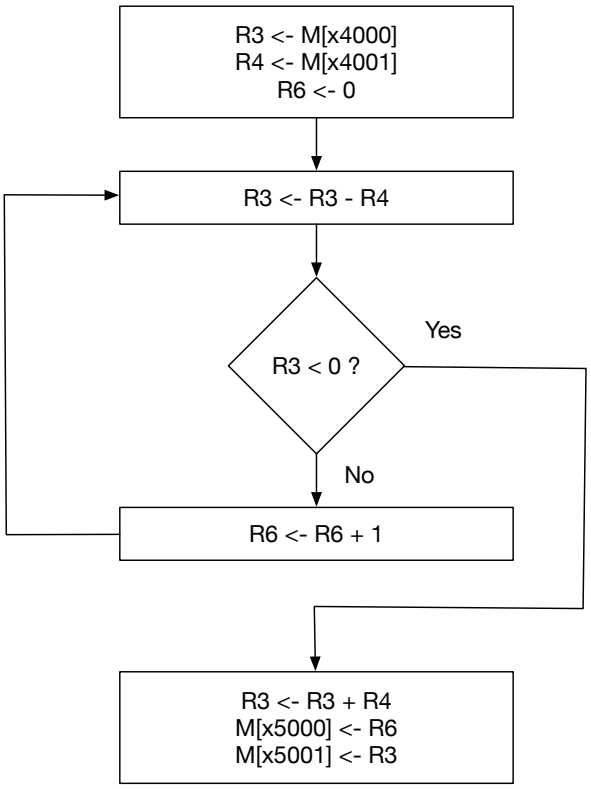
Assignment 2 CS2253 Fall 2021

Due Date: October 7, 2021 - 8:30 am

Purpose: write your first LC-3 machine language program

Divide (based on textbook exercise 6.18)

The LC-3 has no Divide instruction. A programmer needing to divide two numbers would have to write a routine to handle it. The flowchart below shows an algorithm for dividing two positive integers by repeatedly subtracting the second integer from the first until the result is negative. The algorithm reports the quotient of the division as the number of subtractions before the result is negative. The remainder is found by adding back the last subtraction of the second integer.



Follow the following steps:

- **Write your program** Write an LC-3 machine language program starting at location `x3000` that divides the number in memory location `x4000` by the number in memory location `x4001` (the numbers can be assumed to be greater than zero) and stores the quotient at `x5000` and the remainder at `x5001`, using the algorithm (and registers) shown in the flowchart. You will want to use other registers as well.
- **Test your program:** Load your program in the LC-3 simulator and test it thoroughly by running it with multiple different input values at locations `x4000` and `x4001` (which you can insert manually into the simulator), including at least 3 cases where the quotient is zero, the remainder is zero and the remainder is positive, respectively.
- **Submit your program:** Submit your program in D2L in 2 files: a pdf of your program listing, and a text file containing your listing called `divide.bin`. Make sure you include spaces in each machine instruction and comments on each line of the program. **You are not permitted to submit an assembly language program!**