IT-Skills Assignment Day-1

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Semester: 6th **Date of Performance:** 24/06/24

1. **Aim:** Solving Basic Problems on recursion.

2. **Code:**

a)

```
#include <bits/stdc++.h>
using namespace std;
int main(){
    int a, b;
    cin >> a >> b;
    if (a == 0){
        cout << "https://www.codechef.com/practice";
    }else if (a == 1 && b == 0){
        cout << "https://www.codechef.com/contests";
    }else{
        cout << "https://discuss.codechef.com";
    }
    return 0;
}
```

b)

```
#include <bits/stdc++.h>
using namespace std;
string add(string &a, string &b){
    string res = "";
    int i = a.size();
    int j = b.size();
    int c = 0;
    while (i + j + c){
        if (i)   c += a[i - 1] - '0', i--;
        if (j)   c += b[j - 1] - '0', j--;
        res += (c % 10 + '0');
        c /= 10;
    }
    reverse(res.begin(), res.end());
    return res;
}
int main(){
    vector<string> fib(1001);
    fib[0] = "0";
    fib[1] = "1";
    fib[2] = "1";
    for (int i = 3; i < 1001; i++){
        fib[i] = add(fib[i - 1], fib[i - 2]);
    }
    int t;
    cin >> t;
    while (t--){
        int n, m;
        cin >> n >> m;
        int ans = 0;
        string s = fib[n];
        for (int i = 0; i < s.length(); i++){
            ans = ans * 10 + (s[i] - '0');
            ans %= m;
        }
        ans = (2 * ans) % m;
        cout << ans << endl;
    }
}
```

c)

```
def takeinput()-> None:
  practice=str(input("Enter yes if submitted(Practice): ")).strip()
  contest=str(input("Enter yes if submitted(Contest): ")).strip()
  if(practice.lower()=="yes" and contest.lower()=="no"):
          print("Mail: https://codechef.com/problems")
  elif(practice.lower()=="no"):
          print("Mail: https://codechef.com/practice")
  else:
          print("Mail: https://discuss.codechef.com")
takeinput()
```

d)

```
#include <iostream>
using namespace std;
void solve(){
    int nd, xd;
    cin >> nd;
    int ad[3] = {0};
    for (int i = 0; i < nd; i++){
        cin >> xd;
        if (xd == 1 || xd == 2){
            ad[0]++;
        }
        else if (xd == 3 || xd == 4){
            ad[1]++;
        }
        else{
            ad[2]++;
        }
    }
    cout << "TYPE 1 - " << ad[0] << " TYPE 2 - " << ad[1] << " TYPE 3 - " <<
ad[2] << "\n";
}

int main(){
    int t;
    cin >> t;
    while (t--){
        solve();
    }
    return 0;
}
```

e)

```
#include <iostream>
using namespace std;

int main(){
    int t;
    cin >> t;
    while (t--){
        int n;
        cin >> n;
        int ans = 0;
        while (n)
        {
            ans += n % 10;
            n /= 10;
        }
        cout << ans << endl;
    }
    return 0;
}
```

f)

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

set<char> dict1;
set<char> dict2;

int samadhan(){
    for (int i = 0; i < 13; i++){
        dict1.insert('a' + i);
        dict2.insert('N' + i);
    }
    int k;
    cin >> k;

    vector<string> sentences(k);

    for (int i = 0; i < k; i++){
        cin >> sentences[i];
    }

    for (int i = 0; i < k; i++){
        if (dict1.find(sentences[i][0]) != dict1.end()){
            for (int j = 0; j < sentences[i].size(); j++){
                if (dict1.find(sentences[i][j]) == dict1.end()){
                    cout << "NO" << endl;
                    return 0;
                }
            }
        }else if (dict2.find(sentences[i][0]) != dict2.end()){
            for (int j = 0; j < sentences[i].size(); j++){
                if (dict2.find(sentences[i][j]) == dict2.end()){
                    cout << "NO" << endl;
                    return 0;
                }
            }
        }else{
            cout << "NO" << endl;
            return 0;
        }
    }
    cout << "YES" << endl;
    return 0;
}
int main(){
    int tc;
    cin >> tc;
    for (int i = 1; i <= tc; i++){
        samadhan();
    }
    return 0;
}
```

g)

