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Section : A1

Dept : IT UG-2

Q1) 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
```

```

DOS
BOX
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...
Run File [A1Q1.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:

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.20    FF.ff

-e 076C:0040
076C:0040 E4.30    40.ff

-g=0000

AX=FF20 BX=FE50 CX=0001 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:0050,0052
076C:0050 50 FE 01      P..

```

Q2) 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, 0040h
    mov al, [si]
    not al
    inc al
    mov si, 0030h
    add al, [si]
    jc l1
    not al
    inc al
l1 :

```

```

        mov si, 0050h
        mov [si], al
        cmc
        mov ah, 00
        adc ah, ah
        inc si
        mov [si], ah
        int 03h
        mov ah, 4ch
        int 21h
main endp
end main

```

```

Run File [A1Q2.EXE]:
List File [NUL.MAP]:
Libraries [LIB]:

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  NV UP EI PL NZ NA PO NC
076A:0003 8ED8          MOV     DS,AX
-e 076C:0030
076C:0030 3D 0B

-e 076C:0040
076C:0040 E4 0D

-g=0000

AX=0102 BX=0000 CX=002B DX=0000 SP=0100 BP=0000 SI=0051 DI=0000
DS=076C ES=075A SS=076D CS=076A IP=0026  NV UP EI PL NZ NA PO NC
076A:0026 CC          INT     3
-d 076C:0050,0051
076C:0050 02 01

```

Q3) 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
    mov cx, 0008h
    cld
l1:
    movsb
    loop l1
    mov ah, 03h
    mov ah, 4ch
    int 21h
main endp
end main

```

```

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...
C:\>link A1Q3.obj

Microsoft (R) Overlay Linker Version 3.60
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Run File [A1Q3.EXE]:
List File [NUL.MAP]:
Libraries [LIB]:

C:\>debug A1Q3.exe
-t

AX=076B BX=0000 CX=001A 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 00.11  52.FE  50.22  E8.22  EA.AB  48.33  83.44  C4.CC

-g=0000

Program terminated normally
-d 076B:0040,0047
076B:0040 11 FE 22 22 AB 33 44 CC                .."" .3D.

```

Q4) 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.

```

.model small
.stack 100h
.data

```

```
.code
main proc
    mov ax, @data
    mov ds, ax
    mov si, 0030h
    mov cx, 0007h
    mov ax, 0000h
    mov bl, 00h
l1:
    add al, [si]
    jnc l2
    inc bl
l2 : inc si
    loop l1

    mov si, 0050h
    mov [si], al
    inc si
    mov [si], bl
    int 03h
    mov ah, 03h
    mov ah, 4ch
    int 21h
main endp
end main
```

```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...
0 Severe Errors

C:\>link A1Q4.obj:

Microsoft (R) Overlay Linker Version 3.60
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C:\>debug A1Q4.exe
-t

AX=076C BX=0000 CX=0028 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.AA  FF.BB  FF.CC  74.DD  03.EE  E9.FF  ED.FF

-g=0000

AX=00FA BX=0005 CX=0000 DX=0000 SP=0100 BP=0000 SI=0051 DI=0000
DS=076C ES=075A SS=076D CS=076A IP=0021 NU UP EI PL NZ NA PO CY
076A:0021 CC          INT     3
-d 076C:0050,0051
076C:0050 FA 05          ..
```

Q5) 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.

```
.model small
.stack 100h
.data
.code
main proc
    mov ax, @data
    mov ds, ax
    mov si, 0030h
    mov cx, 0005h
    mov ax, 0000h
    mov bl, 00h
l1:
    add ax, [si]
    jnc l2
    inc bl
l2: add si, 02h
    loop l1
```

```

    mov si, 0050h
    mov [si], ax
    add si, 02h
    mov [si], bl
    int 03h
    mov ah, 03h
    mov ah, 4ch
    int 21h
main endp
end main

```

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...

```

C:\>link A1Q5.obj;

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C:\>debug A1Q5.exe
-t

AX=076C BX=0000 CX=002C 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.AA  FF.BB  FF.CC  74.DD  03.EE  E9.FF  ED.FF  00.EE
076C:0038 C4.DD  5E.CC

-g=0000

AX=5540 BX=0004 CX=0000 DX=0000 SP=0100 BP=0000 SI=0052 DI=0000
DS=076C ES=075A SS=076D CS=076A IP=0025  NU UP EI PL NZ NA PO NC
076A:0025 CC      INT     3
-d 076C:0050,0052
076C:0050 40 55 04      EQU .

```

Q6) 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.

