ASM Laboratory

Name: **Soham Das**

Section: **A1**

Roll No: **002311001004**

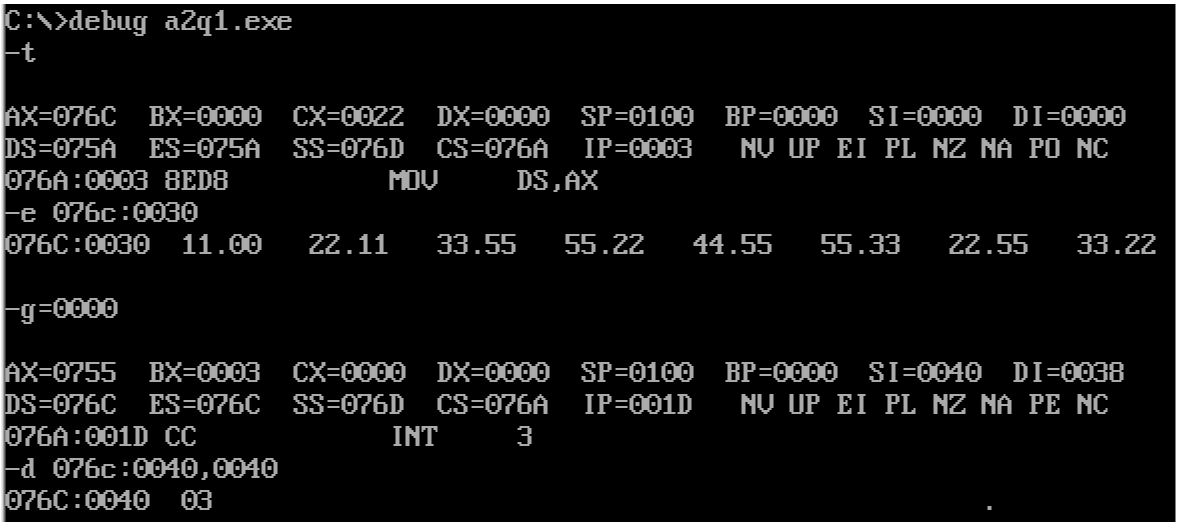
IT-UG2

1. Write an Assembly Language Program to count the number of occurrence of 55H in a string of eight data bytes. The starting address of string is DS: 0030H. Store the count value in DS:0040H.

Code:

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

main proc

mov ax, @data
mov ds, ax
mov es, ax

mov al, 55h
mov cx, 0008h
mov di, 0030h
mov bl, 00h

l1:
scasb
jnz l2
inc bl
l2:
loop l1

mov si, 0040h
mov [si], bl

int 03h
mov ah, 4ch
int 21h

main endp
end main
```

Output:



```
C:\>debug a2q1.exe
-t

AX=076C  BX=0000  CX=0022  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  11.00   22.11   33.55   55.22   44.55   55.33   22.55   33.22

-g=0000

AX=0755  BX=0003  CX=0000  DX=0000  SP=0100  BP=0000  SI=0040  DI=0038
DS=076C  ES=076C  SS=076D  CS=076A  IP=001D   NV UP EI PL NZ NA PE NC
076A:001D CC            INT     3
-d 076c:0040,0040
076C:0040  03                                                  .
```

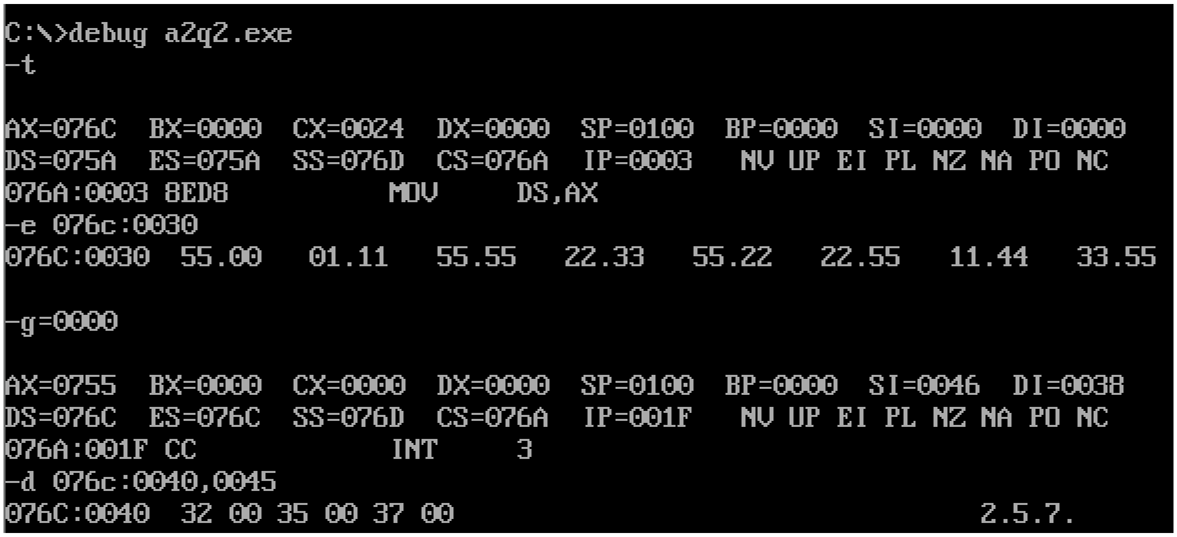
2. Write an Assembly Language Program to find out the location where 55H is placed in a string of eight data bytes. The starting address of string is DS: 0030H.

Code:

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

main proc

mov ax, @data
mov ds, ax
mov es, ax

mov di, 0030h
mov al, 55h
mov cx, 0008h
mov si, 0040h
cld

l1:
scasb
jnz l2
dec di
mov [si], di
add si, 0002h
```

```
inc di
l2:
loop l1

int 03h
mov ah, 4ch
int 21h

main endp
end main
```

