南京林业大学

汇编语言上机实验

任务书

实验五 编写、调试具有多个段的程序

一. 实验目的

编写、调试具有多个段的程序

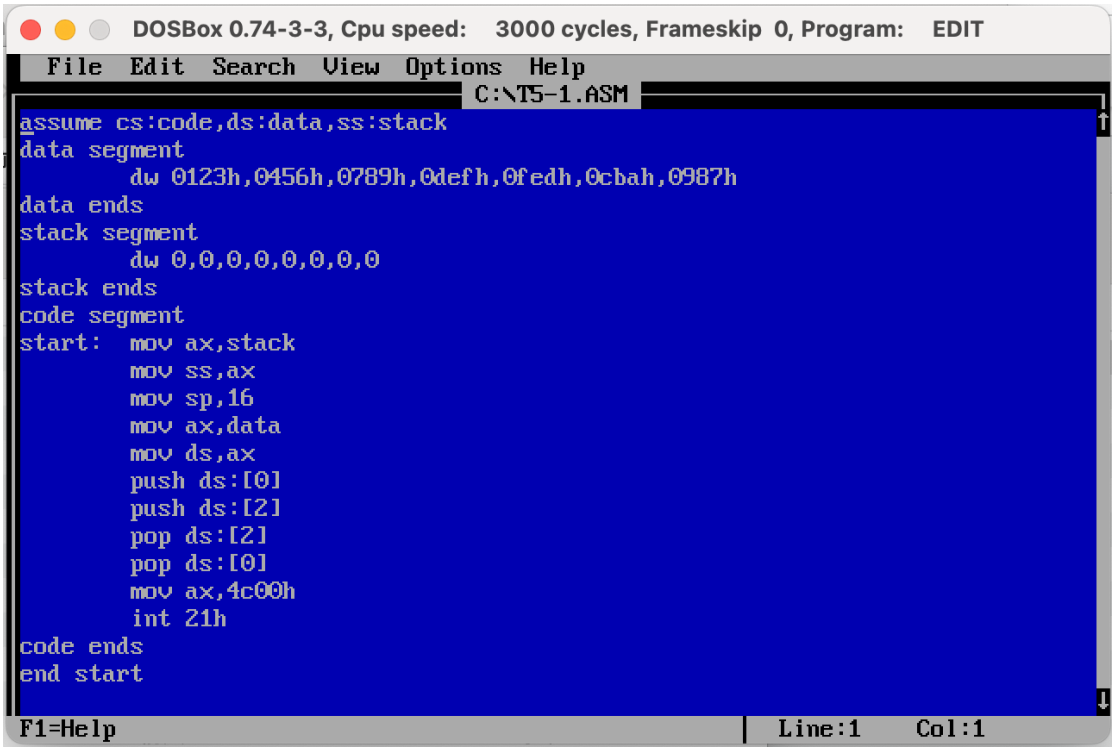
二. 实验内容

1. 将下面的程序编译、链接，用 Debug 加载、跟踪，然后回答问题。

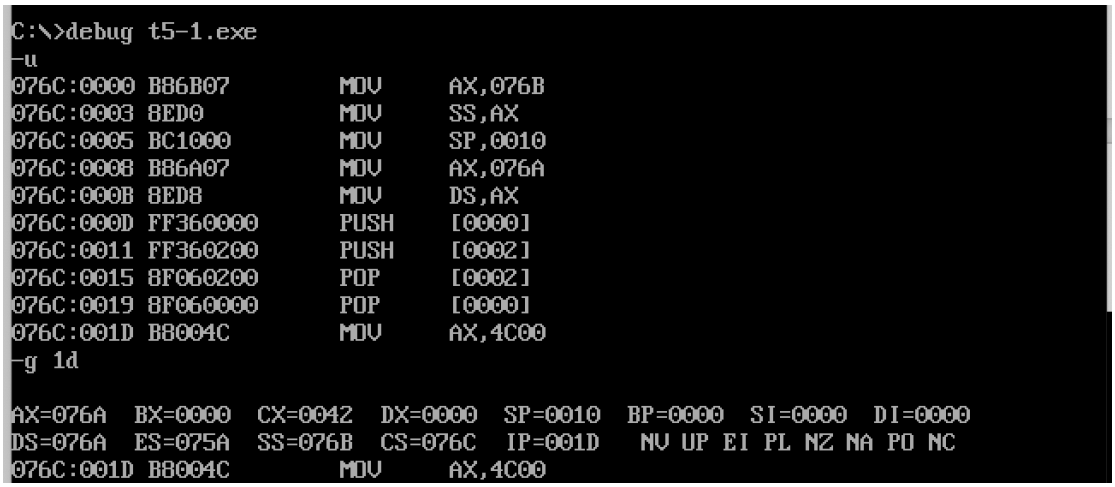
```
assume cs:code,ds:data,ss:stack
data segment
        dw 0123h,0456h,0789h,0defh,0fedh,0cbah,0987h
data ends
stack segment
        dw 0,0,0,0,0,0,0,0
stack ends
code segment
start:  mov ax,stack
        mov ss,ax
        mov sp,16
        mov ax,data
        mov ds,ax
        push ds:[0]
        push ds:[2]
        pop ds:[2]
```

```
        pop ds:[0]
        mov ax,4c00h
        int 21h
code ends
end start
```

输入程序：



执行程序：



1）CPU 执行程序，程序返回前，data 段中的数据为多少？

Data 中的数据是：23 01 56 04 89 07 EF 0D ED 0F BA 0C 87 09

2） CPU 执行程序，程序返回前，cs=0042，ss=076B，ds=076A。

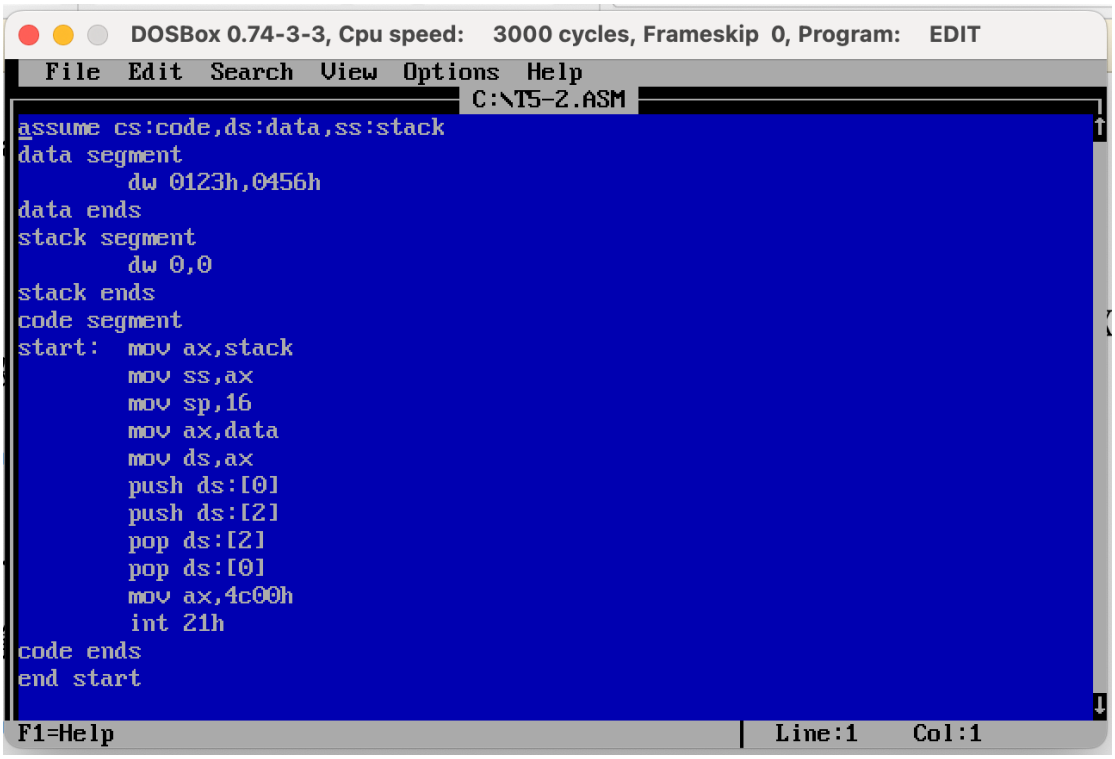
3） 设程序加载后，code 段段段地址为 X，则 data 段段段地址为：X-2，stack 段段段地址为 X-1。

