XOR Rounds

You are given a cyclic array A having N numbers. In an XOR round, each element of the array A is replaced by the bitwise XOR (Exclusive OR) of itself, the previous element, and the next element in the array. All operations take place simultaneously. Can you calculate A after K such XOR rounds?

Input

The first line contains the number of test cases T (T <= 50). There follow 2T lines, 2 per test case. The first line contains two space separated integers N (3 <= N <= 500) and K (1 <= K <= 1000000000). The next line contains N space separated integers Ai (0 <= Ai <= 1000000000), which are the initial values of the elements in array A.

Output

Output T lines, one per test case. For each test case, output a space separated list of N integers, specifying the contents of array A after K XOR rounds.

Example

Input:
2
3 1
1 2 3
5 100
1 11 111 1111 11111

Output:
0 0 0
11117 101 1075 12127 12081