Output:



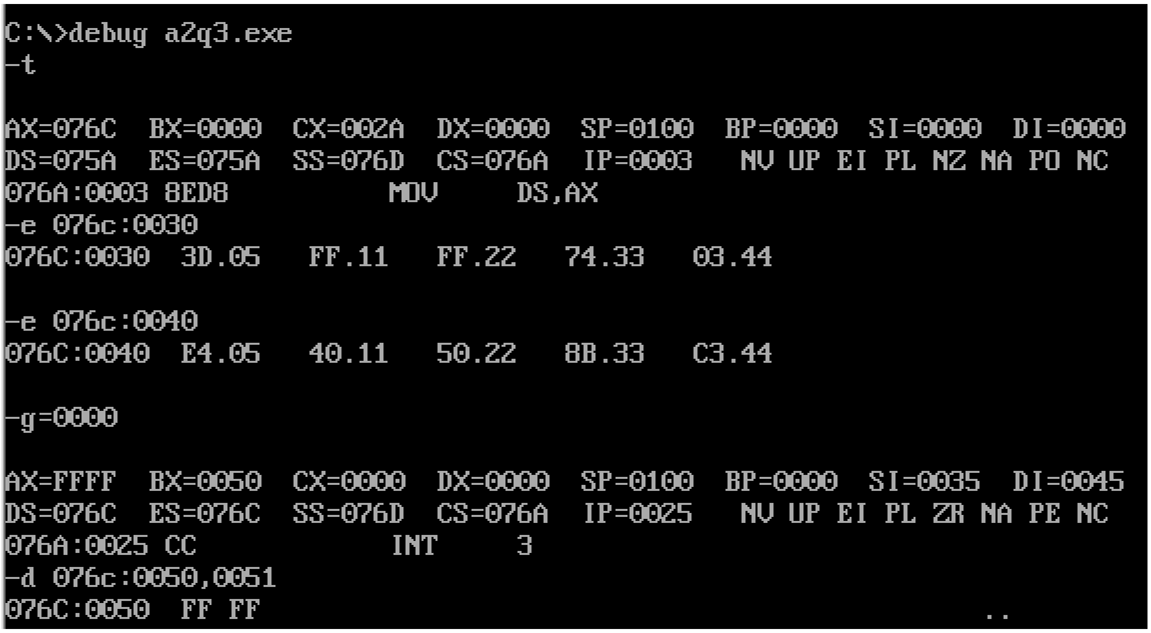
```
C:\>debug a2q2.exe
-t

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   NV UP EI PL NZ NA PO NC
076A:0003 8ED8          MOV     DS,AX
-e 076c:0030
076C:0030  55.00   01.11   55.55   22.33   55.22   22.55   11.44   33.55

-g=0000

AX=0755  BX=0000  CX=0000  DX=0000  SP=0100  BP=0000  SI=0046  DI=0038
DS=076C  ES=076C  SS=076D  CS=076A  IP=001F   NV UP EI PL NZ NA PO NC
076A:001F CC            INT     3
-d 076c:0040,0045
076C:0040  32 00 35 00 37 00                                  2.5.7.
```

3. Write an Assembly Language Program to compare two strings. The first string is stored from memory location DS: 0030H and the second sting is stored from DS: 0040H. Consider that the first byte of both strings contain the number of bytes contained in that string. If both strings are found equal, then show a value FFFFH in address DS: 0050H, otherwise show 1111H.

