# C++ Fundamentals: Judge Assignment 1 (JA1)

The following tasks should be submitted to the SoftUni Judge system, which will be open starting Saturday, 26 May 2018, 10:00 (in the morning) and will close on Sunday, 10 June 2018, 23:59. Submit your solutions here: <https://judge.softuni.bg/Contests/Compete/Index/1037> .

After the system closes, you will be able to “Practice” on the tasks – however the “Practice” results are NOT considered in the homework evaluation.

For this assignment, the code for each task should be a single C++ file, the contents of which you copy-paste into the Judge system.

Please be mindful of the strict input and output requirements for each task, as well as any additional requirements on running time, used memory, etc., as the tasks are evaluated automatically and not following the requirements strictly may result in your program’s output being evaluated as incorrect, even if the program’s logic is mostly correct.

You can use C++03 and C++11 features in your code.

Unless explicitly stated, any integer input fits into int and any floating-point input can be stored in double.

NOTE: the tasks here are NOT ordered by difficulty level.

## Task 1 – Pipes (JA1-Task-1-Pipes)

The company "Water You Waiting For" provides hot water to houses in a village through a series of underground pipes, each house having its own pipe for hot water. But the pipes corrode over periods of years and need to be replaced. Since the company wants to save money, it only does checkups of the pipes once a year, always on the same date (April 1st). Pipes are replaced only during checkups.

But the company wants to save even more money by skipping checkups when they are not necessary. Since the pipes corrode at a constant speed, it is enough to have 2 measurements of a pipe’s strength and calculate how much time remains before it needs to be replaced. This needs to be rounded-down to years, since the repair can only happen during a checkup – so if a pipe is going to break after 2 years and 11 months, the company needs to replace it after 2 years, because otherwise the pipe will be broken and leak water for 1 month until the 3rd year checkup.

Write a program which, given two arrays of consecutive strength measurements (measured when the pipes were installed and the year after that) of all the pipes, calculates the lifetimes the pipes (i.e. how many years after it was installed it needs to be replaced).

### Input

The first line of the standard input will contain a single positive integer number N – the number of pipes. The second line of the standard input will contain an array of N positive integer numbers, separated by single spaces, representing the measurements of each pipe, made during this year’s checkup – let’s call them checkup.

The second line of the standard input is analogous to the first but contains the measurements from last year – when the pipes were installed – let’s call it installation.

So, the strength of pipe i last year was installation[i] and this year it is checkup[i].

### Output

A single line, containing integers separated by single spaces, representing the years remaining until the corresponding pipe described in the input arrays must be replaced (counting from installation). If we call this array lifetimes, then pipe i has to be replaced lifetimes[i] years after installation[i] was measured.

### Restrictions

0 < installation[i] <= 1000000000; 0 <= checkup[i] < installation[i];

N will be a positive number less than or equal to 500.

The total running time of your program should be no more than 0.1s

The total memory allowed for use by your program is 5MB

### Example I/O

|  |  |  |
| --- | --- | --- |
| Example Input | Expected Output | Explanation |
| 3  3 2 2  5 4 3 | 2 2 3 | Pipe 0 has suffered 5 – 3 = 2 damage – next year it will have 3 – 2 = 1 strength remaining and needs to be replaced, otherwise it will fail ~1.5 years from now (so it has a lifetime of 2 years counting from installation). Pipe 1 will break exactly 1 year from now, which means 2 years since it was installed. |
| 5  1 1 1 1 11  2 3 4 5 12 | 2 1 1 1 12 | Pipe 0 and Pipe 4 get 1 damage per year (i.e. their lifetimes in years are equal to their initial strength), but the others lose more than half their strength per year – they need to be replaced each year |