Ahsanullah University of Science & Technology

Department of Computer Science and Engineering

Course No : CSE 2214

Course Title : Assembly Language Programming Sessional

Assignment no : 05

Date of Performance : 03.03.20

Date of Submission : 10.03.20

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Year : 2nd

Semester : 2nd

Group : A1

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Question 1: 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

Answer:

a. Here,

AX = 7FFFh = 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

BX = 0001h = 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1

AX = 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Now Flags,

CF = 0 because there is no carry out of the MSB on addition

SF = 1 because the MSB is 1

ZF = 0 because the result is non zero

PF = 1 because there is no 1 in the low byte of the result

OF = 1 because there is a carry into the MSB and no carry out

b. Here,

AL = 00h = 0 0 0 0 0 0 0 0

2's complement of 1 = 1 1 1 1 1 1 1 1

AL = 1 1 1 1 1 1 1 1

Flags :

CF = 0 because there is no carry out of the MSB on addition

SF = 1 because the MSB is 1

ZF = 0 because the result is non zero

PF = 1 because there are even number of 1 bits in the low byte of the result

OF = 0 because there is no carry into the MSB and no carry out

c. Here , AL = 7Fh = 0 1 1 1 1 1 1 1

1's complement = 1 0 0 0 0 0 0 0

+ 1

1 0 0 0 0 0 0 1 (2's complement)

Flags:

CF = 1 because the result is not zero

SF = 1 because the MSB is 1

ZF = 0 because the result is non zero

PF = 0 because there are odd number of 1 bits in the low byte of the result

OF = 0 because the byte operand is not 80h

d. Here, AX = 1ABCh = 0 0 0 1 1 0 1 0 1 0 1 1 1 1 0 0

BX = 712Ah = 0 1 1 1 0 0 0 1 0 0 1 0 1 0 1 0

After execution of XCHG AX, BX :

AX = 712Ah = 0 1 1 1 0 0 0 1 0 0 1 0 1 0 1 0

BX = 1ABCh = 0 0 0 1 1 0 1 0 1 0 1 1 1 1 0 0

Flags:

CF = 0

SF = 0

ZF = 0

PF = 0

0F = 0

All Flags are zero because there is no change after XCHG.