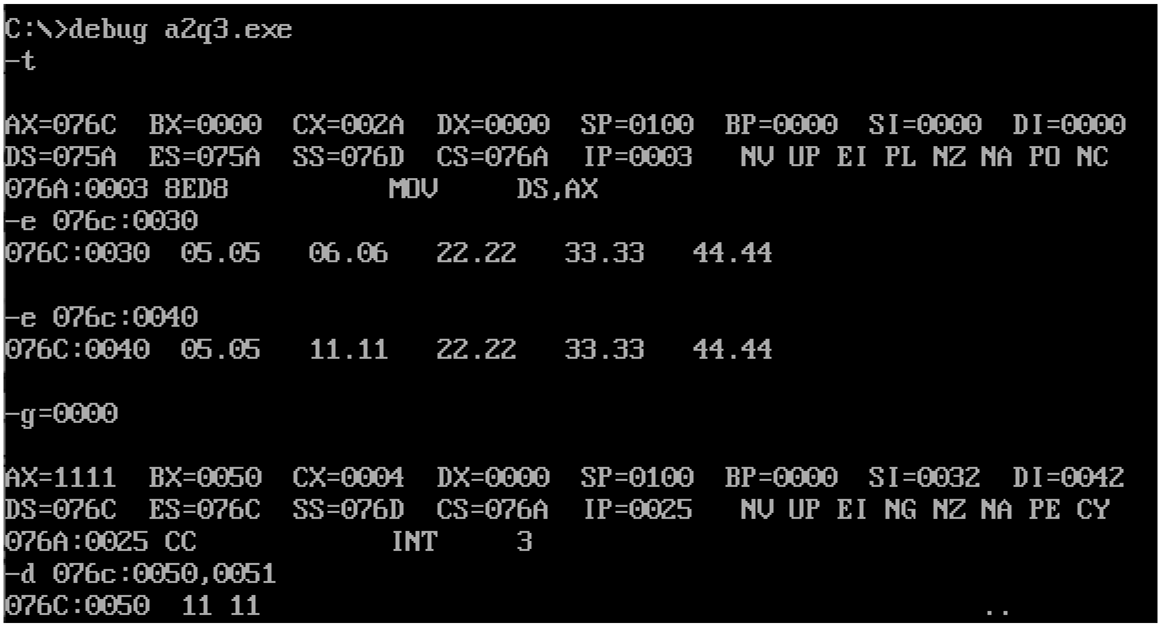
Code:

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

main proc

mov ax, @data
mov ds, ax
mov es, ax

mov si, 0030h
mov di, 0040h

mov cl, [si]
mov ch, 00h
cld

l1:
cmpsb
jnz l2
loop l1

mov ax, 0ffffh
jmp l3

l2:
mov ax, 01111h

l3:
mov bx, 0050h
mov [bx], ax

int 03h
mov ah, 4ch
int 21h

main endp
end main
```

Output:



```
C:\>debug a2q3.exe
-t

AX=076C  BX=0000  CX=002A  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.05   FF.11   FF.22   74.33   03.44

-e 076c:0040
076C:0040  E4.05   40.11   50.22   8B.33   C3.44

-g=0000

AX=FFFF  BX=0050  CX=0000  DX=0000  SP=0100  BP=0000  SI=0035  DI=0045
DS=076C  ES=076C  SS=076D  CS=076A  IP=0025   NV UP EI PL ZR NA PE NC
076A:0025 CC            INT     3
-d 076c:0050,0051
076C:0050  FF FF                                                ..
```



```
C:\>debug a2q3.exe
-t

AX=076C  BX=0000  CX=002A  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  05.05   06.06   22.22   33.33   44.44

