

Help Kejriwal

During college days of Mr. Kejriwal, he wanted to go out with a girl of CSE on Valentines Day. The girl being a geek decided to organize a coding contest to decide the person with whom she will go out(Yeah! That craze). There was only one question in the contest and it goes like this.

Given n numbers a_1, a_2, \dots, a_n . There are two probabilistic functions $f(x)$ and $g(x)$. $f(x)$ returns 0 or 1 with equal probability. $g(x)$ returns a number by toggling(flipping) any one bit of x with equal probability, where x is an unsigned integer(32 bit).

A function $h()$ is defined as

$$h() = f(a_1)*g(a_1) + f(a_2)*g(a_2) + \dots + f(a_n)*g(a_n)$$

Find the total number of ways in which $h()$ takes the value m . Since, this value can be very large give it **modulo 1000000007**. (See test case explanation in order to understand when two ways are considered different.)

Also, find the expected value of function $h()$ rounded up to **exactly** 6 decimal places.

Mr. Kejriwal had very less interest in coding and thus was not good at it. Help him top the contest in order to get him a date for Valentines Day.

Input Specification

First line consists of number of test cases t .

First line of each test case contains two integers n and m in order.

Second line of each test case consists of n integers a_1, a_2, \dots, a_n .

Output Specification

Output consists of t lines.

Each line contains 2 space separated values. First value is the number of ways in which $h()$ is equal to m , modulo 1000000007. Second value is the expected value of $h()$ rounded up to **exactly** 6 decimal places.

Constraint

$$1 \leq t \leq 50$$

$$1 \leq n \leq 500$$

$$0 \leq m \leq 1000$$

$$0 \leq a_i \leq 1000000000$$

Sample Input

```
2
2 3
1 2
1 0
4
```

Sample Output

```
66 134217729.375000
33 67108865.859375
```

Explanation for second test case:

Value of $h()$ needed is zero.

When $f(4)=1$ and $g(4)=0$, $h()=0$. ways = 1

When $f(4)=0$ and $g(4) =$ (value obtained after any of the 32 possible flips), $h()=0$. ways = 32

total ways = $1 + 32 = 33$