

Problem G: Gini Coefficient

The Gini coefficient is a measure of statistical dispersion most prominently used as a measure of inequality of income distribution or inequality of wealth distribution. It is defined as a ratio with values between 0 and 1: A low Gini coefficient indicates more equal income or wealth distribution, while a high Gini coefficient indicates more unequal distribution. 0 corresponds to perfect equality (everyone having exactly the same income) and 1 corresponds to perfect inequality (where one person has all the income, while everyone else has zero income). The Gini coefficient requires that no one have a negative net income or wealth. Worldwide, Gini coefficients range from approximately 0.232 in Denmark to 0.707 in Namibia although not every country has been assessed. The Gini coefficient was developed by the Italian statistician Corrado Gini and published in his 1912 paper "Variability and Mutability" (Italian: Variabilità e mutabilità).¹

Problem description

You will be given n numbers, that is the wealth of each person from the population. You are asked to compute the Gini coefficient. Usually Gini coefficient can be expressed as the greatest possible value of $\frac{1}{n-1} \left(n + 1 - 2 \left(\frac{\sum_{i=1}^n (n+1-i)y_i}{\sum_{i=1}^n y_i} \right) \right)$, where $y_1, y_2 \dots y_n$ are the wealths in any order. Otherwise remember that perfect inequality leads to value of 1, and perfect equality corresponds to value of 0.

Input

Each input file can consist of more than one test case. In the first line there is number of test cases. Each case's description starts with a line with one number n , that is the size of the population ($1 < n < 2 \cdot 10^5$). Then n lines follow. In the i^{th} following line there is number w_i , the wealth of the i^{th} person ($0 \leq w_i \leq 10^8$). All numbers in the input are integers.

Output

For each test case write only one line. In that line write the value of Gini coefficient with absolute error not greater than 0.001.

Example

For input:

2
 3
 0
 0
 1000
 2
 750
 1250

The correct answer is:

1
 0.25

¹ http://en.wikipedia.org/wiki/Gini_coefficient