-e 076c:0040
076C:0040  05.05   11.11   22.22   33.33   44.44

-g=0000

AX=1111  BX=0050  CX=0004  DX=0000  SP=0100  BP=0000  SI=0032  DI=0042
DS=076C  ES=076C  SS=076D  CS=076A  IP=0025   NV UP EI NG NZ NA PE CY
076A:0025 CC            INT     3
-d 076c:0050,0051
076C:0050  11 11                                                ..
```

4. Write an Assembly Language Program to check if a string of five data bytes is palindrome or not. The string is stored from memory location DS: 0030H. If the string is found to be palindrome then place FFFFH in addresses DS: 0040H otherwise place 1111H.

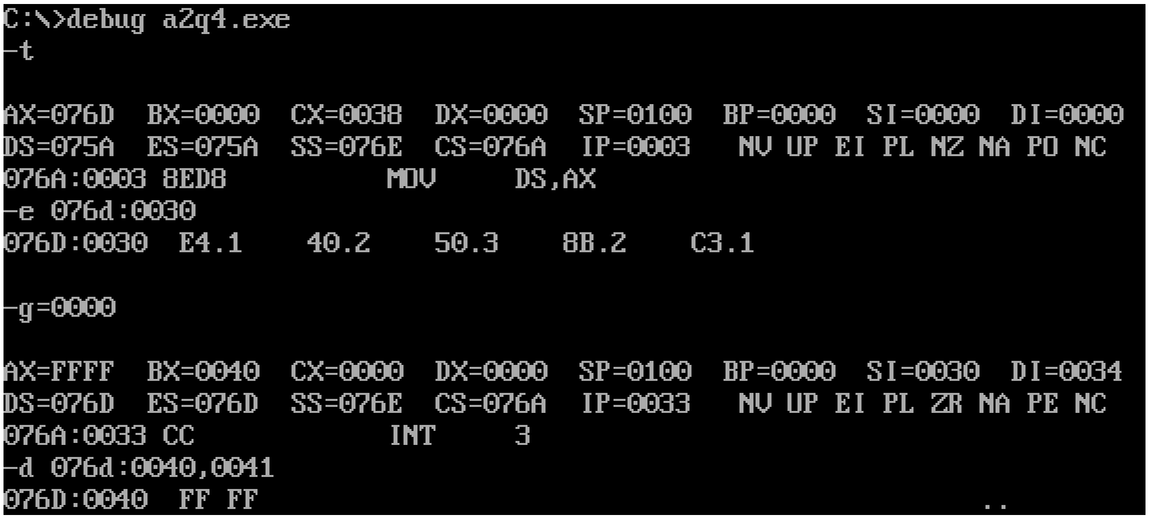
Code:

```
.model small
.stack 100h
```

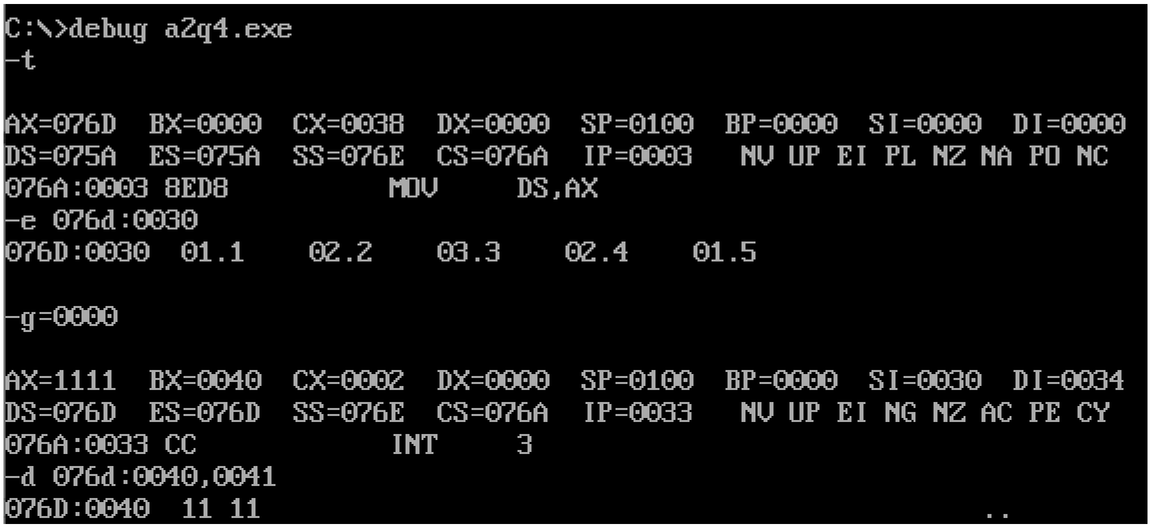
```
.data
.code

