



cry's blog

Codeforces Round 952 (Div. 4) Editorial

By **cry**, 6 weeks ago,

This was our first time setting a Div.4 contest. We sincerely hope you enjoyed the problems!

1985A - Creating Words

Problem Credits: **cry**

Analysis: **cry**

[Solution](#)

[Code \(C++\)](#)

1985B - Maximum Multiple Sum

Problem Credits: **cry**

Analysis: **cry**

[Solution](#)

[Code \(C++\)](#)

1985C - Good Prefixes

Problem Credits: **sum**

Analysis: **cry**

[Solution](#)

[Code \(C++\)](#)

1985D - Manhattan Circle

Problem Credits: **cry**

Analysis: **cry**

[Solution](#)

[Code \(C++\)](#)

1985E - Secret Box

Problem Credits: **cry**

Analysis: **cry**

[Solution](#)

[Code \(C++\)](#)

1985F - Final Boss

Problem Credits: **cry, sum**

Analysis: **cry, sum**

[About Hacks](#)

→ Pay attention

Before contest

[Educational Codeforces Round 167 \(Rated for Div. 2\)](#)

08:40:41

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[Codeforces Educational Round 167 Solution Discussion \(with Shayan\)](#)

By **Shayan**

Before stream 10:45:40

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→ shine_rocks



Rating: **1015**

Contribution: **+1**



shine_rocks

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Unfortunately, there was a lot of hacks on this problem, and we're sorry for it. Since our intended solution is not binary search, we didn't really take overflow using binary search seriously. I ([cry](#)) prepared this problem and I only took into account about overflow with big cooldown, but I forgot overflow can happen on attacks as well. I apologize and we will do better next time!

Solution

Since the sum of h is bounded by $2 \cdot 10^5$, and each attack deals at least 1 damage. If we assume every turn we can make at least one attack, the sum of turns to kill the boss in every test case is bounded by $2 \cdot 10^5$. This means that we can afford to simulate each turn where we make at least one attack.

But what if we cannot make an attack on this turn? Since the cooldown for each attack can be big, we cannot increment turns one by one. We must jump to the next turn we can make an attack. This can be done by retrieving the first element of a sorted set, where the set stores pairs $\{t, i\}$ which means {next available turn you can use this attack, index of this attack} for all i . Here, we can set the current turn to t and use all attacks in the set with first element in the pair equal to t . Remember to insert the pair to $\{c_i + t, i\}$ back into the set after processing the attacks.

The time complexity is $\mathcal{O}(h \log n)$.

Code (C++)

```
#include <bits/stdc++.h>
using namespace std;

int main(){
    int t; cin >> t;
    while(t--){
        int h, n; cin >> h >> n;
        vector<int> a(n), c(n);
        for(int& i: a) cin >> i;
        for(int& i: c) cin >> i;
        set<pair<long long, int>> S;
        for(int i = 0; i < n; i++){
            S.insert({1, i});
        }
        long long last_turn = 1;
        while(h > 0){
            auto [turn, i] = *S.begin();
            S.erase(S.begin());
            last_turn = turn;
            h -= a[i];
            S.insert({turn + c[i], i});
        }
        cout << last_turn << "\n";
    }
}

// comment "tomato" if you see this comment
```

Bonus

Try to solve this if $1 \leq h \leq 10^9$.

Solution

We can do this by binary searching for the answer. For some time t , we know that we can perform an attack of cooldown c exactly $\lfloor \frac{t-1}{c} \rfloor + 1$ times. The total damage we will do in time t will be:

4	nor	152
6	-is-this-fft-	151
7	TheScrasse	148
8	atcoder_official	146
9	Petr	145
10	pajenegod	144

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[peacebringer167](#) → [My first problem.](#) 🎉

[awoo](#) → [Educational Codeforces Round 140 Editorial](#) 🎉 📈

[adinan_toky](#) → [Codeforces Round #848 \(Div. 2\) Editorial](#) 🎉 📈

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[khaledkunbargi](#) → [An Exciting Challenge](#) 🎉

[Beaboss](#) → [A Chatbot for Competitive Programming](#) 🎉

$$\sum_{i=1}^n a_i \left(\lfloor \frac{t-1}{c_i} \rfloor + 1 \right)$$

Codeforces
adaptatron → [Contest] : DP on Distinct Subsequences ⚡

hbar2803 → [Not Codeforces] USACO account ⚡

ahmadexe → Help needed: Indentation issues in sublime text ⚡

[Detailed →](#)

Code (C++)

```
#include <bits/stdc++.h>
using namespace std;

#define ll long long

void solve(){
    ll h, n;
    cin >> h >> n;

    vector<ll> A(n), C(n);

    for (ll &i : A)
        cin >> i;
    for (ll &i : C)
        cin >> i;

    auto chk = [&](ll t){
        ll dmg = 0;
        for (int i = 0; i < n and dmg < h; i++){
            ll cnt = (t - 1) / C[i] + 1;

            if (cnt >= h)
                return true;

            dmg += cnt * A[i];
        }
        return dmg >= h;
    };

    ll L = 1, H = 1e12;

    while (L < H){
        ll M = (L + H) / 2;
        chk(M) ? H = M : L = M + 1;
    }
    cout << L << "\n";
}

int main(){
    ios_base::sync_with_stdio(0); cin.tie(0);
    int tc;
    cin >> tc;

    while (tc--)
        solve();
}
```



[Analysis: cry](#)[Solution](#)

To satisfy $D(k \cdot n) = k \cdot D(n)$, each digit d in n must become $k \cdot d$ after multiplying n by k . In other words, none of n 's digits can carry over to the next digit upon multiplication. From this, we can deduce that each digit in n must be less than or equal to $\lfloor \frac{9}{k} \rfloor$. Only thing left is to count all such numbers in the range of 10^l inclusive and 10^r exclusive.

Every number below 10^r has r or less digits. For numbers with less than r digits, let's pad the beginning with zeroes until it becomes a r digit number (for example, if $r = 5$, then 69 becomes 00069). This allows us to consider numbers with less than r digits the same way as numbers with exactly r digits. For each digit, we have $\lfloor \frac{9}{k} \rfloor + 1$ choices (including zero), and there are r digits, so the total number of numbers that satisfies the constraint below 10^r is $(\lfloor \frac{9}{k} \rfloor + 1)^r$.

To get the count of numbers in range, it suffices to subtract all valid numbers less than 10^l . Therefore, the answer is $(\lfloor \frac{9}{k} \rfloor + 1)^r - (\lfloor \frac{9}{k} \rfloor + 1)^l$. To exponentiate fast, we can use [modular exponentiation](#).

[Code \(Python\)](#)

```
MOD = int(1e9+7)
t = int(input())
for _ in range(t):
    l, r, k = map(int, input().split())
    print((pow(9 // k + 1, r, MOD) - pow(9 // k + 1, l, MOD) + MOD) % MOD)
```



1985H1 - Maximize the Largest Component (Easy Version)

Problem Credits: sum

[Analysis: sum](#)[Solution](#)[Code \(C++\)](#)

1985H2 - Maximize the Largest Component (Hard Version)

Problem Credits: sum

[Analysis: sum](#)[Solution](#)[Code \(C++\)](#)

Tutorial of Codeforces Round 952 (Div. 4)

▲ +103 ▼ ☆
cry 6 weeks ago 289

Comments (289)

[Write comment?](#)2 weeks ago, <#> | ☆

tomato

→ [Reply](#)

animishy

▲ +33 ▼



MrKisame

2 weeks ago, # ⌂ | ☆

tomato

→ [Reply](#)

2 weeks ago, # ⌂ | ☆

▲ 0 ▼

tomato

→ [Reply](#)

cry



itsiftikar02

2 weeks ago, # ⌂ | ☆

▲ 0 ▼

tomato

→ [Reply](#)

Larin_Lev

2 weeks ago, # ⌂ | ☆

▲ +2 ▼

tomato

→ [Reply](#)

gautamkr22

2 weeks ago, # ⌂ | ☆ ▲ 0 ▼

tomato

→ [Reply](#)

khaledgad

2 weeks ago, # ⌂ 0 ▼

| ☆

tomatooooo

→ [Reply](#)

peterstromso

2 weeks ago, # ⌂ 0 ▼

| ☆

me too

→ [Reply](#)

priyabrata8558

2 weeks ago, # ⌂ 0 ▼

| ☆

tomato

→

[Reply](#)

probot_codes

2 weeks ago, # ⌂ +9 ▼

| ☆

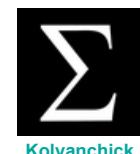
laaltamarbademazedar^ ahaatamarbademazedar→ [Reply](#)

**ONLYOP**

2 weeks ago,
^
| ☆
tomato
→ [Reply](#)

**mastermind239**

2 weeks ago,
^
| ☆
tomato
→ [Reply](#)

**Kolyanchick**

2 weeks ago,
^
| ☆
tomato
→ [Reply](#)

**sahidkth7917**

2 weeks ago,
^
| ☆
tamatar
bina
chatni
kaise
bani.
→ [Reply](#)

**SkyMagic**

2 weeks ago,
^
| ☆
tomato
→ [Reply](#)

**Neelesh124**

5 days ago,
^
| ☆
tomato
→ [Reply](#)

**Connectus**

2 weeks ago,
^
| ☆
tomato
→ [Reply](#)



2 weeks ago,

[Contest](#)

tomato

[Reply](#)I THINK GRONKELIPS JUST
ACT LIKE THEY KNOW
WHAT THEY'RE DOING.

