**Playing With Bits**

Johnny is playing a game with the binary representation of numbers. If given the number, what’s the fastest way to turn it into 0 using the following rules?

* Change the rightmost (0th) bit in the binary representation to a 1 or 0.
* Change the ***i***th bit in the binary string if the (***i*** – 1)th bit is set to 1 and the (***i*** – 2)th through 0th bits are set to 0.

**Input:** The first line of input contains **T**, the number of test cases. The next **T** lines contain an integer which you will use for that test case.

**Output:** You will output “CASE #(case number): “ followed by the minimum number of operations to transform the integer into 0.

**Example Input:**

2

3

6

**Example Output:**

CASE #1: 2

CASE #2: 4

**Explanation:** For case #1, the binary representation of 3 is “11”. For the first step, you can change “11” to “01” with the second rule since the 0th bit is 1. For the second step, you can change “01” to “00” with the first rule.

For case #2, the binary representation of 6 is “110”. You can change “110” to “010” with the second rule since the 1st bit is 1 and the 0th through 0th bits are 0. You can then change “010” to “011” with the first rule. Change “011” to “001” with the second rule since the 0th bit is 0. Finally, change “001” to “000” with the first rule.