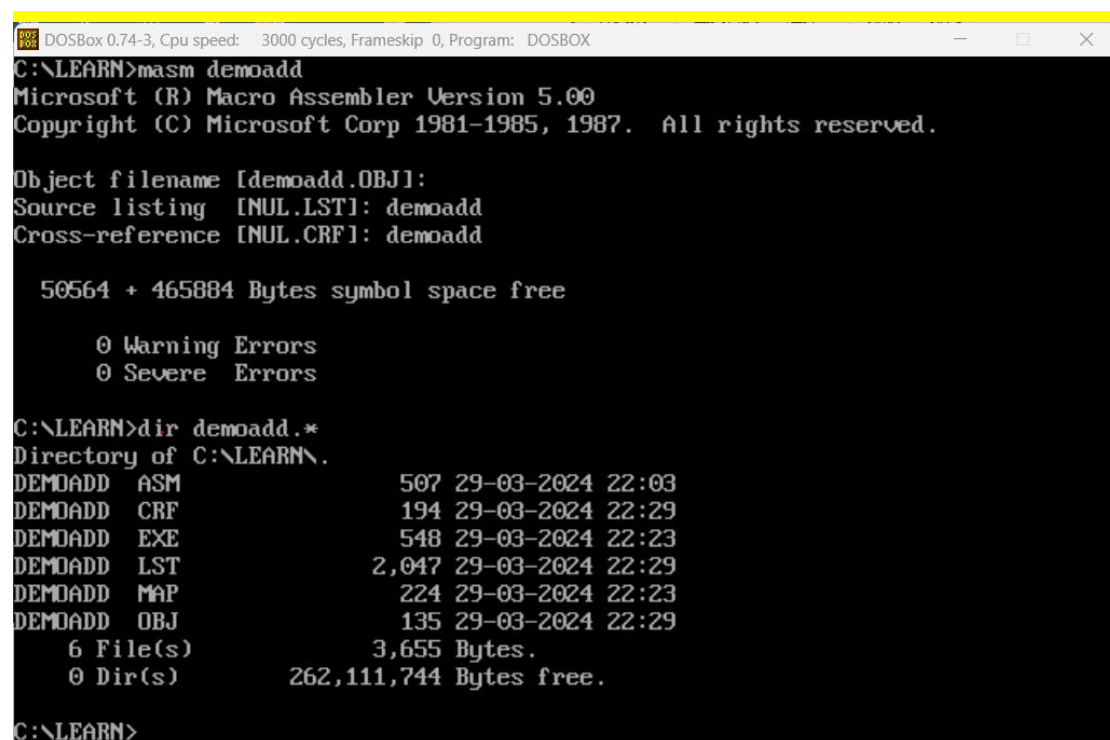


第 1 次上机

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1、熟悉汇编语言实验环境（masm、link、debug）

（1）使用 masm 编译 demoadd.asm，同时生成.lst、.crf 文件，给出运行结果截图。



```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX
C:\LEARN>masm demoadd
Microsoft (R) Macro Assembler Version 5.00
Copyright (C) Microsoft Corp 1981-1985, 1987. All rights reserved.

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

50564 + 465884 Bytes symbol space free

0 Warning Errors
0 Severe Errors

C:\LEARN>dir demoadd.*
Directory of C:\LEARN\
DEMOADD ASM                507 29-03-2024 22:03
DEMOADD CRF                194 29-03-2024 22:29
DEMOADD EXE                548 29-03-2024 22:23
DEMOADD LST               2,047 29-03-2024 22:29
DEMOADD MAP                224 29-03-2024 22:23
DEMOADD OBJ               135 29-03-2024 22:29
6 File(s)                 3,655 Bytes.
0 Dir(s)                 262,111,744 Bytes free.

C:\LEARN>_
```

（2）使用 link 编译 demoadd.asm，同时生成同名的.map 文件，给出运行结果截图。

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

6 File(s)                3,655 Bytes.
0 Dir(s)                  262,111,744 Bytes free.

C:\LEARN>link demoadd

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

Run File [DEMOADD.EXE]:
List File [NUL.MAP]: demoadd
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\LEARN>dir demoadd.*
Directory of C:\LEARN\
DEMOADD  ASM                507 29-03-2024 22:03
DEMOADD  CRF                194 29-03-2024 22:29
DEMOADD  EXE                548 29-03-2024 22:31
DEMOADD  LST               2,047 29-03-2024 22:29
DEMOADD  MAP                224 29-03-2024 22:31
DEMOADD  OBJ                135 29-03-2024 22:29
6 File(s)                3,655 Bytes.
0 Dir(s)                  262,111,744 Bytes free.