**PsychQ91**

2 weeks ago,
^
| ☆
tomato
→ [Reply](#)

**kir_tan22**

2 weeks ago, #
^ | ☆
tomATO!?
→ [Reply](#)

**Kaal09**

2 weeks ago,
^
| ☆
tomato
→ [Reply](#)

**MuhammadAydi**

2 weeks ago,
^
| ☆
Tomato
→ [Reply](#)

**fleedledeedle**

13 days ago,
^
| ☆
tomato
→ [Reply](#)

**Naman1213**

13 days ago,
^
| ☆
tomato
→ [Reply](#)

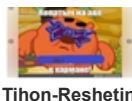
**samchen123**

11 days ago,
^
| ☆
tomato
→ [Reply](#)

**Pikachu--**

13 days ago, # ^
| ☆
even you are not able
to crush that tomato.
→ [Reply](#)





Tihon-Reshetin

11 days ago, # ⌂ | ☆

tomato

→ [Reply](#)

▲ 0 ▼



xinxun

2 weeks ago, # ⌂ | ☆

what's mean? why so many "tomato"

→ [Reply](#)

▲ 0 ▼



xinxun

2 weeks ago, # ⌂ | ☆

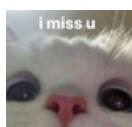
i see now, abort F

→ [Reply](#)

▲ +3 ▼



PrabhuPSahoo



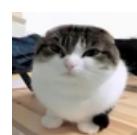
liedsonf

2 weeks ago, # ⌂ | ☆

tomato

→

▲ 0 ▼



toasted_duckens

2 weeks ago, # ⌂ | ☆

tomato

→ [Reply](#)

▲ 0 ▼



Morselllprimo

8 days ago, # ⌂ | ☆

tomato

→ [Reply](#)

▲ 0 ▼



ayushsuman

2 weeks ago, # ⌂ | ☆

tomato

→ [Reply](#)

▲ 0 ▼



811_Ni99a_Bytes

2 weeks ago, # ⌂ | ☆

tomato

→ [Reply](#)

▲ 0 ▼



H_R_K

2 weeks ago, # ⌂ | ☆

tomato

→ [Reply](#)

▲ 0 ▼



Aureum

11 days ago, # ⌂ | ☆

tomato

→ [Reply](#)

▲ 0 ▼



EdanLiahovetsky

new, 3 days ago, # ⌈ | ☆

▲ 0 ▼

tomato

→ [Reply](#)

oximas

2 weeks ago, # ⌈ | ☆

▲ 0 ▼

F : Boss Fight Detailed Video Tutorial Priority Queues and Maps

<https://youtu.be/COKEV373zRo?feature=shared>

formidablechief27

→ [Reply](#)

2 weeks ago, # ⌈ | ☆

▲ 0 ▼

got hacked on F :(

→ [Reply](#)

harshitpareekk



DENGSTAR

2 weeks ago, # ⌈ | ☆

▲ 0 ▼

Me too :(

→ [Reply](#)

CChord

2 weeks ago, # ⌈ | ☆

▲ 0 ▼

Me too too :(

→ [Reply](#)

Snowball_511

FARMAAN_KHANN



2 weeks ago, # ⌈ | ☆

▲ 0 ▼

me too too too two:)

→ [Reply](#)

2 weeks ago, # ⌈ | ☆

▲ 0 ▼

me too too too too too:(

→ [Reply](#)

gtg321



milk_81

2 weeks ago, # ⌈ | ☆

▲ 0 ▼

me too too too too too
too→ [Reply](#)

2 weeks ago, # ⌈ | ☆

▲ 0 ▼

Me tooo

→ [Reply](#)



Naman1213

2 weeks ago, #

| ⚡

me too too

too too too

too too :(

→ [Reply](#)

petertrømsø

2 weeks ago, #

| ⚡

me too, but

got some

consolation

in reading

that the

author got

"hacked"

too. ("

forgot

overflow

can

happen on

attacks as

well")

→ [Reply](#)

rmz

2 weeks ago, #

| ⚡

Me too

too too

too too

too too

too :(

Tomato

→

[Reply](#)

smeshar

12 days ago, #

| ⚡

Me too

too too

too too

too too

too too

:(

tomato

→

[Reply](#)

deep_n_drap

2 weeks ago, #

| ⚡

plus

→ [Reply](#)

▲ 0 ▼



the max value of $2^r \cdot 2^{(r+1)}$ is 2^{2r+1} . If r is large enough, this value will overflow. To solve it, at every iteration of n we have to check if the value is greater than health or not.

→ [Reply](#)



2 weeks ago, # 🔍 | ⭐

▲ 0 ▼

Your comment literally says its because of overflow :D

→ [Reply](#)



mahendraakshansh

2 weeks ago, # 🔍 | ⭐

▲ 0 ▼

He was asking about the constraints on binary search. $L < r$ or $l \leq r$ won't lead to overflow. Maybe he meant it as 2 separate things.

→ [Reply](#)



akshaynigam90

2 weeks ago, # 🔍 | ⭐

▲ 0 ▼

oh sorry i misunderstood but yea whenever we multiply two very large integers its always recommended to check for whether its gonna overflow or not :D well you are definitely a specialist and way better than me so you know better ;D

→ [Reply](#)



mahendraakshansh

2 weeks ago, # 🔍

| ⭐

Yea I actually forgot checking. Anyways rating doesn't matter when making mistakes and during discussions. Also I think you will reach pupil, Congo!

→ [Reply](#)



om172

2 weeks ago, # 🔍 | ⭐

▲ 0 ▼

I have checked if monster health is between $[2^r, 2^{r+1})$ taking r from 0, 1 ... so on to avoid overflow.

→ [Reply](#)



doitwithcod3

13 days ago, # 🔍 | ⭐

▲ 0 ▼

[Youtube Link](#) this video might help you.

→ [Reply](#)



Srijan_Shekhar

13 days ago, # 🔍 | ⭐

▲ 0 ▼

Thank you

→ [Reply](#)



retinue

2 weeks ago, # | ☆

Thanks for the editorial. I learned a lot.

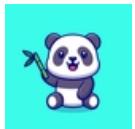
→ [Reply](#)

2 weeks ago, # | ☆

tomato

→ [Reply](#)

yatindanger0001



Hustler2464

2 weeks ago, # | ☆

This was a good contest! Thank you **cry** and **sum**!→ [Reply](#)

abhinav789

2 weeks ago, # | ☆

Was it a unrated contest??

→ [Reply](#)

quad_wipe

2 weeks ago, # ▲ | ☆

No, after system testing ratings will be updated

→ [Reply](#)

abhinav789

2 weeks ago, # ▲ | ☆

Ok

→ [Reply](#)

navyaoberoi

2 weeks ago, # | ☆

When is the time of acceptance for a problem calculated? Is it at the time the problem is submitted and accepted, or at the time we see the acceptance?

→ [Reply](#)

mrgliff

2 weeks ago, # ▲ | ☆

Time will be calculated based on submission but the solution should be accepted

→ [Reply](#)

nightfury02

2 weeks ago, # ▲ | ☆

Sometimes, the verdict of our solution will be delayed because it will be in the queue. If your solution is accepted then the time of acceptance will be when you submitted it.

→ [Reply](#)

LordPiyush

2 weeks ago, # | ☆

← Rev. 2

▲ 0 ▼

tomato! got hacked on F ;(

→ [Reply](#)

lptd

2 weeks ago, # | ☆

▲ 0 ▼

What is the difference between my binary search sol and those that got hacked? I wanna know more on why I got pass the hacking phase.

