

Stacks: Balanced Brackets



A bracket is considered to be any one of the following characters: `(`, `)`, `{`, `}`, `[`, or `]`.

Two brackets are considered to be a *matched pair* if the an opening bracket (i.e., `(`, `[`, or `{`) occurs to the left of a closing bracket (i.e., `)`, `]`, or `}`) of the *exact same type*. There are three types of matched pairs of brackets: `[]`, `{}`, and `()`.

A matching pair of brackets is *not balanced* if the set of brackets it encloses are not matched. For example, `{[(())]}` is not balanced because the contents in between `{` and `}` are not balanced. The pair of square brackets encloses a single, unbalanced opening bracket, `(`, and the pair of parentheses encloses a single, unbalanced closing square bracket, `]`.

By this logic, we say a sequence of brackets is considered to be *balanced* if the following conditions are met:

- It contains no unmatched brackets.
- The subset of brackets enclosed within the confines of a matched pair of brackets is also a matched pair of brackets.

Given n strings of brackets, determine whether each sequence of brackets is balanced. If a string is balanced, print **YES** on a new line; otherwise, print **NO** on a new line.

Input Format

The first line contains a single integer, n , denoting the number of strings.

Each line i of the n subsequent lines consists of a single string, s , denoting a sequence of brackets.

Constraints

- $1 \leq n \leq 10^3$
- $1 \leq \text{length}(s) \leq 10^3$, where $\text{length}(s)$ is the length of the sequence.
- Each character in the sequence will be a bracket (i.e., `{`, `}`, `(`, `)`, `[`, and `]`).

Output Format

For each string, print whether or not the string of brackets is balanced on a new line. If the brackets are *balanced*, print **YES**; otherwise, print **NO**.

Sample Input

```
3
{[(())}
{[(())}
{[[[(())]]}
```

Sample Output

```
YES
NO
YES
```

Explanation

1. The string `{[(())}` meets both criteria for being a balanced string, so we print **YES** on a new line.

2. The string `{[(())}` is not balanced, because the brackets enclosed by the matched pairs `[(` and `()` are not balanced. Thus, we print `NO` on a new line.
3. The string `{[[[(())]]}` meets both criteria for being a balanced string, so we print `YES` on a new line.