

master ▾

...

Digital-Electronics-2 / labs / lab2 /



FilipPaul ...

now



..



lab2_LED

1 hour ago



pictures

38 minutes ago



Readme.md

now

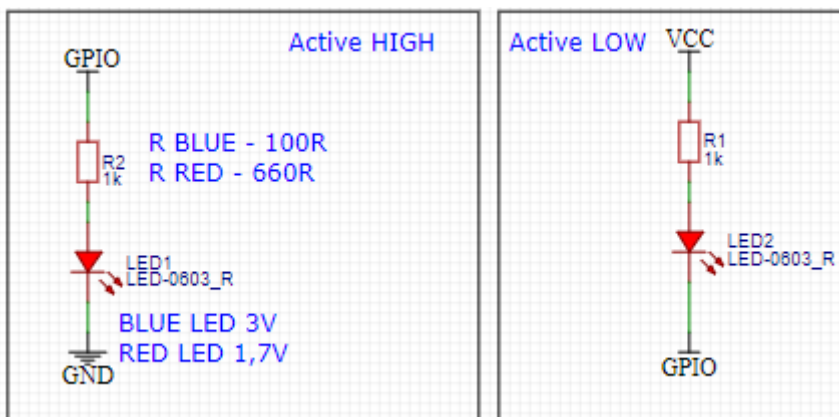
Readme.md



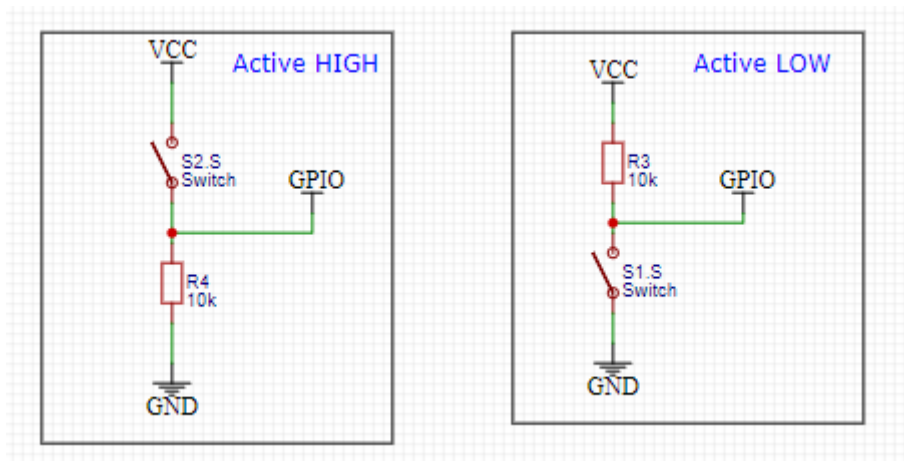
lab2

Preparation TASK

LEDs in common wiring



Pushbuttons in common wiring



computation of current limiting resistors

$$R = \frac{V_{SUPPLY} - V_{LED}}{I} = \frac{5 - 3}{20mA} = 100\Omega$$

LED color	Supply voltage	LED current	LED voltage	Resistor value
red	5 V	20 mA	1,7 V	660 Ω
blue	5 V	20 mA	3 V	100 Ω

