

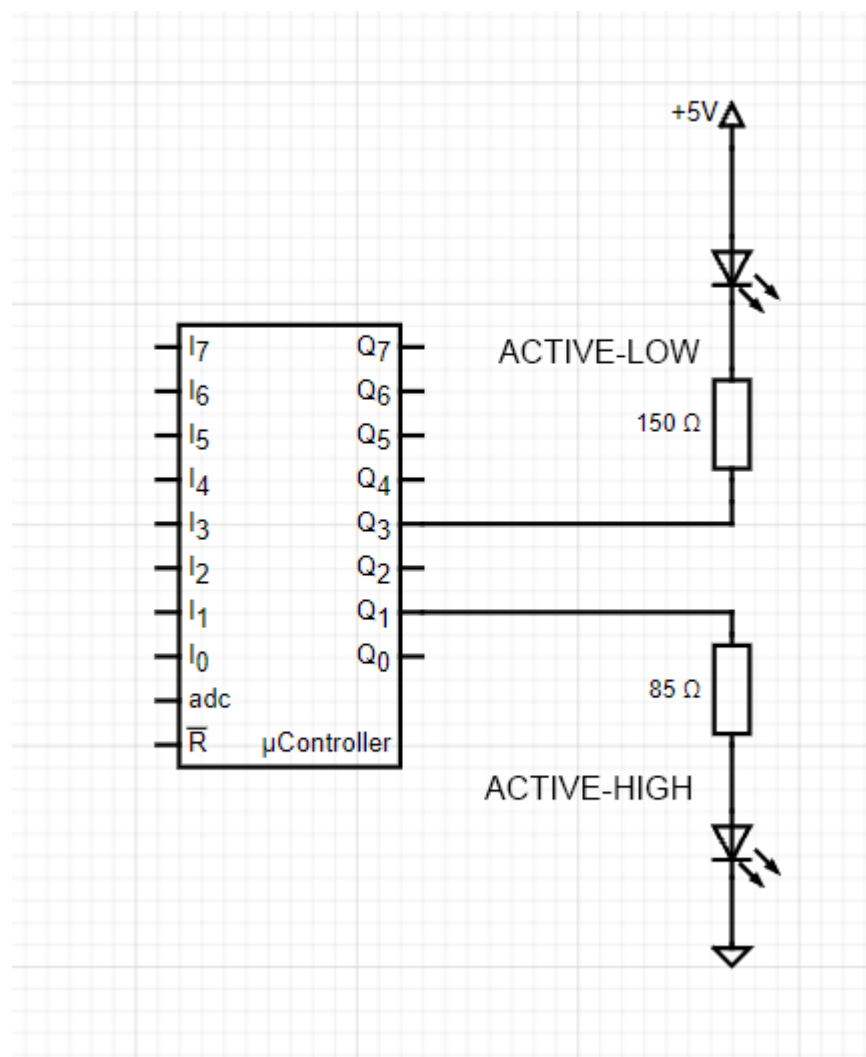
02-leds

My repository

[My git - Tomáš Kříčka, 223283](#)

