

南京林业大学



汇编语言上机实验

任务书

实验六 实践课程中的程序

一. 实验目的

实践课程中的程序

二. 实验内容

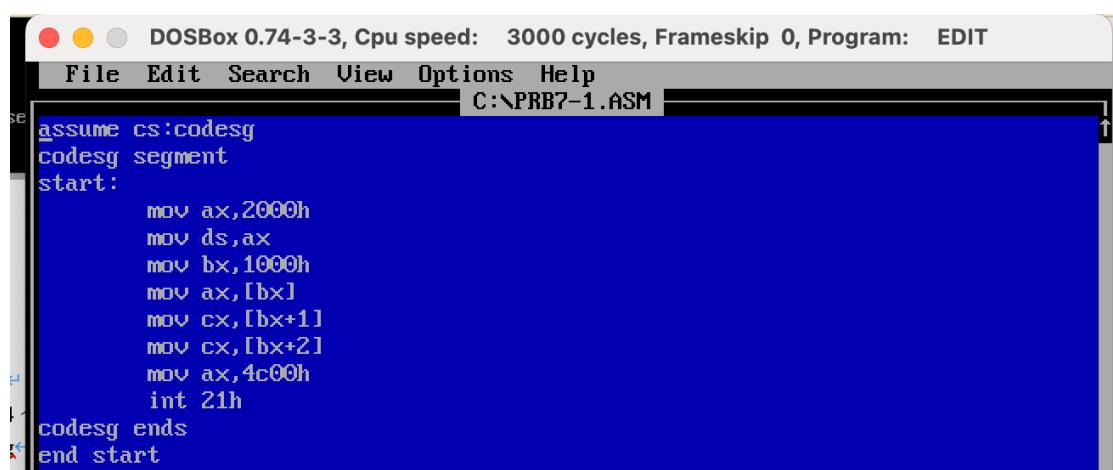
- 将课程中所有讲解过的程序上机调试，用 Debug 跟踪其执行过程，并在过程中进一步理解所讲内容。

- 问题 7.1: 用 debug 查看内存，结果如下：

2000:1000 BE 00 06 00 00 00.....

写出下面程序执行后，ax bx cx 中的内容。

```
assume cs:codesg
codesg segment
start:
    mov ax,2000h
    mov ds,ax
    mov bx,1000h
    mov ax,[bx]
    mov cx,[bx+1]
    mov cx,[bx+2]
    mov ax,4c00h
    int 21h
codesg ends
end start
```



The screenshot shows the DOSBox 0.74-3-3 window with the title bar "DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: EDIT". The menu bar includes File, Edit, Search, View, Options, and Help. The current file is "C:\NPRB7-1.ASM". The code area displays the following assembly code:

```
assume cs:codesg
codesg segment
start:
    mov ax,2000h
    mov ds,ax
    mov bx,1000h
    mov ax,[bx]
    mov cx,[bx+1]
    mov cx,[bx+2]
    mov ax,4c00h
    int 21h
codesg ends
end start
```

编译、链接：

```

DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX

0 Warning Errors
0 Severe Errors

C:\>link prb7.1

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

Run File [PRB7.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : fatal error L1093: PRB7.1 : object not found

C:\>link prb7-1

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

Run File [PRB7-1.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\>_

```

用 debug 运行：

```

DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG

076A:0013 CD21      INT     21
076A:0015 AB        STOSW
076A:0016 015EC9    ADD     [BP-37],BX
076A:0019 C20600    RET     0006
076A:001C C8        DB      C8
076A:001D 06        PUSH    ES
076A:001E 0000    ADD     [BX+SI],AL
-g

Program terminated normally
-d
076A:0000 B8 00 20 8E D8 BB 00 10-8B 07 8B 4F 01 8B 4F 02  . . . . . 0..0.
076A:0010 B8 00 4C CD 21 AB 01 5E-C9 C2 06 00 C8 06 00 00  ..L.!.^..... .
076A:0020 57 56 33 F6 39 36 CE 49-75 05 33 C0 E9 D3 00 8B  WU3.96.Iu.3.....
076A:0030 7E 06 39 75 0E 74 13 FF-76 08 57 6A 08 56 E8 1F  ~.9u.t..v.Wj.U..
076A:0040 D3 8B 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.....U...
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
-t

AX=2000 BX=0000 CX=0015 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=075A ES=075A SS=0769 CS=076A IP=0003 NV UP EI PL NZ NA PO NC
076A:0003 8ED8      MOV     DS,AX

```

Ax=2000H, bx=0000H, cx=0015H

2) 问题 7.2

assume cs:codesg,ds:datasg

datasg segment

db 'welcome to masm'

```
        db '.....'
datasg ends
codesg segment
start: mov ax,datasg
        mov ds,ax
        mov si,0
        mov di,16
        mov cx,8
s:    mov ax,[si]
        mov [di],ax
        add si,2
        add di,2
        loop s
        mov ax,4c00h
        int 21h
codesg ends
end start
```