main proc

mov ax, @data
mov ds, ax
mov es, ax

mov ax, 0005h

mov si, 0030h
mov di, 0030h
add di, ax
dec di

mov bl, 02h
div bl
mov cl, al
mov ch, 00h

l1:
mov al, [si]
mov bl, [di]
cmp al, bl
jnz l2
loop l1

mov ax, 0ffffh
jmp l3

l2:
mov ax, 01111h

l3:
mov bx, 0040h
mov [bx], ax


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

main endp
end main

Output:



```
C:\>debug a2q4.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=0003   NV UP EI PL NZ NA PO NC
076A:0003 8ED8          MOV     DS,AX
-e 076d:0030
076D:0030  E4.1    40.2    50.3    8B.2    C3.1

-g=0000

AX=FFFF  BX=0040  CX=0000  DX=0000  SP=0100  BP=0000  SI=0030  DI=0034
DS=076D  ES=076D  SS=076E  CS=076A  IP=0033   NV UP EI PL ZR NA PE NC
076A:0033 CC            INT     3
-d 076d:0040,0041
076D:0040  FF FF                                             ..
```



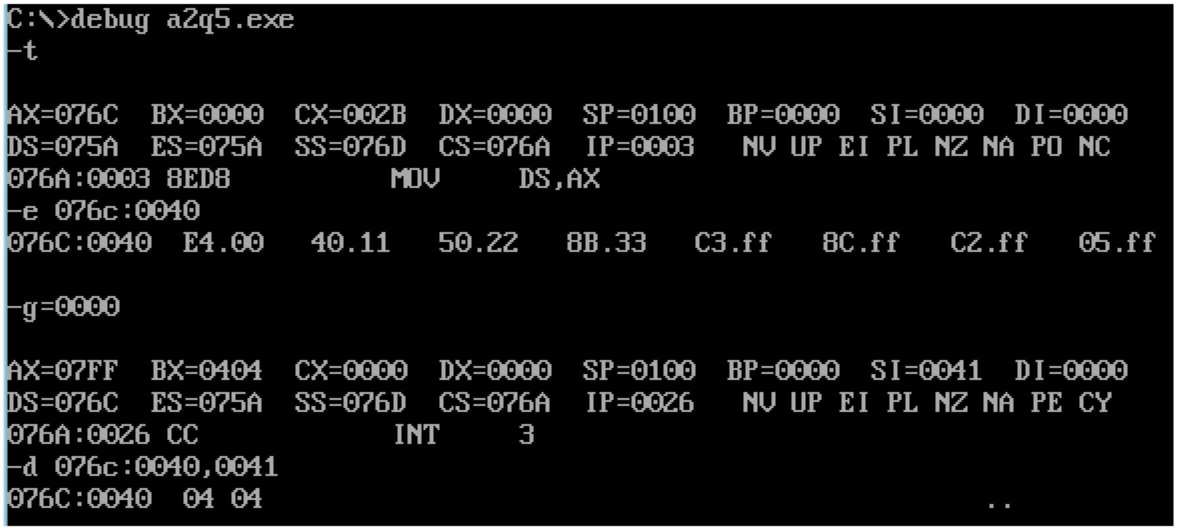
```
C:\>debug a2q4.exe
-t

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=0003   NV UP EI PL NZ NA PO NC
076A:0003 8ED8          MOV     DS,AX
-e 076d:0030
076D:0030  01.1    02.2    03.3    02.4    01.5

-g=0000

AX=1111  BX=0040  CX=0002  DX=0000  SP=0100  BP=0000  SI=0030  DI=0034
DS=076D  ES=076D  SS=076E  CS=076A  IP=0033   NV UP EI NG NZ AC PE CY
076A:0033 CC            INT     3
-d 076d:0040,0041
076D:0040  11 11                                             ..
```

5. Write an Assembly Language Program to count the number of positive and negative numbers present in a series of eight data bytes. The starting address of the series is DS: 0040H. Store the count value of positive number in DS: 0040H and count value of negative number in DS: 0041H.

