



اسم المادة: Advanced computer technology

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المرحلة :الرابعة

السنة الدراسية : 2024-2025

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.

Mnemonic operand ; comment

Mnemonic : The operation to be performed like :, Sub , Mov ,

Operand: with which the data is transferred and used in the instruction

Types of data transfer instructions:

These instructions transfer data and addresses between the registers and the memory or the input and output ports, and we will mention the most important of them as:

- (MOV): Move byte or word instructions
- (XCHG): Exchange byte or word instruction

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- (XLAT): Translate byte instructions
- (LDA): Load effective address instruction
- (LDS): Load data segment instruction
- (LES): Load extra segment instruction (LES)

MOV :

This instruction works on transferring (copying) data between registers or between a register and a memory

MOV Destination, Source

XCHG :

Exchange the value of the register in the memory with another register or with a location in the memory

XCHG Destination, Source



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Example:

MOV CX, 037AH ; Move 037AH into the CX
MOV AX, BX ; Copy the contents of register BX to AX
MOV DL, [BX] ; Copy byte from memory at BX to DL

Example:

Org 100 h
MOV AL, 5
MOV AH, 2
XCHG AL, AH ; AL = 2 , AH = 5
RET

Arithmetic instructions

These instructions provide mathematical operations that consist of addition, subtraction, multiplication, and division, as shown below:

- **ADD instructions:**

This instruction collects the two operands and puts them in the first operand

$$A1 = A1 + A2$$

ADD Destination, Source

Example:

Org 100 h
MOV AL, 5 ; AL = 5
ADD AL, 3 ; AL = 2
RET

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• **ADC instructions:**

Add the two operands by the carry flag value

$$A1 = A1 + A2 + CF$$

ADC Destination , Source

Example:

Org 100 h

STC ; set CF =1

MOV AL, 5 ; AL = 5

ADC AL, 1 ; AL = 7

RET

SUB :

The process of subtracting the second parameter from the first and the result is in the first parameter

$$A1 = A1 - A2$$

SUB Destination , Source



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Example:

```
Org 100 h
MOV AL, 10 h
MOV BL , 7
SUB AL, BL
Ret
```

SBB :

SBB Destination , Source

The process of subtracting the second parameter from the first, as well as subtracting the value of Carry flag

$A1 = A1 - A2 - CF$

Example:

```
Org 100 h
STC
MOV AL, 9 h
MOV BL , 7
SBB AL, BL
Ret
```