```
class Solution{
public:
    int calculate(string s)    {
        long long int sum = 0;
        int sign = 1;
        stack<pair<int, int>> st;
        for (int i = 0; i < s.size(); i++){
            if (isdigit(s[i])){
                long long int num = 0;
                while (i < s.size() && isdigit(s[i])){
                    num = num * 10 + (s[i] - '0');
                    i++;
                }
                i--;
                sum += num * sign;
                sign = 1;
            }
            else if (s[i] == '('){
                st.push({sum, sign});
                sum = 0;
                sign = 1;
            }
            else if (s[i] == ')'){
                sum = st.top().first + (st.top().second * sum);
                st.pop();
            }else if (s[i] == '-'){
                sign = -1 * sign;
            }
        }
        return sum;
    }
};
```

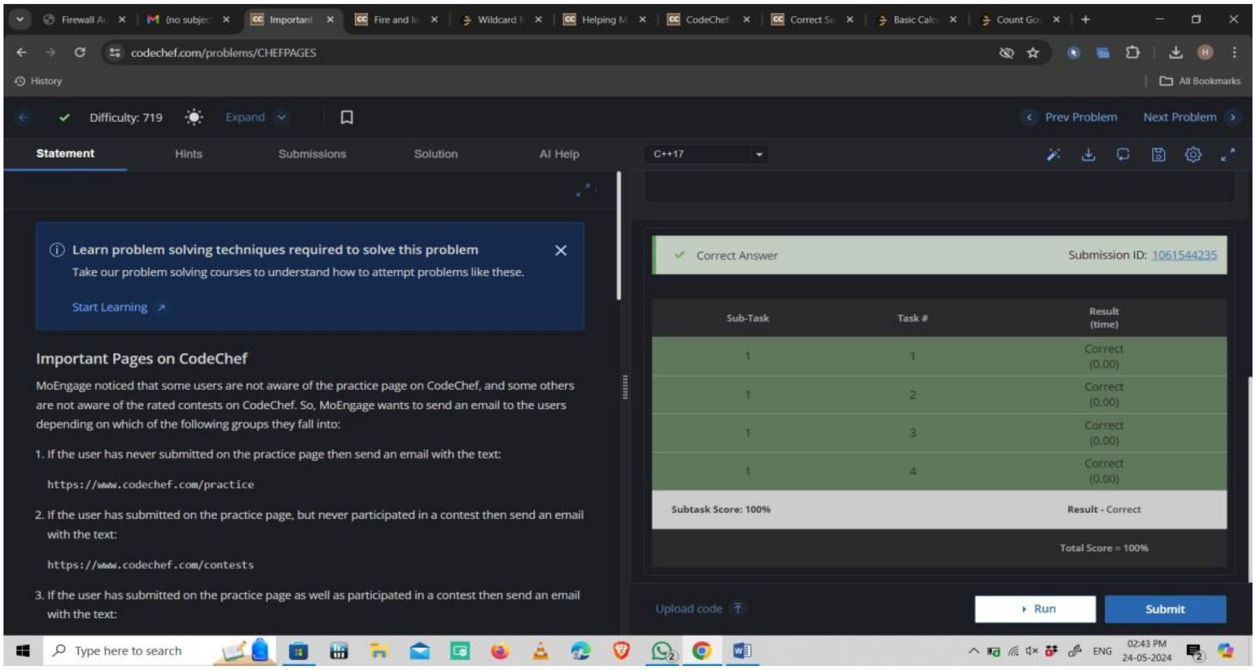
h)

```
class Solution{
private:
    long long power(long long x, long long n){
        if (n == 0){
            return 1;
        }
        long long ans = power(x, n / 2);
        ans *= ans;
        ans %= mod;
        if (n % 2 == 1){
            ans *= x;
            ans %= mod;
        }
        return ans;
    }

