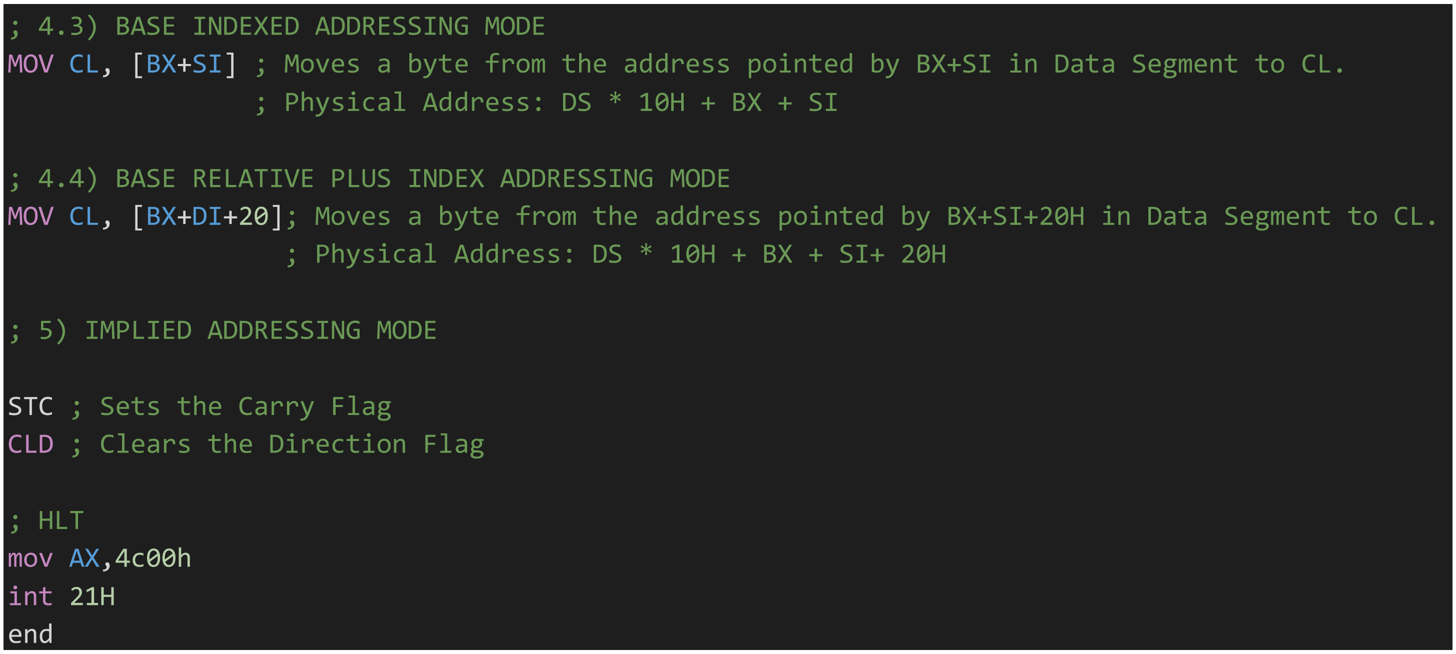
M.I.T. LAB Assignment – 11

U19CS012

1. Write a Program for data transfer using different addressing modes.

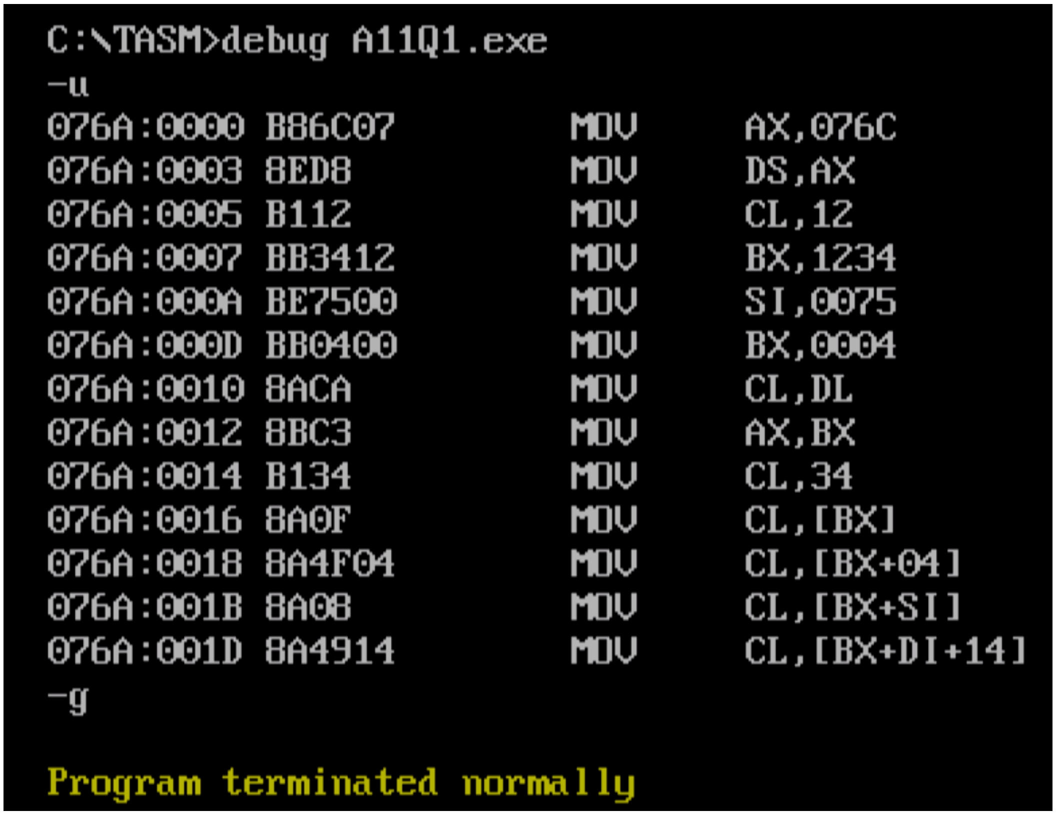
TASM Code:

```
.model small
.stack 100
.8086

.code
mov AX,@data
mov DS,AX

; 1) IMMEDIATE ADDRESSING MODE

mov CL, 12H     ; Moves 12 immediately into CL register
mov BX, 1234H   ; Moves 1234 immediately into BX register

; 2) REGISTER ADDRESSING MODE

mov CL, DL      ; Moves data of DL register into CL register
mov AX, BX      ; Moves data of BX register into AX register

; 3) DIRECT ADDRESSING MODE

mov CL, [4321H] ; Moves data from location 4321H in the data segment into CL
                ; Phy Addr = DS * 10H + 4321

mov CX, [4320H] ; Moves data from location 4320H and 4321H
                ; in the data segment into CL and CH resp.


; 4) INDIRECT ADDRESSING MODES

; 4.1) REGISTER INDIRECT ADDRESSING MODE
MOV CL, [BX]    ; Moves a byte from the address pointed by BX in Data
                ; Segment into CL.
                ; Physical Address calculated as DS * 10H + BX

; 4.2) REGISTER RELATIVE ADDRESSING MODE
MOV CL, [BX+4]  ; Moves a byte from the address pointed by BX+4 in
                ; Data Seg to CL.
                ; Physical Address: DS * 10H + BX + 4H
```



```
; 4.3) BASE INDEXED ADDRESSING MODE
MOV CL, [BX+SI] ; Moves a byte from the address pointed by BX+SI in Data Segment to CL.
                ; Physical Address: DS * 10H + BX + SI

; 4.4) BASE RELATIVE PLUS INDEX ADDRESSING MODE
MOV CL, [BX+DI+20]; Moves a byte from the address pointed by BX+SI+20H in Data Segment to CL.
                  ; Physical Address: DS * 10H + BX + SI+ 20H

; 5) IMPLIED ADDRESSING MODE

STC ; Sets the Carry Flag
CLD ; Clears the Direction Flag

; HLT
mov AX,4c00h
int 21H
end
```

