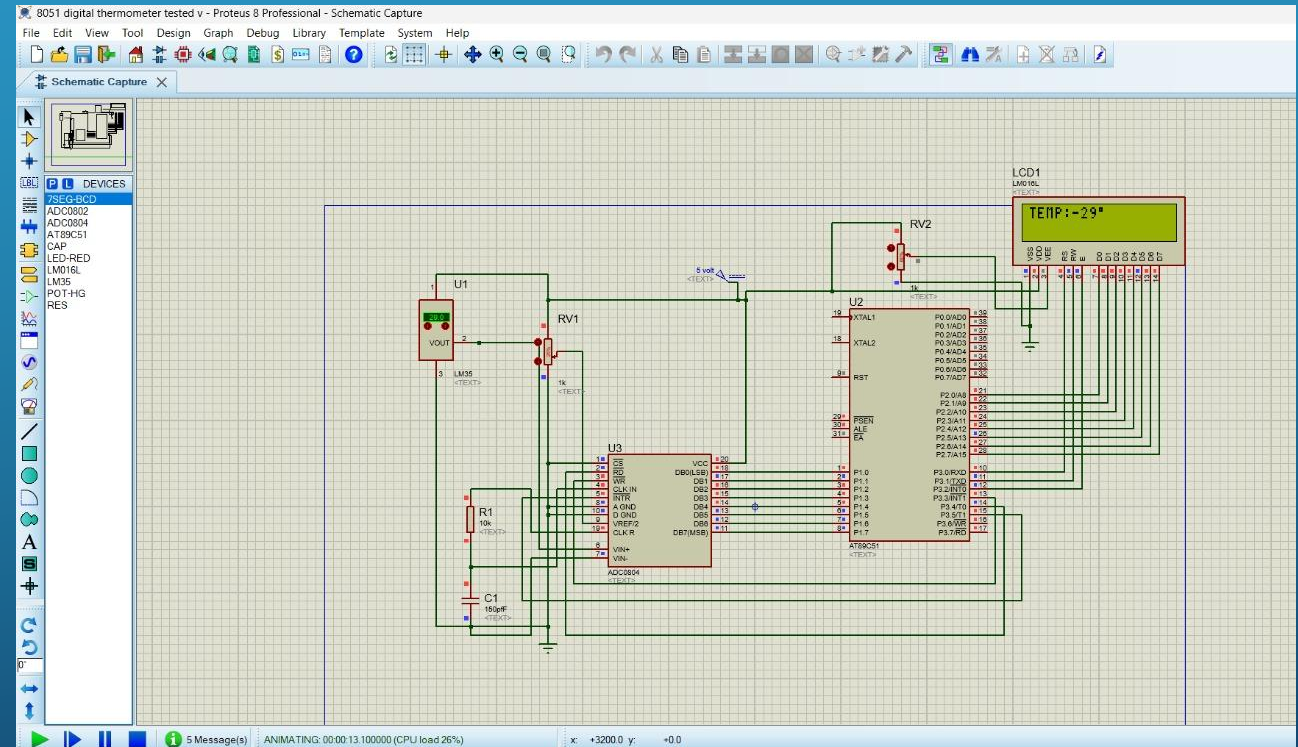
The project was successfully completed, and the thermometer displayed temperature accurately within 1°C resolution. We faced challenges during converting C code to ALP, but by changing the file type in Keil software, we overcame them. The project is reliable and ready for use in real-world applications.



