

**Laboratory
8**

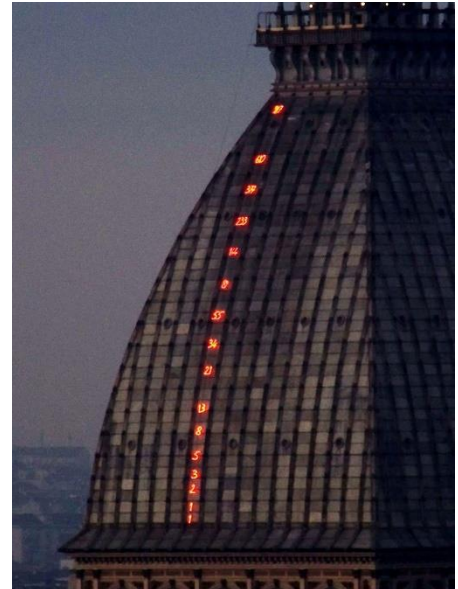
Expected delivery of **lab_08.zip** must include:

- zipped project folder of exercise 1
- this lab track completed and converted to pdf format.

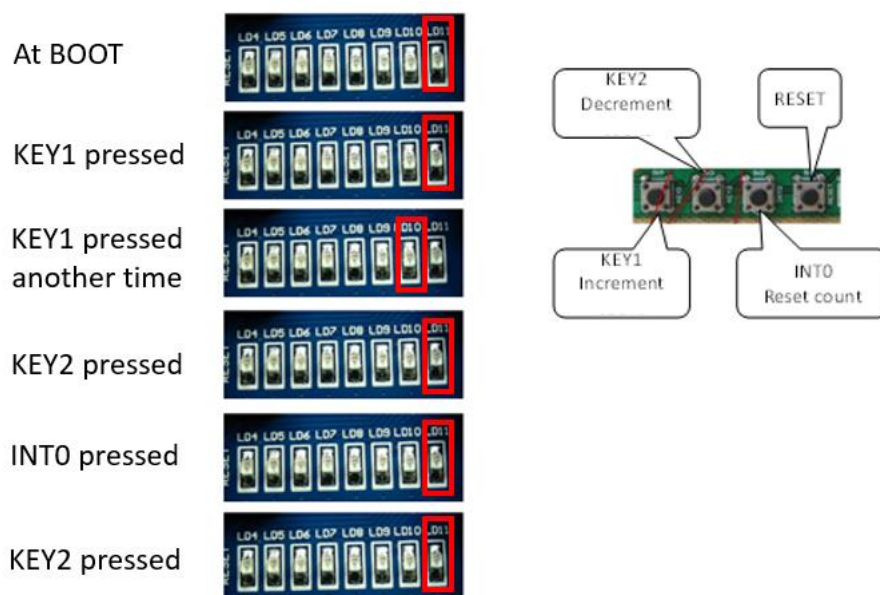
Solve the following problems by starting from the *sample_BUTTON_LED* project (open the file project from the uVision menu)

Exercise 1) Implement a system on the LANDTIGER board that displays the Fibonacci series on 8 LEDs. The software uses buttons to update the displayed value (either moving forward or backward) and LEDs to show the current value. Start by using emulation capabilities (later, flash your firmware on the board) to implement the following functionalities:

- at every KEY1 button pressure, move to the next value of the series. If the maximum value, i.e., 233, is already displayed, do nothing,
- at every KEY2 button pressure, move to the previous value of the series. If the minimum value, i.e., 1, is already displayed, do nothing,
- at INTO pressure, reset the value to the initial 1 in the Fibonacci series.



LEDs show the current count in a binary representation.



HINT: It could be useful to use two global variables to keep track of the information about the series. For example, you could define two unsigned integer variables called “uint8_t old_value” and “uint8_t curr_value” in the main function, to be updated by the button interrupt handler execution.

Q1: Do you observe on the board any behavior that unexpectedly differs from the SW emulation? Please describe.

Sì, e tale differenza è facilmente osservabile sfruttando il simulatore della LandTiger, andando ad abilitare/disabilitare il bouncing. Abilitando tale opzione, si cade nel caso non ideale, in cui si manifestano delle variazioni improvvise di tensione del segnale, andando ad oltrepassare in maniera irregolare le soglie imposte, contando dunque più operazioni di quelle aspettate. Ad esempio, mantenendo il bouncing attivo, si può notare come vengano saltati dei valori nella serie di Fibonacci, mentre disabilitandolo il tutto procede senza alcun problema, rappresentando dunque tutti i valori contigui della serie.