```

.model small
.stack 100h
.data
.code

```

```

main proc

```

```

mov ax, @data
mov ds, ax
mov si, 0030h
mov cx, 0005h
mov ax, 0000h
mov bl, 0000h
l2: add al,[si]
    daa
    jnc l1
    inc bl
l1: inc si
    loop l2
    mov si, 0040h
    mov [si], al
    inc si
    mov [si], bl
    int 03h
    mov ah, 03h
    mov ah, 4ch
    int 21h
main endp
end main

```

```

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...
0 Severe Errors

C:\>link A1Q6.obj:

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C:\>debug A1Q6.exe
-t
AX=076C BX=0000 CX=0029 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 8EDB          MOV     DS,AX
-e 076C:0030
076C:0030 3D.1      FF.2      FF.3      74.4      03.5

-g=0000
AX=0015 BX=0000 CX=0000 DX=0000 SP=0100 BP=0000 SI=0041 DI=0000
DS=076C ES=075A SS=076D CS=076A IP=0022  NU UP EI PL NZ NA PE NC
076A:0022 CC          INT     3
-d 076C:0040,0041
076C:0040 15 00          ..

```


Q7) 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.

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

main proc
    mov ax, @data
    mov ds, ax
    mov si, 0050h
    mov al, [si]
    mov si, 0040h
    mov ah, 00h
    sub al, [si]
    das
    jnc l2
    adc ah, 00h
l2: 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, Progra...
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C:\>debug A1Q7.exe
-t

AX=076C BX=0000 CX=0021 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:0040
076C:0040 E4.70

-e 076C:0050
076C:0050 C4.40

-g=0000

AX=0170 BX=0000 CX=0021 DX=0000 SP=0100 BP=0000 SI=0060 DI=0000
DS=076C ES=075A SS=076D CS=076A IP=001C  NU UP EI PL NZ NA PO NC
076A:001C CC          INT     3
-d 076C:0060,0061
076C:0060 70 01          p.
-
```

Q8) Write an Assembly Language Program to multiply two eight bit number stored in DS: 0040H and DS: 0050H. Store the result from DS: 0060H.

```
.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, Progra...
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C:\>debug A1Q8.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 DD
-e 076B:0050
076B:0050 E4 20
-g=0000

AX=1BA0 BX=0020 CX=001B DX=0000 SP=0100 BP=0000 SI=0060 DI=0000
DS=076B ES=075A SS=076C CS=076A IP=0016  OU UP EI PL NZ NA PO CY
076A:0016 CC          INT     3
-d 076B:0060,0061
076B:0060 A0 1B

```

Q9) Write an Assembly Language Program to multiply two sixteen bit number stored in DS:0040H and DS:0050H. Store the result from DS: 0060H.

```

.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

```

```

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C:\>debug A1Q9.exe
-t

AX=076C  BX=0000  CX=0020  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 076C:0040
076C:0040  E4.FF  40.DD

-e 076C:0050
076C:0050  C4.10  04.00

-g=0000

AX=DFF0  BX=0010  CX=0020  DX=000D  SP=0100  BP=0000  SI=0062  DI=0000
DS=076C  ES=075A  SS=076C  CS=076A  IP=001B  OV UP EI PL NZ NA PO CY
076A:001B CC          INT     3
-d 076C:0060,0063
076C:0060  F0 DF 0D 00          ....

