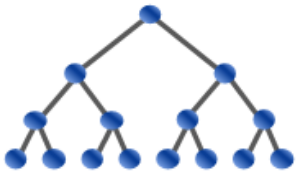
USA Computing Olympiad



USACO 2022 December Contest, Bronze
Problem 2. Feeding the Cows

Return to Problem List

Contest has ended.

Submitted; Results below show the outcome for each judge test case

1	2	3	4	5	6	7	8	9	10	11	12
* 32.2mb 185ms	* 32.0mb 187ms	* 32.1mb 185ms	* 32.0mb 195ms	* 32.4mb 189ms	* 32.0mb 189ms	* 32.0mb 191ms	* 32.0mb 180ms	* 42.0mb 557ms	* 41.7mb 517ms	* 42.0mb 571ms	* 41.4mb 518ms

English (en)

Farmer John has N ($1 \le N \le 10^5$) cows, the breed of each being either a Guernsey or a Holstein. They have lined up horizontally with the cows occupying positions labeled from $1 \ldots N$.

Since all the cows are hungry, FJ decides to plant grassy patches on some of the positions $1 \ldots N$. Guernseys and Holsteins prefer different types of grass, so if Farmer John decides to plant grass at some location, he must choose to planting either Guernsey-preferred grass or Holstein-preferred grass --- he cannot plant both at the same location. Each patch of grass planted can feed an unlimited number of cows of the appropriate breed.

Each cow is willing to move a maximum of K ($0 \le K \le N-1$) positions to reach a patch. Find the minimum number of patches needed to feed all the cows. Also, print a configuration of patches that uses the minimum amount of patches needed to feed the cows. Any configuration that satisfies the above conditions will be considered correct.

INPUT FORMAT (input arrives from the terminal / stdin):

Each input contains T test cases, each describing an arrangement of cows. The first line of input contains T ($1 \le T \le 10$). Each of the T test cases follow.

Each test case starts with a line containing N and K. The next line will contain a string of length N, where each character denotes the breed of the ith cow (G meaning Guernsey and H meaning Holstein).

OUTPUT FORMAT (print output to the terminal / stdout):

For each of the T test cases, please write two lines of output. For the first line, print the minimum number of patches needed to feed the cows. For the second line, print a string of length N that describes a configuration that feeds all the cows with the minimum number of patches. The ith character, describing the ith position, should be a '.' if there is no patch, a 'G' if there is a patch that feeds Guernseys, and a 'H' if it feeds Holsteins. Any valid configuration will be accepted.

SAMPLE INPUT:

```
6
5 0
GHHGG
5 1
GHHGG
5 2
GHHGG
5 3
GHHGG
5 4
GHHGG
2 1
GH
```

SAMPLE OUTPUT:

```
5
GHHGG
3
.GH.G
2
..GH.
```

```
2
...GH
2
...HG
2
HG
```

Note that for some test cases, there are multiple acceptable configurations that manage to feed all cows while using the minimum number of patches. For example, in the fourth test case, another acceptable answer would be:

```
.GH..
```

This corresponds to placing a patch feeding Guernseys on the 2nd position and a patch feeding Holsteins on the third position. This uses the optimal number of patches and ensures that all cows are within 3 positions of a patch they prefer.

SCORING:

- Inputs 2 through 4 have $N \leq 10$.
- Inputs 5 through 8 have $N \leq 40$.
- Inputs 9 through 12 have $N \leq 10^5$.

Problem credits: Mythreya Dharani

Language: C

Source File: Choose File No file chosen

Submit Solution

Note: Many issues (e.g., uninitialized variables, out-of-bounds memory access) can cause a program to produce different output when run multiple times; if your program behaves in a manner inconsistent with the official contest results, you should probably look for one of these issues. Timing can also differ slightly from run to run, so it is possible for a program timing out in the official results to occasionally run just under the time limit in analysis mode, and vice versa. Note also that we have recently changed grading servers, and since our new servers run at different speeds from the servers used during older contests, timing results for older contest problems may be slightly off until we manage to re-calibrate everything properly.