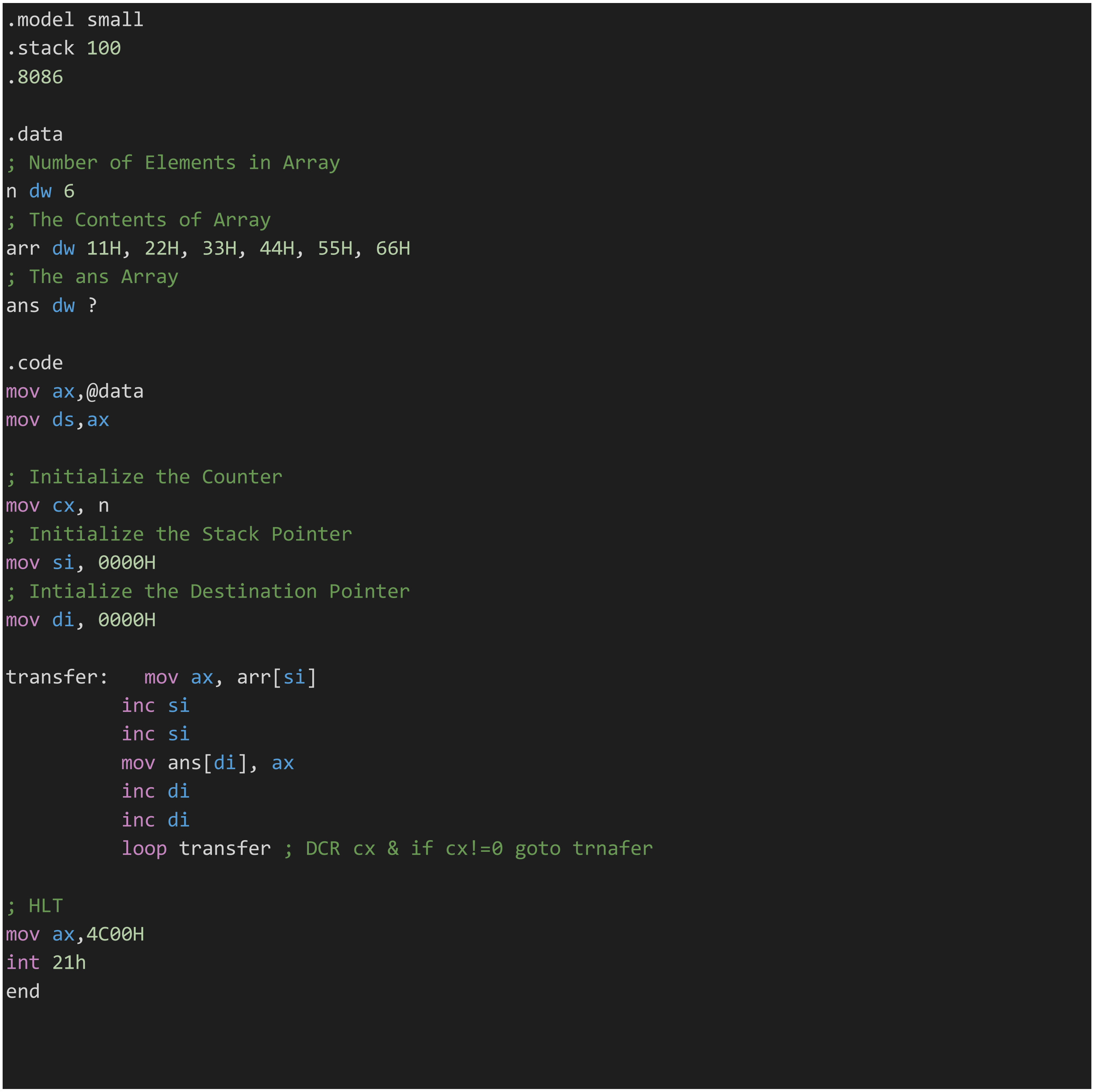
Output:



```
C:\TASM>debug A11Q1.exe
-u
076A:0000 B86C07        MOV     AX,076C
076A:0003 8ED8          MOV     DS,AX
076A:0005 B112          MOV     CL,12
076A:0007 BB3412        MOV     BX,1234
076A:000A BE7500        MOV     SI,0075
076A:000D BB0400        MOV     BX,0004
076A:0010 8ACA          MOV     CL,DL
076A:0012 8BC3          MOV     AX,BX
076A:0014 B134          MOV     CL,34
076A:0016 8A0F          MOV     CL,[BX]
076A:0018 8A4F04        MOV     CL,[BX+04]
076A:001B 8A08          MOV     CL,[BX+SI]
076A:001D 8A4914        MOV     CL,[BX+DI+14]
-g

Program terminated normally
```