2. 将下面的程序编译、链接，用 Debug 加载、跟踪，然后回答问题。

```
assume cs:code,ds:data,ss:stack

data segment

        dw 0123h,0456h

data ends

stack segment

        dw 0,0

stack ends

code segment

start:  mov ax,stack

        mov ss,ax

        mov sp,16

        mov ax,data

        mov ds,ax

        push ds:[0]
```

```
        push ds:[2]
        pop ds:[2]
        pop ds:[0]
        mov ax,4c00h
        int 21h
code ends
end start
```

输入程序：



执行程序：

```
C:\>debug t5-2.exe
-u
076C:0000 B86B07        MOV     AX,076B
076C:0003 8ED0          MOV     SS,AX
076C:0005 BC1000        MOV     SP,0010
076C:0008 B86A07        MOV     AX,076A
076C:000B 8ED8          MOV     DS,AX
076C:000D FF360000      PUSH    [0000]
076C:0011 FF360200      PUSH    [0002]
076C:0015 8F060200      POP     [0002]
076C:0019 8F060000      POP     [0000]
076C:001D B8004C        MOV     AX,4C00
-g 1d

AX=076A  BX=0000  CX=0042  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076A  ES=075A  SS=076B  CS=076C  IP=001D   NV UP EI PL NZ NA PO NC
076C:001D B8004C        MOV     AX,4C00
```

1) CPU 执行程序，程序返回前，data 段中的数据是多少？

```
076A:0000  23 01 56 04 00 00 00 00-00 00 00 00 00 00 00 00   #.V.............
076A:0010  00 00 00 00 00 00 00 00-00 00 1D 00 6C 07 A3 01   ............l...
076A:0020  B8 6B 07 8E D0 BC 10 00-B8 6A 07 8E D8 FF 36 00   .k.......j....6.
076A:0030  00 FF 36 02 00 8F 06 02-00 8F 06 00 00 B8 00 4C   ..6............L
076A:0040  CD 21 F0 0B F0 74 03 E9-B8 00 83 3E CE 49 01 75   .!...t.....>.I.u
076A:0050  50 A1 2C 4B 33 D2 E8 01-07 8B F0 89 56 FE 0B D0   P.,K3.......V...
076A:0060  75 06 B8 1F 00 E9 9A 00-8B 1D 2A E4 8A 47 04 50   u.........*..G.P
076A:0070  8A 45 10 03 45 02 50 8A-45 11 2A E4 03 45 04 50   .E..E.P.E.*..E.P
```

为 23 01 56 04

2) CPU 执行程序，程序返回前，cs=076C，ss=076B，ds=076A

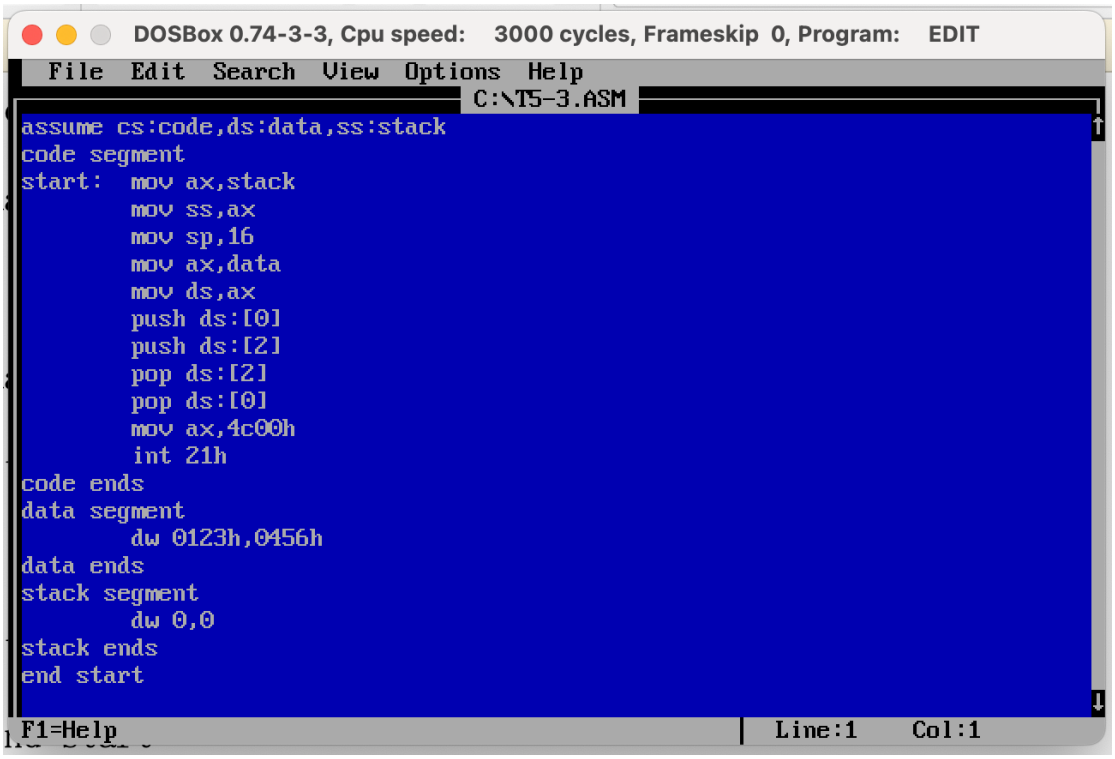
3) 设程序加载后，code 段段段地址是 X，则 data 段的段地址为 X-2，stack 段段段地址为 X-1。

