

DO NOT TURN OVER

until instructed to

Practical Exam 1

This prac is broken up into 4 entirely separate parts. Each part has its own assignment on Vula. You must submit a .zip file for each part separately and they will be marked separately. This is to try to mitigate the issue of you getting completely stuck if you can't get the first parts correct or can't get your code to build.

When submitting, I advise you just select ALL files in your working directory, zip them and submit. This is to avoid the case where you accidentally forget to upload a critical file. The marker can handle having object or elf files in your .zip.

As usual, running 'make' on the contents of the zip should produce a single .elf file.

Part 1: (2):

The LEDs should be initialised to display 0x0A.

When SW0 is **released** (ie: on the rising edge) the value on the LEDs should be incremented by 1. You will need to debounce noisy edges. Pressing or holding the button should have no effect. Only when it's released should the LEDs change. Ask a tutor if you're confused!

Hint: if you're struggling, first get it working without debouncing then add debouncing later.

Part 2: (2):

On Vula, a part2 template file is provided with an array definition in it. The marker will change the values and length of this array at build time. You need to find the smallest value and largest value in the array.

If SW0 is not held, display the largest value in the array on the LEDs.

If SW0 is held, display the smallest value in the array on the LEDs.

Part 3: (4)

Initialise the LEDs to 0. TIM6 should be used to generate an interrupt, the handler of which should increment the value on the LEDs by 1.

The time between timer interrupts should be variable based on whichever potentiometer is outputting a LARGER value.

If the larger pot is outputting 0 V, the timer should fire every 0.3 seconds.

If the larger pot is outputting 3.3 V, the timer should fire every 2.5 seconds. Linear between.

Part 4: (2)

Attached is a template with an array of some patterns. The length of the array will not be changed by the marker. As POT0 is rotated from 0V to 3.3 V, the LEDs should sweep through the patterns in the array. In other words:

- when POT0 is outputting between 0 V and 0.366 V, pattern 0 should be displayed,
- when POT0 is outputting between 0.366 V and 0.733 V, pattern 1 should be displayed,
- ...
- when POT0 is outputting between 2.933 V and 3.3 V, pattern 8 should be displayed.

Bonus: (1)

PB10 should be made to produce a 24 MHz square wave.