MP unit test 1 FS19C0042

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Second Year, First shift

Course name - Microprocessor
Course code - IT19207

Q.1 Attempt any 3 out of 4

a. State the system bus with its types.

→ System bus is an electrical pathway that connects the major components of computer system. System bus reduces number of physical connections to ~~improve~~ make a system connections manageable. There are 3 types of System Bus:

1. Address Bus

Address bus carries physical addresses of memory locations processor is currently working on. It's width determines amount of memory addressable

2. Data bus

Data bus carries the data between processor and other components like memory & I/O Its width determines size of data that can be transferred at a time.

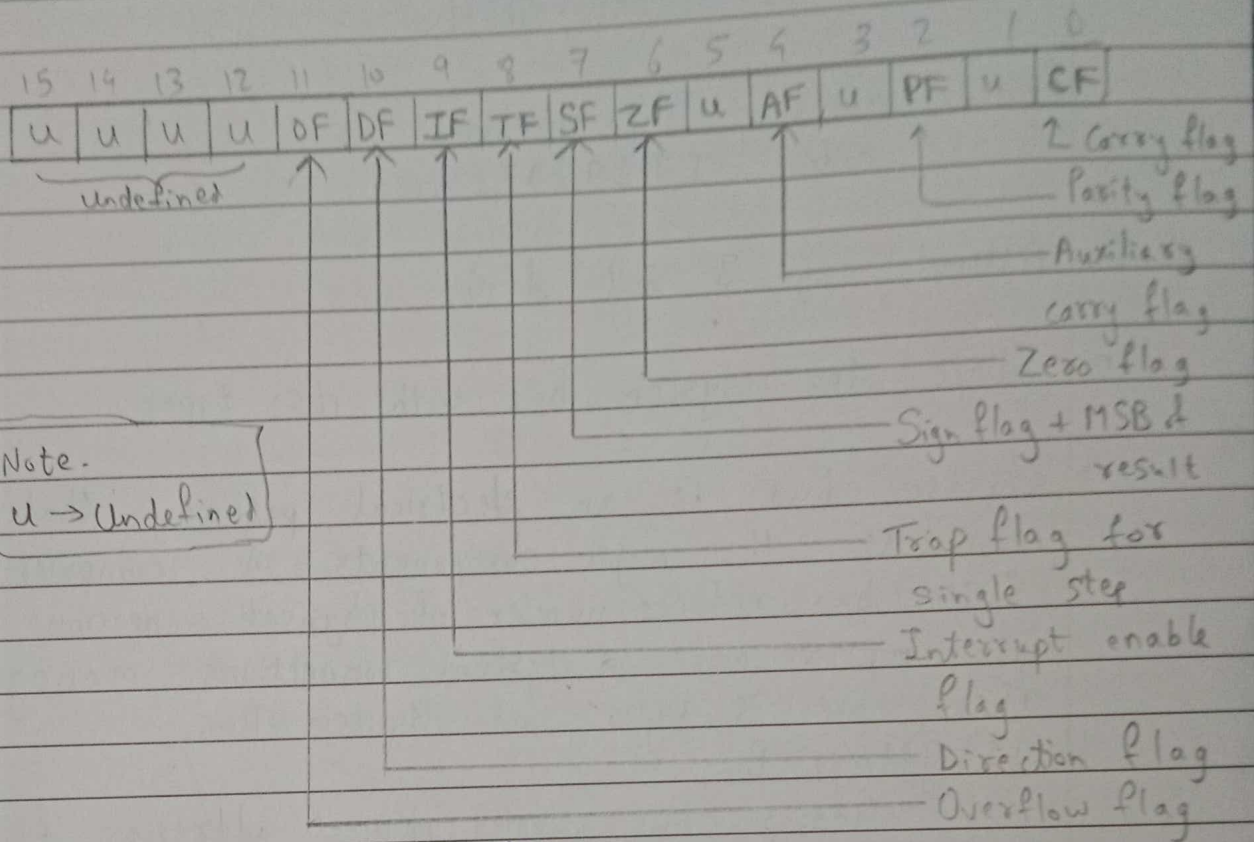
~~3. System bus~~

3. Control bus

Control bus carries control signals like memory read / write, I/O read & write, interrupts etc. These indicate type of actions

Q. 1)

b. Draw labeled flag register of 8086



Labeled 8086 flag register

d. ~~Explain~~ List any 4 instructions from bit manipulation instructions

→ Bit manipulation instructions:

1. NOT - Invert each bit of a byte or word
2. AND - ANDing each bit in byte/word with corresponding bit in another byte/word.
3. SHR - Shifts bits of word/byte right, put Zero in MSB
4. ROL - Rotate bits of byte/word left, MSB to LSB & to Carry Flag

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Q. 2) Any 2 out of 3

a. State all control signals generated by S_0 S_1 S_2

→ $\bar{S}_2$, $\bar{S}_1$, $\bar{S}_0$ are the status lines that reflect type of operation being carried out by the processor

Following are control signals generated by these:

$\bar{S}_2$	$\bar{S}_1$	$\bar{S}_0$	Function
0	0	0	Interrupt Acknowledge
0	0	1	Read I/O port
0	1	0	Write I/O port
0	1	1	Halt
1	0	0	Code access
1	0	1	Read memory
1	1	0	Write memory
1	1	1	Passive

c. Explain 4 rotate instructions with their syntax, operation & example

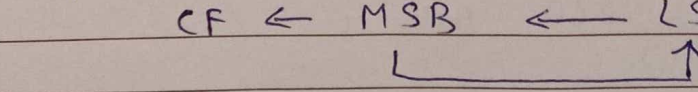
→ Rotate instructions are as follows:

1. ROL (Rotate Left)

ROL instruction rotates mentioned bits in register to left side one by one such that (MSB) leftmost bit is stored as (LSB) rightmost bit and it is also stored in carry flag.

Syntax - ROL Register, Bit

Example - ROL AH, 4



Q2.

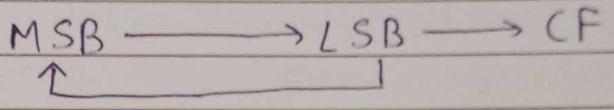
c ~~Continu~~ ... continued

2. ROR (Rotate right)

ROR instruction ~~stands~~ fo rotates mentioned bits in register to right side one by one such that LSB is stored in MSB and also stored in Carry Flag

Syntax - ROR Register, bits to be shifted

Example - ROR AH, 4

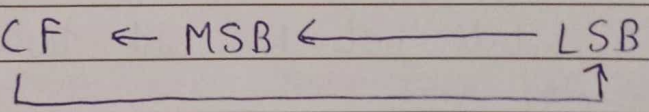


3. RCL (Rotate Carry left)

ROR instruction rotates mentioned bits in register to left side one by one such that MSB is stored in Carry Flag & bit in carry flag is moved as LSB

Syntax: RCL Register, bits to be shifted

Example. RCL CH, 1



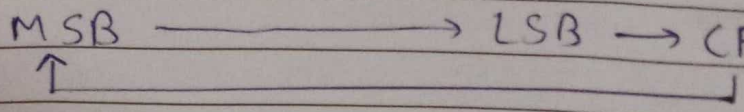
4. RCR (Rotate Carry right)

RCR instruction rotates mentioned bits in register to right side one by one such that LSB is stored in carry flag & bit in carry flag is moved as MSB

Syntax: RCR Register, bits to be shifted

Example: ~~RCR AH~~

RCR AH, 4



Q.3. Attempt any one

b. Describe any 6 addressing modes of 8086 with one example

→ Addressing modes of 8086 are as follows:

1. Immediate addressing mode
In this type of addressing, immediate data is part of instruction and appears in form of successive byte or bytes.
Example, MOV AX, 0005H
(Here, 0005H is immediate data)
It can be 8-bit / 16-bit

2. Direct addressing mode
In this type of addressing, a 16-bit memory address (offset) is directly specified in the instruction as a part of it.
Example, MOV AX, [8000 H]
(Here 8000H is address & Square brackets indicate it is an address

3. Register addressing mode
In this type of addressing, data is stored in a register & it is referred using that particular register. (IP cannot be used)
Example, MOV BL, AL
(Here both operands are registers)

... continued

Q. 3)
b

4. ~~Reg~~ Indexed addressing mode:
In this addressing mode, offset of operand is stored in one of index registers (DS & ES are default segments for index registers SI & DI respectively)

Example, MOV BX, [DI]
(Here, DI contains address)

5. Based indexed addressing mode
In this addressing mode, effective address is formed by adding content of Base register (BP/BX) to content of an index register (SI/DI)
DS & ES are default segments for SI & DI respectively

Example, MOV AX, [BX][SI]

6. Relative based indexed
In this addressing mode, effective address is formed by adding an 8/16 bit displacement with sum of contents of any of base registers (BP or BX) & any one of index registers, & ~~re~~ corresponding Default segments are considered.

Example, MOV AX, 80H [BP][SI)