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Section: A1

Dept: INFORMATION TECHNOLOGY

Year: UG2 Sem 1

ASM lab assignment – 1

1. Write an Assembly Language Program to add two sixteen-bit numbers. The numbers are stored in DS: 0030H and DS: 0040H. Store the result in DS: 0050H, DS: 0051H, and DS: 0052H.

```
. model small
. stack 100h
. data
. code
```

```
main proc
mov ax, @data
mov ds, ax
mov cl, 00h
mov si, 0030h
mov ax, [si]
mov si, 0040h
mov bx, [si]
add bx, ax
adc cl, cl
mov si, 0050h
mov [si], bx
add si, 02h
```

```
mov [si], cl
int 03h
mov ah, 4ch
int 21h
```

```
main endp
end main
```

```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG
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C:\>a1q1.exe

C:\>debug a1q1.exe
-t

AX=076C BX=0000 CX=0024 DX=0000 SP=0100 BP=0000 SI=0000 DI=0000
DS=075A ES=075A SS=076D CS=076A IP=0003  NU UP EI PL NZ NA PO NC
076A:0003 8ED8          MOV     DS,AX
-e 076C:0030
076C:0030 3D.11  FF.22

-e 076C:0040
076C:0040 E4.33  40.44

-g=0000

AX=2211 BX=6644 CX=0000 DX=0000 SP=0100 BP=0000 SI=0052 DI=0000
DS=076C ES=075A SS=076D CS=076A IP=001F  NU UP EI PL NZ NA PO NC
076A:001F CC          INT     3
-d 076C:0050,0051
076C:0050 44 66                      Df
-
```

