Electronics II
exercise 3

Deadline: Wed 16.2.2022 14:00

1.

a) Use the 74HC595 shift register to display a message of your choice on the 4-digit 7-segment display. (It is possible to drive the display without a shift register but it requires more pins.) (1p)
b) Measure the temperature with a thermistor and display it on the display you've just built with 0.1 °C resolution. (1p)

2.

Take the following code block and add an interrupt service routine which counts the number of falling edges on a pin. Write a `displayNumber(byte number)` function which writes the input argument on the 7-segment display. You can connect either a button or the tilt switch to the pin to produce the edges. Use the loop function given below. (1.5p)

```
volatile byte fallingEdges = 0; //why volatile?

void loop(){
  delay(5000);
  displayNumber(fallingEdges);
  fallingEdges = 0;
}
```

3.

Light up an LED for 5 seconds when passive IR sensor detects movement. Set range to around 3m and make the trigger repeatable. (1p)

4.

Make a capacitive button without any external components. To test it make a reaction time tester: light up an LED and measure the time it takes for you to touch the capacitive sensor. (Hint) (1.5p)