C:\LEARN>_
```

(3) 使用 debug 调试 demoadd.exe, 按下面的要求分别给出结果截图。

(a) 反汇编指令 U

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

DEMOADD  LST                2,047 29-03-2024 22:29
DEMOADD  MAP                224 29-03-2024 22:31
DEMOADD  OBJ                135 29-03-2024 22:29
6 File(s)                3,655 Bytes.
0 Dir(s)                  262,111,744 Bytes free.

C:\LEARN>debug demoadd.exe
-r
AX=FFFF BX=0000 CX=0024 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=0766 ES=0766 SS=0775 CS=0777 IP=0000  NV UP EI PL NZ NA PO NC
0777:0000 B87607          MOV     AX,0776
-u
0777:0000 B87607          MOV     AX,0776
0777:0003 8ED8           MOV     DS,AX
0777:0005 A00000          MOV     AL,[0000]
0777:0008 02060100       ADD     AL,[0001]
0777:000C A20200          MOV     [0002],AL
0777:000F B8004C          MOV     AX,4C00
0777:0012 CD21           INT     21
0777:0014 FF00           INC     WORD PTR [BX+SI]
0777:0016 C682FBFE00      MOV     BYTE PTR [BP+SI+FEFB],00
0777:001B 2BC0           SUB     AX,AX
0777:001D 50             PUSH    AX
0777:001E 8D86FBFE       LEA     AX,[BP+FEFB]
```

(b) 显示寄存器指令 R

```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG
DEMOADD LST 2,047 29-03-2024 22:29
DEMOADD MAP 224 29-03-2024 22:31
DEMOADD OBJ 135 29-03-2024 22:29
6 File(s) 3,655 Bytes.
0 Dir(s) 262,111,744 Bytes free.

C:\LEARN>debug demoadd.exe
-r
AX=FFFF BX=0000 CX=0024 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=0766 ES=0766 SS=0775 CS=0777 IP=0000 NU UP EI PL NZ NA PO NC
0777:0000 B87607 MOV AX,0776
-u
0777:0000 B87607 MOV AX,0776
0777:0003 8ED8 MOV DS,AX
0777:0005 A00000 MOV AL,[0000]
0777:0008 02060100 ADD AL,[0001]
0777:000C A20200 MOV [0002],AL
0777:000F B8004C MOV AX,4C00
0777:0012 CD21 INT 21
0777:0014 FF00 INC WORD PTR [BX+SI]
0777:0016 C682FBFE00 MOV BYTE PTR [BP+SI+FEFB],00
0777:001B 2BC0 SUB AX,AX
0777:001D 50 PUSH AX
0777:001E 8D86FBFE LEA AX,[BP+FEFB]
```

(c) 单步调试指令 T, 执行 2 次 T 指令后的结果

```
-t
AX=0776 BX=0000 CX=0024 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=0776 ES=0766 SS=0775 CS=0777 IP=0005 NU UP EI PL NZ NA PO NC
0777:0005 A00000 MOV AL,[0000] DS:
```

(d) 显示内存指令 D, 显示 数据段 前 3 的个字节的内容

```
-d 0 2
0776:0000 11 22 00
```

(e) 执行程序指令 G, 运行到 add al, Y 行

```
-g8
AX=0711 BX=0000 CX=0024 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=0776 ES=0766 SS=0775 CS=0777 IP=0008 NU UP EI PL NZ NA PO NC
0777:0008 02060100 ADD AL,[0001] DS:
```

