Lab 1: Jiří Navrátil

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

https://github.com/GeorgeNavratil/Digital-electronics-2

Blink example

1. What is the meaning of the following binary operators in C?
    - `|` => Bitwise OR
    - `&` => Bitwise AND
    - `^` => Bitwise XOR
    - `~` => Bitwise NOT
    - `<<` => Left Bit shift
    - `>>` => Right Bit 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 300 // Short delay in milliseconds
#define LONG_DELAY  900 // Long delay in milliseconds
#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)
{
    DDRB = DDRB | (1<<LED_GREEN);       // Set pin as output in Data Direction
Register
    // DDRB = DDRB or 0010 0000
```

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

    while (1)    // Infinite loop
    {

        _delay_ms(SHORT_DELAY);             // Pause for several milliseconds
        PORTB = PORTB | (1<<LED_GREEN);     // Turn on
        _delay_ms(SHORT_DELAY);             // Pause for several milliseconds
        PORTB = PORTB & ~(1<<LED_GREEN);    // Turn off to make a dot
        _delay_ms(SHORT_DELAY);             // Pause for several milliseconds
        PORTB = PORTB | (1<<LED_GREEN);     // Turn on
        _delay_ms(LONG_DELAY);              // Pause for a bit more than several
milliseconds
        PORTB = PORTB & ~(1<<LED_GREEN);    // Turn off to make a dash

    }

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

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!