3. 将下面的程序编译、链接，用 Debug 加载、跟踪，然后回答问题。

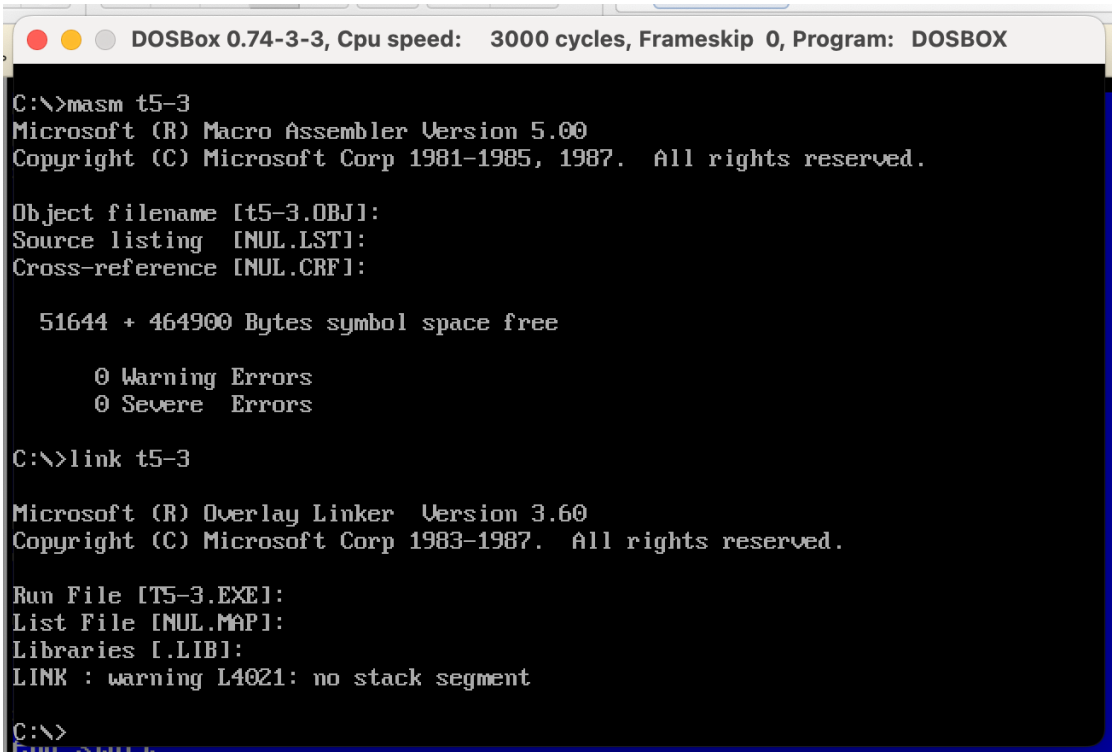
```
assume cs:code,ds:data,ss:stack

code segment

start:  mov ax,stack

        mov ss,ax

        mov sp,16

        mov ax,data

        mov ds,ax
```

```
        push ds:[0]
        push ds:[2]
        pop ds:[2]
        pop ds:[0]
        mov ax,4c00h
        int 21h
code ends
data segment
        dw 0123h,0456h
data ends
stack segment
        dw 0,0
stack ends
end start
```

输入程序：



编译并链接程序：



用 debug 执行程序：

```
C:\>debug t5-3.exe
-u
076A:0000 B86E07        MOV     AX,076E
076A:0003 8ED0          MOV     SS,AX
076A:0005 BC1000        MOV     SP,0010
076A:0008 B86D07        MOV     AX,076D
076A:000B 8ED8          MOV     DS,AX
076A:000D FF360000      PUSH    [0000]
076A:0011 FF360200      PUSH    [0002]
076A:0015 8F060200      POP     [0002]
076A:0019 8F060000      POP     [0000]
076A:001D B8004C        MOV     AX,4C00
-g 1d

AX=076D  BX=0000  CX=0044  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076D  ES=075A  SS=076E  CS=076A  IP=001D   NV UP EI PL NZ NA PO NC
076A:001D B8004C        MOV     AX,4C00
-_
```

1）CPU 执行程序，程序返回前，data 段中的数据为多少？

```
-d 076d:0000
076D:0000  23 01 56 04 00 00 00 00-00 00 00 00 00 00 00 00   #.V.............
076D:0010  00 00 00 00 EA 48 83 C4-00 00 1D 00 6A 07 A3 01   .....H......j...
076D:0020  3D FF FF 74 03 E9 ED 00-C4 5E FC 26 8A 47 0C 2A   =..t.....^.&.G.*
076D:0030  E4 40 50 8B C3 8C C2 05-0C 00 52 50 E8 C1 48 83   .@P.......RP..H.
076D:0040  C4 04 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
-_
```

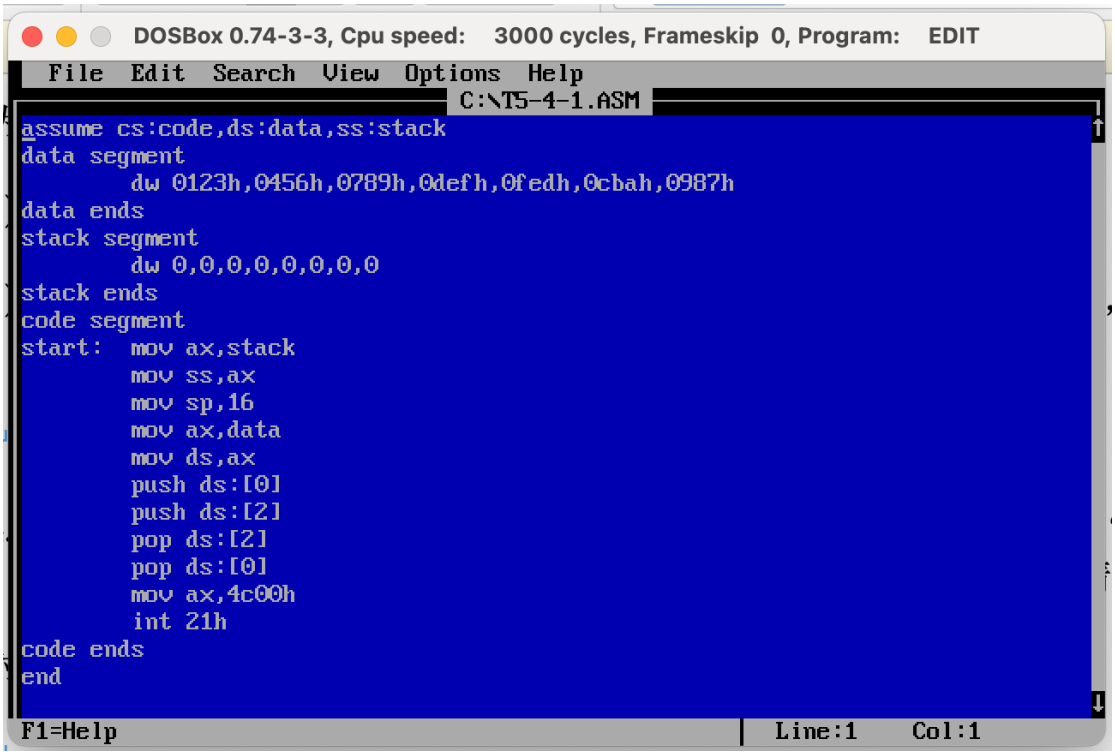
为：23 01 56 04

2）CPU 执行程序，程序返回前，cs=076A，ss=076E，ds=076D

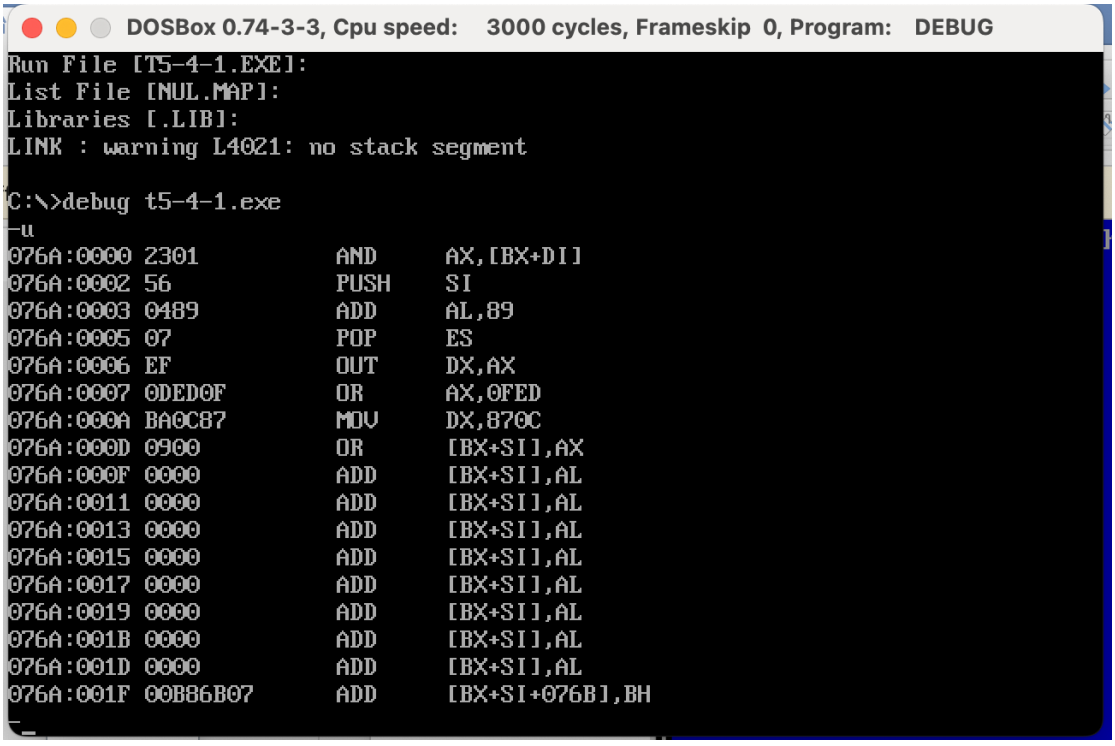
3）设程序加载后，code 段的段地址是 X，则 data 段的段地址为 X+3，stack 段段段地址为 X+4。