输入代码:



The screenshot shows the DOSBox 0.74-3-3 window with the title bar "DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: EDIT". The menu bar includes File, Edit, Search, View, Options, and Help. The current file is "C:\PRB7-2.ASM". The code area displays the assembly code provided in the previous text block. The status bar at the bottom shows "F1=Help", "Line:20", and "Col:10".

```
assume cs:codesg,ds:datasg
datasg segment
    db 'welcome to masm'
    db'.....'
datasg ends
codesg segment
start: mov ax,datasg
        mov ds,ax
        mov si,0
        mov di,16
        mov cx,8
s:    mov ax,[si]
        mov [di],ax
        add si,2
        add di,2
        loop s
        mov ax,4c00h
        int 21h
codesg ends
end start
```

编译、链接:

```
C:\>masm prb7-2
Microsoft (R) Macro Assembler Version 5.00
Copyright (C) Microsoft Corp 1981-1985, 1987. All rights reserved.

Object filename [prb7-2.OBJ]:
Source listing [NUL.LST]:
Cross-reference [NUL.CRF]:

      51672 + 464872 Bytes symbol space free

      0 Warning Errors
      0 Severe Errors

C:\>link prb7-2

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

Run File [PRB7-2.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\>_
```

用 debug 运行程序:

```
C:\> DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG

Run File [PRB7-2.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\>debug prb7-2.exe
-u
076C:0000 B86A07      MOV     AX,076A
076C:0003 8ED8      MOV     DS,AX
076C:0005 BE0000      MOV     SI,0000
076C:0008 BF1000      MOV     DI,0010
076C:000B B90800      MOV     CX,0008
076C:000E 8B04      MOV     AX,[SI]
076C:0010 8905      MOV     [DI],AX
076C:0012 83C602      ADD     SI,+02
076C:0015 83C702      ADD     DI,+02
076C:0018 E2F4      LOOP    000E
076C:001A B8004C      MOV     AX,4C00
076C:001D CD21      INT     21
076C:001F 0C00      OR      AL,00
-g

Program terminated normally
-
```

查看运行结果:

```

0-d 076a:0000
,076A:0000  77 65 6C 63 6F 6D 65 20-74 6F 20 6D 61 73 6D 2E welcome to masm.
076A:0010  77 65 6C 63 6F 6D 65 20-74 6F 20 6D 61 73 6D 2E welcome to masm.
076A:0020  B8 6A 07 8E D8 BE 00 00-BF 10 00 B9 08 00 8B 04 .j.....
076A:0030  89 05 83 C6 02 83 C7 02-E2 F4 B8 00 4C CD 21 0C .....L.!
076A:0040  00 52 50 E8 EA 48 83 C4-04 50 E8 7B 0E 83 C4 04 .RP..H...P.€....
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 .EP.....RP..H.
076A:0070  C4 04 50 8D 86 FA FE 50-E8 17 73 83 C4 06 8B B6 ..P....P..s.....

```

3) 我们可以利用[bx(si/di)+idata]的方式，让代码变得简洁，程序如下：

```

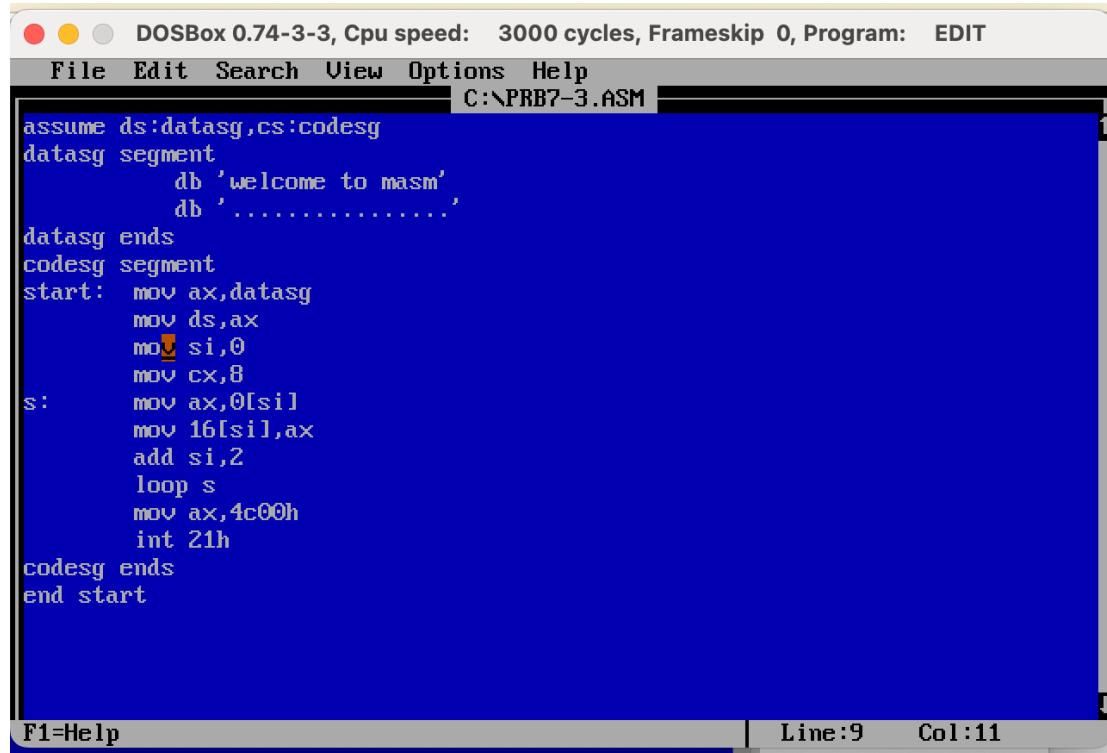
codesg segment
start: mov ax,datasg
       mov ds,ax
       mov si,0
       mov cx,8
s:      mov ax,0[si]
       mov 16[si],ax
       add si,2
       loop s
       mov ax,4c00h
       int 21h

