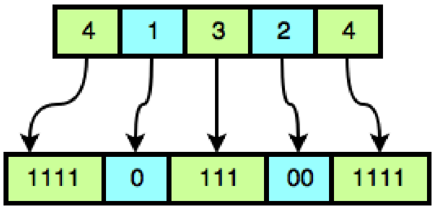
What's Next?

Johnny is playing with a large binary number, B. The number is so large that it needs to be compressed into an array of integers, A, where the values in *even indices* $(0, 2, 4, \ldots)$ represent some number of consecutive 1 bits and the values in *odd indices* $(1, 3, 5, \ldots)$ represent some number of consecutive 0 bits in alternating substrings of B.

For example, suppose we have array $A = \{4, 1, 3, 2, 4\}$. A_0 represents "1111", A_1 represents "0", A_2 represents "111", A_3 represents "00", and A_4 represents "1111". The number of consecutive binary characters in the i^{th} substring of B corresponds to integer A_i, as shown in this diagram:



When we assemble the sequential alternating sequences of 1's and 0's, we get $B =$ "11110111001111".

We define *setCount(B)* to be the number of 1's in a binary number, B. Johnny wants to find a binary number, D, that is the smallest binary number $> B$ where *setCount(B)* = *setCount(D)*. He then wants to compress D into an array of integers, C (in the same way that integer array A contains the compressed form of binary string B).

Johnny isn't sure how to solve the problem. Given array A, find integer array C and print its length on a new line. Then print the elements of array C as a single line of space-separated integers.

Input Format

The first line contains a single positive integer, T, denoting the number of test cases. Each of the $2T$ subsequent lines describes a test case over 2 lines:

1. The first line contains a single positive integer, n, denoting the length of array A.
2. The second line contains n positive space-separated integers describing the respective elements in integer array A (i.e., $A_0, A_1, \ldots, A_{n-1}$).

Constraints

- $1 \leq T \leq 100$
- $1 \leq n \leq 10$

Subtasks

- For a 50% score, $1 \leq A_i \leq 10^4$.
- For a 100% score, $1 \leq A_i \leq 10^{18}$.

Output Format

For each test case, print the following 2 lines:

1. Print the length of integer array C (the array representing the compressed form of binary integer D) on a new line.
2. Print each element of C as a single line of space-separated integers.

It is *guaranteed* that a solution exists.

Sample Input

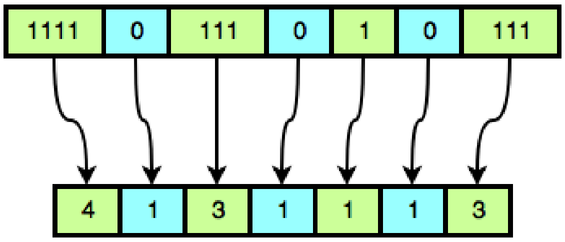
```
1
5
4 1 3 2 4
```

Sample Output

```
7
4 1 3 1 1 1 3
```

Explanation

$A = \{4, 1, 3, 2, 4\}$, which expands to $B = 11110111001111$. We then find *setCount(B)* $= 11$. The smallest binary number $> B$ which also has eleven 1's is $D = 11110111010111$. This can be reduced to the integer array $C = \{4, 1, 3, 1, 1, 1, 3\}$. This is demonstrated by the following figure:



Having found C, we print its length (7) as our first line of output, followed by the space-separated elements in C as our second line of output.