Contest Duration: 2025-07-19(Sat) 22:00 (http://www.timeanddate.com/worldclock/fixedtime.html?
iso=20250719T2100&p1=248) - 2025-07-19(Sat) 23:40 (http://www.timeanddate.com/worldclock/fixedtime.html?
iso=20250719T2240&p1=248) (local time) (100 minutes)   Back to Home (/home)

🏠 Top (/contests/abc415)   📑 Tasks (/contests/abc415/tasks)

❓ Clarifications (/contests/abc415/clarifications)   ☰ Results ▾

⇟ Standings (/contests/abc415/standings)

⇟ Virtual Standings (/contests/abc415/standings/virtual)   📘 Editorial (/contests/abc415/editorial)

💬 Discuss (https://codeforces.com/blog/entry/144821)   📌

C - Mixture   Editorial (/contests/abc415/tasks/abc415_c/editorial)   🇯🇵 / 🇬🇧

Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 350 points

Problem Statement

There are N types of chemicals $1, 2, \ldots, N$. Your goal is to create a state where all of them are mixed.

You are given a string S of length $2^N - 1$ consisting of 0 and 1, which represents the following information:

- First, define state i ($1 \leq i \leq 2^N - 1$) where one or more types of chemicals are mixed as follows:
    - When the k-th digit ($1 \leq k \leq N$) from the bottom in the binary representation of i is 1, and only then, chemical k is included.
    - For example, 13 in binary is $1101_{(2)}$, so state 13 represents a state where chemicals $1, 3, 4$ are mixed.
- When the i-th character of S is 0, state i is **safe**.
- When the i-th character of S is 1, state i is **dangerous**.

You mix chemicals using the following operation:

- First, prepare an empty bottle.
- Next, repeat the following:
    - Choose one type of chemical that has not yet been poured into the bottle and pour it into the bottle.
    - At this time, the chemicals mixed in the bottle must not be in a dangerous state.

Determine whether this operation can create a state where all chemicals are mixed.

You are given T test cases; solve each of them.

Constraints

- T is an integer between 1 and 40000, inclusive.
- N is an integer between 1 and 18, inclusive.
- S is a string of length $2^N - 1$ consisting of 0 and 1.
- The sum of $|S| = 2^N - 1$ in each input does not exceed 5×10^5.

Input

The input is given from Standard Input in the following format:

```
T
case_1
case_2
⋮
case_T
```

$case_i$ represents the i-th test case. Each test case is given in the following format:

```
N
S
```

Output

Output T lines. The i-th line should contain the answer for the i-th test case.

For each test case, if it is possible to create a state where all chemicals are mixed, print Yes; otherwise, print No.

Sample Input 1   Copy

Copy

```
5
3
0010000
3
0010110
1
1
2
100
4
001110010101110
```

Sample Output 1 Copy

```
Yes
No
No
Yes
Yes
```

Copy

This input contains five test cases.

The 1st case is as follows:

- There are three types of chemicals.
- Only state 3 where chemicals $1, 2$ are mixed is dangerous, and the other states are safe.
- For example, you can create a state where all chemicals are mixed with the following procedure:
  - First, pour chemical 2 into the bottle. Only chemical 2 is mixed in the bottle, which is state 2, so it is safe.
  - Next, pour chemical 3 into the bottle. Chemicals $2, 3$ are mixed in the bottle, which is state 6, so it is safe.
  - Finally, pour chemical 1 into the bottle. Chemicals $1, 2, 3$ are mixed in the bottle, which is state 7, so it is safe.

The 2nd case is as follows:

- There are three types of chemicals.
- State 3 where chemicals $1, 2$ are mixed, state 5 where chemicals $1, 3$ are mixed, and state 6 where chemicals $2, 3$ are mixed are dangerous, and the other states are safe.
- For this case, it is impossible to create a state where all chemicals are mixed.

The 3rd case is as follows:

- There is one type of chemical.
- Since state 1 where only chemical 1 is mixed is dangerous, it is impossible to create a state where all chemicals are mixed.

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'(#telegram)

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