



## J. KAMI

KAMI (Kami's Amazing Mathematical Instructions) is a simple programming language.

There are 676 variables that can be used, which are represented by pairs of English letters: AA, AB, AC, ..., ZX, ZY, ZZ. All variables are unsigned 64-bit integers. That is, their values range from 0 to  $2^{64} - 1$ .

There are three types of instructions:

- ADD A B C - Assign the value of the sum of variable A and variable B (modulo  $2^{64}$ ) to variable C.
- MUL A B C - Assign the value of the product of variable A and variable B (modulo  $2^{64}$ ) to variable C.
- MOD A B - Assign the value of variable A modulo P to variable C, where P is some fixed prime number.

Your task is to write a program in this language that can compute the value of the N-th Fibonacci number modulo P for all integer values of N that satisfy  $1 \leq N \leq 2^{64} - 1$ .

The Fibonacci sequence is defined as follows:  $F_0 = 0$ ,  $F_1 = 1$ , and  $F_N = F_{N-2} + F_{N-1}$  for all  $N \geq 2$ .

At the beginning of the program, the variable AA is set to N. All other variables are set to 0. At the end of the program, the variable AA must be set to the value of  $F_N$  modulo P. The values of the other variables do not matter.

For each test case, your program will be tested on 100 different values of N. These values are fixed beforehand and are the same for each test case. Your program will be accepted if it correctly calculates the value of  $F_N$  modulo P for all tested values of N.

### INPUT

The first and only line contains the positive integer P, the modulus used for the MOD instruction ( $3 \leq P \leq 10^9 + 7$ ). It is guaranteed that P is a prime number.

### OUTPUT

On the first line, print an integer K ( $1 \leq K \leq 10^5$ ) - the total number of instructions of the program.

Then, print K more lines containing the instructions as described above. Each instruction must be on a separate line.

Sample Input	Sample Output
3	5 ADD AA AA AB ADD AA AB AC MUL AB AC AD ADD AA AD AE MOD AE AF

The output is an example of a valid program.

If the initial value of AA is 1, then at the end of the program, these variables have the following values:

AA = 1, AB = 2, AC = 3, AD = 6, AE = 7, AF = 1

All other variables have a value of 0.

Note that this output will not be accepted for this input. It is only for demonstration purposes.