

# COE 205, Term 991

## Computer Organization & Assembly Programming

### HW# 5

Due date: Saturday, Nov. 20

**Q.1.** Suppose that you have the following initial content of registers and memory:

AX=1A22H BX=3C40H CX=4502H SP=1000H BP=1002H

Determine the content of SP, and modified registers and memory locations after the execution of each of the following instructions starting from the initial content of the registers and memory for the execution of each instruction.

- (i) POP AX
- (ii) PUSH BX
- (iii) MOV CX, [BP+1]
- (iv) Call Sub, where the call is a near call and Sub is at an offset address 3000H from the code segment.
- (v) RET 1

Memory Location	Content
0FFD	1A
0FFE	CF
0FFF	36
1000	1B
1001	60
1002	32
1003	FF
1004	E4

**Q.2.** Give 8086 code that performs each of the following instructions:

- (i) Write the contents of register CL into the I/O port with address 50H.
- (ii) Write the letter 'A' into the I/O port with address 1A52H.
- (iii) Read a byte from the I/O port with address 3FE2H and store it in DL.
- (iv) Move the byte content of I/O port with address 30H to the I/O port with address 60H.

**Q.3.** Determine the type of interrupt in each of the following:

- (i) INT 21H.
- (i) Overflow interrupt.
- (ii) Divide by 0 interrupt.
- (iii) Single-step interrupt.
- (iv) An active signal at the NMI input.
- (v) An active signal at the INTR input.

**Q.4.** Suppose that following fetching of the instruction INT 21H, the following registers have the values shown below:

CS=1CC2H    IP=1000H    SP=2000H    Flags=1093H

Furthermore, suppose that the memory content of a portion of the IVT is as shown below:

Memory Location	Content
0080	AB
0081	1C
0082	91
0083	10
0084	DE
0085	20
0086	3A
0087	E2
0088	25

- (i) Determine the content of the stack after executing the interrupt instruction.
- (ii) What will be the physical address of the start of the ISR servicing the interrupt.
- (iii) What will be the values of IF and TF flag bits as the first instruction in the ISR is fetched.
- (iv) Determine the content of the CS, IP, Flags, and SP after the execution of the IRET instruction at the end of the ISR.

**Q.5.** Suppose that there are two tables defined in the data segment, DS=2FF0H, namely Table1 and Table2. Table1 is at offset 1000H and Table2 is at offset 2000H. Both tables have a size of 100 bytes.

- (i) Write a code segment to copy the content of Table1 to Table2 using the instruction MOVSB and the prefix REP.
- (ii) Write a subroutine to search for a constant number, that can be represented in a byte, in a table, and returns the index of the table where the number is found in the DI register. Assume that the constant number to be searched is pushed first in the stack, followed by the table address, and finally the size of the table. Then, write a code segment to search for the number 5 in Table1 and the number 10 in Table2, using the subroutine, and store the corresponding indices in registers AX and BX respectively.

**(iii)** Write a macro to search for a constant number, that can be represented in a byte, in a table, and returns the index of the table where the number is found in the DI register. Pass the constant to be searched, the address of the table, and the table size as parameters to the macro. Then, write a code segment to search for the number 5 in Table1 and the number 10 in Table2, using the macro, and store the corresponding indices in registers AX and BX respectively.