**DIGITAL THERMOMETER USING ATMEGA32**

**ABSTRACT:**

**ABOUT THIS PROJECT:**

This project is a simple thermometer which is easy to use and provides accurate results.

1)When the temperature is more than 35 degree celsius, the green led glows.

2)When the temperature is less than 35 degree celsius, the red led glows.

3)The 10K ohm potentiometer is used to set contrast of 16x2 LCD screen.

The main component used here is the temperature sensor (LM35).

**INTRODUCTION:**

A thermometer is a device that [measures temperature](https://en.wikipedia.org/wiki/Temperature_measurement) or a [temperature gradient](https://en.wikipedia.org/wiki/Temperature_gradient) (the degree of hotness or coldness of an object).

A thermometer has two important elements:

(1) a temperature sensor (e.g. the bulb of a [mercury-in-glass thermometer](https://en.wikipedia.org/wiki/Mercury-in-glass_thermometer) or the pyrometric sensor in an [infrared thermometer](https://en.wikipedia.org/wiki/Infrared_thermometer)) in which some change occurs with a change in temperature;

(2) some means of converting this change into a numerical value (e.g. the visible scale that is marked on a mercury-in-glass thermometer or the digital readout on an infrared model).

Thermometers are widely used in technology and industry to monitor processes, in [meteorology](https://en.wikipedia.org/wiki/Meteorology), in medicine, and in scientific research..

**DIGITAL THERMOMETER:**

A digital thermometer is used to verify a smart temperature transmitter under flowing conditions and a successful calibration of the smart temperature transmitter. Portable electronic thermometers (PETs) are designed to measure temperature in a RTD-type thermowell using a thermistor or RTD probe.

The LM35 digital thermometer converts temperature sensitive current to digital, transmits that on demand through a protocol, while optionally powering all the circuitry from busts of voltage made present on one wire between packets.

Measurements are available over an operating range of -55°C to +125°C and spec'd accurate to ±0.5°C over the range of -10°C to +85°C. The device has a maximum reporting resolution of 1/16°C.

Experience shows a reporting resolution eight times that of the expected accuracy to be justified as measurements are highly repeatable over short time periods and show uniform step rates when observing slow changes of large thermal masses.

Thermometers are useful apparatus being used since long time for temperature measurement. In this project we have made an ATmega32 based digital thermometer to display the current ambient temperature on a 16x2 LCD unit in real time . It can be deployed in houses, offices, industries etc. to measure the temperature. We can divide this **ATmega32 based thermometer** into three sections - The first section senses the temperature by using [temperature sensor LM35](https://circuitdigest.com/tags/lm35), second section converts the temperature value into a suitable numbers in Celsius scale which is done by ATmega32, and last part of system displays temperature on [16x2 LCD](https://circuitdigest.com/article/16x2-lcd-display-module-pinout-datasheet)..

In this **digital temperature sensor with ATmega32**, ATMEGA32 is used to control the whole process. An LM35 temperature sensor is used for sensing environment temperature which gives 1 degree temperature on every 10mV change at its output pin. You can easily check it with voltmeter by connecting Vcc at pin 1 and Ground at pin 3 and output voltage at pin 2 of LM35 sensor. For an example if the output voltage of LM35 sensor is 250m volt, that means the temperature is around 25 degree Celsius.

ATMEGA 32 reads output voltage of temperature sensor by using Analog pin and performs the calculation to convert this Analog value to a digital value of current temperature. After calculations ATMEGA32 sends these calculations or temperature to 16x2 LCD unit by using appropriate commands of LCD.

**COMPONENTS USED:**

* ATMEGA 32
* LCD
* LM 35
* CAPACITORS
* FIXED VOLTAGE
* Connecting wires

**SOFTWARE USED:**

* SimulIDE