MIT Practicals
Assignment 9
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Question 1: Write a program to find square and cube of a 16-bit number.

```
.model small
.stack 10H
.data
num dw 200h
res dd ?

.code
start:
mov ax,@data
mov ds,ax

mov ax,num
mov bx, num
mul bx
mov word ptr res,ax
mov word ptr res+2,dx

mov ah,4ch
int 21h
end start
```

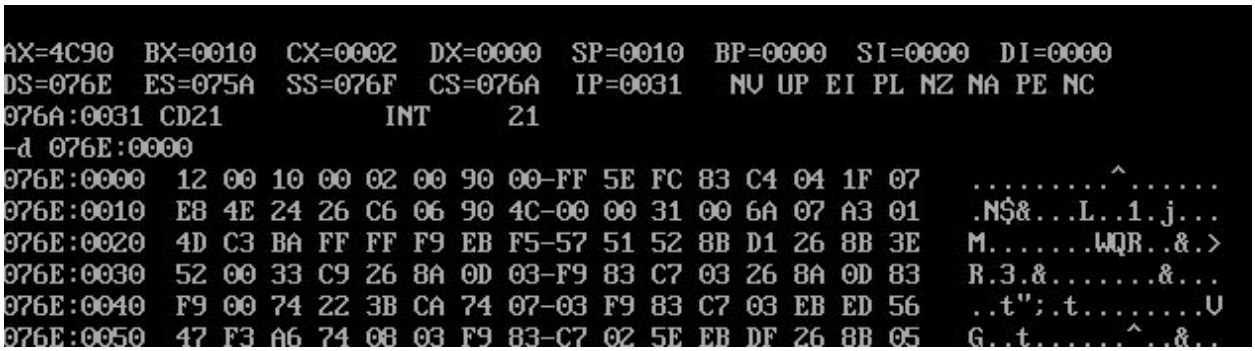
```
AX=076C  BX=0000  CX=0022  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076C  ES=075A  SS=076D  CS=076A  IP=0005   NV UP EI PL NZ NA PO NC
076A:0005 A10000        MOV     AX,[0000]                       DS:0000=0200
-t

AX=0200  BX=0000  CX=0022  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076C  ES=075A  SS=076D  CS=076A  IP=0008   NV UP EI PL NZ NA PO NC
076A:0008 8B1E0000      MOV     BX,[0000]                       DS:0000=0200
-t

AX=0200  BX=0200  CX=0022  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076C  ES=075A  SS=076D  CS=076A  IP=000C   NV UP EI PL NZ NA PO NC
076A:000C F7E3          MUL     BX
-t

AX=0000  BX=0200  CX=0022  DX=0004  SP=0010  BP=0000  SI=0000  DI=0000
DS=076C  ES=075A  SS=076D  CS=076A  IP=000E   OV UP EI PL ZR NA PO CY
076A:000E A30200        MOV     [0002],AX                       DS:0002=FBE3
-t

AX=0000  BX=0200  CX=0022  DX=0004  SP=0010  BP=0000  SI=0000  DI=0000
DS=076C  ES=075A  SS=076D  CS=076A  IP=0011   OV UP EI PL ZR NA PO CY
076A:0011 89160400      MOV     [0004],DX                       DS:0004=36E8
-
```

```
.model small
.stack 10H
.data
num dw 12h
res dd ?

.code
start:
mov ax,@data
mov ds,ax

mov ax,num
mov bx, num
mul bx
mul bx
mov word ptr res,ax
mov word ptr res+2,dx

mov ah,4ch
int 21h
end start
```

```
AX=0012  BX=0000  CX=0022  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076C  ES=075A  SS=076D  CS=076A  IP=0008   NV UP EI PL NZ NA PO NC
076A:0008 8B1E0000      MOV     BX,[0000]                       DS:0000=0012
-t

AX=0012  BX=0012  CX=0022  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076C  ES=075A  SS=076D  CS=076A  IP=000C   NV UP EI PL NZ NA PO NC
076A:000C F7E3          MUL     BX
-t

AX=0144  BX=0012  CX=0022  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076C  ES=075A  SS=076D  CS=076A  IP=000E   NV UP EI PL NZ NA PO NC
076A:000E F7E3          MUL     BX
-t

AX=16C8  BX=0012  CX=0022  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076C  ES=075A  SS=076D  CS=076A  IP=0010   NV UP EI PL NZ NA PO NC
076A:0010 A30200        MOV     [0002],AX                       DS:0002=FBE3
-t

AX=16C8  BX=0012  CX=0022  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076C  ES=075A  SS=076D  CS=076A  IP=0013   NV UP EI PL NZ NA PO NC
076A:0013 89160400      MOV     [0004],DX                       DS:0004=36E8
-
```

