

CS 431-1 Embedded Systems

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Lab 3

Working Draft! - Keep checking here for changes.

Your assignment is to build a morse code flasher. You shall program the edsim51 emulator to receive characters from serial port and flash the corresponding chars using ONE of the LEDs.

- Input chars should be buffered internally until enter (\n) is sent from serial (fixed size buffer is OK). **This is why you must use edsim51_nonewline variant!**
- Chars that are not numbers should be ignored (e.g. abc123qwe is equivalent to 123). So you only need to write a morse lookup table for chars '0'-'9'.
- If enter was pressed during the flashing of a previous sequence, the flashing job should restart with the new sequence.
- Make sure to think of and to handle any other potential problems.

You will make a demo of, and upload a code of working parts below that build up to the full functionality. No report is needed, however you will demo your code and present it to myself or your TA.

To begin with, you will use Round-Robin architecture (no ISRs (callbacks, etc.)). **Unfortunately due to 15th of July Holiday we didn't yet get to cover the subject, however a round robin loop is basically what you did in previous lab. And David's book (main textbook clearly explains the idea).**

Parts:

1. Demonstrate you are able to receive chars by echoing them back. (5 pts)
2. Demonstrate you are able to save sequences by printing them back when enter is pressed. (10 pts)
3. Demonstrate you are able to flash certain hard-coded chars. (10 pts)
4. Demonstrate you are able to flash hard-coded strings. (5 pts)
5. Demonstrate you can report back to serial when you finish flashing strings. (5 pts)
6. Demonstrate you can report back to serial when you cancel flashing strings; i.e. when a new sequence is entered before flashing a new one is finished. (5 pts)
7. Connect it all together, and demonstrate full functionality. i.e. demonstrate you can cancel flashing of sequences and handle other test cases. (10 pts). Cancellation does not need to occur during a character's flashing.
8. Repeat all with RR w/ISR architecture (40 pts). **Again we didn't yet get to formally cover what RR w/ISR architecture is, but main textbook clearly explains the structure and we've been in fact seeing this structure for the last few lectures.**

In-demo questions will be worth the last 10 pts.

For this lab only; for morse-code sequences programming busy-waits are allowed. But please feel free to use Timers or any other method of non-busy waiting if you feel like it, you already have the code segments ready from previous lab. Also note that you are only allowed to use official keil libraries and not the user/community libs/codes.

p.s.1: some of you may notice that some of these steps are basically the same code and/or 1 line of difference. That is fine, it just means you were on the right path and it just means free points for you.

p.s.2: you will re-implement almost entirely the same system using an RTOS (FreeRTOS) as the final lab. Do this lab well, and you'll be able to recycle a lot of code.

For this lab it's utmost important that you use the edsim51_nonewline.jar variant, the standard one doesn't play nice with getc, getchar or scanf variants. The standard one sends a new line every time you press send.

 [edsim51di.tar.gz](#)

7 July 2020, 11:36 AM

Grading summary

Hidden from students

No

Participants	11
Submitted	8
Needs grading	8
Due date	Thursday, 23 July 2020, 2:30 PM
Time remaining	Assignment is due
Late submissions	Only allowed for participants who have been granted an extension

[View all submissions](#)[Grade](#)[◀ Serial Port Tutorial \(a little too late perhaps\)](#)[Lab 3 Discussion ►](#)

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CS 431-1

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