D. Tree

time limit per test: 2 seconds
memory limit per test: 512 megabytes
input: standard input
output: standard output

You are given a node of the tree with index 1 and with weight 0. Let cnt be the number of nodes in the tree at any instant (initially, cnt is set to 1). Support Q queries of following two types:

- Add a new node (index $cnt + 1$) with weight W and add edge between node R and this node.
- Output the maximum length of sequence of nodes which

  1. starts with R.
  2. Every node in the sequence is an ancestor of its predecessor.
  3. Sum of weight of nodes in sequence does not exceed X.
  4. For some nodes i, j that are consecutive in the sequence if i is an ancestor of j then $w[i] \geq w[j]$ and there should not exist a node k on simple path from i to j such that $w[k] \geq w[j]$

The tree is rooted at node 1 at any instant.

Note that the queries are given in a modified way.

Input

First line containing the number of queries Q $(1 \leq Q \leq 400000)$.

Let $last$ be the answer for previous query of type 2 (initially $last$ equals 0).

Each of the next Q lines contains a query of following form:

- 1 p q $(1 \leq p, q \leq 10^{18})$: This is query of first type where and . It is guaranteed that $1 \leq R \leq cnt$ and $0 \leq W \leq 10^9$.
- 2 p q $(1 \leq p, q \leq 10^{18})$: This is query of second type where and . It is guaranteed that $1 \leq R \leq cnt$ and $0 \leq X \leq 10^{15}$.

denotes bitwise XOR of a and b.

It is guaranteed that at least one query of type 2 exists.

Output

Output the answer to each query of second type in separate line.

Examples

input
6 1 1 1 2 2 0 2 2 1 1 3 0 2 2 0 2 2 2

output
0 1 1 2

input

```
6
1 1 0
2 2 0
2 0 3
1 0 2
2 1 3
2 1 6
```

output

```
2
2
3
2
```

input

```
7
1 1 2
1 2 3
2 3 3
1 0 0
1 5 1
2 5 0
2 4 0
```

output

```
1
1
2
```

input

```
7
1 1 3
1 2 3
2 3 4
1 2 0
1 5 3
2 5 5
2 7 22
```

output

```
1
2
3
```

Note

In the first example,

$last = 0$

- Query 1: 1 1 1, Node 2 with weight 1 is added to node 1.

- Query 2: 2 2 0, No sequence of nodes starting at 2 has weight less than or equal to 0. $last = 0$

- Query 3: 2 2 1, Answer is 1 as sequence will be $\{2\}$. $last = 1$

- Query 4: 1 2 1, Node 3 with weight 1 is added to node 2.

- Query 5: 2 3 1, Answer is 1 as sequence will be $\{3\}$. Node 2 cannot be added as sum of weights cannot be greater than 1. $last = 1$

- Query 6: 2 3 3, Answer is 2 as sequence will be $\{3, 2\}$. $last = 2$