Problem K. Koolhash

Input file:	`stdin`
Output file:	`stdout`
Time limit:	2 seconds
Memory limit:	256 MB

tourist has thought of a new hashing function to store administrator records, and he's enlisted you to help him build it! His hash function $\phi(n)$ will output a single integer, and needs the following pieces of information: l, r, and N, where l represents the leftmost bit of n, r represents the rightmost bit of n, and N represents the number of 1-bits in n.

There aren't too many administrator records, so for now let's assume an unsigned 32-bit number system. Your job is to provide **tourist** with the three components of his hashing function given the number of records k, and the unique identifier of each record n. And yes, please forget about the absurdity of his hashing algorithm. Unfortunately, **tourist** has never taken a formal CS class.

Input

The first line contains the number of records k, $1 \leq k \leq 500$.

Each of the next k lines contains an integer representing a record identifier n, $0 \leq n < 2^{31}$.

You can assume all inputs are given in decimal, and you need to convert them into 32-bits unsigned integers to get l, r and N for each n.

Output

On each line, print three space-separated integers for every input record, denoting the leftmost bit l of n, the rightmost bit r of n, and number of 1-bits bits N of n, respectively.

For further clarification, see the explanation provided for the first example below.

Examples

stdin	stdout
1 8	0 0 1

stdin	stdout
3 45 68 23	0 1 4 0 0 2 0 1 4

Explanation

For the first example, 8 is represented as $0x00000008$ (written in hexadecimal for simplicity). Thus, the left most bit is 0, the right most bit is 0, and the number of 1-bits is 1.