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Section: A1

Dept: INFORMATION TECHNOLOGY

Year: UG2 Sem 1

ASM lab assignment – 4

1. Write an Assembly Language Program to add 3 X 3 matrices. Assume the matrices are stored in the form of lists (row wise). First matrix is stored from DS:0030H and the second matrix is stored from DS:0040H. Store the result of the addition in the third lists starting from DS:0050H.

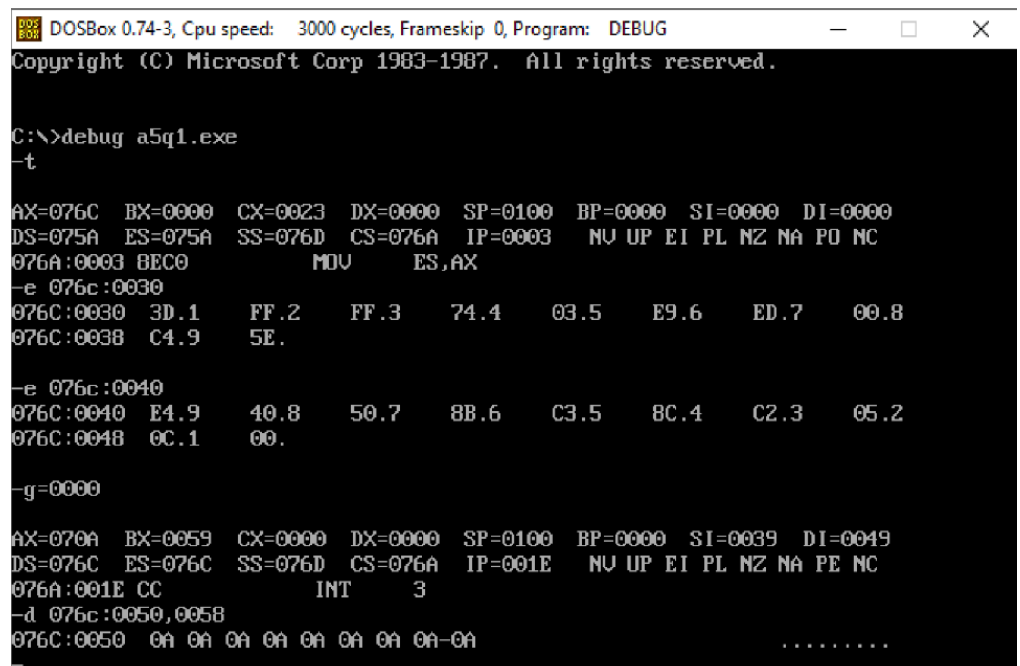
```
.model small
.stack 100h
.data
.code
```

```
main proc
mov ax,@data
mov es,ax
mov ds,ax
mov si,0030h
mov di,0040h
mov bx,0050h
mov cx,0009h
```

```
l1:
mov al,[si]
mov al,[di]
mov [bx],al
inc di
inc bx
inc si
loop l1

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 a5q1.exe
-t

AX=076C BX=0000 CX=0023 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 BEC0          MOV     ES,AX
-e 076c:0030
076C:0030 3D.1 FF.2 FF.3 74.4 03.5 E9.6 ED.7 00.8
076C:0038 C4.9 5E.
-e 076c:0040
076C:0040 E4.9 40.8 50.7 8B.6 C3.5 8C.4 C2.3 05.2
076C:0048 0C.1 00.
-g=0000

AX=070A BX=0059 CX=0000 DX=0000 SP=0100 BP=0000 SI=0039 DI=0049
DS=076C ES=076C SS=076D CS=076A IP=001E  NU UP EI PL NZ NA PE NC
076A:001E CC          INT     3
-d 076c:0050,0058
076C:0050 0A 0A 0A 0A 0A 0A 0A 0A
.....
```

2. Write an Assembly Language Program to convert an eight bit binary number stored in DS:0030H into its equivalent BCD number. Stored the result in DS:0040H.

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

main proc
mov ax,@data
mov es,ax
mov ds,ax
mov si,0030h
mov dx,0000h
mov ax,0000h
mov cl,[si]

l2:
cmp cl,00hs
jz l1
dec cl
mov al,dl
add al,01h
daa
mov dl,al
mov al,dh
adc al,00h
daa
mov dh,al
jmp l2

l1:
mov si,0040h
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
0 Severe Errors

C:\>link a5q2.obj;

Microsoft (R) Overlay Linker Version 3.60
Copyright (C) Microsoft Corp 1983-1987. All rights reserved.

