Name: ____________________ Section #: ____________________

Instructions: Work these problems on your own paper and submit on Canvas. As usual, you may collaborate with your classmates and ask for assistance from the TA. But don’t copy anyone else’s answer. Each problem is worth the same number of points (more or less).

1. Write an x86-64 assembly language routine that will take four longs (x, y, z, w) and perform double precision addition. That is, treat xy as one 128-bit integer and zw as another. Write the code to return a 128-bit result. You can return the result in %rbx and %rax. Don’t forget to carry out of the low result word into the high word. (There’s an x86 instruction that makes that easy, but you can do it without that.)

2. In slideset 12, we took several Y86 instructions and “microcoded” them into a set of lower level steps in six phases. For example, slide 14 shows how to do this for rmmovq. Do a similar thing for the following additional instructions:
   (a) nop
   (b) irmovq
   (c) pushq

3. Do problem 3.68 on p. 320 of Bryant and O’Hallaron.