2. Write an Assembly Language Program to subtract an 8-bit numbers stored in DS: 0030H from a number stored in DS: 0040H using 2's complement method. Store the result in DS: 0050H, and DS: 0051H.

```
. model small
. stack 100h
. data
. code

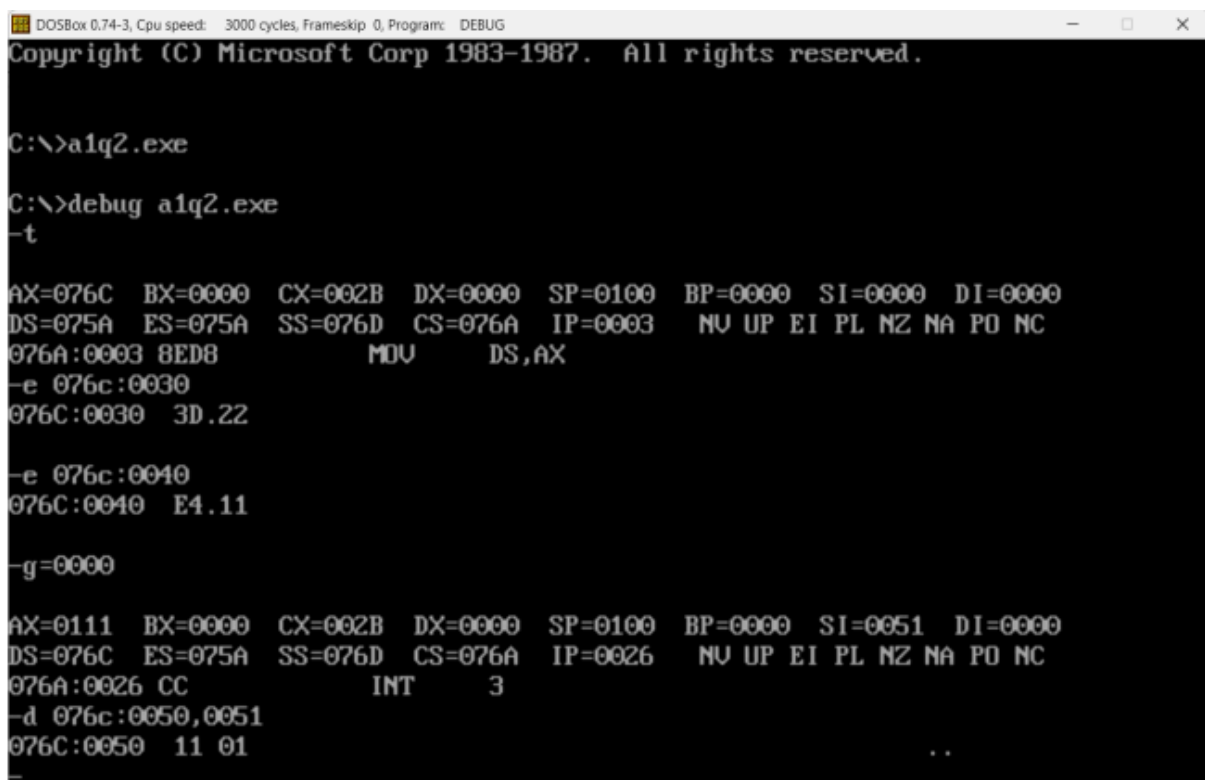
main proc
mov ax, @data
mov ds, ax
mov si, 0030h
mov al, [si]
not al
add al, 01h
```

```
mov si, 0040h
add al, [si]
```

```
jc l1
not al
inc al
```

```
l1:
mov si, 0050h
mov [si], al
mov ah, 00h
cmc
adc ah, ah
inc si
```

```
mov [si], ah
int 03h
mov ah, 4ch
int 21h
main endp
end main
```



```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip: 0, Program: DEBUG
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C:\>a1q2.exe

C:\>debug a1q2.exe
-t

AX=076C BX=0000 CX=002B DX=0000 SP=0100 BP=0000 SI=0000 DI=0000
DS=075A ES=075A SS=076D CS=076A IP=0003  NU UP EI PL NZ NA PO NC
076A:0003 8ED8          MOV     DS,AX
-e 076c:0030
076C:0030 3D.22

-e 076c:0040
076C:0040 E4.11

-g=0000

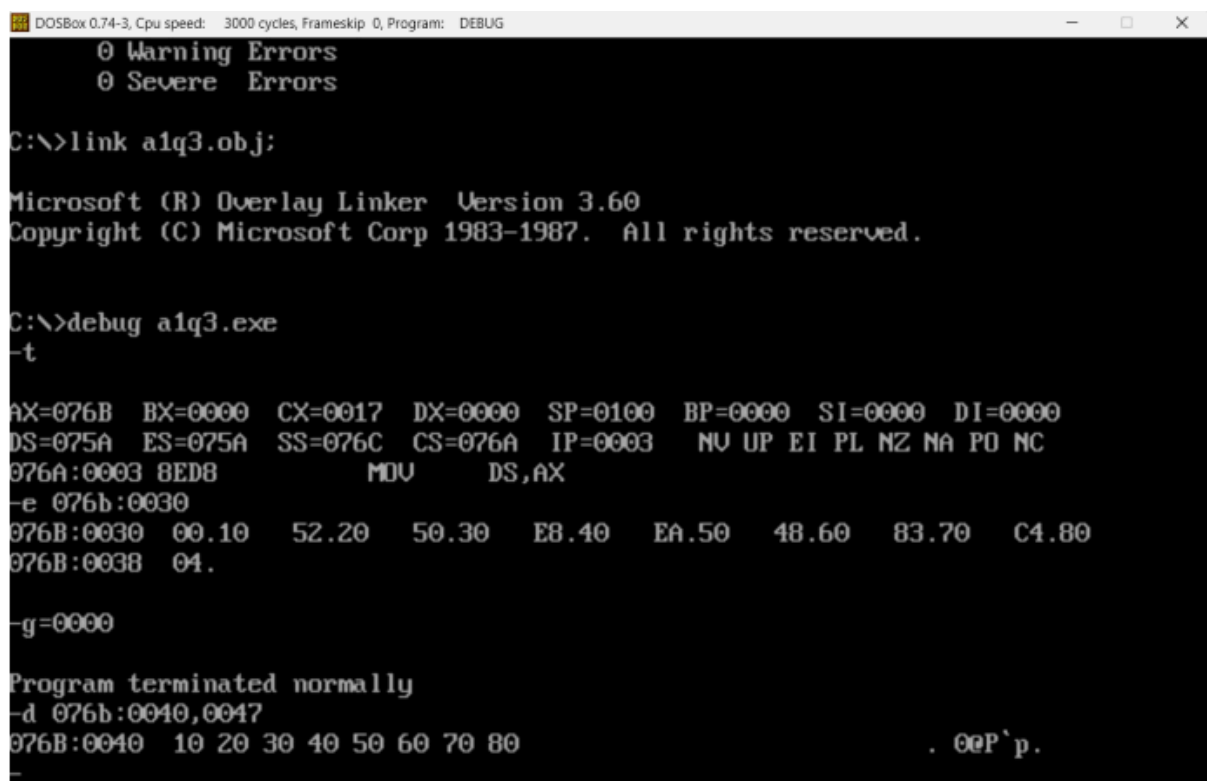
AX=0111 BX=0000 CX=002B DX=0000 SP=0100 BP=0000 SI=0051 DI=0000
DS=076C ES=075A SS=076D CS=076A IP=0026  NU UP EI PL NZ NA PO NC
076A:0026 CC          INT     3
-d 076c:0050,0051
076C:0050 11 01          ..
-
```

