Make SYSU Great Again IV

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

As you know, you are participating in the Chinese Constructive Problem Contest (CCPC), and without a doubt, the proposing school, Sun Yat-sen University, as the Kingdom of Construction, is very eager for you to challenge some related problems.

Little U is a student in the Kingdom of Construction. In an algorithm class, Little U learned about the MCOP (Matrix Chain Ordering Problem). Here is an introduction to MCOP:

> Given a sequence of positive integers of length $n \geq 3$, $[w_1, w_2, \ldots, w_n]$, as input to the algorithm. The following formula multiplies $n-1$ matrices to ultimately obtain a new matrix:
>
> $$M = M_1 \times M_2 \times \cdots \times M_{n-1}$$
>
> where M_i is a matrix of size $w_i \times w_{i+1}$. Matrix multiplication satisfies the associative law, so changing the order of multiplication will yield the same final matrix M, but the number of operations may differ. The goal of the problem is to find an optimal multiplication strategy among $(n-2)!$ possible strategies, such that the total number of operations required for matrix multiplication is minimized. Here, it is assumed that multiplying matrices of sizes $p \times q$ and $q \times r$ will yield a matrix of size $p \times r$, requiring pqr operations. The minimum total number of operations required to compute M under the optimal strategy is denoted as $\mathrm{MCOP}([w_1, w_2, \ldots, w_n])$.

Little U has learned how to solve this problem with sufficiently good time complexity in class, but as a student of the Kingdom of Construction, Little U naturally thought of the following problem:

Given an integer X, satisfying $1 \leq X \leq 10^9$. You need to construct an integer sequence of length l, $[a_1, a_2, \ldots, a_l]$, that meets the following requirements:

- $3 \leq l \leq 6$;
- For all $i \in [1, l]$, $1 \leq a_i \leq 4000$;
- $\mathrm{MCOP}([a_1, a_2, \ldots, a_l]) = X$.

Little U has already implemented a checker using the algorithm learned in class, and what you need to do is solve this construction problem.

Input

This problem contains multiple test cases. The first line of input contains an integer T ($1 \leq T \leq 500$), representing the number of test cases.

For each test case, the input consists of a single line with an integer X ($1 \leq X \leq 10^9$), the meaning of which has been given in the problem.

Output

For each test case: first output a line with an integer l ($3 \leq l \leq 6$), representing the length of the constructed sequence. Then output a line with l integers, representing the constructed sequence.

It can be proven that for any input X, there is always a construction that meets the requirements. If there are multiple constructions that meet the requirements, output any one of them.

Example

standard input	standard output
2 90 10	4 5 3 2 6 3 1 1 10

Note

For the first test case, the constructed sequence is $[5, 3, 2, 6]$, which represents the need to perform a chain multiplication of three matrices of sizes 5×3, 3×2, and 2×6. Consider two multiplication strategies:

- First, multiply M_1 and M_2 to obtain a matrix of size 5×2, then multiply with M_3, corresponding to the expression $(M_1 \times M_2) \times M_3$. The total number of operations at this point is $5 \times 3 \times 2 + 5 \times 2 \times 6 = 90$;
- First, multiply M_2 and M_3 to obtain a matrix of size 3×6, then multiply with M_1, corresponding to the expression $M_1 \times (M_2 \times M_3)$. The total number of operations at this point is $3 \times 2 \times 6 + 5 \times 3 \times 6 = 126$.

Here, the goal is to minimize the total number of operations, so $\mathrm{MCOP}([5, 3, 2, 6]) = \min(90, 126) = 90$.