Homework4

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Q1(1)

Assume we have following address binding table and value of registers :

Address	Value	Register	Value
0x100	0x10	%eax	0x10
0x110	0x11	%ebx	0x100
0x120	0x12		
...	...	...	...
0x190	0x19		
0x200	0x20		

Answer1(1)

Please fill in the table below

Operand	Value
%ebx	0x100
$0x150	0x150
0x170	0x17
(%ebx)	0x10
(%ebx,%eax)	0x11
0x30(%ebx)	0x13
80(%ebx,%eax,2)	0x17

思路

1.%ebx=0x100,[0x100]=0x10 2.(%ebx,%eax)=[0x100+0x10]=[0x110]=0x11 3.0x30(%ebx)=[0x100+0x30]=[0x130]=0x13 4.80=0x50,80(%ebx,%eax,2)=[0x50+0x100+0x10*2]=[0x170]=0x17

Q1(2)

Suppose registers and bound values will be reset as above after each instruction. Please fill in the table below: (Write all if there are more than one destinations and None if there is no destination)

Answer1(2)

Instruction	Destination	Value
addl %eax,%ebx	%ebx	0x110
subl %eax,(%ebx)	0x100	0
leal 0x50(%eax), %edx	%edx	0x60
movzbl %al, %ebx	%ebx	0x10
movsbl %bh, %ecx	%ecx	0x01

Q1(3)

Assume the initial value of the flags is 0. Fill the table below

Answer1(3)

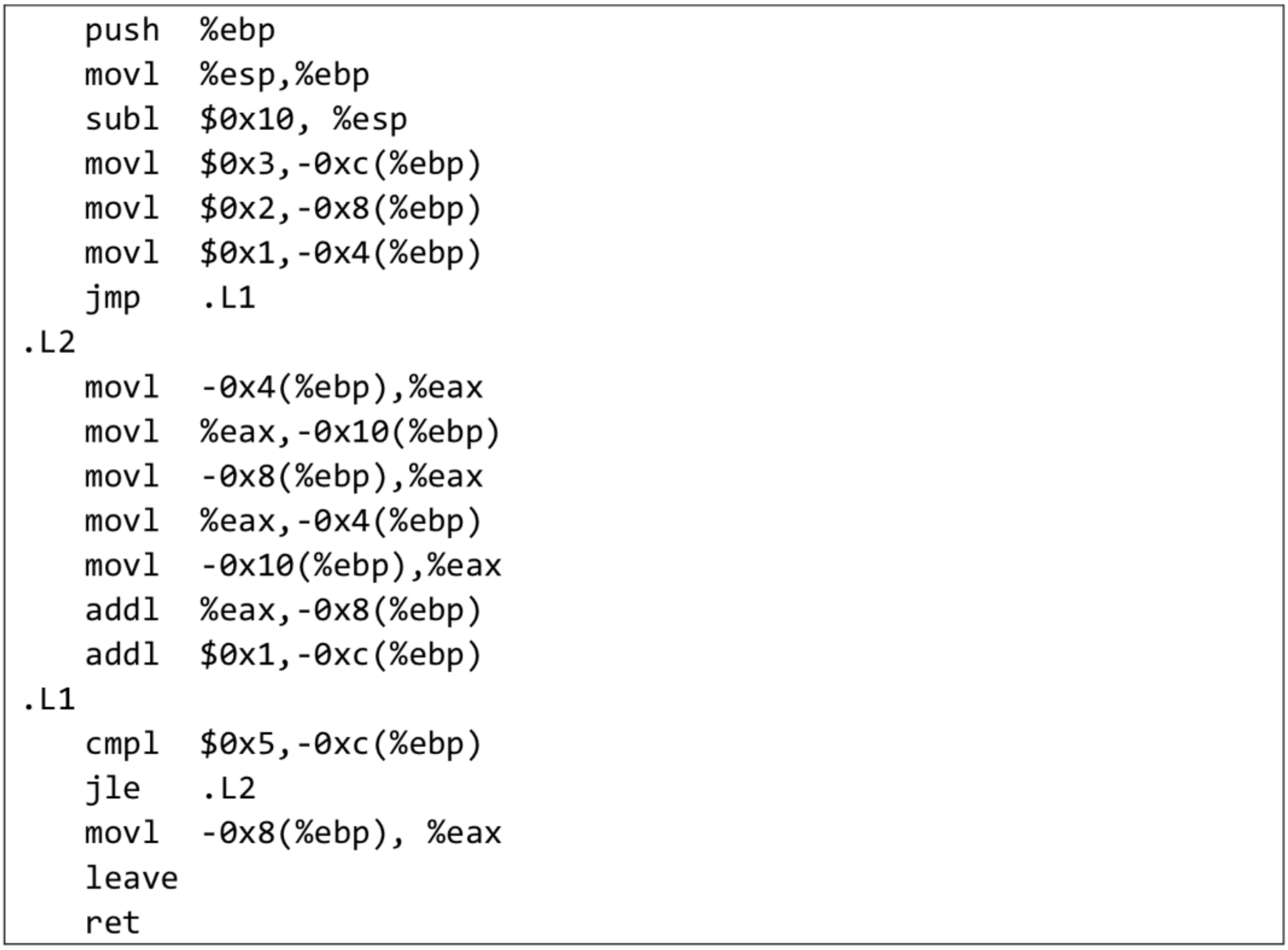
Instruction	OF	SF	ZF	CF
leal(%eax),%ebx	0	0	0	0
subl %ebx, %eax	0	0	1	0
xorl %eax, %eax	0	0	1	0
test %eax, %ebx	0	0	1	0

