

Contest Duration: 2025-06-07(Sat) 22:00 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20250607T2100&p1=248>) - 2025-06-07(Sat) 23:40 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20250607T2240&p1=248>) (local time) (100 minutes)

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## G - Accumulation of Wealth

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Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 625 points

### Problem Statement

You are given an integer  $N \geq 2$  and an integer  $P$  between 0 and 100, inclusive. Let  $p = P/100$ .

There is a sequence  $A$ . Initially, the length of  $A$  is 1, and its only element is 1.

The following operation is repeated  $N - 1$  times on sequence  $A$ :

- Let  $m$  be the smallest positive integer that does not appear in  $A$ . With probability  $p$ , perform operation 1; with probability  $1 - p$ , perform operation 2:
  - Operation 1: Append  $m$  to the end of  $A$ .
  - Operation 2: Let  $c_1, c_2, \dots, c_{m-1}$  be the number of times  $1, 2, \dots, m - 1$  appear in  $A$ , respectively. Choose an integer  $k$  between 1 and  $m - 1$ , inclusive, with probability proportional to  $c_k$ . That is, choose  $k$  with probability  $c_k / \sum_{j=1}^{m-1} c_j$ . Then, append  $k$  to the end of  $A$ .

For each  $k = 1, 2, \dots, N$ , find the expected number of occurrences of  $k$  in  $A$  after  $N - 1$  operations, modulo 998244353.

► Definition of expected value modulo 998244353

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## Constraints

- $2 \leq N \leq 10^5$
- $0 \leq P \leq 100$
- All input values are integers.

## Input

The input is given from Standard Input in the following format:

```
N P
```

## Output

Output  $N$  lines. The  $k$ -th ( $1 \leq k \leq N$ ) line should contain the expected number of occurrences of  $k$  in  $A$  after the operations, modulo 998244353.

### Sample Input 1

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```
3 50
```

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### Sample Output 1

[Copy](#)

```
124780546
124780545
748683265
```

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The operations proceed as follows:

- Initially,  $A = (1)$ .
- 1st operation: It becomes  $A = (1, 2)$  with probability  $1/2$ , and  $A = (1, 1)$  with probability  $1/2$ .
- 2nd operation:
  - If  $A = (1, 2)$ , it becomes  $A = (1, 2, 3)$  with probability  $1/2$ ,  $A = (1, 2, 1)$  with probability  $1/4$ , and  $A = (1, 2, 2)$  with probability  $1/4$ .
  - If  $A = (1, 1)$ , it becomes  $A = (1, 1, 2)$  with probability  $1/2$ , and  $A = (1, 1, 1)$  with probability  $1/2$ .

The expected numbers of occurrences of 1, 2, 3 in the final  $A$  are  $\frac{15}{8}$ ,  $\frac{7}{8}$ ,  $\frac{1}{4}$ , respectively.

## Sample Input 2

[Copy](#)

```
2 0
```

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## Sample Output 2

[Copy](#)

```
2
0
```

[Copy](#)

## Sample Input 3

[Copy](#)

```
5 24
```

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## Sample Output 3

[Copy](#)

```
297734288
442981554
937492320
798158491
518366411
```

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'#telegram)

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