UVa Online Judge

11979 Hamming Base

You are given N integers in base-N each of them having exactly M digits (may be with some leading zeros). Two integers are called K-similar if they have the same digits in exactly K positions. For example 321 and 213 are 0-similar. 3456 and 6453 are 2-similar, 123 and 453 are 1-similar. You want to change these given N-integers in such a way that each pair of these integers are 0-similar. To achieve this goal you can change the integers in several steps. In a single step you can change a single digit of a single integer by 1 (incrementing or decrementing). But you can't decrement if the digit is 0 or you can't increment if the digit is $N - 1$.

You need to achieve your goal in minimum number of steps.

Input

Input starts with an integer T (≤ 50), denoting the number of test cases.

Each case starts with a line containing two integers N ($2 \leq N \leq 2000$) and M ($1 \leq M \leq 10$). Each of the next N lines contains M integers between 0 and $N - 1$ inclusive. These M integers form an M digit number in base N.

Output

For each case, print the case number and the minimal steps required to achieve your goal.

Sample Input

```
2
3 3
0 0 0
0 0 0
0 0 0
4 2
0 0
0 0
0 2
2 0
```

Sample Output

```
Case 1: 9
Case 2: 8
```