E Simple Encryption

Input: Standard Input
Output: Standard Output

Some day in the future a person named Reuben wants to submit some interesting problems to the judging director of ACM ICPC (Association for Copotron Mechanics International Collegiate Programming Contest) World Finals so that they can be used in World Finals 2031. This contest requires problem submitters to submit their problems in encrypted format. But in year 2030, encryption software is not widely available on the Internet just to prevent terrorists from sending encrypted messages. So he wants to use a simplified encryption technique to submit his problem. He uses several 12-digit encryption keys to encrypt his messages. We would not disclose the encryption/decryption technique for safety because your next generations will be competing in World Finals by then. But Reuben also does not want to send his encryption key in a straightforward email. He wants to send a key (public) K_1 that will implicitly denote the actual key (private) $\mathbf{K_2}$. $\mathbf{K_2}$ is such a **12** digit number so that $\mathbf{K_1}^{K_2} \equiv \mathbf{K_2}$ (modulo $\mathbf{10^{12}}$). Given the value of $\mathbf{K_1}$ your job is to help Reuben find the value of $\mathbf{K_2}$.

Input

The input file contains around **1600** line of input. Each line contains an integer, which denotes the value of $\mathbf{K_1}$ **(0<K₁<50001)**. A line containing a single zero terminates input.

Output

For each line of input produce one line of output. This line contains the serial of output, followed by the given public key $\mathbf{K_1}$ and then a possible actual private key $\mathbf{K_2}$. Look at the output for sample input for exact formatting. Inputs will be such that for given value of $\mathbf{K_1}$ there will always be at least one value of $\mathbf{K_2}$. Note that $\mathbf{K_2}$ should always have **12** digits and will not have any leading zeroes.

Sample Input / Output for Sample Input

Sample Input	Output for Sample Input
78 99 0	Case 1: Public Key = 78 Private Key = 308646916096 Case 2: Public Key = 99 Private Key = 817245479899

Problemsetter: Shahriar Manzoor, Special Thanks: Derek Kisman