

# 南京林业大学



## 汇编语言上机实验 任务书

# 实验四 [bx]和 loop 的使用

## 一. 实验目的

学会[bx]和 loop 的使用

## 二. 实验内容

1. 编程, 向内存 0:200~0:23F 中依次传送数据 0 ~ 63(3FH)。

代码如下:

Assume cs:code

Code segment

```
mov ax,0
```

```
mov ds,ax
```

```
mov al,0
```

```
mov bx,200h
```

```
mov cx,64
```

```
s: mov [bx],al
```

inc al

inc bx

loop s

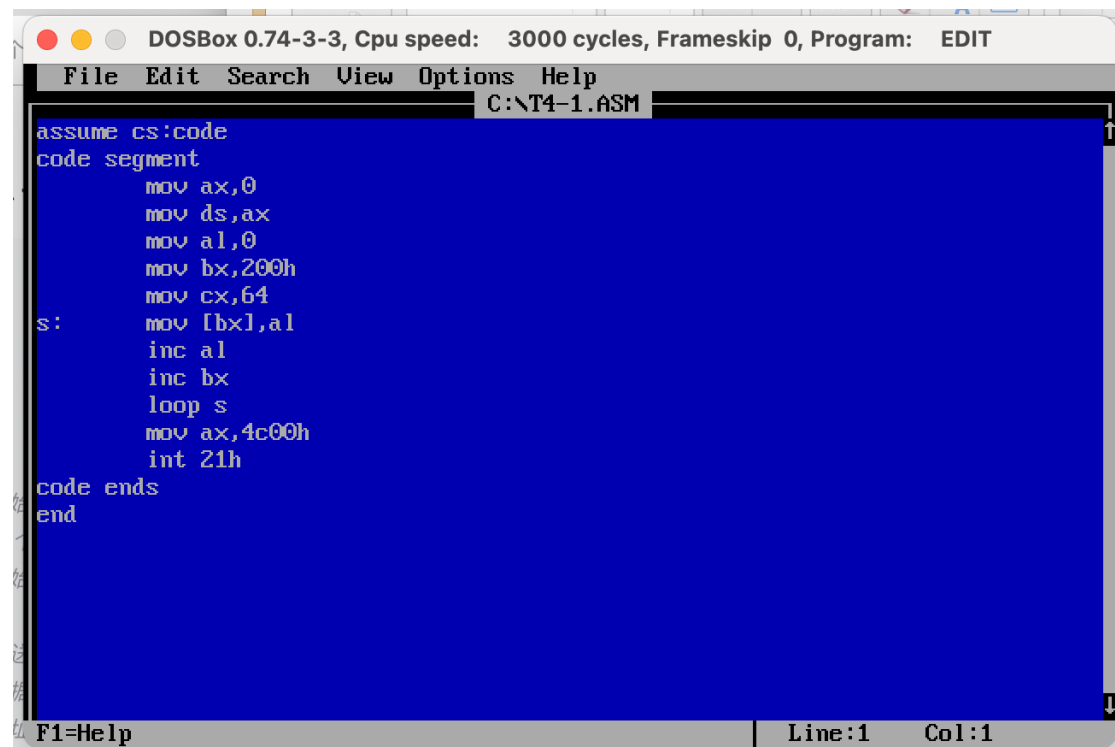
mov ax,4c00h

int 21h

code ends

end

输入代码：



The screenshot shows a DOSBox window titled "DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: EDIT". The window contains a text editor with the filename "C:\T4-1.ASM". The code being edited is as follows:

```
assume cs:code
code segment
    mov ax,0
    mov ds,ax
    mov al,0
    mov bx,200h
    mov cx,64
s:    mov [bx],al
    inc al
    inc bx
    loop s
    mov ax,4c00h
    int 21h
code ends
end
```

The status bar at the bottom of the window displays "F1=Help", "Line:1", and "Col:1".