Code:

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

main proc

mov ax, @data
mov ds, ax

mov bx, 0000h ; storing +ve in bh, -ve in bl
mov si, 0040h
mov cx, 0008h

l1: mov al, [si]
rol al, 01h
inc si
jc l2
inc bh
jmp l3
l2: inc bl
l3: loop l1

mov si, 0040h
mov [si], bh
inc si
mov [si], bl

int 03h
mov ah, 4ch
int 21h

main endp
end main
```

Output:



```
C:\>debug a2q5.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:0040
076C:0040  E4.00   40.11   50.22   8B.33   C3.ff   8C.ff   C2.ff   05.ff

-g=0000

AX=07FF  BX=0404  CX=0000  DX=0000  SP=0100  BP=0000  SI=0041  DI=0000
DS=076C  ES=075A  SS=076D  CS=076A  IP=0026   NV UP EI PL NZ NA PE CY
076A:0026 CC            INT     3
-d 076c:0040,0041
076C:0040  04 04                                                ..
```

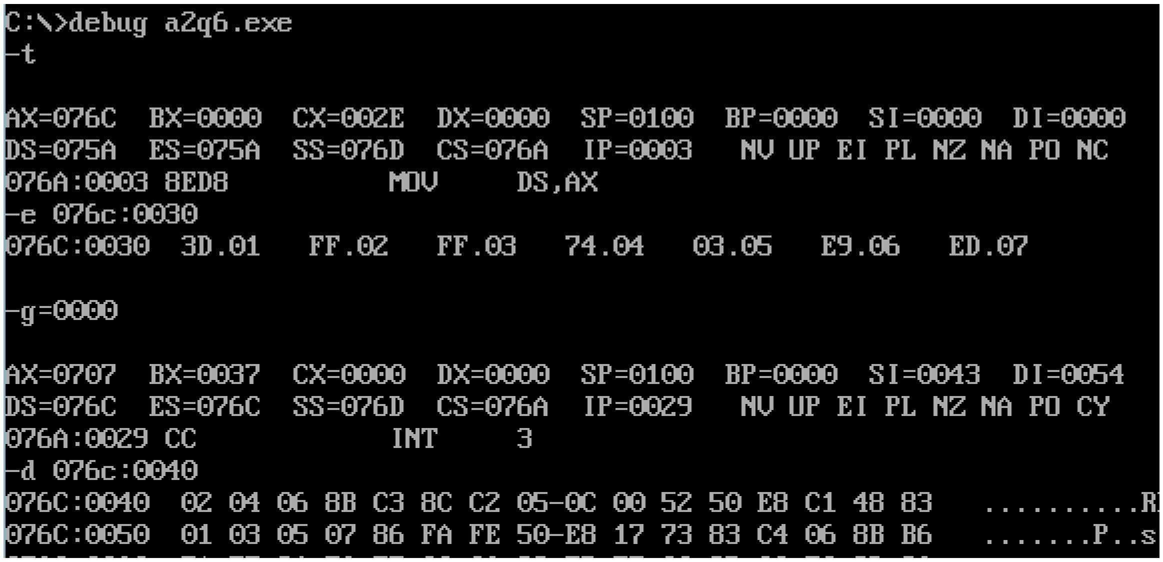
6. Write an Assembly Language Program to separate the odd and even numbers from a series of 7 data bytes. The starting address of the series is DS: 0030H. Store the even numbers from DS: 0040H and the odd numbers from DS: 0050H.

Code:

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

main proc

mov ax, @data
mov ds, ax
mov es, ax

mov bx, 0030h
mov si, 0040h ;even
mov di, 0050h ;odd
mov cx, 0007h

l1: mov al, [bx]
ror al, 01h
inc bx
jnc l2
rol al, 01h
mov [di], al ;storing odd in si
inc di
```

```
jmp l3
l2: rol al, 01h
mov [si], al
inc si
l3: loop l1

int 03h
mov ah, 4ch
int 21h

main endp
end main
```

Output:



