PROJECT 6

TEMPERATURE SENSOR TO LCD DISPLAY

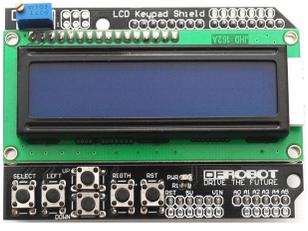Arduino Duemilanova have come with 6 Analog to Digital Converter I/O with 10-bits resolution. In here, we going to explore on how to interface LM35 temperature sensor to Arduino and Display the output on Arduino LCD-Keypad shield.

Connect LM35 RED wire(VDD) to +5V, ORANGE wire (GND) to ground and lastly the middle pin **WHITE** wire of LM35 to Arduino analog port A1.

COMPONENT NEEDED
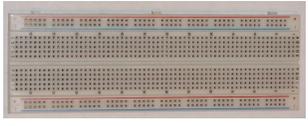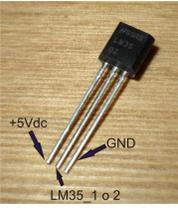
	BREADBOARD
	LM35 TEMPRETURE SENSOR
	ARDUINO LCD-KEYPAD SHIELD
	JUMPER WIRE
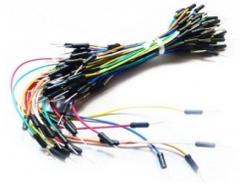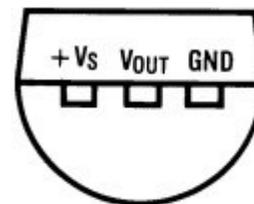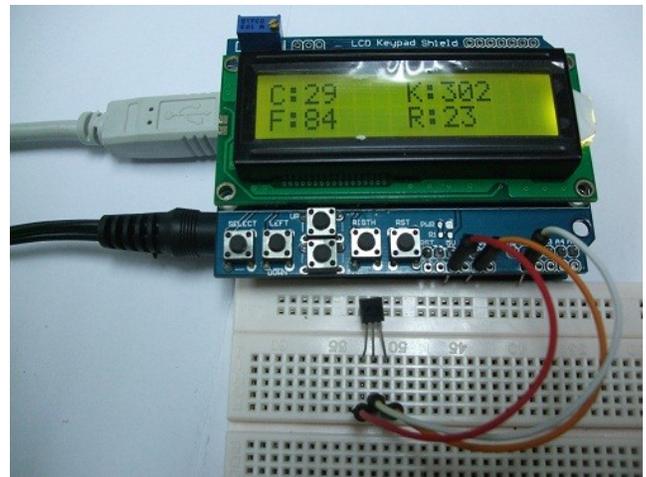
CONNECTION

Basic Centigrade Temperature Sensor
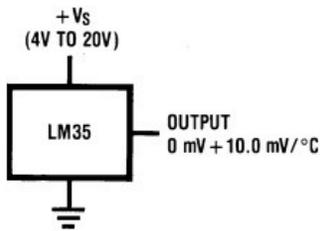**(+2˚C to +150˚C)**

ADDITIONAL INFORMATION

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1⁄4˚C at room temperature and ±3 ⁄4˚C over a full −55 to +150˚C temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 μA from its supply, it has very low self-heating, less than 0.1˚C in still air. The LM35 is rated to operate over a −55˚ to +150˚C temperature range.

Features
~ Calibrated directly in ° Celsius (Centigrade)
~ Linear + 10.0 mV/°C scale factor
~ 0.5°C accuracy guaranteeable (at +25°C)
~ Rated for full −55° to +150°C range
~ Suitable for remote applications
~ Low cost due to wafer-level trimming
~ Operates from 4 to 30 volts
~ Less than 60 μA current drain
~ Low self-heating, 0.08°C in still air
~ Nonlinearity only ±1⁄4°C typical
~ Low impedance output, 0.1 W for 1 mA load.

CODE OVERVIEW

```
temp = analogRead(temp_analogPin);

celsius = temp/2;
lcd.setCursor(2, 0);
lcd.print(celsius,DEC);

kelvin = celsius + 273;
lcd.setCursor(10, 0);
lcd.print(kelvin,DEC);

fehrenheit = (celsius*18)+320;
fehrenheit = fehrenheit/10;
lcd.setCursor(2, 1);
lcd.print(fehrenheit,DEC);

reaumur = celsius*8;
reaumur = reaumur/10;
lcd.setCursor(10, 1);;
lcd.print(reaumur,DEC);

delay(1000);
temp_value_clear();
```

temp = analogRead(temp_analogPin);
Read analog pin from LM35 temperature sensor input pin and store at temp.

celsius = temp/2;
LM35 are design to give the exact value of temperature in Celsius. To get the celsius value, the ADC value are required to divided by 2 .

kelvin = celsius + 273;
Kelvin formula are (Celsius + 273.15). But for microcontroller, it will not read the result after the DOT.

fehrenheit = (celsius*18)+320;
fehrenheit = fehrenheit/10;
Fahrenheit formula are ([celsuis*1.8]+32). In the coding, the formula have been times will 10 times to get the exact result.

reaumur = celsius*8;
reaumur = reaumur/10;
Reaumur formula are (celsius*0.8). To get the exact

result, we times the value 10 time larger.

References:
http://www.national.com/ds/LM/LM35.pdf