

Implement a simple text editor. The editor initially contains an empty string,  $S$ . 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.

### Example

$S = \text{'abcde'}$

$ops = [ \text{'1 fg'}, \text{'3 6'}, \text{'2 5'}, \text{'4'}, \text{'3 7'}, \text{'4'}, \text{'3 4'} ]$

operation			
index	S	ops[index]	explanation
0	abcde	1 fg	append fg
1	abcdefg	3 6	print the 6th letter - f
2	abcdefg	2 5	delete the last 5 letters
3	ab	4	undo the last operation, index 2
4	abcdefg	3 7	print the 7th character - g
5	abcdefg	4	undo the last operation, index 0
6	abcde	3 4	print the 4th character - d

The results should be printed as:

f  
g  
d

### 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  $W = \text{"abcd"}$ , 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

```
STDIN  Function
-----
8      Q = 8
1 abc  ops[0] = '1 abc'
3 3    ops[1] = '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.