```

codesg ends

end start

输入代码：



The screenshot shows the DOSBox 0.74-3-3 window with the title bar "DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: EDIT". The menu bar includes File, Edit, Search, View, Options, and Help. The current file is "C:\PRB7-3.ASM". The assembly code is displayed in the main window:

```

assume ds:datasg,cs:codesg
datasg segment
    db 'welcome to masm'
    db '.....'
datasg ends
codesg segment
start: mov ax,datasg
       mov ds,ax
       mov si,0
       mov cx,8
s:      mov ax,0[si]
       mov 16[si],ax
       add si,2
       loop s
       mov ax,4c00h
       int 21h
codesg ends
end start

```

The status bar at the bottom shows "F1=Help" and "Line:9 Col:11".

编译、链接：

```
C:\>masm prb7-3
Microsoft (R) Macro Assembler Version 5.00
Copyright (C) Microsoft Corp 1981-1985, 1987. All rights reserved.

Object filename [prb7-3.OBJ]:
Source listing [NUL.LST]:
Cross-reference [NUL.CRF]:

    51596 + 464948 Bytes symbol space free

    0 Warning Errors
    0 Severe Errors

C:\>link prb7-3

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

Run File [PRB7-3.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\>
```

执行：

```
C:\> DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG

Run File [PRB7-3.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\>debug prb7-3.exe
-u
076C:0000 B86A07      MOV     AX,076A
076C:0003 8ED8      MOV     DS,AX
076C:0005 BE0000      MOV     SI,0000
076C:0008 B90800      MOV     CX,0008
076C:000B 8B04      MOV     AX,[SI]
076C:000D 894410      MOV     [SI+10],AX
076C:0010 83C602      ADD     SI,+02
076C:0013 E2F6      LOOP    000B
076C:0015 B8004C      MOV     AX,4C00
076C:0018 CD21      INT     21
076C:001A FC      CLD
076C:001B BB56FE      MOV     DX,[BP-02]
076C:001E 050C00      ADD     AX,000C
-g

Program terminated normally
-
```

查看结果：

DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG

```

076C:0003 8ED8      MOV     DS,AX
076C:0005 BE0000      MOV     SI,0000
076C:0008 B90800      MOV     CX,0008
076C:000B 8B04      MOV     AX,[SI]
076C:000D 894410      MOV     [SI+10],AX
076C:0010 B3C602      ADD     SI,+02
076C:0013 E2F6      LOOP    000B
076C:0015 B8004C      MOV     AX,4C00
076C:0018 CD21      INT    21
076C:001A FC      CLD
076C:001B BB56FE      MOV     DX,[BP-02]
076C:001E 050000      ADD     AX,0000
g
Program terminated normally
-d 076a:0000
076A:0000 77 65 6C 63 6F 6D 65 20-74 6F 20 6D 61 73 6D 2E welcome to masm.
076A:0010 77 65 6C 63 6F 6D 65 20-74 6F 20 6D 61 73 6D 2E welcome to masm.
076A:0020 B8 6A 07 8E D8 BE 00 00-B9 08 00 8B 04 89 44 10 .j.....D.
076A:0030 83 C6 02 E2 F6 B8 00 4C-CD 21 FC 8B 56 FE 05 0C .....L.t..U...
076A:0040 00 52 50 E8 EA 48 83 C4-04 50 E8 7B 0E 83 C4 04 .RP..H...P.t....
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 .EP.....RP..H.
076A:0070 C4 04 50 8D 86 FA FE 50-E8 17 73 83 C4 06 8B B6 ..P....P..s....
```

