

DIVISION

Introduction

Commissar Beetlechev considered map of the country once again. The task he was entrusted with by the Commander-in-Chief was clearly defined: secure the victory of the Beetleparty (due to its vital role referred to as *Party A*) over the Pacifist Party (referred to as *Party B*). In addition the elections was to be conducted in the manner not causing undue surprises or confusion.

The matter was seemingly simple, as the voting results in individual regions of the country were already known. Unfortunately the latest legislative regulations – following the trend for *binarism* – represented a difficulty. The new electoral law only allowed for creation of voting districts that consisted of exactly two adjacent regions. Therefore, the planet had to be divided into such districts.

“Adjutant!” – yelled the Commissar. *“Bring in my deputies! Since the Command ordered their numbers diminished, we’ll test in practice which ones are the most intelligent...”* – he twitched his antennae menacingly.

Problem

A map with dimensions $N \times M$ fields is known. Each field represents one region where election takes place. Election results in each region are pre-established. Two adjacent regions (having a common side) can create a voting district. A party wins in a given voting district, if and only if both regions of that district voted for the party.

Calculate the number of possible divisions of the territory into voting districts in such a manner that Party A wins in exactly X districts. The remainder of division of the obtained number of possible divisions by a certain fixed (for a given map) number R should be given as the result.

Input data

Test sets are given in `division*.in` files.

The first line of the test set includes one integer T , denoting the number of tests. The following lines include descriptions of tests.

The first line of the test description includes two natural numbers M and N that constitute the dimensions of the map of voting regions. The second line includes an integer value X – the exact number of voting districts where Party A is supposed to win. The third line of the test set includes the integer R .

The following N lines of the test description include M $P_{i,j}$ characters each. Each of the $P_{i,j}$ characters represents one region of the map with coordinates (i, j) and can take one of two values: 'A' (if Party A wins in a given region) or 'B' (if Party B wins in a given region).

$$1 \leq T \leq 10$$

$$3 \leq M, N \leq 20$$

$$1 \leq X \leq 200$$

$$2 \leq R \leq 10^4$$

$$P_{i,j} \in \{A, B\}$$

$$1 \leq i \leq M$$

$$1 \leq j \leq N$$

Output data

For each test give the value that constitutes the remainder of division by R of the number of possible divisions of the map into voting districts in such a manner that allows Party A to win in exactly X districts. If the specified division is not possible, give the value 0.

Test answers should be given in the same order, as in the input data file.

Example

For input data:

```
3
4 3
5
13
AAAA
ABBA
AAAA
4 3
4
101
AAAA
ABBA
AAAA
4 4
4
11
AABB
AABB
AABB
AABB
```

The correct answer is:

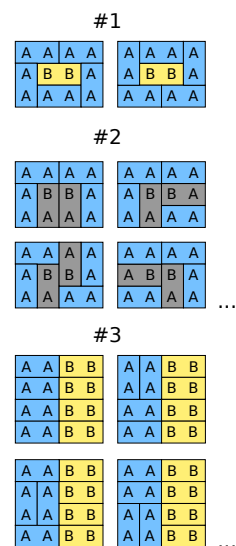
```
2
9
3
```

Example clarification

For the first test there are only two divisions possible, for Party A to win in exactly five voting districts. Both are shown in the figure on the right (#1). Therefore, the correct value for the test is: $2 \bmod 13 = 2$

In the second test Party A is supposed to win in exactly four voting districts. In order for it to be possible there must be a tie in two voting districts (none of the parties wins). There are nine divisions that comply with the constraints. Four of them are shown in the figure on the right (#2). Result: $9 \bmod 101 = 9$.

Assumptions adopted for the third test preclude the creation of voting districts where the result is a tie. The shape and size of the area with the regions where Party A wins is the same as the analogous area created for Party B. In both areas there are 5 possible divisions into voting districts (4 different divisions with regions A are shown on the right, #3). In total it gives 25 ($5 \cdot 5$) divisions that comply with the test constraints. The value R is equal to 11. Thus, the final result is: $25 \bmod 11 = 3$.



Score

If the answer is correct, the score for the given set is 1. Otherwise the score is 0.