C. Limak and Shooting Points

time limit per test: 3 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Bearland is a dangerous place. Limak can't travel on foot. Instead, he has k magic teleportation stones. Each stone can be used **at most once**. The i-th stone allows to teleport to a point (ax_i, ay_i). Limak can use stones **in any order**.

There are n monsters in Bearland. The i-th of them stands at (mx_i, my_i).

The given $k + n$ points are pairwise distinct.

After each teleportation, Limak can shoot an arrow in some direction. An arrow will hit the first monster in the chosen direction. Then, both an arrow and a monster disappear. It's dangerous to stay in one place for long, so Limak can shoot only one arrow from one place.

A monster should be afraid if it's possible that Limak will hit it. How many monsters should be afraid of Limak?

Input

The first line of the input contains two integers k and n ($1 \le k \le 7$, $1 \le n \le 1000$) — the number of stones and the number of monsters.

The i-th of following k lines contains two integers ax_i and ay_i ($-10^9 \le ax_i, ay_i \le 10^9$) — coordinates to which Limak can teleport using the i-th stone.

The i-th of last n lines contains two integers mx_i and my_i ($-10^9 \le mx_i, my_i \le 10^9$) — coordinates of the i-th monster.

The given $k + n$ points are pairwise distinct.

Output

Print the number of monsters which should be afraid of Limak.

Examples

input
2 4 -2 -1 4 5 4 2 2 1 4 -1 1 -1

output
3

input
3 8 10 20 0 0 20 40 300 600 30 60 170 340 50 100 28 56 90 180 -4 -8 -1 -2

output
5

Note

In the first sample, there are two stones and four monsters. Stones allow to teleport to points $(-2, -1)$ and $(4, 5)$, marked blue in the drawing below. Monsters are at $(4, 2)$, $(2, 1)$, $(4, -1)$ and $(1, -1)$, marked red. A monster at $(4, -1)$ shouldn't be afraid because it's impossible that Limak will hit it with an arrow. Other three monsters can be hit and thus the answer is 3.

In the second sample, five monsters should be afraid. Safe monsters are those at $(300, 600)$, $(170, 340)$ and $(90, 180)$.