3. Write a program to transfer a block of 8 data bytes from memory location DS: 0030H to DS: 0040H.

```
. model small
. stack 100h
. data
. code

main proc
mov ax, @data
mov ds, ax
mov es, ax
mov si,0030h
mov di,0040h
cld
mov cx, 0008h
rep movsb

mov ah,4ch
int 21h
main endp
end main
```



```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip: 0, Program: DEBUG
0 Warning Errors
0 Severe Errors

C:\>link a1q3.obj:

Microsoft (R) Overlay Linker Version 3.60
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C:\>debug a1q3.exe
-t
AX=076B BX=0000 CX=0017 DX=0000 SP=0100 BP=0000 SI=0000 DI=0000
DS=075A ES=075A SS=076C CS=076A IP=0003  NV UP EI PL NZ NA PO NC
076A:0003 8ED8          MOV     DS,AX
-e 076b:0030
076B:0030  00.10  52.20  50.30  EB.40  EA.50  48.60  83.70  C4.80
076B:0038  04.

-g=0000

Program terminated normally
-d 076b:0040,0047
076B:0040  10 20 30 40 50 60 70 80                . 00P`p.
-
```

4. Write an 8086 Assembly Language Program for the addition of 7 eight-bit numbers stored from DS: 0030H. Store the result in DS: 0050H and DS: 0051H.

```
dosseg
.model small
.stack 100h
.data
.code

main proc
mov ax, @data
mov ds, ax
mov si, 0030h
mov di, 0050h
mov cx, 0007h
mov ax, 0000h
mov bl, 0000h

l1:    mov bl, [si]
        add ax, bx
        inc si
        loop l1

mov [di], ax
int 03h
mov ah, 4ch
int 21h
main endp
end main
```

```

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG
C:\>link a1q4.obj;

Microsoft (R) Overlay Linker Version 3.60
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C:\>debug a1q4.exe
-t

AX=076D BX=0000 CX=0032 DX=0000 SP=0100 BP=0000 SI=0000 DI=0000
DS=075A ES=075A SS=076E CS=076A IP=0013  NU UP EI PL NZ NA PO NC
076A:0013 8ED8          MOV     DS,AX
-e 076d:0030
076D:0030 E4.11  40.22  50.33  8B.44  C3.55  8C.66  C2.77

-g=0000

AX=01DC BX=0077 CX=0000 DX=0000 SP=0100 BP=0000 SI=0037 DI=0050
DS=076D ES=075A SS=076E CS=076A IP=002D  NU UP EI PL NZ NA PO NC
076A:002D CC          INT     3
-076d:0050,0051
^ Error
-d 076D:0050,0051
076D:0050 DC 01

```

[Note: $11+22+33+44+55+66+77 = 01DC$]