## 编译代码

```
C:\>masm t4-1.asm
Microsoft (R) Macro Assembler Version 5.00
Copyright (C) Microsoft Corp 1981-1985, 1987. All rights reserved.

Object filename [t4-1.OBJ]:
Source listing [NUL.LST]:
Cross-reference [NUL.CRF]:

51760 + 464784 Bytes symbol space free

0 Warning Errors
0 Severe Errors
```

## 链接代码

```
C:\>link t4-1.obj

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

Run File [T4-1.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment
```

## 执行代码

```
C:\>t4-1
```

## 进入 debug 查看执行结果：

```
C:\>debug
-d 0:200
0000:0200  00 01 02 03 04 05 06 07-08 09 0A 0B 0C 0D 0E 0F  .....
0000:0210  10 11 12 13 14 15 16 17-18 19 1A 1B 1C 1D 1E 1F  .....
0000:0220  20 21 22 23 24 25 26 27-28 29 2A 2B 2C 2D 2E 2F  !"#$%&'()*+,-./
0000:0230  30 31 32 33 34 35 36 37-38 39 3A 3B 3C 3D 3E 3F  0123456789:;<=>?
0000:0240  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  .....
0000:0250  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  .....
0000:0260  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  .....
0000:0270  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  .....
```

2. 编程, 向内存 0:200~0:23F 依次传送数据 0 ~ 63(3FH), 程序中只能使用 9 条指令, 其中 9 条指令中包含 "mov ax,4c00h "和" int 21h "

代码如下:

Assume cs:code

Code segment

mov ax,20h

mov ds,ax

mov bx,0

mov cx,64

s: mov [bx],bl

inc bx

loop s

mov ax,4c00h

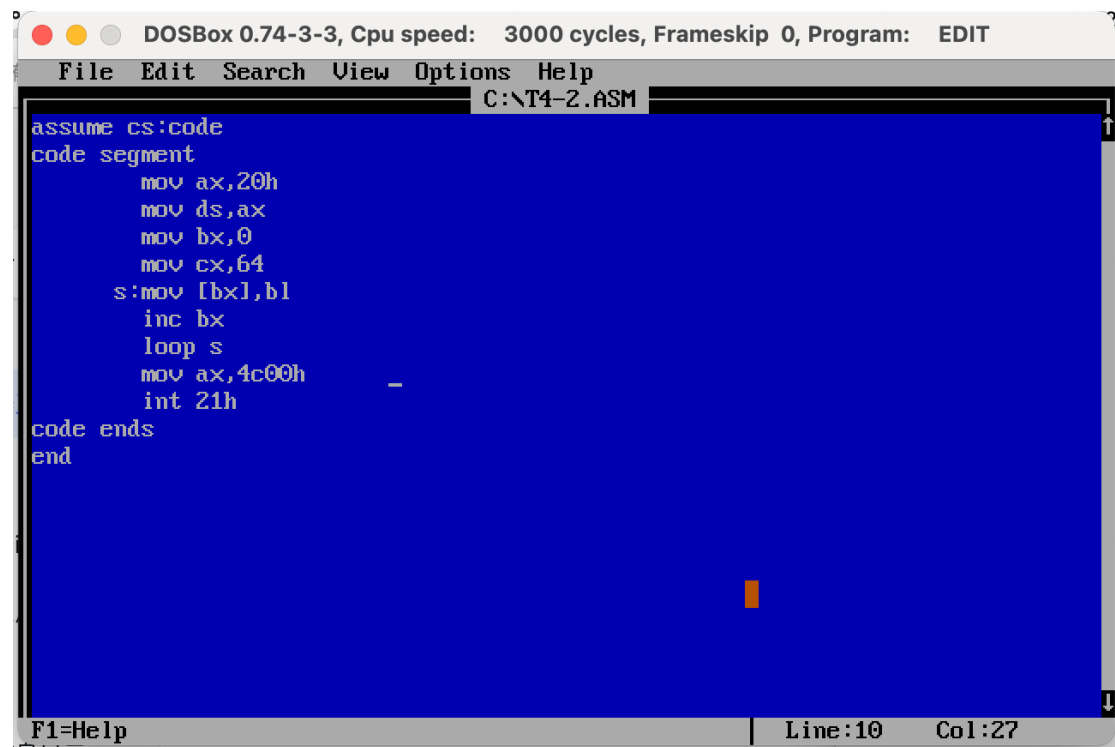
int 21h

code ends

end

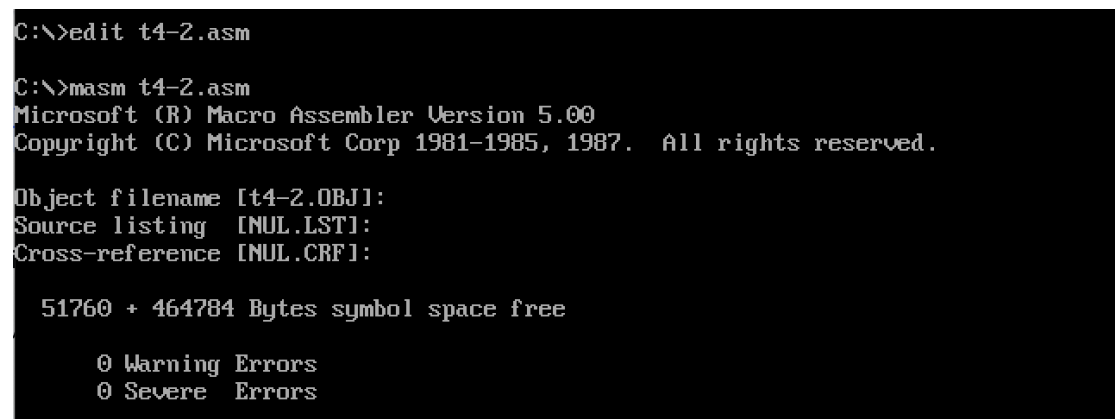
end

首先写入代码：



```
assume cs:code
code segment
    mov ax,20h
    mov ds,ax
    mov bx,0
    mov cx,64
s:    mov [bx],bl
    inc bx
    loop s
    mov ax,4c00h
    int 21h
code ends
end
```

编译：



```
C:\>edit t4-2.asm

C:\>masm t4-2.asm
Microsoft (R) Macro Assembler Version 5.00
Copyright (C) Microsoft Corp 1981-1985, 1987. All rights reserved.

Object filename [t4-2.OBJ]:
Source listing [NUL.LST]:
Cross-reference [NUL.CRF]:

51760 + 464784 Bytes symbol space free

0 Warning Errors
0 Severe Errors
```

链接

```
C:\>link t4-2.obj

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

Run File [T4-2.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment
```

运行

```
C:\>t4-2
```

在 debug 中查看结果

```
C:\>debug
-d 0:200
0000:0200  00 01 02 03 04 05 06 07-08 09 0A 0B 0C 0D 0E 0F  .....
0000:0210  10 11 12 13 14 15 16 17-18 19 1A 1B 1C 1D 1E 1F  .....
0000:0220  20 21 22 23 24 25 26 27-28 29 2A 2B 2C 2D 2E 2F  !"#$%&'()*+,-./
0000:0230  30 31 32 33 34 35 36 37-38 39 3A 3B 3C 3D 3E 3F  0123456789:;<=>?
0000:0240  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  .....
0000:0250  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  .....
0000:0260  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  .....
0000:0270  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  .....
```

