Labs 1: DANIEL HAVRÁNEK

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

https://github.com/Dan5049/Digital-electronic-2

Blink example

1. What is the meaning of the following binary operators in C?
   - `|` - Bitwise OR
   - `&` - Bitwise AND
   - `^` - Bitwise XOR
   - `~` - Bitwise NOT
   - `<<` - Binary left shift
   - `>>` - Binary right shift

2. Complete truth table with operators: `|`, `&`, `^`, `~`

b	a	b or a	b and a	b xor a	not b
0	0	0	0	0	1
0	1	1	0	1	1
1	0	1	0	1	0
1	1	1	1	0	0

Morse code

1. Listing of C code with syntax highlighting which repeats one "dot" and one "comma" on a LED:

```
#define LED_GREEN   PB5 // AVR pin where green LED is connected
#define SHORT_DELAY 250 // Delay in milliseconds
#define DOT_DELAY   200
#define DASH_DELAY  600 // dash is 3 times longer than dot
#ifndef F_CPU           // Preprocessor directive allows for conditional
                        // compilation. The #ifndef means "if not defined".
# define F_CPU 16000000 // CPU frequency in Hz required for delay
#endif                  // The #ifndef directive must be closed by #endif

#include <util/delay.h> // Functions for busy-wait delay loops
#include <avr/io.h>     // AVR device-specific IO definitions

int main(void)
{
    // Set pin as output in Data Direction Register
    // DDRB = DDRB or 0010 0000
    DDRB = DDRB | (1<<LED_GREEN);
```

```
    // Set pin LOW in Data Register (LED off)
    // PORTB = PORTB and 1101 1111
    PORTB = PORTB & ~(1<<LED_GREEN);

    // Infinite loop
    while (1)
    {

        //blink dot_dash
        _delay_ms(DOT_DELAY);               //Wait
        PORTB = PORTB | (1<<LED_GREEN);     //Turn on for dot
        _delay_ms(DOT_DELAY);               //Wait for dot
        PORTB = PORTB & ~(1<<LED_GREEN);    //Turn off for pause
        _delay_ms(DOT_DELAY);               //Wait for pause
        PORTB = PORTB | (1<<LED_GREEN);     //Turn on for dash
        _delay_ms(DASH_DELAY);              //Wait for dash
        PORTB = PORTB & ~(1<<LED_GREEN);    //Turn of
    }

    // Will never reach this
    return 0;
}
```

2. Scheme of Morse code application, i.e. connection of AVR device, LED, resistor, and supply voltage. The image can be drawn on a computer or by hand. Always name all components and their values!