<https://codeforces.com/contest/1985/submission/265355482>→ [Reply](#)



Ryuu7

2 weeks ago, # ⌂ | ☆

It's when someone uses a very high value for the upper limit of binary search (like $1e18$). Then $(\text{turns}/c[i]) * a[i]$ could go very high, even above 64 bit long long. So to AC you could either use int128, or set a lower upper limit such as yours. Or use a lang like python :)

[→ Reply](#)

lptd

2 weeks ago, # ⌂ | ☆

Oh, that's interesting! Thanks!

[→ Reply](#)

▲ 0 ▼



ouster

2 weeks ago, # ⌂ | ☆

h -= a[i]

▲ 0 ▼

This rules out the test cases where all the attack values were $2 \cdot 10^5$. So, the maximum sum of a_i should be less than $2 \cdot 10^5$. The choice of $r = 10^{11}$ is judicious as $r \cdot \sum_{k=0}^n a_k$ fits in the range of **LONG LONG INT**.

[→ Reply](#)

lptd

2 weeks ago, # ⌂ | ☆

▲ 0 ▼

That makes more sense now :0

[→ Reply](#)

Naman1213

If all attacks have damage $2e5$ and cooldown is 1, sum can reach $2e5 \times 2e5 \times \text{mid}$. if mid is $\geq 1e8$, it overflows. Yours is correct because of the $h -= a[i]$. It prevents running binary search in such cases.

The correct way to deal with this is to use 128 bit integer or break out of the loop as soon as sum becomes $\geq h$.

[→ Reply](#)

← Rev. 2 ▲ +6 ▼

You're wrong, it's not because of the upper bound you take. I've also taken $1e11$ as upper bound but got hacked.

265328896



lptd

2 weeks ago, # ⌂ | ☆

▲ 0 ▼

I will consider this as the official answer :v Thank you so much!

[→ Reply](#)

LordPiyush

2 weeks ago, # ⌂ | ☆

▲ 0 ▼

the value of r (or high) you have taken it to be $1e11$ while i took $1e14$ which caused overflow

265361398

[→ Reply](#)



lptd

2 weeks ago, # ▲ | ☆

Thank you, I got it!

→ Reply

▲ 0 ▼



2 weeks ago, # ▲ | ☆

▲ 0 ▼

tomato

→ Reply

Ryuu7



Anas986

2 weeks ago, # ▲ | ☆

▲ 0 ▼

Going to spend time crying because the brute force approach did not come to mind for E

→ Reply



Aspergillus

2 weeks ago, # ▲ | ☆

▲ 0 ▼

Anyone who used DSU for H1,H2 explain your solution?

→ Reply



yJaTin

2 weeks ago, # ▲ | ☆

▲ 0 ▼

For H1 — You can use dsu to connect the components first and get the size of each component. Now for each row, check if there are any neighbors '#' which it can connect to, if it can then add that component size, finally add all '#' of this row to size as well (as they will be converted to '#'). Do the same for columns as well and then finally return max value.

→ Reply



2 weeks ago, # ▲ | ☆

▲ +3 ▼

You can use dsu to join components of '#'. Notice that for any $(n * m)$ grid, we can represent (i, j) as $(i * m + j)$. So initialize a disjoint set of $(n * m)$ components at first.

Then whenever you encounter a '#', you can run a flood fill via dfs / bfs and take $(i, j) = (i * m + j)$ as the parent for all '#' you encounter.

Now you have size of all the connected components of '#'.

Now you can either '#' an entire row or column. I'm considering row here, same thing can be done for each column.



SNX03

Notice when you '#' an entire row, You already have some '#' as parents, once you '#' the row, all these parents combine together.

One more thing, the parents from row above and row below will also be joined in this new component.

Hence the final answer would be $\text{Count}('') + \text{size of each parent you encounter}$.

To prevent taking a parent twice you can use the set.

Code:

Spoiler

→ Reply

2 weeks ago, # ⌈ | ⭐

Thanks, in a few hours ill study DSU then I'll sit and understand your solution soon. :D

[→ Reply](#)**Aspergillus****AvaraKedavra**

2 weeks ago, # ⌈ | ⭐

▲ 0 ▼

I used the same approach but how will you extend this approach for H2 ?

[→ Reply](#)**akashdadwai**

2 weeks ago, # ⌈ | ⭐

▲ +10 ▼

neal did a very neat implementation using DSU.

Link: [265272303](#)[→ Reply](#)**smit_384**

2 weeks ago, # ⌈ | ⭐

▲ 0 ▼

i am using DSU but **this** code is giving TLE can you tell me why?

[→ Reply](#)**PiscesDream**

5 days ago, # ⌈ | ⭐

▲ 0 ▼

I use DSU+DP to calculate four arrays: when the operation is at row=x, col=y, what's the total size we can get for the top-left/top-right/bot-left/bot-right w.r.t to (x, y).

I use set to track rather than unordered_set so the complexity is O(mnlog(n)):

<https://codeforces.com/contest/1985/submission/266763301>[→ Reply](#)**hackstar**

2 weeks ago, # | ⭐

▲ 0 ▼

tomato

[→ Reply](#)



2 weeks ago, # | ☆

▲ 0 ▼

For problem F, if we take R as 1e12 it is being hacked

→ [Reply](#)[Aviral_Gupta](#)

2 weeks ago, # ▲ | ☆

← Rev. 2 ▲ 0 ▼

Consider 2e5 values equal 2e5 in array a, array c : 2e5 values equal 1
.. so, when multiplying (mid / c[i] * a[i]) 1e12 * 2e5 * 2e5 gives 1e22
which doesn't fit into 64bit :)→ [Reply](#)[Wiaam_SA](#)

2 weeks ago, # ▲ | ☆

▲ 0 ▼

The editorial contains bonus problem solution which uses
1e12→ [Reply](#)[Aviral_Gupta](#)[Wiaam_SA](#)

2 weeks ago, # ▲ | ☆

← Rev. 2 ▲ 0 ▼

I have used 1e13 lol, just break the loop as soon as
sum becomes GTOE health. I mean if you're not
breaking the loop, it will cause overflow .→ [Reply](#)[Aviral_Gupta](#)

2 weeks ago, # ▲ | ☆

▲ 0 ▼

My bad didn't see that return true part.
Understood thanks→ [Reply](#)[Wasif_Shahzad](#)

2 weeks ago, # | ☆

▲ +4 ▼

tomato :) btw a question. will the time complexity of priority queue solution be also
 $O(h \log n)$?→ [Reply](#)[shubham22488](#)

2 weeks ago, # | ☆

▲ 0 ▼

tomato

→ [Reply](#)[WhisperingWillow](#)

2 weeks ago, # | ☆

← Rev. 2 ▲ 0 ▼

Fast Editorial!

→ [Reply](#)[_Rounak](#)

2 weeks ago, # | ☆

▲ 0 ▼

Tomato

→ [Reply](#)[bansalarpan4](#)

2 weeks ago, # | ☆

▲ 0 ▼

this was my first contest on codeforces , managed to solve A and B , got TLE on
C . should i register for upcoming div 2 contests or just wait for other div 3 or div 4
contest ? What should i do , suggestions ??→ [Reply](#)



Harman001

2 weeks ago, # ⚡ | ☆

You should register for contest and try to solve a and b

→ [Reply](#)

0



bansalarpan4

2 weeks ago, # ⚡ | ☆

0

but it feels like waste of time struggling with problems after A and B , should i prepare more first ? before contesting for div 2 contests

→ [Reply](#)

Pvkevra

2 weeks ago, # ⚡ | ☆

0

I think you should wait for DIV 3, because problem A div 2 +-= problem C div 4

→ [Reply](#)

Jelly.bean

2 weeks ago, # ⚡ | ☆

0

you should register for div 2 and try to solve atleast a. from my first 5 contests, onlt 1 was div3, rest were div2s.

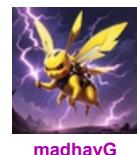
→ [Reply](#)

bansalarpan4

2 weeks ago, # ⚡ | ☆

0

Ok , thankyou for your suggestion

→ [Reply](#)

madhavG

2 weeks ago, # ⚡ | ☆

+1

You could do either, I personally waited till I hit expert atleast once before doing non-educational Div2.

→ [Reply](#)

animishy

2 weeks ago, # | ☆

0

this was my first contest, will this change my status from unrated to newbie?

