6.004 Fall 2018
L19 – Operating Systems
Take-Home Problem

Due at the beginning of recitation R19 on Wednesday November 14.

(A) You are given a RISC-V processor that does not have hardware support for multiplications, but you still need to do multiply operations in your programs. Which of the following are valid approaches to perform multiplications? (Select all that apply.)

a. Use the normal mul RISC-V instruction in your programs, and use exceptions to emulate them in software.
b. Write a multiply function in assembly, and use it as a normal function every time you want to perform a multiplication.
c. Write a multiply function and replace every mul instruction that would be in the code by jal multiply.

(B) An unsupported instruction at pc X causes an exception, and the kernel emulates this instruction in software. Where should the kernel return control to?

a. Address X
b. Address X + 4

(C) A timer interrupt fires when the current process is at pc X, and the kernel returns control to the same process after servicing the interrupt. Where should the kernel return control to?

a. Address X
b. Address X + 4