Problem M. Kingdom of Construction

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	1024 megabytes

Given a sequence of length n, $a_1, a_2, \ldots, a_n$, you need to construct an $n \times n$ matrix A such that for any two sets $S \subseteq S' \subseteq [n]$,

$$\det(A_{S'}) - \det(A_S) \equiv \left(\sum_{i \in S'} a_i - \sum_{i \in S} a_i \right) \pmod{998\,244\,353}.$$

Here $[n]$ denotes the set $\{1, 2, \ldots, n\}$, and $\det(A)$ denotes the determinant of A. For a subset $T \subseteq [n]$, A_T denotes the principal submatrix of A formed by rows and columns with indices in T. By convention, $\det(A_\emptyset) = 1$.

Input

There is only one test case in each test file.

The first line contains an integer n ($1 \le n \le 18$), denoting the length of the sequence.

The second line contains n integers $a_1, a_2, \ldots, a_n$ ($0 \le a_i < 998244353$), representing the elements of the sequence.

Output

Output n lines, with the i-th line containing n integers $A_{i,1}, A_{i,2}, \ldots, A_{i,n}$ ($0 \le A_{i,j} < 998244353$), representing the matrix A you constructed.

Example

standard input	standard output
2 6 8	7 12 4 9