→ [Reply](#)

2 weeks ago, # | ☆

0

tomato

→ [Reply](#)

adityaarya2003



WizAhaan

2 weeks ago, # | ☆

0

tomato

→ [Reply](#)

jrsak_vrmr

2 weeks ago, # ⚡ | ☆

0

what does it mean

→ [Reply](#)

WizAhaan

2 weeks ago, # ⚡ | ☆

0

check out code for problem F

→ [Reply](#)



jrsak_vmr

ok got it

→ Reply



forbiddenlogic

2 weeks ago, # 0 | ⭐

what does tomato mean?

→ Reply

▲ 0 ▼



animishy

2 weeks ago, # 0 | ⭐

The editorial solution for problem F has a comment in the code that says to comment "tomato" if you read that comment.

→ Reply

▲ 0 ▼

2 weeks ago, # 0 | ⭐

← Rev. 3

▲ 0 ▼

Is there anyone generous enough to debug my code?

Riyad_Hossain

I tried to up-solve F. If I'm not wrong my solution takes $O(n \log n)$. Then why it's getting TLE on the second test case?

Submission: 265448705

Edit: Solve it by replacing the vector(named coolingTime) with a map;

→ Reply



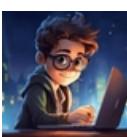
Riyad_Hossain

2 weeks ago, # 0 | ⭐

▲ 0 ▼

oh, yeah tomato

→ Reply



Sanjeet_Patel

2 weeks ago, # 0 | ⭐

▲ 0 ▼

Tomato

→ Reply



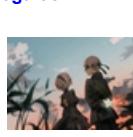
electric_boogaloo

2 weeks ago, # 0 | ⭐

▲ +18 ▼

I'm still eager to see a proof of why there are no such n that satisfy $D(n \cdot k) = k \cdot D(n)$ in the case of possible carries in multiplication.

→ Reply



Abito

2 weeks ago, # 0 | ⭐

▲ +4 ▼

Same. I just guessed it

→ Reply



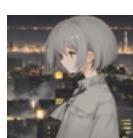
kefolen

2 weeks ago, # 0 | ⭐

▲ 0 ▼

Yeah, guessed it is well, 'cause haven't managed to construct a formal proof of that fact in a reasonable amount of time during the contests. Wonder if such even exists. If yes, I am interested to see it too.

→ Reply



2 weeks ago, # 0 | ⭐

← Rev. 4 ▲ +7 ▼

We can see that for a number with more than one digit, its D will be smaller than itself(this is how number expression works!). For a number with exactly one digit, its D is equal to itself.Imagine we are multiplying a single digit a by k , resulting in a carryover

We get a result kx which has more than one digit. And we expect $D(kx)$ to be $kD(x)$, which is equal to kx ($x = D(x)$). Thus, our D has been smaller than the target. It's impossible to compensate for this with another digit multiplication since $D(ky)$ won't be greater than ky for any y .

→ [Reply](#)



peterstromso

2 weeks ago, # ▲ | ☆

▲ 0 ▼

For each carry, D will be reduced by 9: the carry will add 1 to D instead of adding ten.

→ [Reply](#)



crimsonred

2 weeks ago, # ▲ | ☆

▲ 0 ▼

Yeah shitty editorial.

→ [Reply](#)



AmeyPatil

2 weeks ago, # | ☆

▲ 0 ▼

solved A B C D , first contest after so long , hoping to be 1000+ after the rating update.

→ [Reply](#)



hasan_15_07_03

2 weeks ago, # | ☆

▲ +5 ▼

I submitted the hacked solution for question F again and it got accepted then how is it possible that my solution got hacked, please help!! **cry**

→ [Reply](#)



single_malt

2 weeks ago, # ▲ | ☆

▲ +3 ▼

test cases aren't yet updated!!

→ [Reply](#)



hasan_15_07_03

2 weeks ago, # ▲ | ☆

▲ 0 ▼

Ok

→ [Reply](#)



GeekKaka

2 weeks ago, # | ☆

▲ 0 ▼

Problem G was ProjecteulerForces XD

→ [Reply](#)



670rw

2 weeks ago, # | ☆

▲ 0 ▼

tomato

→ [Reply](#)



rampushpa_1ced

2 weeks ago, # | ☆

▲ 0 ▼





2 weeks ago, # | ☆

▲ 0 ▼

In H1 why to subtract R[maxR + 1] -= sz; and C[maxC + 1] -= sz; in solution.

→ Reply

ankitpatilavp

2 weeks ago, # | ☆

← Rev. 2 ▲ 0 ▼

Can anyone help explain why this equation is wrong only with large numbers in problem F using the binary search method?

The number of times we use the current attack is `ceil(mid / (c[i] + 1))`. $(c[i] + 1)$ is the segment length in which we can perform only one attack.

SuperMo

Dividing gives us the number of segments we have, and any float will be ceiled. I don't understand why this is incorrect. Can anyone clarify?

→ Reply



2 weeks ago, # ^ | ☆

▲ 0 ▼

It might overflow depending on your value of 'r'.

→ Reply

TRYING_To_Do_Better_



2 weeks ago, # | ☆

▲ 0 ▼

When will start System testing?

→ Reply

hackstar



2 weeks ago, # | ☆

▲ 0 ▼

Is there a formal proof for B?

→ Reply

aneee



2 weeks ago, # ^ | ☆

← Rev. 8 ▲ +14 ▼

Let's consider any number greater than $n > 3$, then for $x = 2$ we have $k = \lfloor n/2 \rfloor$, hence $2 \cdot (1 + 2 + \dots + k) = k \cdot (k + 1)$, which is $n \cdot (n + 2)/4$ for even n and $(n^2 - 1)/4$ for odd n .

akshatchaudhary

Consider any $x \geq 2$, then,

$$g(x) = \frac{(n+1) \cdot (n+1-x)}{2x} \leq \frac{x \cdot k \cdot (k+1)}{2} \leq \frac{n \cdot (n/x+1)}{2} = \frac{n \cdot (n+x)}{2x} = f(x).$$

On evaluating, we get $f'(x) = \frac{-n^2}{2x^2}$ and $g'(x) = \frac{-(n+1)^2}{2x^2}$, hence a decreasing function. Thus, $f(x)$ or $g(x)$ should be maximum at $x = 2$.If the $f(x)$ and $g(x)$ logic is not convincing, you can think that $\lfloor n/x \rfloor$ will be always of the form $(n - \lambda)/x$, where $0 \leq \lambda < x$ and it depends on n . [In fact, $\lambda = n \% x$] Thus the sum
$$h(x, \lambda) = \frac{(n-\lambda) \cdot (n-\lambda+x)}{2x},$$
 where λ itself depends on x and n . But, the for the extreme values of λ , the function $h(x)$ essentially takes the
form $f(n)$ or $g(n)$, and it can be shown that it will work for any

PS: I am not sure why the above explanation doesn't work for $n = 3$, could anyone point it out? Thanks!

→ [Reply](#)



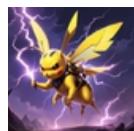
2 weeks ago, # ⌂ | ☆

▲ 0 ▼

Really intuitive and clear explanation, thanks a lot.

→ [Reply](#)

5hriom



2 weeks ago, # ⌂ | ☆

▲ 0 ▼

$3(2) = 2$

$3(3) = 3 > 2$

→ [Reply](#)

madhavG



2 weeks ago, # ⌂ | ☆

▲ 0 ▼

Yep I know that, but why is the proof failing? Cause the function is decreasing?

→ [Reply](#)

akshatchaudhary



21bcs022

7 days ago, # ⌂ | ☆

▲ 0 ▼

$x(1+2+3+\dots+k) = k(x+kx)/2$ — eq1 As $x \leq n$ and $kx \leq n \Rightarrow x+kx \leq 2n$ $\Rightarrow (x+kx)/2 \leq n$ — eq1 $\leq kn$ and if we consider $n \geq 2$ except 3 we get the maximum value of eq1 when we have max k value thus k will be max for $x = 2$ as $x \geq 2$ given in problem and $x = n/k$ thus for largest k we have to take smallest possible value of x thus 2 here and it will give the max answer for every n value. But for 3 we will have to take 3 as $2 < 3$

→ [Reply](#)



ZeroPointTwo

2 weeks ago, # ⌂ | ☆

▲ 0 ▼

got hacked F, ha.

→ [Reply](#)



Aspergillus

2 weeks ago, # ⌂ | ☆

▲ +1 ▼

cry for H2 on point 3. of the last paragraph, shouldn't it be subtract s on the subrectangle?

