Exercise 3: Fan control

Description

In this laboratory exercise, the motion of a fan will be simulated. A fan consists of two rotary motions, a circular motion of the blades and a circular movement of the base, so that the fan can rotate and cover the blades. These two circular movements will be simulated with two different rhythms, determined by two different Pulse-Width Modulators (PWMs), (you can use whichever register is convenient for you). The rate of each movement will be displayed on an LED (LED0 and LED1), which will be activated when the pulse is at the rising edge and will be switched off when it is followed by the rising edge of the next pulse. LED0 (PORTD PIN0) will correspond to the movement of the blades and LED1 (PORTD PIN1) to the movement of the base.

Assumptions

When a switch (switch 5 of PORTF) is activated, the fan is activated, i.e. the following actions are performed:

- The circular movement of the base is activated, which is simulated by a period pulse Tb = 2 ms and duty cycle Db = 60%. This pulse drives the LED1 of the PORTD via the rising edges.

- The circular movement of the blades is activated, which is simulated by a pulse period Tl = 1 ms and duty cycle Dl = 50%. This pulse drives the LED0 of PORTD through the rising edges.

-When the same switch (switch 5 of PORTF) is activated a second time after the start fan operation is started, the pulse period of the blade cycling pulse is doubled with a duty cycle Tl = 50%. The pulse of the blade cycling base continues to operate as described above.

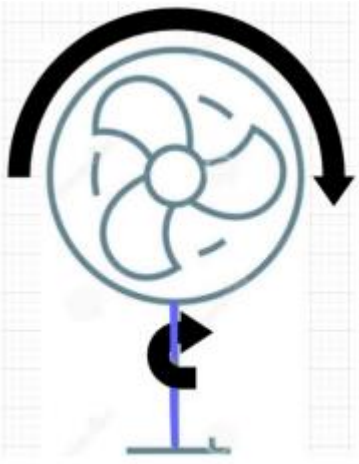
-If the switch is pressed for the third time time, then the fan is switched off and both pulses stop operating.

Exercise Questions

1. Implement the fan activation function after the fan is turned on switch (switch 5), i.e. the two PWM pulses are initialized and drive the two LEDs.

2. Add the second pulse function of the blade cycling pulse via activation of the switch (switch 5).

3. Also add the fan off function with the possibility of reactivation at the next press of the switch.



A picture of the fan motions