DMOPC '20 Contest 3 P2 - Bob and Parallel-Ks

Time limit: 2.0s   **Memory limit:** 512M

Bob is composing a song for M singers to perform! The song lasts for N beats, and the x-th singer is assigned a series of N notes $a_{x,1}, \ldots, a_{x,N}$ to sing on each of the beats. Notes are represented by integer values, and the M notes sung on a single beat are all distinct.

Unfortunately, Bob needs to watch out for **parallel-Ks**. A parallel-K is a triple (x, y, t) such that $a_{y,t} - a_{x,t} = a_{y,t+1} - a_{x,t+1} = K$. In other words, a parallel-K is two singers x and y, plus a beat t, such that the notes that x and y sing form an interval of K on both beats t and $t+1$.

Parallel-Ks make music sound absolutely horrendous (for some reason), so please help Bob find all the parallel-Ks in his song!

Constraints

$1 \le N \le 20$
$1 \le K \le 10^9$
$1 \le a_{ij} \le 10^9$
For a given j, $a_{1j}, \ldots, a_{Mj}$ are distinct.

Subtask 1 [2/15]

$1 \le M \le 1\,000$

Subtask 2 [5/15]

$1 \le M \le 50\,000$

Subtask 3 [8/15]

$1 \le M \le 200\,000$

Input Specification

The first line contains three space-separated integers: M, N, and K.
The next M lines each contain N space-separated integers, $a_{i1}, \ldots, a_{iN}$, the notes sung on each beat by singer i.

Output Specification

The number of distinct parallel-Ks in Bob's song. (Two parallel-Ks (x_1, y_1, t_1) and (x_2, y_2, t_2) are distinct if $x_1 \ne x_2$, or $y_1 \ne y_2$, or $t_1 \ne t_2$.)

Sample Input

```
5 3 5
5 6 6
10 11 11
15 16 16
105 116 118
110 111 113
```

Sample Output

```
5
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Explanation for Sample Output

Singers 1 and 2 form two parallel-5s: one between beats 1 and 2, and another between beats 2 and 3. Singers 2 and 3 also form two parallel-5s. Finally, singers 5 and 4 form one parallel-5 between beats 2 and 3. In total, there are five parallel-5s: $(1, 2, 1)$, $(1, 2, 2)$, $(2, 3, 1)$, $(2, 3, 2)$, and $(5, 4, 2)$. (Note that $(4, 5, 2)$, $(5, 4, 1)$, and $(4, 5, 1)$ do not fit the definition of a parallel-5.)