3. 下面的程序都功能是将 “mov ax, 4c00h ”之前的指令复制到内存 0:200 处，补全程序，上机调试，跟踪运行结果。

补全的代码：

assume cs:code

code segment

mov ax,cs

```
    mov ds,ax

    mov ax,0020h

    mov es,ax

    mov bx,0

    mov cx,12
s:   mov al,[bx]

    mov es:[bx],al

    inc bx

    loop s

    mov ax,4c00h

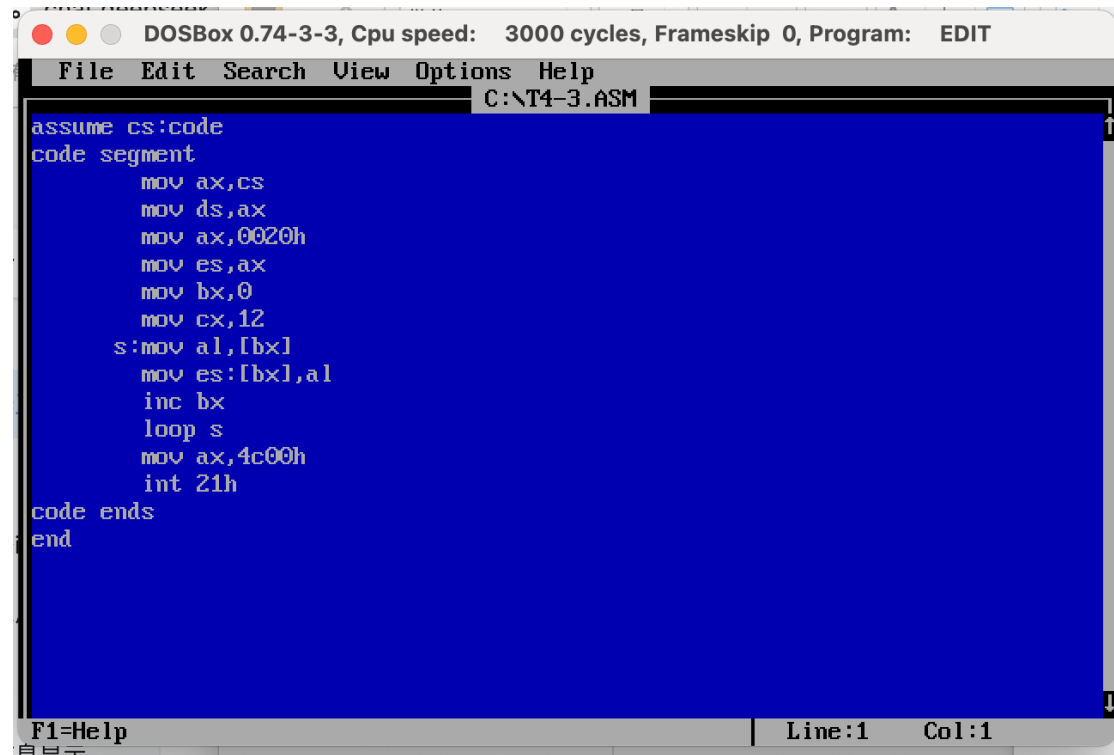
    int 21h

code ends

end
```

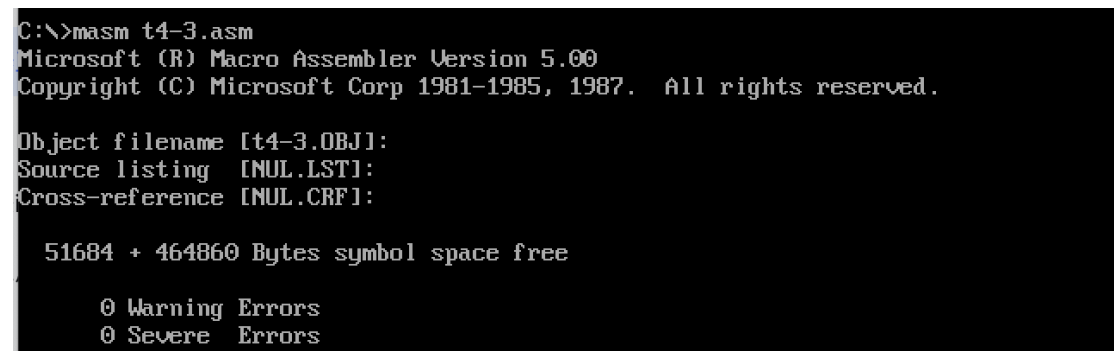
输入代码：





```
DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: EDIT
File Edit Search View Options Help
C:\T4-3.ASM
assume cs:code
code segment
    mov ax,cs
    mov ds,ax
    mov ax,0020h
    mov es,ax
    mov bx,0
    mov cx,12
s:mov al,[bx]
    mov es:[bx],al
    inc bx
    loop s
    mov ax,4c00h
    int 21h
code ends
end
F1=Help Line:1 Col:1
```

