

Magical Well Of Lilies

Problem

There is a deep magical well in a forest that has some lilies on its waters. You have a large empty basket and some coins, and are standing next to the well. You have more coins than there are lilies in the well. The well has taken note of the fact that your basket is empty.

If you toss one coin into the well, the well will toss out one lily into your basket. If you toss four coins at once into the well, the well will take note of how many lilies it has tossed out into your basket so far. If you toss two coins at once into the well, the well will toss out as many lilies into your basket as it had last taken note of. If you toss one coin, or two coins at once, into the well, and there are not enough lilies left in the well, the well will not toss out any lilies.

Given the number of lilies L in the well at the beginning, return the minimum number of coins you will need to toss into the well to make it toss all of its lilies into your basket.

Input

The first line of the input gives the number of test cases, T . T lines follow. Each line contains a single integer L , representing the number of lilies in the well at the beginning.

Output

For each test case, output one line containing `Case #x: y`, where x is the test case number (starting from 1) and y is the minimum number of coins you will need to toss into the well to make it toss out all of its L lilies into your basket.

Limits

Time limit: 15 seconds.
Memory limit: 1 GB.

Test Set 1

$$1 \leq T \leq 20.$$
$$1 \leq L \leq 20.$$

Test Set 2

$$1 \leq T \leq 100.$$
$$1 \leq L \leq 10^5.$$

Sample

Sample Input

Sample Output

2
5
20

Case #1: 5
Case #2: 15

For test case #1, when there are 5 lilies in the well, the least number of coins needed is 5. We toss them, one at a time, into the well, and the well tosses out the 5 lilies, one at a time, into our basket. No other sequence of moves results in a better solution, so 5 is our answer.

For test case #2, first, we toss 5 coins, one at a time, into the well, and the well tosses out 5 lilies, one at a time, into our basket. Next, we toss 4 coins at once into the well, and the well takes note that it has tossed out 5 lilies into our basket so far. Then, we toss 2 coins at once into the well, and the well tosses out 5 lilies (that it took note of) into our basket. Then, we toss another 2 coins at once into the well, and the well tosses out another 5 lilies into our basket. Finally, we toss another 2 coins at once into the well, and the well tosses out the final 5 lilies into our basket. Total coins needed is 15. Getting 20 lilies out of the well is not possible with any lesser number of coins, so 15 is our answer.