Appleby Contest '20 P2 - Playful Playdoughs

Time limit: 1.0s **Memory limit:** 512M

Plasmatic loves playing with playdoughs in his spare time. Currently, he has a collection of N playdoughs, and the i^{th} playdough weighs a_i grams for each i from 1 to N. However, he is too busy practicing for IOI. As a result, he doesn't have much time to play with the playdoughs. Instead, he gives you Q operations that he wants you to do with his collection of playdoughs, and each operation can be one of the two:

1. `1 x`: Find all playdoughs that weighs exactly x grams then split the playdough into $\lceil \frac{x}{2} \rceil$ and $\lfloor \frac{x}{2} \rfloor$.
2. `2 y`: Find the number of playdoughs that weigh exactly y grams.

As a good friend of him, you want to print the answers for all of the queries in the form of `2 y`. Do not disappoint him!

Constraints

Subtask 1 [15%]

$1 \leq N \leq 100$

$1 \leq Q \leq 500$

$1 \leq a_i, y \leq 100$

$2 \leq x \leq 100$

Subtask 2 [85%]

$1 \leq N \leq 10^5$

$1 \leq Q \leq 5 \cdot 10^5$

$1 \leq a_i, y \leq 10^5$

$2 \leq x \leq 10^5$

Note that a 64-bit integer is needed to get full points. In C++, this can be done with `long long`. In Java, this can be done with `long`. In Python, the standard `int` will suffice.

Input Specification

The first line contains two integers N and Q separated by a space.

The next line contains N integers a_i, the weight of each of his playdough originally.

The following Q lines each contains two space-separated integers, indicating a valid query.

Output Specification

Print the answer to each query of the second type, followed by a newline.

Sample Input

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

Sample Output

```
4
2
```