A. Equity Fluctuations

time limit per test: 3 seconds
memory limit per test: 256 megabytes

The stock market is a fascinating world, with prices going up and down based on various factors. In this problem, you are given a history of stock prices in the form of an integer array. Your task is to determine how often a particular trend in stock prices has occurred in the past.

Definition of a Trend:

A trend is a sequence of relative movements (ups and downs) of the stock price. The actual values don't matter, but rather the direction of the change. For instance, if the stock prices for 5 days were [4, 5, 3, 4, 4], the trend would be [up, down, up, constant].

Input

- The first line contains a single integer N ($2 \leq N \leq 10^6$) — the length of the stock price array.
- The second line contains N space-separated integers $p_1, p_2, \ldots, p_N$ ($1 \leq p_i \leq 10^9$) — the stock prices at different points in time.
- The third line contains a single integer Q ($1 \leq Q \leq N$) — the number of queries.
- The next Q lines each contain a single integer X ($2 \leq X \leq N$) — the number of recent stock prices whose trend you need to match against in the past data.

Output

For each query, output a single integer — the number of times the trend of the last X prices occurred in the past.

Examples

input Copy

```
5
1 2 3 4 5
4
5
4
3
2
```

output Copy

```
1
2
3
4
```

input Copy

```
10
3 2 1 4 5 6 8 7 9 1
9
9
8
7
6
5
4
3
2
10
```

output Copy

```
1
1
1
1
1
1
2
4
1
```

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- number theory (medium)
- number theory (easy)
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- graph(easy)
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- geometry(medium)
- geometry(easy)
- ad-hoc(hard)
- ad-hoc(medium)
- ad-hoc(easy)
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string (easy)

Finished

Practice

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