4) 问题 7.4

```

assume cs:codesg
codesg segment
start: mov ax,2000h
        mov ds,ax
        mov bx,1000h
        mov si,0
        mov ax,[bx+si]
        inc si
        mov cx,[bx+si]
        inc si
        mov di,si
        add cx,[bx+di]
        mov ax,4c00h
        int 21h
codesg ends
end start
输入程序:
```

DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: EDIT
File Edit Search View Options Help
C:\PRB7-4.ASM

```
assume cs:codesg
codesg segment
start: mov ax,2000h
        mov ds,ax
        mov bx,1000h
        mov si,0
        mov ax,[bx+si]
        inc si
        mov cx,[bx+si]
        inc si
        mov di,si
        add cx,[bx+di]
        mov ax,4c00h
        int 21h
codesg ends
end start
```

编译、链接:

DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX

```
C:\>masm prb7-4
Microsoft (R) Macro Assembler Version 5.00
Copyright (C) Microsoft Corp 1981-1985, 1987. All rights reserved.

Object filename [prb7-4.OBJ]:
Source listing [NUL.LST]:
Cross-reference [NUL.CRF]:

51598 + 464946 Bytes symbol space free

0 Warning Errors
0 Severe Errors

C:\>link prb7-4

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

Run File [PRB7-4.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\>_
```

执行:

```

DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\>debug prb7-4.exe
-u
076A:0000 B80020      MOV     AX,2000
076A:0003 8ED8        MOV     DS,AX
076A:0005 BB0010      MOV     BX,1000
076A:0008 BE0000      MOV     SI,0000
076A:000B 8B00        MOV     AX,[BX+SI]
076A:000D 46          INC    SI
076A:000E 8B08        MOV     CX,[BX+SI]
076A:0010 46          INC    SI
076A:0011 8BFE        MOV     DI,SI
076A:0013 0309        ADD    CX,[BX+DI]
076A:0015 B8004C      MOV     AX,4C00
076A:0018 CD21        INT    21
076A:001A 050000      ADD    AX,000C
076A:001D 52          PUSH   DX
076A:001E 50          PUSH   AX
076A:001F E80E49      CALL   4930
-g

Program terminated normally

```

查看运行结果:

```

t
AX=2000  BX=0000  CX=001A  DX=0000  SP=0000  BP=0000  SI=0000  DI=0000
DS=075A  ES=075A  SS=0769  CS=076A  IP=0003  NV UP EI PL NZ NA PO NC
076A:0003 8ED8        MOV     DS,AX
3<_

```

5) 问题 7.5

```

assume cs:codesg
code segment
start: mov ax,2000h
        mov ds,ax
        mov bx,1000h
        mov si,0
        mov ax,[bx+2+si]
        inc si
        mov cx,[bx+2+si]
        inc si
        mov di,si
        mov bx,[bx+2+di]
        mov ax,4c00h
        int 21h
codesg ends
end start

```

输入代码:

DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: EDIT
File Edit Search View Options Help
C:\PRB7-5.ASM

```
assume cs:codesg
code segment
start: mov ax,2000h
        mov ds,ax
        mov bx,1000h
        mov si,0
        mov ax,[bx+2+si]
        inc si
        mov cx,[bx+2+si]
        inc si
        mov di,si
        mov bx,[bx+2+di]
        mov ax,4c00h
        int 21h
codesg ends
end start
```

F1=Help | Line:16 Col:10

编译链接:

DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX

```
C:\>masm prb7-5
Microsoft (R) Macro Assembler Version 5.00
Copyright (C) Microsoft Corp 1981-1985, 1987. All rights reserved.

Object filename [prb7-5.OBJ]:
Source listing [NUL.LST]:
Cross-reference [NUL.CRF]:

51598 + 464946 Bytes symbol space free

    0 Warning Errors
    0 Severe Errors

C:\>link prb7-5

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

Run File [PRB7-5.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\>_
```

用 debug 执行:

```

DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\>debug prb7-5.exe
-u
076A:0000 B80020      MOV     AX,2000
076A:0003 8ED8        MOV     DS,AX
076A:0005 BB0010      MOV     BX,1000
076A:0008 BE0000      MOV     SI,0000
076A:000B 8B4002      MOV     AX,[BX+SI+02]
076A:000E 46          INC     SI
076A:000F 8B4802      MOV     CX,[BX+SI+02]
076A:0012 46          INC     SI
076A:0013 8BFE        MOV     DI,SI
076A:0015 8B5902      MOV     BX,[BX+DI+02]
076A:0018 B8004C      MOV     AX,4C00
076A:001B CD21        INT    21
076A:001D 52          PUSH   DX
076A:001E 50          PUSH   AX
076A:001F E80E49      CALL   4930
-g
Program terminated normally

