Recitation 9 Practice Solution - Computer Organization, Fall 2013

1. Translate the following “C” code to assembly.

```
void mp(int old, int *new)

{

int t1=32, t2=-23;

int tmp;

tmp = old+t2;

*new=old*t1;

}
```

Sol:

```
push %ebp
mov %esp, %ebp
subl $12,%esp
movl $32, -4(%ebp)
movl $-23,-8(%ebp)
movl 12(%ebp),%edx
movl 8(%ebp),%ecx
movl -8(%ebp),%eax
addl %ecx,%eax
movl %eax,-12(%ebp)
movl -4(%ebp),%eax
imull %ecx, %eax
movl %eax,(%edx)
leave
ret
```

2. Assuming your machine uses 8 bit 2’s complement for integer representation. Indicate the flags that will be set (if any) in the operations for the following values of “old”.

a. -32

b. 114

c. -114.

Sol:

SF is 1 when the sign is'-'. OF, the overflow flag is set when changing the number from positive to negative. OF is set if the high bit changes. CF is set if a '1' bit moves off the left end of the register.

t2 in 8 bit 2’s complement is 1110 1001

a. -32 in 8 bit 2’s complement is 1110 0000

tmp = 1100 1001, with a carry CF=1, ZF=0, SF=1, OF =0

b. 114 is 0111 0010, temp=0101 1011 with a carry CF=1, ZF=0, SF=0, OF=0

c. -114 is 10001110, temp=01110111 with a carry, CF=1, ZF=0,SF=0,OF=1

(try to do the same with multiplication at home)