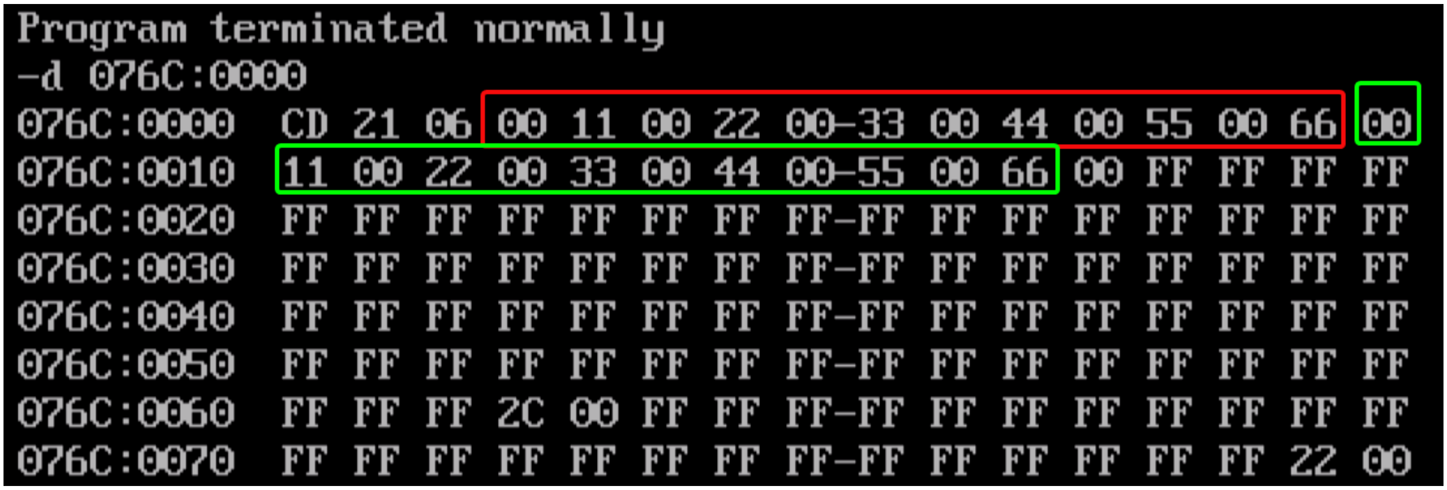
2. Write Program to move data from source to destination using indirect addressing mode (Block Move without overlap).

TASM Code:



```
.model small
.stack 100
.8086

.data
; Number of Elements in Array
n dw 6
; The Contents of Array
arr dw 11H, 22H, 33H, 44H, 55H, 66H
; The ans Array
ans dw ?

.code
mov ax,@data
mov ds,ax

; Initialize the Counter
mov cx, n
; Initialize the Stack Pointer
mov si, 0000H
; Intialize the Destination Pointer
mov di, 0000H

transfer:   mov ax, arr[si]
          inc si
          inc si
          mov ans[di], ax
          inc di
          inc di
          loop transfer ; DCR cx & if cx!=0 goto trnafer

; HLT
mov ax,4C00H
int 21h
end
```

<u>Output:</u>



```
Program terminated normally
-d 076C:0000
076C:0000  CD 21 06 00 11 00 22 00-33 00 44 00 55 00 66 00
076C:0010  11 00 22 00 33 00 44 00-55 00 66 00 FF FF FF FF
076C:0020  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF FF
076C:0030  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF FF
076C:0040  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF FF
076C:0050  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF FF
076C:0060  FF FF FF 2C 00 FF FF FF-FF FF FF FF FF FF FF FF
076C:0070  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF 22 00
```

