

安徽大学人工智能学院

实验报告



课程名称: 《计算机组成原理与汇编语言》

专 业: 人工智能

学 号: WA2214014

姓 名: 杨跃浙

指导老师: 杜库

实验项目	实验 11-第十一次上机实验			实验次序	11
实验地点	笃行南楼 A104	参与人员	杨跃浙	实验日期	06.19
一、实验目的 汇编语言程序设计					
二、实验环境 Windows 2011, DOSBox					

三、实验内容

1、编制一个程序把 BX 寄存器内的二进制数用十进制的形式在屏幕上显示出来。

思路： 将 bx 中的内容 mov 到 ax，分别除 10000，1000，100，10，将商放到 data segment 存起来，将余数放回 ax 继续除，直到余数为一位数，再将 data segment 的数顺序打印出来。

Datas segment

decnum db 5 dup(?)

Datas ends

Code segment

assume cs:Code,ds:Datas

start:

....

Code ends

end start

```

1  Datas segment
2      decnum db 5 dup(?)
3  Datas ends
4
5  Code segment
6      assume cs:Code, ds:Datas
7
8  start:
9      mov ax, Datas
10     mov ds, ax
11     mov bx, 10111100B
12     mov ax, bx
13     mov cx, 10
14     mov si, 4
15
16  convert_loop:
17     xor dx, dx
18     div cx
19     add dl, '0'
20     mov [decnum + si], dl
21     dec si
22     cmp ax, 0
23     jne convert_loop
24
25     mov si, 0
26
27  print_loop:
28     mov ah, 0Eh
29     mov al, [decnum + si]
30     int 10h
31     inc si
32     cmp si, 5
33     jne print_loop
34
35     mov ah, 4Ch
36     int 21h
37
38  Code ends
39  end start
40

```

```

1 Datas segment
2   decnum db 5 dup(?)
3 Datas ends
4
5 Code segment
6   assume cs:Code, ds:Datas
7
8 start:
9   mov ax, Datas
10  mov ds, ax
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17  xor dx, dx
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19  add dl, '0'
20  mov [decnum + si], dl
21  dec si
22  cmp ax, 0
23  jne convert_loop
24
25  mov si, 0
26
27 print_loop:
28  mov ah, 0Eh
29  mov al, [decnum + si]
30  int 10h
31  inc si
32  cmp si, 5
33  jne print_loop
34
35

```

```

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

Object filename [11_1.OBJ]:
Source listing [NUL.LST]:
Cross-reference [NUL.CRF]:

51602 + 464942 Bytes symbol space free

0 Warning Errors
0 Severe Errors

C:\>link 11_1.obj

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

Run File [11_1.EXE]:
List File [NUL.LIB]:
Libraries [L.LIB]:
LINK : warning L4021: no stack segment

C:\>11_1.exe
100
C:\>

```

2、分支程序设计

1. 设有 10 个学生的成绩分别是 76, 69, 84, 90, 73, 88, 99, 63, 100 和 80 分。试编制一个程序统计 60~69 分, 70~79 分, 80~89 分, 90~99 分和 100 分的人数, 分别存放到 S6, S7, S8, S9 和 S10 单元中。

Datas segment

STU db 76,69,84,90,73,88,99,63,100,80

S6 db 0

S7 db 0

S8 db 0

S9 db 0

S10 db 0

Datas ends

Code segment

assume ds:Datas,cs:Code

start:

...

Code ends

end start

```

1  Datas segment
2      STU db 76,69,84,90,73,88,99,63,100,80
3      S6 db 0
4      S7 db 0
5      S8 db 0
6      S9 db 0
7      S10 db 0
8  Datas ends
9
10 Code segment
11     assume ds:Datas,cs:Code
12
13 start:
14     mov ax, Datas
15     mov ds, ax
16
17     mov cx, 10
18     mov si, 0
19
20 scores:
21     mov al, [STU + si]
22     cmp al, 60
23     jl next
24
25     cmp al, 70
26     jl s6_case
27     cmp al, 80
28     jl s7_case
29     cmp al, 90
30     jl s8_case
31     cmp al, 100
32     jl s9_case
33     je s10_case
34
35 s6_case:
36     inc S6
37     jmp next
38
39 s7_case:
40     inc S7

```

```

41     jmp next
42
43 s8_case:
44     inc S8
45     jmp next
46
47 s9_case:
48     inc S9
49     jmp next
50
51 s10_case:
52     inc S10
53     jmp next
54
55 next:
56     inc si
57     loop scores
58
59     mov ah, 4Ch
60     int 21h
61
62 Code ends
63 end start
64

```

The screenshot shows a Windows desktop with two windows. The background window is Notepad++ editing a file named 'E:\MASM\11_2.asm'. The code in the file is as follows:

```

1  Datas segment
2      STU db 76,69,84,90,73,88,99,63,100,80
3      S6 db 0
4      S7 db 0
5      S8 db 0
6      S9 db 0
7      S10 db 0
8  Datas ends
9
10 Code segment
11     assume ds:Datas,cs:Code
12
13 start:
14     mov ax, Datas
15     mov ds, ax
16
17     mov cx, 10
18     mov si, 0
19
20 scores:
21     mov al, [STU + si]
22     cmp al, 60
23     jl next
24
25     cmp al, 70
26     jl s6_case
27     cmp al, 80
28     jl s7_case
29     cmp al, 90
30     jl s8_case
31     cmp al, 100
32     jl s9_case
33     je s10_case
34

```

The foreground window is a debugger (likely OllyDbg) showing the memory dump of the program. The memory address 076A:0000 is highlighted, showing the following hex values: 4C 45 54 5A 49 58 63 3F 64 50 82 82 83 82 81 00. The corresponding ASCII values are: .j... .11_2.exe... .<15<F1.<P1.<Z1.< d1.t... .F...L.* .0P...RP..H. .P...P..s....

3、以 T 为首地址定义 10 个带符号数（补码），将负数去掉，正数按原序排列，

并显示正数。

思路：如果一个长度为一个字节的十六进制数高位为大于 9 的数，那这个数就是负数，所以遍历整个数组，判断每个十六进制数的高位大小，跳过负数，输出正数。

Data segment

```
num db 0AAH,01H,02H,0ABH,03H,04H,05H,06H,07H,0FFH
```

```
count db 10
```

Data ends

Code segment

```
assume cs:Code,ds:Data
```

start:

```
...
```

Code ends

```
end start
```

```
1 Data segment
2     num db 0AAH,01H,02H,0ABH,03H,04H,05H,06H,07H,0FFH
3     count dw 10
4 Data ends
5
6 Code segment
7     assume cs:Code, ds:Data
8
9 start:
10    mov ax, Data
11    mov ds, ax
12
13    mov cx, count
14    mov si, 0
15
16 positive:
17    mov al, [num + si]
18    test al, 80H
19    jnz skip
20
21    mov ah, 0Eh
22    add al, '0'
23    int 10h
24
25 skip:
26    inc si
27    loop positive
28
29    mov ah, 4Ch
30    int 21h
31
32 Code ends
33 end start
34
```


