

Lab 5: Alexandre TRUONG

Link to my Digital-electronics-2 GitHub repository:

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

7-segment library

1. In your words, describe the difference between Common Cathode and Common Anode 7-segment display.
 - CC SSD : CC is active high, each segment-driving output is normally low, but goes high to turn a segment on.
 - CA SSD : CA is active low, each segment-driving output is normally high, but goes low to turn a segment on.
2. Code listing with syntax highlighting of two interrupt service routines (TIMER1_OVF_vect, TIMER0_OVF_vect) from counter application with at least two digits, ie. values from 00 to 59:

```
/******  
 * Function: Timer/Counter1 overflow interrupt  
 * Purpose: Increment counter value from 00 to 59.  
******/  
ISR(TIMER1_OVF_vect)  
{  
    // WRITE YOUR CODE HERE  
    cnt0++;  
    if(cnt0 > 9)  
    {  
        cnt0 = 0;  
        cnt1++;  
        if (cnt1 > 5)  
        {  
            cnt1 = 0;  
        }  
    }  
}
```

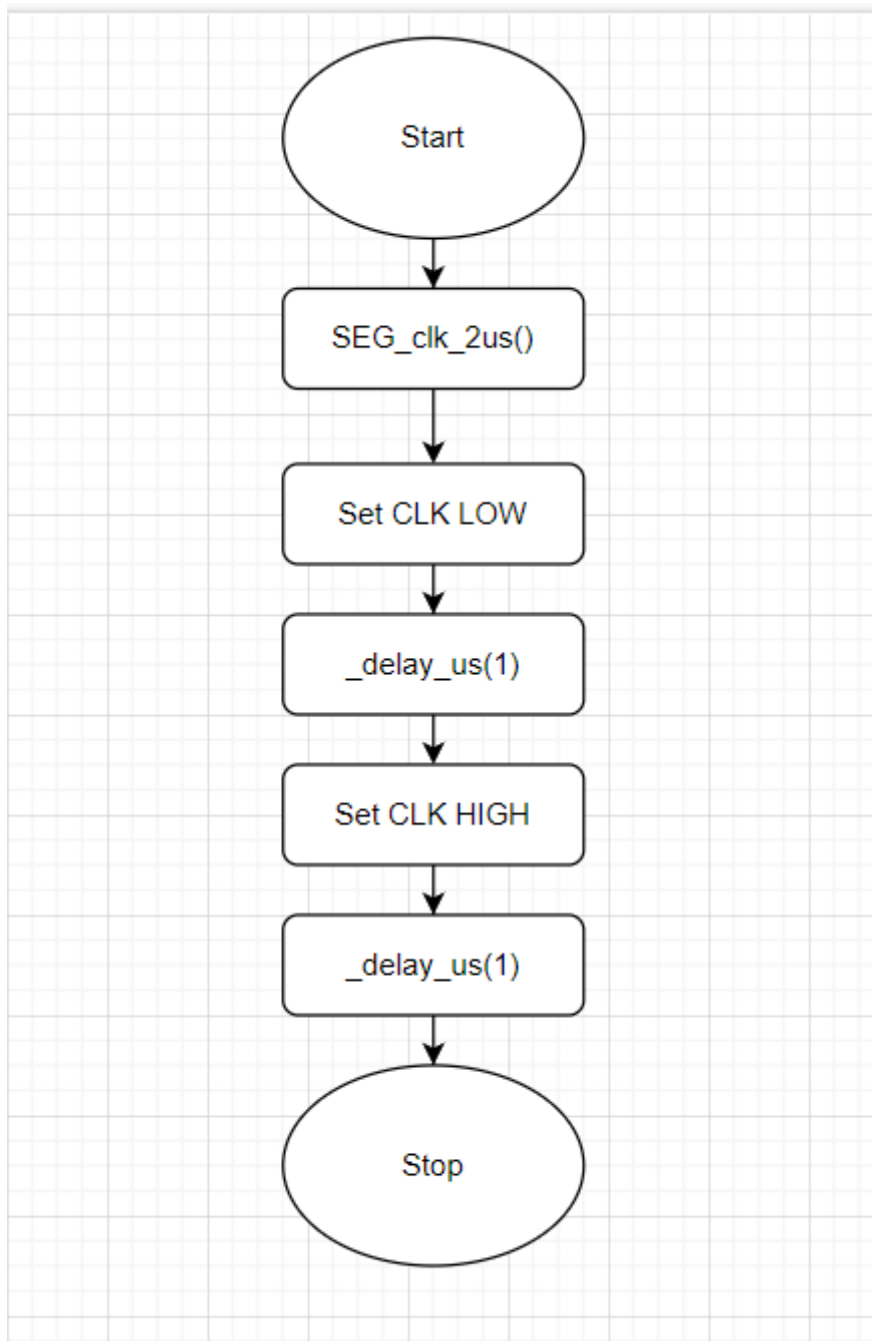
```
/******  
 * Function: Timer/Counter0 overflow interrupt  
 * Purpose: Display tens and units of a counter at SSD.  
******/  
ISR(TIMER0_OVF_vect)  
{  
    static uint8_t pos = 0;  
  
    // WRITE YOUR CODE HERE  
    if (pos == 0){
```

```

        SEG_update_shift_regs(cnt0, 0);
    }
    else if (pos == 1) {
        SEG_update_shift_regs(cnt1, 1);
    }
    pos++;
    if(pos > 1)
    {
        pos = 0;
    }
}
}

```

3. Flowchart figure for function `SEG_clk_2us()` which generates one clock period on `SEG_CLK` pin with a duration of 2 us. The image can be drawn on a computer or by hand. Use clear descriptions of the individual steps of the algorithms.



Kitchen alarm

Consider a kitchen alarm with a 7-segment display, one LED and three push buttons: start, +1 minute, -1 minute. Use the +1/-1 minute buttons to increment/decrement the timer value. After pressing the Start button, the countdown starts. The countdown value is shown on the display in the form of mm:ss (minutes.seconds). At the end of the countdown, the LED will start blinking.

1. Scheme of kitchen alarm; do not forget the supply voltage. The image can be drawn on a computer or by hand. Always name all components and their values.

