

Contest Duration: 2025-08-02(Sat) 22:00 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20250802T2100&p1=248>) - 2025-08-02(Sat) 23:40 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20250802T2240&p1=248>) (local time) (100 minutes)

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G - Binary Cat

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Time Limit: 6 sec / Memory Limit: 1024 MiB

Score : 625 points

Problem Statement

Define strings S_0 and S_1 as $S_0 = \emptyset$ and $S_1 = 1$.

You are given Q queries, so process them in order.

In the i -th query ($1 \leq i \leq Q$), you are given a triple of integers (L_i, R_i, X_i) .

Let S_{i+1} be the string obtained by concatenating S_{L_i} and S_{R_i} in this order. Then, find the X_i -th character of S_{i+1} .

It is guaranteed that X_i is at most the length of S_{i+1} .

Constraints

- $1 \leq Q \leq 5 \times 10^5$
- $0 \leq L_i, R_i \leq i$
- $1 \leq X_i \leq 10^{18}$
- X_i is at most the length of S_{i+1} .
- All input values are integers.

Input

The input is given from Standard Input in the following format:

```
Q
L1 R1 X1
L2 R2 X2
⋮
LQ RQ XQ
```

Output

Output Q lines. The i -th line ($1 \leq i \leq Q$) should contain the answer to the i -th query.

Sample Input 1

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```
7
0 1 1
0 0 2
1 1 1
2 3 2
2 4 3
5 4 2
6 7 6
```

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Sample Output 1

[Copy](#)

```
0
0
1
1
1
1
1
```

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Each query is processed as follows:

- In the first query, concatenate $S_0 = 0$ and $S_1 = 1$ to get $S_2 = 01$. The first character of S_2 is 0, so output 0 on the first line.
- In the second query, concatenate $S_0 = 0$ and $S_0 = 0$ to get $S_3 = 00$. The second character of S_3 is 0, so output 0 on the second line.
- In the third query, concatenate $S_1 = 1$ and $S_1 = 1$ to get $S_4 = 11$. The first character of S_4 is 1, so output 1 on the third line.

- In the fourth query, concatenate $S_2 = 01$ and $S_3 = 00$ to get $S_5 = 0100$. The second character of S_5 is 1, so output 1 on the fourth line.
- In the fifth query, concatenate $S_2 = 01$ and $S_4 = 11$ to get $S_6 = 0111$. The third character of S_6 is 1, so output 1 on the fifth line.
- In the sixth query, concatenate $S_5 = 0100$ and $S_4 = 11$ to get $S_7 = 010011$. The second character of S_7 is 1, so output 1 on the sixth line.
- In the seventh query, concatenate $S_6 = 0111$ and $S_7 = 010011$ to get $S_8 = 0111010011$. The sixth character of S_8 is 1, so output 1 on the seventh line.

'#telegram)

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