Binary Weight

The binary weight of a number is the amount of 1s in the number's binary representation. For example, 43 in binary is 101011, so the binary weight is 4. Given a decimal number, we want to find the next greater decimal number that has the same binary weight. In this case, 45 (101101) is such a number.

Input

The first line of the input will contain an integer T, the number of test cases. Each test case will be one line with an integer N, $1 \leq N \leq 1,000,000,000$.

Output

The output will contain T lines, each corresponding to the next decimal number with the same binary weight as in the input.

Reminder: a binary representation of a number is the sum of powers of 2, where 1 means that power is included, and 0 means that it's not. So a binary 43 is $1 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$, which evaluates to $1 \times 32 + 0 \times 16 + 1 \times 8 + 0 \times 4 + 1 \times 2 + 1 \times 2 = 32 + 8 + 2 + 1 = 43(101011)$.

Example

Input:
3
3
4
10

Output:
5
8
12