

## **CS401 – Computer Architecture & Assembly Language Programming**

### **Lab Exercise – Week 12**

You are required to write a TSR program that will print total number of characters in your name (including spaces within complete name) on top left corner of screen once you will press first letter of your name from keyboard.

```
; Example student name : Muhammad Rizan Mir
; Name length : 18
[org 0x0100]
jmp start
oldisr: dd 0 ; space for saving old isr

; keyboard interrupt service routine
kbisr: push ax
push es
mov ax, 0xb800
mov es, ax ; point es to video memory
in al, 0x60 ; read a char from keyboard port
cmp al, 0x32 ; check if m has been pressed
jne nomatch
mov byte [es:0], '1' ; yes, print 1 at first column
mov byte [es:2], '8' ; yes, print 8 at second column

; jmp exit ; leave interrupt routine
nomatch: pop es
pop ax
jmp far [cs:oldisr] ; call the original ISR
exit: mov al, 0x20
out 0x20, al ; send EOI to PIC
pop es
pop ax
iret ; return from interrupt
start: xor ax, ax
mov es, ax ; point es to IVT base
mov ax, [es:9*4]
mov [oldisr], ax ; save offset of old routine
mov ax, [es:9*4+2]
mov [oldisr+2], ax ; save segment of old routine
cli ; disable interrupts
mov word [es:9*4], kbisr ; store offset at n*4
mov [es:9*4+2], cs ; store segment at n*4+2
```

```
sti ; enable interrupts
mov dx, start ; end of resident portion
add dx, 15 ; round up to next para
mov cl, 4
shr dx, cl ; number of paras
mov ax, 0x3100 ; terminate and stay resident
int 0x21
```

### **Mechanism to Conduct Lab:**

Students and teacher communicate through Skype/Adobe Connect. Students will write code using Notepad or Programmer's Notepad and will share code and screen output.

Nasm: <https://vulms.vu.edu.pk/Courses/CS401/Downloads/AssmSoft.zip>

DosBOX: <http://sourceforge.net/projects/dosbox/files/dosbox/0.74-2/DOSBox0.74-2-win32-installer.exe/download>

Programmers Notepad: <https://github.com/simonsteele/pn/releases/download/v2.4.2/portable-pn2421440.zip>