Packing Biscuits (biscuits)

Aunty Khong is organising a competition with x participants, and wants to give each participant a **bag of biscuits**. There are k different types of biscuits, numbered from 0 to $k-1$. Each biscuit of type i ($0 \le i \le k-1$) has a **tastiness value** of 2^i. Aunty Khong has $a[i]$ (possibly zero) biscuits of type i in her pantry.

Each of Aunty Khong's bags will contain zero or more biscuits of each type. The total number of biscuits of type i in all the bags must not exceed $a[i]$. The sum of tastiness values of all biscuits in a bag is called the **total tastiness** of the bag.

Help Aunty Khong find out how many different values of y exist, such that it is possible to pack x bags of biscuits, each having total tastiness equal to y.

Implementation Details

You should implement the following procedure:

```
int64 count_tastiness(int64 x, int64[] a)
```

- x: the number of bags of biscuits to pack.
- a: an array of length k. For $0 \le i \le k-1$, $a[i]$ denotes the number of biscuits of type i in the pantry.
- The procedure should return the number of different values of y, such that Aunty can pack x bags of biscuits, each one having a total tastiness of y.
- The procedure is called a total of q times (see Constraints and Subtasks sections for the allowed values of q). Each of these calls should be treated as a separate scenario.

Examples

Example 1

Consider the following call:

```
count_tastiness(3, [5, 2, 1])
```

This means that Aunty wants to pack 3 bags, and there are 3 types of biscuits in the pantry:

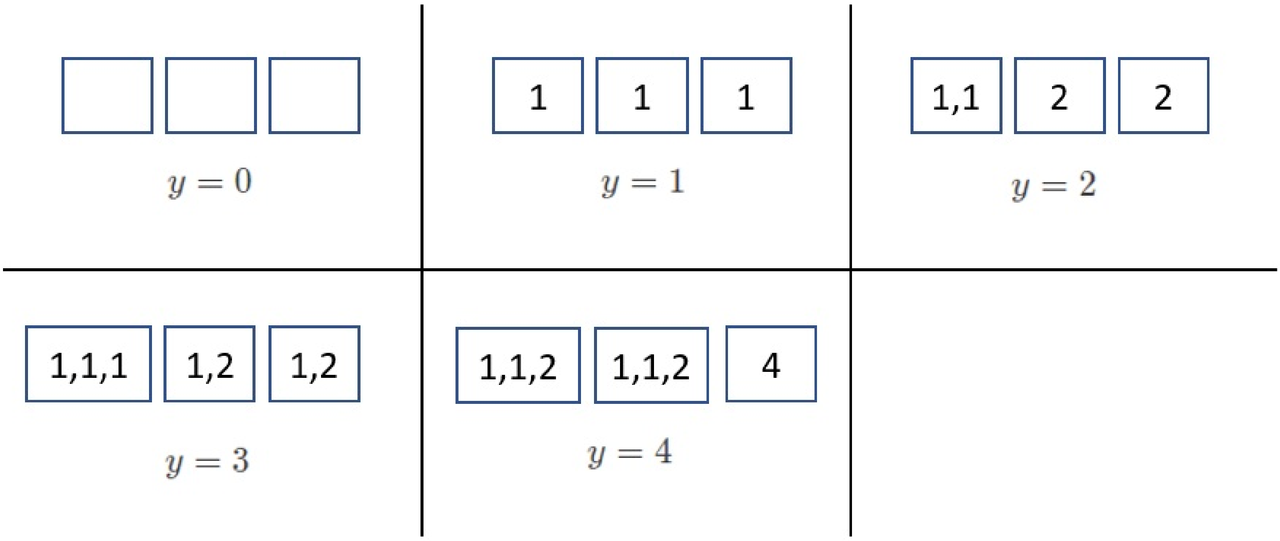
- 5 biscuits of type 0, each having a tastiness value 1,

- 2 biscuits of type 1, each having a tastiness value 2,
- 1 biscuit of type 2, having a tastiness value 4.

The possible values of y are $[0, 1, 2, 3, 4]$. For instance, in order to pack 3 bags of total tastiness 3, Aunty can pack:

- one bag containing three biscuits of type 0, and
- two bags, each containing one biscuit of type 0 and one biscuit of type 1.

Since there are 5 possible values of y, the procedure should return 5.



Example 2

Consider the following call:

```
count_tastiness(2, [2, 1, 2])
```

This means that Aunty wants to pack 2 bags, and there are 3 types of biscuits in the pantry:

- 2 biscuits of type 0, each having a tastiness value 1,
- 1 biscuit of type 1, having a tastiness value 2,
- 2 biscuits of type 2, each having a tastiness value 4.

The possible values of y are $[0, 1, 2, 4, 5, 6]$. Since there are 6 possible values of y, the procedure should return 6.

Constraints

- $1 \leq k \leq 60$
- $1 \leq q \leq 1000$
- $1 \leq x \leq 10^{18}$
- $0 \leq a[i] \leq 10^{18}$ (for all $0 \leq i \leq k - 1$)

- For each call to `count_tastiness`, the sum of tastiness values of all biscuits in the pantry does not exceed 10^{18}.

Subtasks

1. (9 points) $q \leq 10$, and for each call to `count_tastiness`, the sum of tastiness values of all biscuits in the pantry does not exceed $100\ 000$.
2. (12 points) $x = 1$, $q \leq 10$
3. (21 points) $x \leq 10\ 000$, $q \leq 10$
4. (35 points) The correct return value of each call to `count_tastiness` does not exceed $200\ 000$.
5. (23 points) No additional constraints.

Sample grader

The sample grader reads the input in the following format. The first line contains an integer q. After that, q pairs of lines follow, and each pair describes a single scenario in the following format:

- line 1: $k\ \ x$
- line 2: $a[0]\ \ a[1]\ \ \ldots\ \ a[k-1]$

The output of the sample grader is in the following format:

- line i ($1 \leq i \leq q$): return value of `count_tastiness` for the i-th scenario in the input.