

Easy Math

Limits: 2s, 512 MB

You will be given three integers **a**, **b**, **m**. Print $(a^b) \bmod m$. There will be 30 test cases at most in an input file. In each case **a** and **b** both will be integer numbers of at most 10^5 digits.

Input

There will be multiple test cases in each input file . Each line of the input file will contain three integer numbers **a** , **b** and **m** ($1 \leq m \leq 1.5 \times 10^9$).

a and **b** both will be integer numbers of at most 10^5 digits.

Input will be terminated when $a = 0$, $b = 0$ and $m = 0$. This line should not be processed. Each input file contains 30 test cases at most.

Output

For each case, print $(a^b) \bmod m$ in a new line.

Samples

Input	Output
7 2 11	
4 2 3	
19 1 5	
0 0 0	

```
1 //https://toph.co/p/easy-math
2 #include<bits/stdc++.h>
3 using namespace std;
4 #define ll long long
5 ll bigmod(ll b, ll p, ll m){
6     ll res = 1%m, k = b%m;
7     while(p){
8         if(p&1) res = (res*k)%m;
9         k = (k*k)%m;
10        p = p>>1LL;
11    }
12    return res;
13 }
14 int main(){
15     ios::sync_with_stdio(0); cin.tie(0); cout.tie(0);
16
17     string a,b;
18     ll m;
19     while(cin>>a>>b>>m){
20         if(a=="0" && b=="0" && m==0)break;
21
22         ll base = 0;
23         for(int i=0; i<a.size(); i++){
24             int d = a[i]-'0';
25             base = ((base*10)+d)%m;
26         }
27
28         ll ans = 1;
29         for(int i=0; i<b.size(); i++){
30             int d = b[i]-'0';
31             ans = (bigmod(ans,10,m) * bigmod(base,d,m))%m;
32         }
33
34         cout << ans << endl;
35     }
36     return 0;
37 }
```