

Lab 7

Loop Instruction Interrupts

أعداد: م.م. سمر أميل يوسف

Loop Instruction

Q: $1+2+3+\dots+9$

```
Mov cl,9
```

```
Top: add dl,cl
```

```
Loop Top
```

```
ret
```

Q: Write a program in assembly language to compute the sum of array a1 elements?

```
mov cx, 5
```

```
sum:
```

```
    add al,a1[si]
```

```
    inc si
```

```
    loop sum
```

```
ret
```

```
a1 db 1, 2, 3, 4, 5
```

Q: Write a program in assembly language to add a1 array to a2 and put result in a3 array?

```
mov cx, 4
sum:
    mov al,a1[si]
    add al,a2[si]
    mov a3[si], al

    inc si
    loop sum
ret
a1 db 1, 2, 5, 6
a2 db 3, 5, 6, 1
a3 db ?, ?, ?, ?
```

Interrupts

Hardware Interrupts

Software Interrupts can be seen as a **number of functions**. These functions make the programming much easier, instead of writing a code to print a character you can simply call the interrupt and it will do everything for you.

INT instruction

To make software interrupt

INT Value

The value number can be between 0 to 255 (0 to 0FFh)

INT instruction

INT 10h

The following example uses **INT 10h** sub-function **0Eh**.

This functions displays a character on the screen.

INT instruction

ORG 100h

MOV **AH, 0Eh**

MOV **AL, 'H'** ; ASCII code: 72

INT 10h ; print it!

RET ; returns to operating system.

INT instruction

ORG 100h

MOV **AH, 0Eh**

MOV **AL, 'H'** ; ASCII code: 72

INT 10h ; print it!

MOV **AL, 'e'** ; ASCII code: 101

INT 10h ; print it!

MOV **AL, 'l'** ; ASCII code: 108

INT 10h ; print it!

MOV **AL, 'l'** ; ASCII code: 108

INT 10h ; print it!

MOV **AL, 'o'** ; ASCII code: 111

INT 10h ; print it!

RET ; returns to operating system.

INT instruction

INT 21h

INT 21h use many sub-functions such as:

01h to read one value of character from keyboard

02h to write one character on the screen.

Every sub-function value was include in AH register

INT instruction

EX1: INT 21h for 01h sub-function لقراءه حرف

MOV AH, 01

INT 21H

Ret

قراءه حرفين

```
MOV AH, 01
```

```
INT 21H
```

```
MOV DL,AL
```

```
INT 21H
```

```
Ret
```

INT instruction

EX2: INT 21h for 02h sub-function

Input: load 02 into AH register

Load ASCII code into DL register

Output: Copy ASCII code into AL register

INT instruction

```
MOV AH , 02H
```

```
MOV DL , '?'
```

```
INT 21H
```

```
Ret
```

```
MOV AH, 02
```

```
mov dl,72
```

```
INT 21H
```

```
Ret
```

Library of common functions - emu8086.inc

emu8086.inc defines the following **macros**:

- **PUTC char** - macro with 1 parameter, prints out an ASCII char at current cursor position.
- **GOTOXY col, row** - macro with 2 parameters, sets cursor position.
- **PRINT string** - macro with 1 parameter, prints out a string.

```
include emu8086.inc
ORG 100h
PRINT 'Welcome'
GOTOXY 10, 5
PUTC 65      ; 65 is an ASCII code for 'A'
PUTC 'B'
RET          ; return to operating system.
```