4. 如果将（1）（2）（3）题中的最后一条伪指令“end start”改为“end”（也就是说，不指明程序的入口），则哪个程序仍然可以正确执行？请说明原因。

对于 1 题，编写 T5-4-1.asm：



编译、链接、用 debug 查看代码：

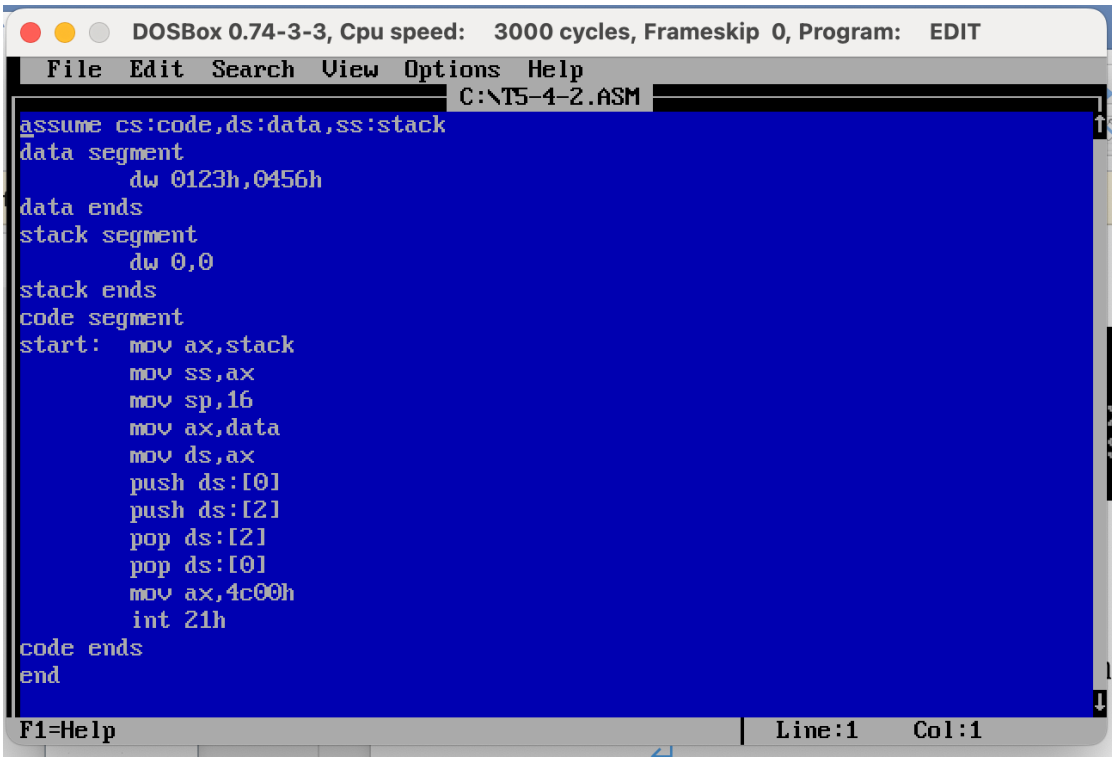


执行：

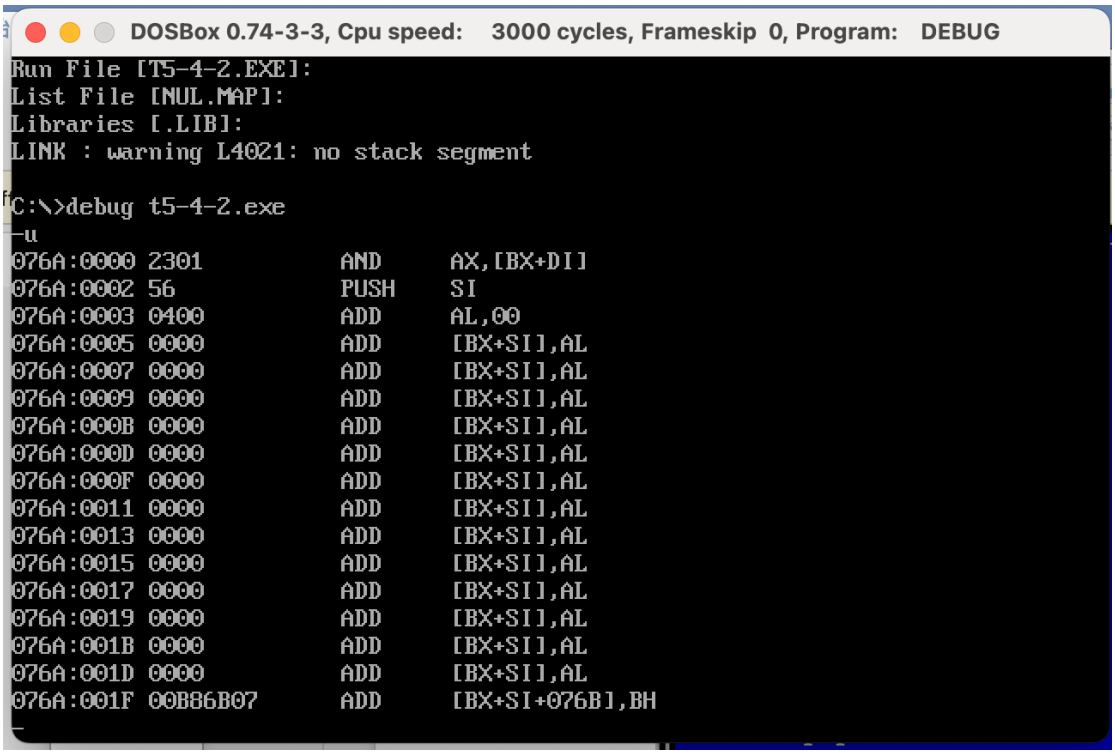
```
-g 1f

AX=2FFF  BX=0000  CX=0042  DX=870C  SP=0000  BP=0000  SI=0000  DI=0000
DS=075A  ES=0000  SS=0769  CS=076A  IP=001F   NV UP EI NG NZ AC PO CY
076A:001F 00B86B07      ADD     [BX+SI+076B],BH                 DS:076B=58
```

