Given n integers you can generate 2^{n-1} non-empty subsets from them. Determine for how many of these subsets the product of all the integers in that is a perfect square. For example for the set {4,6,10,15} there are 3 such subsets. {4}, {6,10,15} and {4,6,10,15}. A perfect square is an integer whose square root is an integer. For example 1, 4, 9, 16, ...

Input

Input contains multiple test cases. First line of the input contains T $(1 \leq T \leq 30)$ the number of test cases. Each test case consists of 2 lines. First line contains n $(1 \leq n \leq 100)$ and second line contains n space separated integers. All these integers are between 1 and 10^{15}. None of these integers is divisible by a prime greater than 500.

Output

For each test case output is a single line containing one integer denoting the number of non-empty subsets whose integer product is a perfect square. The input will be such that the result will always fit into signed 64 bit integer.

Sample Input

```
4
3
2 3 5
3
6 10 15
4
4 6 10 15
3
2 2 2
```

Sample Output

```
0
1
3
3
```