Unhappy Team

Input file:	`standard input`
Output file:	`standard output`
Time limit:	5 seconds
Memory limit:	512 megabytes

You are managing a team of N people numbered from 1 to N. In the team everyone perceives everyone else as stronger or weaker than them in work performance. For the year end bonus you need to stack rank the team in some way. A stack rank P is a permutation of the numbers from 1 to N, where P_1 is the best ranked person while P_N is the worst ranked. After the stack ranking is done, it is visible to everyone in the team.

Everyone has an unhappiness score which is equal to the number of people with better rank that they deemed weaker than them. If we find the unhappiness score of everyone and sum up the largest or worst K unhappiness score then we find the score of that stack ranking. For example if the ascendingly sorted unhappiness score of a stack ranking is [0,1,2,2,3] then for $K = 2$ the score is 5(3+2) and for $K = 3$ the score is 7 (3+2+2).

Given N, K and everyone's perception of who is stronger or weaker than them, find the expected unhappiness score of a randomly chosen stack ranking. The answer can be expressed as $\frac{P}{Q}, Q \neq 0$, then answer the value of $(P \cdot Q^{-1})$ modulo 998244353.

Input

The first line of the input contains an integer T($1 \leq T \leq 50$), denoting the number of test scenarios. For each test scenario, the first line contains two integers N and K ($1 \leq K \leq N \leq 16$). The next N lines each contain N uppercase characters. The character j in line i represents what person i thinks of person j. If the character is **'S'** then i thinks j is stronger. If it is **'W'** then i thinks j is weaker. It will be **'X'** if $i = j$. It is guaranteed that the number of test cases where $N > 12$ is at most 3.

Output

For each test scenario print one line, the expected score of a randomly chosen stack ranking modulo 998244353.

Example

standard input	standard output
3 3 2 XSW SXW WSX 4 3 XSWS WXSW SSXS SWWX 1 1 X	499122178 499122179 0