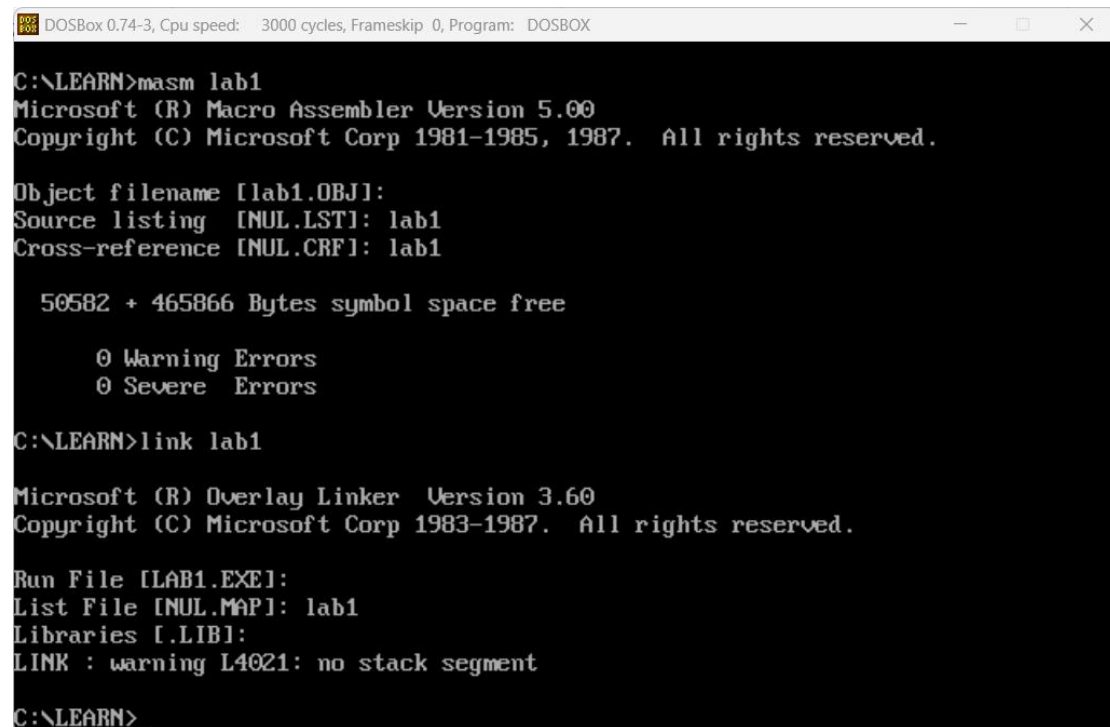
(f) 执行程序指令 G

```
-g
Program terminated normally
```

2、算术指令程序设计。在数据段分别定义 stu, X,Y,Z,W 变量。其中, 将 stu

初始化为自己的学号，X,Y,W 可以任意初始化。截图中 stu 的初始值和学号不相符的将判定为抄袭。（说明：为简化编程，除法运算后不考虑余数）

（1）汇编、连接后的截图



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

C:\LEARN>masm lab1
Microsoft (R) Macro Assembler Version 5.00
Copyright (C) Microsoft Corp 1981-1985, 1987. All rights reserved.

Object filename [lab1.OBJ]:
Source listing [NUL.LST]: lab1
Cross-reference [NUL.CRF]: lab1

