Hats

n people are coming to your birthday party. You have bought n unique hats and stacked them on top of each other in a way so that the i-th hat from the top is labeled with $H[i]$ (i.e., the topmost hat is labeled with $H[1]$; the second topmost one is labeled with $H[2]$ and so on). Additionally, no two hats have the same label.

Each of the n persons, from 1 to n **in order**, will enter the party one by one. There's a receptionist sitting in front of the door. Whenever a new person enters the party, the receptionist can choose to do **only one** of the followings:

- Pick the topmost hat from the stack and give it to the current person.
- Don't provide any hat to the current person, resulting in no hat being taken from the stack.

i-th person is **happy** if the label of the hat he gets is i. Otherwise i-th person is **not happy**. That is, he either didn't receive any hat or the label of the hat he got isn't i.

You are given a binary string (i.e., consisting of only 0's and 1's) S of length n. Determine whether it is possible for the receptionist to make choices in a way that the i-th person is happy if $S[i] = 1$ and not happy if $S[i] = 0$.

Input

Each test contains multiple test cases. **The first line of the input contains the number of test cases t.** Then for each of the t test cases, input is given in the following format:

- line 1: n
- line 2: $H[1] \;\; H[2] \;\; \cdots \;\; H[n]$
- line 3: S

Output

For each of t test cases, output **`YES`** if the receptionist can give away the hats that satisfy S, and **`NO`** otherwise.

Constraints

Let N be the sum of n over all test cases.

- $2 \leq n \leq 10^5$
- $N \leq 10^5$
- $1 \leq H[i] \leq n$ (for all $1 \leq i \leq n$)
- $H[i] \neq H[j]$ (for any $i \neq j$)
- $0 \leq S[i] \leq 1$ (for all $1 \leq i \leq n$)

Subtasks

Let N be the sum of n over all test cases.

1. (9 points) $n = 2$.
2. (22 points) $n \leq 15, N \leq 1000$.
3. (13 points) There exists exactly one index i such that $S[i] = 0$; and for all $j \neq i$, $S[j] = 1$.
4. (25 points) $N \leq 1000$, and in any test case, the number of i such that $S[i] = 0$ is not greater than 15.
5. (31 points) No additional constraints.

Examples

Example 1

```
3
5
3 2 1 5 4
01001
4
1 3 4 2
0010
5
2 3 1 4 5
11011
```

The correct output is:

```
YES
YES
NO
```

Here in the first test case, 5 people are coming to the party, and initially the hats are ordered this way: $[3, 2, 1, 5, 4]$. The receptionist needs to ensure that only the 2nd and 5th person will be happy. For that, the receptionist can give the hats in the following way:

1. Give the topmost hat to the person 1. Since the label of the hat is 3, person 1 is not happy. The remaining hats are $[2, 1, 5, 4]$.

2. Give the current topmost hat to person 2. Since the label of the hat is 2, person 2 is happy. The remaining hats are $[1, 5, 4]$.
3. Don't give any hat to person 3. Since person 3 doesn't receive any hat, person 3 is not happy.
4. Give the current topmost hat to person 4. Since the label of the hat is 1, person 4 is not happy. The remaining hats are $[5, 4]$.
5. Give the current topmost hat to person 5. Since the label of the hat is 5, person 5 is happy. The remaining hats are $[4]$.

Example 2

```
1
2
1 2
00
```

The correct output is:

```
YES
```