

Problem C. Find the Array

Input file: **standard input**
 Output file: **standard output**
 Time limit: 2 seconds
 Memory limit: 256 megabytes

This is an interactive problem.

There is an array a of length n , consisting of **distinct** integers. It is guaranteed that every element of the array is a positive integer less than or equal to 10^9 . You have to find out the values of all the elements of it.

To do so, you can make up to 30 queries of the following two types:

- “1 i ” ($1 \leq i \leq n$) — ask the value of a_i
- “2 $k\ i_1, i_2, \dots, i_k$ ” ($2 \leq k \leq n$, $1 \leq i_j \leq n$, all i_j must be distinct) — the number k and k positions in the array. As the answer to this query you will receive $\frac{k \cdot (k-1)}{2}$ integers — $|a_{i_c} - a_{i_d}|$ for every $c < d$. In other words, you will receive $\frac{k \cdot (k-1)}{2}$ absolute values of differences between all pairs of elements that are on positions i_1, i_2, \dots, i_k . Note that the answer on query 2 is randomly shuffled.

Once you know the answer, print it using the following query:

- “3 a_1, a_2, \dots, a_n ” ($1 \leq a_i \leq 10^9$) — the elements of the array a . After this query, your program must terminate. This query doesn’t count (i.e. you can make up to 30 queries of either of the first two types plus 1 query of the third type).

Interaction Protocol

At the beginning, your program should read one integer n ($1 \leq n \leq 250$) — the number of elements.

In order to make a query of the first type, print “1 i ” ($1 \leq i \leq n$). After this query, read one integer — the value of a_i .

In order to make a query of the second type, print “2 k ” ($2 \leq k \leq n$). Then in the same line print k space-separated distinct integers — i_1, i_2, \dots, i_k , ($1 \leq i_j \leq n$). After this query read $\frac{k \cdot (k-1)}{2}$ integers — $|a_{i_c} - a_{i_d}|$ for every $c < d$. These values will be given in random order.

Once you know the answer, print “3”. Then in the same line, print n space-separated integers — a_1, a_2, \dots, a_n ($1 \leq a_i \leq 10^9$). Your program must terminate after this query.

If for either of two first queries you get one number -1 as the answer, then it means that you made more queries than allowed, or made an invalid query. Your program should immediately terminate (for example, by calling `exit(0)`). You will receive “**Wrong Answer**”. If you ignore this, you can get other verdicts since your program will continue to read from a closed stream.

After printing a query do not forget to output end of line and flush the output. Otherwise, you will get **Wall time-limit exceeded**. To do this, use:

- `fflush(stdout)` or `cout.flush()` in C++;
- `System.out.flush()` in Java;

- `stdout.flush()` in Python.

Precisely follow this format of interaction.

Example

standard input	standard output
3	1 1
1	1 2
2	2 3 1 2 3
4 3 1	3 1 2 5

Note

In the first query of type 1, we ask the value of a_1 and receive 1 as the answer.

In the second query of type 2, we ask the value of a_2 and receive 2 as the answer.

In the query of type 2, we ask all the possible differences between the elements of array with indexes 1, 2 and 3. And we get array 4, 3, 1 as the result. We know that the array contains values $|a_1 - a_2|$, $|a_1 - a_3|$, $|a_2 - a_3|$. Since we already know that $|a_2 - a_1| = 1$, one of the following is true: $|a_1 - a_3| = 3$ and $|a_2 - a_3| = 4$ or $|a_2 - a_3| = 3$ and $|a_1 - a_3| = 4$. The only case that is possible, taking into account the constraints of the problem, is when $|a_1 - a_3| = 4$ and $|a_2 - a_3| = 3$ with $a_3 = 5$.

Since we know the values of all the elements of the array, we print them in the last query.