```

查看内存中的数据:

```

,4Program terminated normally
-d 2000:0000
2000:0000  5B 07 70 07 72 07 62 07-37 07 2D 07 35 07 2E 07  I.p.r.b.7.-.5...
2000:0010  4F 07 42 07 4A 07 5D 07-3A 07 20 07 20 07 20 07  O.B.J.I.: . .
2000:0020  20 07 20 07 20 07 20 07-20 07 20 07 20 07 20 07  . . . .
2000:0030  20 07 20 07 20 07 20 07-20 07 20 07 20 07 20 07  . . . .
2000:0040  20 07 20 07 20 07 20 07-20 07 20 07 20 07 20 07  . . . .
2000:0050  20 07 20 07 20 07 20 07-20 07 20 07 20 07 20 07  . . . .
2000:0060  20 07 20 07 20 07 20 07-20 07 20 07 20 07 20 07  . . . .
2000:0070  20 07 20 07 20 07 20 07-20 07 20 07 20 07 20 07  . . . .
-
```

6) 问题 7.6: 编程, 加过 debug 段中每个单词的第一个字母改成大写字母

assume cs:codesg,ds:datasg

datasg segment

```

db '1.file'
db '2.edit'
db '3.search'
db '4.view'
db '5.options'
db '6.help'
```

datasg ends

codesg segment

start: mov ax,datasg

```

mov ds,ax
mov bx,0
mov cx,6
```

s: mov al,[bx+2]

```
and al,11011111B  
mov [bx+2],al  
add bx,16  
loop s  
mov ax,4c00h  
int 21h  
  
codesg ends  
end start
```

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 file path is "C:\PRB7-6.ASM". The assembly code is as follows:

```
assume cs:codesg,ds:datasg  
datasg segment  
    db '1.file'      ;  
    db '2.edit'      ;  
    db '3.search'    ;  
    db '4.view'      ;  
    db '5.options'   ;  
    db '6.help'      ;  
datasg ends  
codesg segment  
start: mov ax,datasg  
       mov ds,ax  
       mov bx,0  
       mov cx,6  
s:    mov al,[bx+2]  
       and al,11011111B  
       mov [bx+2],al  
       add bx,16  
       loop s  
       mov ax,4c00h  
       int 21h  
codesg ends
```

编译、链接:

```
DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX

C:\>masm prb7-6
Microsoft (R) Macro Assembler Version 5.00
Copyright (C) Microsoft Corp 1981-1985, 1987. All rights reserved.

Object filename [prb7-6.OBJ]:
Source listing [NUL.LST]:
Cross-reference [NUL.CRF]:

      51596 + 464948 Bytes symbol space free

      0 Warning Errors
      0 Severe Errors

C:\>link prb7-6

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

Run File [PRB7-6.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\>
```

执行：

```
DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG

Run File [PRB7-6.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\>debug prb7-6.exe
-u
0770:0000 B86A07      MOV     AX,076A
0770:0003 8ED8      MOV     DS,AX
0770:0005 BB0000      MOV     BX,0000
0770:0008 B90600      MOV     CX,0006
0770:000B 8A4702      MOV     AL,[BX+02]
0770:000E 24DF      AND     AL,DF
0770:0010 884702      MOV     [BX+02],AL
0770:0013 B3C310      ADD     BX,+10
0770:0016 E2F3      LOOP    000B
0770:0018 B8004C      MOV     AX,4C00
0770:001B CD21      INT     21
0770:001D 06      PUSH    ES
0770:001E BBB6FAFE      MOV     SI,[BP+FEFA]
-g
Program terminated normally
```

查看结果：

```

01 Program terminated normally
01-d 076A:0000
01 076A:0000 31 2E 46 69 6C 65 20 20-20 20 20 20 20 20 20 20 20 20 1.File
01 076A:0010 32 2E 45 64 69 74 20 20-20 20 20 20 20 20 20 20 20 20 20 2.Edit
01 076A:0020 33 2E 53 65 61 72 63 68-20 20 20 20 20 20 20 20 20 20 3.Search
01 076A:0030 34 2E 56 69 65 77 20 20-20 20 20 20 20 20 20 20 20 20 4.View
01 076A:0040 35 2E 4F 70 74 69 6F 6E-73 20 20 20 20 20 20 20 20 20 20 5.Options
01 076A:0050 36 2E 48 65 6C 70 20 20-20 20 20 20 20 20 20 20 20 20 6.Help
01 076A:0060 B8 6A 07 8E D8 BB 00 00-B9 06 00 8A 47 02 24 DF .J.....G.$.
01 076A:0070 88 47 02 83 C3 10 E2 F3-B8 00 4C CD 21 06 8B B6 .G.....L.!...

