汇编语言第1次上机

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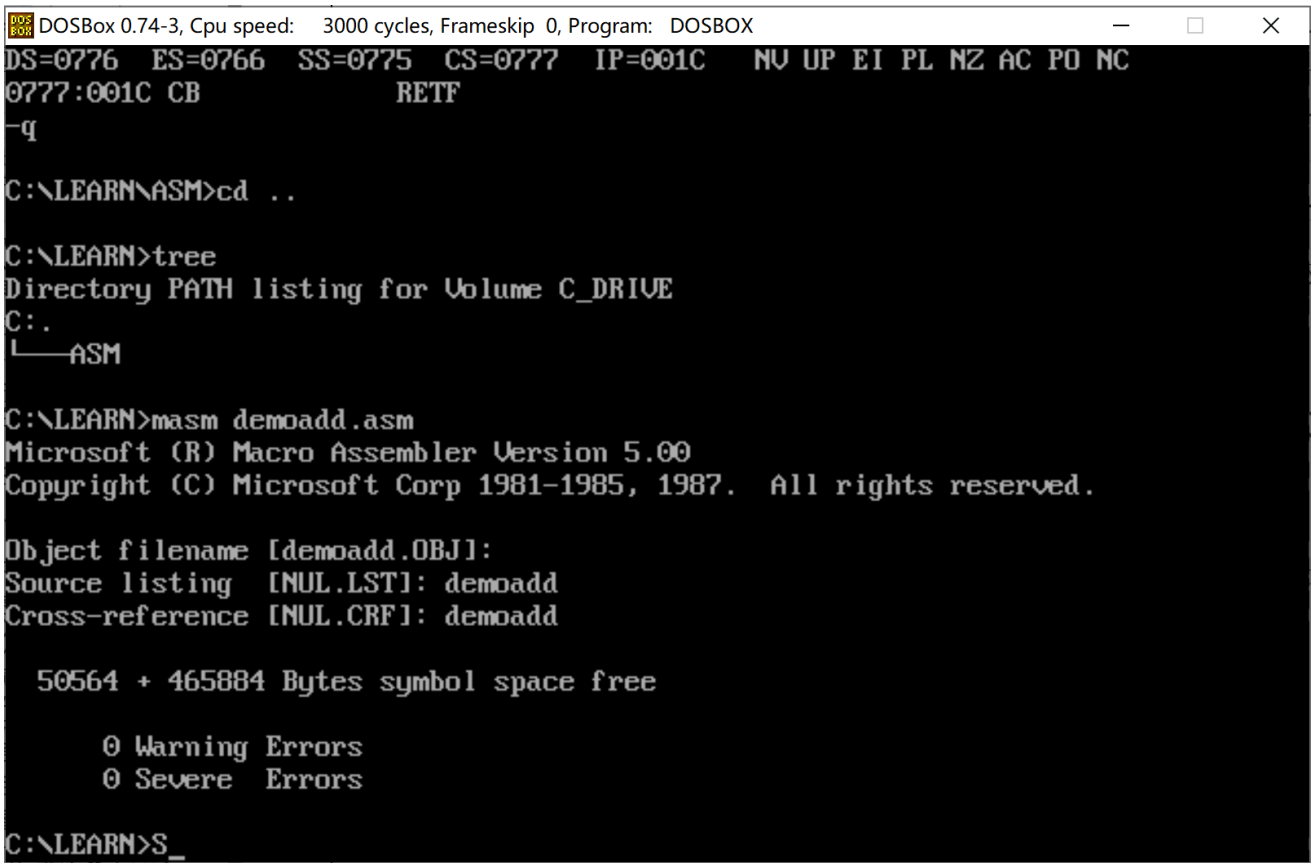
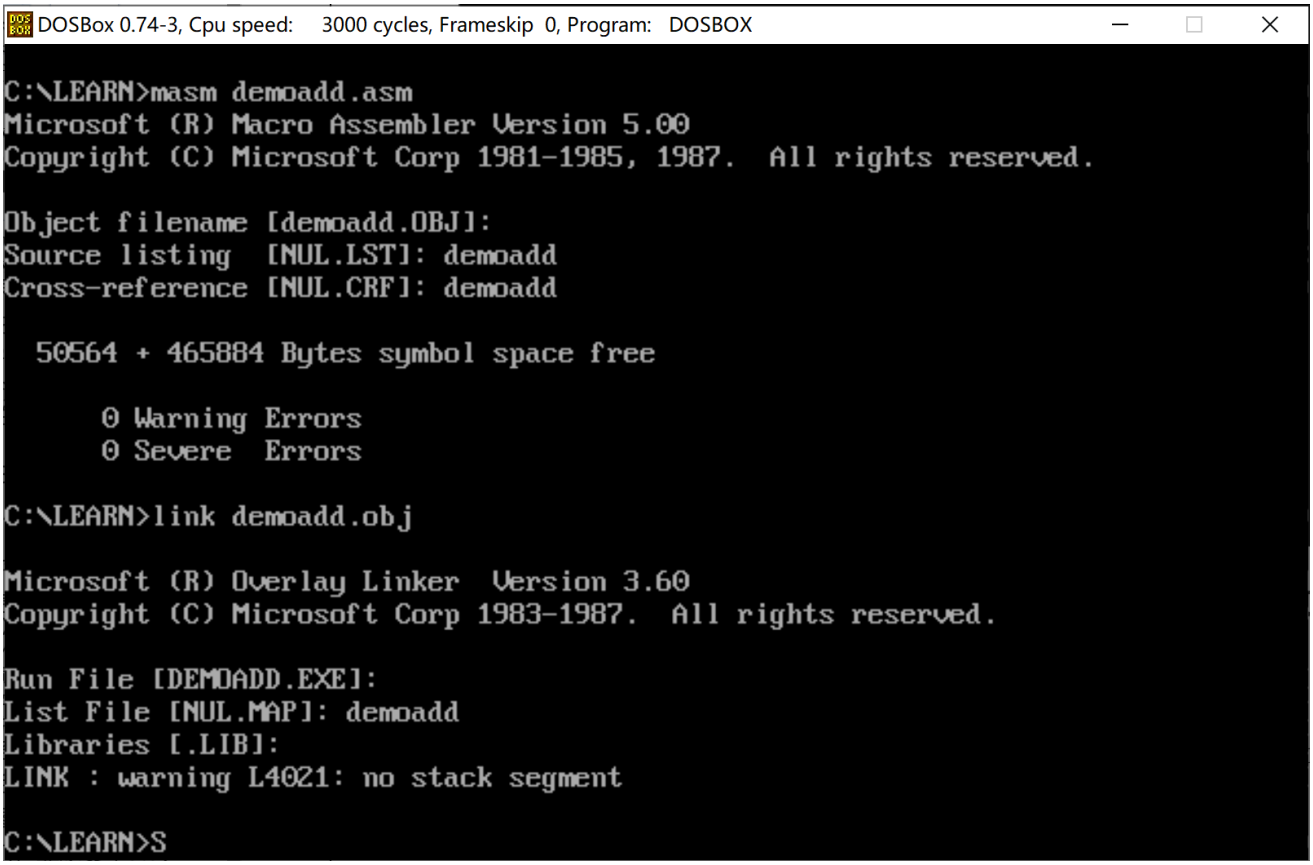
1. 熟悉汇编语言实验环境（`masm`、`link`、`debug`）