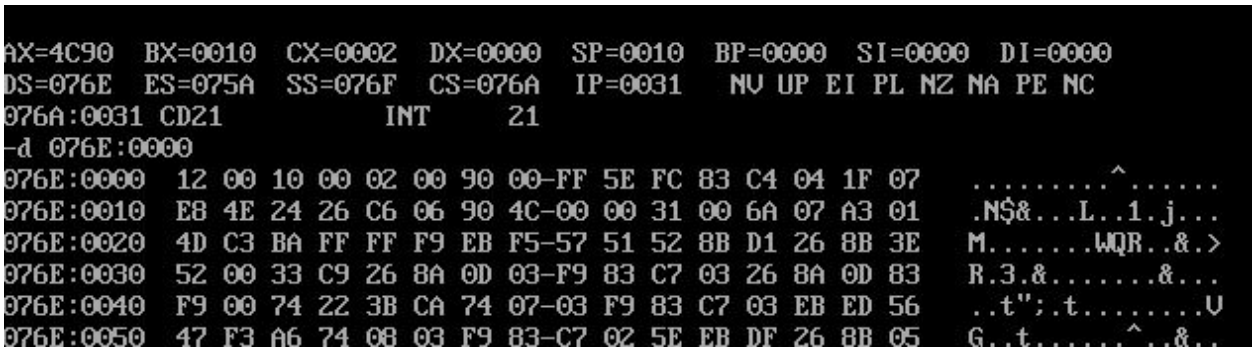
Question 2: Write a program to find LCM of two 8-bit number.

```
.model small
.stack 10H
.data
num1 dw 12h
num2 dw 10h
hcf dw ?
lcm dw ?

.code
start:
mov ax,@data
mov ds,ax

mov ax,num1
mov bx, num2

doit:
mov dx,0
mov cx,bx
div bx
mov bx,dx
mov ax,cx
cmp bx,0
jne doit

mov hcf,ax
mov cx,ax
mov ax,num1
mov bx,num2
mul bx
div cx

mov lcm,ax


mov ah,4ch
int 21h
end start
```


AX=4C90 BX=0010 CX=0002 DX=0000 SP=0010 BP=0000 SI=0000 DI=0000
DS=076E ES=075A SS=076F CS=076A IP=0031 NV UP EI PL NZ NA PE NC
076A:0031 CD21 INT 21
-d 076E:0000
076E:0000 12 00 10 00 02 00 90 00-FF 5E FC 83 C4 04 1F 07 .....^.....
076E:0010 E8 4E 24 26 C6 06 90 4C-00 00 31 00 6A 07 A3 01 .N$&...L..1.j...
076E:0020 4D C3 BA FF FF F9 EB F5-57 51 52 8B D1 26 8B 3E M.....WQR..&.>
076E:0030 52 00 33 C9 26 8A 0D 03-F9 83 C7 03 26 8A 0D 83 R.3.&.....&...
076E:0040 F9 00 74 22 3B CA 74 07-03 F9 83 C7 03 EB ED 56 ..t";.t.....V
076E:0050 47 F3 A6 74 08 03 F9 83-C7 02 5E EB DF 26 8B 05 G..t.....^..&..

