# 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 $S$ 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 $0 \leq i < Q$) 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`.
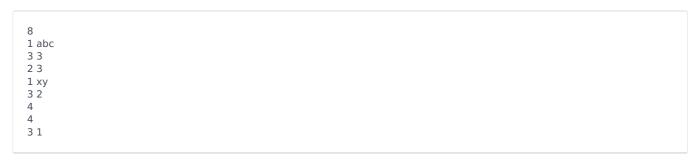
**Constraints**

- $1 \leq Q \leq 10^6$

- $1 \leq k \leq |S|$

- The sum of the lengths of all $W$ in the input $\leq 10^6$.

- The sum of $k$ over all delete operations $\leq 2 \cdot 10^6$.

- All input characters are lowercase English letters.

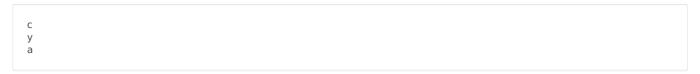- It is guaranteed that the sequence of operations given as input is possible to perform.

**Output Format**

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

**Sample Input**

```
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 $3^{rd}$ character on a new line. Currently, the $3^{rd}$ 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 $2^{nd}$ character on a new line. Currently, the $2^{nd}$ 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 $S = $ "$abc$".

8. Print the $1^{st}$ character on a new line. Currently, the $1^{st}$ character is a.