Problem A. Divide and conquer

Input file:	`divide.in`
Output file:	`divide.out`
Time limit:	1 second
Memory limit:	256 megabytes
Feedback	`subtask points only`
Grading system	`only full solution for subtask receives points`

Mansur plays the new computer strategic game. The main task in such games is mining resources. Fortunately in this game only one resource is necessary for development — the gold, and also there is one supplementary resource type — energy.

In this game there are mining camps, which provide certain amount of gold and energy. All camps are located along the straight line. To protect the mining camps one can build a forcefield (a closed line segment containing mining camps), which needs energy amount equal to it's length.

Mansur wants to build one forcefield in such way, that energy of protected mining camps is enough for the forcefield, and amount of gold provided by these mining camps is maximal possible.

Write a program to help Mansur find the maximal amount of gold which he can obtain from protected mining camps.

Input

First line of the input file contains one integer N — number of mining camps. Following N lines contain three space separated integers x_i, g_i, d_i, $0 \le x_i \le 10^9$, $1 \le g_i \le 10^9$, $1 \le d_i \le 10^9$: mine coordinates, amount of gold and energy provided by the mine. All x_i are different and given in increasing order.

Output

Output only one number — maximal amount of gold which Mansur can mine.

Examples

divide.in	divide.out
4 0 5 1 1 7 2 4 4 1 7 15 1	16
2 0 4 1 3 5 1	5

Note

Subtask 1 — $1 \le N \le 100$, 17 points.

Subtask 2 — $1 \le N \le 5000$, 31 points.

Subtask 3 — $1 \le N \le 100000$, 52 points.

Problem B. Bank

Input file:	`bank.in`
Output file:	`bank.out`
Time limit:	1 second
Memory limit:	256 megabytes
Feedback	`points only`
Grading system	`only full solution for subtask receives points`

N people came to some bank to get their salary of $a_1, a_2, \ldots, a_N$ tenge. There are total M banknotes left in the bank with values $b_1, b_2, \ldots, b_M$ tenge correspondently.

You need to determine whether bank is able to give exact salary to all people using given banknotes or not.

Input

First line of input file contains two integers N and M — number of people and number of banknotes. Second line contains N integers $a_1, a_2, \ldots, a_N$ $(1 \le a_i \le 1000)$ — salary values. Third line contains M integer numbers $b_1, b_2, \ldots, b_M$ $(1 \le b_i \le 1000)$ — values of banknotes .

Output

The output file must contain one word «`YES`», if bank is able to pay salary. In opposite case output «`NO`».

Examples

bank.in	bank.out
1 5 8 4 2 5 1 3	YES
2 6 9 10 5 4 8 6 3 11	NO

Note

Subtask 1 — 19 points ($N = 1$, $1 \le M \le 20$)

Subtask 2 — 25 points ($1 \le N, M \le 10$)

Subtask 3 — 27 points ($1 \le N \le 20$, $M \le 14$)

Subtask 4 — 29 points ($1 \le N, M \le 20$)

Problem C. Shymbulak

Input file:	`shymbulak.in`
Output file:	`shymbulak.out`
Time limit:	1.5 seconds
Memory limit:	256 megabytes
Feedback	`full`
Grading system	`each test is graded separately`

On the famous kazakh resort Shymbulak there are N interesting places for tourists, which are connected by N roads of equal length. Roads are bidirectional. The road system is constructed in such way that from any place you can reach any other place, but sometimes it takes too many steps. Before adding new roads the resort administration wants to know, how many paths are there between all pairs of places which situated farthest apart from each other.

Pairs of places which situated farthest apart from each other means such pairs of places that the shortest path between them is maximal. The answer you should calculate is the total number of shortest paths between all pairs of places that satisfy the condition above.

Input

The first line of the input file contains integer N ($3 \le N \le 200\,000$). Each of the next N lines contains 2 integers — numbers of places, which are connected by a road. It is guaranteed that all roads connect different pairs of places.

Output

Output one integer — a number of shortest paths between all pairs of places which situated farthest apart from each other.

Examples

shymbulak.in	shymbulak.out
6 1 2 1 3 2 4 4 3 4 5 4 6	4
4 1 2 1 3 1 4 4 3	2

Note

In the first example farthest apart places are 1, 5 and 1, 6. For every pair there are two different paths. So the answer is 4.

For 30% points $N \le 500$.

For 50% points $N \le 5\,000$.