```

7) 问题 7.7

```
assume cs:codesg,ds:datasg
```

```
datasg segment
```

```

    db 'ibm'
    db 'dec'
    db 'dos'
    db 'vax'

```

```
datasg ends
```

```
codesg segment
```

```
start: mov ax,datasg
```

```

        mov ds,ax
        mov bx,0
        mov cx,4

```

```
s1:    mov si,0
```

```

        mov dx,cx
        mov cx,3

```

```
s2:    mov al,[bx+si]
```

```

        and al,11011111B
        mov [bx+si],al

```

```
        inc si

```

```
        loop s2

```

```
        mov cx,dx

```

```
        add bx,16

```

```
        loop s1

```

```
        mov ax,4c00h

```

```
        int 21h

```

```
codesg ends
```

```
end start
```

输入代码:

DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: EDIT

```
File Edit Search View Options Help
C:\PRB7-7.ASM

assume cs:codesg,ds:datasg
datasg segment
    db 'ibm'
    db 'dec'
    db 'dos'
    db 'vax'
datasg ends
code segment
start: mov ax,datasg
        mov ds,ax
        mov bx,0
        mov cx,4
s1:   mov si,0
        mov dx,cx
        mov cx,3
s2:   mov al,[bx+si]
        and al,11011111B
        mov [bx+si],al
        inc si
        loop s2
        mov cx,dx
        and bx,16
```

F1=Help | Line:1 Col:1

编译、链接：

DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX

```
C:\>masm prb7-7
Microsoft (R) Macro Assembler Version 5.00
Copyright (C) Microsoft Corp 1981-1985, 1987. All rights reserved.

Object filename [prb7-7.OBJ]:
Source listing [NUL.LST]:
Cross-reference [NUL.CRF]:

51596 + 464948 Bytes symbol space free

0 Warning Errors
0 Severe Errors

C:\>link prb7-7

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

Run File [PRB7-7.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\>
```

运行：

```

● ○ ● DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG
Run File [PRB7-7.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\>debug prb7-7.exe
-u
076E:0000 B86A07      MOV     AX,076A
076E:0003 8ED8      MOV     DS,AX
076E:0005 BB0000      MOV     BX,0000
076E:0008 B90400      MOV     CX,0004
076E:000B BE0000      MOV     SI,0000
076E:000E 8BD1      MOV     DX,CX
076E:0010 B90300      MOV     CX,0003
076E:0013 8A00      MOV     AL,[BX+SI]
076E:0015 24DF      AND     AL,DF
076E:0017 8800      MOV     [BX+SI],AL
076E:0019 46      INC     SI
076E:001A E2F7      LOOP    0013
076E:001C 8BCA      MOV     CX,DX
076E:001E 83C310      ADD     BX,+10
-g

Program terminated normally
-
```

查看结果：

```

-d 076A:0000
076A:0000 49 42 4D 20 20 20 20 20-20 20 20 20 20 20 20 20 IBM
076A:0010 44 45 43 20 20 20 20 20-20 20 20 20 20 20 20 20 DEC
076A:0020 44 4F 53 20 20 20 20 20-20 20 20 20 20 20 20 20 DOS
076A:0030 56 41 58 20 20 20 20 20-20 20 20 20 20 20 20 20 VAX
076A:0040 B8 6A 07 8E D8 BB 00 00-B9 04 00 BE 00 00 8B D1 .j.....
076A:0050 B9 03 00 8A 00 24 DF 88-00 46 E2 F7 8B CA 83 C3 ....$.F....
076A:0060 10 E2 E8 B8 00 4C CD 21-0C 00 52 50 E8 C1 48 83 ....L!.RP..H.
076A:0070 C4 04 50 8D B6 FA FE 50-E8 17 73 83 C4 06 8B B6 ..P...P..S....
```

8) 问题 7.8

```
assume cs:codesg,ds:datasg,ss:stacksg
```

```
datasg segment
```

```
    db 'ibm'
```

```
    db 'dec'
```

```
    db 'dos'
```

```
    db 'vax'
```

```
datasg ends
```

```
stacksg segment
```

```
    dw 0,0,0,0,0,0,0,0
```

```
stacksg ends
```

```
codesg segment
```

```
start: mov ax,stacksg
```

```
    mov ss,ax
```

```
    mov ax,datasg
```

```
    mov ds,ax
```

```
    mov bx,0
```

```

        mov cx,4
s0:    push cx
        mov si,0
        mov cx,3
s:     mov al,[bx+si]
        and al,11011111b
        mov [bx+si],al
        inc si
        loop s
        add bx,16
        pop cx
        loop s0
        mov ax,4c000h
        int 21h

```

输入代码:



The screenshot shows the DOSBox interface with the title bar "DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: EDIT". The menu bar includes File, Edit, Search, View, Options, and Help. The current file is "C:\PRB7-8.ASM". The assembly code in the editor window is:

```

assume cs:codesg,ds:datasg,ss:stacksg
datasg segment
    db 'ibm'
    db 'dec'
    db 'dos'
    db 'vax'
datasg ends
stacksg segment
    dw 0,0,0,0,0,0,0,0
stacksg ends
codesg segment
start:  mov ax,stacksg
        mov ss,ax
        mov ax,datasg
        mov ds,ax
        mov bx,0
        mov cx,4
s0:    push cx
        mov si,0
        mov cx,3
s:     mov al,[bx+si]
        and al,11011111b

```

The status bar at the bottom shows "F1=Help", "Line:22", and "Col:16".

