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 ${\bf 1}$ or ${\bf 2}$, reverting ${\bf S}$ 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 $0 \le i < Q$) 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 t=1 abcd.

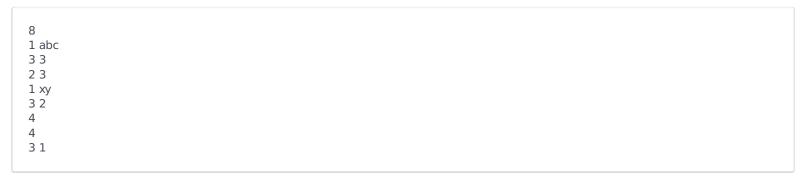
Constraints

- $1 < Q < 10^5$
- $1 \le k \le |S|$
- ullet The sum of the lengths of all W in the input $\leq 10^6$.
- All input characters are lowercase English letters.
- It is guaranteed that the sequence of operations given as input is possible to perform.

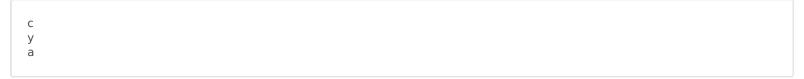
Output Format

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

Sample Input



Sample Output



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 $\mathbf{3}^{rd}$ character on a new line. Currently, the $\mathbf{3}^{rd}$ character is \mathbf{c} .
- 3. Delete the last ${\bf 3}$ characters in ${\bf \it S}$ (abc), so ${\bf \it S}=$ "".
- 4. Append xy to S, so S = "xy".
- 5. Print the $\mathbf{2}^{nd}$ character on a new line. Currently, the $\mathbf{2}^{nd}$ character is \mathbf{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 S characters), making S = abc.
- 8. Print the $\mathbf{1}^{st}$ character on a new line. Currently, the $\mathbf{1}^{st}$ character is \mathbf{a} .