程序没有正常执行。

对于 2 题，编写 T5-4-2.asm：



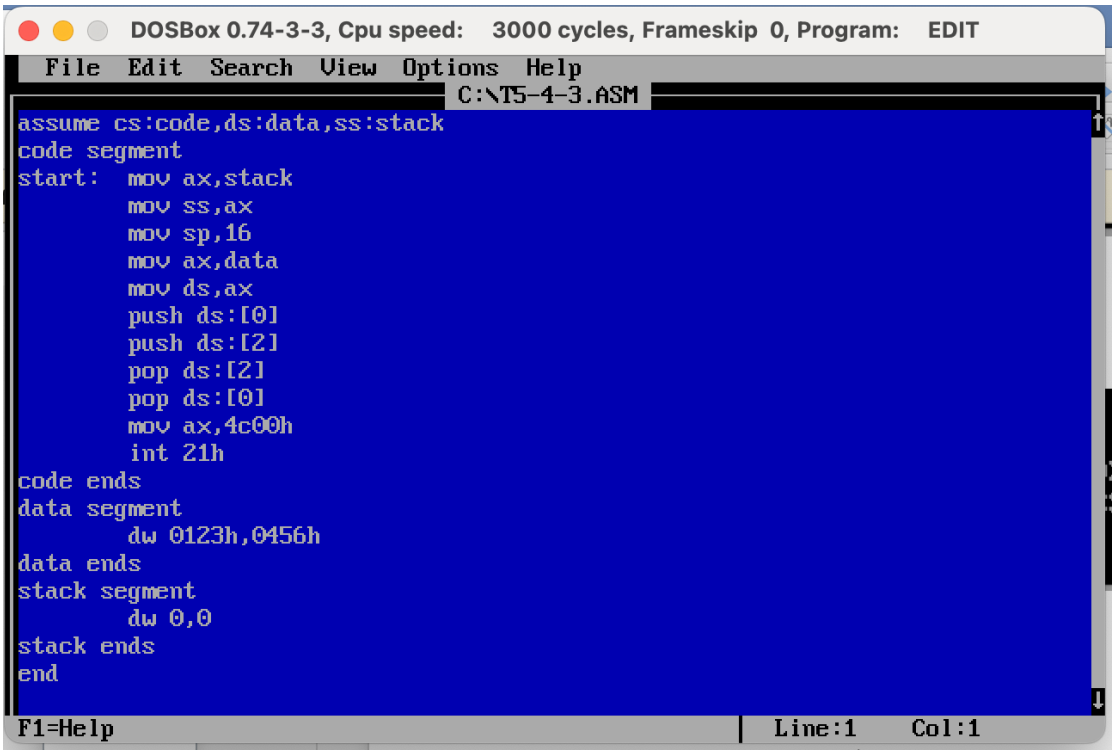
编译、链接、用 debug 查看代码：



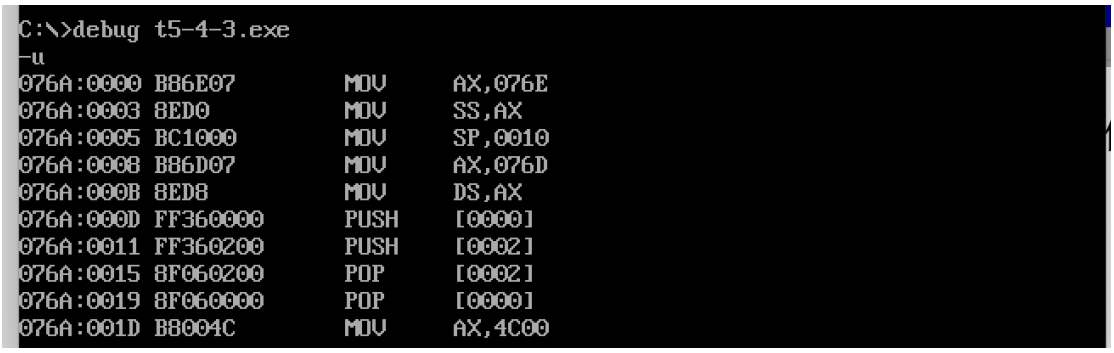
执行：

程序没有正常执行。

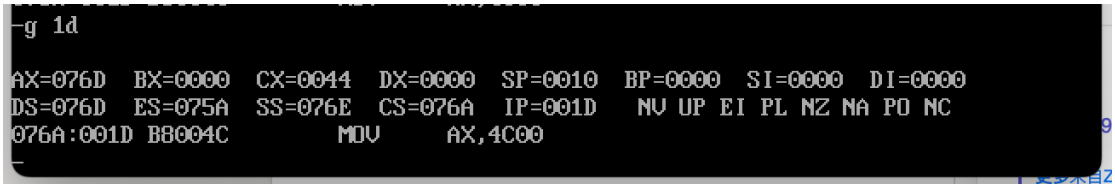
对于 3 题，编写 T5-4-3.asm：



编译、链接、用 debug 查看代码：



执行：



程序正确执行了。

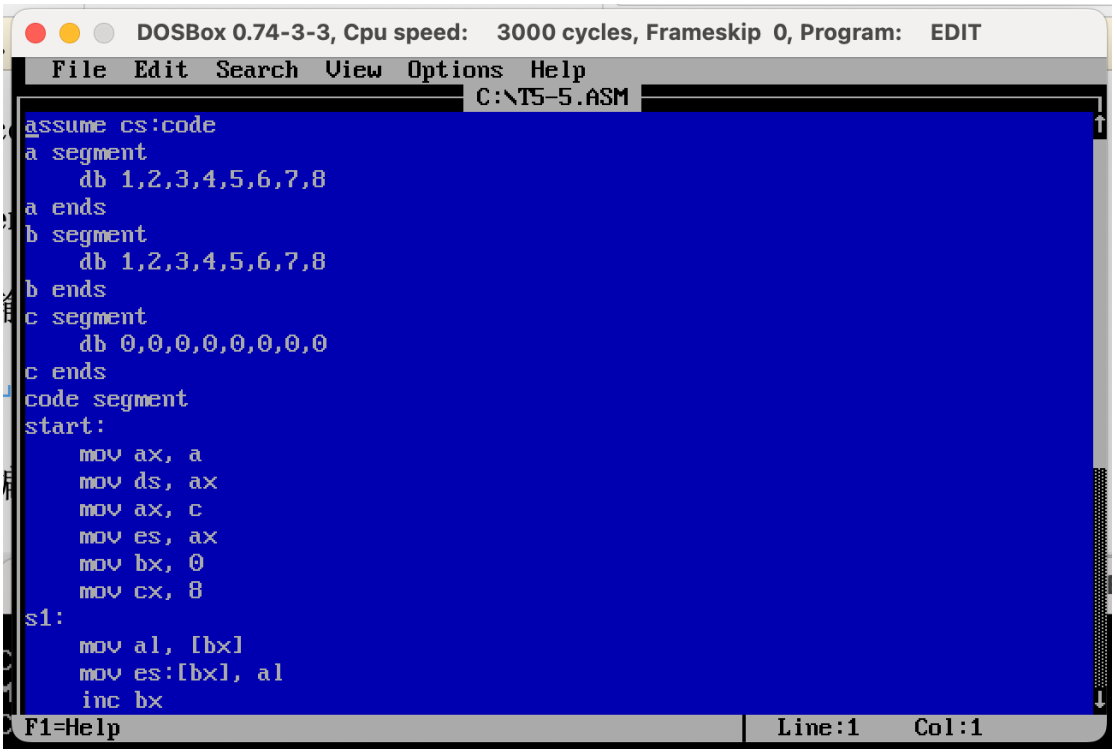
结论：只有 3 可以正确执行，1 2 不可以正确执行。

5. 程序如下，编写 code 段段代码，将 a 段和 b 段段数据一次想家，并将结果存在 c 段中。

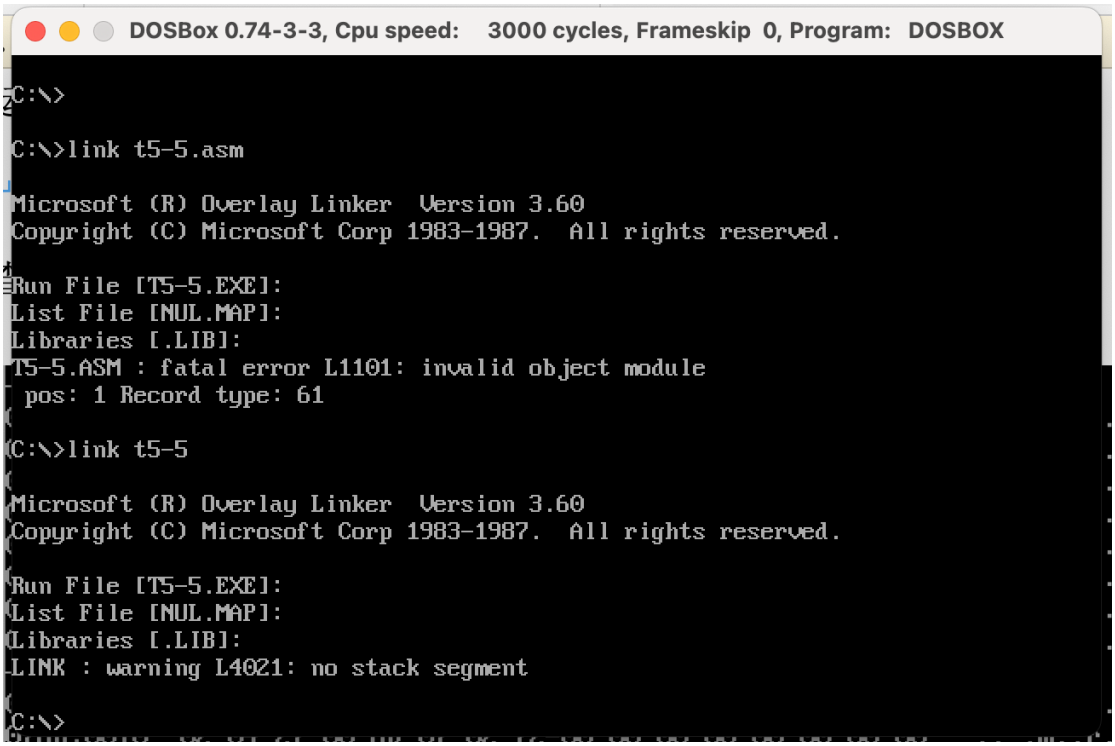
```
assume cs:code

a segment

    db 1,2,3,4,5,6,7,8

a ends

b segment

    db 1,2,3,4,5,6,7,8

b ends

c segment

    db 0,0,0,0,0,0,0,0

c ends

code segment

start:    mov ax, A

    mov ds, ax

    mov ax, B

    mov es, ax

    mov ax, C

    mov ss, ax

    mov sp, 8

    mov cx, 8

    mov si, 0

s:  mov al, [si]

    add al, es:[si]

    mov ss:[si], al
```

```
    inc si
    loop s
    mov ah, 4ch
    int 21h
code ends
end start
```

