

Practical 10

This practical is optional. If you submit it will count towards your mark. If you do not, it will be ignored.

Even if you don't submit, I strongly advise you attempt the prac as the concepts tested here will also be tested in the prac exam.

Part 1: (2)

The LEDs should cycle through the following patterns:

0x01, 0x02, 0x04, 0x08, 0x88, 0x48, 0x28, 0x18

On reset, the patterns should be cycled at a rate of 1 Hz. In other words: 1 second between each pattern. The pattern should be a cycle: when it get to the end it starts back at the beginning. You are strongly advised to implement this with a timer as it will make the next parts easier to do.

Part 2: (2)

If SW0 is pressed (not held, but **pressed**) the value on the LEDs should immediately jump back to the start of the sequence and continue cycling from there.

Continuing to hold the switch should not interfere with the cycling of patterns.

Hint: check out the *TIMx_EGR* register to see how to force a timer interrupt.

Part 3: (2)

If SW1 is **pressed** the cycling frequency should change to 2 Hz.

Part 4: (1)

If SW2 is **pressed** the cycling frequency should change to 5 Hz.

Part 5: (3)

While SW3 is **held**, the cycling frequency should be temporarily overridden by the potentiometers. Both POT0 and POT1 should be sampled, and whichever pot is outputting a **higher** voltage should control the frequency.

The frequency should be 20 Hz when the pot is outputting maximum voltage (3.3 V) and by 1 Hz when the pot is outputting minimum voltage (0 V).

Note that this is the reverse of how it's been done before!

Notes:

None of these tasks actually require debouncing. However I would still suggest you implement debouncing as good practice, as it may be needed for tasks in the prac exam.