Lab results

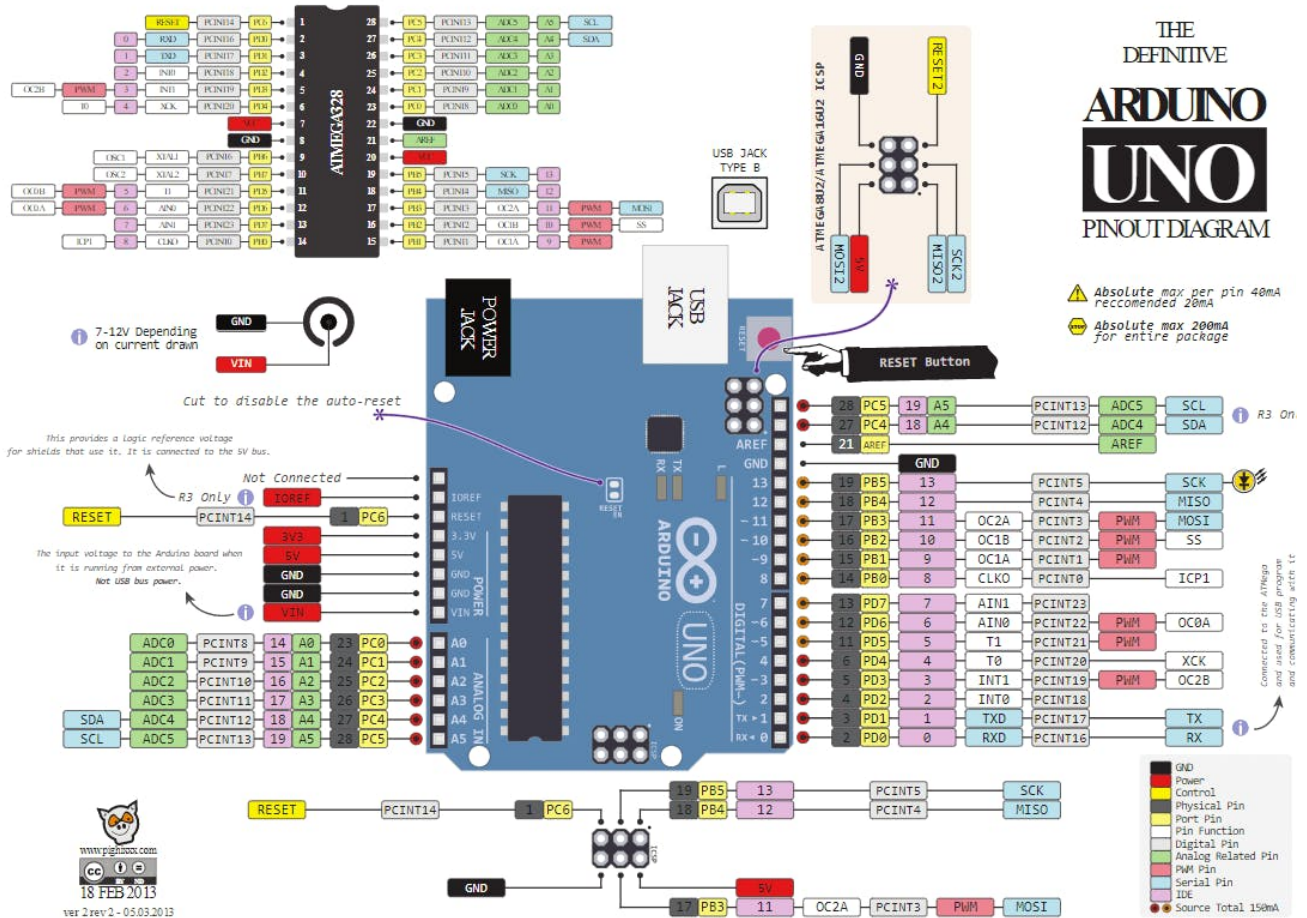
DDRB	Description
0	Input pin
1	Output pin

PORTB	Description
0	Output low value
1	Output HIGH value

DDRB	PORTB	PUD (in MCUCR)	Direction	Internal pull-up resistor	Description
0	0	X	input	no	Tri-state, high-impedance
0	1	0	input	yes	PBx will source current if ext.pulled low.

DDRB	PORTB	PUD (in MCUCR)	Direction	Internal pull-up resistor	Description
0	1	1	input	no	Tri-state, high-impedance
1	0	X	output	no	Output low (sink)
1	1	1	output	no	Output high (source)

