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) - Appends the string W at the end of S.
2. *delete*(k)- Delete the last k character of S.
3. *print*(k) - Returns the kth character of S.
4. *Undo()* - Undo the last (not previously undone) operation of type 1 or 2 , reverting 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<=i<Q) defines an operation to be performed. Each operation starts with a single integer, t (where t E {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

- $1 \leq Q \leq 10^6$
- $1 \leq k \leq |S|$
- The sum of the lengths of all W in the input <=10^6.
- The sum of k over all delete operations<=2.10^6.
- All input characters are lowercase English letters.
- It is guaranteed that the sequence of operations given as input is possible to perform.

Output Format

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

Sample Input

```
8
1 abc
3 3
2 3
1 xy
3 2
4
4
3 1
```

Sample Output

```
c
```

```
y
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 3 characters), making .
8. Print the 1st character on a new line. Currently, the1st character is `a`.