C:\>debug a5q2.exe
-t
AX=076E BX=0000 CX=0043 DX=0000 SP=0100 BP=0000 SI=0000 DI=0000
DS=075A ES=075A SS=076F CS=076A IP=0013  NU UP EI PL NZ NA PO NC
076A:0013 8EC0          MOV     ES,AX
-e 076e:0030
076E:0030 C4.ff

-g=0000
AX=0002 BX=0000 CX=0000 DX=0255 SP=0100 BP=0000 SI=0040 DI=0000
DS=076E ES=076E SS=076F CS=076A IP=003E  NU UP EI PL ZR NA PE NC
076A:003E CC          INT     3
-d 076e:0040,0041
076E:0040 55 02          U.
-
```

3. Write an Assembly program to convert a BCD number stored in DS:0030H into its equivalent hexadecimal number. Stored the result in DS:0040H.

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

```

main proc
mov ax,@data
mov ds,ax
mov si,0030h
mov di,0040h
mov al,[si]
mov bl,al
and al,0f0h
mov cl,04h
ror al,cl
mov dl,0ah
mul dl
mov dx,ax
mov al,bl
and al,0fh
mov ah,00h
add ax,dx
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:\>debug a5q3.exe
-t
AX=076D BX=0000 CX=003A 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  E4.96

-g=0000
AX=0060 BX=0096 CX=0004 DX=005A SP=0100 BP=0000 SI=0030 DI=0040
DS=076D ES=075A SS=076E CS=076A IP=0035  NU UP EI PL NZ AC PE NC
076A:0035 CC          INT      3
-d 076d:0040
076D:0040  60 00 50 8D 86 FA FE 50-E8 17 73 83 C4 06 8B B6  .P...P..s....
076D:0050  FA FE 81 E6 FF 00 C6 82-FB FE 00 2B C0 50 8D 86  .....+.P..
076D:0060  FB FE 50 E8 08 6A 83 C4-04 0B C0 75 03 E9 A5 00  ..P..j.....u...
076D:0070  C7 86 7A FF 00 00 EB 04-FF 86 7A FF A1 70 08 39  ..z.....z..p.9
076D:0080  86 7A FF 72 03 E9 8D 00-8A 86 FA FE 2A E4 40 50  .z.r.....*.@P
076D:0090  8D 86 FA FE 50 8D 86 7C-FF 50 E8 C5 72 83 C4 06  ....P..l.P..r...
076D:00A0  8B 9E 7A FF D1 E3 D1 E3-8B 87 CC 17 8B 97 CE 17  ..z.....
076D:00B0  89 46 FC 89 56 FE 05 0C-00 52 50 E8 42 48 83 C4  .F..U....RP..BH..

```

- Write an Assembly program to convert a binary number stored in DS:0030H into its equivalent gray code. Stored the result in DS:0040H.

```

dosseg
.model small
.stack 100h
.data
.code
main proc
mov ax,@data
mov ds,ax
mov si,0030h
mov di,0040h
mov al,[si]
mov dl,[si]
clc
rcr al,01
xor al,dl
mov [di],al
int 03h
mov ah, 4ch
int 21h
main endp
end main

```

