Problem I
The Spectrum

Time limit: 5 seconds

Memory limit: 1024 megabytes

Problem Description

Let $X = (x_1, x_2, \ldots, x_n)$ be an integer sequence whose elements are distinct. The *spectrum* of X, denoted by $spec(X)$, is the multiset $\{|x_i - x_j| : 1 \le i < j \le n\}$. Notice that a multiset counts multiplicity but ignores order. For example, $\{1, 1, 2\}$ and $\{2, 1, 1\}$ are the same, but $\{1, 1, 2\}$ and $\{1, 2\}$ are different in multisets. For simplicity, we assume that sequence X is in the *ascending* order and $x_1 = 0$. For example, suppose $X = (0, 1, 4, 5)$. Then $spec(X) = \{1, 1, 3, 4, 4, 5\}$. Given X, it is easy to compute $spec(X)$. However, given $spec(X)$, it is not an easy task to recover X from $spec(X)$. In fact, it is possible that $spec(X) = spec(Y)$ for two different sequences X and Y. For example, $spec(0, 7, 20) = \{7, 13, 20\} = spec(0, 13, 20)$. Your job is to recover all possible X's such that $spec(X)$ is equal to the specified spectrum in the input.

Input Format

The first line in a test case gives you the number n, which is the size of the integer sequence X. The second line gives you the spectrum of X, which is a multiset and the numbers $d_1, \ldots, d_{\frac{n(n-1)}{2}}$ are listed in nondescending order with a single space as the delimiter between two consecutive numbers.

Output Format

First, output the total number of possible X's (i.e. the number of solutions) in a line. Then dump all possible X's in the lexicographic order (i.e. the dictionary order), one X per line. Let $Y = (y_1, \ldots, y_n)$ and $Z = (z_1, \ldots, z_n)$ be two such solutions. Then Y *should precede* Z if and only if there exists some index k where $1 \le k \le n$ such that $y_k < z_k$ and $y_j = z_j$ for all $1 \le j < k$. For example, the sequence $Y = (0, 7, 20)$ should precede $Z = (0, 13, 20)$ in the lexicographic order because $y_2 < z_2$ (i.e. $7 < 13$) and $y_1 = z_1$. For each X, print its elements in ascending order with a single space between two consecutive numbers.

Technical Specification

- $2 \le n \le 62$.
- $0 < d_1 \le d_2 \le \cdots \le d_{\frac{n(n-1)}{2}}$.
- Your output should satisfy: $0 \le x_i \le 999$ for $1 \le i \le n$ and $x_1 = 0$.
- $x_i < x_j$ for $1 \le i < j \le n$.

Sample Input 1

```
4
2 2 2 4 4 6
```

Sample Output 1

```
1
0 2 4 6
```

Sample Input 2

```
5
3 3 6 9 9 12 12 15 18 21
```

Sample Output 2

```
2
0 3 12 15 21
0 6 9 18 21
```

Sample Input 3

```
4
5 6 7 8 9 10
```

Sample Output 3

```
0
```