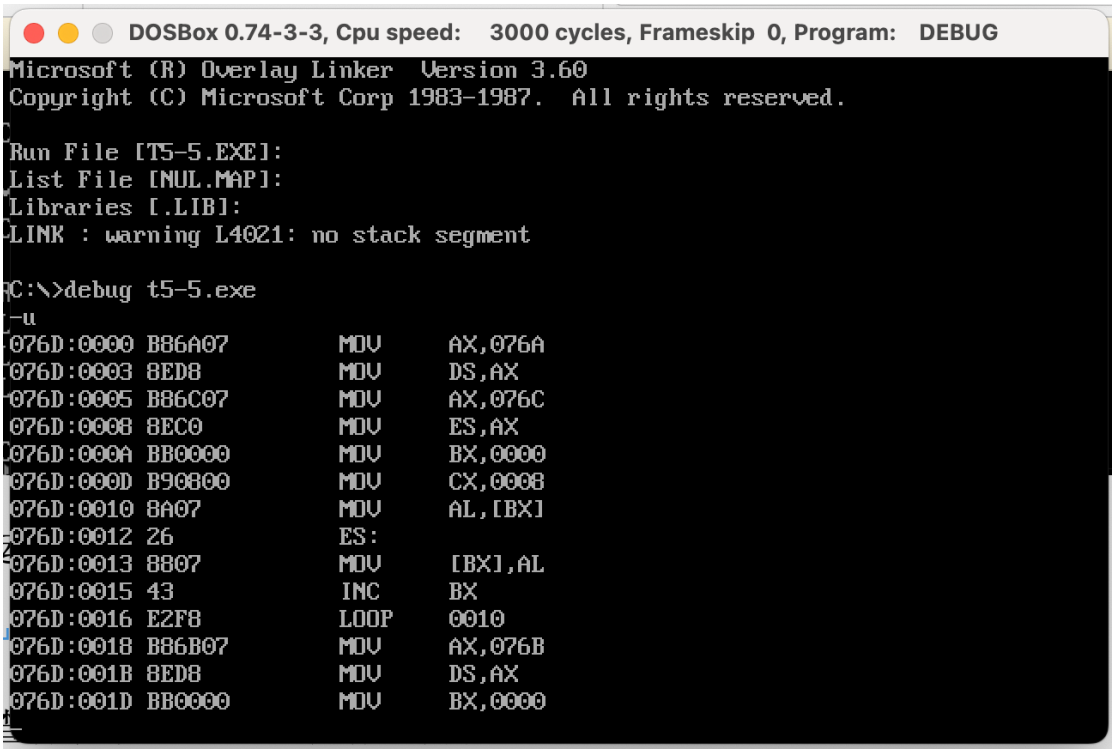
输入程序：



编译并链接程序：

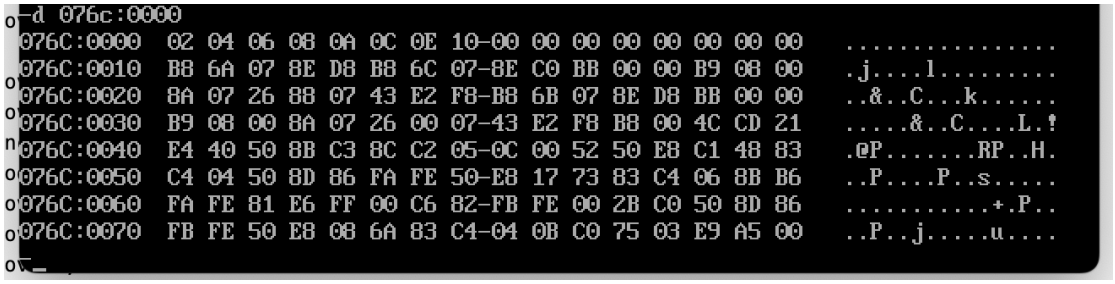


运行程序：



查看数据段 a、b 处内存的内容：

查看数据段 c 中的内容：

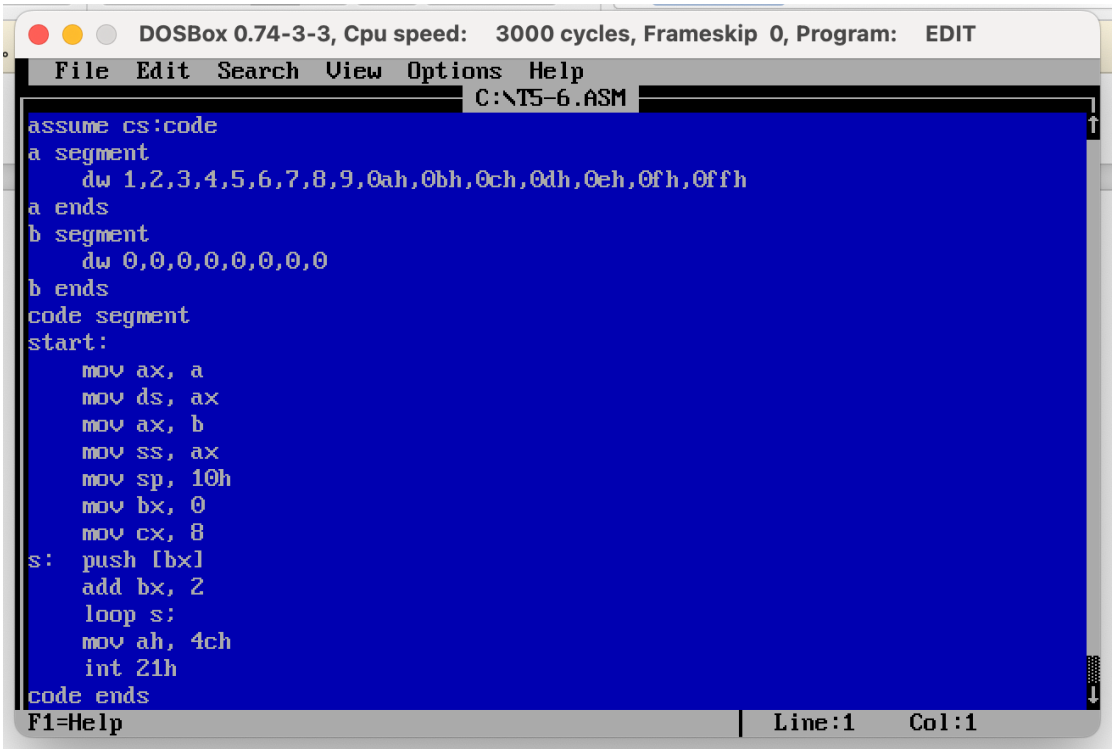


6. 程序如下，编写 code 段中的代码，用 push 指令将 a 段中的前 8 个字型数据，逆序存储到 b 段中。

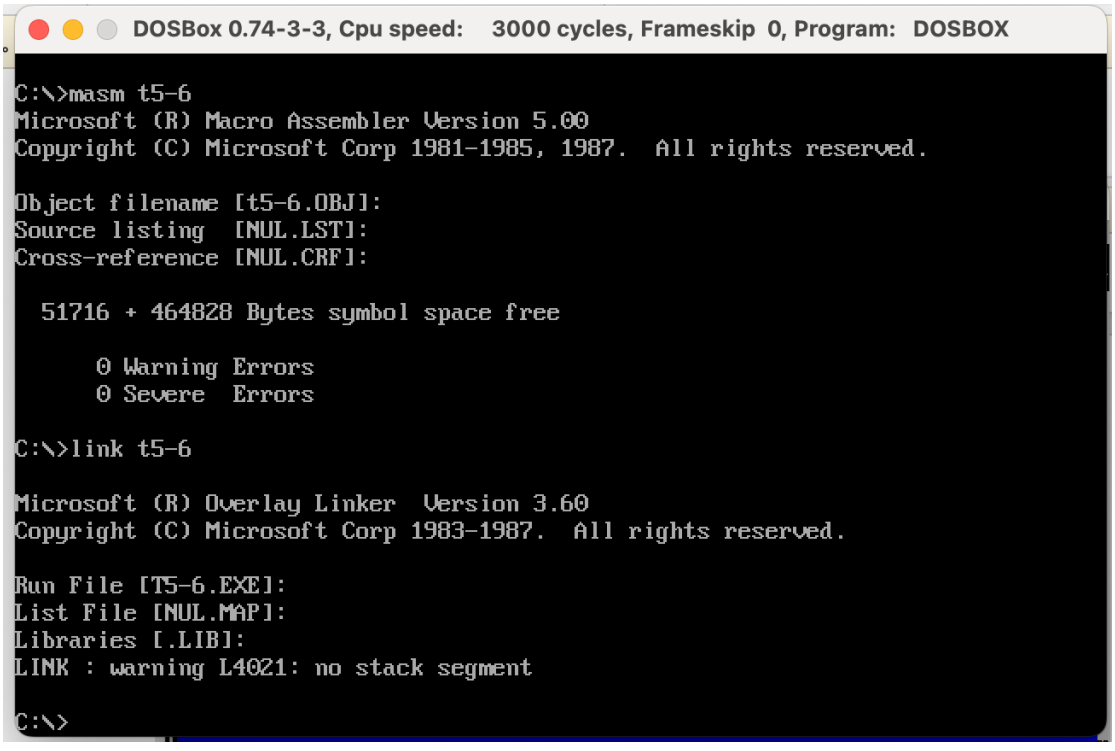
```
assume cs:code
a segment
    dw 1,2,3,4,5,6,7,8,9,0ah,0bh,0ch,0dh,0eh,0fh,0ffh
a ends
b segment
    dw 0,0,0,0,0,0,0,0
b ends
code segment
start:
    mov ax, a
    mov ds, ax
    mov ax, b
    mov ss, ax
    mov sp, 10h
    mov bx, 0
    mov cx, 8
s:  push [bx]
    add bx, 2
    loop s;
    mov ah, 4ch
```

```
    int 21h
code ends
end start
```

