

**2022/23**  
**C++ Crash Course**  
**Mini Contest**

**Editorial**

# Gonna Let You Down

**TC23A0**

# Statistics

Attempt: 11

| Score | Solved |
|-------|--------|
| 5     | 11     |

First Solve:

Ryan

@ 0:02:54

# Story

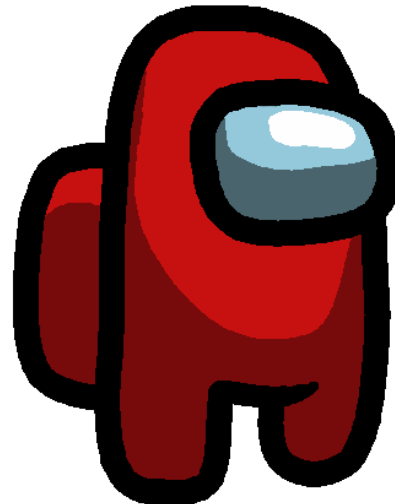
1

*Eulermonia*



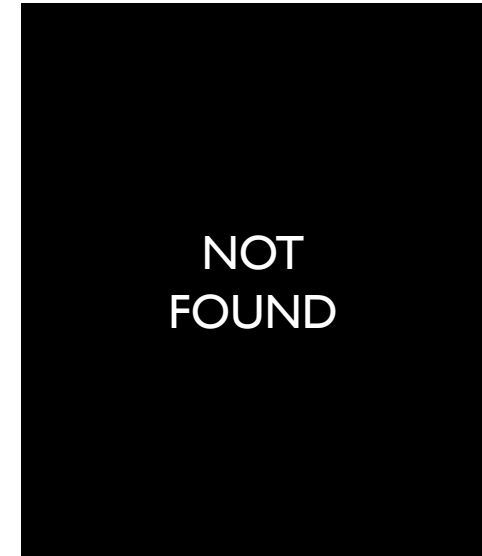
2

*Nesus*



3

*Octicity*



# Explanation

You know the rules, and you know how to do.

## TC22A0 - Gonna Give You Up

You know the rules, and you know how to do.

# Letter to the Reader

**TC23AI**

# Statistics

Attempt: 7

First Solve:

Username

@ 0:08:59

| Subtask | Score | Solved |
|---------|-------|--------|
| 1       | 7     | 4      |
| 2       | 10    | 2      |
| 3       | 8     | 1      |

# Problem Statement

Give you an unknown lines of input.

Your mission is to keep every words' first letter.

## Example

Input        This is a sentence

Output      Tias

# Problem Statement

## INPUT

Huhhhh 😞

The input consists of an unknown number of lines, which is the original letter that you have to "shorten".

Wait...

How can we do that?

This seems not exactly what we had done so far (???)

# Problem Solving Techniques

人生哲學 Time:

No one can solve everything.

If you can solve everything and know everything's answer, you should not stay here.

Then we should we do?

To solve what we know how to solve!

(You can probably stay here!)



# Subtask I

- There are only 2 words in the input
- It is guaranteed that the first letters of the words in the input will not repeat

## Example

Input      Thank you

Output    Ty

# Subtask I

This is a very simple task as you only need to handle how to select the first letter from two strings.

You may just set two variables (eg. `string A`, `string B`).

Do you remember the property of string?

| i    | 0 | 1 | 2 | 3 | 4 |
|------|---|---|---|---|---|
| A[i] | T | h | a | n | k |

# Subtask I

| i    | 0 | 1 | 2 | 3 | 4 |
|------|---|---|---|---|---|
| A[i] | T | h | a | n | k |

So what is the first letter?

~~A0!~~ A[0]!

Subtask I is completed! (How easy)

Score: 7

# Subtask 2

- It is guaranteed that the first letters of the words in the input will not repeat.

Ok...We finally have to deal with the “unknown lines” problem.