```

Q10) Write an Assembly Language Program to divide 88H by 33H. Store the quotient in DS: 0060H and remainder in DS: 0061H.

```

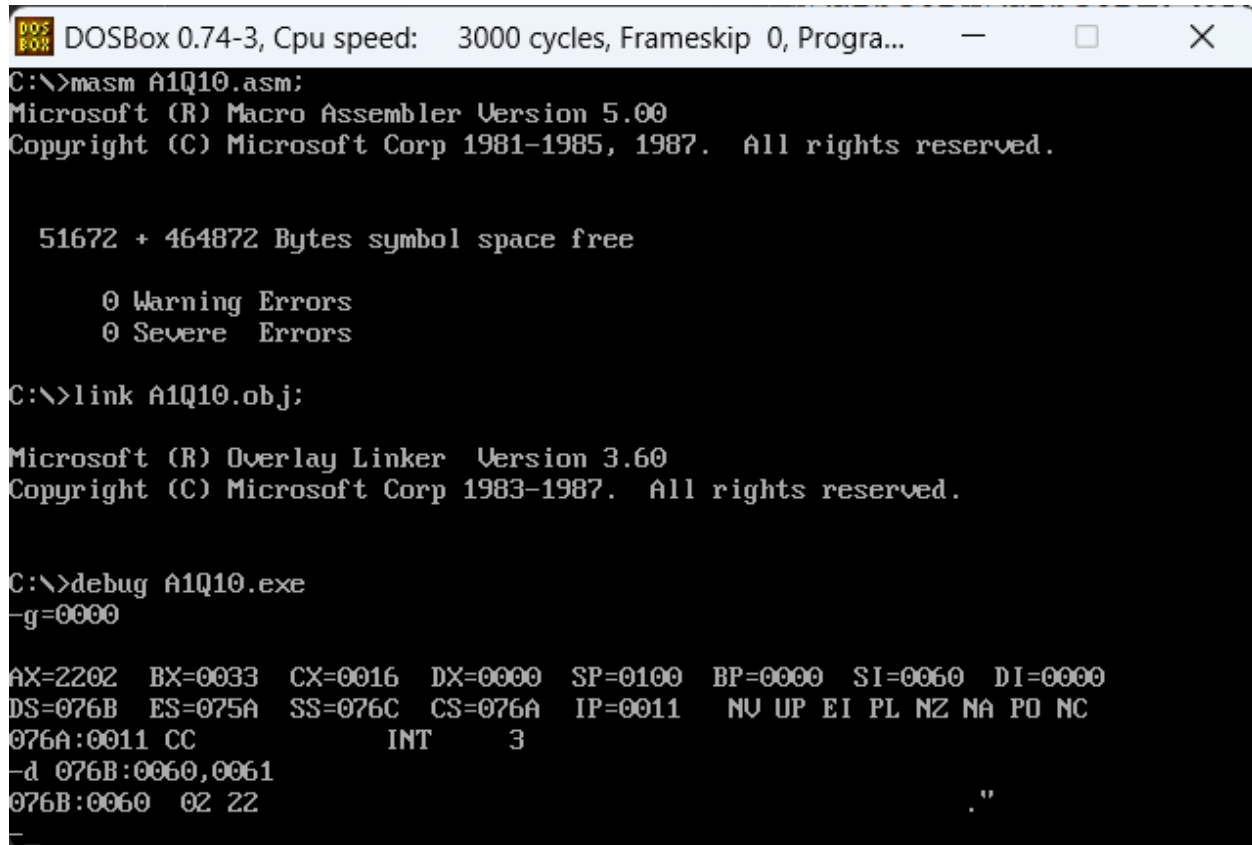
.model small
.stack 100h
.data
.code
main proc
    mov ax, @data
    mov ds, ax
    mov ax, 0088h
    mov bl, 33h

```

```

        div bl
        mov si, 0060h
        mov [si], ax
        int 03h
        mov ah, 4ch
        int 21h
main endp
end main

```



The screenshot shows a DOSBox window titled "DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...". The command prompt shows the following sequence of commands and output:

```

C:\>masm A1Q10.asm;
Microsoft (R) Macro Assembler Version 5.00
Copyright (C) Microsoft Corp 1981-1985, 1987. All rights reserved.

51672 + 464872 Bytes symbol space free

0 Warning Errors
0 Severe Errors

C:\>link A1Q10.obj;
Microsoft (R) Overlay Linker Version 3.60
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C:\>debug A1Q10.exe
-g=0000

AX=2202 BX=0033 CX=0016 DX=0000 SP=0100 BP=0000 SI=0060 DI=0000
DS=076B ES=075A SS=076C CS=076A IP=0011 NU UP EI PL NZ NA PO NC
076A:0011 CC INT 3
-d 076B:0060,0061
076B:0060 02 22 ."