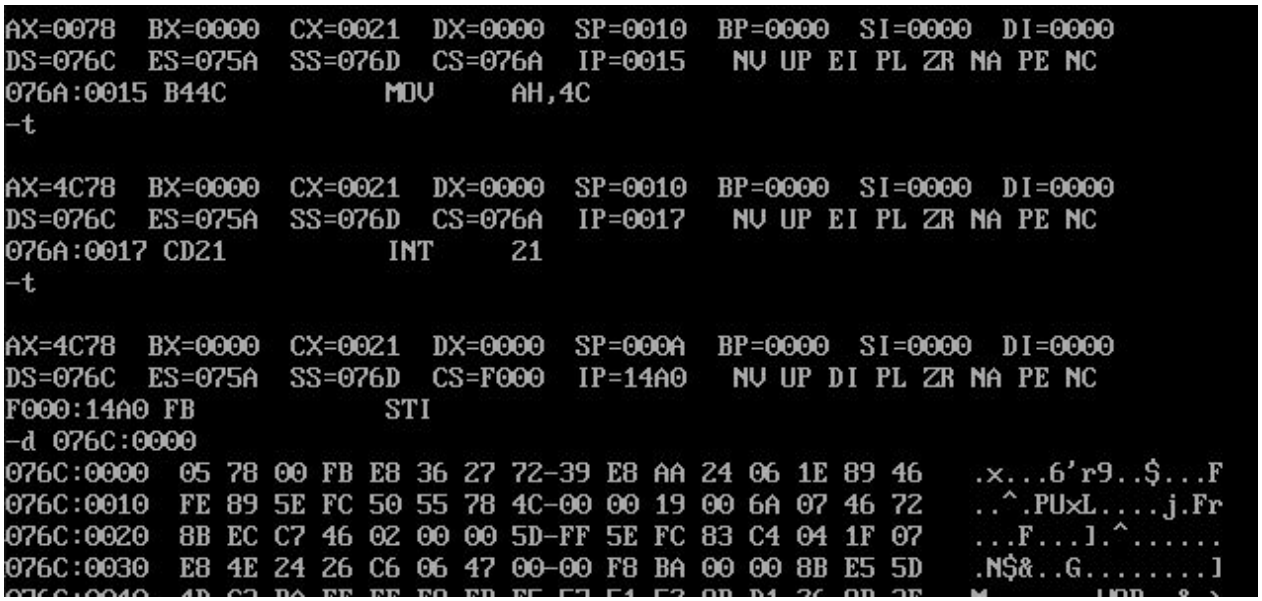
Question 3: Write a program to find GCD of two 8-bit numbers.

```
.model small
.stack 10H
.data
num1 dw 12h
num2 dw 10h
hcf dw ?
lcm dw ?

.code
start:
mov ax,@data
mov ds,ax

mov ax,num1
mov bx, num2

doit:
mov dx,0
mov cx,bx
div bx
mov bx,dx
mov ax,cx
cmp bx,0
jne doit

mov hcf,ax
mov cx,ax
mov ax,num1
mov bx,num2
mul bx
div cx

mov lcm,ax


mov ah,4ch
int 21h
end start
```


AX=4C90 BX=0010 CX=0002 DX=0000 SP=0010 BP=0000 SI=0000 DI=0000
DS=076E ES=075A SS=076F CS=076A IP=0031 NV UP EI PL NZ NA PE NC
076A:0031 CD21 INT 21
-d 076E:0000
076E:0000 12 00 10 00 02 00 90 00-FF 5E FC 83 C4 04 1F 07 .....^.....
076E:0010 E8 4E 24 26 C6 06 90 4C-00 00 31 00 6A 07 A3 01 .N$&...L..1.j...
076E:0020 4D C3 BA FF FF F9 EB F5-57 51 52 8B D1 26 8B 3E M.....WQR..&.>
076E:0030 52 00 33 C9 26 8A 0D 03-F9 83 C7 03 26 8A 0D 83 R.3.&.....&...
076E:0040 F9 00 74 22 3B CA 74 07-03 F9 83 C7 03 EB ED 56 ..t";.t.....V
076E:0050 47 F3 A6 74 08 03 F9 83-C7 02 5E EB DF 26 8B 05 G..t.....^..&..

Question 4: Write a program to find the factorial of a given number.

```
.model small
.stack 10H
.data
num1 db 5h
res dw ?

.code
start:
mov ax,@data
mov ds,ax

mov ax, 1h
mov bl, num1
doit:
mul bl
dec bl
jnz doit

mov res,ax


mov ah,4ch
int 21h
end start
```


