String Imbalance (stringimbalance)

Bogdan is giving Carlo orthography lessons! The course will be held in Q days, during which Carlo will have to copy the string written on the blackboard as an exercise. The string is initially empty, and each day i ($0 \leq i < Q$) will be extended by Bodgan with F_i copies of the character C_i that is the lesson's topic. More formally, the exercise string S_i will be as follows:

- S_0 consists of F_0 characters equal to C_0;
- S_i is the concatenation of S_{i-1} and F_i characters equal to C_i.

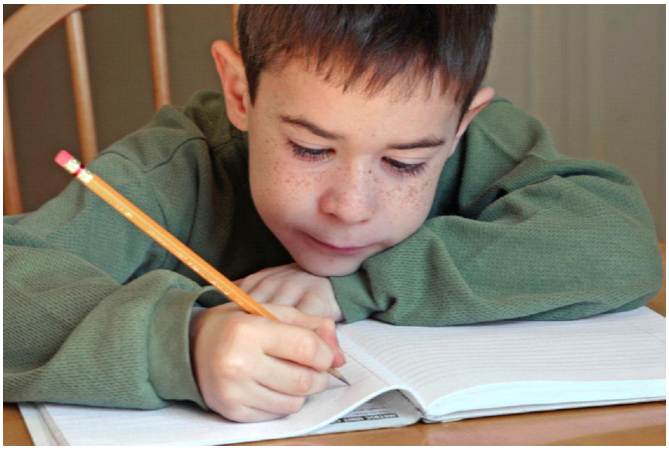

Figure 1: Carlo practising.

Carlo is very prone to mistakes and on day i he will get up to K_i letters wrong. Thus, the string he will write on that day will differ from S_i in at most K_i positions. Bogdan would like to know the minimum possible *imbalance* of the strings Carlo will write. We define the *imbalance* of a string of length N as the number of pair of indices (i, j) such that $0 \leq i < j < N$ and $S_i \neq S_j$.

☞ Among the attachments of this task you may find a template file *stringimbalance.** with a sample incomplete implementation.

Input

The first line of the input file contains a single integer T, the number of test cases. T test cases follow, each preceded by an empty line. Each test case consists of:

- a line containing integer Q.
- Q lines, the i-th of which consisting of integer F_i; character C_i and integer K_i.

Output

For each query from each testcase, output a single line containing one integer denoting the answer for that query.

Constraints

- $1 \leq T \leq 10$.
- $1 \leq Q \leq 200\,000$.
- $1 \leq F_i \leq 5000$.
- $1 \leq K_i \leq 10^9$.
- C_i is a lowercase or uppercase letter of the English alphabet.
- The sum of Q over all test cases does not exceed 200 000.

Scoring

Your program will be tested against several test cases grouped in subtasks. In order to obtain the score of a subtask, your program needs to correctly solve all of its test cases.

– **Subtask 1** (0 points) Examples.

– **Subtask 2** (20 points) $Q \leq 200$ and $F_i = 1, K_i \leq 10$ for every $0 \leq i < Q$.

– **Subtask 3** (24 points) $C_i =$ `'a'` or $C_i =$ `'b'` for every $0 \leq i < Q$.

– **Subtask 4** (26 points) C_i is a lowercase letter for every $0 \leq i < Q$.

– **Subtask 5** (30 points) No additional limitations.

Examples

input	output
2 3 2 a 0 3 b 3 2 c 2 2 2 A 10 3 a 1	0 0 10 0 4

Explanation

In the **first testcase of the sample case**:

- $S_0 =$ `"aa"`. Its *imbalance* is 0 and it is possible for Carlo to copy it correctly.
- $S_1 =$ `"aabbb"`. It is possible for Carlo to write `"aaaaa"`, which has an imbalance of 0.
- $S_2 =$ `"aabbbcc"`. Its imbalance is 16. It is possible for Carlo to write `"aabbbbb"`, which has an imbalance of 10. He cannot write a string with a lower *imbalance* with up to 2 mistakes.