ABC 148 Commentary

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2019 years 12 May 22 days

For International Readers: English editorial will be published in a few days.

A: Round One

You can calculate $6 - A - B$ and output the value.

Input and output methods differ depending on the language. For example, in C ++ , use cin and cout.

And can be realized by

Listing 1 C implementation example

```
# Include < Stdio . H >

int main ( void ) {
        int A , B ;
        scanf ("% d % d ", & A , & B ); // Receive A and B from input

        int result = 6- A - B ; // Calculate 6- A - B and store in variable result
        printf ("% d \ n ", result ); // output

        return 0;
}
```

Listing 2 Implementation example with ferNANDo

```
r a7 a6 a5 a4 a3 a2 a1 a0
rferna nn do
```

```
r b7 b6 b5 b4 b3 b2 b1 b0
d a7 b7
e a7 d
f b7 d
x7 ef
d a6 b6
e a6 d
```

One

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```
f b6 d
x6 ef
d a5 b5
e a5 d
f b5 d
x5 ef
d a4 b4
e a4 d
f b4 d
x4 ef
d a3 b3
e a3 d
f b3 d
x3 ef
d a2 b2
e a2 d
f b2 d
x2 ef
d a1 b1
e a1 d
f b1 d
x1 ef
d a0 b0
e a0 d
f b0 d
x0 ef
x4 x4 x4
```

```
x5 x5 x5
x7 x6 x5 x4 x3 x2 x1 x0
```


B: Strings with the Same Length

1 from N Turn the loop until, i in time through the loop S of i to output a character eyes, then T of i characters eyes If you repeat output without opening spaces, you will end up with the desired new string.

The following is an implementation example using C ++ (includes etc. are omitted) .

```
char S [110];
char T [110];
int main () {
        int a ; scanf ( "% d" , & a );
        scanf ( "% s% s" , S , T );
        for ( int i = 0; i < a ; i ++) printf ( "% c% c" , S [ i ], T [ i ]); printf ( "\ n" );
}
```

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C: Snack writer: beet

Just look at the positive multiples of A in ascending order and see if they are multiples of B. At this time, $A \times B$ is clearly a multiple of both, so it is sufficient to check at most B times.

The following is an example of the answer in C ++ . Beware of overflow.

https://atcoder.jp/contests/abc148/submissions/9083476

As an aside, such numbers are called the least common multiple of A and B , and the complexity of $O(\log(\min(A, B)))$ It is also possible to ask for.

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D: Brick Break

In the following, "how to break bricks that Suzuke is satisfied with" is called "good way to break bricks".

First 1 If you do not there is a brick that was written, the answer is clearly - 1 is.

Otherwise, let i be the number of the leftmost brick in which 1 is written . Then i

The i- th lens where the same number of bricks remain for the "good crushing method"

There is a “good crushing method” that does not crush the moth. Because crush the bricks with the remaining one written in the original crushing method

If you do not crush the i- th brick instead, it will still be a "good crushing method". Therefore,

When searching for the " best way to break" the largest number of bricks to keep, it is a problem even if it is assumed that the i- th brick does not break

There is none.

According to the same idea, there is a brick with 2 written on the right of the i- th brick.

Then you can assume that the leftmost of them will remain unbroken.

By repeating this greedy approach, you can see the best way to crush

You can turn it on.

When solving a combinatorial optimization problem, it is assumed that a certain element is selected because there is no loss.

The idea of making search space smaller by doing so is typical of greedy methods in competitive programming.

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E: Double Factorial

$f(N)$ to 10 subsequent to the end when expressed in binary 0 number of, $f(N)$ is 2 times and is divisible by $f(N)$ is 5 the number of divisible by min 's.

Below, we consider N even and odd

- If N is odd ... $f(N)$ is the product of some odd numbers, so it does not break at 2 . Yo The answer is always 0 .
- If N is an even number ... Obviously, the number of times that $f(N)$ is divisible by 2 is more than the number that is divisible by 5 So we only consider the number of times divisible by 5 .

$f(N) = N(N-2)(N-4)\cdots 2$ is 5 times divisible In, $(2, 4, \cdots, N$ out of 5 those divisible by Number $)$ + $(2, 4, \cdots, N$ out of 5^2 number of those divisible by $)$ + $(2, 4, \cdots, N$ out of 5^3 also divisible by The number of $)$ ... will be. Each, $2, 4, \cdots, N$ out of 5 the number of those divisible by the $floor(N/10)$, $2, 4, \cdots, N$ out of 5^2 number of those divisible by the $floor(N/50)$, $2, 4, \cdots, N$ out of 5^3 divisible by The number of things $Floor(N/250)$, $\cdots$ So, $N/10$ from the order, the denominator is N between the following, the denominator 5 and times quotient It is sufficient to repeat the process of finding the sum.

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F: Playing tag on tree

The answer is 0 when Takahashi can only move to the vertex where Aoki is in the first action . When not

think.

The root is the first vertex where Aoki is. Since Takahashi and Aoki cannot pass each other, the game ends.

It ends when Takahashi is cornered by a " dead end " (otherwise, Takahashi escapes towards the leaves)

The game can be extended) . Therefore, just before the end of the game, "Takahashi has leaves x and Aoki has x

It becomes a situation that parent parents are in the "on, then 2 people 1 to act by degrees, both x game in the situation you are in the parent of

The program ends.

Aoki can always keep up with Takahashi in the shortest distance, so Aoki's travel count is

It only depends on whether you are cornered by. Therefore, Takahashi is a place to be cornered,

Of the leaves that can reach earlier than Aoki, the one that is farthest from Aoki is the best choice.

It will be good. This is obtained by calculating the distances from vertices u *and* v using DFS and BFS , respectively.

And the complexity is $O(N)$.

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