Preparation tasks

Schema of LED active-low and LED active-high



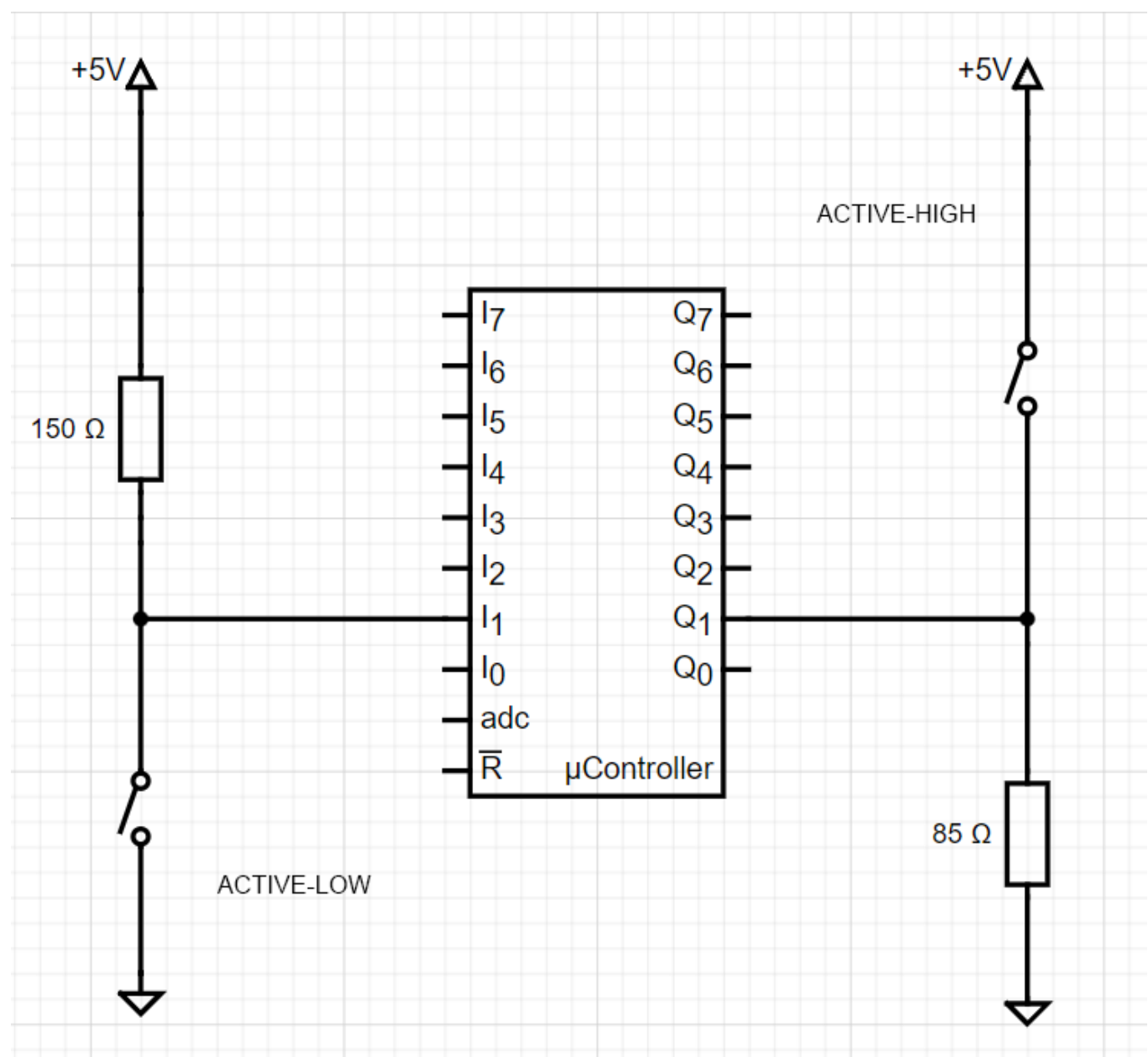
Rezistor calculation

$$R_{RED} = \frac{V_{SUP} - V_{RED_LED}}{I} = \frac{5 - 2}{20 \cdot 10^{-3}} = 150 \, \Omega$$

$$R_{BLUE} = \frac{V_{SUP} - V_{BLUE_LED}}{I} = \frac{5 - 3.3}{20 \cdot 10^{-3}} = 85 \, \Omega$$

LED color	Supply voltage	LED current	LED voltage	Resistor value
red	5 V	20 mA	2 V	150 Ω
blue	5 V	20 mA	3.3 V	85 Ω

Schema of button active-low and button active-high



2. Active-low and active-high LEDs

/* I/O ports page 100*/

DDRB	Description
0	Input pin

1	Output pin
---	------------

PORTB	Description
0	Output low value
1	Output high value

DDRB	PORTB	Direction	Internal pull-up resistor	Description
0	0	input	no	

DDRB	PORTB	Direction	Internal pull-up resistor	Description
0	1	input	yes	
1	0	output	no	
1	1	output	no	Tri-state, high-impedance

Port	Pin	Input/output usage?
A	x	Microcontroller ATmega328P does not contain port A
B	0	Yes (Arduino pin 8)
	1	Yes (Arduino pin 9)
	2	Yes (Arduino pin 10)
	3	Yes (Arduino pin 11)
	4	Yes (Arduino pin 12)
	5	Yes (Arduino pin 13)
	6	No
	7	No
C	0	Yes (Arduino pin A0)
	1	Yes (Arduino pin A1)
	2	Yes (Arduino pin A2)
	3	Yes (Arduino pin A3)
	4	Yes (Arduino pin A4/SDA)
	5	Yes (Arduino pin A5/SCL)
	6	Yes (Arduino pin RESET)
	7	No
D	0	Yes (Arduino pin RX<-0)
	1	Yes (Arduino pin TX->1)
	2	Yes (Arduino pin 2)
	3	Yes (Arduino pin 3)
	4	Yes (Arduino pin 4)
	5	Yes (Arduino pin 5)
	6	Yes (Arduino pin 6)
	7	Yes (Arduino pin 7)

Blinking separately

```
while(1)
{
    _delay_ms(BLINK_DELAY);
    PORTB = PORTB | (1<<LED_GREEN);
    _delay_ms(BLINK_DELAY);
    PORTB = PORTB &~ (1<<LED_GREEN);
    _delay_ms(BLINK_DELAY);
    PORTC = PORTC | (1<<LED_WHITE);
    _delay_ms(BLINK_DELAY);
    PORTC = PORTC &~ (1<<LED_WHITE);
}
```

Blinking together

```
while(1)
{
    _delay_ms(BLINK_DELAY);
    PORTB = PORTB | (1<<LED_GREEN);
    PORTC = PORTC | (1<<LED_WHITE);
    _delay_ms(BLINK_DELAY);
    PORTB = PORTB &~ (1<<LED_GREEN);
    PORTC = PORTC &~ (1<<LED_WHITE);
}
```

4.Push button

```
int main(void)
{
    DDRB = DDRB | (1<<LED_GREEN);
    PORTB = PORTB & ~(1<<LED_GREEN);

    DDRC = DDRC | (1<<LED_WHITE);
    PORTC = PORTC & ~(1<<LED_WHITE);

    DDRD = DDRD &~ (0<<BUTTON);
    PORTD = PORTD | (1<<BUTTON);
}
```

```

while(1)
{
    if (bit_is_clear(PIND ,BUTTON))
    {
        PORTB ^= (1<<LED_GREEN);
        PORTC ^= (1<<LED_WHITE);
        loop_until_bit_is_clear(PIND, BUTTON);
    }
}
return 0;
}

```

Knight rider

