codeaau

Simple Text Editor

In this challenge, you must implement a simple text editor. Initially, your editor contains an empty string, ***S***. You must perform ***Q*** operations of the following ***4*** types:

1. ***append(W)*** - Append string ***W*** to the end of ***S***.
2. ***delete(k)*** - Delete the last ***k*** characters of ***S***.
3. ***print(k)*** - Print the k^{th} character of ***S***.
4. ***undo()*** - Undo the last (not previously undone) operation of type ***1*** or ***2***, reverting to the state it was in prior to that operation.

Input Format

The first line contains an integer, ***Q***, denoting the number of operations.

Each line ***i*** of the ***Q*** subsequent lines (where ***0 ≤ i ≤ Q***) defines an operation to be performed. Each operation starts with a single integer, ***t*** (where $t \in \{1, 2, 3, 4\}$), denoting a type of operation as defined in the Problem Statement above. If the operation requires an argument, ***t*** is followed by its space-separated argument. For example, if ***t = 1*** and ***W = "abcd"***, line ***i*** will be ***1 abcd***.

Constraints

- **$1 \le Q \le 10^6$**
- **$1 \le k \le$ length(S)**
- The sum of the lengths of all ***W*** in the input ***≤ 10^6***.
- The sum of ***k*** over all delete operations ***≤ 2 x 10^6***.
- All input characters are lowercase English letters.
- It is guaranteed that the sequence of operations given as input is possible to perform.

Output Format

Each operation of type ***3*** must print the k^{th} character on a new line.

Sample Input

Sample input	Sample output
8 1 abc	c y

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3 3 2 3 1 xy 3 2 4 4 3 1	a

Explanation

Initially, ***S*** is empty. The following sequence of ***8*** operations are described below:

1. ***S = “”***. We append ***abc*** to ***S***, so ***S = “abc”***.
2. Print the ***3rd*** character on a new line. Currently, the ***3rd*** character is ***c***.
3. Delete the last ***3*** characters in ***S(abc)***, so ***S = “”***.
4. Append ***xy*** to ***S***, so ***S = “xy”***.
5. Print the ***2nd*** character on a new line. Currently, the ***2nd*** character is ***y***.
6. Undo the last update to ***S***, making ***S*** empty again (i.e., ***S = “”***).
7. Undo the next to last update to ***S*** (the deletion of the last characters), making ***S = “abc”***.
8. Print the ***1st*** character on a new line. Currently, the ***1st*** character is ***a***.

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