→ [Reply](#)



ibrahimwq

2 weeks ago, # ⌂ | ☆

▲ +3 ▼

write proof for G, please

→ [Reply](#)



Aspergillus

2 weeks ago, # ⌂ | ☆

▲ +4 ▼

If I add two numbers and their digit carry over, then the digit sum of the new number will obviously decrease than the sum of the digit sum of the first two numbers. Same thing for k additions, if it is same after k additions, there should still be no carry. If there is no carry then each digit can be calculated separately. More precisely each digit can range from 0 to $9/k$. If a number is less than 10^l , then there are l digits to be filled so $9/(k+1)^l$. since we are asked in between, we can simply subtract the two values for r and l.

→ [Reply](#)



2 weeks ago, # ⌂ | ⭐

thanks)

→ [Reply](#)

ibrahimwq

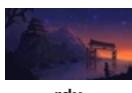


2 weeks ago, # ⌂ | ⭐

Is it just me or the code for Problem E is wrong?

→ [Reply](#)

NanJi115



2 weeks ago, # ⌂ | ⭐

Having the same doubt...

→ [Reply](#)

2 weeks ago, # ⌂ | ⭐

my bad , it's fixed now

→ [Reply](#)

cry



2 weeks ago, # ⌂ | ⭐

For G, i solved this problem by Matrix Multiplication

Spoiler→ [Reply](#)

Whisper



2 weeks ago, # ⌂ | ⭐

H2: We find some $O(n^3)(O(nm \times \min(n, m)))$ solutions like 265329368.

Their solutions need to enumerate each cells in the smallest rectangle containing the connected blocks.

The data like

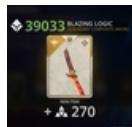
```
#.#.#.#
..#.#.#
###.#.#
....#.#
#####.#
.....#
#######
```



or

```
##.##.##.##
.##.##.##.#
.##.##.##.#
##.##.##.##
.##.##.##.#
.##.##.##.#
##.##.##.##
```

can let them have $O(n^3)$, but in fact they just need to run about $\frac{n^3}{12}$ times. We tried another construction, but it also failed. I think these solutions are wrong, hope the new construction can hack them.

→ [Reply](#)

2 weeks ago, # ⌂ | ⭐

Problem G was really good. Though I did not figure it out until I read the solution.

→ [Reply](#)



2 weeks ago, # | ☆

▲ 0 ▼

tomato

→ [Reply](#)**sprkrd**

2 weeks ago, # | ☆

▲ 0 ▼

Tomato

→ [Reply](#)**aibakgaming747**

2 weeks ago, # | ☆

▲ 0 ▼

I wonder why some participants solved the 'D' problem in a horrible way. Simply, push all the coordinates where the char is '#'. Then print the middle one.

Submission: [265290261](#)→ [Reply](#)**Riyad_Hossain**

2 weeks ago, # | ☆

▲ +3 ▼

So how many testcases are there now in problem F?

→ [Reply](#)**jackylova_fan_fan_fan**

2 weeks ago, # ^ | ☆

▲ +3 ▼

236

→ [Reply](#)**_Navia_**

2 weeks ago, # | ☆

▲ 0 ▼

tomato

→ [Reply](#)**b_harsh**

2 weeks ago, # | ☆

▲ 0 ▼

how much time it takes for the ratings to be updated ???

→ [Reply](#)**bansalarpan4**

2 weeks ago, # ^ | ☆

▲ 0 ▼

after system testing gets completed.

→ [Reply](#)**Priyansh_Kumar**

2 weeks ago, # ^ | ☆

← Rev. 2 ▲ 0 ▼

What is system testing and how much time it takes??

→ [Reply](#)**bansalarpan4**

2 weeks ago, # ^ | ☆

▲ 0 ▼

refer this post contest FAQ's blog

→ [Reply](#)**Priyansh_Kumar**



bansalarpan4

▲ 0 ▼



2 weeks ago, # 🔍 | ⭐

▲ 0 ▼

tomato

→ [Reply](#)

Gyanpapi



2 weeks ago, # 🔍 | ⭐

▲ 0 ▼

Meow

→ [Reply](#)

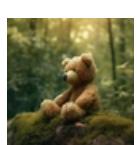
CatInDaPringlesCan

2 weeks ago, # 🔍 | ⭐

▲ 0 ▼



to be honest, i generated all n satisfy for all k from 2 to 11 and got the rules. got AC just by guessing the rules and i don't know how to prove the solution at all i was so regret that my solution for problem F got hacked because i forgot to check the overflow case

→ [Reply](#)

2 weeks ago, # 🔍 | ⭐

▲ 0 ▼

for this problem 1985E — Secret Box the code you provided gave 0 instead of 1030301 for the last test case. how come does it get accepted ? please answer. even my code was giving 0.that's why i didn't submit it yesterday.

→ [Reply](#)

2 weeks ago, # 🔍 | ⭐

▲ 0 ▼

Hi everyone,

I participated in this contest yesterday and I managed to solve 3 questions out of 9. Today when I look at the submissions, it says that I was only able to solve 2 out of 9. Can anyone tell me why is this happening?

Insignificant_guy

Thanks.

→ [Reply](#)

2 weeks ago, # 🔍 | ⭐

▲ 0 ▼

System testing is going on. Wait until it reaches 100%.

Priyansh_Kumar

→ [Reply](#)

2 weeks ago, # 🔍 | ⭐

▲ 0 ▼

Thanks, brother!!

→ [Reply](#)

Insignificant_guy



2 weeks ago, # 🔍 | ⭐

▲ 0 ▼

tomato

→ [Reply](#)

2 weeks ago, # 🔍 | ⭐

▲ 0 ▼

tomatoooooo

→ [Reply](#)

Rohan_Agrawal



RomanLeshchuk

2 weeks ago, # | ☆

Wow, G solution was so easy... I almost came up with the idea that for each digit there are $9/k+1$ digits, but I used $10/k+1$, so couldn't figure out the answer(

[→ Reply](#)

mohammadjaloudi

2 weeks ago, # | ☆

▲ +3 ▼

Hey Guys, did anyone solve E. Secret Box in less than $O(xy)$?

[→ Reply](#)

SKnight4

Here is the complete solution. Find all divisors of k and store them in a vector(let's call it div). The maximum size of this vector is \sqrt{k} (let's call it size sz). Then you can brute force for x and y in this vector and calculate $x = k/x/y$. Now if these x,y,z satisfy given constraint then you got a valid dimension.

Overall complexity($O(sz^2)$ where $sz = \sqrt{k}$) => so $O(k)$ Here is my $O(n)$ submission:

<https://codeforces.com/contest/1985/submission/265647792>[→ Reply](#)

mohammadjaloudi

2 weeks ago, # | ☆

← Rev. 2

▲ 0 ▼

k <= 1e9?

[→ Reply](#)

SKnight4

13 days ago, # | ☆

▲ 0 ▼

Yes, it will still work because number of divisors for k $\leq 1e9$ at max is 1344. So $O(1344^2)$

[→ Reply](#)

Kenshi01

13 days ago, # | ☆

▲ 0 ▼

But $O(\sqrt{k})$ to find divisors actually takes more time then $O(xy)$

I used the same approach, and my runtime was more then that of $O(xy)$

[→ Reply](#)

Basmala_Hekal

2 weeks ago, # | ☆

▲ 0 ▼

<https://codeforces.com/contest/1985/submission/265300819> Why my sol for C got TLE in testing?

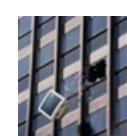
[→ Reply](#)

Mukul9571

2 weeks ago, # | ☆

▲ 0 ▼

Due to collision as u have used unordered map

[→ Reply](#)

Basmala_Hekal

2 weeks ago, # | ☆

▲ 0 ▼

Ok Thanks!

[→ Reply](#)

Same here



Snigdho386

I too got a TLE.

But there shouldn't be any collision as I'm considering frequency.

Isn't it?

→ [Reply](#)

mohammadjaloudi

2 weeks ago, # ⌂ | ⭐

▲ 0 ▼

you can read the blog here about unordered_map
(<https://codeforces.com/blog/entry/50626>)→ [Reply](#)

Snigdho386

13 days ago, # ⌂ | ⭐

▲ 0 ▼

Thanks bro

→ [Reply](#)

mohammadjaloudi

2 weeks ago, # ⌂ | ⭐

← Rev. 2

▲ 0 ▼

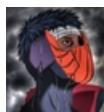
you can read the blog here about collision
(<https://codeforces.com/blog/entry/50626>)→ [Reply](#)

Basmala_Hekal

2 weeks ago, # ⌂ | ⭐

▲ 0 ▼

Thank u!

