18 Fischer Clock

10 points

Introduction

Bobby Fischer is considered one of the greatest chess players of all time. He won the World Chess Championship in 1972 against Boris Spassky. Publicized as a Cold War confrontation between the USA and the USSR, it attracted more worldwide interest than any chess championship before or since.

After that championship Fischer disappeared from the competition and his life became erratic. But in 1988 he filed a patent for a new type of digital chess clock. As you may know, game clocks are used while playing chess tournaments to keep track of the total time taken by the players for their moves. The innovation patented by Fischer was a digital clock that gave each player a fixed time at the start of the game and then added a small amount after each move. For example, if the delay is five seconds and the player has ten minutes remaining on his clock and spent thirty seconds thinking and completing the chess move, he now has 9 minutes and thirty-five seconds remaining. Time can be accumulated, so if the player moves within the delay period, his remaining time increases. This made sure that the players would never be desperately short of time. This invention was officially adopted by the FIDE (World Chess Federation) in 1998.

Given a time control description of the game and a series of game moves, can you write a program to report the actual remaining time for each player?

Input

The input consists of several lines. The first line describes the time control of the game in seconds: the total time per player + delay time. The next lines contain a pair of values specifying the movement time of player 1 and player 2 in seconds with millisecond resolution. Note that the first of this sequence will be the pair 0.0 0.0 as the starting time (delay is not applied). The input ends with the character #.

Output

The remaining time for each player, within 3 decimal precision.

Example

Input

```
900+5
0.0 0.0
7.359 3.237
3.914 2.005
6.077 2.229
4.204 3.128
7.525 5.014
#
```

Output

```
895.921 909.387
```