Московский Авиационный Институт (национальный исследовательский университет)

Институт информационных технологий и прикладной математики

Кафедра вычислительной математики и программирования

Журнал по исследовательской практике (индивидуальный план)

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Москва, 2021

Сводная таблица за осень 2021

Дата	Название	Время	Место проведения	Решенные задачи	Дорешанные задачи
12.09.2021	Grand Prix of Dolgoprudny	11:00-16:00	Дистанционно	A, B	C
19.09.2021	Grand Prix of IMO	11:00-16:00	Дистанционно	A, B	C
26.09.2021	Grand Prix of XiAn	11:00-16:00	Дистанционно	A, B	C
10.10.2021	XXII Открытая Всесибирская олимпиада	10:00-15:00	Дистанционно	A, B	C
17.10.2021	ICPC training MAI 21-22	11:00-16:00	Дистанционно	A, B	C
24.10.2021	Grand Prix of Korea	11:00-16:00	Дистанционно	A, B	C
07.11.2021	Grand Prix of Siberia	11:00-16:00	Дистанционно	A, B	C
14.11.2021	Grand Prix of EDG	11:00-16:00	Дистанционно	A, B	C
21.11.2021	RuCode 4.0 Div A-B Champoinship	11:00-16:00	Дистанционно	A, B	C
28.11.2021	Grand Prix of Southern Europe	11:00-16:00	Дистанционно	A, B	C
05.12.2021	Grand Prix of Poland	11:00-16:00	Дистанционно	A, B	C
12.12.2021	Grand Prix of Nanjing	11:00-16:00	Дистанционно	A, B	C
19.12.2021	Moscow Regional Contest	11:00-16:00	Дистанционно	A, B	C

Явка на контесты

Дата	Название	Присутствующие
12.09.2021	Grand Prix of Dolgoprudny	Артемьев, Белоусов, Инютин
19.09.2021	Grand Prix of IMO	Артемьев, Белоусов, Инютин
26.09.2021	Grand Prix of XiAn	Артемьев, Белоусов, Инютин
10.10.2021	XXII Открытая Всесибирская олимпиада	Артемьев, Белоусов, Инютин
17.10.2021	ICPC training MAI 21-22	Артемьев, Белоусов, Инютин
24.10.2021	Grand Prix of Korea	Артемьев, Белоусов, Инютин
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19.12.2021	Moscow Regional Contest	Артемьев, Белоусов, Инютин

Problem G. Nikanor Loves Games

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	512 mebibytes

Nikanor spends all his free time on games. Because of this, he gets bad marks at the university, but that's another story. He also likes gambling. In this problem, we consider the modification of the game called "Orlyanka". There are two players, and each of them has his own coin. Each of the two sides of a coin contains an integer. Players toss their coins, and the winner is the one with the highest number. We can assume that for each coin the probabilities of coming up both sides are equal.

Tonight Nikanor is playing this game with his friends. Nikanor has n friends, and he will play with each of them for a bet of x_i rubles. Fortunately, Nikanor knows that his i-th friend has a coin with the numbers a_i and b_i. If Nikanor wins against his friend, he will receive x_i rubles. Otherwise, he will pay x_i rubles to his friend. If Nikanor and his friend dropped the same value, Nikanor is declared the winner.

Now Nikanor is going to go to the store and buy one coin for all games to maximize his expected profit, taking the coin cost into account. In this shop, a coin with the numbers a and b costs $a \cdot b$ rubles. Nikanor can buy any coin with positive integers.

It's so hard for Nikanor to make the right decision... Nikanor asks you to help him choose a coin so that the expected profit is as high as possible.

Input

The first line contains one integer n ($1 \le n \le 2 \cdot 10^5$) denoting the number of friends.

Each of the following n lines contains three integers a_i, b_i, and x_i ($1 \le a_i, b_i, x_i \le 10^9$) representing the numbers on i-th friend's coin and i-th bet in rubles.

Output

Print a single integer — the maximum expected profit.

Your answer will be considered correct if its absolute or relative error does not exceed 10^{-6}.

Formally, let your answer be a, and the jury's answer be b. Your answer will be accepted if and only if $\frac{|a-b|}{\max(1,|b|)} \le 10^{-6}$.

Examples

standard input	standard output
2 1 4 15 3 5 10	2.5000000000
1 2 2 8	4.0000000000

Идея

Тут вы описываете идею решения, оцениваете сложность...
Например, сложность жадного алгоритма $O(n \cdot \log n)$, а перебор $O(2^n \cdot n^2)$.

Исходный код

```
#include <bits/stdc++.h>

using namespace std;

#define flush cout.flush

using ll = long long;
using ull = unsigned long long;
using ld = long double;
using pl = pair<ll, ll>;
const ll INF = 1e9 + 7;
const ll mod = 1e9 + 7;
const ll mod2 = 998244353;
const ld eps = 1e-9;
const ld PI = acos(-1);
const ll MAGIC = 32;

int main() {
    ios::sync_with_stdio(false);
    cin.tie(NULL);
    ll n;
    cin >> n;
    vector<ll> a(n), b(n), x(n);
    for (ll i = 0; i < n; ++i)cin >> a[i] >> b[i] >> x[i];
    vector<pl> z;
    for (ll i = 0; i < n; ++i) {
        z.push_back({a[i], i});
        z.push_back({b[i], i});
    }
    z.push_back({1, -1});
    sort(z.begin(), z.end());
    ll m = z.size();
    vector<ld> pref(m, 0.0);
    ld bad = 0.0;
    for (ll i = 1; i < m; ++i) {
        pref[i] = pref[i - 1] + (ld) x[z[i].second] * 0.5;
        bad += (ld) x[z[i].second] * 0.5;
    }
    ld res = -1e18;
    for (ll i = 0; i < m; ++i) {
        for (ll j = max(0ll, i - MAGIC); j <= i; ++j) {
```

```
            ld E = pref[i] + pref[j] - bad;
            E -= (ld) (z[i].first * z[j].first);
            res = max(res, E);
        }
      for (ll j = 0; j <= min(i, MAGIC); ++j) {
            ld E = pref[i] + pref[j] - bad;
            E -= (ld) (z[i].first * z[j].first);
            res = max(res, E);
        }
    }
    cout << fixed << setprecision(20);
    cout << res << "\n";
    return 0;
}
```

Положение команды

№	Участник	A 0/24	B 2/11	C 3/11	D 59/605	E 13/74	F 1/14	G 104/442	H 128/330	I 73/140	J 36/111	K 2/98	Очки	Штраф
104	MAI #2 :	—	—	—	—	—	—	+10 04:22	+12 02:30	-3 02:41	—	—	2	852