16/11/2017 HackerRank



GCD Matrix **■**



Problem Submissions Leaderboard Discussions Editorial

Alex has two arrays defined as $A = [a_0, a_1, \dots, a_{n-1}]$ and $B = [b_0, b_1, \dots, b_{m-1}]$. He created an $n \times m$ matrix, M, where $M_{i,j} = \gcd(a_i, b_j)$ for each i, j in M. Recall that $\gcd(a, b)$ is the greatest common divisor of a and b.

For example, if A=[2,3] and B=[5,6], he builds M=[[1,2],[1,3]] like so:

(i,j)	0	1
0	$\gcd(2,5)=1$	$\gcd(2,6)=2$
1	$\gcd(3,5)=1$	$\gcd(3,6)=3$

Alex's friend Kiara loves matrices, so he gives her q questions about matrix M where each question is in the form of some submatrix of M with its upper-left corner at M_{r_1,c_1} and its bottom-right corner at M_{r_2,c_2} . For each question, find and print the number of distinct integers in the given submatrix on a new line.

Input Format

The first line contains three space-separated integers describing the respective values of n (the size of array A), m (the size of array B), and q (Alex's number of questions).

The second line contains n space-separated integers describing $a_0, a_1, \ldots, a_{n-1}$.

The third line contains m space-separated integers describing $b_0, b_1, \ldots, b_{m-1}$.

Each line i of the q subsequent lines contains four space-separated integers describing the respective values of r_1 , c_1 , r_2 , and c_2 for the ith question (i.e., defining a submatrix with upper-left corner (r_1, c_1) and bottom-right corner (r_2, c_2)).

Constraints

- $1 \le n, m \le 10^5$
- $1 \le a_i, b_i \le 10^5$
- $1 \le q \le 10$
- $0 \le r_1, r_2 < n$
- $0 \le c_1, c_2 < m$

Scoring

- $1 \le n, m \le 1000$ for 25% of score.
- $1 \le n, m \le 10^5$ for 100% of score.

Output Format

For each of Alex's questions, print the number of distinct integers in the given submatrix on a new line.

Sample Input 0

- 3 3 3
- 1 2 3

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```
2 4 6
0 0 1 1
0 0 2 2
1 1 2 2
```

Sample Output 0

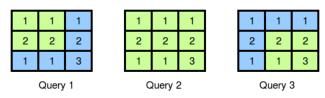
2 3 3

Explanation 0

Given A = [1, 2, 3] and B = [2, 4, 6], we build the following M:

(i,j)	0	1	2
0	$\gcd(1,2)=1$	$\gcd(1,4)=1$	$\gcd(1,6)=1$
1	$\gcd(2,2)=2$	$\gcd(2,4)=2$	$\gcd(2,6)=2$
2	$\gcd(3,2)=1$	$\gcd(3,4)=1$	$\gcd(3,6)=3$

The diagram below depicts the submatrices for each of the q=3 questions in *green*:



- 1. For the submatrix between $M_{0,0}$ and $M_{1,1}$, the set of integers is $\{1,2\}$. The number of distinct integers is 2.
- 2. For the submatrix between $M_{0,0}$ and $M_{2,2}$, the set of integers is $\{1,2,3\}$. The number of distinct integers is 3.
- 3. For the submatrix between $M_{1,1}$ and $M_{2,2}$, the set of integers is $\{1,2,3\}$. The number of distinct integers is 3.

```
f in Submissions:<u>122</u>
Max Score:60
Difficulty: Hard
Rate This Challenge:
☆☆☆☆☆
```

```
Current Buffer (saved locally, editable) & • •
                                                                                            Java 7
1 ▼ import java.io.*;
   import java.util.*;
3
   import java.text.*;
   import java.math.*;
   import java.util.regex.*;
7 ▼ public class Solution {
8
9 🔻
        public static void main(String[] args) {
10
            Scanner in = new Scanner(System.in);
11
             int n = in.nextInt();
12
            int m = in.nextInt();
            int q = in.nextInt();
13
14 ▼
            int[] a = new int[n];
            for(int a_i=0; a_i < n; a_i++){</pre>
15 ▼
16 ▼
                 a[a_i] = in.nextInt();
17
            int[] b = new int[m];
```

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Test against custom input

1 Upload Code as File

```
19 ▼
            for(int b_i=0; b_i < m; b_i++){</pre>
20 ▼
                 b[b_i] = in.nextInt();
21
22 ▼
            for(int a0 = 0; a0 < q; a0++){
23
                 int r1 = in.nextInt();
24
                 int c1 = in.nextInt();
25
                 int r2 = in.nextInt();
26
                 int c2 = in.nextInt();
27
                 // your code goes here
28
29
        }
30
    }
31
                                                                                                                      Line: 1 Col: 1
```

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