Q1

Consider a devotee wishing to give offerings to temples along a mountain range. The temples are located in a row at different heights. Each temple should receive at least one offering. If two adjacent temples are at different altitudes, then the temple that is higher up should receive more offerings than the one that is lower down. If two adjacent temples are at the same height, then their offerings relative to each other does not matter. Given the number of temples and the heights of the temples in order, find the minimum number of offerings to bring.

Input Format

First line contains an integer t denoting the number of test cases.  
For each of the next t lines , a first integer represents the number of elements n in the array. Same line contains the n number of space separated integers denoting the elements of array.

Constraints

1<= t <= 10. 1<= n <= 10^5. 1<= array elements <= 10^5

Output Format

Output t lines , each line having one integer denoting the answer.

Sample Input

1

6 1 4 3 6 2 1

Sample Output

10

Explanation

We can distribute the offerings in the following way, 1, 2, 1, 3, 2, 1. The second temple has to receive more offerings than the first due to its height being higher. The fourth must receive more than the fifth, which in turn must receive more than the sixth. Thus the total becomes 10.

Q2

During a fierce storm ,the great sailor Popeye got shipwrecked .He ,being the only survivor from the crew got marooned on a strange uninhabited island . In search of food ,he found a magic tree with **N** nodes in it .The tree was protected by a golden fairy.On each node ,there is an integer written on it . The fairy promised Popeye that if he is able to select exactly two non intersecting subtrees of this tree ,then she will give Popeye gold coins equal to the sum of values on all nodes of both the subtrees .

Popeye being poor in mathematics asks you to find the maximum coins he can get (if any).Popeye cannot select only one subtree .He must select two subtrees or none at all .

(Two subtrees are non intersecting if they do not have any node in common.)

Note: The nodes can have negative values .If total sum is negative , Popeye will not get any coins .

Input Format

First line of the input contains single integer representing the number of nodes N in the tree . Second line contains N integers a1,a2,a3…..an representing the value on each node . Next N-1 lines contains two integers A and B ,representing that node A and node B are connected .

Constraints

0<N<=100000  
-100000<=ai<=100000 (Value on node)

Output Format

Print a single integer representing the maximum coins Popeye can get .

Sample Input

5

-20 -1 8 1 7

1 2

1 4

2 3

2 5

Sample Output

15

Explanation

The best choice is to choose subtrees having node 3 and node 4 only .

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Q3

Suppose there is a circle. There are N petrol pumps on that circle. Petrol pumps are numbered 0 to (N-1) (both inclusive). You have two pieces of information corresponding to each of the petrol pump: (1) the amount of petrol that particular petrol pump will give, and (2) the distance from that petrol pump to the next petrol pump.  
Initially, you have a tank of infinite capacity carrying no petrol. You can start the tour at any of the petrol pumps.  
Calculate the first point from where the bus will be able to complete the circle. Consider that the bus will stop at each of the petrol pumps. The bus will move one kilometer for each litre of the petrol.

Input Format

The first line will contain the value of N. The next N lines will contain a pair of integers each, i.e. the amount of petrol that petrol pump will give and the distance between that petrol pump and the next petrol pump.

Constraints

1<=N<=100000

1<=amount of petrol, distance<=1000000000

Output Format

An integer which will be the smallest index of the petrol pump from which we can start the tour.

Sample Input

3

1 5

10 3

3 4

Sample Output

1

Explanation

We can start the tour from the second petrol pump.

Q4

Given a fence with n posts and k colors, find out the number of ways of painting the fence such that at most 2 adjacent posts have the same color. Since answer can be large return it modulo 10^9 + 7.

Input Format

First and only line of each test case consists of two integers n and k.

Constraints

n and k are sufficiently small numbers

Output Format

Output an integer denoting the answer modulo 10^9 + 7.

Sample Input

4 2

Sample Output

10

Q5

The kids in kindergarten made Christmas cookies with their teacher, and piled them up in columns. They then arranged the columns so that the tops of the columns, going from shortest to tallest, were in a nice straight ramp. The cookies were all of uniform size. Given that there were A cookies in the shortest pile, that the difference in height between any two adjacent piles was D cookies, and that there were N piles, can you write a program to figure out how many cookies there were in total?

Input Format

The first line contains the number of test cases T. T lines follow, one corresponding to each test case, containing 3 integers : N, A and D.

Constraints

T <= 100000  
1 <= N, A, D <=100

Output Format

Output T lines, each line containing the required answer for the corresponding test case.

Sample Input

3

1 1 1

3 5 6

2 1 2

Sample Output

1

33

4

Explanation

In the second test case the sequence is: 5, 11, 17 whose sum is 33.