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

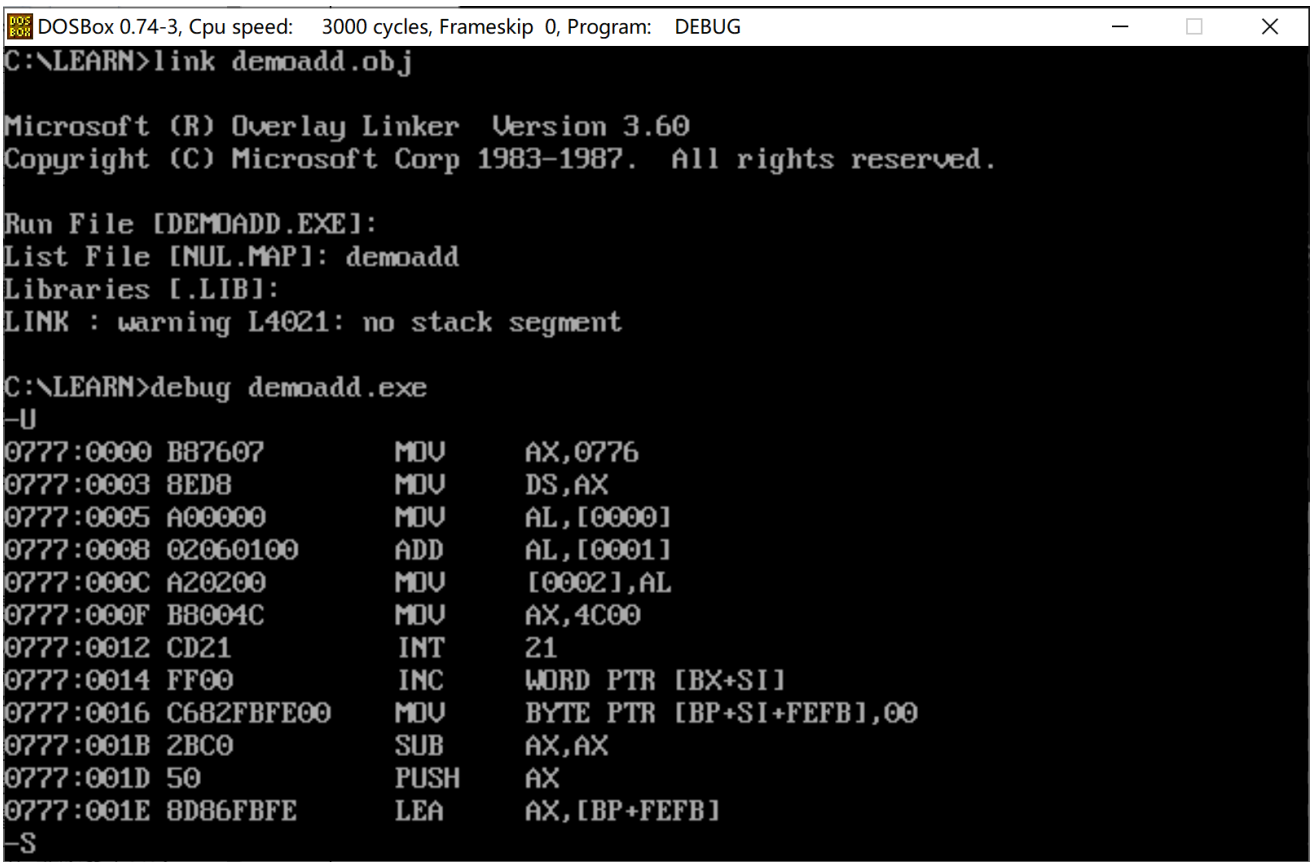


(2) 使用`link`编译`demoadd.obj`，同时生成同名的`.map`文件，给出运行结果截图。

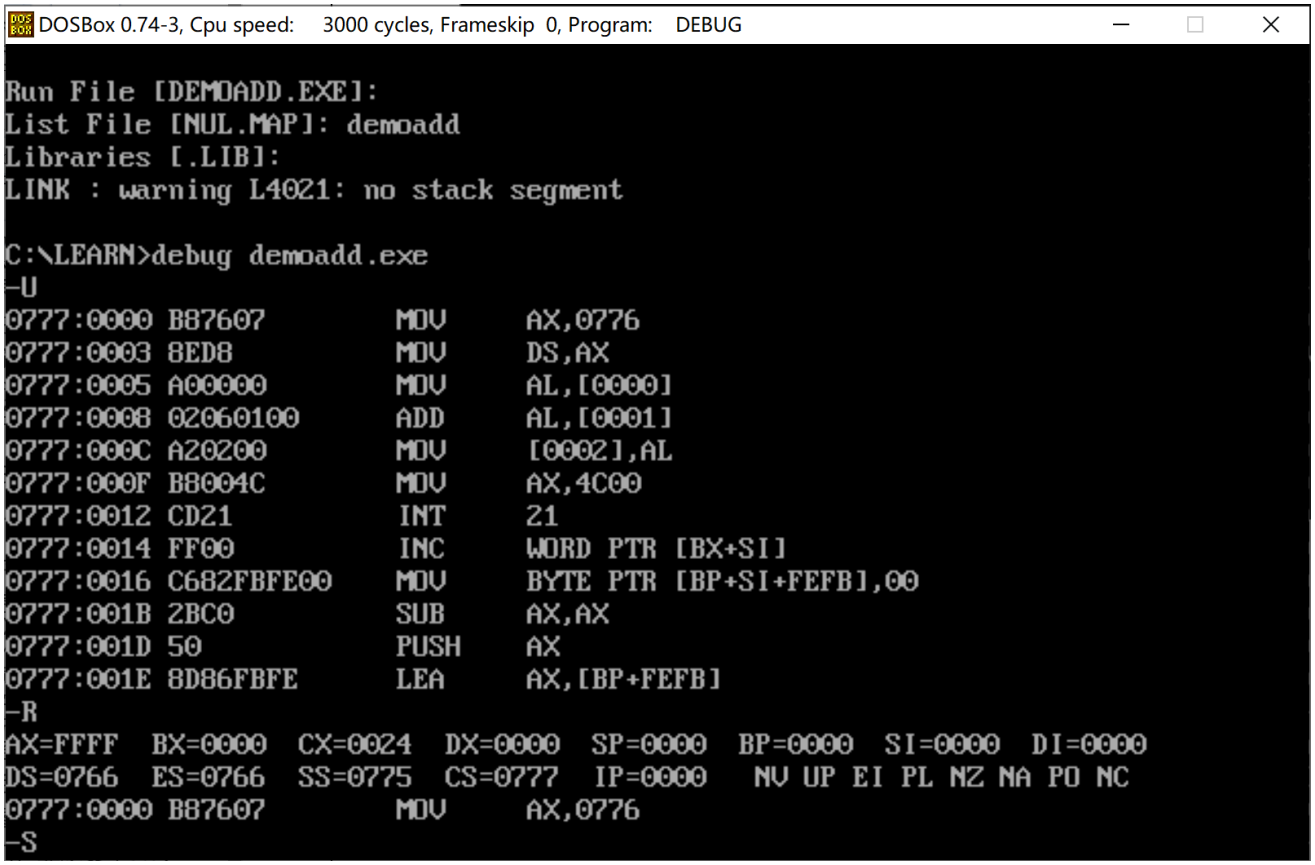


