Problem H. RPG Pro League

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	1024 megabytes

The International Computer Playing Company (ICPC) is recently scheduling the annual RPG Pro League (RPL). In the RPG game, there are three kinds of different roles: Damager, Synergier, and Buffer. A team consists of exactly four players. Only the following two types of teams are allowed in RPL:

- One Damager, two Synergiers, and one Buffer.
- Two Damagers, one Synergier, and one Buffer.

Before the real competition, the ICPC decides to hold an exhibition game. There are n players, labeled by $1, 2, \ldots, n$. The i-th player can only play roles in set S_i, and the price to invite him to participate in the exhibition game is p_i dollars.

You are working for the ICPC. Your job is to select which players to invite such that they can make the maximum number of valid teams, and the total cost is minimized. Note that a player can not join multiple teams.

Unfortunately, the players may always adjust their prices. You will be given q events, in each event, the price of a player will be changed. Your task is to report the current minimum total cost for maximizing the valid teams after each event.

Input

The first line contains a single integer n ($1 \le n \le 10^5$), denoting the number of players.

Each of the following n lines contains a string S_i and an integer p_i ($1 \le |S_i| \le 3$, $1 \le p_i \le 10^9$), denoting the role set and the price of the i-th player. S_i consists of at most three different characters in {'`D`', '`S`', '`B`'}, denoting Damager, Synergier, and Buffer, respectively.

The next line contains a single integer q ($1 \le q \le 10^5$), denoting the number of events.

Each of the following q lines contains two integers x_i and y_i ($1 \le x_i \le n$, $1 \le y_i \le 10^9$), denoting the price of the x_i-th player is changed into y_i dollars.

Output

Output q lines, the i-th ($1 \le i \le q$) of which contains an integer denoting the minimum total cost for maximizing the valid teams after the i-th event.

Example

standard input	standard output
5 BS 3 D 3 B 2 D 4 D 5 2 5 2 1 5	10 12