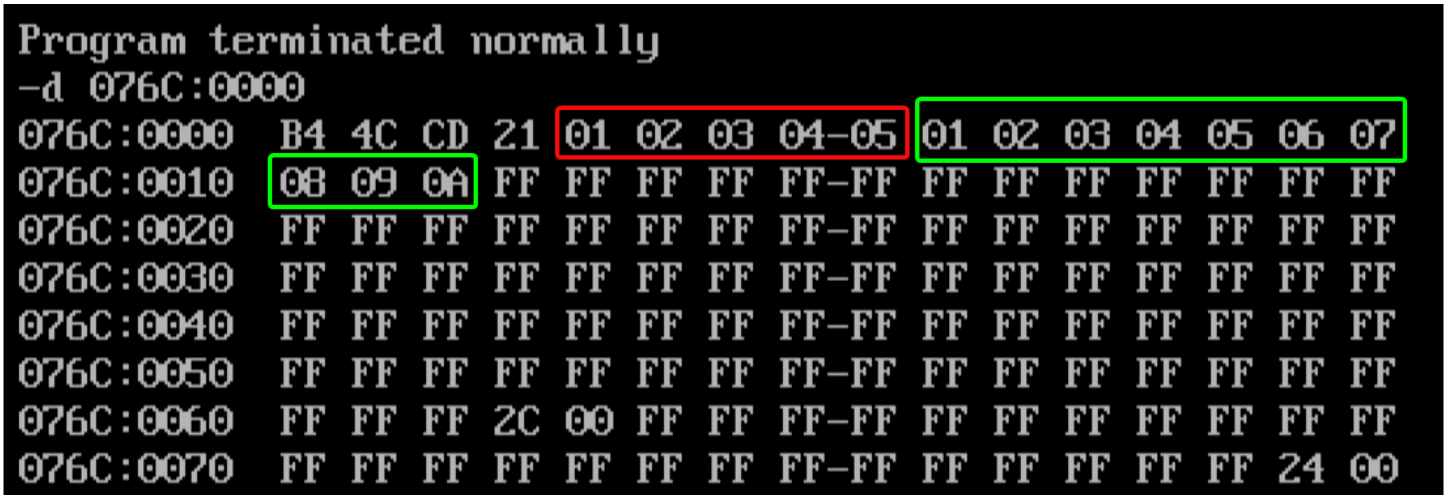
3. Write a Program to move a block of data from source to destination (With overlap in either direction).

<u>TASM Code:</u>

```
.model small
.stack 100
.8086

.data
; 10 Data Bytes
x db 01h,02h,03h,04h,05h,06h,07h,08h,09h,0ah
y db 10 dup(?)

.code
mov ax,@data
mov ds,ax

mov ES,ax
mov si,offset x
mov di,offset y

mov cx, 000ah
add si, 0009h
add di, 0004h

up:     mov al, [si]
        mov [di], al
        dec si
        dec di
        loop up
```

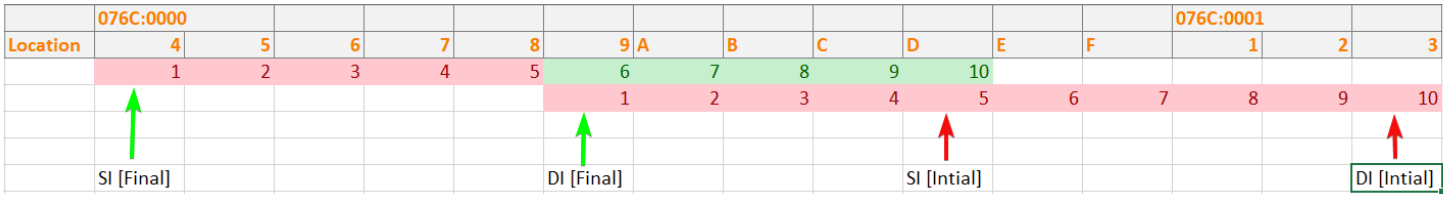
```
mov ax,4c00h
int 21h
end
```

Output:



```
Program terminated normally
-d 076C:0000
076C:0000  B4 4C CD 21 01 02 03 04-05 01 02 03 04 05 06 07
076C:0010  08 09 0A FF FF FF FF FF-FF FF FF FF FF FF FF FF
076C:0020  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF FF
076C:0030  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF FF
076C:0040  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF FF
076C:0050  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF FF
076C:0060  FF FF FF 2C 00 FF FF FF-FF FF FF FF FF FF FF FF
076C:0070  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF 24 00
```

