Magic Maze

Time limit: 1.0s **Memory limit:** 512M
Java 8: 2.5s
PyPy 2: 2.5s
PyPy 3: 2.5s

Naofumi is exploring a magical maze! The maze is a 2-D array with $N \times N$ pillars. The height of each pillar is generated using two arrays R and C, each of size N. Specifically, the height of the pillar at row i and column j, pillar (i, j), would be $R_i \times C_j$. A path in this maze is defined as a sequence of pillars where every successive pillar is below or to the right of the previous pillar (i.e. only moving down or to the right). A valid path is defined as a path where the height of each pillar in the path is 0. To help him reduce the height of the pillars, Naofumi has a magical modulus spray, allowing him to reduce the height of each pillar to $R_i \times C_j \bmod M$, where M is any prime number Naofumi chooses. Being the observant person he is, Naofumi has Q queries containing 4 integers r_a, c_a, r_b, c_b. For each query, he wants you to find out the maximum prime M he can choose such that there is a valid path from (r_a, c_a) to (r_b, c_b), or determine that it is impossible to create a valid path. Note that he does not actually use the spray after you answer a query. Can you help him find these values?

Input Specification

The first line will contain 2 integers N and Q, representing the dimensions of the grid and the number of queries.

The second line will contain N integers R_i, representing the array R.

The third line will contain N integers C_j, representing the array C.

The next Q lines will each contain 4 integers r_a, c_a, r_b, c_b, representing a query from (r_a, c_a) to (r_b, c_b).

Output Specification

The output should contain Q integers, each on a separate line, representing the maximum prime M that can be used to create a valid path for the corresponding query. If no such M exists, print `-1`.

Constraints

$1 \leq N \leq 10^5$

$1 \leq Q \leq 10^5$

$1 \leq R_i, C_j \leq 1000$

$1 \leq r_a, c_a, r_b, c_b \leq N$

$r_a \leq r_b$

$c_a \leq c_b$

Subtask 1 [20%]

$1 \leq N \leq 100$

$1 \leq Q \leq 100$

Subtask 2 [80%]

No additional constraints.

Sample Input

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

Sample Output

```
2
3
-1
```

Visualization of Sample Input

×	3	4	2	6	5
2	6	8	4	12	10
3	9	12	6	18	15
1	3	4	2	6	5
4	12	16	8	24	20
3	9	12	6	18	15