

National University of Computer and Emerging Sciences



Laboratory Manual
for
Computer Organization and Assembly Language Programming
(EL 213)

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Objectives

After performing this lab, students shall be able to:

- ✓ Display Memory
- ✓ Hooking
- ✓ Interrupts
- ✓ TSR

Exercise 1: Write a TSR to calculate the current typing speed of the user. Current typing speed is the number of characters typed by the user in the last five seconds. The speed should be represented by printing asterisks at the right border (80th column) of the screen starting from the upper right to the lower right corner (growing downwards). Draw n asterisks if the user typed n characters in the last five seconds. The count should be updated every second.

Exercise 2: Write a TSR to make a screensaver by hooking into interrupt 9h (keyboard interrupt) and interrupt 8h (timer interrupt). The screensaver should initially set the screen to a specific color, and if the user does not press any key within 10 seconds (detected through the timer interrupt), the screen color should change. The program should allow the user to terminate the screensaver by pressing any key (captured through the keyboard interrupt).

Exercise 3: Write an assembly program to create a Terminate Stay Resident (TSR) application by hooking into interrupt 9h (keyboard interrupt). The program should perform the following tasks:

1. Wait for a keystroke from the user.
2. Handle only five keystrokes: "a" for the upper-left part, "b" for the upper-right part, "c" for the lower-left part, "d" for the lower-right part, and "esc" to terminate the program.
3. When a key "a," "b," "c," or "d" is pressed, display a timer in the respective part of the screen.
4. The timer should continue to display until another key "a," "b," "c," "d," or "esc" is pressed.
5. If "esc" is pressed, the program should terminate. Otherwise, in the case of key "a," "b," "c," or "d," the timer should restart and display in the corresponding part of the screen.

An image is attached below for illustrative purposes of where the parts of the screen would be.