- Write an 8086 Assembly Language Program for the addition of 5 sixteen-bit numbers stored from DS: 0030H. Store the result in DS: 0050H, DS: 0051H, DS: 0052H.

```

dosseg
.model small
.stack 100h
.data
.code

main proc
mov ax, @data
mov ds, ax
mov si, 0030h
mov di, 0050h
mov cx, 0005h
mov ax, 0000h
mov bx, 0000h

```

```

l1:    mov bx, [si]
        add ax, bx
        adc dl,00h
        inc si
        inc si
        loop l1

```

```

mov [di], ax
inc di
inc di
mov [di], dl

```

```

int 03h
mov ah,4ch
int 21h
main endp
end main

```

```

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG
C:\>link a1q5.obj;

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C:\>debug a1q5.exe
-t

AX=076D BX=0000 CX=003C DX=0000 SP=0100 BP=0000 SI=0000 DI=0000
DS=075A ES=075A SS=076E CS=076A IP=0013  NU UP EI PL NZ NA PO NC
076A:0013 8ED8          MOV     DS,AX
-e 076d:0030
076D:0030 E4.ff  40.ff  50.ff  8B.ff  C3.ff  8C.ff  C2.ff  05.ff
076D:0038 0C.ff  00.ff  52.
-g=0000

AX=FFFB BX=FFFF CX=0000 DX=0004 SP=0100 BP=0000 SI=003A DI=0052
DS=076D ES=075A SS=076E CS=076A IP=0037  NU UP EI PL NZ NA PO NC
076A:0037 CC          INT     3
-d 076d:0050,0052
076D:0050 FB FF 04          ...

```

[Note: FFFF + FFFF + FFFF + FFFF + FFFF = 04FFFB]

6. Write an Assembly Language Program for the addition of five BCD numbers stored from DS: 0030H. Store the result in DS: 0040H and DS: 0041H.

```
dosseg
.model small
.stack 100h
.data
.code

main proc
    mov ax, @data
    mov ds, ax

    mov si, 0030h
    mov di, 0040h
    mov cx, 0005h
    mov ax, 0000h
    mov dl, 00h

l1:
    mov bl, [si]
    add al, bl
    daa
    adc dl, 00h
    inc si
    loop l1

    mov [di], al
    inc di
    mov [di], dl

    int 03h
    mov ah, 4ch
    int 21h

main endp
end main
```



```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip: 0, Program: DEBUG
0 Severe Errors

C:\>link a1q6.obj:

Microsoft (R) Overlay Linker Version 3.60
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C:\>debug a1q6.exe
-t

AX=076D BX=0000 CX=0038 DX=0000 SP=0100 BP=0000 SI=0000 DI=0000
DS=075A ES=075A SS=076E CS=076A IP=0013  MV UP EI PL NZ NA PO NC
076A:0013 8ED8      MOV     DS,AX
-e 076d:0030
076D:0030 E4.1    40.2    50.3    8B.4    C3.5

-g=0000

AX=0015 BX=0005 CX=0000 DX=0000 SP=0100 BP=0000 SI=0035 DI=0041
DS=076D ES=075A SS=076E CS=076A IP=0033  MV UP EI PL NZ NA PE NC
076A:0033 CC      INT     3
-d 076d:0040,0041
076D:0040 15 00    ..

=
```

7. Write an Assembly Language Program to subtract a BCD number stored in DS: 0040H from a BCD number stored in DS: 0050H. Store the result in DS: 0060H and DS: 0061H.

```
dosseg
.model small
.stack 100h
.data
.code

main proc
mov ax, @data
mov ds, ax
mov si,0050h
mov al, [si]
mov si,0040h
sub al, [si]
das
mov si,0060h
```

```

mov [si], al
mov ah,00h
adc ah, ah
inc si
mov [si], ah

