USACO 2024 FEBRUARY CONTEST, SILVER
PROBLEM 3. MOORBLES

Return to Problem List

Time Remaining: **3 hrs, 50 min, 35 sec**

Not submitted yet

English (en) ⌄

Bessie and Elsie are playing a game of Moorbles. The game works as follows: Bessie and Elsie each start out with some amount of marbles. Bessie holds out A of her marbles in her hoof and Elsie guesses if A is Even or Odd. If Elsie is correct, she wins the A marbles from Bessie and if she guesses incorrectly, she loses A of her marbles to Bessie (if Elsie has less than A marbles, she loses all her marbles). A player loses when they lose all of their marbles.

After some amount of turns in the game, Elsie has N ($1 \le N \le 10^9$) marbles. She thinks it is hard to win, but she is playing to not lose. After being around Bessie enough, Elsie has a good read on Bessie's habits and recognizes that on turn i, there are only K ($1 \le K \le 4$) different amounts of marbles that Bessie may put out. There are only M ($1 \le M \le 3 \cdot 10^5$) turns before Bessie gets bored and stops playing. Can you identify a lexicographically minimum turn sequence such that Elsie will not lose, regardless of how Bessie plays?

INPUT FORMAT (input arrives from the terminal / stdin):

The first line contains a single integer T ($1 \le T \le 10$) representing the number of test cases. Each test case is described as follows:

- First, one line containing three integers N, M, and K, representing the number of marbles Elsie has, the number of turns, and the number of potential moves Bessie can make respectively.
- Then, M lines where line i contains K distinct space separated integers $a_{i,1}\ a_{i,2} \ldots a_{i,K}$ ($1 \le a_{i,j} \le 10^3$) representing the possible amounts of marbles that Bessie might play on turn i.

It is guaranteed that the sum of M over all test cases is at most $3 \cdot 10^5$.

OUTPUT FORMAT (print output to the terminal / stdout):

For each test case, output the lexicographically minimum move sequence for Elsie to guarantee not losing, or -1 if she will lose. The move sequence should be on a single line and consist of M space-separated tokens each equal to either "Even" or "Odd".

Note: "Even" is lexicographically smaller than "Odd".

SAMPLE INPUT:

```
2
10 3 2
2 5
1 3
1 3
10 3 3
2 7 5
8 3 4
2 5 6
```

SAMPLE OUTPUT:

```
Even Even Odd
-1
```

In the first case, the only lexicographically smaller sequence of moves is "Even Even Even", but Bessie can make Elsie lose in that case by first playing 5, which reduces Elsie's number of marbles from 10 to 5, then playing 3, which reduces Elsie's number of marbles from 5 to 2, then playing 3, which wipes out all of her marbles.

If Elsie instead plays the correct move sequence "Even Even Odd", then if Bessie plays the same way, at the end when she plays 3, Elsie will gain those 3 marbles, increasing her number of marbles to 5. It can further be shown that Bessie cannot play in a different way to take all of Elsie's marbles given that Elsie plays "Even Even Odd".

In the second case, it can be shown that for any move sequence that Elsie could choose, Bessie can play in a way to take all of Elsie's marbles.

SAMPLE INPUT:

```
1
```

```
20 8 2
3 5
3 5
3 5
3 5
3 5
3 5
3 5
3 5
```

SAMPLE OUTPUT:

```
Even Even Even Odd Even Odd Even Odd
```

SCORING:

Problem credits: Suhas Nagar

Language: C

Source File: 选择文件 未选择任何文件

Submit Solution