

Problem F. Fair Lottery

There is a lottery going to happen among N groups of people. Group i consists of a_i persons. In the end, at most M persons will be the winner of this lottery.

There is one extra restriction for this lottery: for each group, either all or none of the person in this group are winners. In other words, no partial winners allowed for each group.

A lottery program is defined as a set of outcomes. The outcome announces the winners of the lottery. Each outcome has it's own probability to happen, and the sum of probabilities among all outcomes equals to 1.0.

A fair lottery program is a lottery program that makes each person having the same probability p of winning the lottery. Find the maximum probability p over all fair lottery programs.

For example, suppose there are 3 groups: A, B, and C, each consists of 1, 2, and 2 persons. At most 3 persons will be the winner of the lottery.

One possible fair lottery program is: it consists of only one outcome that no one wins. So each person has the same probability of 0% winning the lottery.

A better fair lottery program is: there are two outcomes, each happening with probability of 50%. Outcome 1 announces person in group A and B as winners; and outcome 2 announces person in group C as winners. Hence each person having the winning probability of 50%. It's easy to verify that 50% is the maximum probability over all lottery programs.

Input

The first line of the input gives the number of test cases, T . T test cases follow.

Each test case contains 2 lines, the first line consists of 2 numbers N , M indicating the number of groups and the max number of lottery winners.

The second line consists of N numbers a_1, a_2, \dots, a_N indicating the number of persons in each group.

Output

For each test case, output one line containing "Case #x: y", where x is the test case number (starting from 1) and y is the maximum probability p for each one to be the winner over all fair lottery programs.

y will be considered correct if it is within an absolute or relative error of 10^{-6} of the correct answer.

Limits

- $1 \leq T \leq 100$.
- $1 \leq N \leq 10$.
- $1 \leq M \leq 100$.
- $1 \leq a_i \leq 100$.

Example

standard input	standard output
2	Case #1: 0.5000000000
3 3	Case #2: 0.4000000000
1 2 2	
4 2	
1 1 1 2	

Note

The first test case is the sample in the problem.

In the second test case, the best lottery program is: Assume groups are A(1), B(1), C(1), D(2), For $[0, 0.2)$ persons in A, B are the winners. For $[0.2, 0.4)$ persons in B, C are the winners. For $[0.4, 0.6)$ persons in A, C are the winners. For $[0.6, 1)$ persons in D are the winners.