Minimum distance between a point and other points

In the universe, it is proven that there exists a long, long 1D line. There are n points on that line, each point P_i on the coordinate x_i. All points are in distinct positions.

If points are close to each other, they are very happy since they can hang out with each other. This is why in this problem, you have to write a program that calculates the minimum distance between each point and other points. Formally, for each $1 \leq i \leq n$, your program has to calculate the minimum distance between P_i and P_j (for all $1 \leq j \leq n,\ i \neq j$).

Input

Your input consists of an arbitrary number of records, but no more than 5.

Each record starts with a line containing an integer n $(2 \leq n \leq 100{,}000)$, the number of points. The next line contains n integers $x_1, x_2, \cdots, x_n$ $(-10^{18} \leq x_i \leq 10^{18})$, which are coordinates of the points $P_1, P_2, \cdots, P_n$. It is guaranteed that all x_i are distinct.

The end of input is indicated by a line containing only the value -1.

Output

For each input record, print a line that contains n integers separated by a space. The i-th $(1 \leq i \leq n)$ integer should be the minimum distance between P_i and P_j (for all $1 \leq j \leq n,\ i \neq j$).

Example

Standard input	Standard output
3 5 3 1 4 -1 2 -3 4 -1	2 2 2 2 2 2 2

Time Limit

1 second.