

# Fibonacci vs Polynomial

Define a sequence  $Pib(n)$  as following

- $Pib(0) = 1$
- $Pib(1) = 1$
- otherwise,  $Pib(n) = Pib(n-1) + Pib(n-2) + \mathbf{P}(n)$

Here  $\mathbf{P}$  is a polynomial.

Given  $\mathbf{n}$  and  $\mathbf{P}$ , find  $Pib(n)$  modulo 1,111,111,111.

## Input

First line of input contains two integer  $\mathbf{n}$  and  $\mathbf{d}$  ( $0 \leq \mathbf{n} \leq 10^9$ ,  $0 \leq \mathbf{d} \leq 100$ ),  $\mathbf{d}$  is the degree of polynomial.

The second line contains  $\mathbf{d}+1$  integers  $\mathbf{c}_0, \mathbf{c}_1 \dots \mathbf{c}_d$ , represent the coefficient of the polynomial (Thus  $\mathbf{P}(x)$  can be written as  $\sum \mathbf{c}_i x^i$ ).  $0 \leq \mathbf{c}_i \leq 100$  and  $\mathbf{c}_d \neq 0$  unless  $d = 0$ .

## Output

A single integer represents the answer.

## Example

**Input:**

10 0  
0

**Output:**

89

**Input:**

10 0  
1

**Output:**

177

**Input:**

100 1  
1 1

**Output:**

343742333