Problem D
Gene Team

Input File: *testdata.in*
Time Limit: 3 seconds

Problem Description

It is known that a gene contains the information necessary to build a protein. Genes are stored in a very long DNA molecule, called *chromosome*. Biological evidence suggests that genes which are located close tend to code for proteins that have a functional interaction. Let Σ be a set of n genes, a chromosome G can be represented as a permutation of Σ, where each gene g in G associates an integer to denote the location of g in G. We use g_i to denote that gene g is at location i in a chromosome. For two genes a_i and b_j, he distance of genes a and b is defined as $|i-j|$. For a given value δ, a subset of Σ is called a δ-term of a chromosome if the distance between two closest neighbor genes is smaller or equal to δ. For example, let $\Sigma = \{a, b, c, d\}$. Given two chromosomes G_1 and G_2, assume that $G_1 = \langle a_1, b_2, c_3, d_4\rangle$ and $G_2 = \langle a_1, b_4, c_5, d_9\rangle$. Let $\delta = 2$. Then $\{a, b, c, d\}$ is a δ-term of G_1 while $\{a\}$, $\{b, c\}$, and $\{d\}$ are the three δ-terms of G_2.

For two chromosomes G_1 and G_2, a δ-term x is called a *gene team* of G_1 and G_2 if x is contained in a δ-term for each chromosome, $|x| \geq 2$, and there is no other gene team containing x. For example, $\{b, c\}$ is a gene team of G_1 and G_2 in the above example.

Given two chromosomes G_1 and G_2, and an integer δ, can you determine the number of gene teams for G_1 and G_2?

Technical Specifications

1. The number of genes in Σ is at most 100, *i.e.*, $|\Sigma| = n \leq 100$.
2. The integer δ satisfies $2 \leq \delta \leq 10$.

Input Format

The first line of the input file contains an integer indicating the number of test cases to follow. Each test case contains four data. The first one is the δ value. The second one is the number of genes in Σ. The remaining data are the two chromosomes. For simplicity, each gene is represented as an integer. Thus a chromosome can be represented as a $2 \times |\Sigma|$ array D. The first row is a sequence of genes in the chromosome. The second row stores the positions for the genes. That is, each $D[1, i]$ stores a number that represents a gene g and $D[2, i]$ is the position of g in the chromosome. Note that the numbers in $D[2]$ form an increasing sequence.

Output Format

For each test case, output a number (≥ 0) that is the number of gene teams for the two chromosomes.

Sample Input

```
2
2
4
1 2 3 4
1 2 3 4
1 2 3 4
1 4 5 9
3
5
1 2 3 4 5
1 2 5 7 8
5 4 1 3 2
1 3 7 8 9
```

Sample Output

```
1
2
```