Fermat's little theorem states that if p is a prime number, then for any integer a, the number $(a^p - a)$ is an integer multiple of p. In the notation of *modular arithmetic*, this is expressed as

$$a^p \equiv a (\text{mod } p)$$

For example, if $a = 2$ and $p = 7$, $2^7 = 128$, and $128 - 2 = 7 \times 18$ is an integer multiple of 7. We can also write $128\%7 = 2$, here % is the modulo operator used in C/C++ or Java.

If a is not divisible by p, Fermat's little theorem is equivalent to the statement that $a^{p-1} - 1$ is an integer multiple of p, or in symbols

$$a^{p-1} \equiv 1 (\text{mod } p)$$

For example, if $a = 2$ and $p = 7$ then $2^6 = 64$ and $64 - 1 = 63$ is a multiple of 7. We can also write $64\%7 = 1$.

You are given a set S which contains 1 to N. You want to find two subsets of S, X and Y such that the following conditions are met:

1. $X \cap Y = \varnothing$
2. Let bitwise XOR of every element of X equals U and Y equals V. U must be less than or equal to V.

You want to find out number of ways you can choose such subset X and Y.

Two ways (X_1, Y_1) and (X_2, Y_2) will be equal if X_1 equals X_2 and Y_1 equals Y_2 or X_1 equals Y_2 and Y_1 equals X_2.

For example is $S = \{1, 2\}$, the ways are:

1. $X = \varnothing$, $Y = \varnothing$. [$U = 0$, $V = 0$]
2. $X = \varnothing$, $Y = \{1\}$. [$U = 0$, $V = 1$]
3. $X = \varnothing$, $Y = \{1, 2\}$. [$U = 0$, $V = 1 \wedge 2 = 3$, ($\wedge$ means bitwise XOR in C/C++/Java)]
4. $X = \varnothing$, $Y = \{2\}$. [$U = 0$, $V = 2$]
5. $X = \{1\}$, $Y = \{2\}$. [$U = 1$, $V = 2$]

Now, given N, you need to find the number of ways you can choose two subsets of S such that the 2 conditions meet, *modulo* 1000000007 ($10^9 + 7$).

Input

First line contains T ($T \leq 100$), the number of test cases. Each of the next T lines each contains an integer N ($0 \leq N < 10^{10000}$).

Output

For each case print one line, '`Case` C`:` W', where C is the case number, and W is the required answer for that case.

Sample Input

```
2
2
3
```

Sample Output

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Case 1: 5
Case 2: 14
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