EMB2– Spring 2025

Assignment 5 – Timers and Counters

Submission deadline: **4th April 2025**

Hand in will contain code for the given tasks together with explanations as well as oscilloscope screenshots/printscreens or captures of the serial monitor where relevant.

5a:
Use **Timer0** to create your own *delay_ms and delay_hs* functions.
The function prototypes are:

```
void delay_ms(unsigned int milliseconds);
void delay_hs(unsigned int hundred_milliseconds);
```

Example:

```
delay_ms(100);              // 0.1 second delay
delay_hs(1);                // 0.1 second delay
delay_hs(10);               // 1 second delay
```

Test this function by toggling an LED at different rates (100ms) using the delay_ms function as well as 05.s, 1s and 2s using delay_hs function.
Use an oscilloscope to measure the duration of the signal driving the LED and use oscilloscope screenshots/printscreens to support your results. A USB flash drive can be used to capture screenshots from the oscilloscopes.

5b:
Use **Counter0** for counting input transitions.
Use the program from the lecture notes and add the necessary code to print the value of TCNT0 every second, repeating forever. Now connect/disconnect a wire from pin PD4 (T0 input) to 3.3V/GND and see what happens every time you trigger a rising/falling edge. Use the wires originally supplied with your EMB kit/ask the teacher.