Name:
Date:

Circuit #7 Temperature Sensor

1.

How is this circuit, or a circuit like it, used in everyday life? Provide at least three examples.

_____

_____

_____

_____

_____

Does your temperature sensor work?
Great. Upload Circ10BExpansion Code to your RedBoard. Attach the shift register and LEDs as shown in the schematic below. You may have to alter some code depending on how hot or cold it is where you are.

Write voltage values for the two temperature values below. Also record the amount of LEDs that light up with each temperature. For the first temperature use whatever temperature your room currently is.

2.

_____**°F ≈** _____**°C (room temperature, fill in degrees)**

V =_____**v LEDs =**___

3.

98.6°F = 37°C (use a cup of cocoa to warm up sensor)

V =_____**v LEDs =**___

4.

50°F = 10°C (use an ice pack to cool down sensor)

V =_____**v LEDs =**___

Using the values above, formulate an equation so you can calculate values for the temperatures below.

_____

_____

5.

105°F ≈ 40.5°C V =_____v LEDs =____

6.

86°F ≈ 30°C V =_____v LEDs =____

7.

32°F ≈ 0°C V =_____v LEDs =____

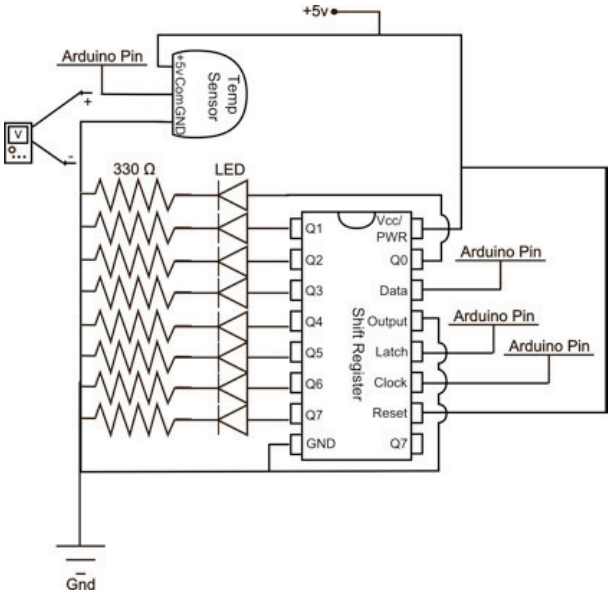
8.

-49°F ≈ -45°C V =_____v LEDs =____

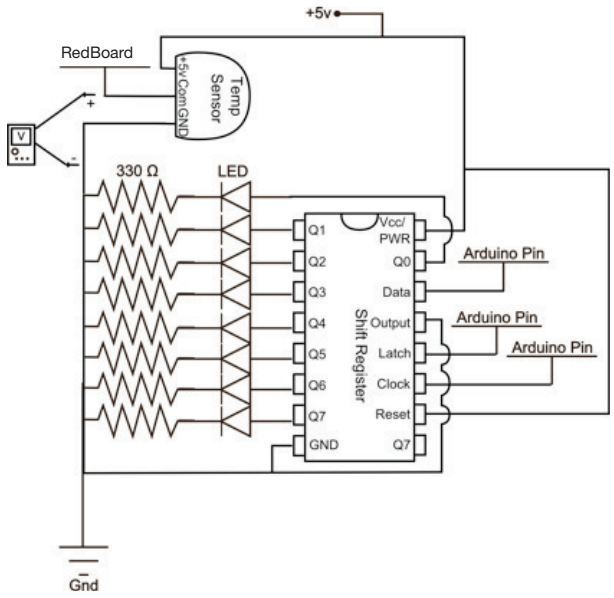
9.

It is impossible to get a reading for one of the temperatures above. Place an X beside this value.

Circuit:



Circuit:



10.

Draw a logic flow chart of the circuit here:

11.

Write the equation below that solves for the change in voltage (V) given a change in temp (X).

12.

There are four main types of temperature sensors, thermocouples, resistance temperature detectors, thermistors, and temperature-transducing ICs. Which one are you playing with and is it analog or digital?

13.

How is this similar to a LED? To a motor?

14.

Find a way to quickly change the temp read by the sensor. How fast can you get it to change by 20°F?