```

```

int 03h
mov ah,4ch
int 21h
main endp
end main

```

```

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG
C:\>debug q7.exe
-t
AX=076D BX=0000 CX=0031 DX=0000 SP=0100 BP=0000 SI=0000 DI=0000
DS=075A ES=075A SS=076E CS=076A IP=0013  NU UP EI PL NZ NA PO NC
076A:0013 8ED8          MOV     DS,AX
-e 076d:0050
076D:0050 FA.50

-e 076d:0040
076D:0040 C4.30

-g=0000
AX=0020 BX=0000 CX=0031 DX=0000 SP=0100 BP=0000 SI=0061 DI=0000
DS=076D ES=075A SS=076E CS=076A IP=002C  NU UP EI PL NZ NA PO NC
076A:002C CC          INT     3
-076d:0060,0060
^ Error
-e 076d:0060,0060
^ Error
-d 076d:0060,0060
076D:0060 20

```

- Write an Assembly Language Program to multiply two eight bit numbers stored in DS: 0040H and DS: 0050H. Store the result from DS: 0060H.

```

dosseg
.model small
.stack 100h

```

. data

. code

main proc

mov ax, @data

mov ds, ax

mov si,0040h

mov al, [si]

mov si,0050h

mov bl, [si]

mul bl

mov si,0060h

mov [si], ax

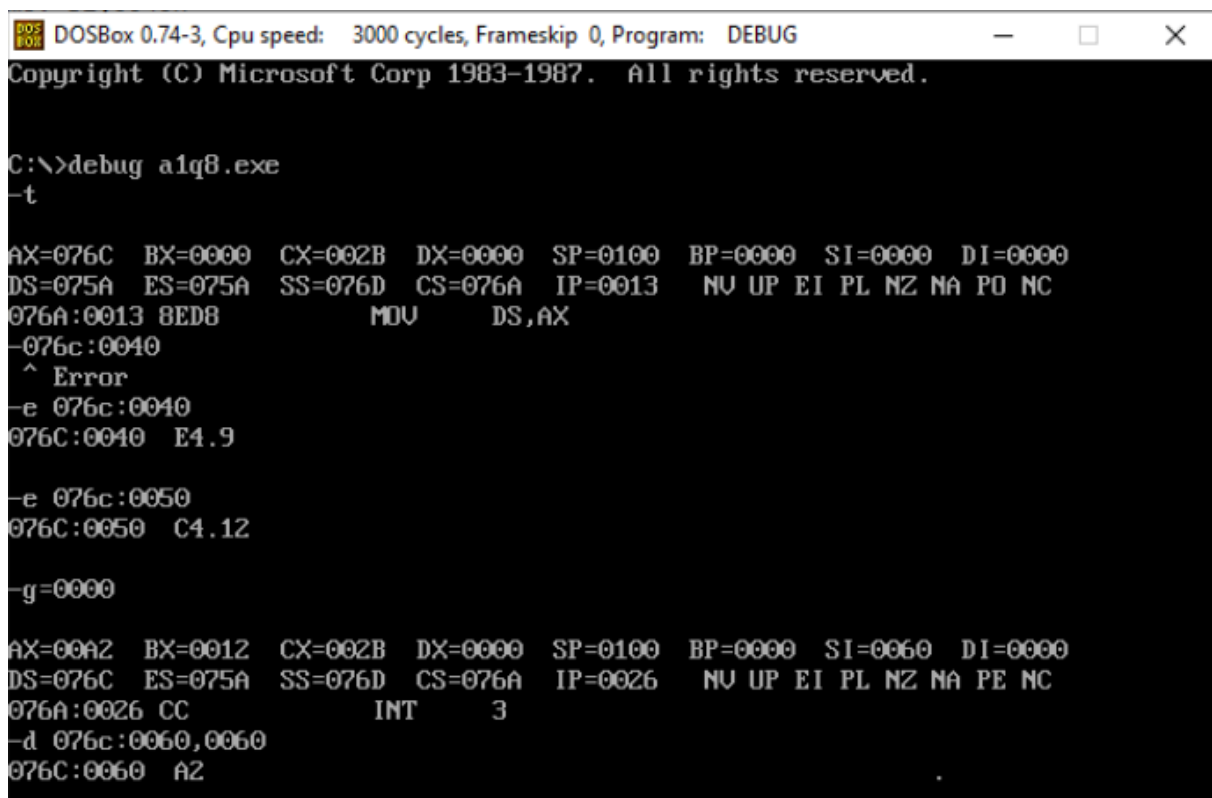
int 03h

mov ah,4ch

int 21h

main endp

end main



```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG
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C:\>debug a1q8.exe
-t

AX=076C BX=0000 CX=002B DX=0000 SP=0100 BP=0000 SI=0000 DI=0000
DS=075A ES=075A SS=076D CS=076A IP=0013  NU UP EI PL NZ NA PO NC
076A:0013 8ED8          MOV     DS,AX
-076c:0040
^ Error
-e 076c:0040
076C:0040  E4.9

-e 076c:0050
076C:0050  C4.12

-g=0000

AX=00A2 BX=0012 CX=002B DX=0000 SP=0100 BP=0000 SI=0060 DI=0000
DS=076C ES=075A SS=076D CS=076A IP=0026  NU UP EI PL NZ NA PE NC
076A:0026 CC          INT     3
-d 076c:0060,0060
076C:0060  A2
```

9. Write an Assembly Language Program to multiply two sixteen bit numbers stored in DS:0040H and DS:0050H. Store the result from DS: 0060H.

```
