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CS/ECE/INSTR/EEE F241
MICROPROCESSORS AND INTERFACING
LABORATORY MANUAL
II Semester 2021-22

CYCLE I
EXPERIMENT 2

P1. Write a program to add two multi-byte binary numbers stored in memory and also store the result in memory.

Handwritten code/program:

```
A.
.MODEL SMALL ; small code, data segment.
.STACK 20
.DATA
    Org 1000H

NUM1 DB 25H, 35H, 45H, 32H, 56H, 48H, 76H, 76H
NUM2 DB 40H, 56H, 43H, 75H, 89H, 10H, 39, 22 +1
ANS DB 10 DUP (?)

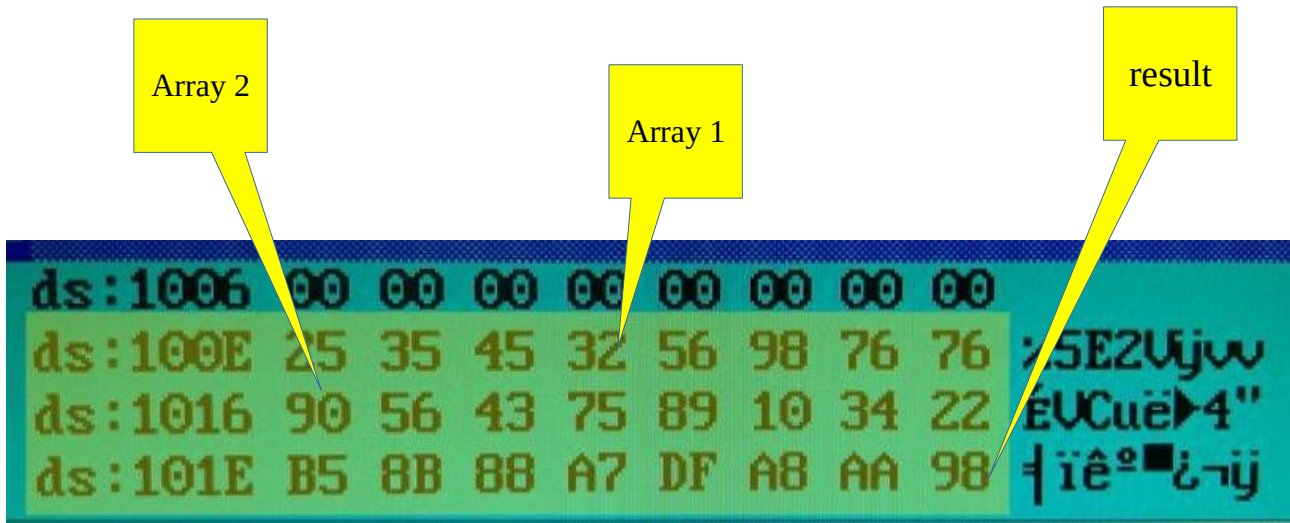
COUNT DW 8H

.CODE
START:
    MOV AX, @DATA
    MOV DS, AX
    MOV CX, COUNT
    MOV SI, 0H

    CLC ; Clear carry flag before adding
REPEAT:
    MOV AL, NUM1[SI] ; AL ← A[0]
    ADC AL, NUM2[SI] ; AL ← AL + B[0]
    MOV ANS[SI], AL ; ANS[0] ← AL
    INC SI ; increment
    LOOP REPEAT
INT 3
END START
```

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Result:



P2. Write a program to subtract two multi-byte binary numbers stored in memory and also store the result in memory.

Handwritten code/program:

```
P2:
.MODEL SMALL
.STACK 20
.DATA
    Org 1000H
    NUM1 DB 89H, 35H, 45H, 32H, 56H, 98H, 76H, 76H
    NUM2 DB 32H, 56H, 43H, 75H, 89H, 10H, 34H, 22H
    ANS DB 9 DUP(0)

    COUNT DW 8H ; 8 in counter to subtract 8 times across array

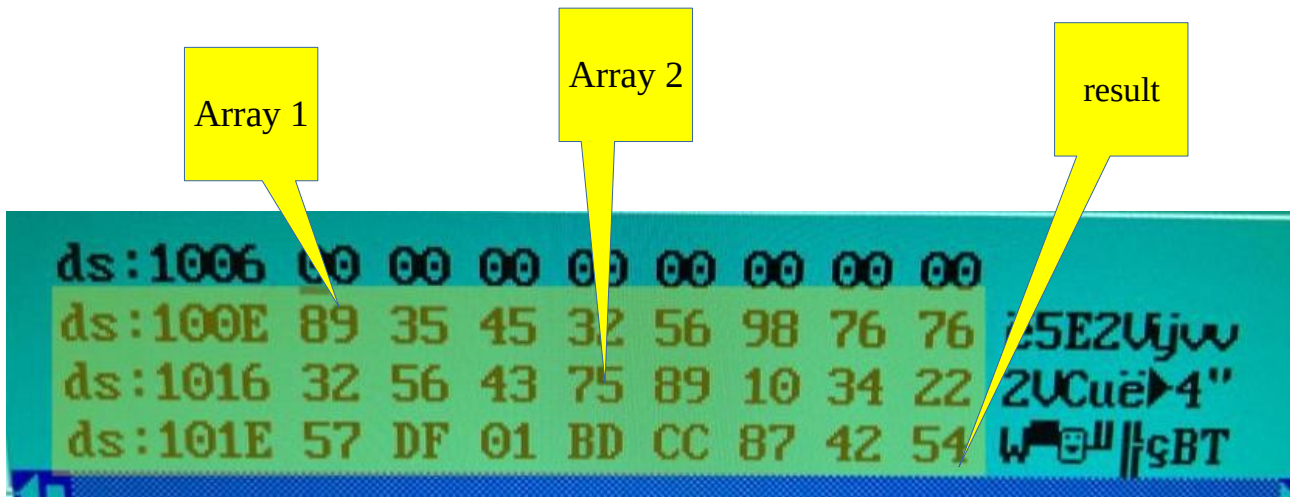
.CODE
START:
    MOV AX, @DATA
    MOV DS, AX
    MOV CX, COUNT ; CX ← count = 8

    MOV SI, 0H
    CLC
REPEAT:
    MOV AL, NUM1[SI]
    MOV AL, NUM2[SI]
    MOV ANS[SI], AL
    INC SI
    LOOP REPEAT

    INT 3
    END START
```