→ [Reply](#)

MagNneto

2 weeks ago, # ⌂ | ⭐

▲ 0 ▼

Tomato

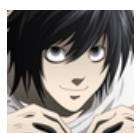
→ [Reply](#)

KietJ

2 weeks ago, # ⌂ | ⭐

▲ 0 ▼

Is there a solution about dsu roll back for H2, can you help me?

→ [Reply](#)

ardekarsanket

2 weeks ago, # ⌂ | ⭐

▲ 0 ▼

H1 can be solved using RollbackUnionFind

Submission: <https://codeforces.com/contest/1985/submission/265404470>→ [Reply](#)

KietJ

2 weeks ago, # ⌂ | ⭐

▲ 0 ▼

I also use rollback for h1, but i need it for H2. Do you have a solution?

→ [Reply](#)



djm03178

2 weeks ago, # ▲ | ☆

▲ 0 ▼

I didn't even use rollback, simply doing it both directions works:

<https://codeforces.com/contest/1985/submit/265320343>→ [Reply](#)

2 weeks ago, # ▲ | ☆

▲ 0 ▼



vinzonX

The queuing time was too long. My solution for F got queued for 15mins, and gave wrong answer. I could have rectified it sooner :(

Hope codeforces fixes this :)

→ [Reply](#)

2 weeks ago, # ▲ | ☆

▲ 0 ▼

tomatoo

→ [Reply](#)

khumayunabduraupov

2 weeks ago, # ▲ | ☆

▲ 0 ▼



darthwalker

I have a friend who solved f using binary search and value of right 1e18 but it passes system tests.How?

→ [Reply](#)

2 weeks ago, # ▲ | ☆

▲ 0 ▼

share code

→ [Reply](#)

Verma_26



2 weeks ago, # ▲ | ☆

▲ 0 ▼

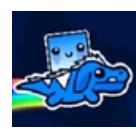
<https://codeforces.com/contest/1985/submit/265374959>→ [Reply](#)

Verma_26

2 weeks ago, # ▲ | ☆

▲ 0 ▼

the guys is clever, i think it passes because he first performed the division then multiplication (in line 7 and 8), but i also got overflow because i multiplied both terms together and then divided, during multiplication of both then i might have got overflow.. any experts please reply after

→ [Reply](#)

1xx55

2 weeks ago, # ▲ | ☆

▲ 0 ▼

in Line 5:

`double totalDamage = 0;`

He used double to store the totalDamage, so there's no worry about overflow.

in Line 7:

`double numAttacks = (turns + cooldown[i] - 1) / cooldown[i];`

the expression at right is at most 1e18, also not overflow.



2 weeks ago, # | ☆

▲ 0 ▼

tomato

→ [Reply](#)

BinaryPioneer



2 weeks ago, # ▲ | ☆

▲ 0 ▼

tomato

→ [Reply](#)

darthwalker



2 weeks ago, # | ☆

▲ 0 ▼

Its sad that being from India most of the cheaters and leaked solution are from my country although it does not affect my personal growth but it ruins the sportsmanship .. sad !!!

→ [Reply](#)

par4dox



2 weeks ago, # ▲ | ☆

▲ 0 ▼

nothing sad, colleges focus on rubbish curriculum poor faculties, such high competition for low paying jobs too.. then kuch to chahiye resume me bharne ke lie. not supporting cheating but most people start in their colleges , cp needs time and dedication blood sweat. but then students should have to do dev also, core also. seeing this they have nothing but to cheat and get rating tag (specialist/expert)..

→ [Reply](#)

Verma_26



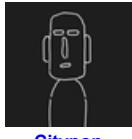
2 weeks ago, # | ☆

▲ 0 ▼

just out of curiosity i am asking... in the E question is there any mathematical way to find the optimal sides of the smaller box directly(in constant time or even if in O(N) time) rather than using nested loop?

→ [Reply](#)

itsiftikar02



Citypop

2 weeks ago, # ▲ | ☆

← Rev. 2 ▲ 0 ▼

You can downgrade it from 3D to 2D, so if you can solve 2D version in constant time then you can solve 3D in linear time. In my opinion, the problem requires you to fix the shape first which I think may not be possible to have a solution faster than $O(\min(\min(x, y), \sqrt{k}))$.

→ [Reply](#)

dasakash26

2 weeks ago, # | ☆

▲ 0 ▼

tomato

→ [Reply](#)

ByteBrio_369

2 weeks ago, # | ☆

▲ +1 ▼

265530894 This is my approach for problem F — Final Boss. I am fairly new to codeforces. I am not able to solve this error. Can anyone help why i am getting this diagnostics error?

Thanks

→ [Reply](#)

failai12

2 weeks ago, # ▲ | ☆

▲ 0 ▼

Diagnostics detected issues [cpp.clang++-c++20-diagnose]:

p71.cpp:37:20: runtime error: signed integer overflow:

9195700509336791281 + 60645102003290034 cannot be represented

in type 'long long' SUMMARY: UndefinedBehaviorSanitizer: undefined

I am a C++ noob, but i think you need to use a bigger datatype for sum variable.

→ [Reply](#)

2 weeks ago, # ⌂ | ☆

▲ 0 ▼



[TRYING_To_Do_Better_](#)

Basically your sum variable is overflowing. try to figure out a way such that it doesn't overflow.

Spoiler

→ [Reply](#)

2 weeks ago, # ⌂ | ☆

▲ 0 ▼

265665651



still not working

[ByteBrio_369](#)

Can you find out certain errors in my code?

→ [Reply](#)

13 days ago, # ⌂ | ☆

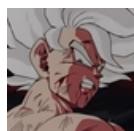
▲ +1 ▼



I was able to solve it

Thanks

→ [Reply](#)



[BluoCaroot](#)

2 weeks ago, # ⌂ | ☆

▲ 0 ▼

tomato

→ [Reply](#)



[prcsamrat](#)

2 weeks ago, # ⌂ | ☆

▲ 0 ▼

For problem E,

Can any one explain for $h < 10^9$, why the given time complexity holds true?

Why in \log there is $h * \max c_i$?

Thanks.

→ [Reply](#)

2 weeks ago, # ⌂ | ☆

← Rev. 2

▲ 0 ▼

$h * \max c_i$ is one upper_bound of turns to kill the boss.



[1xx55](#)

It's easy to prove. If you only use the attack that have max cooldown time of all attacks , assume that this attack only takes 1 damage , after $(h - 1) * \max c_i + 1$ turns the boss will die. This is the worst case, so you know that in $(h - 1) * \max c_i + 1$ turns the boss must die. For $(h - 1) * \max c_i + 1 < h * \max c_i$,in convinient we use $h * \max c_i$ for the upper_bound.

\log comes from binary_search approach.We use binary_search to find answer. You can find its time complexity proof on the Internet.

→ [Reply](#)

2 weeks ago, # ⌂ | ☆

▲ 0 ▼

Got it [1xx55](#)!

Thank you for the help! Appreciated.

→ [Reply](#)



ash1596

2 weeks ago, # ▲ | ☆

G:(D-Function) Can someone explain, why do we add mod in this

`print((pow(9 // k + 1, r, MOD) - pow(9 // k + 1, 1, MOD) + MOD)`

% MOD) to the result of the difference?

→ Reply

▲ 0 ▼



1xx55

2 weeks ago, # ▲ | ☆

we know that `pow(9 // k + 1, r, MOD)` $\in [0, MOD - 1]$ and
`pow(9 // k + 1, 1, MOD)` $\in [0, MOD - 1]$ so it's possible that in some cases we have `(pow(9 // k + 1, r, MOD) < pow(9 // k + 1, 1, MOD))`

To avoid print a negative value , we add a MOD to the result.

→ Reply

▲ 0 ▼



ash1596

13 days ago, # ▲ | ☆

Got it.

→ Reply



Ivle

2 weeks ago, # ▲ | ☆

For problem G, how to prove the legal number n should be only that each digits of n multiple k have no influence to the next digits.

→ Reply

▲ 0 ▼



1xx55

2 weeks ago, # ▲ | ☆

using $D(x + y) = D(x) + D(y) - 9 * \text{carry}$

To prove this formula , you can start with one digit , and it's correct. And you can expand this to all digits.

so we have $D(k * n) = k * D(n) - 9 * \text{carries}$.

→ Reply

▲ +8 ▼



Ivle

2 weeks ago, # ▲ | ☆

What a prove! ! ! Pretty good, thanks.

