

# Lab 1: Alexandre TRUONG

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Link to my Digital-electronics-2 GitHub repository:

<https://github.com/AkaiRyussei/Digital-electronics-2>

## Blink example

1. What is the meaning of the following binary operators in C?

- `|` stands for the binary operation OR.
- `&` stands for the binary operation AND.
- `^` stands for the binary operation XOR.
- `~` stands for the binary operation NOT.
- `<<` stands for the binary operation logical shift left.
- `>>` stands for the binary operation logical shift right.

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" (BTW, in Morse code it is letter A ) on a LED:

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

    // Infinite loop of the letter A in morse " . _ "
    // a dot corresponds to the LED switched on for a SHORT_DELAY
    // a comma corresponds to the LED switched on for two SHORT_DELAY
    // between a comma and a point, the LED is switched off for a SHORT_DELAY
    // between two letters, the LED is switched off for two SHORT_DELAY
```

```

while (1)
{
    PORTB = PORTB ^ (1<<LED_GREEN); // .
    _delay_ms(SHORT_DELAY);

    PORTB = PORTB & ~(1<<LED_GREEN); // pause between two components of a letter
    _delay_ms(SHORT_DELAY);

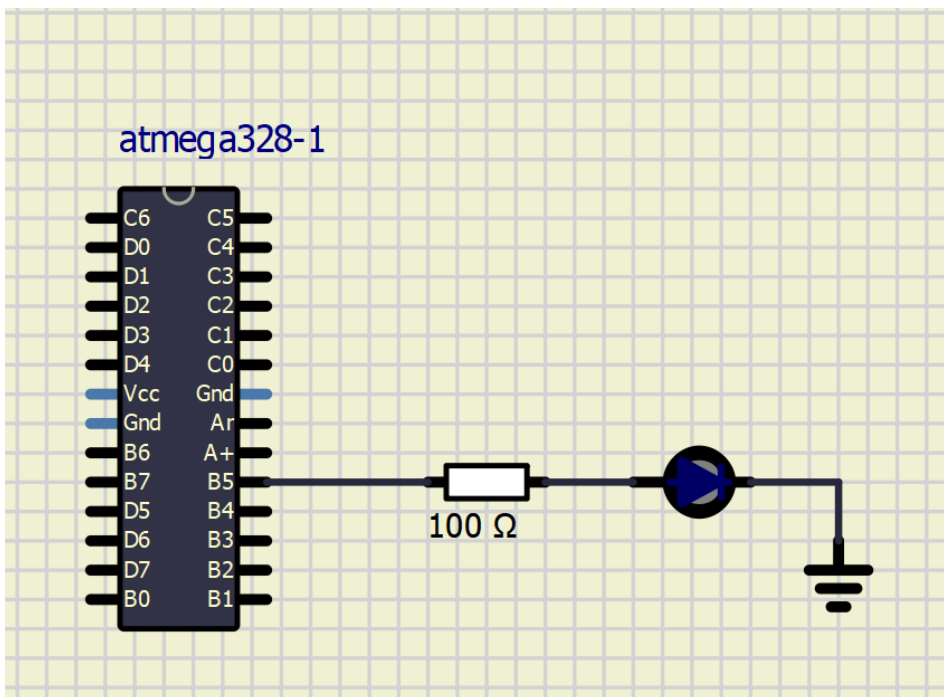
    PORTB = PORTB ^ (1<<LED_GREEN); // _
    _delay_ms(SHORT_DELAY*2);

    PORTB = PORTB & ~(1<<LED_GREEN); // pause between two letters
    _delay_ms(SHORT_DELAY*2);

}
// 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!



Led-4	
m	Valeur
itemtype	Led
ID	Led-4
Afficher ID	false
Couleur	yellow
Seuil	2,4
Courant max	0,03
Résistance	0,6
Masse	false

Led:

To simplify the circuit you can set "Gronded" property to true. This creates a virtual connection from diode cathode to ground. Cathode pin will dissapear deleting any wire connected to it.

Led will blink white when the maximun current is exedeed by aprox 40%.