Experiment 005 Temperature Sensor #WeAreAllMakers

OVERVIEW

In this experiment you will control how to read a value from the temperature sensor and display the temperature on the computer's serial monitor window.

OUTCOMES

By the end of this assignment the student will be able to:

- Read an analog sensor value.
- Apply a formula to a data value to calulate temperature.
- Convert between Celsius and Fahrenheit.

REQUIREMENTS

- Arduino-Compatible board
- 321Maker Things Shield
- USB Cable
- Arduino Software

PREREQUISITES

- Getting Started Tutorial: http://321maker.com/start
- Source Code: https://git.io/vpvCW

VIDEO TUTORIAL

http://youtube.com/indevelopment

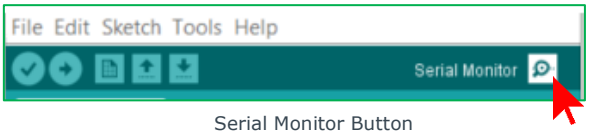
BACKGROUND

Temperature Sensor

The temperature sensor changes its output voltage linearly based on the ambient temperature around the sensor. The temperature sensor is connected to analog pin A2 on the Arduino. The temperature sensor that is on the 321Maker board is an LM35 which is calibrated to the Celsius temperature scale.

LEVEL 1 PROCEDURE

- [ ] Connect your Arduino to your computer using the USB port. Open the Arduino software.
- [ ] Download the **Temperature Sensor** program code from here: https://git.io/vpvCW
- [ ] Copy and paste the program code into the Arduino software editor.
- [ ] Make sure you have the correct Arduino Board and Communications port setup.
- [ ] Click the upload button in the upper left corner to compile and upload the code to the Arduino device. If you see an Orange error in the bottom of your screen, then something went wrong.
- [ ] From the Arduino program click the magnifying glass in the upper right of the screen to open the serial monitor.



Serial Monitor Button

- [ ] Congratulations, you are now reading data from the temperature sensor. You should see the temperature values change as you hold and let go of the temperature sensor.

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LEVEL 2 PROGRAM MODIFICATION

- [ ] Modify the program to show the current temperature and how far away the current temperature is away from boiling water.

IE) The current temperature is 25C and it is 75C away from boiling water.

LEVEL 3 ADVANCED APPLICATION

- [ ] Write a program that will display the current temperature using Celsius, kelvin and Newton scales.

LEVEL 4 PROJECT CHALLENEGE

- [ ] **Temperature Alarm –** Write a program that will sound the buzzer (D5) if the temperature is above 25C.

- [ ] **HVAC Challenge-** Write a program that will turn on the red LED (D12) when the temperature is below 25C to indicate that the furnace is on, and turn on the blue LED (D13) when the temperature is above 25C to indicate that air conditioner is on.