Figurines

Problem Statement

Tom has decided to venture into the toy market, and he has set up a factory to produce toy figurines on a large scale. However, auditors will routinely demand a sample toy figurine to be sent over to check if the height of the figurine follows safety standards. Note that Tom's toys can be rather small, and the toy figurine heights are measured in nanometres (nm).

Currently, when new toy figurines are created on the production line, they will be sent to a holding area where they are held before being sent for packaging or inspection. As the inspection requests can be rather frequent, Tom decides to simply send the smallest toy figurine with a height larger than or equal to the median height of all toy figurines in the holding area whenever an inspection request is received. Can you help Tom with this task?

Note: For the purposes of this lab, you may not use Java API TreeSet, TreeMap, or any other implementations of binary search trees.

Input

Each line of the input contains either a positive integer h, indicating that a toy figurine with height h nm has arrived at the holding area, or the command "INSPECT", indicating a request from the auditors to send a figurine for inspection. There are at most 600,000 lines of input, and it can be assumed the holding area is empty when the first figurine in the input arrives to the holding area. It can be guaranteed that an INSPECT command will only be sent when the holding area is occupied. Note that the production line is programmed such that the height of a toy figurine will not exceed 40 centimetres (or 400,000,000 nanometres).

Output

Output a sequence of lines indicating the height in nm of the figurines sent for inspection, in the same order they are sent.

Sample Input 1

2

4

6

8

INSPECT

INSPECT

INSPECT

INSPECT

Sample Output 1

6

4

8

2

Sample Input 2

2

INSPECT

3

INSPECT

4

INSPECT

5

INSPECT

Sample Output 2

2

3

4

5