INOI, Iranian National Olympiad in Informatics
Online Contest, April 2008
Third Exam

Antography

Time limit for each test: 5 seconds
Memory limit: 200 megabytes

> If you see a moving blue point on the wall, say what do you think it might be?
> Yes, you've guessed right! It is an ant, worn blue jeans!

As you may know, Aideen[1] is interested in taking shots from anywhere! Last night, when Aideen was reviewing his taken photos, he found that there exist two distinct photos taken from same part of the wall but in different times. Looking closer at those photos, he found n blue points (ant worn blue jeans!) in each of them, which, due to the movement of the ants, were not necessarily in the same places in those two photos. Assume that all of the ants lie on a straight line parallel to the x axis and make all their movements on that line. Furthermore, all the ants are present in both pictures.

Since Aideen has lots of studies about life of ants, he knows that **every ant in his life, moves either only to the right side or only to left side. Beside, every ant moves exactly one centimeter per second**. Also, as ants are advanced and gregarious creatures, when two of them meet each other, they exchange hellos, for sure!

Now, Aideen is thinking that how many times each ant has said hello to the others between these two shots? We know that as Aideen's camera stores the time of the photos, he is capable to determine time difference between two photos. Notice that in any of the photos, no ant is above any other (though, it's possible that one ant in the first photo has the same place to another ant in the second photo).

Problem

Write a program that

- Reads places of the ants in two photos and time difference between photos from *Standard Input*,
- Computes number of ants has been said hello to, for any single ant,
- Writes the answer in *Standard Output*.

Input Sepcification

The first line of input contains n (number of ants) and t (time difference between the two photos), separated by single space.
In the second line of input, n integers show the places of ants in the first photo in an arbitrary order. Finally, in the third line of input, n integers show the places of ants in the second photo in an arbitrary order.

Output Specification

In the single line of output, write n space-separated numbers where i-th number represents number of hellos that n-th ant has said. Here, i-th ant means the i-th ant that its initial place is given in input (i.e. the ant respective to the i-th number of the second line of input).

Write "`impossible`" in the only line of the output in case it's not possible for ants to reach the final state from the initial state.

[1] The Media-man of last year competitions

Restrictions

- $1 \leq n \leq 10^6$.
- $1 \leq t \leq 10^7$.
- The absolute values of the initial and the final places of the ants $\leq 10^9$.
- All the input numbers are integers.
- In 40% of the test cases, $n \leq 50,000$.

Example

Standard Input	Standard Output
2 3 2 1 4 -1	1 1