→ Reply

▲ 0 ▼



GaiaKing

2 weeks ago, # ▲ | ☆

for problem H1 could someone tell me why my code get tle? Is there anything wrong with my dsu? code

→ Reply

▲ 0 ▼



GaiaKing

2 weeks ago, # ▲ | ☆

there is a mistake in line 56, but it is still TLE after I correct it :(

→ Reply

▲ 0 ▼



w3bml

2 weeks ago, # ▲ | ☆

tomato

→ Reply

▲ -8 ▼



Deep

2 weeks ago, # | ☆

Can someone explain why my submission 265271439 for problem C gives a TLE? It seems to be an O(n) approach. While I agree it's in Python, it would be helpful if someone pointed out what went wrong

[→ Reply](#)

2 weeks ago, # | ☆

▲ 0 ▼

From problem H2 what is wrong with the idea of taking maximum(first convert a row which gives maximum component size then convert a column which gives maximum component size, or reverse of previous).



codex47

I already implemented it and it fails at 5th sample case but I am not able to figure out why. I doubt its implementation mistake.

[→ Reply](#)

2 weeks ago, # | ☆

▲ 0 ▼

Does anyone get stack overflow in test 5 in Problem H2 in Java while implementing recursive dfs? In C++, it seems to be working (the author's solution uses recursive dfs). Any reason for this? Submission: 265565304



vaal

[→ Reply](#)

2 weeks ago, # | ☆

← Rev. 4

▲ 0 ▼

For problem F,

Can anyone help me to understand how $\lfloor \frac{t-1}{c} \rfloor$ is derived?



prcsamrat

Also, please let me know if it is a standard or generic way to calculate in such situations.

Thank you in advance.

[→ Reply](#)

The_Dragon_Warrior

2 weeks ago, # ^ | ☆

▲ -10 ▼

This is a typical data structure problem. Here is my solution:

<https://codeforces.com/contest/1985/submission/265355672>

[→ Reply](#)

jay_1410

2 weeks ago, # ^ | ☆

▲ 0 ▼

```
say c = Cool Down , t = Turns
```

```
now attacks will be on the turns : 1 , 1+c , 1+2c , 1+3c . .
```

```
.
```

```
so , kth attack will be on the turn : 1 + (k-1) * c
```

```
say , till 't' turn , 'k' attacks has been done
```

```
so => turn on kth attack <= 't' turn
```

```
=> 1 + (k-1) * c <= t
```

```
=> k <= (t-1)/c + 1
```

```
=> k = (t-1)/c + 1 (since division gives floor result, so
```

```
we can just equate)
```

[→ Reply](#)

prcsamrat

2 weeks ago, # ^ | ☆

▲ 0 ▼

Great explanation [jay_1410](#)!

Thank you so much! Appreciated!

[→ Reply](#)



2 weeks ago, # | ☆

TOMATO!!

→ [Reply](#)**soumyajitmishra8**

2 weeks ago, # | ☆

▲ +1 ▼

For H1 I am using a map of pairs called **compNum** which basically marks each `***#***` with its component number. I have taken key pairs because I need to store coordinate of `***#***` and the value of this map is component number. And at the same time using another **unordered map<int,int>cnt** I am counting the size of the current component number and using a visited matrix I am keeping track of whether the neighboring `***#***` is visited or not, standard **dfs** stuff. Then for each row I am placing `***#***` and counting answers as follows: For each row **ri**, if the cell contains `***#***` then using a map I am checking whether the component to which this cell belongs has already been taken or not. The **compNum** map gives the component of this cell. And if it is not `***#***` then I increment the current answer by 1 because I place a new `***#***` in place of `***.***` and now I check four neighbors if any neighbor is `***#***` and its component is not taken then I add the size of the component to my current answer and proceed. Finally when I am done computing the value of the current answer for a row then I try to maximize my final ans with the current answer same stuff I do for columns. But I don't know why it is giving TLE. Any help will be appreciated. Thank you for spending time in understanding my approach.

→ [Reply](#)

2 weeks ago, # | ☆

▲ 0 ▼

tomato

→ [Reply](#)**KrIsN123****aaradhyakul**

2 weeks ago, # | ☆

▲ 0 ▼

265582011 H1: I have used DSU for solving H1. It works for testcase1 but gives wrong answer for testcase2. Could someone pls lemme know where I went wrong. I have been printing and debugging the last 6 hours. thx!

→ [Reply](#)**The_noob1**

2 weeks ago, # | ☆

▲ 0 ▼

For H1 problem I have solved the problem but getting TLE on testcase 2. Any idea why it is giving TLE? According to me the complexity is somewhat $O(mn \log(mn))$. Please correct me if I am wrong in assuming the complexity

include <bits/stdc++.h>

```
using namespace std;

const int buf_size = 1e6+9;

bool vis[buf_size]; char grid[buf_size]; int grid_comp[buf_size]; int n,m;

void dfs(int i, int j, int comp) { // cout<<"dfs at index "<<i<<" "<<j<<"\n"; if(i<0 || j<0
|| i>=n || j>=m) return;

if(vis[i*m + j] || grid[i*m + j] == '.') return;

vis[i*m + j] = 1;
grid_comp[i*m + j] = comp;

dfs(i+1, j, comp);
dfs(i-1, j, comp);
dfs(i, j-1, comp);
dfs(i, j+1, comp);
```

```

return;

}

int main() { // your code goes here int t; cin>>t; while(t--) {

    memset(vis, 0, sizeof(vis));
    memset(grid_comp, 0, sizeof(grid_comp));
    map<int,int> mp;

    cin>>n>>m;
    int comp = 0;

    for(int i=0 ;i<n; i++)
    {
        for(int j=0 ;j<m; j++)
        {
            cin>>grid[i*m + j];
        }
    }

    for(int i=0; i<n; i++)
    {
        for(int j=0 ; j<m; j++)
        {
            // cout<<grid[i*m + j]<<" ";
            if(!vis[i*m + j] && grid[i*m + j] == '#')
            {
                comp++;
                dfs(i, j, comp);
                mp[comp]++;
            }
            else if(grid[i*m + j] == '#')
            {
                mp[grid_comp[i*m + j]]++;
            }
        }
        // cout<<"\n";
    }

    // cout<<"dfs done\n";

    int max_comp_size = 0;

    for(int i=0 ; i<n; i++)
    {
        set<int> st;

        int changed_cells = 0;

        for(int j=0; j<m; j++)
        {
            if(grid[i*m + j] == '#')
            {
                st.insert(grid_comp[i*m + j]);
            }

            if(i>=1)
            {
                if(grid[(i-1)*m + j] == '#')
                {
                    if(st.find(grid_comp[(i-1)*m + j]) != st.end())
                    {
                        changed_cells++;
                    }
                }
            }
        }

        if(changed_cells > max_comp_size)
        {
            max_comp_size = changed_cells;
        }
    }

    cout<<max_comp_size<<endl;
}
}

```



```

        st.insert(grid_comp[(i-1)*m + j]);
    }

    if(i<=n-2)
    {
        if(grid[(i+1)*m + j] == '#')
        {
            st.insert(grid_comp[(i+1)*m + j]);
        }
    }

    if(grid[i*m + j] == '.')
    {
        changed_cells++;
    }
}

int ans = 0;
for(auto it: st)
{
    ans = ans + mp[it];
}

// cout<<"row iteration "<<i<<" ans:"<<ans<<" changed_cells:"
//<<changed_cells<<"\n";
max_comp_size = max(max_comp_size, ans + changed_cells);
}
}

// cout<<"iteration over row done\n";

for(int i=0 ; i<m; i++)
{
    set<int> st;
    int changed_cells = 0;

    for(int j=0; j<n; j++)
    {
        if(grid[i + j*m] == '#')
        {
            st.insert(grid_comp[i + j*m]);
        }

        if(i>=1)
        {
            if(grid[(i-1) + j*m] == '#')
            {
                st.insert(grid_comp[(i-1) + j*m]);
            }
        }

        if(i<=m-2)
        {
            if(grid[(i+1) + j*m] == '#')
            {
                st.insert(grid_comp[(i+1) + j*m]);
            }
        }
    }
}

```



```

        if(grid[i + j*m] == '.')
        {
            changed_cells++;
        }

        int ans = 0;
        for(auto it: st)
        {
            ans = ans + mp[it];
        }
        // cout<<"column iteration "<<i<<" ans:"<<ans<<"\n";
        changed_cells:<<changed_cells<<"\n";
        max_comp_size = max(max_comp_size, ans + changed_cells);
    }

    // cout<<"iteration over column done\n";

    cout<<max_comp_size<<"\n";
}
}

