C. XOR-distance

time limit per test: 2 seconds

memory limit per test: 256 megabytes

You are given integers a, b, r. Find the smallest value of $|(a \oplus x) - (b \oplus x)|$ among all $0 \le x \le r$.

$\oplus$ is the operation of bitwise XOR, and $|y|$ is absolute value of y.

Input

The first line contains a single integer t ($1 \le t \le 10^4$) — the number of test cases.

Each test case contains integers a, b, r ($0 \le a, b, r \le 10^{18}$).

Output

For each test case, output a single number — the smallest possible value.

Example

input	Copy

```
10
4 6 0
0 3 2
9 6 10
92 256 23
165 839 201
1 14 5
2 7 2
96549 34359 13851
853686404475946 283666553522252166 127929199446003072
7352685905579942972 916721749674600979 895150420120690183
```

output	Copy

```
2
1
1
164
542
5
3
37102
27934920819538516
104449824168870225
```

Note

In the first test, when $r = 0$, then x is definitely equal to 0, so the answer is $|4 \oplus 0 - 6 \oplus 0| = |4 - 6| = 2$.

In the second test:

- When $x = 0$, $|0 \oplus 0 - 3 \oplus 0| = |0 - 3| = 3$.
- When $x = 1$, $|0 \oplus 1 - 3 \oplus 1| = |1 - 2| = 1$.
- When $x = 2$, $|0 \oplus 2 - 3 \oplus 2| = |2 - 1| = 1$.

Therefore, the answer is 1.

In the third test, the minimum is achieved when $x = 1$.

Codeforces Round 922 (Div. 2)

Finished

Practice

⭐

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Language: [GNU G++20 13.2 (64 bit, win ▾]

Choose file: [Choose File] No file chosen

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→ **Last submissions**

Submission	Time	Verdict
258128394	Apr/25/2024 18:26	Accepted

→ **Problem tags**

bitmasks   greedy   implementation
math   *1400

No tag edit access

→ **Contest materials**

- Announcement   ✕
- Tutorial   ✕

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