(3) 使用 `debug` 调试 `demoadd.exe`，按下面的要求分别给出结果截图。

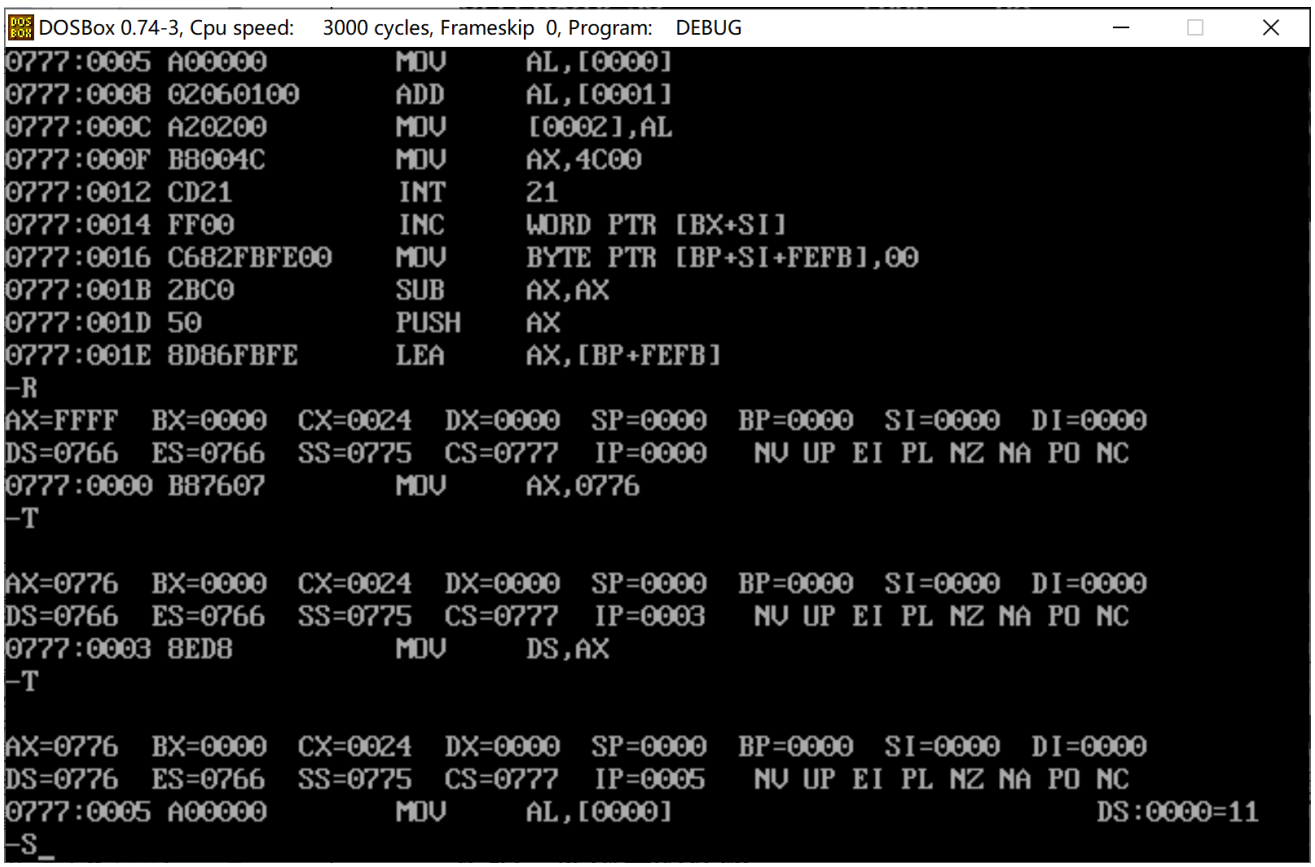
(a) 反汇编指令 `U`



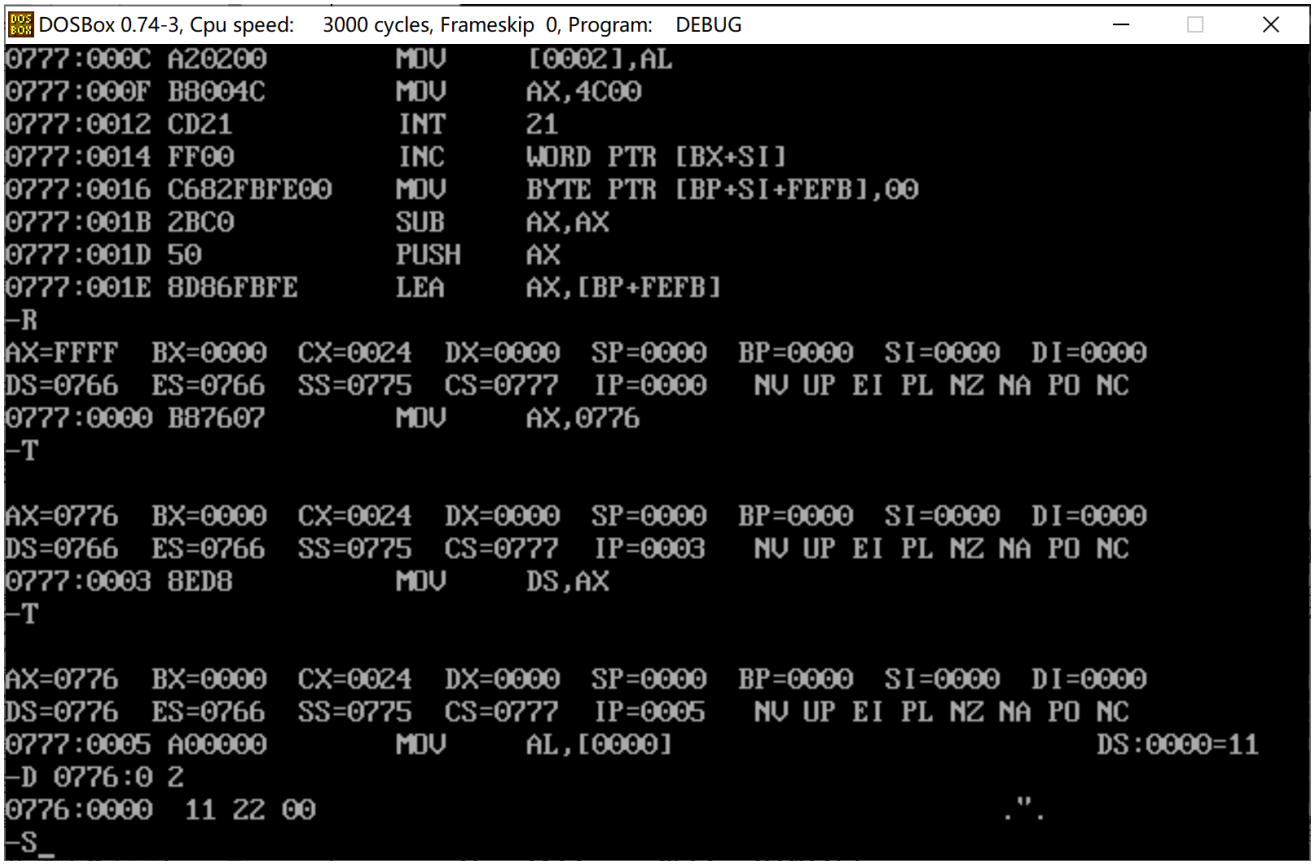
(b) 显示寄存器指令 `R`