人生哲學 Time again:

If you have something that you cannot solve by your own, Google may help you!

# Subtask 2

**By Google,**

Using `while (cin >> [string])`, we can get all the data inside the input file.

Combining what you have done in subtask 1 (getting the first letters),

~~Store 2 variables~~

→ `while (cin >> [string])` and do the follow-up operations

And Subtask 2 is completed!

Score: 10 (Cumulative: 17)

# Full Solution

No additional constraints = The first letters of the words in the input may repeat

It is easy, though.

# Full Solution

By every time we got the first character of the string, we just store it into a variable!

If the new first letter is the same with the first letter stored in the variable, then don't count it.

After understanding all this, your program is done!

Score: 8 (Cumulative: 25)

But how can we implement those?

***Basic programming skills.***

# Disclaimer

**TC23A2**

# Statistics

Attempt: 11

First Solve:

Kitsune

@ 0:13:23

| Subtask | Score | Solved |
|---------|-------|--------|
| 1       | 7     | 10     |
| 2       | 8     | 9      |

# Disclaimer

This problem is being proposed by a 6C student.

← 456climbers\_weare 🔔 ⋮



新用戶

2  
帖子

19  
粉絲

18  
追蹤中

成功成為全校最耀眼既一班 ✨

#456covidweare

// TWGSS || 2020-2023 || 456C \\\

與其後悔自己沒有去做的事情 不如先行動再後悔 ✨

# Story

You saw a students who was very **SUS**,  
so you go to the staff room and ask every  
teacher whether that student is from 6C.

Why?

Because teachers are always correct!

Literally no one:

Everyone when seeing a 6C student:



# Problem Statement

There are  $N$  input class name.

If  $\geq K\%$  of the class name is 6C, output Close Contact.

Otherwise, output Disclaimer.

# Subtask I

$$K = 100$$

What does this mean?

The student is considered as a 6C students only if 100% of the teachers agree.

ALL input string need to be 6C to output Close Contact.

Otherwise, output Disclaimer.

# Subtask I

Just use a for-loop and check if each input is 6C or not.

Once an input is not 6C, output Disclaimer.

If all input are 6C, output Close Contact.

Score: 7

# Full Solution

Actually just do some ***SIMPLE*** maths.

```
z = z / x;  
if (z < y / 100) {  
    cout << "Disclaimer" << endl;  
} else  
    cout << "Close Contact" << endl;
```

In this example,

z (at the beginning) → number of 6C input

x → number of teachers (N)

y → the percentage (K)

Is this correct?

Sadly, **NO**.

# Full Solution

Why this is wrong?

Refer to the beginning of the code:

```
long long x, y;  
long long z = 0;
```

***Oops!*** long long!

***Remember the C++ integer division?***

***It will always take the round-off value of the answer!***

# Full Solution

So how to fix this?

Use *floating point* numbers (double).

The other logic is the same as the example.

Then you should get an **Accepted** for this problem.

Score: 8 (Cumulative: 15)

# Full Solution

## Another Approach

$$\text{Required no. of 6C} = \frac{NK}{100}$$

Then see if the number of 6C input is greater of equal to this value.

You either have to use floating point numbers (double) for this approach,  
or you can multiply the whole equation by 100  
(i.e. compare  $NK$  with number of 6C input  $\times 100$ ).

# Obo the Destructor

**TC23A3**

# Statistics

Attempt: 6

First 15 marks:

Ryan

@ 0:39:11

| Subtask | Score | Solved |
|---------|-------|--------|
| 1       | 8     | 5      |
| 2       | 7     | 5      |
| 3       | 15    | 0      |

# Problem Statement

Find the sum of the odd indexed cost and the sum of the even indexed cost in each segment.

