

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

The following tasks should be submitted to the SoftUni Judge system, which will be open starting Saturday, 25 November 2017, 10:00 (in the morning) and will close on Sunday, 10 December 2017, 23:59. Submit your solutions here: <https://judge.softuni.bg/Contests/Compete/Index/853>.

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.

## 1. 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 1<sup>st</sup>). 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 3<sup>rd</sup> year checkup.

Write a program which, given two arrays of consecutive strength measurements of all the pipes, calculates the years a pipe has remaining before it needs to be replaced (after the latest checkup).

### 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 last year's checkup – let's call them **measurements1**.

The second line of the standard input is analogous to the first, but contains the measurements from this year's checkup – let's call it **measurements2**.

So, the strength of pipe **i** last year was **measurements1[i]** and this year it is **measurements2[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 **measurements2**). If we call this array results, then pipe **i** has to be replaced **results[i]** years after **measurements2[i]** was measured.

### Restrictions

$0 < \text{measurements1}[i] \leq 1000000000$ ;  $0 \leq \text{measurements2}[i] < \text{measurements1}[i]$ ;

**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 5 4 3 3 2 2	1 1 2	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. Pipe 1 will break exactly 1 year from now - i.e. replace during the checkup.
5 2 3 4 5 12 1 1 1 1 11	1 0 0 0 11	Pipe 0 and Pipe 4 get 1 damage per year, but the others lose more strength per year than they have remaining - we need to replace them now