

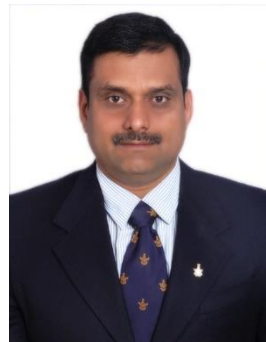


Microprocessors and Interfaces: 2021-22

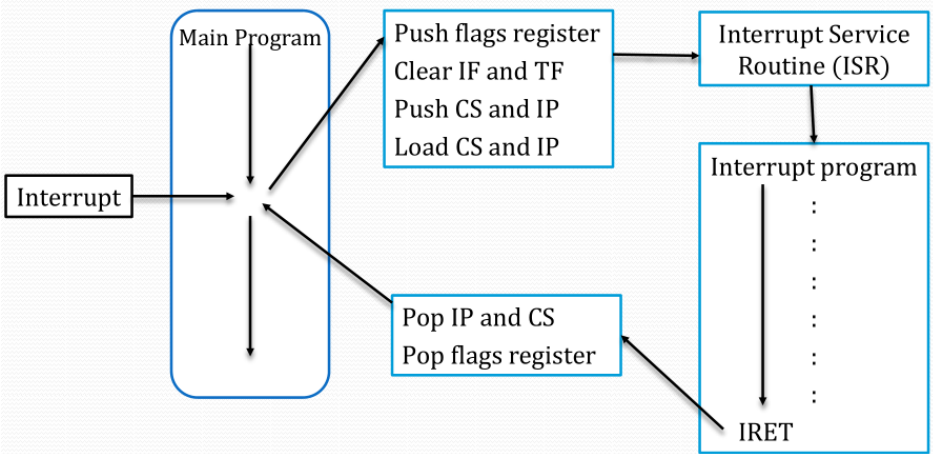
Lab 8

Interrupts

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SOFTWARE INTERRUPTS



Interrupt Type	Content (16-bit)	Address	Comments
Type 0	ISR IP	0000:0000	Reserved for divide by Zero interrupt
	ISR CS	0000:0002	
Type 1	ISR IP	0000:0004	Reserved for single step interrupt
	ISR CS	0000:0006	
Type 2	ISR IP	0000:0008	Reserved for NMI
	ISR CS	0000:000A	
Type 3	ISR IP	0000:000C	Reserved for INT single byte instruction
	ISR CS	0000:000E	
Type 4	ISR IP	0000:0010	Reserved for INTO instruction
	ISR CS	0000:0012	
Type N		0000:0014	Reserved for two byte instruction INT TYPE
		0000:0016	
Type N	ISR IP	0000:004N	Reserved for two byte instruction INT TYPE
	ISR CS	0000:(004N+2)	
Type FFH		0000:03FC	Reserved for two byte instruction INT TYPE
	ISR IP	0000:03FE	
	ISR CS	0000:03FF	

ISR : Interrupt Service Routine

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INT 21

```
Mov ah, ___h  
int 21h
```

AH	Description	AH	Description
01	Read character from STDIN	02	Write character to STDOUT
05	Write character to printer	06	Console Input/Output
07	Direct char read (STDIN), no echo	08	Char read from STDIN, no echo
09	Write string to STDOUT	0A	Buffered input
0B	Get STDIN status	0C	Flush buffer for STDIN
0D	Disk reset	0E	Select default drive
19	Get current default drive	25	Set interrupt vector
2A	Get system date	2B	Set system date
2C	Get system time	2D	Set system time
2E	Set verify flag	30	Get DOS version
35	Get Interrupt vector		
36	Get free disk space	39	Create subdirectory
3A	Remove subdirectory	3B	Set working directory
3C	Create file	3D	Open file
3E	Close file	3F	Read file
40	Write file	41	Delete file
42	Seek file	43	Get/Set file attributes
47	Get current directory	4C	Exit program
4D	Get return code	54	Get verify flag
56	Rename file	57	Get/Set file date

INT 21 / AH = 2h : Write to standard output

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```
Mov ah, 2h  
Mov dl, 'a'  
int 21h
```

The screenshot shows a debugger window with several panes. On the left, the 'registers' pane shows the state of various registers, with IP (Instruction Pointer) at 0154. The main assembly pane displays memory addresses from F4150 to F416F, with the instruction at F4154 highlighted: `CF 207 ±`. To the right, the BIOS interrupt table for INT 020h is visible, starting with `IRET`. In the foreground, a '5ch emulator screen (80x25 chars)' window is open, displaying a single character 'a' on the first line. The emulator window has a menu bar with 'clear screen' and 'change font' options, and a font size dropdown set to 8/16.

INT 21 / AH = 2Ah Read System Date

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```
Mov ah, 2Ah  
int 21h
```

The screenshot shows the emu8086 emulator interface. On the left, the assembly code is displayed:

```
01  
02 ; You may customize t  
03 ; The location of thi  
04  
05 org 100h  
06  
07 Again: mov ah, 2Ah  
08 int 21h  
09  
10  
11 hlt  
12  
13  
14 ret  
15  
16  
17  
18  
19
```

The registers window shows the following values:

Register	H	L
AX	2A	03
BX	00	00
CX	07	E5
DX	03	11
CS	0700	
IP	0104	
SS	0700	
SP	FFFE	
BP	0000	
SI	0000	
DI	0000	

The memory window shows the following values:

Address	Hex	Dec	Char
07104	F4	244	↑
07105	C3	195	↑
07106	90	144	E
07107	90	144	E
07108	90	144	E
07109	90	144	E
0710A	90	144	E
0710B	90	144	E
0710C	90	144	E
0710D	90	144	E
0710E	90	144	E
0710F	90	144	E
07110	90	144	E
07111	90	144	E
07112	90	144	E
07113	90	144	E
07114	90	144	E
07115	90	144	E
07116	90	144	E
07117	90	144	E
07118	90	144	E

A message dialog box is open, displaying the text "the emulator is halted." with an "OK" button.

It get system date; Return format: CX=year(1980-2099); DH=month; DL=day (1-31) ; AL=day of week(00h is Sunday)

Review Question

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1. Write a program using interrupt to read from standard input, store the result in the memory offset 0501h. In which format the data will be stored?

```
MOV AH,01h
INT 21h
MOV [0500h],AL
hlt
```

The data will be stored in ASCII format in the offset memory location.

2. What will be effect of the same code if AH becomes 07h?

Character input will be there without echo in AL.

3. Explain the output of the following code:

```
org 100h
MOV AH,2Ah
INT 21h
ret
```

It get system date; Return format: CX=year(1980-2099); DH=month; DL=day; AL=day of week(00h is Sunday)

INT 21 / AH = 2h : Write to standard output

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1. Repeat the problem with some arbitrary character/number.
2. Using only interrupt write an ALP which will accept a character from keyboard and print the next two characters in the screen.

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INT 21 / AH = 09h : Printing of String

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```
org 100h
.data
msg db 'BITS-PILANI$'

.code
mov ax,@data
mov ds,ax
mov dx,offset msg
mov ah,09h
int 21h
hlt
```

Thankyou

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