Problem D
Base -2
Input: Standard Input
Output: Standard Output

The creator of the universe works in mysterious ways. But he uses a base ten counting system and likes round numbers.

Scott Adams

Everyone knows about base-2 (binary) integers and base-10 (decimal) integers, but what about base **-2**? An integer n written in base -2 is a sequence of digits (b_i), writen right-to-left. Each of which is either 0 or 1 (no negative digits!), and the following equality must hold.

$$n = b_0 + b_1(-2) + b_2(-2)^2 + b_3(-2)^3 + ...$$

The cool thing is that every integer (including the negative ones) has a unique base-**-2** representation, with no minus sign required. Your task is to find this representation.

Input

The first line of input gives the number of cases, **N** (at most 10000). **N** test cases follow. Each one is a line containing a decimal integer in the range from -1,000,000,000 to 1,000,000,000.

Output

For each test case, output one line containing "Case #**x**:" followed by the same integer, written in base -2 with no leading zeros.

Sample Input

Sample Input	Output for Sample Input
4	Case #1: 1
1	Case #2: 11011
7	Case #3: 10
-2	Case #4: 0
0	

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