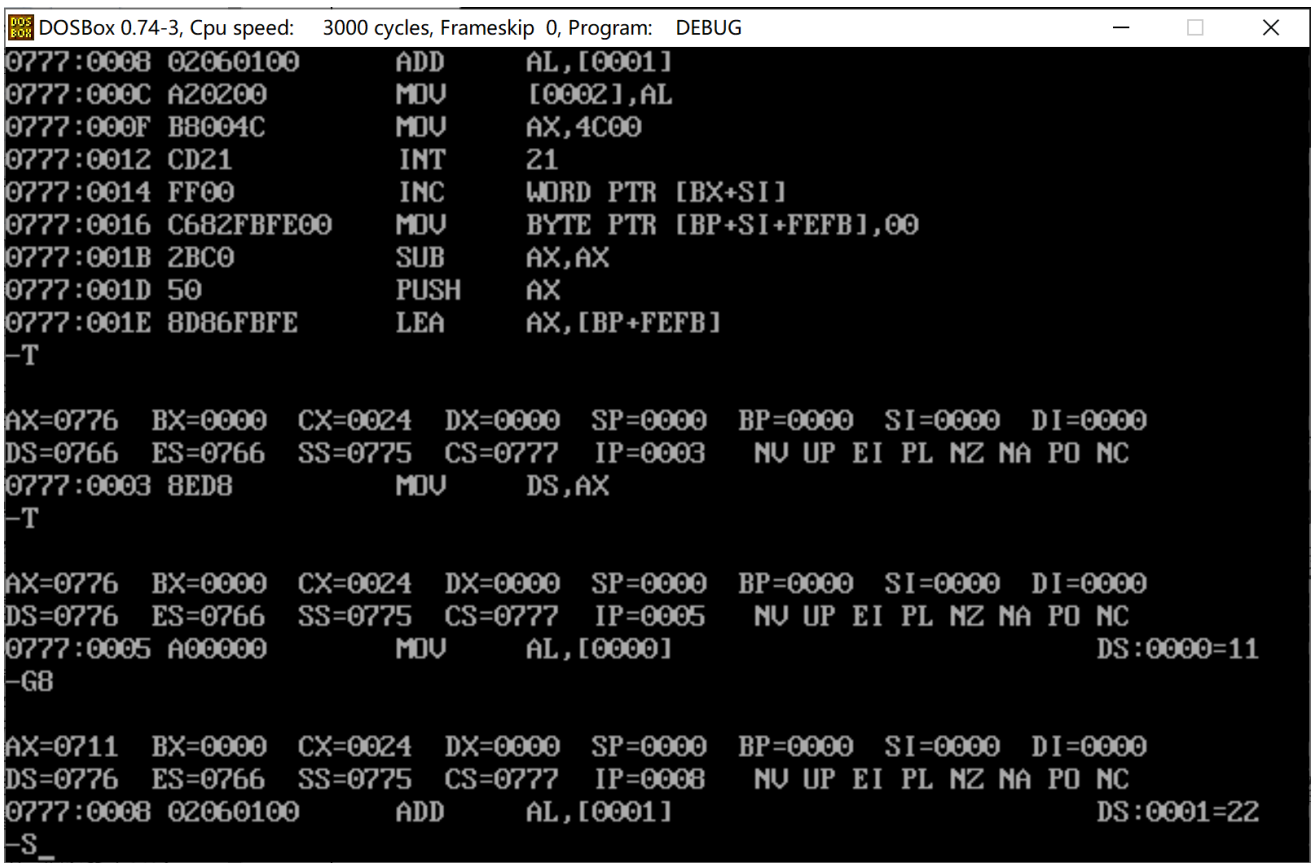
(c) 单步调试指令 `T`，执行2次 `T` 指令后的结果



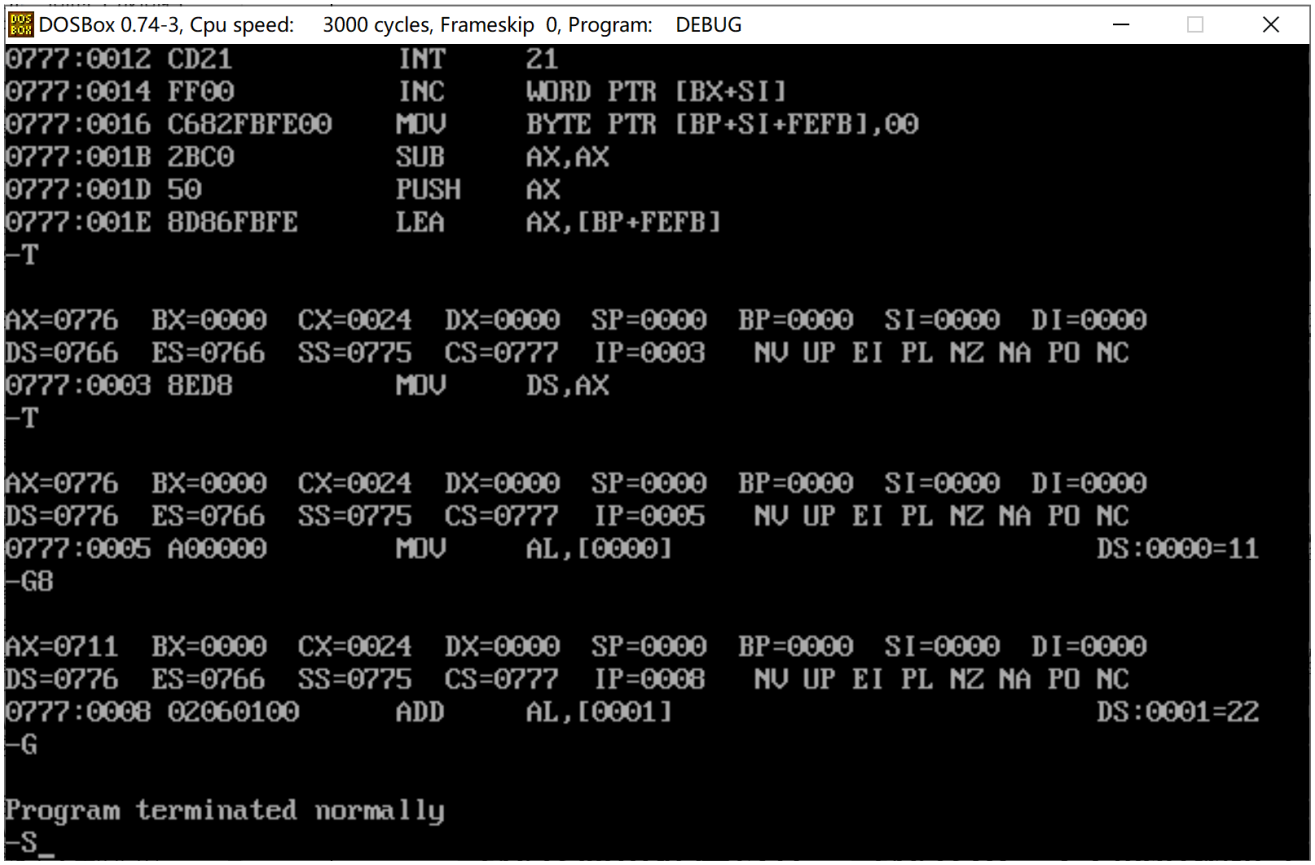
(d) 显示内存指令 `D`，显示 数据段 前3的个字节的内容



(e) 执行程序指令 `G`，运行到 `add al, Y` 行

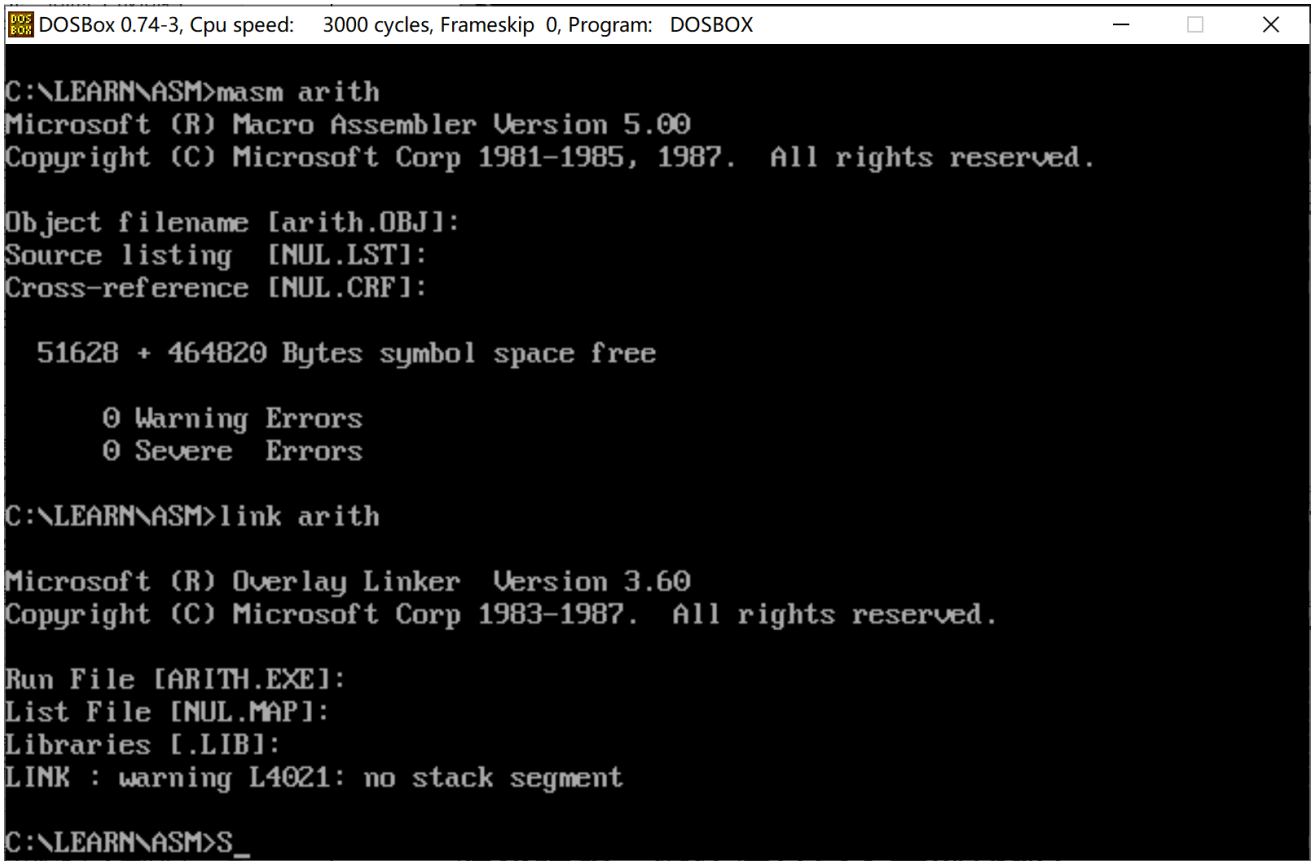


