1. (5 points) What expression (in terms of a, b, c and constants) does this compute and put int $t3? Show your work by writing the contents of the register changed after each instruction. (Assume $a=$t0, $b=$t1, $c=$t2)

Solution:

add $t3, $t0, $t1  #$t3=a+b
addi $t3, $t3, -1  #$t3=a+b-1
sll $t3, $t3, 2  #$t3=4(a+b-1)
add $t4, $t3, 0x1  #t4=0 (because $t3 is a multiple of 4 and hence even)
beq $t4, $zero else  #go to else
sub $t3, $t3, $t2  #skip
else:
add $t3, $t3, $t2  #$t3=4(a+b-1)+c
exit:
addiu $t3, $t3, 4.  #$t3=4(a+b-1)+c+4

2. (5 points) Translate the C code given below to MIPS assembly code. Assume that the value a,b,i,j are in the registers $s0, $s1, $t0, $t1 respectively. Also, assume that registers $s2 holds the base address of the integer array D (each integer takes 4 bytes). Comment your MIPS code to indicate what each line does.

Solution:

addi $s0, $0, 1
forLoop: slti $t2, $s0, 10
    beq $t2, $0, endfor

    add $t3, $s0, $s1
    sll $t4, $s0, 2 (1 pt)
    add $t4, $t4, $s2

    sw $t3, 0($t4)

    addi $s0, $s0, 2
    j forLoop
endfor:

(Note: s0=1, 3, 5, 7, 9)