评阅教师	得分

三、stack discipline（本大题共 13 分）。

Consider the following C code and assembly code for two mutually recursive functions:

```
int even(unsigned int n)
{
    if(!n)
    {
        return 1;
    }

    return odd(n - 1);
}
```

```
0x080483e4 <even+0>:    push   %ebp
0x080483e5 <even+1>:    mov    %esp,%ebp
0x080483e7 <even+3>:    sub    $0x8,%esp
0x080483ea <even+6>:    cmpl   $0x0,0x8(%ebp)
0x080483ee <even+10>:   jne    0x80483f9 <even+21>
0x080483f0 <even+12>:   movl   $0x1,-0x4(%ebp)
0x080483f7 <even+19>:   jmp    0x804840a <even+38>
0x080483f9 <even+21>:   mov    0x8(%ebp),%eax
0x080483fc <even+24>:   sub    $0x1,%eax
0x080483ff <even+27>:   mov    %eax,(%esp)
0x08048402 <even+30>:   call   0x804840f <odd>
0x08048407 <even+35>:   mov    %eax,-0x4(%ebp)
0x0804840a <even+38>:   mov    -0x4(%ebp),%eax
0x0804840d <even+41>:   leave
0x0804840e <even+42>:   ret
```

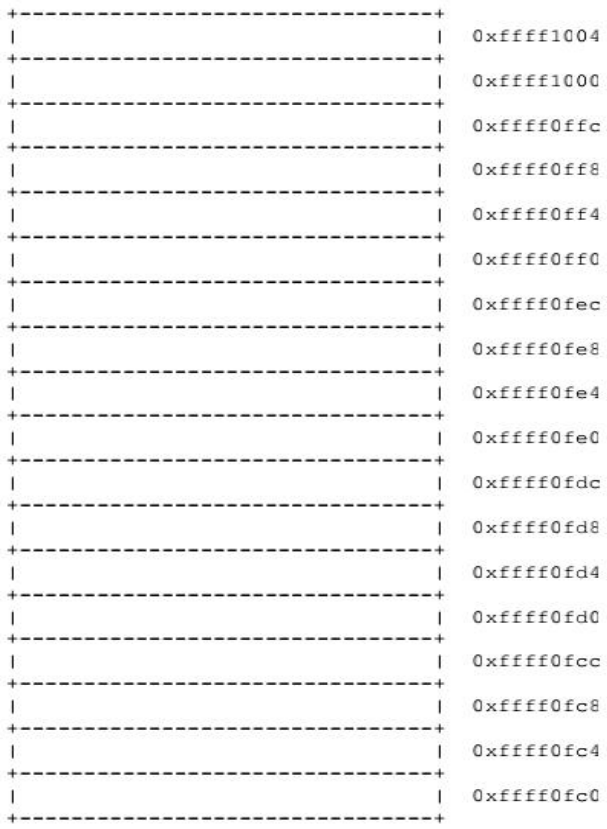
```
int odd(unsigned int n)
{
    if(!n)
    {
        return 0;
    }

    return even(n - 1);
}
```

```
0x0804840f <odd+0>:     push   %ebp
0x08048410 <odd+1>:     mov    %esp,%ebp
0x08048412 <odd+3>:     sub    $0x8,%esp
0x08048415 <odd+6>:     cmpl   $0x0,0x8(%ebp)
0x08048419 <odd+10>:    jne    0x8048424 <odd+21>
0x0804841b <odd+12>:    movl   $0x0,-0x4(%ebp)
0x08048422 <odd+19>:    jmp    0x8048435 <odd+38>
0x08048424 <odd+21>:    mov    0x8(%ebp),%eax
0x08048427 <odd+24>:    sub    $0x1,%eax
0x0804842a <odd+27>:    mov    %eax,(%esp)
0x0804842d <odd+30>:    call   0x80483e4 <even>
0x08048432 <odd+35>:    mov    %eax,-0x4(%ebp)
0x08048435 <odd+38>:    mov    -0x4(%ebp),%eax
0x08048438 <odd+41>:    leave
0x08048439 <odd+42>:    ret
```

Imagine that a program makes the procedure call **even(3)**. Also imagine that prior to the invocation, the value of ESP is 0xffff1000 - that is, 0xffff1000 is the value of ESP immediately before the execution of the **call** instruction.

1. Note the the call even(3) will result in the following function invocations: even(3) odd(2), even(1), and odd(0). Full in the stack diagram with the values that would be present immediately before the execution of the ret instruction for odd(0). Cross out each blank for which there is insufficient information to complete.



2. What are the values of ESP and EBP immediately before the execution of the ret instruction for odd(0)?

ESP= _____

EBP=_____

如果是你出题呢?