Sum of Squares of GCDs

Input file:	`standard input`
Output file:	`standard output`
Time limit:	4 seconds
Memory limit:	1024 megabytes

Little H has two **permutations** a and b, both of length n.

There are q queries, and for each query, he will give you an interval $[l, r]$ for a and an interval $[L, R]$ for b. He wants to know the value of $\sum_{i=l}^{r} \sum_{j=L}^{R} \gcd^2(a_i, b_j)$, but you only need to provide the result modulo 2^{32}.

Input

The first line contains a number n ($1 \le n \le 10^5$), representing the length of a and b.

The next line contains n integers, representing the **permutation** a ($1 \le a_i \le n$), ensuring that $a_i \neq a_j$ for $i \neq j$.

The following line contains n integers, representing the **permutation** b ($1 \le b_i \le n$), ensuring that $b_i \neq b_j$ for $i \neq j$.

The next line contains a number q ($1 \le q \le 10^5$), representing the number of queries.

The next q lines each contain four numbers l, r, L, R ($1 \le l \le r \le n, 1 \le L \le R \le n$), representing the intervals for the i-th query.

Output

Output q lines, where the i-th line outputs an integer representing the answer to the i-th query.

Example

standard input	standard output
5 4 1 5 3 2 1 2 3 4 5 5 3 3 2 3 3 4 2 4 3 4 3 4 5 5 1 1 1 1 2 2	2 14 12 1 4