



LECTURE 17

Data tranfer Instruction



Topics to be covered

- Data transfer Instruction

Data Transfer Instructions

- ◆ Data transfer instructions can be used to transfer data between an internal RAM location and SFR location without going through the accumulator
- ◆ It is possible to transfer data between the internal and external RAM by using indirect addressing
- ◆ The upper 128 bytes of data RAM are accessed only by indirect addressing and the SFRs are accessed only by direct addressing

Mnemonic	Description
MOV @Ri, direct	[@Ri] = [direct]
MOV @Ri, #data	[@Ri] = immediate data
MOV DPTR, #data 16	[DPTR] = immediate data
MOVC A,@A+DPTR	A = Code byte from [@A+DPTR]
MOVC A,@A+PC	A = Code byte from [@A+PC]
MOVX A,@Ri	A = Data byte from external ram [@Ri]
MOVX A,@DPTR	A = Data byte from external ram [@DPTR]
MOVX @Ri, A	External[@Ri] = A
MOVX @DPTR,A	External[@DPTR] = A
PUSH direct	Push into stack
POP direct	Pop from stack
XCH A,Rn	A = [Rn], [Rn] = A
XCH A, direct	A = [direct], [direct] = A
XCH A, @Ri	A = [@Rn], [@Rn] = A
XCHD A,@Ri	Exchange low order digits

MOV <dest-byte>,<source-byte>

- ◆ This instruction moves the source byte into the destination location
- ◆ The source byte is not affected, neither are any other registers or flags
- ◆ *Example:*

```
MOV    R1,#60 ;R1=60H
MOV    A,@R1   ;A=[60H]
MOV    R2,#61 ;R2=61H
ADD    A,@R2   ;A=A+[61H]
MOV    R7,A    ;R7=A
```

- ◆ If internal RAM locations 60H=10H, and 61H=20H, then after the operations of the above instructions R7=A=30H. The data contents of memory locations 60H and 61H remain intact.

MOV DPTR, #data 16

- ◆ This instruction loads the data pointer with the 16-bit constant and no flags are affected
- ◆ *Example:*
MOV DPTR, #1032
- ◆ This instruction loads the value 1032H into the data pointer, i.e. DPH=10H and DPL=32H.

MOVC A,@A + <base-reg>

- ◆ This instruction moves a code byte from program memory into ACC
- ◆ The effective address of the byte fetched is formed by adding the original 8-bit accumulator contents and the contents of the base register, which is either the data pointer (DPTR) or program counter (PC)
- ◆ 16-bit addition is performed and no flags are affected
- ◆ The instruction is useful in reading the look-up tables in the program memory
- ◆ If the PC is used, it is incremented to the address of the following instruction before being added to the ACC
- ◆ *Example:*

```
LOC1:      CLR    A
           INC    A
           MOVC  A,@A + PC
           RET
Look_up    DB    10H
           DB    20H
           DB    30H
           DB    40H
```