(f) 执行程序指令 `G`

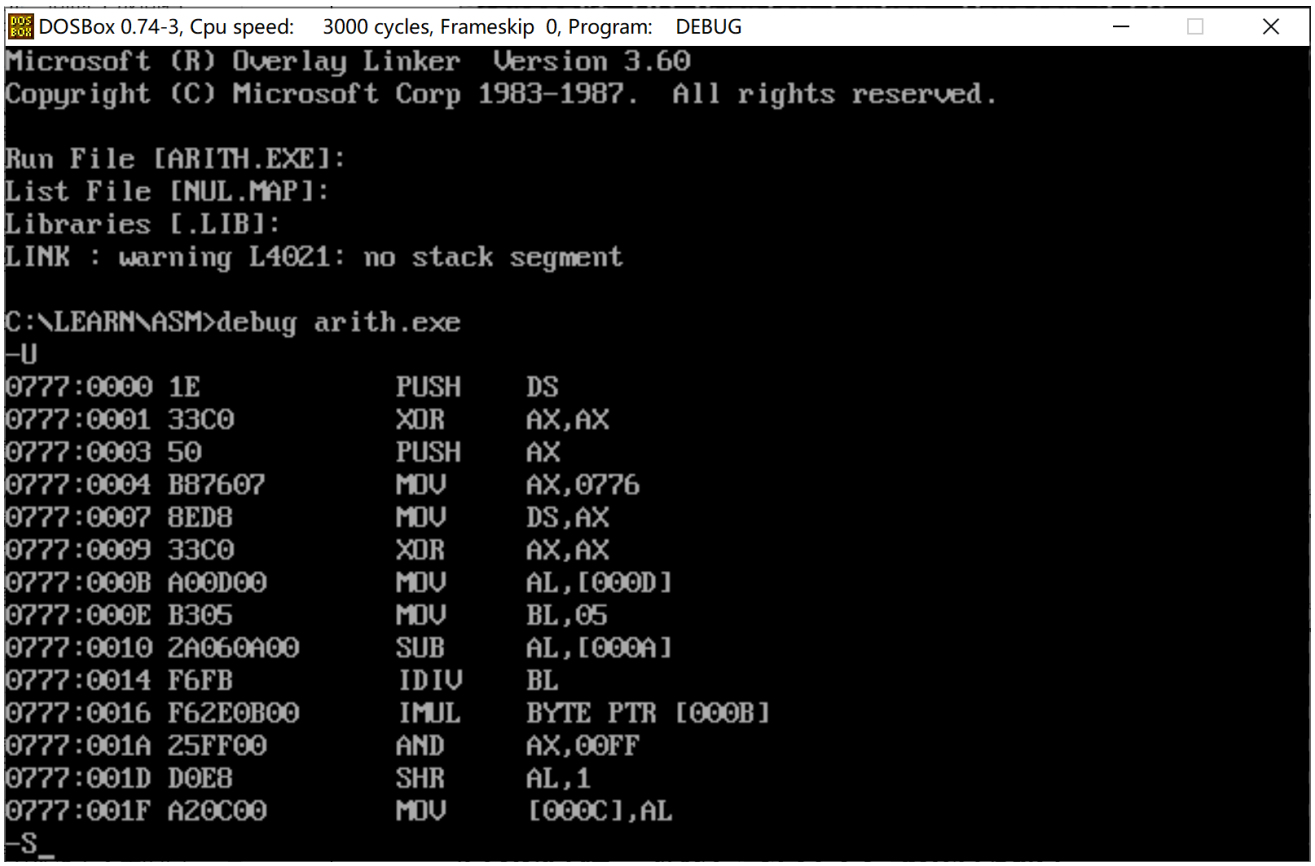


2. 算术指令程序设计。在数据段分别定义stu，X,Y,Z,W变量。其中，将stu初始化为自己的学号，X,Y,W可以任意初始化。截图中stu的初始值和学号不相符的将判定为抄袭。（说明：为简化编程，除法运算后不考虑余数)