# Subtask I

- For each query, we may just loop from  $l$  to  $r$  and check each indexes
- For **odd**: it is always  $0$
- For **even**: it is the sum of all costs from  $l$  to  $r$

Time Complexity:  $O(NQ)$

Score: 8

# Subtask I

## Pseudo Code

For each query:

```
i loop from l to r  
    total += C[i]  
output 0 and total
```

# Subtask 2

- For each query, we may just loop from 1 to  $r$  and check each indexes
- To check whether a number is odd or even: use % (modulo operator)

Time Complexity:  $O(NQ)$

Score: 7 (Cumulative: 15)

# Subtask 2

## Pseudo Code

For each query:

  i loop from 1 to r

    if  $i \% 2$  is 1: odd += C[i]

    if  $i \% 2$  is 0: even += C[i]

  output odd and even

# Full Solution

## *Partial Sum!*

We just have to build a partial sum array on only the odd-indexed numbers and the even-indexed numbers.

Time Complexity:  $O(N)$

Score: 15 (Cumulative: 30)

# Full Solution

## Pseudo Code

```
for i = 1 .. N:
    if i is odd:
        partial_odd[i] = partial_odd[i - 1] + c[i]
        partial_even[i] = partial_even[i - 1]
    else:
        partial_odd[i] = partial_odd[i - 1]
        partial_even[i] = partial_even[i - 1] + c[i]
```

For each query:

```
odd = partial_odd[r] - partial_odd[l - 1]
even = partial_even[r] - partial_even[l - 1]
output odd and even
```

# One Stone Two Fish

**TC23A4**

# Statistics

Attempt: 6

First 3 marks:

Kitsune

@ 0:38:21

| Subtask | Score | Solved |
|---------|-------|--------|
| 1       | 3     | 4      |
| 2       | 4     | 0      |
| 3       | 3     | 0      |
| 4       | 6     | 0      |
| 5       | 9     | 0      |

# Subtask I

$$A = 1$$

If  $B = 1$ , then no pass needed  $\rightarrow$  output 0

If  $B \neq 1$ , then impossible  $\rightarrow$  output -1

Score: 3

# Subtask 2

$$2 \leq A, B \leq 3$$

If you don't have ideas, print out the distance table and look for patterns, then just hardcode.

| B \ A | 2 | 3 |
|-------|---|---|
| 2     | 0 | 2 |
| 3     | 2 | 0 |

Score: 4 (Cumulative: 7)

# Subtask 3

$$1 \leq A, B \leq 5$$

If you don't have ideas, print out the distance table and look for **more** patterns, then just hardcode.

| B \ A | 1  | 2  | 3  | 4  | 5  |
|-------|----|----|----|----|----|
| 1     | 0  | -1 | -1 | -1 | -1 |
| 2     | -1 | 0  | 2  | 1  | 2  |
| 3     | -1 | 2  | 0  | 2  | 2  |
| 4     | -1 | 1  | 2  | 0  | 2  |
| 5     | -1 | 2  | 2  | 2  | 0  |

Score: 7 (Cumulative: 10)

# Subtask 4

$$A = 2$$

If you don't have ideas, print out the distance table and look for *more and more* patterns.

| B   | 1  | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-----|----|---|---|---|---|---|---|---|---|
| ans | -1 | 0 | 2 | 1 | 2 | 1 | 2 | 1 | 2 |

You can observe a pattern that for  $B \geq 3$ ,

if B is **odd**  $\rightarrow$  ans = 2

if B is **even**  $\rightarrow$  ans = 1

Score: 6 (Cumulative: 16)

# Full Solution

For the case  $A = 1$ , we have treated in **subtask 1**.

Actually, we can deal with the case  $B = 1$  symmetrically.

Therefore, we assume  $A, B > 1$  from now on.

If  $A = B$ , obviously the answer is 0.

Otherwise, if  $\gcd(A, B) > 1$ , then the answer is 1.

Note that fish  $A$  can pass the stone to fish  $AB$  and then fish  $B$ , therefore the answer for all other cases are 2.

Expected Score: 25 (Cumulative: 25)