AX=0078 BX=0000 CX=0021 DX=0000 SP=0010 BP=0000 SI=0000 DI=0000
DS=076C ES=075A SS=076D CS=076A IP=0015 NV UP EI PL ZR NA PE NC
076A:0015 B44C MOV AH,4C
-t
AX=4C78 BX=0000 CX=0021 DX=0000 SP=0010 BP=0000 SI=0000 DI=0000
DS=076C ES=075A SS=076D CS=076A IP=0017 NV UP EI PL ZR NA PE NC
076A:0017 CD21 INT 21
-t
AX=4C78 BX=0000 CX=0021 DX=0000 SP=000A BP=0000 SI=0000 DI=0000
DS=076C ES=075A SS=076D CS=F000 IP=14A0 NV UP DI PL ZR NA PE NC
F000:14A0 FB STI
-d 076C:0000
076C:0000 05 78 00 FB E8 36 27 72-39 E8 AA 24 06 1E 89 46 .x...6'r9..$...F
076C:0010 FE 89 5E FC 50 55 78 4C-00 00 19 00 6A 07 46 72 ..^.PUxL....j.Fr
076C:0020 8B EC C7 46 02 00 00 5D-FF 5E FC 83 C4 04 1F 07 ...F...].^.....
076C:0030 E8 4E 24 26 C6 06 47 00-00 F8 BA 00 00 8B E5 5D .N$&..G.....]

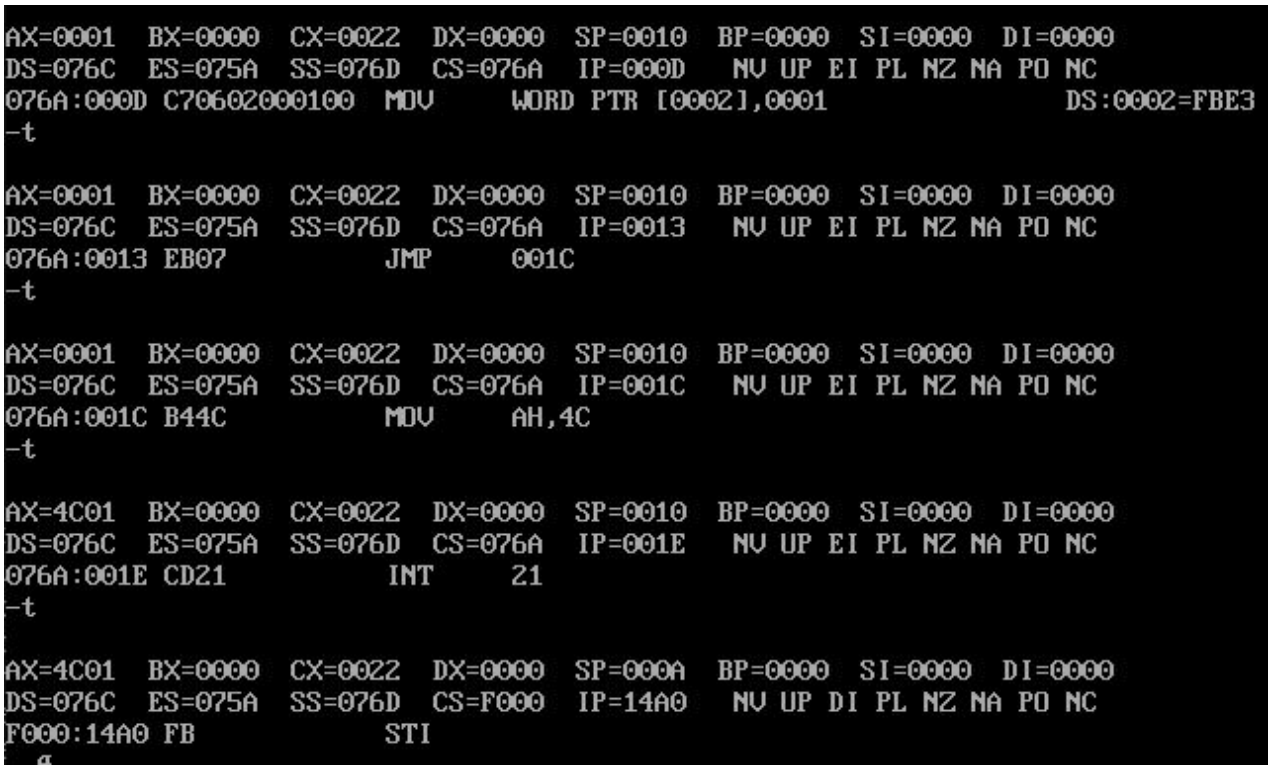
Question 5: Write a program to check whether given data is positive or negative.

```
.model small
.stack 10H
.data
num1 dw -25h
res dw ?

.code
start:
mov ax,@data
mov ds,ax

mov ax, num1
and ax,8000h
jz positive
mov res,-1h
jmp exit

positive:
mov res, 1h

exit:
mov ah,4ch
int 21h
end start
```

```
AX=076C  BX=0000  CX=0022  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076C  ES=075A  SS=076D  CS=076A  IP=0005   NV UP EI PL NZ NA PO NC
076A:0005 A10000        MOV     AX,[0000]                       DS:0000=FFDB
-t

AX=FFDB  BX=0000  CX=0022  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076C  ES=075A  SS=076D  CS=076A  IP=0008   NV UP EI PL NZ NA PO NC
076A:0008 250080        AND     AX,8000
-t

AX=8000  BX=0000  CX=0022  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076C  ES=075A  SS=076D  CS=076A  IP=000B   NV UP EI NG NZ NA PE NC
076A:000B 7409          JZ      0016
-t

AX=8000  BX=0000  CX=0022  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076C  ES=075A  SS=076D  CS=076A  IP=000D   NV UP EI NG NZ NA PE NC
076A:000D C7060200FFFF  MOV     WORD PTR [0002],FFFF            DS:0002=FBE3
-t

AX=8000  BX=0000  CX=0022  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076C  ES=075A  SS=076D  CS=076A  IP=0013   NV UP EI NG NZ NA PE NC
076A:0013 EB07          JMP     001C
```

