

Killing Bits

Input file: **standard input**
Output file: **standard output**
Time limit: 4 seconds
Memory limit: 512 megabytes

You are given two arrays a and b , both consisting of n non-negative integers. You can perform the following operation on the array a an arbitrary number of times (possibly, zero):

- First, you select a permutation p of $0, 1, \dots, n - 1$;
- Then, for each $1 \leq i \leq n$, you set a_i to $a_i \& p_i$. Here, $\&$ denotes the bitwise AND operation.

You have to determine whether it is possible to transform a into b .

Input

The input consists of multiple test cases. The first line contains an integer t ($1 \leq t \leq 10^4$), the number of test cases. For each test case:

- The first line contains a single integer n ($1 \leq n \leq 5 \cdot 10^4$), which is the length of arrays a and b .
- The second line contains n integers a_1, a_2, \dots, a_n ($0 \leq a_i \leq n - 1$), which are the elements of a .
- The third line contains n integers b_1, b_2, \dots, b_n ($0 \leq b_i \leq n - 1$), which are the elements of b .

It is guaranteed that the sum of n over all test cases does not exceed $5 \cdot 10^4$.

Output

For each test case, print “Yes” in a single line if it is possible to transform a into b . Otherwise, print “No”.

You can output the answer in any case (upper or lower). For example, the strings “yEs”, “yes”, “Yes”, and “YES” will be recognized as positive responses.

Example

standard input	standard output
4	No
3	Yes
0 1 2	Yes
2 1 0	No
5	
1 0 1 3 4	
0 0 1 1 4	
8	
1 2 3 4 5 6 7 7	
1 2 3 4 5 6 7 7	
8	
7 7 7 7 7 7 7 7	
1 2 3 4 5 6 7 7	

Note

In the first test case, we need to use at least one operation to transform a into b . Note that $a_1 \& p_1$ is always 0 because $a_1 = 0$. However, $b_1 > 0$, so it is impossible to make $a_1 = b_1$, no matter how the permutations are selected during the operations.

In the second test case, you can select $p = [2, 0, 3, 1, 4]$. After this operation, a is transformed into b .

In the third test case, $a = b$, so we do not need any operations.