Experiment 4

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Question 1 - Part one

Show "Hello World!" message on LCD

For this part we have 2 main functions:
- Cmd -> to get commands to LCD
- Show_on_lcd -> to display char in LCD

Note: a screenshot of simulation attached with name result.png
Note: commands of LCD get from this table:

Hex Code	Command to LCD Command Register
0E	Display on, Cursor on
0F	Display on, cursor blinking
10	Shift cursor position to left
14	Shift cursor position to right
18	Shift the entire display to the left
1C	Shift the entire display to the right
80	Force cursor to the beginning of 1st line
C0	Force cursor to the beginning of 2nd line
28	2-lines and 5 × 7 matrix D4-D7, 4 bits
33	Go into 4-bit operating mode
32	Go into 4-bit operating mode
38	2-lines and 5 × 7 matrix D0-D7, 8 bits

Resources:
- [16x2 LCD Interfacing with Atmega16| Black Box Problem Solved](#)

Question 1 - Part 2

Design Digital clock with timer2 & display on LCD

In this part, we use timer 2 with the bottom config to make 1s timer:

- Timer 2 - 8 bit
    - Prescaler = 256
    - Overflows = 122
    - Reminder = 18
    - This timer should count every 1s

Note: a screenshot of simulation attached with name result.png.

Resources:

- [AVR Timers - TIMER2 | maxEmbedded](#)

Question 1 - Part 3

Design Digital Alarm with timer 1 & display message "finished" when done.

In this part we need to create 1s timer with the bottom configuration:

- Timer = Timer 1 - 16 bit
    - Prescaler = 8
    - Overflows = 15
    - Reminder = 16960

For the setup timer we have 3 push buttons with names:

- UP (+)
- DOWN(-)
- SUBMIT
    - This change states from setup hours -> minutes -> seconds -> start timer

Note: a result of part attached with name result.mkv

Resources:
- [AVR Timers – TIMER1 » maxEmbedded](#)