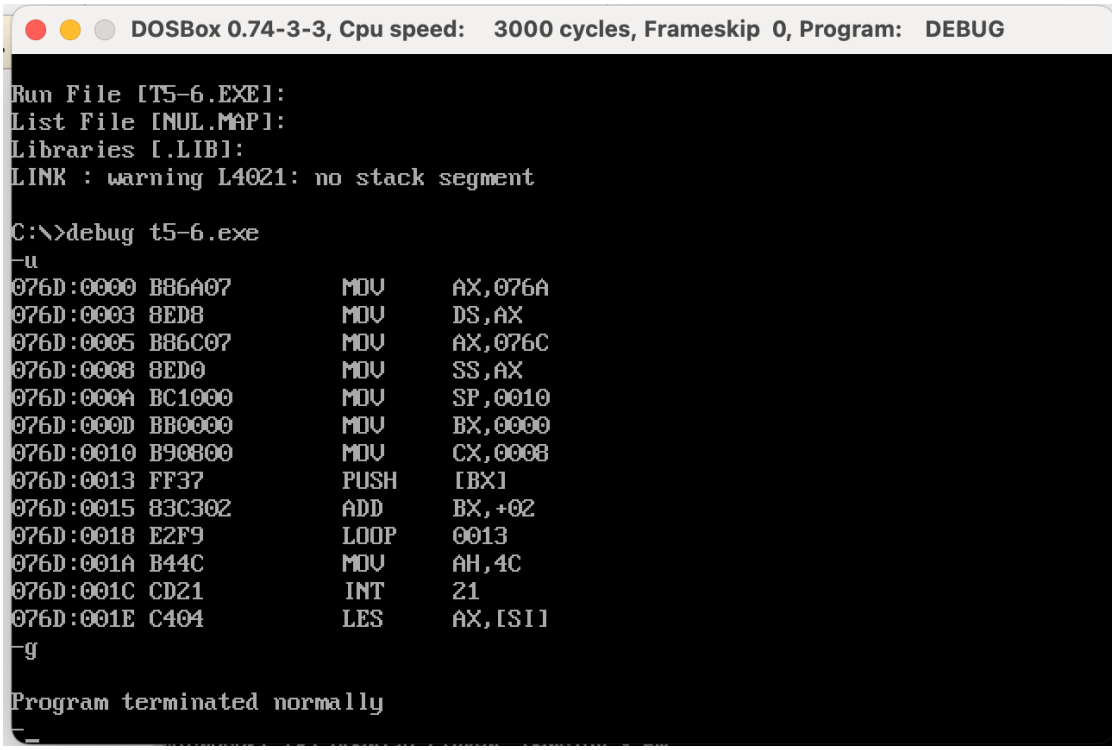
输入代码：



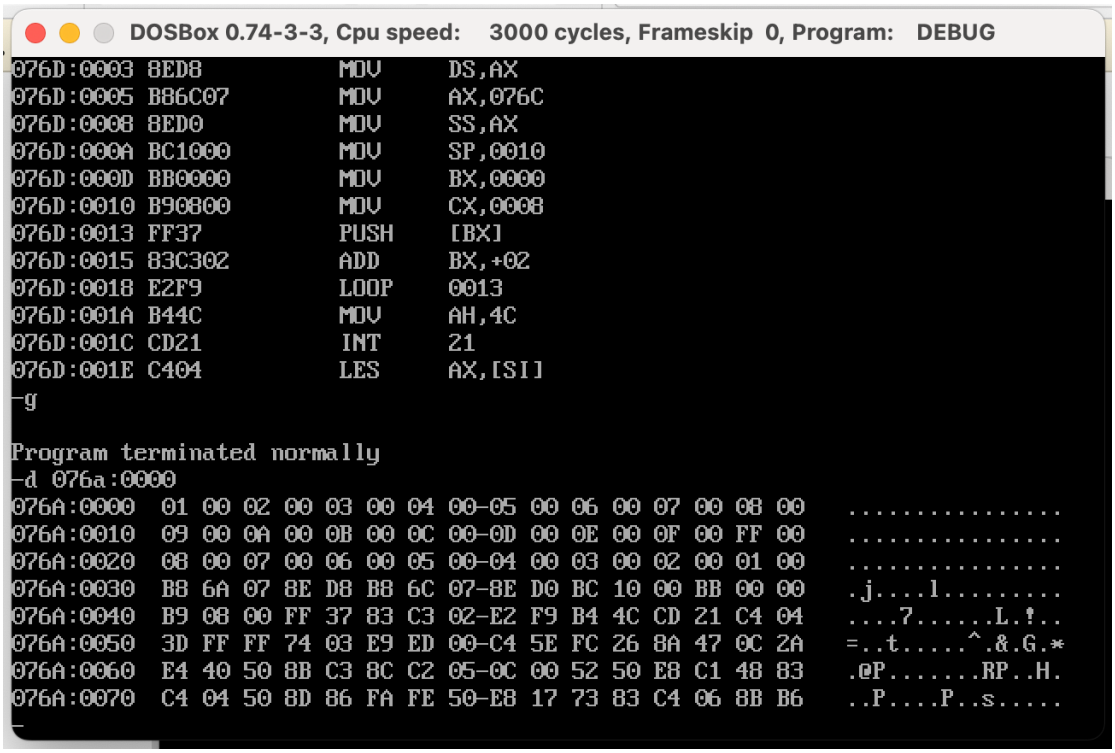
编译并链接代码：



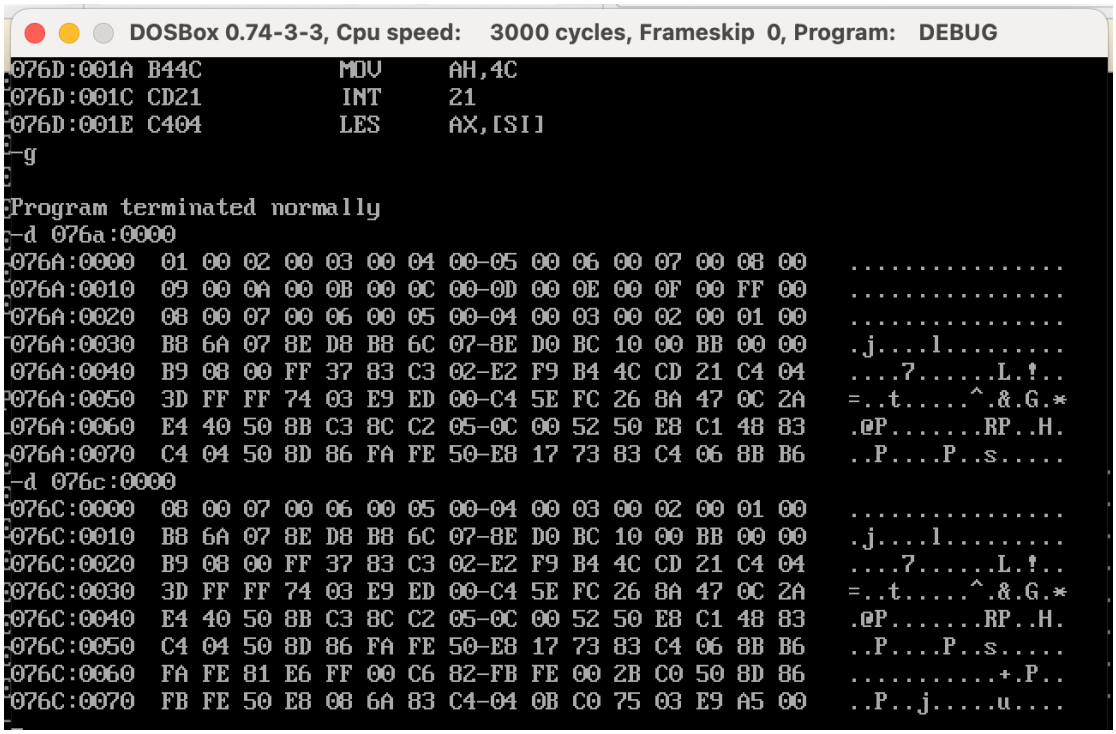
运行代码：



查看代码段 a



查看代码段 b


DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG
076D:001A B44C MOV AH,4C
076D:001C CD21 INT 21
076D:001E C404 LES AX,[SI]
-g
Program terminated normally
-d 076a:0000
076A:0000 01 00 02 00 03 00 04 00-05 00 06 00 07 00 08 00 ....
076A:0010 09 00 0A 00 0B 00 0C 00-0D 00 0E 00 0F 00 FF 00 ....
076A:0020 08 00 07 00 06 00 05 00-04 00 03 00 02 00 01 00 ....
076A:0030 B8 6A 07 8E D8 B8 6C 07-8E D0 BC 10 00 BB 00 00 .j....l.........
076A:0040 B9 08 00 FF 37 83 C3 02-E2 F9 B4 4C CD 21 C4 04 ....7......L.!..
076A:0050 3D FF FF 74 03 E9 ED 00-C4 5E FC 26 8A 47 0C 2A =..t.....^.&.G.*
076A:0060 E4 40 50 8B C3 8C C2 05-0C 00 52 50 E8 C1 48 83 .@P.......RP..H.
076A:0070 C4 04 50 8D 86 FA FE 50-E8 17 73 83 C4 06 8B B6 ..P....P..s.....
-d 076c:0000
076C:0000 08 00 07 00 06 00 05 00-04 00 03 00 02 00 01 00 ....
076C:0010 B8 6A 07 8E D8 B8 6C 07-8E D0 BC 10 00 BB 00 00 .j....l.........
076C:0020 B9 08 00 FF 37 83 C3 02-E2 F9 B4 4C CD 21 C4 04 ....7......L.!..
076C:0030 3D FF FF 74 03 E9 ED 00-C4 5E FC 26 8A 47 0C 2A =..t.....^.&.G.*
076C:0040 E4 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....