编译、链接:

```
C:\>masm prb7-8
Microsoft (R) Macro Assembler Version 5.00
Copyright (C) Microsoft Corp 1981-1985, 1987. All rights reserved.

Object filename [prb7-8.OBJ]:
Source listing [NUL.LST]:
Cross-reference [NUL.CRF]:

      51594 + 464950 Bytes symbol space free

      0 Warning Errors
      0 Severe Errors

C:\>link prb7-8

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

Run File [PRB7-8.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\>
```

运行：

```
DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG

Run File [PRB7-8.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\>debug prb7-8.exe
-u
076F:0000 B86E07      MOV     AX,076E
076F:0003 8BED0      MOV     SS,AX
076F:0005 B86A07      MOV     AX,076A
076F:0008 8ED8      MOV     DS,AX
076F:000A BB0000      MOV     BX,0000
076F:000D B90400      MOV     CX,0004
076F:0010 51          PUSH    CX
076F:0011 BE0000      MOV     SI,0000
076F:0014 B90300      MOV     CX,0003
076F:0017 8A00          MOV     AL,[BX+SI]
076F:0019 24DF          AND    AL,DF
076F:001B 8800          MOV     [BX+SI],AL
076F:001D 46          INC    SI
076F:001E E2F7          LOOP   0017
-g
Program terminated normally
```

查看结果：

```

-d 076A:0000
076A:0000 49 42 4D 20 20 20 20 20 20-20 20 20 20 20 20 20 20 IBM
076A:0010 44 45 43 20 20 20 20 20 20-20 20 20 20 20 20 20 20 DEC
076A:0020 44 4F 53 20 20 20 20 20 20-20 20 20 20 20 20 20 20 DOS
076A:0030 56 41 58 20 20 20 20 20 20-20 20 20 20 20 20 20 20 UAX
076A:0040 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00 00 ...
076A:0050 B8 6E 07 8E D0 B8 6A 07-8E D8 BB 00 00 B9 04 00 .n...j...
076A:0060 51 BE 00 00 B9 03 00 8A-00 24 DF 88 00 46 EZ F7 Q...$..F...
076A:0070 83 C3 10 59 EZ EA B8 00-4C CD 21 83 C4 06 8B B6 ...Y...L?...

```

2. 编程，完成问题 7.9 中的程序。

编程，将 datasg 段中每个单词的前 4 个字母改成大写字母

```
assume cs:codesg, ss:stacksg, ds:datasg
```

```
stacksg segment
```

```
    dw 0,0,0,0,0,0,0,0
```

```
stacksg ends
```

```
datasg segment
```

```
    db '1. display'
```

```
    db '2. brows'
```

```
    db '3. replace'
```

```
    db '4. modify'
```

```
datasg ends
```

```
codesg segment
```

```
start:
```

```
    mov ax, stacksg
```

```
    mov ss, ax
```

```
    mov sp, 16
```

```
    mov ax, datasg
```

```
    mov ds, ax
```

```
    mov bx, 0
```

```
    mov cx, 4
```

```
s:
```

```
    push cx
```

```
    mov si, 3
```

```
    mov cx, 4
```

```
s0:
```

```
    mov al, [bx+si]
```

```
    and al, 11011111b
```

```
    mov [bx+si], al
```

```
    inc si
```

```
    loop s0
```

```
    add bx, 10
```

```
    pop cx
```