public:
    int countGoodNumbers(long long n){
        long long numberOfOddPlaces = n / 2;
        long long numberOfEvenPlaces = n / 2 + n % 2;
        return (power(5, numberOfEvenPlaces) * power(4,numberOfOddPlaces)) % mod;
    }
};
```

Output:

a)



Learn problem solving techniques required to solve this problem

Take our problem solving courses to understand how to attempt problems like these.

Start Learning

Important Pages on CodeChef

MoEngage noticed that some users are not aware of the practice page on CodeChef, and some others are not aware of the rated contests on CodeChef. So, MoEngage wants to send an email to the users depending on which of the following groups they fall into:

1. If the user has never submitted on the practice page then send an email with the text:

`https://www.codechef.com/practice`

2. If the user has submitted on the practice page, but never participated in a contest then send an email with the text:

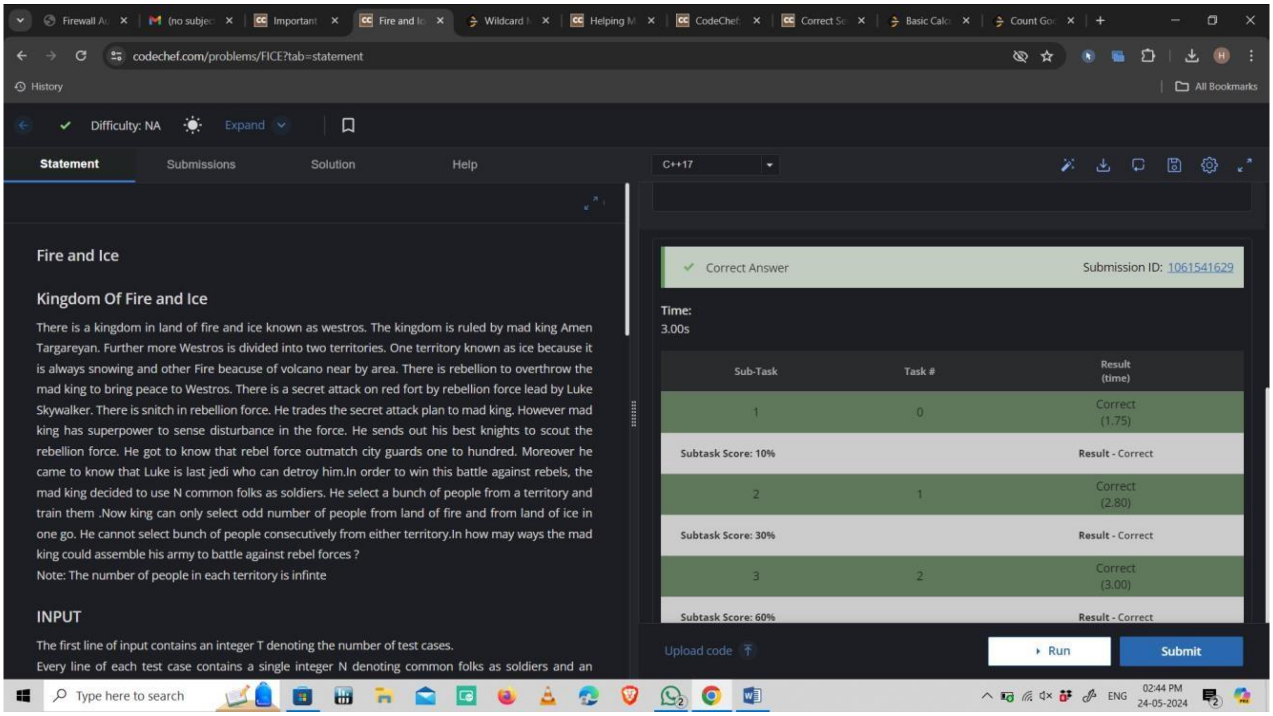
`https://www.codechef.com/contests`

3. If the user has submitted on the practice page as well as participated in a contest then send an email with the text:

Correct Answer   Submission ID: 1061544235

Sub-Task	Task #	Result (time)
1	1	Correct (0.00)
1	2	Correct (0.00)
1	3	Correct (0.00)
1	4	Correct (0.00)
Subtask Score: 100%		Result - Correct
		Total Score = 100%

b)



Fire and Ice

Kingdom Of Fire and Ice