SIMULATION VIDEO

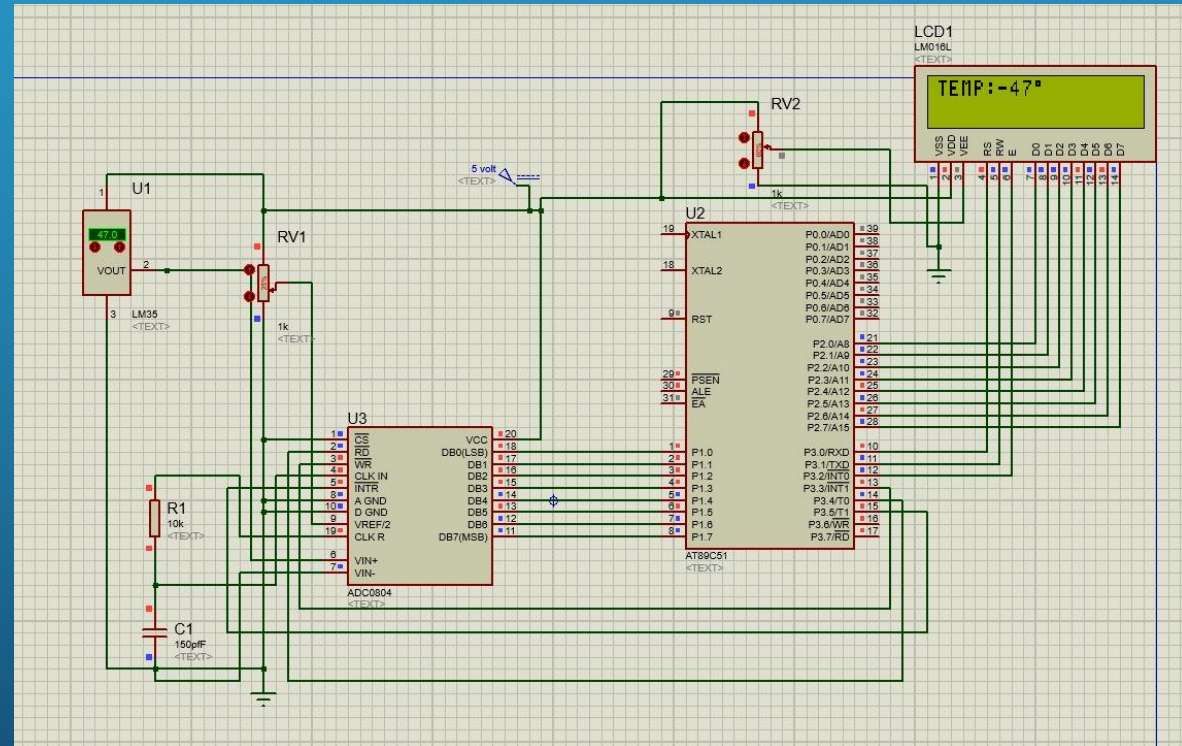


RESULTS AND INFERENCES



Output observed: 29 C

RESULTS AND INFERENCES



Output observed: 47C



IMPACT OF THE PROJECT ON SOCIETY/ENVIRONMENT

This project offers numerous benefits, including:

Accurate Temperature Measurement: Helps in healthcare, industrial processes, and research.

Reduced Energy Consumption: By maintaining optimal temperatures.

Environmentally Friendly: Fewer resources are wasted due to temperature control.

CONTRIBUTION OF INDIVIDUAL TEAM MEMBERS

Mithra Varun: Head of project application

I have worked on collecting resources – books, articles, research papers, websites, etc- to refer from and have contributed to writing the code. I worked mainly on interfacing the ADC to the 8051.

Harikishanthini: Head of Code Development

I have worked on writing the code. I mainly worked on figuring out the temperature sensor and its interfacing with the 8051 through the ADC and interfacing the LED to 8051

Ayush Chandra: Head of content ideation

I have worked on the research for the project. I came up with the idea and have collected resources. I also have helped in writing the report for the project.

Shruthi Ramprasad: Head of project management

I have worked on simulating the project in Keil and proteus. I dealt with debugging the code and fixing errors that we made. I also help in writing the project report.

FUTURE SCOPE

- Future enhancements and applications include:
 - **Wireless Communication:** Transmitting temperature data to remote devices.
 - **Data Logging:** Storing temperature history for analysis.
 - **Mobile App Integration:** Creating a user-friendly interface for smartphones.

REFERENCES

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- <https://www.micro-digital.net/how-to-convert-c-code-into-assembly-in-keil-8051-compiler/>
- [https://www.researchgate.net/publication/346234109_Design and Implementation of a Microcontroller Based Digital Thermometer](https://www.researchgate.net/publication/346234109_Design_and_Implementation_of_a_Microcontroller_Based_Digital_Thermometer)
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