**Lab 11 Assembly Fall 2017 Sec C 21/11/17**

**Question 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.

**Question 2**

**Note: Perform all subtasks in a single asm file.**

1. Write a keyboard interrupt service routine which moves character ‘\*’ (interval between next and previous \* should be 1 sec) on the video screen. It moves the character to the left if ‘a’ is pressed. If ‘d’ is pressed the character is moved to the right. The character is moved up if ‘w’ is pressed. Similarly the character is moved right if ‘d’ is pressed. You have to work with the scan codes of keys pressed in your kbsir. The character cannot move up any further if it has reached the top edge of the screen. The same is the case when the character reaches the other edges of the screen. For printing the character, you have to use bios’ video service int 0x10.

mov ah, 0x13 ; service 13 - print string

mov al, 1 ; subservice 01 – update cursor

mov bh, 0 ; output on page 0

mov bl, 7 ; normal attrib

mov dx, 0x0A03 ; row 10 column 3

mov cx, 11 ; length of string

push cs

pop es ; segment of string

mov bp, message ; offset of string

int 0x10 ; call BIOS video service

The strings in your case are ‘\*’ and ‘ ‘. Each is of length 1. You are not allowed to use clrscr routine. You have to maintain x and y coordinates (row number and column number)

1. Modify your program so that the original kbsir is also run after your kbsir is run. Do interrupt chaining.
2. Modify your program so that your main routine waits for escape key using int 0x16.

mov ah, 0 ; service 0 – get keystroke

int 0x16 ; call BIOS keyboard service (the character will be returned in al register)

1. Modify your program so that that your kbsir become TSR after your program has terminated.

**Mat Kaho KHUDA Se**, MERI Mushkilein Badi **Hai**

MUSKILON Se Keh Do, **Mera** KHUDA Bada **Hai**