Problem E. Very Simple Sum

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	256 megabytes

You are given two arrays a and b, each consisting of n integers. Your task is to calculate a very simple sum:

$$\sum_{1 \le x \le n} \sum_{1 \le y \le n} \sum_{1 \le z \le n} \sum_{1 \le w \le n} (a_x + a_y + a_z + a_w)^{(b_x \oplus b_y \oplus b_z \oplus b_w)} \mod 998244353$$

Input

First line contains a single integer n — the number of elements in arrays a and b.

Second line contains n space-separated integers a_i — the elements of the array a.

Third line contains n space-separated integers b_i — the elements of the array b.

$$1 \le n \le 10^5$$

$$1 \le a_i, b_i \le 500$$

Output

Output a single integer — the value of the very simple sum.

Examples

standard input	standard output
1 1 1	1
5 227 67 445 67 213 297 171 324 493 354	42