Visual Understanding of Above Process

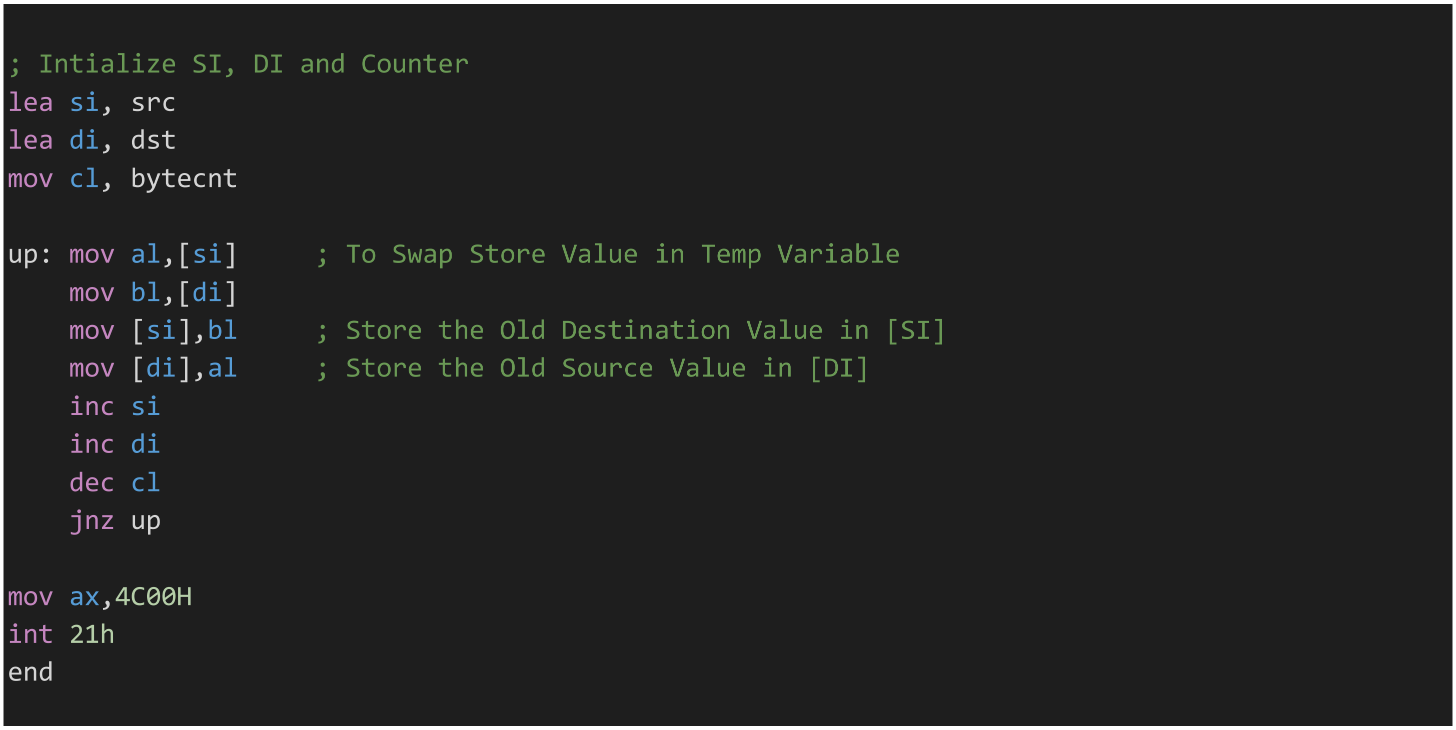


	076C:0000												076C:0001		
Location	4	5	6	7	8	9	A	B	C	D	E	F	1	2	3
	1	2	3	4	5	6	7	8	9	10					
						1	2	3	4	5	6	7	8	9	10
	SI [Final]					DI [Final]				SI [Intial]					DI [Intial]

