Little, Cyan, Fish!

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

There is a chessboard with n columns and n rows, totaling $n \times n$ squares. Columns and rows are numbered starting from 1, and the coordinates of the square in the i-th column and the j-th row are marked as (i, j). Now, you need to perform q operations on this chessboard.

There are three types of operations:

- Mark a horizontal line with a *Little Sign*. Specifically, given two squares (x_1, y_1) and (x_2, y_2), ensuring that $y_1 = y_2$, mark all squares between these two squares (including the two squares) with a *Little Sign*.
- Mark a vertical line with a *Cyan Sign*. Specifically, given two squares (x_1, y_1) and (x_2, y_2), ensuring that $x_1 = x_2$, mark all squares between these two squares (including the two squares) with a *Cyan Sign*.
- Mark a diagonal line with a *Fish Sign*. Specifically, given two squares (x_1, y_1) and (x_2, y_2), ensuring that $x_2 - x_1 = y_2 - y_1$, mark all squares between these two squares (including the two squares) with a *Fish Sign*.

Now you want to know the sum of $a_x \cdot b_y$ for all squares (x, y) on the chessboard that have all three types of markings (*Little*, *Cyan*, *Fish*) after q coloring operations, modulo $998\,244\,353$.

Input

The first line of input contains two positive integers, n and q: the size of the chessboard and the number of coloring operations ($1 \le n, q \le 10^5$).

The second line contains n integers $a_1, a_2, \ldots, a_n$ ($0 \le a_i < 998\,244\,353$).

The third line contains n integers $b_1, b_2, \ldots, b_n$ ($0 \le b_i < 998\,244\,353$).

Each of the next q lines contains four positive integers: x_1, y_1, x_2, and y_2 ($1 \le x_1, x_2, y_1, y_2 \le n$; $(x_1, y_1) \ne (x_2, y_2)$), where x_1, y_1, x_2, y_2 represent the four parameters of the coloring operation. It is guaranteed that each given operation has one of the three types described above.

Output

Output a line containing a single integer: the answer to the problem modulo $998\,244\,353$.

Example

standard input	*standard output*

5 3
1 2 3 4 5
1 2 3 4 5
1 3 5 3
3 5 3 1
5 5 1 1
	9