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السنة الدراسية : 2023 - 2024
عنوان المحاضرة: **The Instruction Set of 8086**

The Instruction Set of 8086

- There are 117 basic instructions in the instruction set of 8086.
- The instruction set of 8086 can be divided into the following groups:
  1- Data transfer instructions
  2- Arithmetic instructions
  3- Logic instructions
  4- Shift instructions
  5- Rotate instructions
  6- Flag control instructions
  7- Compare instructions
  8- Jump instructions
  9- Subroutines and subroutine handling instructions
  10- Loop and loop handling instructions
  11- Strings and string handling instructions.

types of data transfer instructions:

(MOV): Move byte or word instructions
(XCHG): Exchange byte or word instruction
(XLAT): Translate byte instructions
(LDA): Load effective address instruction
(LDS): Load data segment instruction
(LES): Load extra segment instruction (LES)

MOV Destination,Source

Mov copies a value from source to destination. The source can be an immediate value, a register, or a memory location The destination is either a register or a memory location. At most one of source or destination can be memory.

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Example:

MOV CX, 037AH	Put immediate number 037AH to CX
MOV BL, [437AH]	Copy byte in DS at offset 437AH to BL
MOV AX, BX	Copy content of register BX to AX
MOV DL, [BX]	Copy byte from memory at [BX] to DL
MOV DS, BX	Copy word from BX to DS register

XCHG Destination, Source

XCHG instruction exchanges the content of a register with the content of another register or with the content of memory location(s). It cannot directly exchange the content of two memory locations. The source and destination must both be of the same type (bytes or words). The segment registers cannot be used in this instruction.

Example :

XCHG AX, DX	Exchange word in AX with word in DX
XCHG BL, CH	Exchange byte in BL with byte in CH
XCHG AL, [1000h]	Exchange byte in AL with byte in memory

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ARITHMETIC INSTRUCTIONS

ADD – ADD Destination, Source

ADC – ADC Destination, Source

These instructions add a number from some source to a number in some destination and put the result in the specified destination. The ADC also adds the status of the carry flag to the result. The source may be an immediate number, a register, or a memory location. The destination may be a register or a memory location. The source and the destination in an instruction cannot both be memory locations. The source and the destination must be of the same type (bytes or words). If you want to add a byte to a word, you must copy the byte to a word location and fill the upper byte of the word with 0's before adding. Flags affected: AF, CF, OF, SF, ZF.

ADD AL, 74H	Add immediate number 74H to content of AL. Result in AL
ADC CL, BL	Add content of BL plus carry status to content of CL
ADD DX, BX	Add content of BX to content of DX
ADD DX, [SI]	Add word from memory at offset [SI] in DS to content of DX

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SUB – SUB Destination, Source

SBB – SBB Destination, Source

These instructions subtract the number in some source from the number in some destination and put the result in the destination. The SBB instruction also subtracts the content of carry flag from the destination. The source may be an immediate number, a register or memory location. The destination can also be a register or a memory location. However, the source and the destination cannot both be memory location. The source and the destination must both be of the same type (bytes or words). If you want to subtract a byte from a word, you must first move the byte to a word location such as a 16-bit register and fill the upper byte of the word with 0's. Flags affected: AF, CF, OF, PF, SF, ZF.

SUB CX, BX	CX – BX; Result in CX
SBB CH, AL	Subtract content of AL and content of CF from content of CH. Result in CH
SUB AX, 3427H	Subtract immediate number 3427H from AX
SBB BX, [3427H]	Subtract word at displacement 3427H in DS and content of CF from BX

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