

Circular Board Game

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 256 megabytes

Wandering past the fresh produce, Busy Beaver’s attention is captured by the local dairy vendor with a peculiar board game at his stall.

There is a circular board with N squares numbered from 0 to $N - 1$. Busy Beaver plays a game on this board with an N sided die labelled from 0 to $N - 1$. If he is on square s and moves by t steps, he will land directly on the square $s + t \pmod{N}$.

There is also one magical portal on the board, such that **if the player lands exactly on square X , they are instantly teleported to square Y .**

Busy Beaver rolls the die K times and obtains the sequence a_1, a_2, \dots, a_K . From his initial square, Busy Beaver will move by a_1 steps, then by a_2 steps, and so on until he has completed all K moves, where he moves by a_i on the i -th move.

For each possible initial square from 0 to $N - 1$ (inclusive, except square X), determine the square that Busy Beaver lands on **after all K moves are completed (including any teleports)**.

Input

The first line contains the number of test cases T ($1 \leq T \leq 2 \cdot 10^3$).

The first line of each test case contains four integers N, K, X , and Y ($2 \leq N \leq 5 \cdot 10^5, 1 \leq K \leq 5 \cdot 10^5, 0 \leq X, Y < N, X \neq Y$).

The second line of each test case contains K integers a_1, a_2, \dots, a_K ($0 \leq a_i < N$).

The sum of N across all test cases does not exceed $5 \cdot 10^5$.

The sum of K across all test cases does not exceed $5 \cdot 10^5$.

Output

For each test case, output $N - 1$ integers representing the square that Busy Beaver would land on if he started on square i , for all $0 \leq i < N$ except for $i = X$.

Scoring

There are two subtasks for this problem.

- (20 points): The sum of N across all test cases does not exceed $5 \cdot 10^3$, and the sum of K across all test cases does not exceed $5 \cdot 10^3$.
- (80 points): No additional constraints.

Example

standard input	standard output
3	2 3 4 1
5 1 0 1	2 4 4 1
1	6 7 6 6 11 10 11 14 15 16 17 18 17 18 17 2 1 4 1
5 3 0 1	
1 2 3	
20 10 3 1	
4 15 9 2 6 5 3 5 8 9	

Note

In the first sample test case, there are 5 squares on the board and one die roll that rolls 1. The portal teleports the player **from square 0 to square 1**. For each of the starting squares, here is the sequence of events:

- 0: **The portal teleports from this square; we do not need to output anything.**
- 1: starts on square 1, moves by 1 to square 2
- 2: starts on square 2, moves by 1 to square 3
- 3: starts on square 3, moves by 1 to square 4
- 4: starts on square 4, moves by 1 to square 0 and teleports to square 1

In the second sample test case, there are 5 squares on the board and three die rolls that roll 1,2,3 respectively. The portal teleports the player **from square 0 to square 1**. For each of the starting squares, here is the sequence of events:

- 0: **The portal teleports from this square; we do not need to output anything.**
- 1: starts on square 1, moves by 1 to square 2, moves by 2 to square 4, moves by 3 to square 2
- 2: starts on square 2, moves by 1 to square 3, moves by 2 to square 0 and teleports to square 1, moves by 3 to square 4
- 3: starts on square 3, moves by 1 to square 4, moves by 2 to square 1, moves by 3 to square 4
- 4: starts on square 4, moves by 1 to square 0 and teleports to square 1, moves by 2 to square 3, moves by 3 to square 1