There is a kingdom in land of fire and ice known as westros. The kingdom is ruled by mad king Amen Targareyan. Further more Westros is divided into two territories. One territory known as ice because it is always snowing and other Fire beacuse of volcano near by area. There is rebellion to overthrow the mad king to bring peace to Westros. There is a secret attack on red fort by rebellion force lead by Luke Skywalker. There is snitch in rebellion force. He trades the secret attack plan to mad king. However mad king has superpower to sense disturbance in the force. He sends out his best knights to scout the rebellion force. He got to know that rebel force outmatch city guards one to hundred. Moreover he came to know that Luke is last jedi who can detroy him.In order to win this battle against rebels, the mad king decided to use N common folks as soldiers. He select a bunch of people from a territory and train them .Now king can only select odd number of people from land of fire and from land of ice in one go. He cannot select bunch of people consecutively from either territory.In how may ways the mad king could assemble his army to battle against rebel forces ?
Note: The number of people in each territory is infinte

INPUT

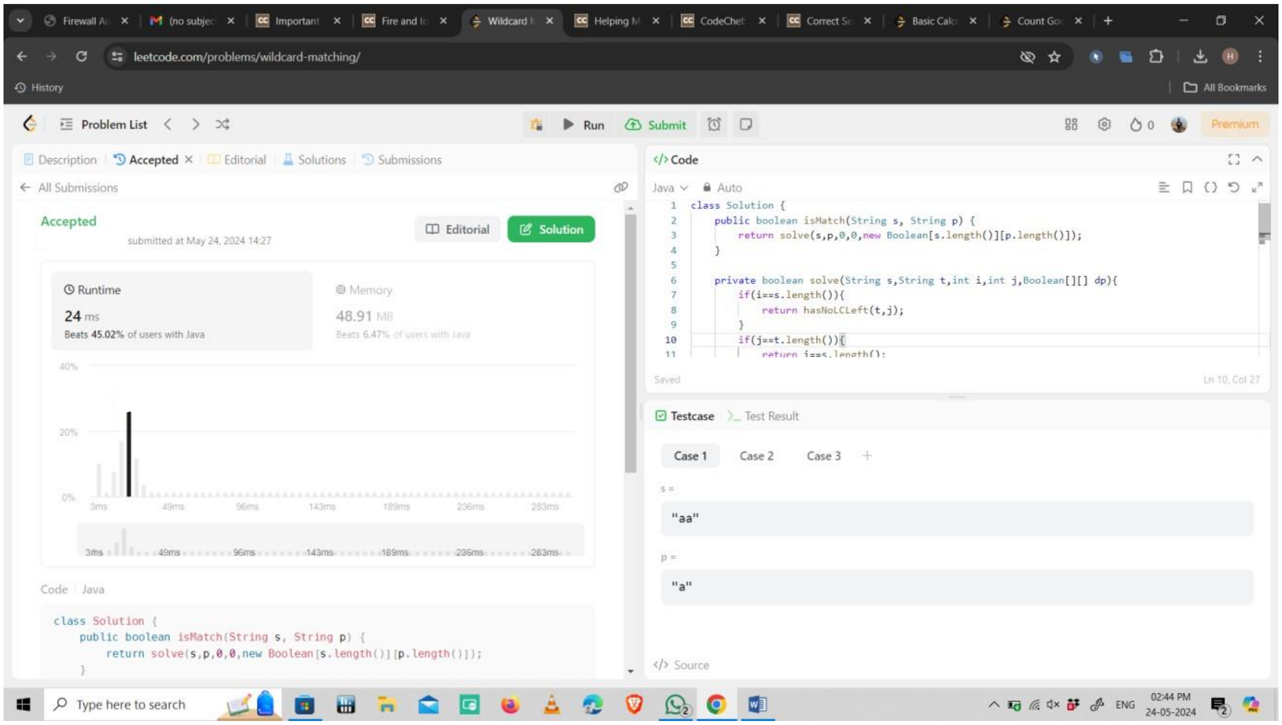
The first line of input contains an integer T denoting the number of test cases.
Every line of each test case contains a single integer N denoting common folks as soldiers and an

Correct Answer   Submission ID: 1061541629

Time:
3.00s

Sub-Task	Task #	Result (time)
1	0	Correct (1.75)
Subtask Score: 10%		Result - Correct
2	1	Correct (2.80)
Subtask Score: 30%		Result - Correct
3	2	Correct (3.00)
Subtask Score: 60%		Result - Correct

c)



Accepted
submitted at May 24, 2024 14:27

Runtime
24 ms
Beats 45.02% of users with Java

Memory
48.91 MB
Beats 6.47% of users with Java

Code | Java