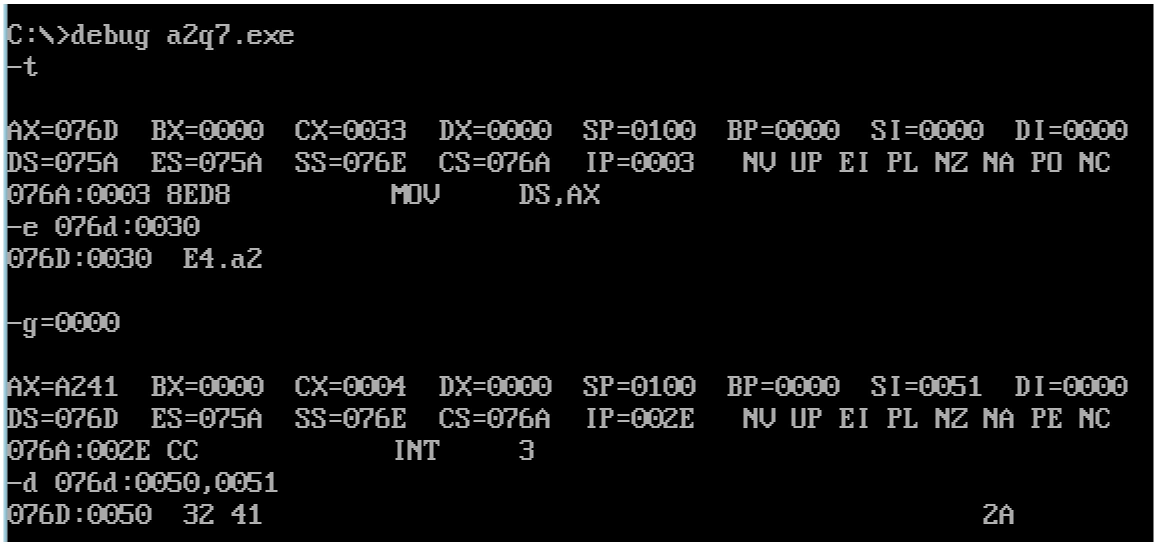
```
C:\>debug a2q6.exe
-t

AX=076C  BX=0000  CX=002E  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.01   FF.02   FF.03   74.04   03.05   E9.06   ED.07

-g=0000

AX=0707  BX=0037  CX=0000  DX=0000  SP=0100  BP=0000  SI=0043  DI=0054
DS=076C  ES=076C  SS=076D  CS=076A  IP=0029   NV UP EI PL NZ NA PO CY
076A:0029 CC            INT     3
-d 076c:0040
076C:0040  02 04 06 8B C3 8C C2 05-0C 00 52 50 E8 C1 48 83   ..........R
076C:0050  01 03 05 07 86 FA FE 50-E8 17 73 83 C4 06 8B B6   .......P..s
```

7. Write an Assembly Language Program to convert an 8-bit number stored in DS:0030H into its equivalent ASCII value. Store the converted code from DS: 0050H.

Code:

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

main proc

mov ax, @data
mov ds, ax
mov si, 0030h
mov al, [si]
mov ah, al

and al, 0fh
cmp al, 09h
jc l2
add al, 07h
l2: add al, 30h

mov si, 0050h
mov [si], al
inc si

mov al, ah
and al, 0f0h
mov cl, 04h
rol al, cl
cmp al, 09h
jc l3
add al, 07h
l3: add al, 30h

mov [si], al

int 03h
mov ah, 4ch
int 21h

main endp
end main
```

Output:



```
C:\>debug a2q7.exe
-t

AX=076D  BX=0000  CX=0033  DX=0000  SP=0100  BP=0000  SI=0000  DI=0000
DS=075A  ES=075A  SS=076E  CS=076A  IP=0003   NV UP EI PL NZ NA PO NC
076A:0003 8ED8          MOV     DS,AX
-e 076d:0030
076D:0030  E4.a2

