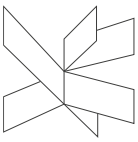
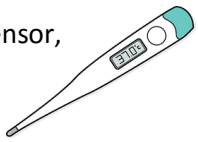


# Assignment 2: Thermometer

Design and implement a thermometer that reads input from the analogue temperature sensor, TMP36GRTZ on the VIA shield.



## Requirements:

The thermometer must autonomously, once every second, convert the signal from the sensor, calculate the temperature in degree Celsius and display it as a bar on the LED array (add a LED-bar feature to your LED driver).
The range of the temperature bar is 18-25 °C (LED0 light up if temperature is at least 18 and all LEDs if temperature is 25 or above)

**Optional**:

- Imagine that someone else is programming a 4 digit 7-segment numeric display driver with the following interface:
  - void init_display( uint8_t no_of_digits);
  - uint8_t printval( int16_t value, uint8_t no_of_decimals); // return 1 on success, 0 on failure.

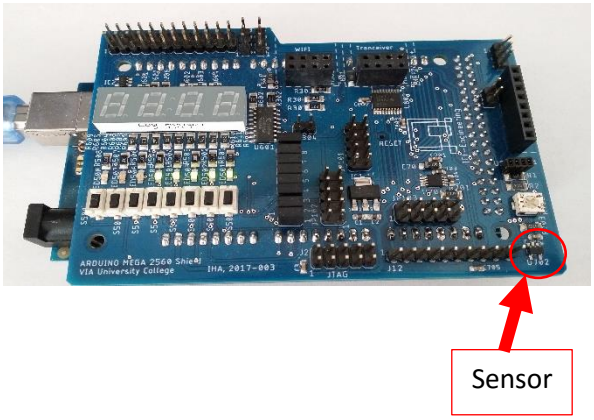
  Test your thermometer software with mocks of these functions. The temperature range is now of your own choice.
- Key press switch to min/max mode. Show measured minimum temperature for 2 sec. then maximum for 2 sec.

## Non-functional requirements:

1) The solution must be divided into two levels; drivers and an application. Each driver must be in its own subfolder in the project. You can use the LED and Key drivers made in the previous assignment and exercises.
2) The sensor driver must use Interrupt. Design your drivers with as short Interrupt Service Routines as possible.
3) Source code must be documented by inline comments.
4) Use Test Driven Development (write test cases for a capability before implementing it).

## Sensor:

The output voltage of the sensor is 10mV/°C, and typically 750mV@25°C.



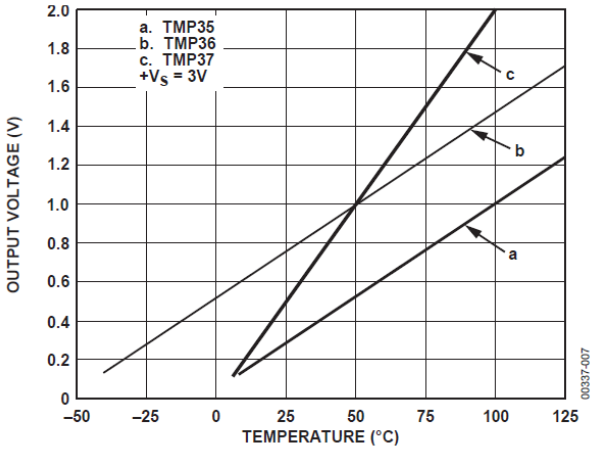




*Figure 6. Output Voltage vs. Temperature*

## What to hand-in:

1) A sketch of the domain model.
2) A sequence diagram of the interaction between application and drivers.
3) The project folder in a zip-archive
4) Test cases that at least verify:
    a. General functionality.
    b. Conversion from sample to temperature.