```
class Solution {
    public boolean isMatch(String s, String p) {
        return solve(s,p,0,0,new Boolean[s.length()][p.length()]);
    }

    private boolean solve(String s,String t,int i,int j,Boolean[][] dp){
        if(i==s.length()){
            return hasNoLCLeft(t,j);
        }
        if(j==t.length()){
            return i==s.length();
```

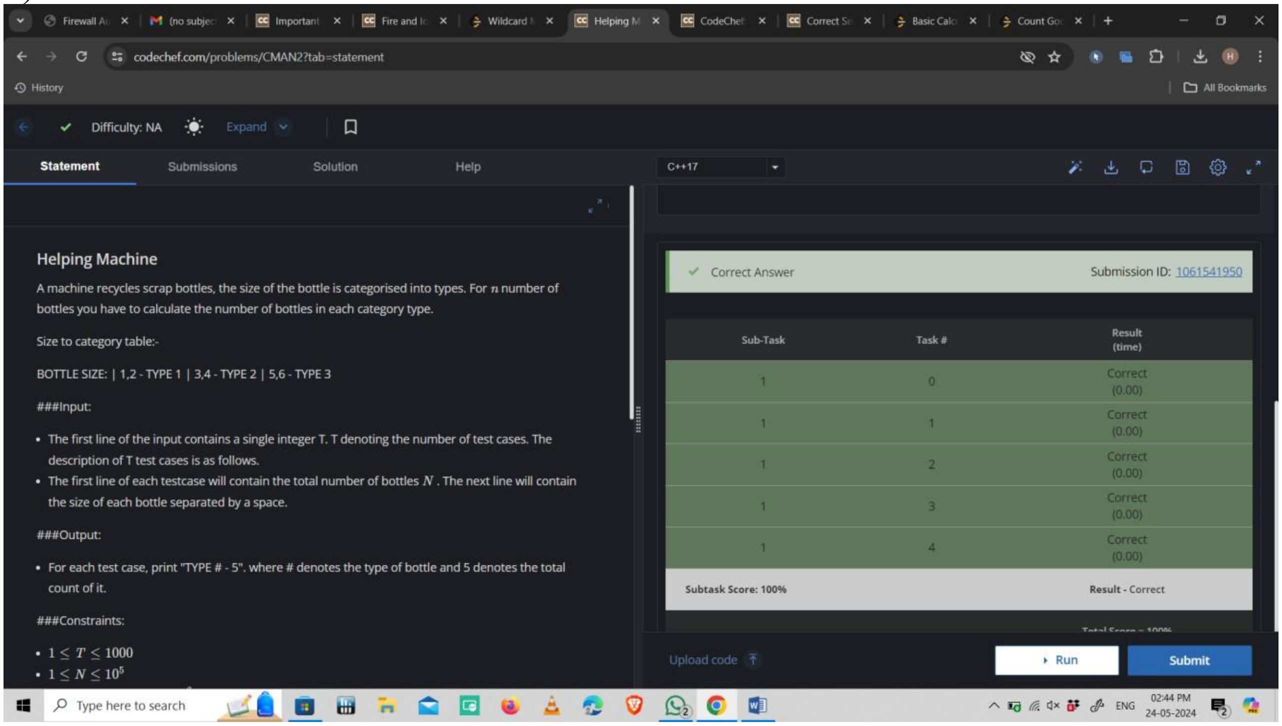
Saved
Ln 10, Col 27

s =
"aa"

p =
"a"

02:44 PM
24-05-2024

d)



Helping Machine

A machine recycles scrap bottles, the size of the bottle is categorised into types. For n number of bottles you have to calculate the number of bottles in each category type.

Size to category table:-

BOTTLE SIZE: | 1,2 - TYPE 1 | 3,4 - TYPE 2 | 5,6 - TYPE 3

###Input:

- The first line of the input contains a single integer T. T denoting the number of test cases. The description of T test cases is as follows.
