

Operating System Lab Assignment 01: Design and Deploy Standard Input, Output, Error Interface, Seven Segment Display Driver

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1 Objectives and Policies

1.1 General Objectives

The objectives of the lab assignment are to understand and have hands-on training to build confidence and working knowledge in developing operating system standard input, output, error driver, and system services. You will use these expanded system services throughout the lab course for input and output data using standard input and output devices.

1.2 Assessment Policy

The assignment has three level objectives (i) primary objectives, (ii) advanced objectives, and (iii) optional boost objectives. Every student must complete the primary objective; however, they can attempt advanced and optional Boost-up objectives. The advanced objective will be a primary objective in the subsequent assignment. Further, you can achieve five (5) marks for completing the optional objectives and add these marks at the end of the semester with your total lab marks. However, you cannot get more than 100% assigned for the labs. The current lab does not contain advanced or optional boost objectives.

2 What to do?

- Download code ‘duos.tar’ from course website.
- Untar ‘duos.tar’
- Current code has a implement of ‘kprintf(..)’ and ‘kscanf(..)’ function in ‘kstdio/kstdio.h’
- Modify ‘init’ module and add your name
- develop a seven segment driver to display 0-9 using ‘kprintf’

To compile the code, go to ‘duos/src/compile’ and execute ‘make all.’ After successful compilation, download the code to the microcontroller and execute. The code should display output and input from the terminal program without error.

3 DUOS Source tree (we will explain in the lab class)

- ‘compile’ – contains Makefile for compile and build the kernel. If you run in Windows OS, update Makefile accordingly, especially ‘clean’ and ‘load’ sections
- ‘You may need to install and configure ‘openocd’ for download the code
- ‘kern’ contains all necessary files and packages for the kernel code.
- ‘kern/arch’ has MCU and Peripheral driver code – you are free to modify without changing the function name
- ‘include’ directories contain a ‘C’ headers for necessary function prototypes
- ‘kmain’ has the boot program called by reset handler

4 What to submit?

Submit functional code correctly for ‘seven-segment display driver’ and ‘initial or boot message modification.’ Compress the ‘duos’ to ‘duos.tar (or zip)’ and submit it to google classroom. Also, the submission must contain a report describing your implementation. You must demonstrate your work after two weeks. We will announce the demonstration date later. Save this work; later, you will use it for system calls and device drivers.

Alert:The current function may not be fully functional for interrupt and other services. However, you can add codes for interrupt. Please discuss this with me before adding any extra functionalities.

Alert:You can discuss with your classmates, however, do not copy code from others.