Kitty and Katty

by forthright48

Problem Submissions Leaderboard Discussions Editorial

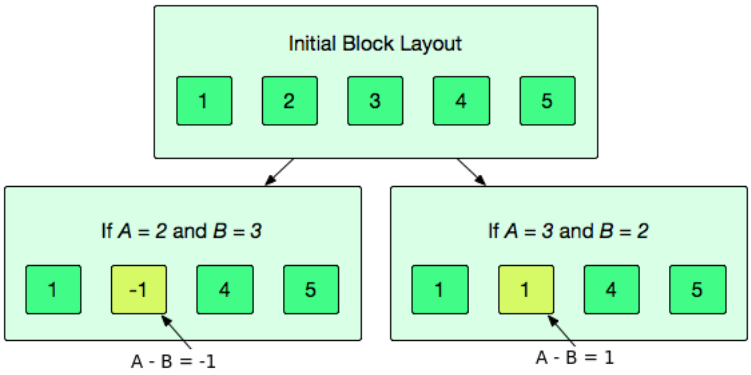
Kitty and Katty have N plastic blocks. They label the blocks with sequential numbers from 1 to N and begin playing a game in turns, with Kitty always taking the first turn. The game's rules are as follows:

- For each turn, the player removes 2 blocks, A and B, from the set. They calculate $A - B$, write the result on a new block, and insert the new block into the set.
- The game ends when only 1 block is left. The winner is determined by the value written on the final block, X:
  - If $X\%3 = 1$, then Kitty wins.
  - If $X\%3 = 2$, then Katty wins.
  - If $X\%3 = 0$, then the player who moved last wins.

Recall that $\%$ is the Modulo Operation.

Given the value of N, can you find and print the name of the winner? Assume that both play optimally.

Note: The selection order for A and B matters, as sometimes $A - B \neq B - A$. The diagram below shows an initial set of blocks where $N = 5$. If $A = 2$ and $B = 3$, then the newly inserted block is labeled -1; alternatively, if $A = 3$ and $B = 2$, the newly inserted block is labeled 1.



Input Format

The first line contains a single positive integer, T (the number of test cases or games).
The T subsequent lines each contain an integer, N (the number of blocks for that test case).

Constraints

- $1 \leq T \leq 100$
- $1 \leq N \leq 10^5$

Output Format

For each test case, print the name of the winner (i.e.: either **Kitty** or **Katty**) on a new line.

Sample Input

```
2
2
3
```

Sample Output

```
Kitty
Katty
```

Explanation

Test Case 0:
$N = 2$ so there are two blocks labeled 1 and 2. Kitty chooses $A = 2$ and $B = 1$, then inserts a new block with the label 1 (the result of $2 - 1$). The game ends, as there is now only 1 block in the set. The label on the last block, X, is 1, so we calculate $result = 1 \ \% \ 3 = 1$. Because $result = 1$, Kitty wins and we print `Kitty` on a new line.

Test Case 1:
$N = 3$, so there are three blocks labeled 1, 2, and 3. No matter how Kitty makes the first move, Katty will win. If Kitty chooses $A = 3$ and $B = 2$ on the first move and inserts a block labeled 1 (the result of $3 - 2$), the set of blocks becomes $\{1, 1\}$. Katty then must choose $A = 1$ and $B = 1$ and insert a new block labeled 0 (the result of $1 - 1$). The game ends, as there is now only 1 block in the set. The label on the last block, X, is 0, so we calculate $result = 0 \ \% \ 3 = 0$. Because $result = 0$ and Katty made the last move, Katty wins and we print `Katty` on a new line.