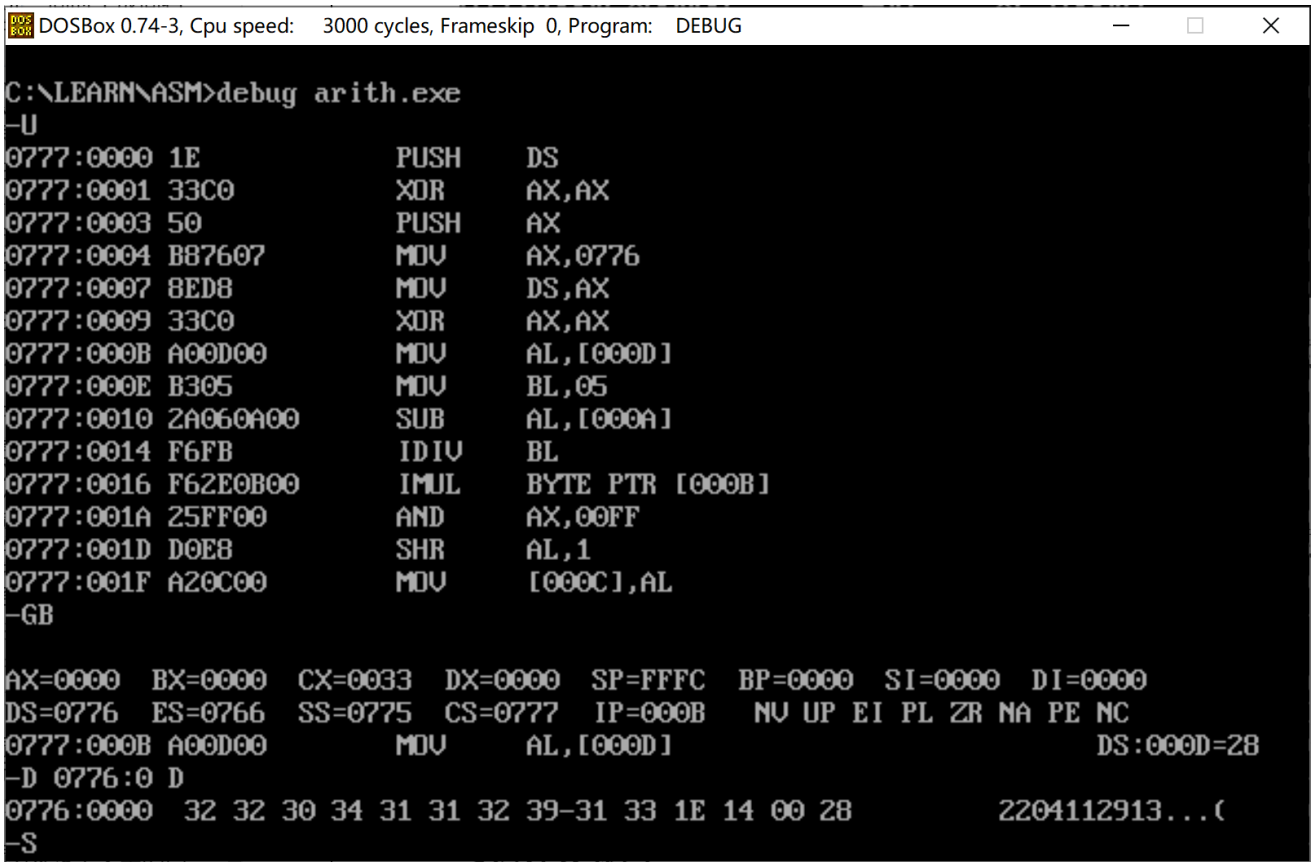
(1) 汇编、连接后的截图


DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX
C:\LEARN\ASM>masm arith
Microsoft (R) Macro Assembler Version 5.00
Copyright (C) Microsoft Corp 1981-1985, 1987. All rights reserved.
Object filename [arith.OBJ]:
Source listing [NUL.LST]:
Cross-reference [NUL.CRF]:
51628 + 464820 Bytes symbol space free
0 Warning Errors
0 Severe Errors
C:\LEARN\ASM>link arith
Microsoft (R) Overlay Linker Version 3.60
Copyright (C) Microsoft Corp 1983-1987. All rights reserved.
Run File [ARITH.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment
C:\LEARN\ASM>S_

