The Splendid Koala

Problem

You are given a $K \times K$ board, where K is even, and an array a of N pairs of adjacent cells on the board. We say that two cells $\{(r_1, c_1), (r_2, c_2)\}$ are adjacent if $|r_1 - r_2| + |c_1 - c_2| = 1$ holds. A set of pairs of adjacent cells is called *Flamante*[1] if it is possible to cut the board along the lines that define the cells into two connected, congruent pieces, ensuring that all pairs in the set are strictly within one of the pieces. There is a Koala that loves Flamante sets and would like to know the largest size of a Flamante subset of the N pairs you have. Help our Splendid Koala solve the problem.

Implementation Details

You must implement the function *Flamante_Koala()*. This function receives an integer K, the size of the board; an integer N, the number of pairs of adjacent cells; and four vectors $r1$, $c1$, $r2$, and $c2$, each with N elements, the coordinates of the pairs of adjacent cells. This function must return an integer, the maximum size of a Splendid subset. The function would look like this:

```
#include <bits/stdc++.h>
using namespace std;

int Flamante_Koala(int K, int N, vector<int> r1, vector<int> c1,
                   vector<int> r2, vector<int> c2) {
    // Implement this function.
}
```

The grader will call the function **multiple** times for each test case.

Examples

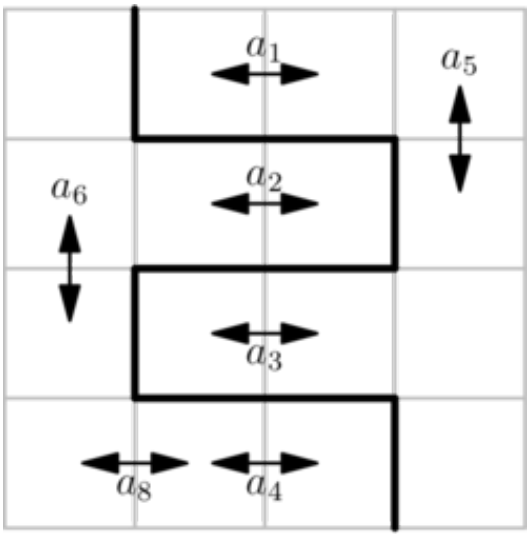
Example 1:

- The grader calls the function

  Flamante_Koala(4, 8, {1, 2, 3, 4, 1, 2, 2, 4}, {2, 2, 2, 2, 4, 1, 2, 1}, {1, 2, 3, 4, 2, 3, 3, 4}, {3, 3, 3, 3, 4, 1, 2, 2})

- In this case, returning 7 would give an accepted verdict. It is possible to show that the set of all pairs is not splendid, but the set with the pairs $\{a_1, a_2, a_3, a_4, a_5, a_6, a_8\}$ is, as shown in the figure:

[1] Flamante means Splendid in spanish :P.



Example 2:

- The grader calls the function

  Flamante_Koala(2, 7, {1, 2, 1, 1, 1, 1, 1}, {1, 1, 1, 1, 2, 1, 2}, {1, 2, 1, 2, 2, 2, 2}, {2, 2, 2, 1, 2, 1, 2})

- In this case, returning 4 would give an accepted verdict.

Example 3:

- The grader calls the function

  Flamante_Koala(6, 1, {3}, {3}, {3}, {4})

- In this case, returning 1 would give an accepted verdict.

Constraints

- $1 \leq N \leq 10^5$.
- $2 \leq K \leq 500$.
- K is an even number.
- For all $0 \leq i \leq N-1$, it holds that $1 \leq c1[i], c2[i], r1[i], r2[i] \leq K$.
- For all $0 \leq i \leq N-1$, the cells $(c1[i], r1[i])$ and $(c2[i], r2[i])$ are adjacent.
- Let S_N be the sum of the values of N over all calls to the function in a case. It is guaranteed that $S_N \leq 10^5$.

- Let S_K be the sum of the values of K over all calls to the function in a case. It is guaranteed that $S_K \leq 500$.

Subtasks

- (10 points) For all $0 \leq i \leq N-1$, it holds that $r1[i] = r2[i]$.
- (10 points) $N, S_N, K, S_K \leq 4$.
- (20 points) $N, S_N, K, S_K \leq 16$.
- (50 points) No additional restrictions.