

Tall people in the Hospital

There was once a town. In that town, there was a hospital. In that hospital, there were patients, and there were quite a few of them. But then came Juro the Statistician and started to make statistics of the patients. When a patient came to the hospital, he wrote down their name, year of birth, weight, height, thumb size, elbow size, and goodness knows what else. But he wouldn't be our Juro if he didn't want to count and deduce all statistical things from it. So, he decided to calculate the median height of the patients. He thinks and thinks, but after all, he's a statistician and not a programmer.

Task:

The input consists of a number $1 \leq N \leq 10^5$ followed by a sequence $0 \leq d_i < 10^9$ of heights of patients in the order they come to the hospital. Your task is to, for each incoming patient, state the median height of patients who have come to the hospital by then (including them). The median of M elements is the element that would be at the $\lceil M/2 \rceil$ -th position after sorting in ascending order.

Examples:

input

10
158 182 112 92 52 201 193 167 177 167

output

158
158
158
112
112
112
158
158
167
167

input

10
83 36 16 58 65 80 52 83 73 71

output

83
36
36
36
36
58
58
58
58
65
65

input

2
1000 100

output

1000
100