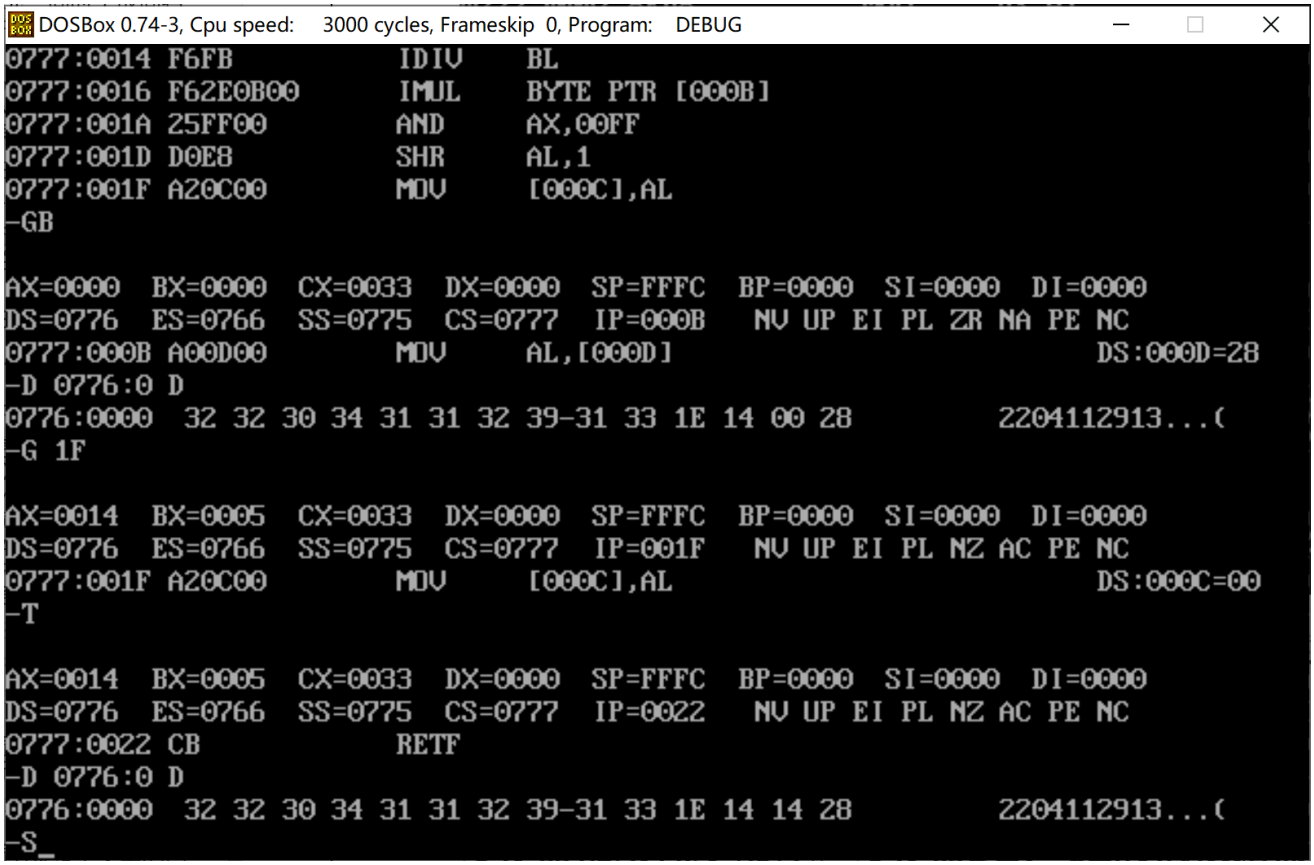
(2) 反汇编的截图


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 [ARITH.EXE]:
List File [NUL.MAP]:
Libraries [.LIB]:
LINK : warning L4021: no stack segment
C:\LEARN\ASM>debug arith.exe
-U
0777:0000 1E PUSH DS
0777:0001 33C0 XOR AX,AX
0777:0003 50 PUSH AX
0777:0004 B87607 MOV AX,0776
0777:0007 8ED8 MOV DS,AX
0777:0009 33C0 XOR AX,AX
0777:000B A00D00 MOV AL,[000D]
0777:000E B305 MOV BL,05
0777:0010 2A060A00 SUB AL,[000A]
0777:0014 F6FB IDIV BL
0777:0016 F62E0B00 IMUL BYTE PTR [000B]
0777:001A 25FF00 AND AX,00FF
0777:001D D0E8 SHR AL,1
0777:001F A20C00 MOV [000C],AL
-S_

(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）



(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）



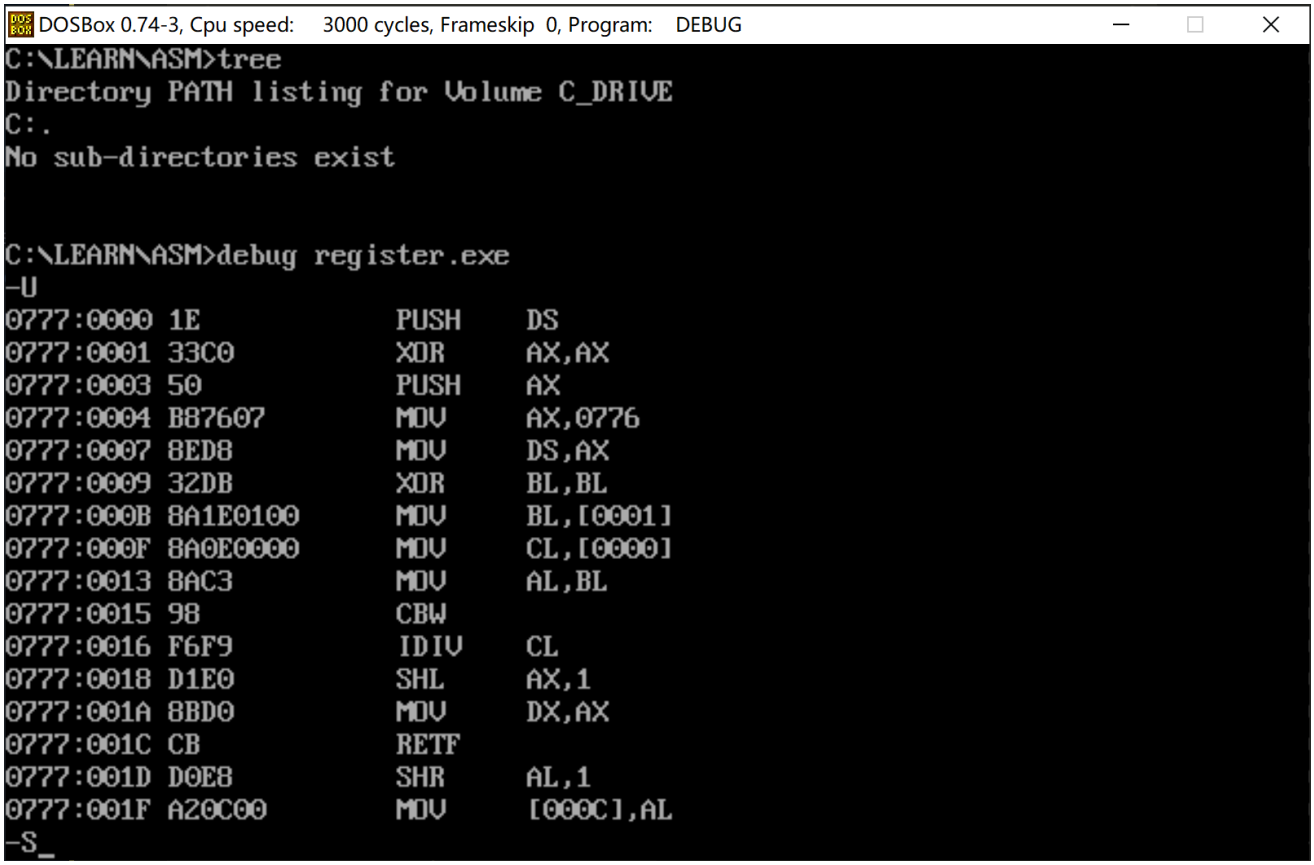
(5) 源代码

```
; Arithmetic Instruction Programming

; Arithmetic instruction programming. Write a complete program to implement
; Z = ( ( W - X ) / 5 * Y ) / 2
; where X, Y, Z, W are all 8-bit signed integers
; (For simplification, remainders are not considered after division)

name arith
title arithematic instruction program design

data segment
    stu db '2204112913'
    X db 30
    Y db 20
    Z db ?
    W db 40
data ends

code segment
    assume cs: code, ds: data

    main proc far
        ; Prepare for return to DOS
        push ds
        xor ax, ax
        push ax
```