思路

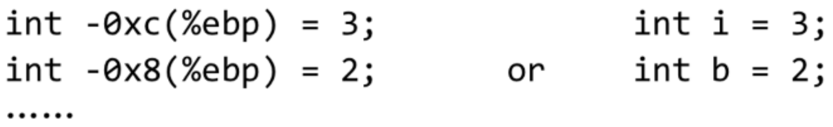
1.leal不改变标志，但使%ebx=0x10。所以都为0。 2.subl操作使得%eax=0x10-0x10=0,所以ZF=1，其它为0。 3.由于x^x=0,所以%eax=0,所以ZF=1，其它为0。 4.由于%eax&%ebx=0,所以ZF=1，其它为0。

Q2

- Translate the following assembly into C codes.
- You can name local variables represented by -12(%ebp), -8(%ebp)...or a,b,c... freely as you like.
- The beginning of C codes is given.



```
    push  %ebp
    movl  %esp,%ebp
    subl  $0x10, %esp
    movl  $0x3,-0xc(%ebp)
    movl  $0x2,-0x8(%ebp)
    movl  $0x1,-0x4(%ebp)
    jmp   .L1
.L2
    movl  -0x4(%ebp),%eax
    movl  %eax,-0x10(%ebp)
    movl  -0x8(%ebp),%eax
    movl  %eax,-0x4(%ebp)
    movl  -0x10(%ebp),%eax
    addl  %eax,-0x8(%ebp)
    addl  $0x1,-0xc(%ebp)
.L1
    cmpl  $0x5,-0xc(%ebp)
    jle   .L2
    movl  -0x8(%ebp), %eax
    leave
    ret
```



```
int -0xc(%ebp) = 3;            int i = 3;
int -0x8(%ebp) = 2;      or    int b = 2;
......
```

Answer2

```
()
{
    int i=3;
    int b=2;
    int a=1;
    while(i<<5){
        int d=a;
        a=b;
        b=b+d;
        i++;
    }
    return b;
}
```

解释

1.一开始我是逐行对应C代码，得如下：

```
-0x10(%ebp)=d;
-0xc(%ebp)=i;
-0x8(%ebp)=b;
-0x4(%ebp)=a;
%eax=val;
(){
    int i=3;
    int b=2;
    int a=1;
    int val;
    while(i<<5){
        val=a;
        d=val;
        val=b;
        a=val;
        val=d;
        b=b+val;
        i++;
    }
    val=b;
    return val;
}
```

二.1.发现在很多情况下，val只起到一个中间变量的作用。 像:

```
1. val=a;
    d=val;

2.  val=b;
    a=val;

3.  val=d;
    b=b+val;
```

2.同时紧接者val变量又会被赋予另一个值，也就因为者val的值不会被之后的过程需要。 3.因而，可以直接合并。