```

→ Reply



2 weeks ago, # | ☆
good round, thx, i got green
→ Reply

believesanta



2 weeks ago, # | ☆
tomato
→ Reply

DaRuuk



2 weeks ago, # | ☆
tomato
→ Reply

ProAlgebra



2 weeks ago, # | ☆
I used binary search on F and got hacked since I defined r = 1e18. Then I changed to 1e13 and it worked, but I don't know exactly why it's working, since if all turns are 1 and a[i] = n (for n = 2*10^5), the possible maximum would be n * n * 1e13 (divided by 2), which it would be approximately 1e23 which doesn't fit on long long int, can anyone help?
→ Reply



jose_5056

2 weeks ago, # ^ | ☆
You might be using a break statement while checking the binary search condition. If you use $r = 10^{13}$, $a_i = 2 \cdot 10^5$ and $c_i = 1$. So as soon as the value is $\boxed{>= h}$ you break out of the loop, and the value for the first iteration is $r \cdot a_i$ which is around 10^{18} that fits in the range of LONG LONG INT and you are able to successfully break out of the loop.
Meanwhile if you use $r = 10^{18}$ then the value is around 10^{23} for first iteration itself and it overflows before the break statement can come into action.



leandro_pina

2 weeks ago, # ⌂ | ☆

← Rev. 2 ▲ 0 ▼

I didn't use break on the for of the binary search, from what I calculated, this shouldn't be accepted, but I could be wrong
<https://codeforces.com/contest/1985/submit/265654152>

→ [Reply](#)

2 weeks ago, # ⌂ | ☆

▲ 0 ▼

```
if(somatotal >= h){
    cout << "1\n";
    continue;
}
```



jose_5056

Because of this initial pruning, you are able to ward off cases where all a_i are $2 \cdot 10^5$. So,

$$\sum_{i=0}^n a_i < 2 \cdot 10^5$$
, is needed to go to binary search

condition. You can easily check $r \cdot \sum_{i=0}^n a_i$ will not cause overflow for $r = 10^{13}$ but for $r = 10^{14}$ it will overflow.[265655706](#)

→ [Reply](#)

2 weeks ago, # ⌂ | ☆

▲ 0 ▼



leandro_pina

Ohh that's true, I didn't even notice it when I did it. $r = 1e14$ overflows because it might reach $1e19$. Thanks a lot!! I will pay more attention now with overflow when doing binary search

→ [Reply](#)

rampushpa_1ced

2 weeks ago, # ⌂ | ☆

▲ 0 ▼

i've posted my solution, please checkout the comment section... .you will get it

→ [Reply](#)

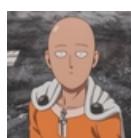
nischithp2003

2 weeks ago, # ⌂ | ☆

▲ 0 ▼

I tried solving H1. Why am I getting TLE on test case 3 ?? My solution is pretty much same as tutorial.

Someone Please check TIA!

Here is my code - [265512050](#)→ [Reply](#)

rampushpa_1ced

2 weeks ago, # ⌂ | ☆

▲ 0 ▼

this is my BS solution for the "F"

`#define ll long long``#include <bits/stdc++.h>``using namespace std;`

```
signed main() {
    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
```

```

ll test;
cin >> test;
while (test--) {
    ll h,n;
    cin>>h>>n;
    vector<ll>a(n),c(n);
    for(ll i=0; i<n; i++)cin>>a[i];
    for(ll i=0; i<n; i++)cin>>c[i];

    ll firstattack=accumulate(a.begin(),a.end(),(ll)0);

    h=h-firstattack;

    if(h<=0){cout<<1<<endl; continue;}

    ll turn=1;

    ll maxturn=1e18;
    ll minturn=0;

    while(minturn<=maxturn){
        ll mid=minturn+(maxturn-minturn)/2;

        ll sum=0;

        for(ll i=0; i<n; i++){
            sum+= (mid/c[i])*a[i];
            if(sum<0){sum=h+1; break;} // this is the condition
        }
        for the overflow, very nice question
    }

    if(sum>=h){
        turn=mid;
        maxturn=mid-1;
    }
    if(sum<h){
        minturn=mid+1;
    }
}

cout<<turn+1<<endl;
}
return 0;
}
→ Reply

```



2 weeks ago, # |

0

tomato

→ [Reply](#)

ELSE_IF_TRIDIB21



2 weeks ago, # |

0

how does max function works for pairs in c++ pair <int,int> a = {1,2} ; pair<int,int> b = {2,1}; max(a,b) ; ?

→ [Reply](#)

bansalarpan4



rampushpa_1ced

13 days ago, # ⚡ | ☆

it will compare according to first... is first is same then according to second

[→ Reply](#)

13 days ago, # ⚡ | ☆

▲ 0 ▼

Ok , thanks for the info

[→ Reply](#)

bansalarpan4



13 days ago, # | ☆

▲ 0 ▼

Can someone tell me whats wrong with this submission 265677247

[→ Reply](#)

parthtushama7x



13 days ago, # | ☆

▲ 0 ▼

How to prove the conclusion of question B?

[→ Reply](#)

qiuqiuyi



laciecoder

13 days ago, # | ☆

▲ 0 ▼

tomato

[→ Reply](#)

God_Of_Thunder1234

12 days ago, # | ☆

▲ 0 ▼

In the problem G `floor(9/k) + 1` why we are adding +1[→ Reply](#)

ZombieUser

11 days ago, # ⚡ | ☆

▲ 0 ▼

`floor(9/k)+1` is helping us find the number of distinct digits d we can place in a single position without making k^d overflow 9.

For example for k=4, possible no. of d are $9/4+1=3$ and these are $d=0(4*0<=9), d=1(4*1<=9)$ and $d=2(4*2<=9)$. That +1 is for the digit 0.

[→ Reply](#)

ash1596

12 days ago, # | ☆

▲ 0 ▼

H1 : Can some explain this part?

```
// Update prefix sums
R[minR] += sz;
R[maxR + 1] -= sz;
```

```
C[minC] += sz;
C[maxC + 1] -= sz;
```

[→ Reply](#)

uleenneelu

11 days ago, # ⚡ | ☆

▲ 0 ▼

If you need to add x to a range (i,j) in an array, you can iterate from i to j and add x to each array element. This would be in the $O(n)$. Now if you have m such operations, it will be $O(m*n)$.

So a better way to do this is to use this prefix array trick. To add x in (i,j), you can add x to $\text{pre}[i]$, and subtract x from $\text{pre}[j+1]$. Now if you make the prefix sum array of this array, it will give you a value for each index that's added to each corresponding array element.

e.g. arr[] = [0, 0, 0, 0, 0] i=1, j=3 (0 indexing). After operation, arr[] = [0,



lemonpro

12 days ago, # | ☆

▲ 0 ▼

tomato

→ [Reply](#)

ditmecuocdoi

12 days ago, # | ☆

▲ 0 ▼

tomato

→ [Reply](#)

PsychQ91

12 days ago, # | ☆

▲ 0 ▼

How can i write the solution of F in python?

and yes..... tomato

→ [Reply](#)

Wakkana

9 days ago, # | ☆

▲ 0 ▼

F, just use i128 in rust to avoid overflow, haha

→ [Reply](#)

rishabhdeepsingh

9 days ago, # | ☆

▲ 0 ▼

I am wondering if it is possible to solve problem G: D-Function using digit DP?

Has anyone solved it?

→ [Reply](#)

paurana

6 days ago, # ▲ | ☆

▲ 0 ▼

not exactly digit dp but say $n = \lceil 9/k \rceil + 1$, then possible numbers between 10^l and 10^r is simply

Since the first digit of these numbers cannot be 0,

$$\begin{aligned} &= (n-1)n^l + (n-1)n^{l+1} + \dots + (n-1)n^{r-1} \\ &= (n-1)n^l(1 + n + \dots + n^{r-l-1}) = n^r - n^l \end{aligned}$$

→ [Reply](#)

Yashvardhan07

8 days ago, # | ☆

▲ 0 ▼

tomato

→ [Reply](#)

panatipu

8 days ago, # | ☆

▲ 0 ▼

How to prove first statement in solution of G?

→ [Reply](#)

forbiddenlogic

7 days ago, # | ☆

▲ 0 ▼

Why did my rating do down? after 8 days

→ [Reply](#)



paurana

6 days ago, # | ☆

DSU solution for H2 gives TLE pls help

→ [Reply](#)

▲ 0 ▼



ht43280

5 days ago, # | ☆

▲ +1 ▼

tomato Why tomato? why not apple or something ?

→ [Reply](#)

blushinghentaigirl

4 days ago, # | ☆

← Rev. 2 ▲ 0 ▼

I tried to solve H2 but I got STATUS_STACK_OVERFLOW on test 5. Can anyone help, please? 266847431

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