

PROBLEMS SUBMIT CODE MY SUBMISSIONS STATUS HACKS ROOM STANDINGS CUSTOM INVOCATION

B. Fun Game

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Vova really loves the **XOR** operation (denoted as \oplus). Recently, when he was going to sleep, he came up with a fun game.

At the beginning of the game, Vova chooses two binary sequences s and t of length n and gives them to Vanya. A binary sequence is a sequence consisting only of the numbers 0 and 1. Vanya can choose integers l, r such that $1 \leq l \leq r \leq n$, and for all $l \leq i \leq r$ **simultaneously** replace s_i with $s_i \oplus s_{i-l+1}$, where s_i is the i -th element of the sequence s .

In order for the game to be *interesting*, there must be a possibility to win. Vanya wins if, with an **unlimited** number of actions, he can obtain the sequence t from the sequence s . Determine if the game will be *interesting* for the sequences s and t .

Input

Each test consists of multiple test cases. The first line contains an integer q ($1 \leq q \leq 10^4$) — the number of test cases. Then follows the description of the test cases.

The first line of each test case contains a single integer n ($1 \leq n \leq 2 \cdot 10^5$) — the length of the sequences s and t .

The second line of each test case contains a binary sequence s of length n .

The third line of each test case contains a binary sequence t of length n .

It is guaranteed that the sum of n over all test cases does not exceed $2 \cdot 10^5$.

Output

For each test case, output "Yes" if the game will be *interesting*, otherwise output "No".

You can output each letter in any case (for example, the strings "yEs", "yes", "Yes", and "YES" will be recognized as a positive answer).

Example

input	Copy
6 1 0 1 7 0110100 0110100 9 100101010 101111110 4 0011 1011 4 0100 0001 8 10110111 01100000	
output	Copy
NO YES YES NO YES YES	

Codeforces Round 959 sponsored by NEAR (Div. 1 + Div. 2).

System testing

91%

Contestant



→ Last submissions

Submission	Time	Verdict
271225008	Jul/18/2024 18:08	Accepted
271222848	Jul/18/2024 18:04	Wrong answer on pretest 2

→ Problem tags

bitmasks constructive algorithms math
No tag edit access

→ Contest materials

- Announcement 

Note

In the first test case, Vanya will not be able to change the sequence s with the only possible action of choosing $l = r = 1$.

In the second test case, the sequences s and t are already equal.

In the third test case, Vanya can act as follows:

1. Choose $l = 3$ and $r = 5$, then s will become **101101010**.
2. Choose $l = 5$ and $r = 6$, then s will become **101111010**.
3. Choose $l = 7$ and $r = 7$, then s will become **101111110**.

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