

Practice



UmeshKanoja

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Modular Exponentiation for large numbers

Submissions: 2977 (/problem_submissions.php?pid=401) Accuracy: 59.94% Difficulty: [Medium](https://practice.geeksforgeeks.org/Medium/0/0/) Marks: 4

Associated Course(s): Sudo Placement [IITs] (/courses/sudo-placement-IIT/)

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Implement $\text{pow}(A, B) \% C$.In other words, given A, B and C, find $(A^B) \% C$.

Input:

The first line of input consists number of the test cases.

The following T lines consist of 3 numbers each separated by a space and in the following order:

A B C

'A' being the base number, 'B' the exponent (power to the base number) and 'C' the modular.

Output:

In each separate line print the modular exponent of the given numbers in the test case.

Constraints:

$$1 \leq T \leq 70$$

$$1 \leq A \leq 10^5$$

$$1 \leq B \leq 10^5$$

$$1 \leq C \leq 10^5$$

Example:

Input:

```
3
3 2 4
10 9 6
450 768 517
```

Output:

```
1
4
34
```

**** For More Input/Output Examples Use 'Expected Output' option ****

Contributor: Madhur Adlakha

Author: madhuradlakha (<https://auth.geeksforgeeks.org/user/madhuradlakha/practice/>)

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C++ (g++ 5.4)

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```
1 #include <iostream>
2 using namespace std;
3
4 int getResult(int a, int b, int c){
5     if (b == 0) {
6         return 1;
7     }
8
9     if (b == 1) {
10        return a%c;
11    }
12
13    int left, right;
14    left = getResult(a, b/2, c);
15    right = getResult(a, b - b/2, c);
16
17    return (left*right)%c;
18 }
19
20 int main() {
21    //code
22    int t, a, b, c;
23    cin>>t;
24    for (int i=0; i<t; i++) {
```

☐ Test against custom input

Expected Outcome

Compile & Test

Submit

Correct Answer. ✓

Execution Time:0.01

Next Suggested Problem: Print Diagonally (/problems/print-diagonally/0/?ref=self)

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Vishnu Sharma • 4 months ago

<https://ide.geeksforgeeks.org/>

a simple solution

2 ^ | v • Reply • Share ›



pagala_bhanra • 6 months ago

 $(a^b) \% c$ is same as $(a^{(b \% \phi(c))}) \% c$ where $\phi(c)$ is the euler totient function of c .step 1: $a = a \% c$; $b = b \% \phi(c)$;step 2: if b is even, compute $\text{power}((a^a) \% c, b / 2) \% c$;else compute $(a \% c * \text{power}(a, b - 1) \% c) \% c$;

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lmao 0.01s

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