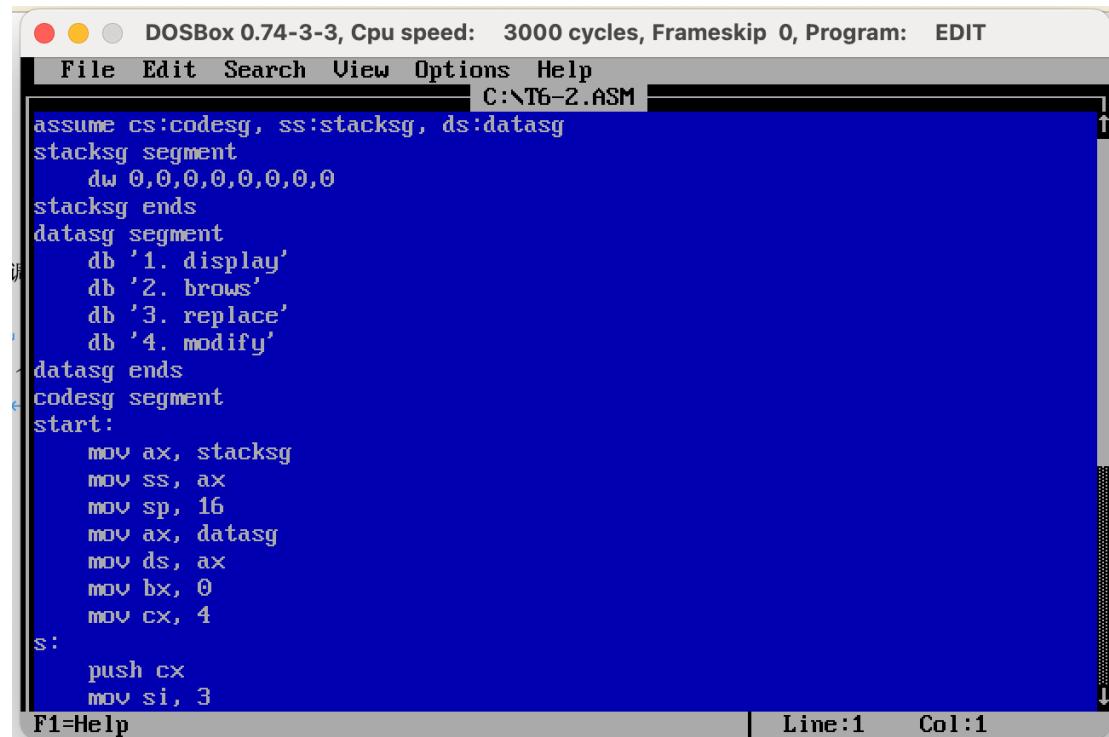
```
    loop s
```

```
    mov ax, 4c00h
```

```
    int 21h
```

```
codesg ends  
end start
```

代码输入到 dos 系统中



DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: EDIT
File Edit Search Options Help
C:\T6-2.ASM

```
assume cs:codesg, ss:stacksg, ds:datasg  
stacksg segment  
    dw 0,0,0,0,0,0,0,0  
stacksg ends  
datasg segment  
    db '1. display'  
    db '2. brows'  
    db '3. replace'  
    db '4. modify'  
datasg ends  
codesg segment  
start:  
    mov ax, stacksg  
    mov ss, ax  
    mov sp, 16  
    mov ax, datasg  
    mov ds, ax  
    mov bx, 0  
    mov cx, 4  
s:  
    push cx  
    mov si, 3
```

F1=Help | Line:1 Col:1

编译、链接程序:



DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX

```
C:\>masm t6-2.asm  
Microsoft (R) Macro Assembler Version 5.00  
Copyright (C) Microsoft Corp 1981-1985, 1987. All rights reserved.  
  
Object filename [t6-2.OBJ]:  
Source listing [NUL.LST]:  
Cross-reference [NUL.CRF]:  
  
51604 + 464940 Bytes symbol space free  
  
0 Warning Errors  
0 Severe Errors  
  
C:\>link t6-2  
  
Microsoft (R) Overlay Linker Version 3.60  
Copyright (C) Microsoft Corp 1983-1987. All rights reserved.  
  
Run File [T6-2.EXE]:  
List File [NUL.MAP]:  
Libraries [.LIB]:  
LINK : warning L4021: no stack segment  
  
C:\>_
```

用 debug 执行程序:

```
● ○ ● DOSBox 0.74-3-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG
076E:0003 8ED0      MOV     SS,AX
076E:0005 BC1000    MOV     SP,0010
076E:0008 B86B07    MOV     AX,076B
076E:000B 8ED8      MOV     DS,AX
076E:000D BB0000    MOV     BX,0000
076E:0010 B90400    MOV     CX,0004
076E:0013 51        PUSH    CX
076E:0014 BE0300    MOV     SI,0003
076E:0017 B90400    MOV     CX,0004
076E:001A 8A00      MOV     AL,[BX+SI]
076E:001C Z4DF      AND    AL,DF
076E:001E 8800      MOV     [BX+SI],AL
-g

Program terminated normally
-d 076a:0000
076A:0000 00 00 00 00 00 00 00 00-00 00 2E 00 6E 07 16 72  .....n..r
076A:0010 31 2E 20 44 49 53 50 6C-61 79 32 2E 20 42 52 4F  1. DISPLAY2. BRO
076A:0020 57 73 33 2E 20 72 65 50-4C 41 43 65 34 2E 20 6D  Ws3. rePLACE4. m
076A:0030 6F 44 49 46 59 00 00 00-00 00 00 00 00 00 00 00 00 oDIFY.....
076A:0040 B8 6A 07 8E D0 BC 10 00-B8 6B 07 8E D8 BB 00 00 .j.....k.....
076A:0050 B9 04 00 51 BE 03 00 B9-04 00 8A 00 24 DF 88 00 ...Q.....$...
076A:0060 46 E2 F7 83 C3 0A 59 E2-EA B8 00 4C CD 21 48 83 F.....Y....L.!H.
076A:0070 C4 04 50 8D 86 FA FE 50-E8 17 73 83 C4 06 8B B6 ..P....P..s.....

```

运行结果：可以看到每 4 个单词的前 4 个字母均变为大写。