CMPT 295 Assignment 2

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1. Binary Conversions



a)



* + 1. 10610 = 64 + 32 + 8 + 2 = 26 + 25 + 23+ 21 = 0110 10102 = 6A16



* + 1. 12810 = 27 = 1000 00002 = 8016



* + 1. 15010 = 128 + 16 + 4 + 2 = 27 + 24 + 22+ 21 = 1001 01102 = 9616
    2. 1­10 = 20 = 0000 00012 ; -1 = + 1 = 1111 11102 + 1 = 1111 11112
    3. Form a), 10610 = 0110 10102; -106 = + 1 = 1001 01012 + 1 = 1001 01102
    4. From a), 12810 = 1000 00002; -128 = + 1 = 0111 11112 + 1 = 1000 00002
    5. 1010 11102 = 27 + 25 + 23+ 22+ 21= 128 + 32 + 8 + 4 + 2 = 174
    6. 1010 11102 = - (2+1) = - (0101 00012 + 1) = - (0101 00102) = - (26 + 24 + 21) = - (64 + 16 + 2) = -8210



* + 1. 1100 11102 = CE, 0011 01112 = 37; CE + 37 = 105



* + 1. 1111 10102 = FA, 1010 11102 = AE; FA + AE = 1A8leal



1. leal
   1. (%r, %r, s), %r means %r = %r + s \* %r = %r \* (s + 1)

%r is %edi, and (s + 1) is k. Because of s may only be 1, 2, 4, 8, k could be 2, 3, 5, 9.

* + 1. k = 13

leal (%edi, %edi, 2), %eax #eax = 3 \* %edi

leal (%edi, %eax, 4), %eax #eax = %edi + 4 \* (3\*edi) = 13\*%edi

* + 1. k = 20

leal (%edi, %edi, 4), %eax #eax = 5 \* %edi

leal (, %eax, 4), %eax #eax = 4 \* (5\*edi) = 20\*%edi

* + 1. k = 37

leal (%edi, %edi, 8), %eax #eax = 9 \* %edi

leal (%edi, %eax, 4), %eax #eax = %edi + 4 \* (9\*edi) = 37\*%edi

.globl sqrt

sqrt: #newton's method

movl $0, %eax #result = 0

movl $16, %esi #count = 16

movl $0x10000, %edx #%edx = 0001 0000 0000 0000 0000 in binary

loop:

shr $1, %edx #shift right 1 bit of %edx

decl %esi #count--

cmpl $0, %esi #count - 0 ? 0

jl endl #jump to endl if count < 0

xorl %edx, %eax #change the kth bit of result to 1

movl %eax, %ecx #move result to %ecx

imull %ecx, %ecx #%ecx = result^2

cmpl %edi, %ecx #result^2 - x ? 0

jle loop #jump to loop if result^2 <= x

xorl %edx, %eax #change the kth bit of result to 0 if result^2 > x

jmp loop #back to loop

endl:

ret