# F. Gellyfish and Forget-Me-Not

time limit per test: 2 seconds
memory limit per test: 1024 megabytes

Gellyfish and Flower are playing a game.

The game consists of two arrays of $n$ integers $a_1, a_2, \ldots, a_n$ and $b_1, b_2, \ldots, b_n$, along with a binary string $c_1 c_2 \ldots c_n$ of length $n$.

There is also an integer $x$ which is initialized to $0$.

The game consists of $n$ rounds. For $i = 1, 2, \ldots, n$, the round proceeds as follows:

1. If $c_i = 0$, Gellyfish will be the active player. Otherwise, if $c_i = 1$, Flower will be the active player.
2. The active player will perform **exactly one** of the following operations:
   - Set $x := x \oplus a_i$.
   - Set $x := x \oplus b_i$.

Here, $\oplus$ denotes the bitwise XOR operation.

Gellyfish wants to minimize the final value of $x$ after $n$ rounds, while Flower wants to maximize it.

Find the final value of $x$ after all $n$ rounds if both players play optimally.

## Input

Each test contains multiple test cases. The first line contains the number of test cases $t$ ( $1 \le t \le 10^4$). The description of the test cases follows.

The first line of each test case contains a single integer $n$ ($1 \le n \le 10^5$) — the number of rounds of the game.

The second line of each test case contains $n$ integers $a_1, a_2, \ldots, a_n$ ($0 \le a_i < 2^{60}$).

The third line of each test case contains $n$ integers $b_1, b_2, \ldots, b_n$ ($0 \le b_i < 2^{60}$).

The fourth line of each test case contains a binary string $c$ of length $n$.

It is guaranteed that the sum of $n$ over all test cases does not exceed $10^5$.

## Output

For each test case, output a single integer — the final value of $x$ after all $n$ rounds.

### Example

input (Copy)

```
5
1
0
2
0
2
12 2
13 3
11
3
6 1 2
6 2 3
010
4
1 12 7 2
4 14 4 2
0111
9
0 5 10 6 6 2 6 2 11
7 3 15 3 6 7 6 7 8
110010010
```

Codeforces Round 1028 (Div. 2)
Finished
Practice

→ Virtual participation

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Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++23 14.2 (64 bit, ms

Choose file: Choose File No file chosen

Submit

→ Last submissions

| Submission | Time | Verdict |
|---|---|---|
| 322837196 | Jun/04/2025 12:57 | Accepted |
| 322835825 | Jun/04/2025 12:47 | Wrong answer on test 1 |

→ Problem tags

bitmasks greedy

No tag edit access

→ Contest materials

- Announcement (en)

output

```
0
15
6
11
5
```

## Note

In the first test case, there's only one round and Gellyfish is the active player of that round. Therefore, she will choose $a_1$, and the final value of $x$ is $0$.

In the second test case, Flower will be the active player in both rounds. She will choose $a_1$ and $b_2$, and the final value of $x$ is $a_1 \oplus b_2 = 15$. Flower may also choose $b_1$ and $a_2$ instead for the same result of $x = a_2 \oplus b_1 = 15$.

In the third test case, $a_1 = b_1$ so it doesn't matter what decision Gellyfish makes in the first round. In the second round:

- If Flower chooses $a_2$, then $x$ will become $7$. Gellyfish will choose $b_3$ in the third round, so the final value of $x$ will be $4$.
- Otherwise, Flower chooses $b_2$, then $x$ will become $4$. Gellyfish will choose $a_3$ in the third round, so the final value of $x$ will be $6$.

Flower wants to maximize the final value of $x$, so Flower will choose $b_2$ in the second round. Therefore, the final value of $x$ will be $6$.