

F. Unfair Game

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Alice and Bob gathered in the evening to play an exciting game on a sequence of n integers, each integer of the sequence **doesn't exceed** 4. The rules of the game are too complex to describe, so let's just describe the winning condition — Alice wins if the **bitwise XOR** of all the numbers in the sequence is non-zero; otherwise, Bob wins.

The guys invited Eve to act as a judge. Initially, Alice and Bob play with n numbers. After one game, Eve removes one of the numbers from the sequence, then Alice and Bob play with $n - 1$ numbers. Eve removes one number again, after which Alice and Bob play with $n - 2$ numbers. This continues until the sequence of numbers is empty.

Eve seems to think that in such a game, Alice almost always wins, so she wants Bob to win as many times as possible. Determine the maximum number of times Bob can win against Alice if Eve removes the numbers optimally.

Input

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

The first and only line of each test case contains four integers p_i ($0 \leq p_i \leq 200$) — the number of ones, twos, threes, and fours in the sequence at the beginning of the game.

Output

For each test case, print the maximum number of times Bob will win in a separate line, if Eve removes the numbers optimally.

Example

input	Copy
5	
1 1 1 0	
1 0 1 2	
2 2 2 0	
3 3 2 0	
0 9 9 9	
output	Copy
1	
1	
3	
3	
12	

Note

In the first example, Bob wins when Eve has not removed any numbers yet.

In the second example, Bob wins if Eve removes one one and one three.

Codeforces Round 938 (Div. 3)

Finished

→ Practice?

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Register for practice

→ Virtual participation

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Start virtual contest

→ Problem tags

dp games greedy math

No tag edit access

→ Contest materials

- Announcement

