You are in the system of $N$-dimensional infinite hyper-grid with each hyper cell having an integer. In an $N$-dimensional grid the co-ordinates of a cell are denoted as $(X_1, X_2, \ldots, X_N)$. Any hyper cell with at least one negative co-ordinate contains the value 0 (zero). The origin hyper cell (the one with all zero co-ordinates) contains the value 1. The value of a hyper cell with co-ordinate $(X_1, X_2, \ldots, X_N)$ (with all non-negative $X_i$) is the sum of the values in $N$ hyper cells with co-ordinates $(X_1 - 1, X_2, \ldots, X_N)$, $(X_1, X_2 - 1, \ldots, X_N)$, \ldots, $(X_1, X_2, \ldots, X_N - 1)$. You are given the starting and ending co-ordinate of a subhypercube. You need to compute how many hyper cells in this sub hypercube contain an integer not divisible by a given prime $P$.

**Input**

First line of the input contains $T$ ($0 < T < 51$) the number of test cases. Each test case starts with a line containing $N$ ($0 < N < 8$) the dimension of the hypercube and the prime $P$ ($1 < P < 20$). The second line contains $N$ integers denoting the co-ordinate of the starting cell of the hypercube. The third line contains $N$ integers denoting the co-ordinate of the ending cell of the hypercube. All the co-ordinates will be non negative integers with at most 15 digits.

**Output**

For each test case, print the serial of output followed by the number of hyper cells in the given sub hypercube that contains an integer not divisible by a given prime $P$. Since the result can be too big so output the result modulo 1000000009. Look at the output for sample input for details.

**Sample Input**

```
3
3 2
4 0 4
7 9 8
4 3
0 3 0 2
6 8 1 5
5 7
1 2 3 4 5
11 12 13 14 15
```

**Sample Output**

```
Case 1: 9
Case 2: 17
Case 3: 2515
```