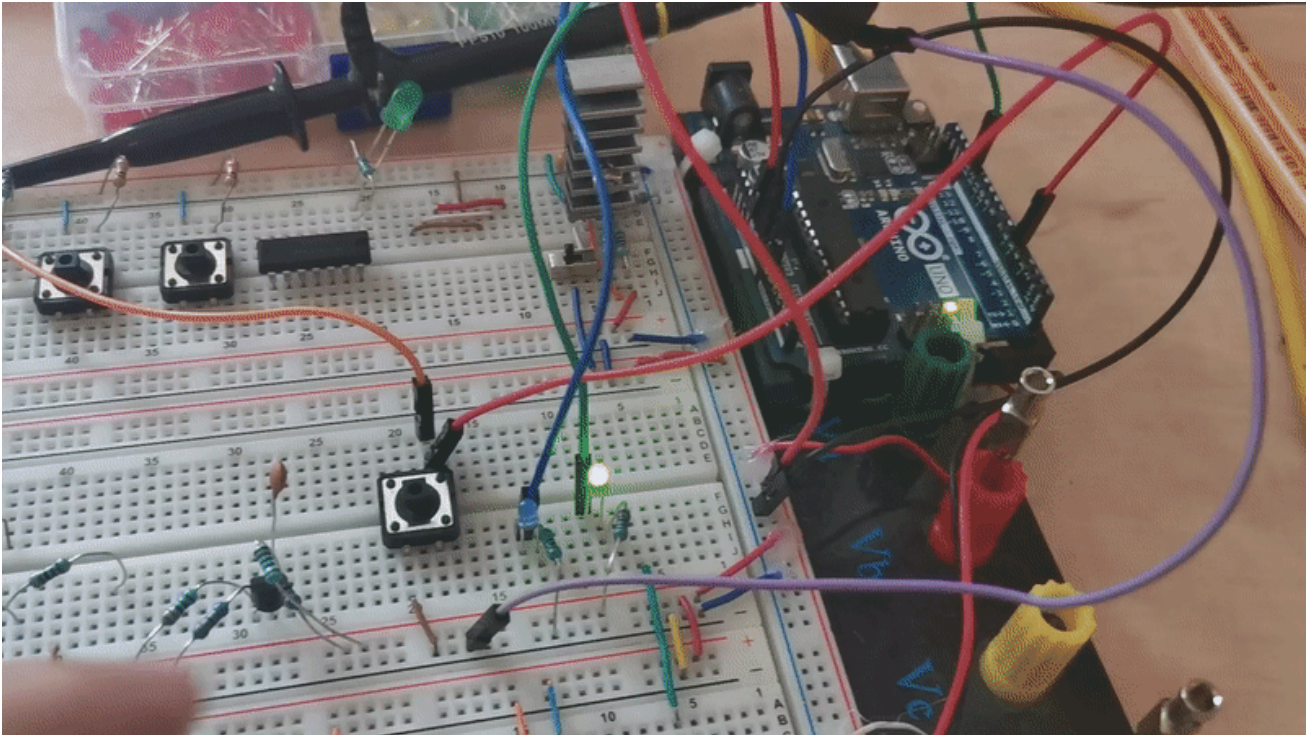
Arduino UNO Schematics



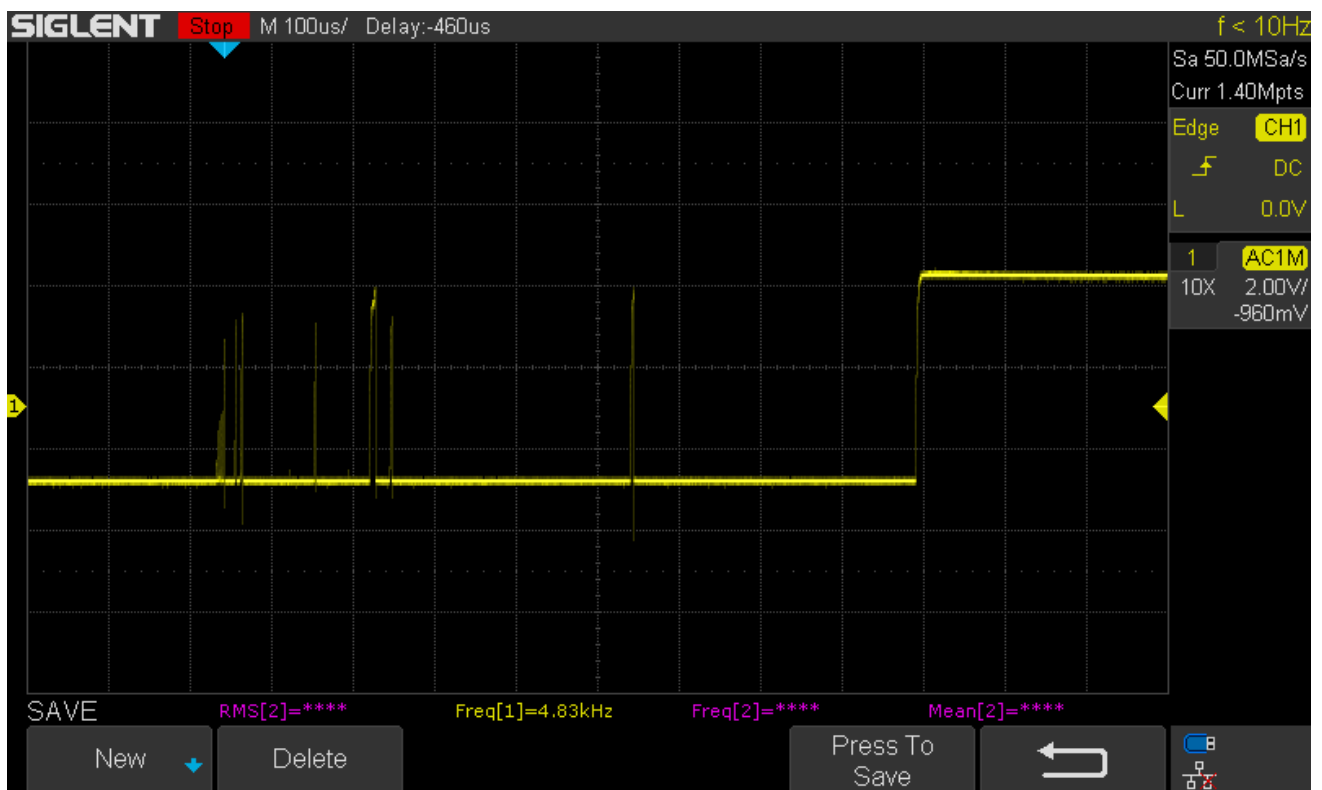
Port	Pin	Input/output usage?
	6	NO(Arduino pin OSC1,XTAL1,)
	7	NO (Arduino pin OSC2,XTAL2,)
C	0	Yes (Arduino pin A0(14))
	1	Yes (Arduino pin A1(15))
	2	Yes (Arduino pin A2(16))
	3	Yes (Arduino pin A3(17))
	4	Yes (Arduino pin A4(18)),SDA
	5	Yes (Arduino pin A5(19)),SCL
	6	NO (Arduino pin RST)
	7	NO (Arduino pin Undefined)
D	0	Yes (Arduino pin RXD<-0)
	1	Yes (Arduino pin TXD(1)
	2	Yes (Arduino pin 2)
	3	Yes (Arduino pin 3,PWM)
	4	Yes (Arduino pin 4)
	5	Yes (Arduino pin 5, PWM)
	6	Yes (Arduino pin 6. PWM)
	7	Yes (Arduino pin 7, PWM)

Test circuit and code

the code is [here](#)



My own button bouncing



```

/*****
*
* Alternately toggle two LEDs when a push button is pressed.
* ATmega328P (Arduino Uno), 16 MHz, AVR 8-bit Toolchain 3.6.2
*

```

```

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* Dept. of Radio Electronics, Brno University of Technology, Czechia
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*
*****/
/* Defines -----*/
#define LED_GREEN    PB5      //arduino 13 AVR pin where green LED is connected
#define LED_BLUE     PC0      // arduino 6
#define SWITCH       PD5      // arduino 5
