

E. Byteland, Berland and Disputed Cities

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

The cities of Byteland and Berland are located on the axis Ox. In addition, on this axis there are also disputed cities, which belong to each of the countries in their opinion. Thus, on the line Ox there are three types of cities:

- the cities of Byteland,
- the cities of Berland,
- disputed cities.

Recently, the project BNET has been launched — a computer network of a new generation. Now the task of the both countries is to connect the cities so that the network of this country is *connected*.

The countries agreed to connect *the pairs* of cities with BNET cables in such a way that:

- If you look at the *only* cities of Byteland and the disputed cities, then in the resulting set of cities, any city should be reachable from any other one by one or more cables,
- If you look at the *only* cities of Berland and the disputed cities, then in the resulting set of cities, any city should be reachable from any other one by one or more cables.

Thus, it is necessary to choose a set of pairs of cities to connect by cables in such a way that both conditions are satisfied simultaneously. Cables allow bi-directional data transfer. Each cable connects exactly two distinct cities.

The cost of laying a cable from one city to another is equal to the distance between them. Find the minimum total cost of laying a set of cables so that two subsets of cities (Byteland and disputed cities, Berland and disputed cities) are connected.

Each city is a point on the line Ox. It is technically possible to connect the cities a and b with a cable so that the city c ($a < c < b$) is not connected to this cable, where a, b and c are simultaneously coordinates of the cities a, b and c.

Input

The first line contains a single integer n ($2 \leq n \leq 2 \cdot 10^5$) — the number of cities.

The following n lines contains an integer x_i and the letter c_i ($-10^9 \leq x_i \leq 10^9$) — the coordinate of the city and its type. If the city belongs to Byteland, c_i equals to 'B'. If the city belongs to Berland, c_i equals to «R». If the city is disputed, c_i equals to 'P'.

All cities have distinct coordinates. Guaranteed, that the cities are given in the increasing order of their coordinates.

Output

Print the minimal total length of such set of cables, that if we delete all Berland cities ($c_i = 'R'$), it will be possible to find a way from any remaining city to any other remaining city, moving only by cables. Similarly, if we delete all Byteland cities ($c_i = 'B'$), it will be possible to find a way from any remaining city to any other remaining city, moving only by cables.

Examples

input
4 -5 R 0 P 3 P 7 B
output

12
input
5 10 R 14 B 16 B 21 R 32 R
output
24

Note

In the first example, you should connect the first city with the second, the second with the third, and the third with the fourth. The total length of the cables will be $5 + 3 + 4 = 12$.

In the second example there are no disputed cities, so you need to connect all the neighboring cities of Byteland and all the neighboring cities of Berland. The cities of Berland have coordinates 10, 21, 32, so to connect them you need two cables of length 11 and 11. The cities of Byteland have coordinates 14 and 16, so to connect them you need one cable of length 2. Thus, the total length of all cables is $11 + 11 + 2 = 24$.