

Reading Novels

Input file: **standard input**
Output file: **standard output**
Time limit: 3 seconds
Memory limit: 1024 megabytes

You are bored and decided to start reading light novels again. There are N light novels that you plan to read, where the i -th light novel takes t_i seconds to read. The light novels are numbered in increasing order of interestingness, i.e. the i -th light novel is less interesting than the j -th light novel if and only if $i < j$.

Yesterday, you read $k \geq 1$ distinct light novels: novels s_1, s_2, \dots, s_k in that order. For each novel s_i , if novel s_{i-1} is more interesting than s_i , then you consider novel s_i as bad. Otherwise, you consider novel s_i as good. Novel s_1 is always classified as good.

Due to your poor memory, you have forgotten what novels you have read yesterday! However, you remembered some of the novels you read and whether they are good or bad. Additionally, since you only had T units of free time yesterday, the total time you took to read the novels is at most T .

For all $1 \leq t \leq T$, you wonder how many sequences s_1, s_2, \dots, s_k of novels are consistent with your memory and such that the total time taken to read them is exactly t . Output the answers modulo $10^9 + 7$.

Note that you do not remember the value of k , so different valid sequences may have different values of k . Also, the order that the novels are read in matters, i.e. sequence 1, 3, 2 is different from sequence 1, 2, 3.

Input

The first line of input contains two space-separated integers, N, T ($1 \leq N, T \leq 600$).

The next line contains N space-separated integers, the i -th of which denotes t_i ($1 \leq t_i \leq T$).

The next line contains a string S of length N . The i -th character of S is **B** if the i -th novel is bad, **G** if the i -th novel is good, and **?** if you are unsure whether the novel is good or bad.

Note that all novels that are marked as good or bad must have been read.

Output

Output T space-separated integers, the i -th of which denotes the answer when $t = i$. Remember to output your answers modulo $10^9 + 7$.

Scoring

Subtask 1 (4 points): $N \leq 8$

Subtask 2 (9 points): All characters in S are **?**.

Subtask 3 (16 points): $N \leq 15, T \leq 100$

Subtask 4 (49 points): $t_i = 1, N \leq 100$

Subtask 5 (22 points): Original Constraints

Examples

standard input	standard output
3 11 1 8 6 B??	0 0 0 0 0 0 1 0 1 0 0
4 9 1 2 3 4 GG??	0 0 1 0 0 1 1 0 0
9 9 3 1 4 1 5 9 2 6 5 ????????	2 3 5 11 14 29 58 72 121

Note

In the first sample, the sequence of novels 3, 1 is the only valid sequence for $t = 7$ and the sequence of novels 2, 1 is the only valid sequence for $t = 9$.

In the second sample, the sequence of novels 1, 2 is the only valid sequence for $t = 3$, the sequence of novels 1, 2, 3 is the only valid sequence for $t = 6$ and the sequence of novels 1, 2, 4 is the only valid sequence for $t = 7$.

The last sample satisfies the constraints for Subtask 2.