Lab 4: David Sladkowski

Link to your `Digital-electronics-2` GitHub repository:

(https://github.com/david3891/Digital-electronic-2)

Overflow times

1. Complete table with overflow times.

Module	Number of bits	1	8	32	64	128
Timer/Counter0	8	16u	128u	--	1024u	--
Timer/Counter1	16	4096u	32,768m	--	262,14m	--
Timer/Counter2	8	16u	128u	512u	1024u	2048u

Timer library

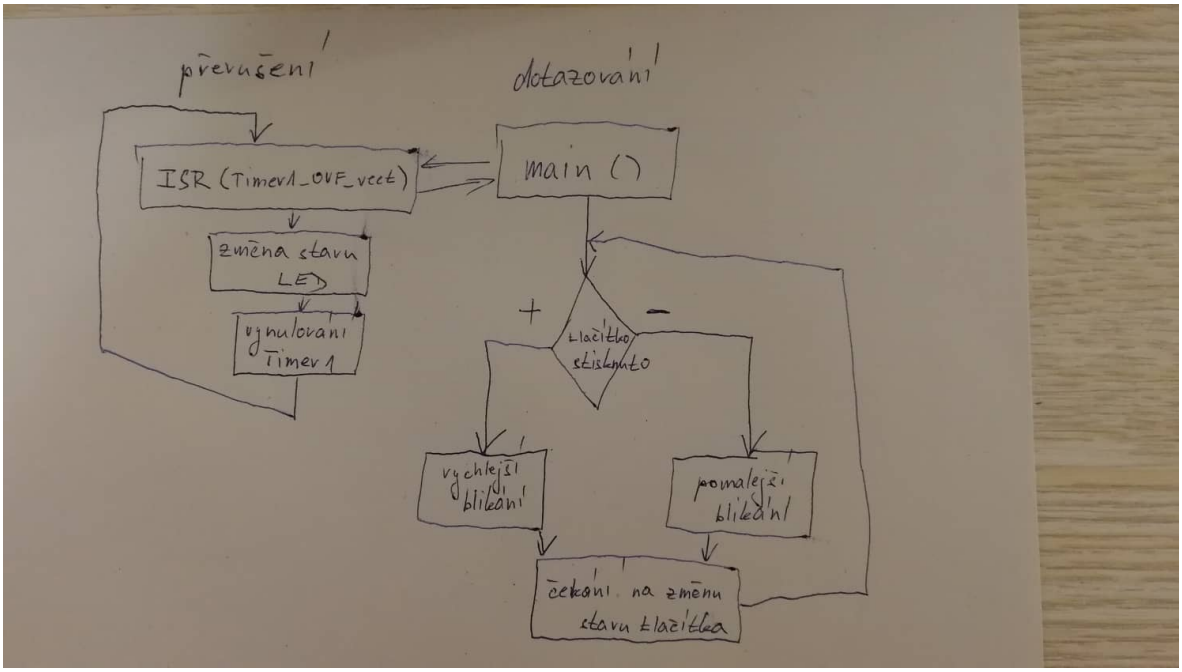
1. In your words, describe the difference between common C function and interrupt service routine.

- Function - spouštěna softwarově, podle definice funkce vrací nebo nevrací hodnotu
- Interrupt service routine - spouštěna hardwarově, nevrací hodnotu

2. Part of the header file listing with syntax highlighting, which defines settings for Timer/Counter0:

```
/**
 * @name  Definitions of Timer/Counter0
 * @note  F_CPU = 16 MHz
 */
/** @brief Stop timer, prescaler 000 --> STOP */
#define TIM0_stop()           TCCR0B &= ~((1<<CS02) | (1<<CS01) | (1<<CS00));
/** @brief Set overflow 4ms, prescaler 001 --> 1 */
#define TIM0_overflow_16us()   TCCR0B &= ~((1<<CS02) | (1<<CS01)); TCCR0B |= (1<<
/** @brief Set overflow 33ms, prescaler 010 --> 8 */
#define TIM0_overflow_128us()  TCCR0B &= ~((1<<CS02) | (1<<CS00)); TCCR1B |= (1<<
/** @brief Set overflow 262ms, prescaler 011 --> 64 */
#define TIM0_overflow_1ms() TCCR0B &= ~(1<<CS02); TCCR0B |= (1<<CS01) | (1<<CS00)
/** @brief Set overflow 1s, prescaler 100 --> 256 */
#define TIM0_overflow_4ms()    TCCR0B &= ~((1<<CS01) | (1<<CS00)); TCCR0B |= (1<<
/** @brief Set overflow 4s, prescaler // 101 --> 1024 */
#define TIM0_overflow_16ms()    TCCR0B &= ~(1<<CS01); TCCR0B |= (1<<CS02) | (1<<C
/** @brief Enable overflow interrupt, 1 --> enable */
#define TIM0_overflow_interrupt_enable()  TIMSK0 |= (1<<TOIE0);
/** @brief Disable overflow interrupt, 0 --> disable */
#define TIM0_overflow_interrupt_disable() TIMSK0 &= ~(1<<TOIE0);
```

3. Flowchart figure for function `main()` and interrupt service routine `ISR(TIMER1_OVF_vect)` of application that ensures the flashing of one LED in the timer interruption. When the button is pressed, the blinking is faster, when the button is released, it is slower. Use only a timer overflow and not a delay library.



Knight Rider

1. Scheme of Knight Rider application with four LEDs and a push button, connected according to Multi-function shield. Connect AVR device, LEDs, resistors, push button, and supply voltage. The image can be drawn on a computer or by hand. Always name all components and their values!