



Addressing Modes

Immediate Mode – specify data by its **value**

```
mov A, #0           ;put 0 in the accumulator
                    ;A = 00000000

mov R4, #11h        ;put 11hex in the R4
    register
                    ;R4 = 00010001

mov B, #11           ;put 11 decimal in b register
                    ;B = 00001011

mov DPTR, #7521h    ;put 7521 hex in DPTR
                    ;DPTR = 0111010100100001
```



Addressing Modes

Register Addressing –source and destination is **CPU register**

MOV R0,A

MOV A,R7

ADD A,R4

ADD A,R7

MOV DPTR,#25F5H

MOV R5,DPL

MOV R,DPH

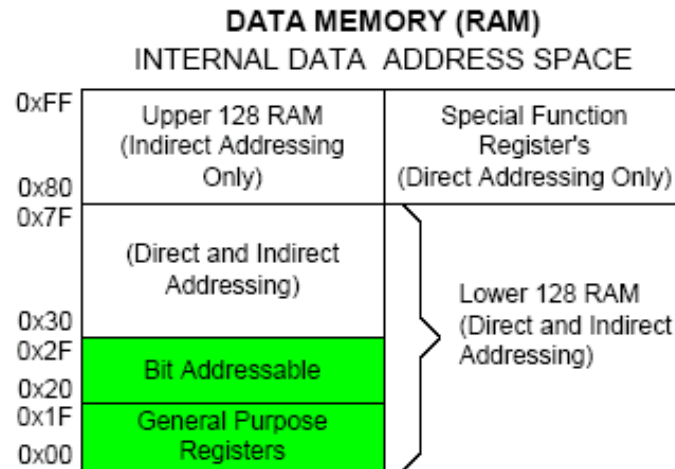
Note that **MOV R4,R7** is incorrect

Addressing Modes

Direct Mode – specify data by its 8-bit address

Usually for 30h-7Fh of RAM

```
Mov a, 70h      ; copy contents of RAM at 70h to a
Mov R0, 40h     ; copy contents of RAM at 70h to a
Mov 56h, a      ; put contents of a at 56h to a
Mov 0D0h, a     ; put contents of a into PSW
```



Addressing Modes

Direct Mode – play with R0-R7 by direct address

MOV A,4 ≡ MOV A,R4

MOV A,7 ≡ MOV A,R7

MOV 7,2 ≡ ~~MOV R7,R6~~

MOV R2,#5 ;Put 5 in R2

MOV R2,5 ;Put content of RAM at 5 in R2



Addressing Modes

Register Indirect – the address of the source or destination is specified in registers

Uses registers R0 or R1 for **8-bit** address:

```
mov psw, #0           ; use register bank 0
mov r0, #0x3C
mov @r0, #3            ; memory at 3C gets #3
                       ; M[3C] ← 3
```

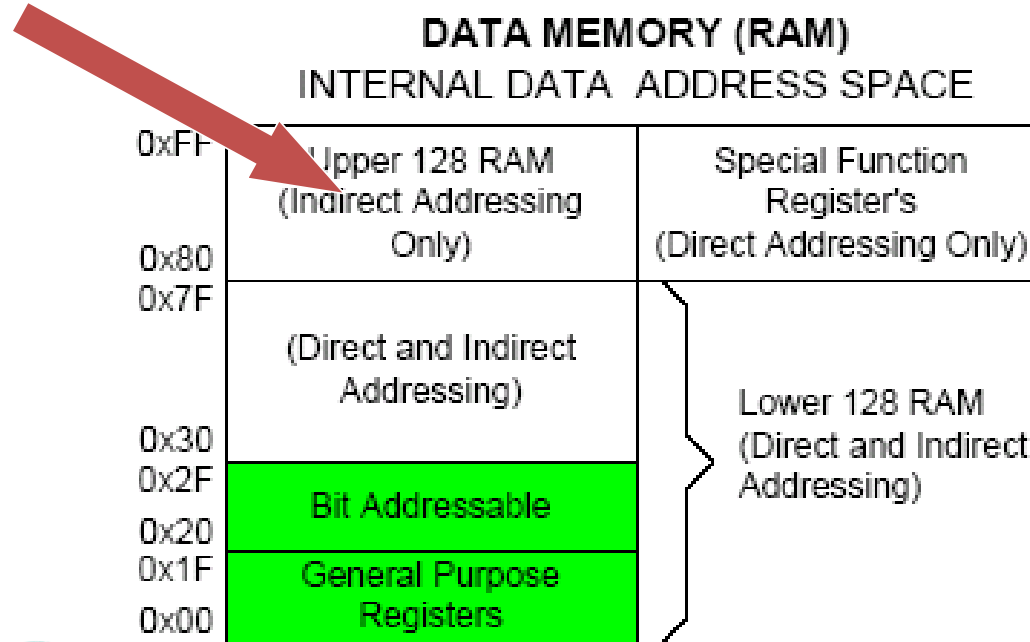
Uses DPTR register for **16-bit** addresses:

```
mov dptr, #0x9000      ; dptr ← 9000h
movx a, @dptr           ; a ← M[9000]
```

Note that 9000 is an address in external memory



Use Register Indirect to access upper RAM block (+8052)





Addressing Modes

Register Indexed Mode – source or destination address is the sum of the base address and the accumulator(Index)

- Base address can be DPTR or PC

```
mov dptr, #4000h
```

```
mov a, #5
```

```
movc a, @a + dptr ; a  $\leftarrow$  M[4005]
```



Addressing Modes

Register Indexed Mode continue

- Base address can be DPTR or PC

ORG 1000h

1000 mov a, #5

1002 movc a, @a + PC ; a ← M[1008]

1003 Nop

- Table Lookup
- MOVC only can read