Project Euler #160: Factorial trailing digits

This problem is a programming version of Problem 160 from projecteuler.net

For any n, let $f_b(n)$ be the last five digits before the trailing zeroes in $n!$ written in base b.

For example,

$9! = 362880$ so $f_{10}(9) = 36288$
$10! = 3628800$ so $f_{10}(10) = 36288$
$20! = 2432902008176640000$ so $f_{10}(20) = 17664$

Find $f_b(n)$ for multiple values of n.

Input Format

First line of each file contains two numbers: b (base) and q (number of queries). q lines follow, each with an integer n written in base b.

Constraints

- $2 \leqslant b \leqslant 36$
- $1 \leqslant q \leqslant 10^5$
- $0 \leqslant n \leqslant 10^{18}$
- Every character in n is a valid digit in base b ('0'-'9','A'-'Z' for values > 9)

Output Format

Output q lines. On each line print exactly 5 digits in base b - the answer to the q-th query. If for some n $n!$ contains less than 5 digits, put the corresponding number of leading zeroes before answer.

Sample Input

```
10 3
9
10
20
```

Sample Output

```
36288
36288
17664
```