Mock CCC '18 Contest 1 S4 - A Graph Problem

Time limit: 4.5s   **Memory limit:** 1G

You are given four sequences a, b, c, and d, each consisting of exactly M positive integers.

Let graph $g(k)$ be the graph consisting of vertices labeled from 1 to N where there is a directed edge from vertex u to vertex v if and only if there exists some index i such that $a_i = u$, $b_i = v$, and $c_i \leq k \leq d_i$.

Define $f(s, t, k)$ to be 1 if there is a path from vertex s to vertex t in $g(k)$, and 0 otherwise.

Given S, T, and K, compute $\sum_{k=1}^{K} f(S, T, k)$: the sum of $f(S, T, k)$ as k ranges over all positive integers from 1 to K.

Constraints

$2 \leq N \leq 1\,000$

$1 \leq M \leq 5\,000$

$1 \leq K \leq 10^9$

$1 \leq S, T \leq N, S \neq T$

$1 \leq a_i, b_i \leq N, a_i \neq b_i$

$1 \leq c_i \leq d_i \leq K$

For any pair (x, y) with $x \neq y$, there is at most one index j such that $a_j = x$ and $b_j = y$.

Input Specification

The first line contains three space-separated integers N, M, and K.

The second line contains two space-separated integers S and T.

The next M lines each contain four space-separated integers. Specifically, line i of the input contains a_{i-2}, b_{i-2}, c_{i-2}, and d_{i-2} in order for $3 \leq i \leq M + 2$.

Output Specification

Print, on a single line,

$$\sum_{k=1}^{K} f(S, T, k)$$

Sample Input 1

```
4 5 10
3 2
1 2 4 7
3 1 1 6
3 4 7 10
2 4 3 5
4 2 8 9
```

Sample Output 1

```
5
```

Sample Input 2

```
4 5 9
1 4
1 2 3 5
1 3 6 7
1 4 2 3
2 4 4 6
3 4 7 9
```

Sample Output 2

```
5
```