编译:



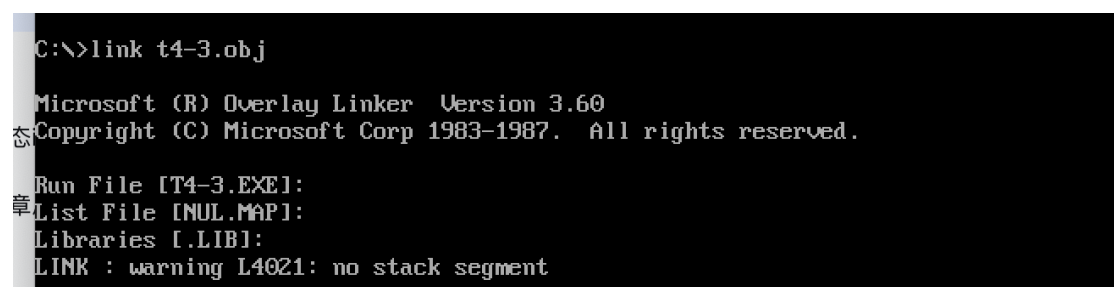
```
C:\>masm t4-3.asm
Microsoft (R) Macro Assembler Version 5.00
Copyright (C) Microsoft Corp 1981-1985, 1987. All rights reserved.

Object filename [t4-3.OBJ]:
Source listing [NUL.LST]:
Cross-reference [NUL.CRF]:

51684 + 464860 Bytes symbol space free

0 Warning Errors
0 Severe Errors
```

链接:



```
C:\>link t4-3.obj

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

Run File [T4-3.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment
```

运行:

```
C:\>t4-3
```

查看运行结果:

```
C:\>debug
-d 0:200
0000:0200  8C C8 BE D8 B8 20 00 8E-C0 BB 00 00 0C 0D 0E 0F  .....
0000:0210  10 11 12 13 14 15 16 17-18 19 1A 1B 1C 1D 1E 1F  .....
0000:0220  20 21 22 23 24 25 26 27-28 29 2A 2B 2C 2D 2E 2F  !"#$/&'()*+,-./
0000:0230  30 31 32 33 34 35 36 37-38 39 3A 3B 3C 3D 3E 3F  0123456789:;<=>?
0000:0240  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00  .....
0000:0250  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00  .....
0000:0260  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00  .....
0000:0270  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00  .....
```

```
DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG
0000:02B0  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00  .....
0000:02C0  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00  .....
0000:02D0  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00  .....
0000:02E0  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00  .....
0000:02F0  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00  .....
-r
AX=0000 BX=0000 CX=0000 DX=0000 SP=00FD BP=0000 SI=0000 DI=0000
DS=073F ES=073F SS=073F CS=0000 IP=0200  NU UP EI PL NZ NA PO NC
0000:0200  BCCB          MOV     AX,CS
-t
AX=0000 BX=0000 CX=0000 DX=0000 SP=00FD BP=0000 SI=0000 DI=0000
DS=073F ES=073F SS=073F CS=0000 IP=0202  NU UP EI PL NZ NA PO NC
0000:0202  8ED8          MOV     DS,AX
-t
AX=0000 BX=0000 CX=0000 DX=0000 SP=00FD BP=0000 SI=0000 DI=0000
DS=0000 ES=073F SS=073F CS=0000 IP=0204  NU UP EI PL NZ NA PO NC
0000:0204  B82000        MOV     AX,0020
-t
AX=0020 BX=0000 CX=0000 DX=0000 SP=00FD BP=0000 SI=0000 DI=0000
DS=0000 ES=073F SS=073F CS=0000 IP=0207  NU UP EI PL NZ NA PO NC
0000:0207  BEC0          MOV     ES,AX
```

问题 1:复制的是什么? 从哪里复制到哪里?

答: 复制的是代码机器码, 从代码段所指向的位置复制到 0:200h 处

问题 2:复制的是什么? 有多少个字节? 你如何知道要复制的字节的数量?

答: 复制的是代码的机器码, 有 12 个字节, 看代码的行数。