Problem H. Hydrology

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	256 mebibytes

Fatima is a hydrologist. She currently studies water circulation in her country river basins. She collects snapshots from various meteorological stations that measure diverse climate-related values. Fatima then searches for interesting patterns in those snapshots. She uses a program which reads incoming snapshots' data in real time and outputs those snapshots which are interesting in some way. The decision whether a snapshot is "interesting" is based on a fixed set of conditions, such as "the value is greater than the average of the last two hours" or "the value is lower than anything else in the last five minutes" which are easy to program into a computer.

Today, Fatima is in doubt about her yesterday's results and she came to see you, an experienced programmer. She thinks that her program did not evaluate the data correctly and she asks you to help her verify its results.

In particular, she brings the complete sequence of snapshots and describes the set of conditions to you. Your program has to read the snapshots and produce the output according to the conditions. Fatima will then compare the output of your program to the output of her program and decide what has to be done next.

Input

There are more test cases. The first line of each test case contains one integer N ($1 \le N \le 10^5$), giving the number of snapshots. Then there are N lines, each describing one snapshot. The line contains two integers T_i and V_i ($1 \le T_i \le 10^9$, $1 \le V_i \le 10^4$), meaning that the snapshot value V_i was acquired in time T_i.

The times are given in seconds elapsed since some fixed moment in the past and they form a strictly increasing sequence (for all i, k such as $1 \le i < k \le N$, $T_i < T_k$).

The next line of the input contains one integer C ($1 \le C \le 10$), the number of conditions to evaluate. Each of the following C lines specifies one condition C_j. The line contains three tokens separated with a space:

1. A relation operator R_j, which is either "`gt`" (greater than) or "`lt`" (less than).
2. An aggregate function F_j, one of the "`min`" (minimum), "`max`" (maximum), or "`avg`" (average).
3. An integer number L_j specifying the length of the time interval to be concerned, in seconds.

In general, a condition applied to a snapshot value V_i checks how V_i is related to some aggregate feature of the snapshots which were acquired before V_i . The function F_j specifies exactly that feature.

To be more specific, let S_{ij} be the set of all snapshots which were acquired before V_i but no more than L_j seconds earlier. The snapshot value V_i satisfies the condition C_j if and only if the relation V_i, R_j, F_j (S_{ij}) holds. For example, the snapshot value 800 in conjunction with "`lt min 300`" can be read as "is 800 less than the minimum snapshot value acquired in the previous 5 minutes before this 800 was obtained?". Note that snapshot V_i is not an element of S_{ij}.

Output

For each condition, print one integer: the number of snapshots whose values satisfy that particular condition. If there are no snapshots in the time interval specified by the condition, the condition is never considered satisfied.

Example

standard input	standard output
10 60 30 120 28 180 35 240 34 300 40 360 31 420 28 480 2 540 42 600 30 2 gt avg 7200 lt min 300	4 2