

Lantern Sparks

time limit per test: 2 seconds (4 seconds for Python)
memory limit per test: 250 megabytes
input: standard input
output: standard output
points: 100 · problem code: lanternsparks

Pondo has strung n lanterns together with m wires. Lantern i independently chooses an integer brightness uniformly at random from the inclusive interval $[l_i, r_i]$.

A wire connecting lanterns u and v produces a spark if at least one of the two brightnesses is divisible by a fixed integer p . Let X be the number of wires that spark.

Output the expected value of X .

It can be shown that the answer can be expressed as a rational number P/Q in lowest terms with Q coprime to $10^9 + 7$. Output $P \cdot Q^{-1} \bmod (10^9 + 7)$.

Input

The first line contains three integers n , m , and p .

Each of the next n lines contains two integers l_i and r_i .

Each of the next m lines contains two integers u and v , describing a wire between lanterns u and v .

Lanterns are numbered 1 through n . The wires form an undirected graph. There are no self-loops, but multiple wires between the same pair of lanterns are allowed; each wire is counted separately.

Output

Print a single integer: the expected number of sparks modulo $10^9 + 7$.

Constraints

- $1 \leq n \leq 10^5$
- $0 \leq m \leq 10^5$
- $1 \leq p \leq 10^9$
- $1 \leq l_i \leq r_i \leq 10^9$
- $1 \leq u, v \leq n$
- $u \neq v$

Example 1

Input

```
3 3 2
1 2
3 4
5 6
1 2
2 3
3 1
```

Output

```
250000004
```

Explanation

Each lantern has brightness even with probability $1/2$. A wire sparks unless both endpoints are odd, which happens with probability $1/4$, so each wire sparks with probability $3/4$. The three wires contribute $9/4$ in expectation, and $9 \cdot 4^{-1} \equiv 250000004 \pmod{10^9 + 7}$.

The three spark events are dependent because they share lanterns, but the expectation of the sum is still the sum of the expectations.

Example 2

Input

```
2 1 3
1 3
1 2
1 2
```

Output

```
333333336
```

Explanation

Lantern 1 fails to be divisible by 3 with probability $2/3$, and lantern 2 never chooses a multiple of 3. The single wire therefore sparks with probability $1/3$.

Example 3

Input

```
1 0 1
1 1
```

Output

```
0
```

Explanation

There are no wires, so the expected number of sparks is 0.