Question 6: Write a program to check whether a given number is odd or even.

```
.model small
.stack 10H
.data
num1 dw 25h
res dw ?

.code
start:
mov ax,@data
mov ds,ax

mov ax, num1
and ax,1h
jz evennum

mov res,1h
jmp exit

evennum:
mov res,0h


exit:
mov ah,4ch
int 21h
end start
```


AX=0001 BX=0000 CX=0022 DX=0000 SP=0010 BP=0000 SI=0000 DI=0000
DS=076C ES=075A SS=076D CS=076A IP=000D NV UP EI PL NZ NA PO NC
076A:000D C70602000100 MOV WORD PTR [0002],0001 DS:0002=FBE3
-t
AX=0001 BX=0000 CX=0022 DX=0000 SP=0010 BP=0000 SI=0000 DI=0000
DS=076C ES=075A SS=076D CS=076A IP=0013 NV UP EI PL NZ NA PO NC
076A:0013 EB07 JMP 001C
-t
AX=0001 BX=0000 CX=0022 DX=0000 SP=0010 BP=0000 SI=0000 DI=0000
DS=076C ES=075A SS=076D CS=076A IP=001C NV UP EI PL NZ NA PO NC
076A:001C B44C MOV AH,4C
-t
AX=4C01 BX=0000 CX=0022 DX=0000 SP=0010 BP=0000 SI=0000 DI=0000
DS=076C ES=075A SS=076D CS=076A IP=001E NV UP EI PL NZ NA PO NC
076A:001E CD21 INT 21
-t
AX=4C01 BX=0000 CX=0022 DX=0000 SP=000A BP=0000 SI=0000 DI=0000
DS=076C ES=075A SS=076D CS=F000 IP=14A0 NV UP DI PL NZ NA PO NC
F000:14A0 FB STI

Question 7: Write a program to count logical 1’s and 0’s in a given data.

```
.model small
.stack 10H
.data
num1 dw 2404h
res dw ?

.code
start:
mov ax,@data
mov ds,ax

mov dx, num1
mov cx,0h
mov bx,10h

doit:
mov ax,dx
and ax,1h
jz notone
inc cx

notone:
rcr dx,1
dec bx
jnz doit

mov res,cx



exit:
mov ah,4ch
int 21h
end start
```

```
AX=0000  BX=0000  CX=0003  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076D  ES=075A  SS=076E  CS=076A  IP=001A   NV UP EI PL ZR NA PE NC
076A:001A 75F3          JNZ     000F
-t

AX=0000  BX=0000  CX=0003  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076D  ES=075A  SS=076E  CS=076A  IP=001C   NV UP EI PL ZR NA PE NC
076A:001C 890E0200      MOV     [0002],CX                       DS:0002=FC5E
-t

AX=0000  BX=0000  CX=0003  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076D  ES=075A  SS=076E  CS=076A  IP=0020   NV UP EI PL ZR NA PE NC
076A:0020 B44C          MOV     AH,4C
-d 076D:0000
076D:0000  04 24 03 00 50 55 8B EC-C7 46 02 00 00 5D 50 55   .$..PU...F...]PU
076D:0010  8B EC C7 46 02 00 00 00-00 00 20 00 6A 07 A3 01   ...F...... .j...
076D:0020  E8 4E 24 26 C6 06 47 00-00 F8 BA 00 00 8B E5 5D   .N$&..G........]
076D:0030  4D C3 BA FF FF F9 EB F5-57 51 52 8B D1 26 8B 3E   M.......WQR..&.>
076D:0040  52 00 33 C9 26 8A 0D 03-F9 83 C7 03 26 8A 0D 83   R.3.&.......&...
076D:0050  F9 00 74 22 3B CA 74 07-03 F9 83 C7 03 EB ED 56   ..t";.t........V
076D:0060  47 F3 A6 74 08 03 F9 83-C7 02 5E EB DF 26 8B 05   G..t......^..&..
076D:0070  5E 5A 59 5F F8 C3 5A 59-5F F9 C3 26 8B 44 06 06   ^ZY_..ZY_..&.D..
```

