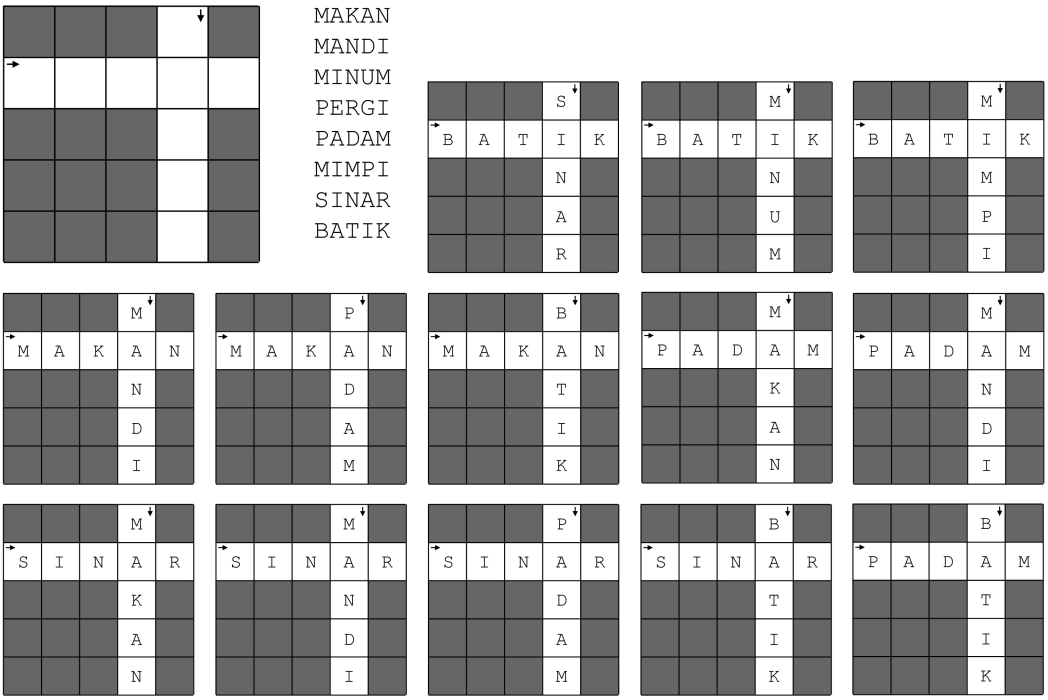
Problem H
Simple Crossword

A crossword is a word puzzle usually played in a square or rectangular grid with white/black cells whereas the goal is to fill all white cells with words. The rule of crossword is that one can fill each empty/white cell with a character such that when we read across or down, the characters form a word.

In this problem, we are going to create a simple crossword puzzle on a square of $N \times N$. It is simple because there are only one row and one column of white cells, thus, this puzzle can only be filled with exactly two words. You are given an empty crossword puzzle and M words each of length N. Your task is to determine how many pairs of words are there that can fill the given crossword puzzle. A pair of words $\langle$WORD-1, WORD-2$\rangle$ is valid if WORD-1 can be put on the empty row and WORD-2 can be put on the empty column while the common cell contains the same character.

For example, consider the following 5×5 crossword puzzle with the 2^{nd} row and the 4^{th} column empty, and the given words are `MAKAN`, `MANDI`, `MINUM`, `PERGI`, `PADAM`, `MIMPI`, `SINAR`, and `BATIK`.



Note that the pair ⟨MAKAN, PADAM⟩ is different from ⟨PADAM, MAKAN⟩. The first one put MAKAN on the empty row, while the later one put MAKAN on the empty column. Also, note that the pair ⟨MAKAN, MAKAN⟩ is not valid as there is only one MAKAN among the given words.

Input

Input begins with an integer T ($1 \leq T \leq 10$) representing the number of cases.

Each case begins with four integers N R C M ($1 \leq N \leq 10$; $1 \leq R, C \leq N$; $1 \leq M \leq 40\,000$) representing the crossword puzzle size (also the length of the given words), the row with white cells, the column with white cells, and the number of the given words, respectively. The next M lines, each contains a word of length N. Each word contains only uppercase alphabetical character. You are guaranteed that all words in the same case are distinct.

Output

For each case, output in a line "Case #X: Y" (without quotes) where X is the case number (starts from 1) and Y is the output for the respective case.

Sample Input #1

```
3
5 2 4 8
MAKAN
MANDI
MINUM
PERGI
PADAM
MIMPI
SINAR
BATIK
3 1 3 4
AIR
API
ADA
RIA
9 3 6 2
KOMPETISI
MAHASISWA
```

Sample Output #1

```
Case #1: 13
Case #2: 6
Case #3: 0
```

Explanation for the sample input/output #1

The pairs for the 2^{nd} case are:

- $\langle$AIR, RIA$\rangle$
- $\langle$ADA, AIR$\rangle$
- $\langle$ADA, API$\rangle$
- $\langle$RIA, AIR$\rangle$
- $\langle$RIA, API$\rangle$
- $\langle$RIA, ADA$\rangle$

Observe that $\langle$AIR, RIA$\rangle$ and $\langle$RIA, AIR$\rangle$ are considered as two different pairs. Also, observe that $\langle$ADA, ADA$\rangle$ is not a valid pair as there is only one ADA among the given words.