← Notes

Get the modulo of a very large number that cannot be stored in any data type in C/C++!

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Modulo big-integer C C++

Today we will solve this problem, of finding modulo of huge numbers, which we face frequently in our CP world.

For now I can remember only one problem on codechef which needs this. Comment down if you know some other problems.

Lets see the modulo operation first. We will have a quick look since we already have discussed about Modular Arithmetic in good detail.

It is a distributive over addition, multiplication. i.e.

1. `(A+B)%m = (A%m + B%m) %m`
2. `(A*B)%m = (A%m * B%m) %m`

These two will help here, mainly the first one.

Consider, `'abcdepqr'` is a string of digits, ok?

Is not `abcdepqr = (abcde*1000 + pqr)` ? Yes, it is.

Similarly, `(a*10000000 + bcdepqr)`, right?

This is the thing we are going to apply.

> What will we do is,
>
> 1. Get one variable to store the answer intialized to zero.
> 2. Scan the string from left to right,
> 3. Everytime multiply the answer by 10 and add the next number and take the modulo and store this as new answer.

```
E.g. 12345 % 100:
ans = 0
ans = (0*10 + 1)%100
ans = (1*10 + 2)%100
ans = (12*10 + 3)%100
ans = (23*10 + 4)%100
ans = (34*10 + 5)%100
ans = 45.
```

It means: we, at the end, are doing this only:

```
a*10000000 + b*1000000 + c*100000 + d*10000 + e*1000 + p*100 + q*10 + r
```

which is nothing but `'abcdepqr'` !

This way have proved the **correctness** too.

I think you have got it!

This will solve the problem.

I hope you like this post, have look at my other notes here.

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Manohar Reddy Poreddy a year ago

The Point 1 seems incorrect:
(A+B)%m = A%m + B%m
It should be:
(A+B)%m = (A%m + B%m)%m
Source: https://www.hackerearth.com/practice/math/number-theory/modulus-arithmetic/tutorial/

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Bhavesh Munot Author a year ago

Yes, you are right. Thanks for pointing this. Corrected.

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Anirban Gorai 3 years ago

https://www.hackerrank.com/contests/zenhacks/challenges/eugene-and-big-number

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Deepank Pruthi 3 years ago

nice method.....
tnxx..
hoping 4 ur another note soon.....

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Bhavesh Munot Author 3 years ago

Thank you for your appreciation.
I already have written many notes, mainly intended for beginners.
Have a look at them here:
https://www.hackerearth.com/notes/u/bhavesh_munot/

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admindeepak 3 years ago

nice ...
thanks :)

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Bhavesh Munot Author 3 years ago

Thank you for your appreciation.

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