COMP.2030 LAB 12

NAME _____

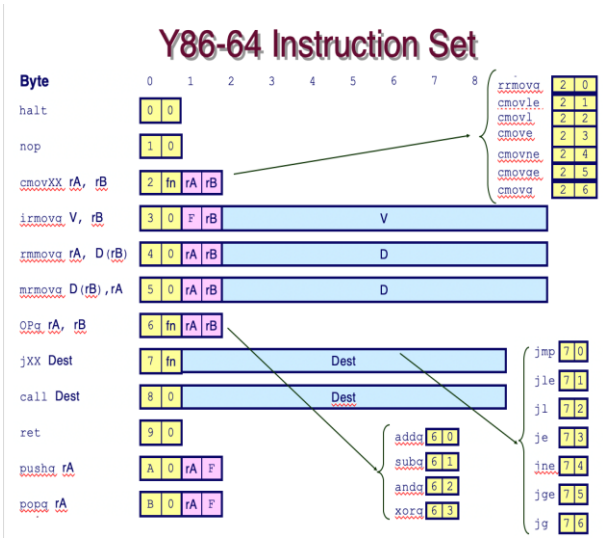
1. Each byte sequence below is written in the format
   address: Y86 encoding
   For each byte sequence below, determine the Y86 instruction sequence it encodes.

   0x100: 30f3fcffffffffffffff4063000800000000000000

   0x200: 505407000000000000000b01f

   0x300: 6113730002000000000000000

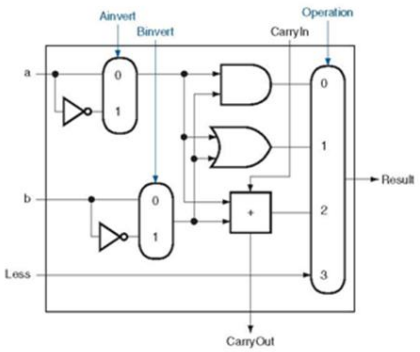
   0x400: 6362a00f



2. A Y86 machine is a subset of x86 with the instruction set shown above right. Write the byte encoding of the following Y86 instruction sequence, starting at address 0x100.

```
        irmovq    $15, %rbx
        rrmovq    %rbx, %rcx
loop:   rmmovq    %rcx, -3(%rbx)
        addq      %rbx, %rcx
        jmp       loop
```

3. Suppose that the 1-bit ALU in Y86 is constructed as on the right, except that OR gate is replaced by an XOR gate so that it can perform add, sub, and and xor operations.
Also shown are three control signals: Ainvert, Binvert, and Operation.



The 2-bit Operation controls the multiplexer to select the appropriate input to the output of the ALU. The two bits are determined by the Y86 instruction iCode of 6 for OP instructions and iFun code.

A separate combinational logic circuit takes two bits ($ifun_1$ and $ifun_0$) for four OP instructions (0, 1, 2, and 3 for add, sub, and, and xor), and generates appropriate values for Operation. Write the truth table for the combinational logic with inputs of $ifun_1$ and $ifun_0$ and the output tied to Operation.

$ifun_1$	$ifun_0$	Operation