Ahsanullah University of Science & Technology

Department of Computer Science and Engineering

Course No   : CSE 2214

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Section : A

Question No: 01

Question: For each of the following instructions, give the new destination contents and the new settings of CF,SF,ZF,PF and OF. Suppose that the flags are initially 0 in each part of this question

a. ADD AX, BX where AX contains 7FFFh and BX contains 0001h

b. DEC AL where Al contains 00h

c. NEG AL where AL contains 7Fh

d. XCHG AX, BX where AX contains 1ABCh and BX contains 712Ah

a. ADD AX, BX where AX contains 7FFFh and BX contains 0001h

Solution:

Here,

AX=7FFFh and
BX=0001h

(7FFF)h = 0111 1111 1111 1111
(+) (0001)h = 0000 0000 0000 0001
AX=   1000 0000 0000 0000

The sum is 8000h.
Here,
CF= 0 ; Because there is no carry out.
SF= 1 ; There is 1 in MSB.So sign flag is 1.
ZF=0 ; The result is non zero.So zero flag is 0.
PF=1; Because the low byte of the result is even parity 1.
OF=1; C_{in} = 1 , C_{out} = 0 .S0, C_{in} EXOR C_{out} = 1.

b. DEC AL where Al contains 00h

Solution:

Here,

<div align="center">

Al=00h

(00)h = 0000 0000

2's complement of 1 = 1111 1111

AL=   1111 1111

</div>

So, The sum is FFh.

Here,

CF= 0 ; Because there is no carry out.

SF= 1 ; There is 1 in MSB.So sign flag is 1.

ZF=0 ; The result is non zero.So zero flag is 0.

PF=1; Because the low byte of the result is even parity 1.So parity flag 1.

OF=0; C_{in} = 0 , C_{out} = 0 .S0, C_{in} EXOR C_{out} = 0.

c. NEG AL where AL contains 7Fh

Solution:

Here,

<div align="center">

AL = 7Fh

(7F)h = 0111 1111

1's complement= 1000 0000

(+) 1

2's complement=1000 0001

</div>

So, The sum is 81h.

Here,

CF= 1 ; Because the result is non zero.In NEG ,when the result is non zero the CF will be 1.

SF= 1 ; There is 1 in MSB.So sign flag is 1.

ZF=0 ; The result is non zero.So zero flag is 0.

PF=1; Because the low byte of the result is even parity 1.So parity flag 1.

OF=0; C_{in} = 0 , C_{out} = 0 .S0, C_{in} EXOR C_{out} = 0.

d. XCHG AX, BX where AX contains 1ABCh and BX contains 712Ah
solution :

here,

AX=1ABCh= 0001101010111100

BX=712Ah= 0111000100101010

After exchanging the AX and BX will be,

AX=712Ah = 0111000100101010

BX=1ABCh = 0001101010111100

Here,

SF= CF= ZF = PF= OF=0

Because XCHG have no effect on flags.SO, all the flags are initially zero.