```

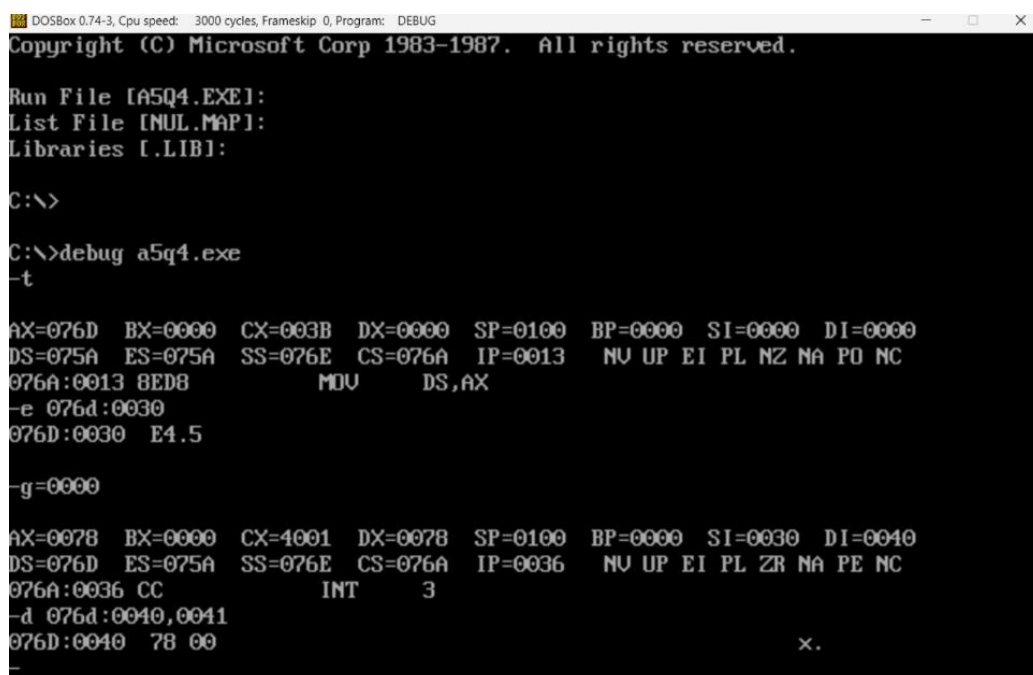
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG
C:\>debug a5q4.exe
-t
AX=076C BX=0000 CX=002B DX=0000 SP=0100 BP=0000 SI=0000 DI=0000
DS=075A ES=075A SS=076D CS=076A IP=0013  NU UP EI PL NZ NA PO NC
076A:0013 8ED8          MOV     DS,AX
-e 076c:0030
076C:0030  3D.10  FF.10  FF.

-g=0000
AX=0718 BX=0000 CX=002B DX=0010 SP=0100 BP=0000 SI=0030 DI=0040
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:0040
076C:0040  18 40 50 8B C3 8C C2 05-0C 00 52 50 E8 C1 48 83  .@P.....RP..H.
076C:0050  C4 04 50 8D 86 FA FE 50-E8 17 73 83 C4 06 8B B6  ..P...P..s....
076C:0060  FA FE 81 E6 FF 00 C6 82-FB FE 00 2B C0 50 8D 86  .....+.P..
076C:0070  FB FE 50 E8 08 6A 83 C4-04 0B C0 75 03 E9 A5 00  ..P..j.....u...
076C:0080  C7 86 7A FF 00 00 EB 04-FF 86 7A FF A1 70 08 39  ..z.....z..p.9
076C:0090  86 7A FF 72 03 E9 8D 00-8A 86 FA FE 2A E4 40 50  .z.r.....*.@P
076C:00A0  8D 86 FA FE 50 8D 86 7C-FF 50 E8 C5 72 83 C4 06  ....P..l.P..r...
076C:00B0  8B 9E 7A FF D1 E3 D1 E3-8B 87 CC 17 8B 97 CE 17  ..z.....

```

5. Write an Assembly program to find the factorial of a number stored in DS:0030H. Stored the result in DS:0040H.

```
dosseg
.model small
.stack 100h
.data
.code
main proc
mov ax,@data
mov ds,ax
mov si,0030h
mov di,0040h
mov bx,0000h
mov ax,0000h
mov al,[si]
mov cx,[si]
mov bl,al
l1:
    dec bl
    cmp bl,00h
    jz l2
    mul bx
    mov dx,ax
    loop l1
l2:    mov [di],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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Run File [A5Q4.EXE]:
List File [NUL.MAP]:
Libraries [LIB]:

C:\>
C:\>debug a5q4.exe
-t
AX=076D BX=0000 CX=003B 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 E4.5

-g=0000
AX=0078 BX=0000 CX=4001 DX=0078 SP=0100 BP=0000 SI=0030 DI=0040
DS=076D ES=075A SS=076E CS=076A IP=0036  NU UP EI PL ZR NA PE NC
076A:0036 CC      INT     3
-d 076d:0040,0041
076D:0040 78 00
x.
```

(note: 78 is hex for 120 in decimal and $5! = 120$)