Exercise 9

9a:

Using data from the following source (the manufacturer is likely not the same):

https://www.ti.com/lit/ds/symlink/lm35.pdf

The output voltage of the censor ranges from from -1 V to 5 V. According to the documentation, our setup is suitable for measuring temperatures from 2 °C to 150 °C. The output voltage V_{out} of the censor is related to the temperature T linearly by V_{out} = 10 mV/°C * T. As before, the unitless reading from A0 can be converted to voltage with the equation: V = reading/1023* 5V.

9b:

The code prints the characters '0' (corresponding to value 48) and 2, 4 and 6 (corresponding to 50, 52, 54). Serial.write(176) tries to print the degree symbol between the numbers but fails. The degree sign is not included in the first 128 characters and can't be represented using a single signed byte.

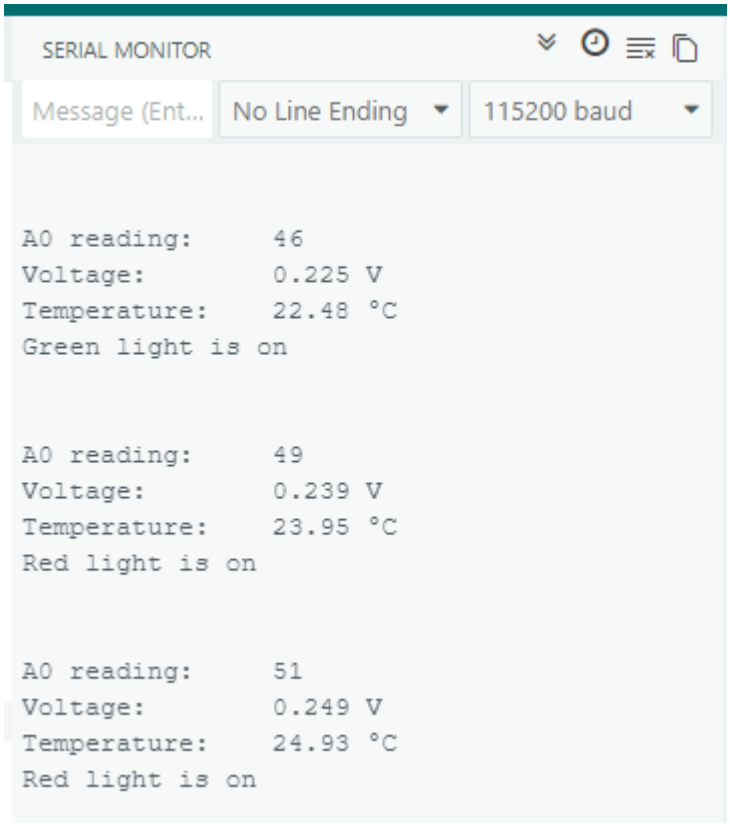
9c:

serial.print() sends to serial the ASCII characters that represent the data. For example, serial.print(11) sends to the serial two characters '1'. It can format values in different bases as well as varying decimal points.

serial.write() send the data to serial as a series of bytes. For example, serial.write(11) sends the bytes that correspond to the number 11. It can print a number, string or an array.

9d-9f:

See code ex9and10_anssi. Temperature measurement was around 22.0 °C in room temperature and the measurement got higher as it was warmed using fingers. Cooling the sensor by blowing didn't have significant impact to temperature. The degree symbol was printed by using Serial.println("°C");. The code successfully printed the temperature to serial monitor, as can be seen in the following serial monitor output (also includes the colour of led for the next exercise).



Exercise 10

See code ex9and10_anssi. Medium temperature was defined to be between 22.5 °C and 23.5 °C.