dosseg
. model small
. stack 100h
. data
. code

main proc

mov ax, @data
mov ds, ax
mov si,0040h
mov ax, [si]
mov si,0050h
mov bx, [si]
mul bx

mov si,0060h
mov [si], ax
mov si,0062h
mov [si], dx

int 03h
mov ah,4ch
int 21h

main endp
end main
```

```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip: 0, Program: DEBUG
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C:\>debug a1q9.exe
-t

AX=076D BX=0000 CX=0030 DX=0000 SP=0100 BP=0000 SI=0000 DI=0000
DS=075A ES=075A SS=076D CS=076A IP=0013  NU UP EI PL NZ NA PO NC
076A:0013 8ED8          MOV     DS,AX
-e 076d:0040
076D:0040 C4.12  04.13  50.

-e 076d:0050
076D:0050 FA.02  FE.19  81.

-g=0000

AX=E824 BX=1902 CX=0030 DX=01DC SP=0100 BP=0000 SI=0062 DI=0000
DS=076D ES=075A SS=076D CS=076A IP=002B  OU UP EI PL NZ AC PE CY
076A:002B CC          INT     3
-d 076d:0060,0062
076D:0060 24 EB DC          $.
-
```

10. Write an Assembly Language Program to divide 88H by 33H. Store the quotient in DS: 0060H and remainder in DS: 0061H.

```
. model small
. stack 100h
. data
. code

main proc
mov ax, @data
mov ds, ax
mov si,0040h
mov ax, [si]
mov si,0050h
mov bl, [si]
div bl
mov si,0060h
mov [si], ax

int 03h
```

```

mov ah,4ch
int 21h
main endp
end main

```

```

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C:\>debug a1q10.exe
-t
AX=076B BX=0000 CX=001B DX=0000 SP=0100 BP=0000 SI=0000 DI=0000
DS=075A ES=075A SS=076C CS=076A IP=0003  NU UP EI PL NZ NA PO NC
076A:0003 8ED8          MOV     DS,AX
-e 076b:0040
076B:0040 3D.88      FF.00

-e 076b:0050
076B:0050 E4.33      40.00

-g=0000
AX=2202 BX=0033 CX=001B DX=0000 SP=0100 BP=0000 SI=0060 DI=0000
DS=076B ES=075A SS=076C CS=076A IP=0016  NU UP EI PL NZ NA PO NC
076A:0016 CC          INT     3
-d 076b:0060,0061
076B:0060 02 22          ."

