

Bit Sequence

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 256 megabytes

Let $f(x)$ denote the number of 1s in the binary representation of x .

Now MianKing has a sequence $a_{0\dots m-1}$ and he wants to know the number of integer $x \in [0, L]$ satisfies that: $\forall i \in [0, m - 1], f(x + i) \bmod 2 = a_i$

You need to help him calculate the answer.

Input

There are T testcases in this problem.

The first line has one integer T .

Then for each testcase, the first line has two integer m, L . The second line has m integers denote $a_{0\dots m-1}$

$$1 \leq T \leq 1000$$

$$1 \leq m \leq 100$$

$$0 \leq L \leq 10^{18}$$

$$a_i \in \{0, 1\}$$

Output

For each testcase, output the answer in one line.

Example

standard input	standard output
3	2
3 10	501
0 1 0	41667
1 1000	
0	
9 1000000	
1 0 1 1 0 1 0 0 1	