4. Write a Program to interchange two blocks of data.

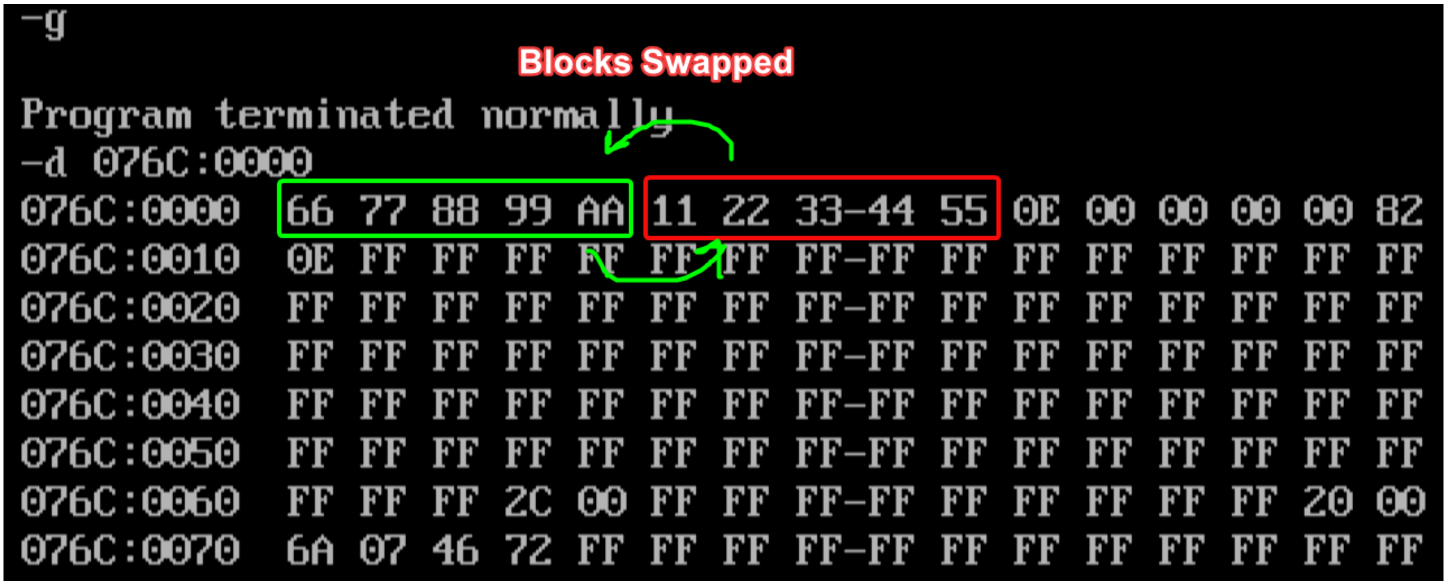
TASM Code:

```
.model small
.stack 100
.8086

.data
; Number of Bytes in Each Block
bytecnt equ 05
; Source Block Data
src db 11H, 22H, 33H, 44H, 55H
; Destination Block Data
dst db 66H, 77H, 88H, 99H, 0AAH

.code
mov ax, @data
mov ds, ax
```



```
; Intialize SI, DI and Counter
lea si, src
lea di, dst
mov cl, bytecnt

up: mov al,[si]      ; To Swap Store Value in Temp Variable
    mov bl,[di]
    mov [si],bl      ; Store the Old Destination Value in [SI]
    mov [di],al      ; Store the Old Source Value in [DI]
    inc si
    inc di
    dec cl
    jnz up

mov ax,4C00H
int 21h
end
```

<u>Output:</u>



```
-g

Program terminated normally
-d 076C:0000
076C:0000  66 77 88 99 AA 11 22 33-44 55 0E 00 00 00 00 82
076C:0010  0E FF FF FF FF FF FF FF-FF FF FF FF FF FF FF FF
076C:0020  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF FF
076C:0030  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF FF
076C:0040  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF FF
076C:0050  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF FF
076C:0060  FF FF FF 2C 00 FF FF FF-FF FF FF FF FF FF 20 00
076C:0070  6A 07 46 72 FF FF FF FF-FF FF FF FF FF FF FF FF
```

SUBMITTED BY:

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