Question 8: Write a program to check if the given 8-bit data is bit wise palindrome or not.

```
.model small
.stack 10H
.data
num1 dw 8001h
res dw ?

.code
start:
mov ax,@data
mov ds,ax
mov cx,10h
mov ax,num1

doit:
rcr ax,1
rcl bx,1
dec cx
jnz doit

ender:
mov ax,num1
cmp ax, bx

jz equal
mov res, 00h
jmp exit

equal:
mov res,1h

exit:
mov ah,4ch
int 21h
end start
```

```
076A:0012 A10000        MOV     AX,[0000]                       DS:0000=8001
-t

AX=8001  BX=8001  CX=0000  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076D  ES=075A  SS=076E  CS=076A  IP=0015   NV UP EI PL ZR NA PE NC
076A:0015 3BC3          CMP     AX,BX
-t

AX=8001  BX=8001  CX=0000  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076D  ES=075A  SS=076E  CS=076A  IP=0017   NV UP EI PL ZR NA PE NC
076A:0017 7409          JZ      0022
-t

AX=8001  BX=8001  CX=0000  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076D  ES=075A  SS=076E  CS=076A  IP=0022   NV UP EI PL ZR NA PE NC
076A:0022 C70602000100  MOV     WORD PTR [0002],0001            DS:0002=FC5E
-t

AX=8001  BX=8001  CX=0000  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076D  ES=075A  SS=076E  CS=076A  IP=0028   NV UP EI PL ZR NA PE NC
076A:0028 B44C          MOV     AH,4C
-
```

Question 9: Write a program to check if the given 8-bit data is nibble wise palindrome or not.

```
.model small
.stack 10H
.data
num1 dw 1001h
res dw ?

.code
start:
mov ax,@data
mov ds,ax
mov ax,num1
mov bx,num1

and ax,0f000h
and bx,0fh
rcr ax,12
cmp ax,bx

jnz exit

mov ax,num1
mov bx,num1

and ax,0f00h
and bx,00f0h
rcr ax,8
rcr bx,4

cmp ax,bx

jnz exit

mov res,1h
jmp exit1


exit:
mov res,0h

exit1:
```

```
mov ah,4ch
int 21h
end start
```


AX=0000 BX=0000 CX=0004 DX=0000 SP=0010 BP=0000 SI=0000 DI=0000
DS=0771 ES=075A SS=0772 CS=076A IP=0059 NV UP EI PL ZR NA PE NC
076A:0059 7509 JNZ 0064
-t
AX=0000 BX=0000 CX=0004 DX=0000 SP=0010 BP=0000 SI=0000 DI=0000
DS=0771 ES=075A SS=0772 CS=076A IP=005B NV UP EI PL ZR NA PE NC
076A:005B C70602000100 MOV WORD PTR [0002],0001 DS:0002=C933
-t
AX=0000 BX=0000 CX=0004 DX=0000 SP=0010 BP=0000 SI=0000 DI=0000
DS=0771 ES=075A SS=0772 CS=076A IP=0061 NV UP EI PL ZR NA PE NC
076A:0061 EB07 JMP 006A
-t
AX=0000 BX=0000 CX=0004 DX=0000 SP=0010 BP=0000 SI=0000 DI=0000
DS=0771 ES=075A SS=0772 CS=076A IP=006A NV UP EI PL ZR NA PE NC
076A:006A B44C MOV AH,4C
-t