New Sticks Game

BACH and KHOA now consider a new sticks game. First, they have a heap of n sticks. BACH and KHOA move alternately, and BACH begins. On each move, the player has to select a number from follow cases:

- **Case 1**: 1,
- **Case 2**: Number of integers between 1 and m inclusive, which are coprime to m,
- **Case 3**: Number of digits of m.

where, m is the current numbers of sticks in the heap, and then he removes the selected number of sticks from the heap. The player who removes the last stick wins the game and they play optimally.

For example, if $n = 11$, the game may proceed as follows:

- BACH selects **Case 3** and removes 2 sticks (9 sticks left)
- KHOA selects **Case 2** and removes 6 sticks. (3 sticks left) - There are 6 coprime numbers to 9: 1, 2, 4, 5, 7 and 8.
- BACH selects **Case 1** and removes 1 stick (2 sticks left)
- KHOA selects **Case 3** and removes 1 stick. (1 stick left)
- BACH selects **Case 1** and wins.

Input

The first line of the input contains one integer t ($1 \le t \le 10^5$) — the number of test cases. The following t lines contain test cases, one per line. Each test case contains a integer n ($1 \le n \le 10^6$) representing the number of sticks in initial heap.

Output

For each test case print the name of winner in one line.

Examples

Standard Input	Standard Output
2 2 11	KHOA BACH