#define BLINK_DELAY  250
#ifndef F_CPU
#define F_CPU 16000000        // CPU frequency in Hz required for delay
#endif
bool toggle_state = 1;

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

/* Functions -----*/

void toggle(){
toggle_state = !toggle_state;
_delay_ms(BLINK_DELAY);

}
/**

```

- Main function where the program execution begins. Toggle two LEDs
- when a push button is pressed.

```

*/
int main(void)

{
Serial.begin(9600);
/PUSHTBUTTON/
DDRD = DDRD & ~(0<<SWITCH); // null DDRD
// setting pull up
PORTD = PORTD |(1<<SWITCH); //

/* GREEN LED */
// Set pin as output in Data Direction Register...
DDRB = DDRB | (1<<LED_GREEN);
// ...and turn LED off in Data Register

```

```
PORTB = PORTB & ~(1<<LED_GREEN);

/* BLUE LED */
// Set pin as output in Data Direction Register...
DDRC = DDRC | (1<<LED_BLUE);
// ...and turn LED off in Data Register
PORTC = PORTC & ~(1<<LED_BLUE);

// Infinite loop
while (1)
{
    if (bit_is_clear(PIND,SWITCH)){

        PORTB = PORTB^(1<<LED_GREEN);
        PORTC = PORTC^(1<<LED_BLUE);
        // Pause several milliseconds
        _delay_ms(BLINK_DELAY);

    }

    // WRITE YOUR CODE HERE
}

// Will never reach this
return 0;

}
```