```

- Write an Assembly Language Program to divide 2222H by 55H. Store the quotient from DS: 0060H and remainder in DS: 0062H.

```

dosseg
.model small
.stack 100h
.data
.code

main proc

mov ax, @data
mov ds, ax
mov si,0040h

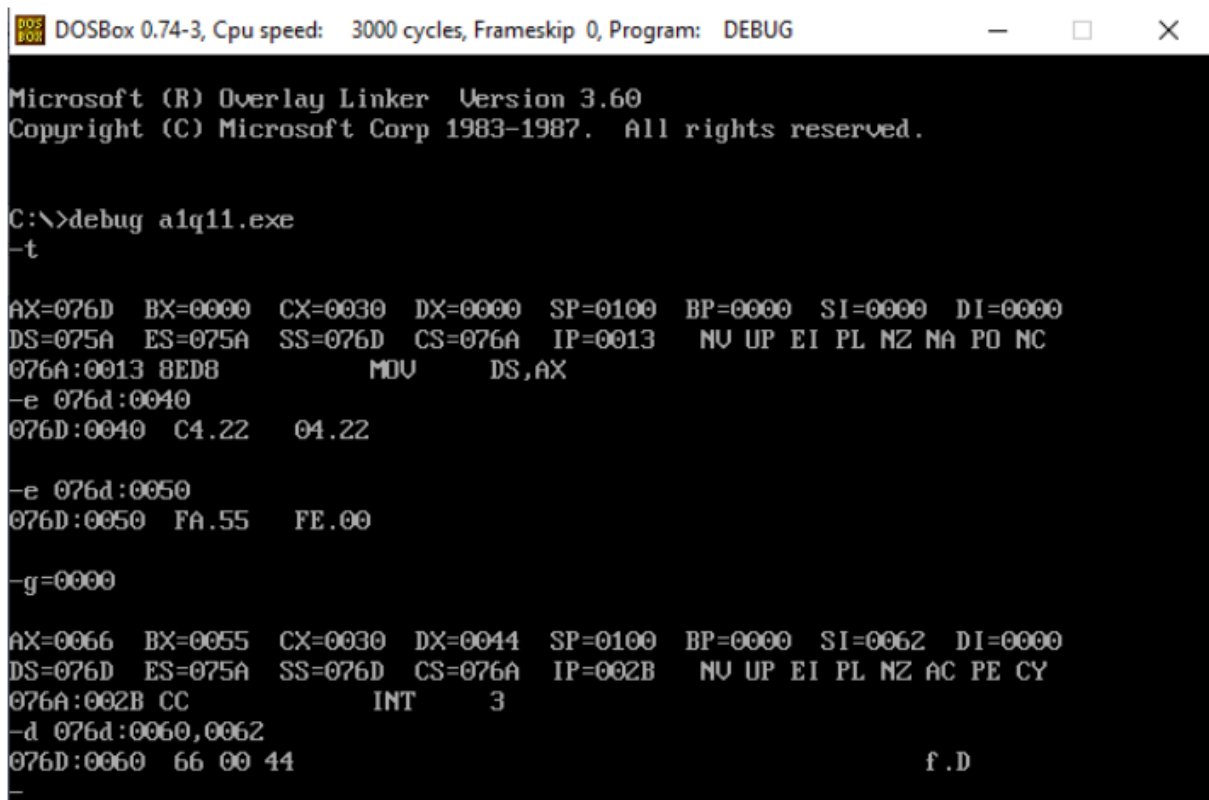
```

```
mov ax, [si]
mov si,0050h
mov bx, [si]
div bx
```

```
mov si,0060h
mov [si], ax
mov si,0062h
mov [si], dx
```

```
int 03h
mov ah,4ch
int 21h
```

```
main endp
end main
```



```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG
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C:\>debug a1q11.exe
-t

AX=076D BX=0000 CX=0030 DX=0000 SP=0100 BP=0000 SI=0000 DI=0000
DS=075A ES=075A SS=076D CS=076A IP=0013  NU UP EI PL NZ NA PO NC
076A:0013 8ED8      MOV     DS,AX
-e 076d:0040
076D:0040  C4.22  04.22

-e 076d:0050
076D:0050  FA.55  FE.00

-g=0000

AX=0066 BX=0055 CX=0030 DX=0044 SP=0100 BP=0000 SI=0062 DI=0000
DS=076D ES=075A SS=076D CS=076A IP=002B  NU UP EI PL NZ AC PE CY
076A:002B CC      INT     3
-d 076d:0060,0062
076D:0060  66 00 44      f.D
-
```