50582 + 465866 Bytes symbol space free

0 Warning Errors
0 Severe Errors

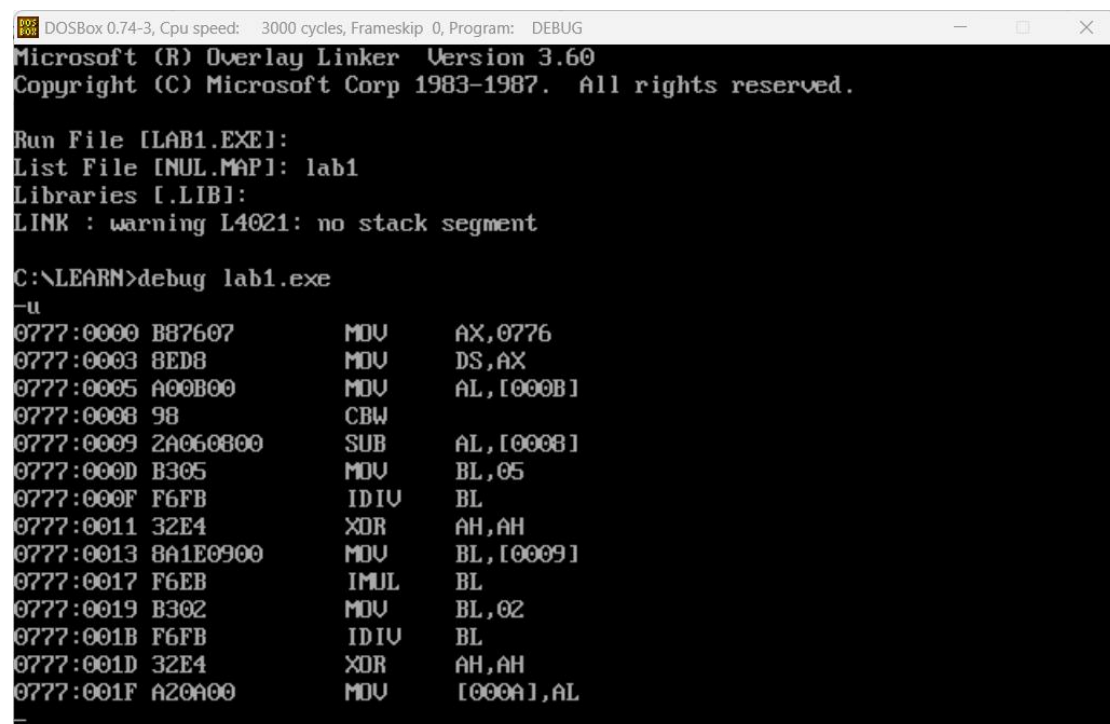
C:\LEARN>link lab1

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

Run File [LAB1.EXE]:
List File [NUL.MAP]: lab1
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\LEARN>_
```

（2）反汇编的截图



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

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

Run File [LAB1.EXE]:
List File [NUL.MAP]: lab1
Libraries [.LIB]:
LINK : warning L4021: no stack segment

C:\LEARN>debug lab1.exe
-u
0777:0000 B87607      MOV     AX,0776
0777:0003 8ED8             MOV     DS,AX
0777:0005 A00B00      MOV     AL,[000B]
0777:0008 98             CBW
0777:0009 2A060800     SUB     AL,[0008]
0777:000D B305             MOV     BL,05
0777:000F F6FB             IDIU    BL
0777:0011 32E4             XOR     AH,AH
0777:0013 8A1E0900     MOV     BL,[0009]
0777:0017 F6EB             IMUL    BL
0777:0019 B302             MOV     BL,02
0777:001B F6FB             IDIU    BL
0777:001D 32E4             XOR     AH,AH
0777:001F A20A00      MOV     [000A],AL
_
```

（3）在进行计算前，显示变量 stu、X、Y、Z、W 的内存值的截图（只能显示这 5 个变量的内存值，多显示、少显示均扣分）

```

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip: 0, Program: DEBUG
0777:0003 8ED8      MOV     DS,AX
0777:0005 A00B00      MOV     AL,[000B]
0777:0008 9B      CBW
0777:0009 2A060800      SUB     AL,[0008]
0777:000D B305      MOV     BL,05
0777:000F F6FB      IDIU    BL
0777:0011 32E4      XOR     AH,AH
0777:0013 8A1E0900      MOV     BL,[0009]
0777:0017 F6EB      IMUL    BL
0777:0019 B302      MOV     BL,02
0777:001B F6FB      IDIU    BL
0777:001D 32E4      XOR     AH,AH
0777:001F A20A00      MOV     [000A],AL
-t2

AX=0776 BX=0000 CX=0037 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=0766 ES=0766 SS=0775 CS=0777 IP=0003  NU UP EI PL NZ NA PO NC
0777:0003 8ED8      MOV     DS,AX

AX=0776 BX=0000 CX=0037 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=0776 ES=0766 SS=0775 CS=0777 IP=0005  NU UP EI PL NZ NA PO NC
0777:0005 A00B00      MOV     AL,[000B]          DS:000B=0A
-d 0 B
0776:0000 46 19 21 23 22 00 00 00-05 08 00 0A          F.!".....

```

(4) 执行完计算后，显示变量 `stu`、`X`、`Y`、`Z`、`w` 的内存值的截图（只能显示这 5 个变量的内存值，多显示、少显示均扣分）

```

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip: 0, Program: DEBUG
-r
AX=0776 BX=0000 CX=0037 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=0776 ES=0766 SS=0775 CS=0777 IP=0005  NU UP EI PL NZ NA PO NC
0777:0005 A00B00      MOV     AL,[000B]          DS:000B=0A
-q
C:\LEARN>debug lab1.exe
-g 001D
AX=0004 BX=0002 CX=0037 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=0776 ES=0766 SS=0775 CS=0777 IP=001D  NU UP EI PL ZR NA PE NC
0777:001D 32E4      XOR     AH,AH
-t
AX=0004 BX=0002 CX=0037 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=0776 ES=0766 SS=0775 CS=0777 IP=001F  NU UP EI PL ZR NA PE NC
0777:001F A20A00      MOV     [000A],AL          DS:000A=00
-t
AX=0004 BX=0002 CX=0037 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=0776 ES=0766 SS=0775 CS=0777 IP=0022  NU UP EI PL ZR NA PE NC
0777:0022 B8004C      MOV     AX,4C00
-d 0 B
0776:0000 46 19 21 23 22 00 00 00-05 08 04 0A          F.!".....

```

(5) 源代码

1. ; use full segment definition

2.

3. title how to use add instruction

4.

5. data segment

6. stu dq 2223211946H

7. X db 05H

8. Y db 08H

9. Z db 00H

10. W db 0AH

11. data ends

12.

13. code segment

14. assume cs:code, ds:data

15. main proc

16. ; assign the data segment base address to DS

17. mov ax, data

18. mov ds, ax

19.

20.