-g=0000

AX=A241  BX=0000  CX=0004  DX=0000  SP=0100  BP=0000  SI=0051  DI=0000
DS=076D  ES=075A  SS=076E  CS=076A  IP=002E   NV UP EI PL NZ NA PE NC
076A:002E CC            INT     3
-d 076d:0050,0051
076D:0050  32 41                                              2A
```

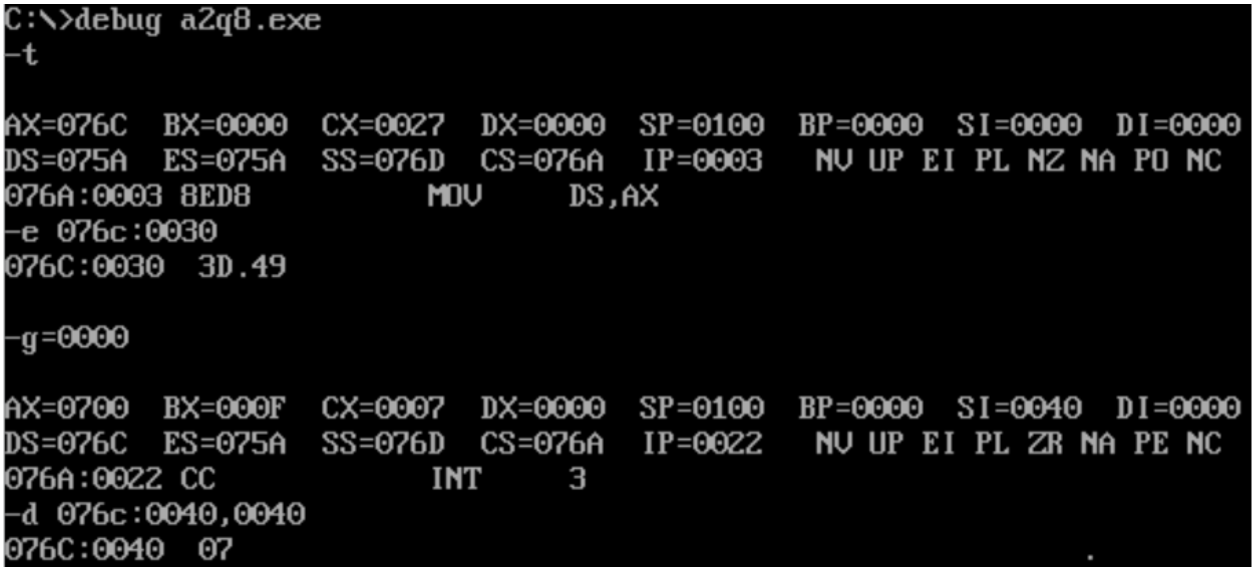
8. Write an Assembly Language Program to find out the square root of a number stored in DS: 0030H. Store the result in DS: 0040H.

Code:

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

main proc

mov ax, @data
mov ds, ax
mov si, 0030h

mov al, [si]
mov bl, 01h
mov cl, 00h

l1: sub al, bl
das
add bl, 02h
daa
inc cl
cmp al, 00h
jz l2
```

```
jmp l1

l2: mov si, 0040h
mov [si], cl

int 03h
mov ah, 4ch
int 21h

main endp
end main
```

Output:



```
C:\>debug a2q8.exe
-t

AX=076C  BX=0000  CX=0027  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.49

-g=0000

AX=0700  BX=000F  CX=0007  DX=0000  SP=0100  BP=0000  SI=0040  DI=0000
DS=076C  ES=075A  SS=076D  CS=076A  IP=0022   NV UP EI PL ZR NA PE NC
076A:0022 CC            INT     3
-d 076c:0040,0040
076C:0040  07                                                    .
```

9. Fibonacci series is defined as:
   F(i) = F(i-1) + F(i-2); for all i>2 with F(1) = F(2) = 1

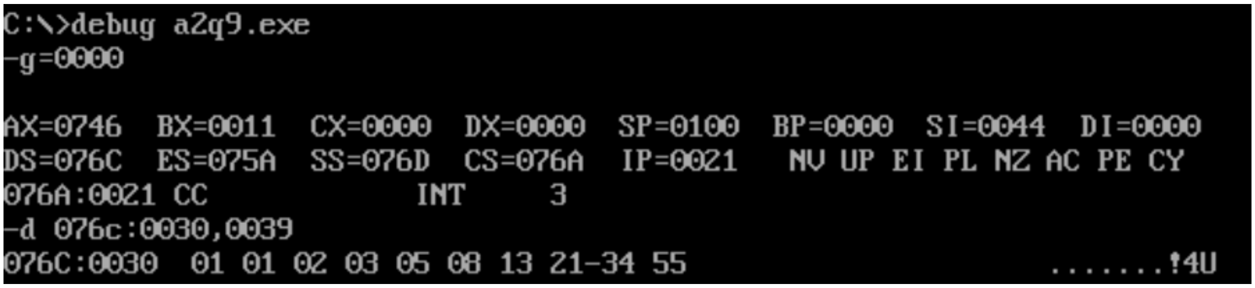
   Write an Assembly language Program to generate the first ten elements of this sequence and store them from DS: 0030H.

Code:

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

main proc
```

```
mov ax, @data
mov ds, ax

mov cx, 000ah
mov al, 01h
mov bl, 01h
mov si, 0030h

l1:
mov [si], al
inc si
mov [si], bl
inc si
add al, bl
daa
xchg al, bl
add al, bl
daa
xchg al, bl

loop l1

int 03h
mov ah, 4ch
int 21h

main endp
end main
```

Output:



```
C:\>debug a2q9.exe
-g=0000

AX=0746  BX=0011  CX=0000  DX=0000  SP=0100  BP=0000  SI=0044  DI=0000
DS=076C  ES=075A  SS=076D  CS=076A  IP=0021   NV UP EI PL NZ AC PE CY
076A:0021 CC            INT     3
-d 076c:0030,0039
076C:0030  01 01 02 03 05 08 13 21-34 55                     .......!4U
```