```

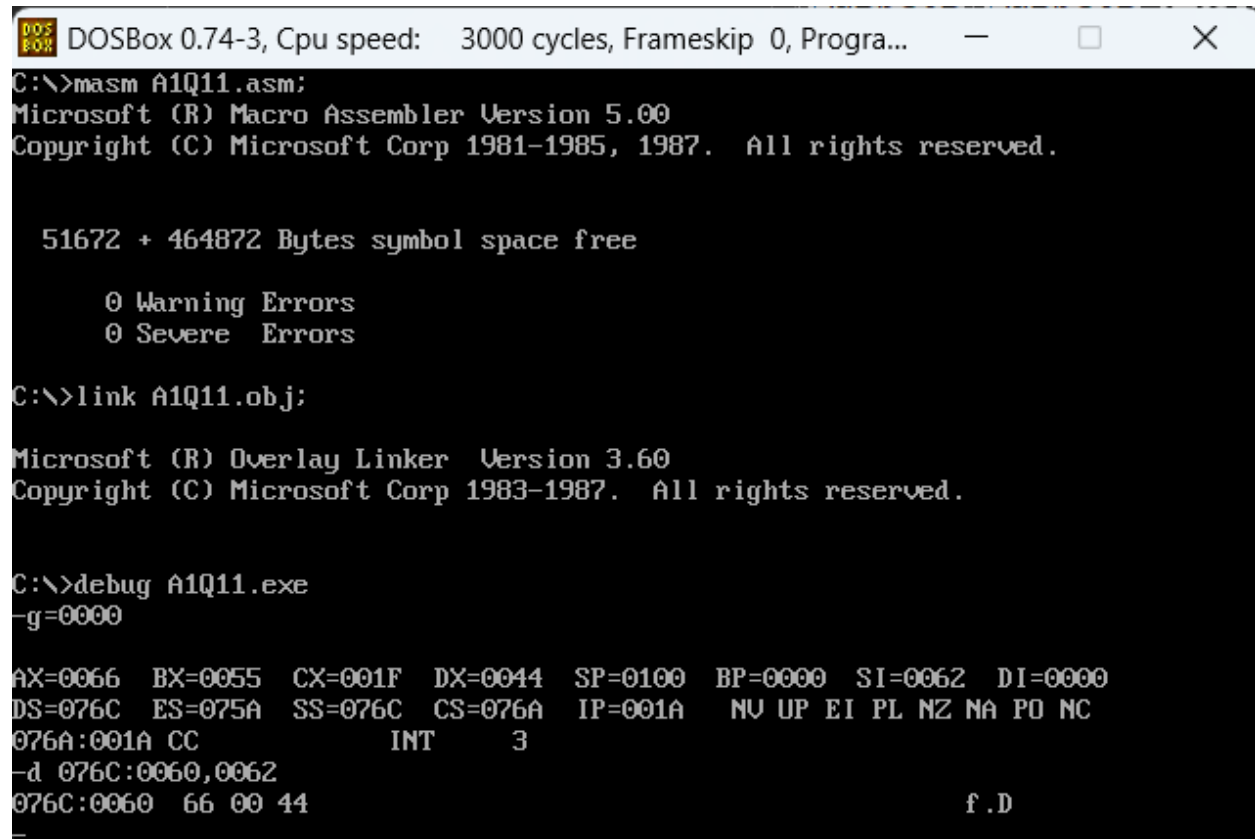
Q11) Write an Assembly Language Program to divide 2222H by 55H. Store the quotient from DS: 0060H and remainder in DS: 0062H.

```

.model small
.stack 100h
.data
.code
main proc
    mov ax, @data
    mov ds, ax
    mov dx, 0000
    mov ax, 2222h

```

```
    mov bx, 0055h
    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, Progra...

```
C:\>masm A1Q11.asm:
Microsoft (R) Macro Assembler Version 5.00
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51672 + 464872 Bytes symbol space free

0 Warning Errors
0 Severe Errors

C:\>link A1Q11.obj:
Microsoft (R) Overlay Linker Version 3.60
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C:\>debug A1Q11.exe
-g=0000

AX=0066 BX=0055 CX=001F DX=0044 SP=0100 BP=0000 SI=0062 DI=0000
DS=076C ES=075A SS=076C CS=076A IP=001A  NU UP EI PL NZ NA PO NC
076A:001A CC          INT     3
-d 076C:0060,0062
076C:0060 66 00 44          f.D
```