CIS 2107. Quiz 5a Solutions. Name:

The quiz is out of 15 points. There are 2 pages.

1. **Move and Load Effective Address Instructions** What value would be stored in register `%ebx` after each of the following operations?

   (a) 1 point  
   ```
   movl 0x10C, %ebx
   ```  
   (a) 0x100

   (b) 1 point  
   ```
   movl $0x10C, %ebx
   ```  
   (b) 0x10C

   (c) 1 point  
   ```
   movl %eax, %ebx
   ```  
   (c) 0x100

   (d) 1 point  
   ```
   movl (%eax), %ebx
   ```  
   (d) 0x86

   (e) 1 point  
   ```
   movl 4(%eax), %ebx
   ```  
   (e) 0x2C

   (f) 1 point  
   ```
   leal 4(%eax), %ebx
   ```  
   (f) 0x104

   (g) 1 point  
   ```
   movl 8(%eax, %ecx, 4), %ebx
   ```  
   (g) 0x100

   (h) 1 point  
   ```
   leal 8(%eax, %ecx, 4), %ebx
   ```  
   (h) 0x10C

   (i) 1 point  
   ```
   leal 8(, %ecx, 4), %ebx
   ```  
   (i) 12
2. Consider the following C code.

```c
int fa(int A[], int len, int c) {
    int i, old_sum=0;
    for (i=0; i<len; i++) {
        old_sum+=A[i];
        A[i]+=c;
    }
    return old_sum;
}
```

which, when compiled is translated to the following assembly:

```assembly
.type fa, @function
fa:
pushl %ebp
movl %esp, %ebp
...
/* several other lines here */
...
movl %ebp, %esp
popl %ebp
ret
```

(a) During most of `fa`, i.e., after the mov instruction in the 2nd line of the function, but before the pop instruction at the end, the value stored in ebp is 0xFFFFD500. If it can be determined based on the information given, what is stored at each of the given addresses. If it cannot be determined, write can't tell?

i. 1 point 0xFFFFD500?  
   i. old ebp

ii. 1 point 0xFFFFD504?  
    ii. return address

iii. 1 point 0xFFFFD508?  
    iii. A, i.e &A[0]

iv. 1 point 0xFFFFD50C?  
    iv. len

v. 1 point 0xFFFFD510?  
    v. c

(b) 1 point We see the function is returning a sum. Where exactly is this stored so that it can later be read by the caller?

(b) EAX/RAX