UCF Local Contest (Qualifying Round) — August 24, 2024

Income Inequality

filename: `income`
Difficulty Level: `Easy-Medium`
Time Limit: `2 seconds`

According to Wikipedia, in 2021, the top 1% of households own 32.3% of the wealth in the United States. More generally, for any given percentage x, we could look at the data and state that the top x% of households own y% of the wealth.

It's obvious that for all societies with some inequality, it is always the case that $y > x$, except for $x = 0$ and $x = 100$. Of all possible choices for x, what is the maximum value of $y - x$?

The Problem:

Given the incomes of all people in a society, determine the maximum value of $y - x$ where the top x% of the people have y% of the society's wealth.

The Input:

The first input line contains a single integer, n ($2 \le n \le 10^6$), indicating the number of people in the society.

The second input line contains n integers; each integer, m ($1 \le m \le 10^{12}$), provides the wealth of a household in the society. Please note that the income values are not necessarily distinct.

The Output:

Print the maximum possible value of $y - x$, where the top x% of households in the society own y% of the society's wealth. Any answer within an absolute or relative error of 10^{-6} will be accepted.

Sample Input	**Sample Output**
4 11 1 2 6	35.000000
5 35 25 30 60 50	15.000000