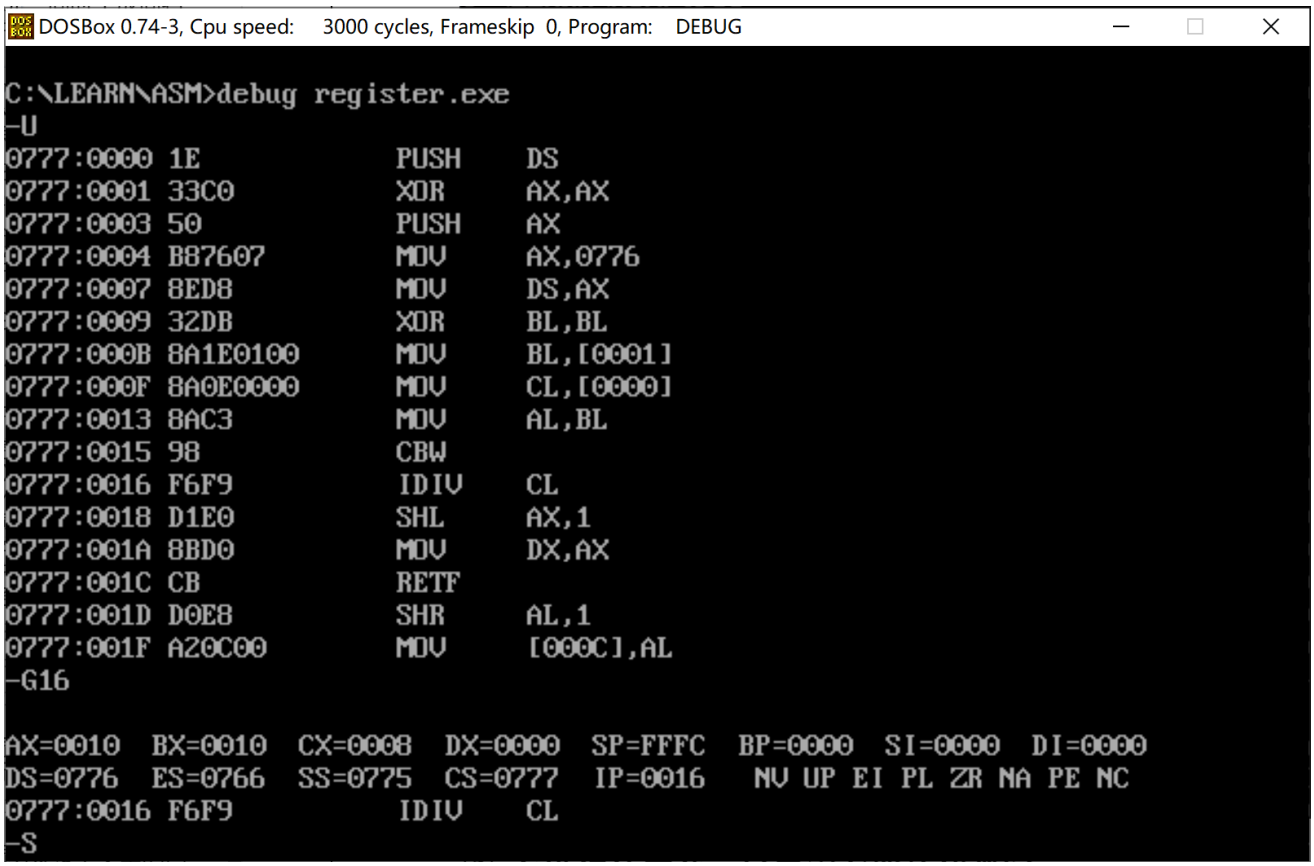
```
        ; Initialize data segment
        mov ax, seg data
        mov ds, ax
        xor ax, ax
        ; Load value to register
        mov al, W
        mov bl, 5
        ; Calculate the result
        sub al, X ; W - X
        idiv bl   ; ( W – X ) / 5
        imul Y    ; ( W – X ) / 5 * Y

        and ax, 00FFh; If consider Overflow???
        shr al, 1 ; ( ( W – X ) / 5 * Y ) / 2
        mov Z, al

        ret
    main endp

code ends
    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）

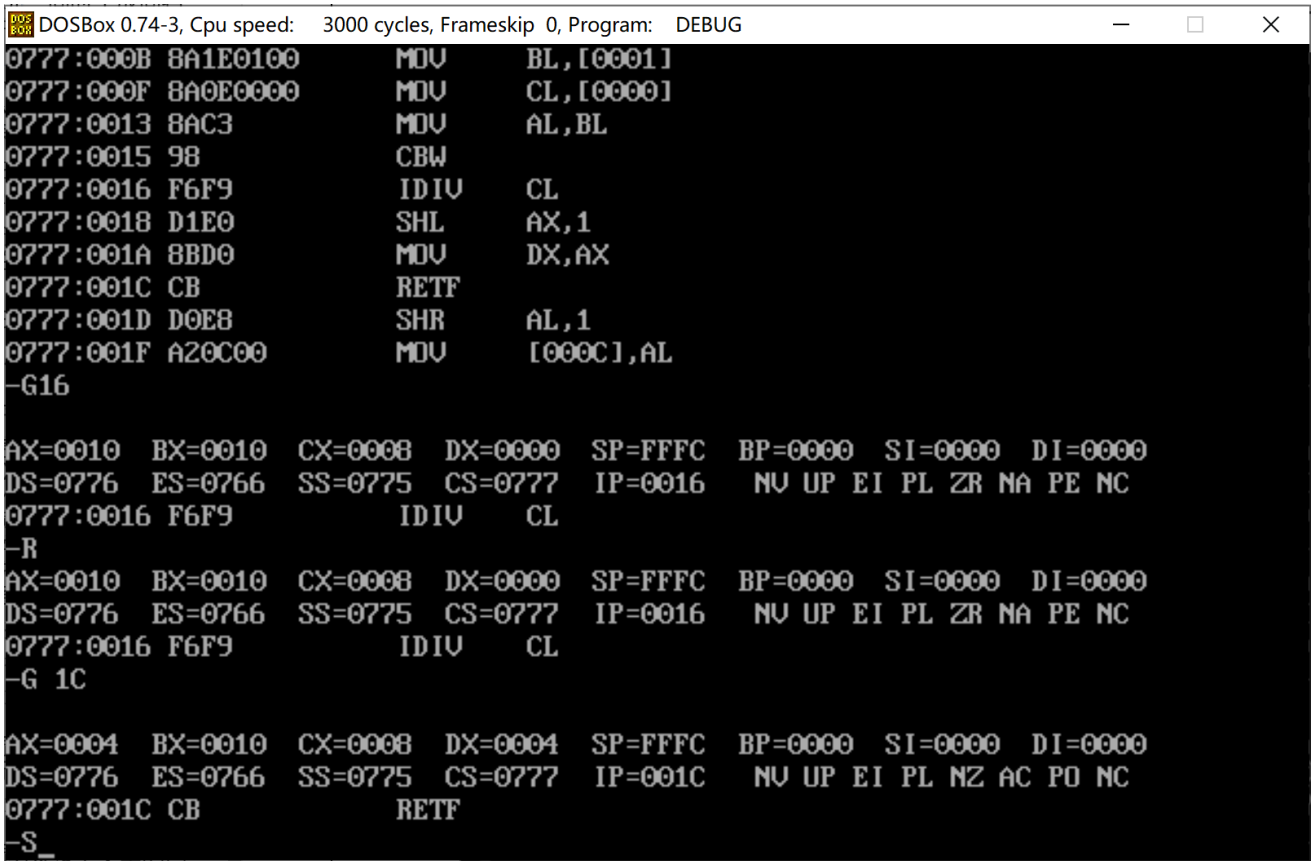
(1) 反汇编的截图



(2) 在进行计算前，显示寄存器的值截图



(3) 执行完计算后，显示寄存器的值截图



(4) 源代码

```
; 寄存器使用程序设计。编写完整程序，
;    要求把BL中的数除以CL中的数，并把其商乘以2，
;    最后结果存入DX寄存器中

; 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）

NAME REGISTER
TITLE arithematic instruction program design


data segment
    cl_number db 8
    bl_number db 16
data ends

code segment
    assume cs: code, ds: data

    main proc far
        ; Prepare for return to DOS
        push ds
        xor ax, ax
        push ax

        ; Initialize data segment
```

```
        mov ax, seg data
        mov ds, ax
        xor bl, bl
        ; Load data
        mov bl, bl_number
        mov cl, cl_number
        ; calcualte
        mov al, bl
        cbw
        idiv cl
        shl ax, 1
        mov dx, ax

        ret
    main endp

code ends
    end main
```