1DT301 – Lab assignment 4

Goal for this lab:

- Learn to access the hardware directly to read from and write to the GPIO pins (instead of using C functions).
- Learn to use timer interrupts to make a counter.

Presentation of results:

After each task has been solved, contact a teacher for grading. To complete the lab, you also need to submit the code on Moodle.

Each group must submit solutions to all lab tasks, and **the names of all group members must be in the header of every file**. **Before sending in the code, your group must show the results to the teacher and all group members must be present during the presentation.**

Tasks

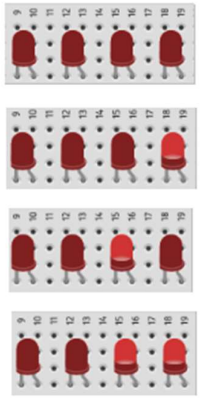
Task 1: Input and output without C code

Connect an LED to GP0 and two pushbuttons: One connected to GP1 and one to GP2. This is the same setup as Task2 on the previous lab assignment.

This time, **you are not allowed to use C functions** to read from the input pin or to turn the LED on/off! You have to use reads and writes to and from hardware registers. You can use the example from the book, chapter 9.

Task 2: Binary counter with reset button

Connect four LEDs in a row to make a binary counter. The counter should count from 0000 to 1111. The picture below shows the counter counting from 0000 to 0011. Also, you have to implement a reset button that resets the counter to 0000 when pressed.



The LEDs should be connected to ports GP1, GP2, GP3 and GP4 and the reset button to GP0.

Requirements:

- There should be 2 seconds interval between the counter values.
- Stop the count when the counter reaches its maximum value 1111.
- At any time, the Reset button should reset the counter to 0000 and after that, the counter shall resume its counting.
- You can check the state of the button in any way you want (using interrupts is not mandatory for the button), however you **have to use timer interrupts** to handle the counter, **not the sleep_ms** function!