PSH: Algorithmic Trading 1

Watch Kevin Salvin's TED talk on algorithmic trading.

The algorithm compares the median of the last m sales prices with the last price. If this median is greater than the last price, the algorithm recommends that you sell the stock; if the median is equal to the last price, the algorithm recommends that you hold; and if the median is less than the last prices, the algorithm recommends that you buy.

Input Format

The first line of input consists of two integer n and m, $3 \le n \le 5 * 10^5$ and $3 \le m \le n$.

n indicates the number of prices in the input, and m indicates how many of the most recent values should be considered when calculating the median.

The remaining n lines give a sequence of prices.

Constraints

m will be odd.

Output Format

Starting with the m^{th} price, your program should output, on a line by itself, `buy`, `hold`, or `sell`, based on the comparison of the median of the last m prices and the most recent price.

Note: You will output n - m + 1 values

Sample Input

```
5 3
10
12
8
9
11
```

Sample Output

```
sell
hold
buy
```

Explanation

For the first decision, the program calculates the median of <10, 12, 8> which is 10, and compares this with the last price 8. Since the median is greater than the last price, the program outputs "sell".

For the second decision, the program calculates the median of <12, 8, 9> which is 9, and compares this with the last price 9. Since the median is equal to the last price, the program outputs "hold".

For the third decision, the program calculates the median of <8, 9, 11> which is 9, and compares this with the last price 11. Since the median is less than the last price, the program outputs "buy".