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Result:



P3. Write a program to multiply two 8-bit binary numbers stored in memory and also store the result in memory (both unsigned and signed operation).

**** Unsigned numbers stored only positive numbers but not negative numbers**

**** Signed numbers contain sign flag,**

Handwritten code/program:

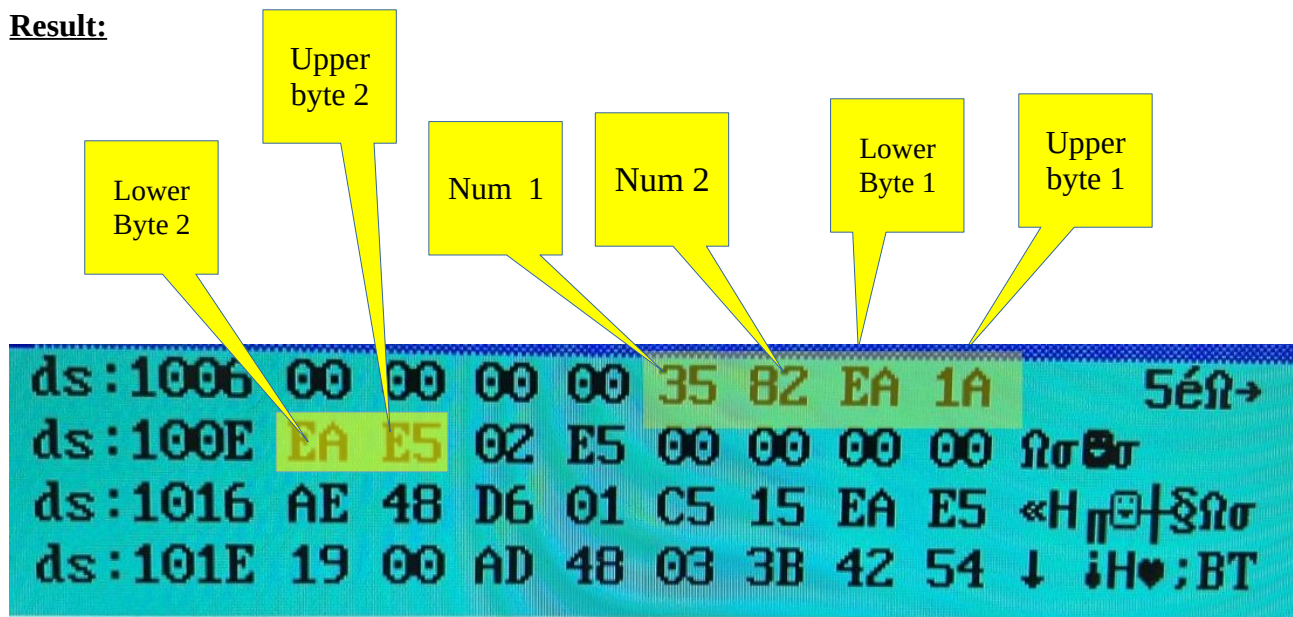
```
P3:
.MODEL SMALL
.STACK 20

.DATA
ORG 1000H
N1 DB 35H
N2 DB 42H
Un-Sign-Prod DW ?
Sign-Prod DW ?

.CODE
START:
MOV AX, @DATA
MOV DS, AX
MOV AL, N1
MUL N2 ; (AX) * (N2) => stored in DS: AX pair
MOV Un-Sign-Prod, AX
MOV AL, N1
IMUL N2
MOV Sign-Prod, AX
INT 3
END START
```

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Result:



***** Assignment Problem *****

Q2. Write a program to find factorial of number.

Handwritten code/program:

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```
2099n:
.MODEL SMALL
.STACK 20
.DATA
Org 1000 H

num dw 60
fact dw 10

.CODE
START:
MOV AX, @DATA
MOV DS, AX
MOV CX, NUM
MOV SI, 0H ; zero H
MOV AX, 10

REPEAT:
MUL CX
LOOP REPEAT
MOV FACT, AX

INT 3
END START
```

Result:

