Extra credits (2.5 points in the final grade)

 The number puzzle

Objective: Programming for fun and credits

Overview

The number puzzle is similar to the “24” puzzle where you are given 4 integer numbers and you would try to form an expression that calculates to 24 using the 4 numbers and the +, -, \*, / operators. In our number puzzle, you are given N integer numbers (N = 1, 2, …, 6) and a result, and the program should try to form an expression that calculates to the result using the N numbers and the +, -, \*, / operators.

The input to the program consists of lines of the following format:

N x1 x2 … xN  RES

For each line, if the program finds an expression, EXP, that calculates to RES, it should print out a line “Success: {EXP} == RES.” If there exist such expressions, the program must find at least one of them and print the “Success” line. If there is no such expression, the program should print out a line “Fail: x1 x2 … xN  can’t make RES.” A sample input file and the corresponding output are provided. In forming the expression, there are two restrictions. First, there should not have any negative number in the expression. For example, the resulting expression can contain a sub-expression, 5-3, but it should not have a sub-expression 3-5. Second, there should not have any fraction in the expression. For example, there should not have a sub-expression 5/3: if there is a sub-expression X/Y, X must be divisible by Y.

Submission

The latest time to get extra points for this program is December 11, 2023. 11:59pm. Put everything in one file, name it yourlastname\_firstinitial\_extra5.cpp, and submit the file on canvas.

Grading

The program will be awarded at most 2.5 points in the final course numerical grade that can be applied either as the programming assignment points or exam points.

* A program that correctly solves all problems in 24.txt (4 numbers with RES=24) and a few additional test cases will receive 1 point.
* A program that correctly answers to all cases including all in test\_extra5.txt and a few additional test cases and meet the following conditions will receive 2.5 points.
	+ The program must be able to complete all cases in test\_extra1.txt in 2 minutes on linprog (you can compile with –O3 flag).