

## Problem F. Counting Trees

Given an integer  $K$  and two arrays  $a_{1 \sim 2^K - 1}$  and  $b_{1 \sim 2^K - 1}$ , each of size  $2^K - 1$ .

There is an undirected complete graph  $G$  of size  $2^K$  with vertices numbered  $0 \sim 2^K - 1$ .

For a spanning tree  $T$  of  $G$ , define  $A(T) = \prod_{(u,v) \in T} a_{u \oplus v}$ ,  $B(T) = \sum_{(u,v) \in T} b_{u \oplus v}$ ,  $C(T) = \oplus_{(u,v) \in T} (u \oplus v)$ .

For each  $0 \leq x < 2^K$ , compute  $(\sum_{T, C(T)=x} A(T)B(T)^p) \bmod 998244353$ , where  $p$  is a given constant.

We define  $0^0 = 1$ .

### Input

The first line contains two integers  $K, p$  ( $1 \leq K \leq 16$ ,  $0 \leq p \leq 5$ ).

The next line contains  $2^K - 1$  integers, where the  $i$ -th integer is  $a_i$  ( $0 \leq a_i < 998244353$ ).

The next line contains  $2^K - 1$  integers, where the  $i$ -th integer is  $b_i$  ( $0 \leq b_i < 998244353$ ).

### Output

Output a single line with  $2^K$  integers, where the  $i$ -th integer is the answer for  $x = i - 1$ .

### Examples

standard input	standard output
2 0 1 1 1 1 2 3	4 4 4 4
2 2 2 3 5 1 4 2	5880 5416 10464 9640