21. mov al, W

22. cbw

```

23.          sub    al, X
24.          mov    bl, 5
25.          idiv   bl
26.          xor     ah, ah
27.          mov    bl, Y
28.          imul    bl
29.          mov    bl, 2
30.          idiv   bl
31.          xor     ah, ah
32.          mov    Z, al
33.
34.          ; method 2: return to dos
35.          mov    ax, 4c00h
36.          int     21h
37.      main    endp
38. code ends
39. end main

```

3、寄存器使用程序设计。寄存器 BL、CL 的值根据需要进行初始化。（说明：为简化编程，除法运算后不考虑余数）

（1）反汇编的截图


```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip: 0, Program: DEBUG
Copyright (C) Microsoft Corp 1983-1987. All rights reserved.

LINK : warning L4021: no stack segment
Generate lab12.exe successfully.

C:\LEARN>debug lab12.exe
-u
077E:0000 B87E07      MOV     AX,077E
077E:0003 8ED8          MOV     DS,AX
077E:0005 B319          MOV     BL,19
077E:0007 B105          MOV     CL,05
077E:0009 8AC3          MOV     AL,BL
077E:000B 98            CBW
077E:000C 8AD9          MOV     BL,CL
077E:000E F6FB          IDIV    BL
077E:0010 B302          MOV     BL,02
077E:0012 F6EB          IMUL    BL
077E:0014 8BD0          MOV     DX,AX
077E:0016 B8004C        MOV     AX,4C00
077E:0019 CD21          INT     21
077E:001B 4E            DEC     SI
077E:001C 42            INC     DX
077E:001D 3030          XOR     [BX+SI],DH
077E:001F 7400          JZ      0021
```

(2) 在进行计算前，显示寄存器的值截图

```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip: 0, Program: DEBUG
077E:001B 4E            DEC     SI
077E:001C 42            INC     DX
077E:001D 3030          XOR     [BX+SI],DH
077E:001F 7400          JZ      0021
-t
AX=077E BX=0000 CX=00C1 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=076E ES=076E SS=077D CS=077E IP=0003  NV UP EI PL NZ NA PO NC
077E:0003 8ED8          MOV     DS,AX
-t
AX=077E BX=0000 CX=00C1 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=077E ES=076E SS=077D CS=077E IP=0005  NV UP EI PL NZ NA PO NC
077E:0005 B319          MOV     BL,19
-t
AX=077E BX=0019 CX=00C1 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=077E ES=076E SS=077D CS=077E IP=0007  NV UP EI PL NZ NA PO NC
077E:0007 B105          MOV     CL,05
-t
AX=077E BX=0019 CX=0005 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=077E ES=076E SS=077D CS=077E IP=0009  NV UP EI PL NZ NA PO NC
077E:0009 8AC3          MOV     AL,BL
```

(3) 执行完计算后，显示寄存器的值截图


```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip: 0, Program: DEBUG
DS=077E ES=076E SS=077D CS=077E IP=000E  NV UP EI PL NZ NA PO NC
077E:000E F6FB          IDIV  BL
-t
AX=0005 BX=0005 CX=0005 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=077E ES=076E SS=077D CS=077E IP=0010  NV UP EI PL NZ NA PO NC
077E:0010 B302          MOV  BL,02
-t
AX=0005 BX=0002 CX=0005 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=077E ES=076E SS=077D CS=077E IP=0012  NV UP EI PL NZ NA PO NC
077E:0012 F6EB          IMUL  BL
-t
AX=000A BX=0002 CX=0005 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=077E ES=076E SS=077D CS=077E IP=0014  NV UP EI PL NZ NA PO NC
077E:0014 8BD0          MOV  DX,AX
-t
AX=000A BX=0002 CX=0005 DX=000A SP=0000 BP=0000 SI=0000 DI=0000
DS=077E ES=076E SS=077D CS=077E IP=0016  NV UP EI PL NZ NA PO NC
077E:0016 B8004C        MOV  AX,4C00
```

(4) 源代码

```
1. ; use full segment definition
2.
3. title how to use add instruction
4.
5. data segment
6.
7. data ends
8.
9. code segment
10. assume cs:code, ds:data
11. main proc
12. ; assign the data segment base address to DS
13. mov ax, data
14. mov ds, ax
15.
16.
17. mov bl, 25
18. mov cl, 5
19. mov al, bl
20. cbw
21. mov bl, cl
22. idiv bl
23. mov bl, 2
24. imul bl
```

```
25.  
26.      mov dx,ax  
27.  
28.      ; method 2: return to dos  
29.      mov  ax, 4c00h  
30.      int  21h  
31.      main      endp  
32. code ends  
33. end main
```