- The first line of each testcase will contain the total number of bottles N . The next line will contain the size of each bottle separated by a space.

###Output:

- For each test case, print "TYPE # - 5". where # denotes the type of bottle and 5 denotes the total count of it.

###Constraints:

- $1 \leq T \leq 1000$
- $1 \leq N \leq 10^5$

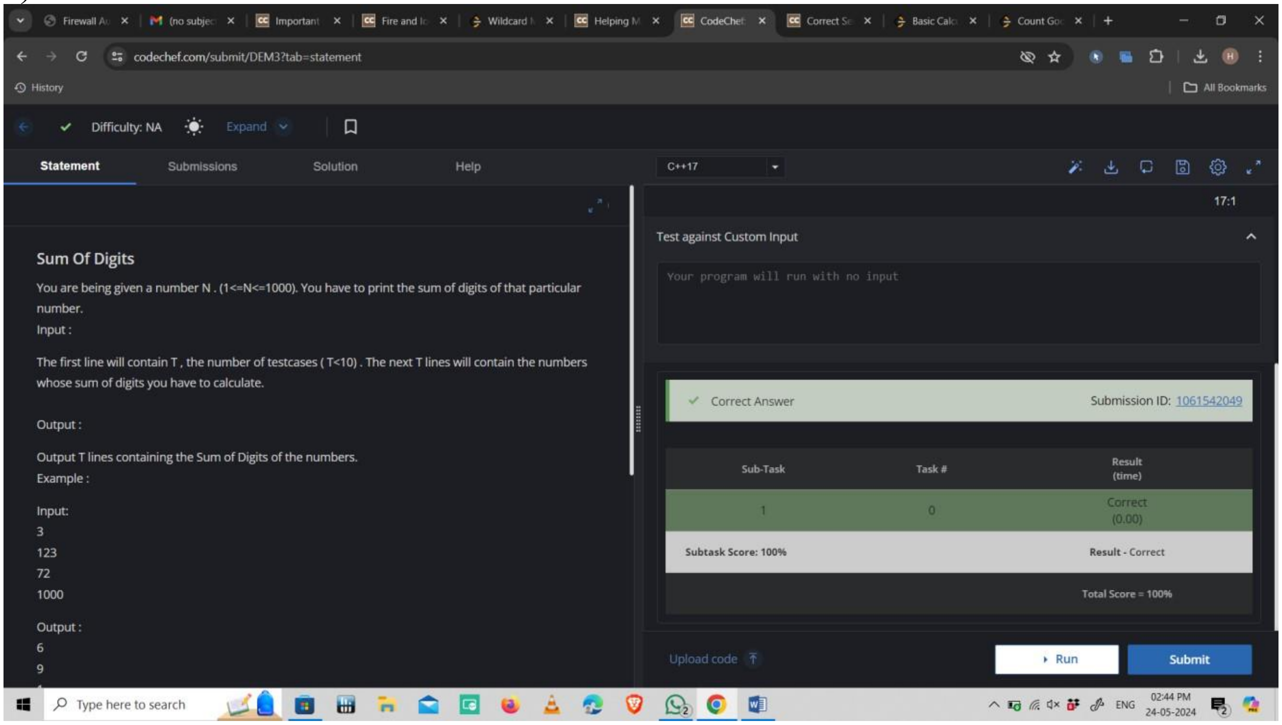
✓ Correct Answer
Submission ID: 1061541950

Sub-Task	Task #	Result (time)
1	0	Correct (0.00)
1	1	Correct (0.00)
1	2	Correct (0.00)
1	3	Correct (0.00)
1	4	Correct (0.00)
Subtask Score: 100%		Result - Correct

Total Score = 100%

02:44 PM
24-05-2024

e)



Sum Of Digits

You are being given a number N . (1<=N<=1000). You have to print the sum of digits of that particular number.

Input :

The first line will contain T , the number of testcases (T<10) . The next T lines will contain the numbers whose sum of digits you have to calculate.

Output :

Output T lines containing the Sum of Digits of the numbers.

Example :

Input:

```
3
123
72
1000
```

Output :

```
6
9
```

```
Your program will run with no input
```

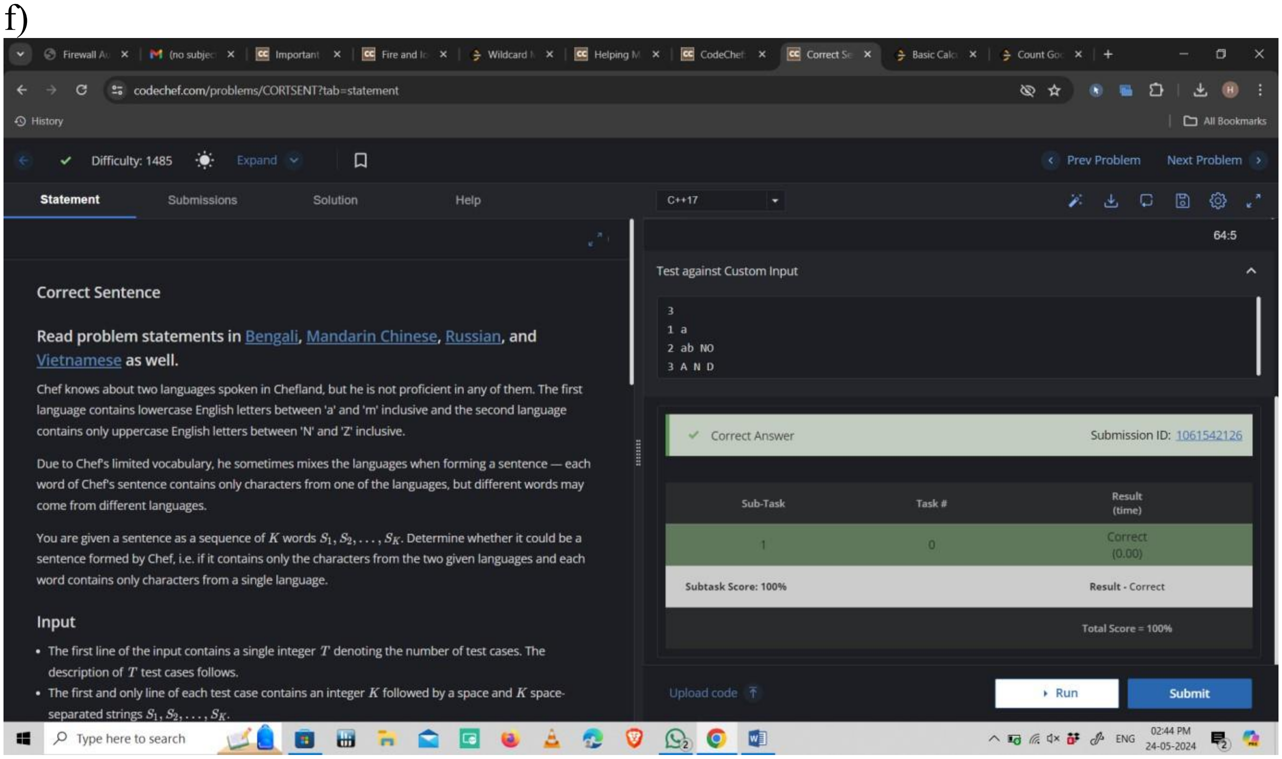
✓ Correct Answer Submission ID: 1061542049

Sub-Task	Task #	Result (time)
1	0	Correct (0.00)

Subtask Score: 100% Result - Correct

Total Score = 100%

f)



Correct Sentence

Read problem statements in Bengali, Mandarin Chinese, Russian, and Vietnamese as well.

Chef knows about two languages spoken in Chefland, but he is not proficient in any of them. The first language contains lowercase English letters between 'a' and 'm' inclusive and the second language contains only uppercase English letters between 'N' and 'Z' inclusive.

Due to Chef's limited vocabulary, he sometimes mixes the languages when forming a sentence — each word of Chef's sentence contains only characters from one of the languages, but different words may come from different languages.

You are given a sentence as a sequence of K words $S_1, S_2, \ldots, S_K$. Determine whether it could be a sentence formed by Chef, i.e. if it contains only the characters from the two given languages and each word contains only characters from a single language.

Input

- The first line of the input contains a single integer T denoting the number of test cases. The description of T test cases follows.
- The first and only line of each test case contains an integer K followed by a space and K space-separated strings $S_1, S_2, \ldots, S_K$.

```
3
1 a
2 ab NO
3 A N D
```

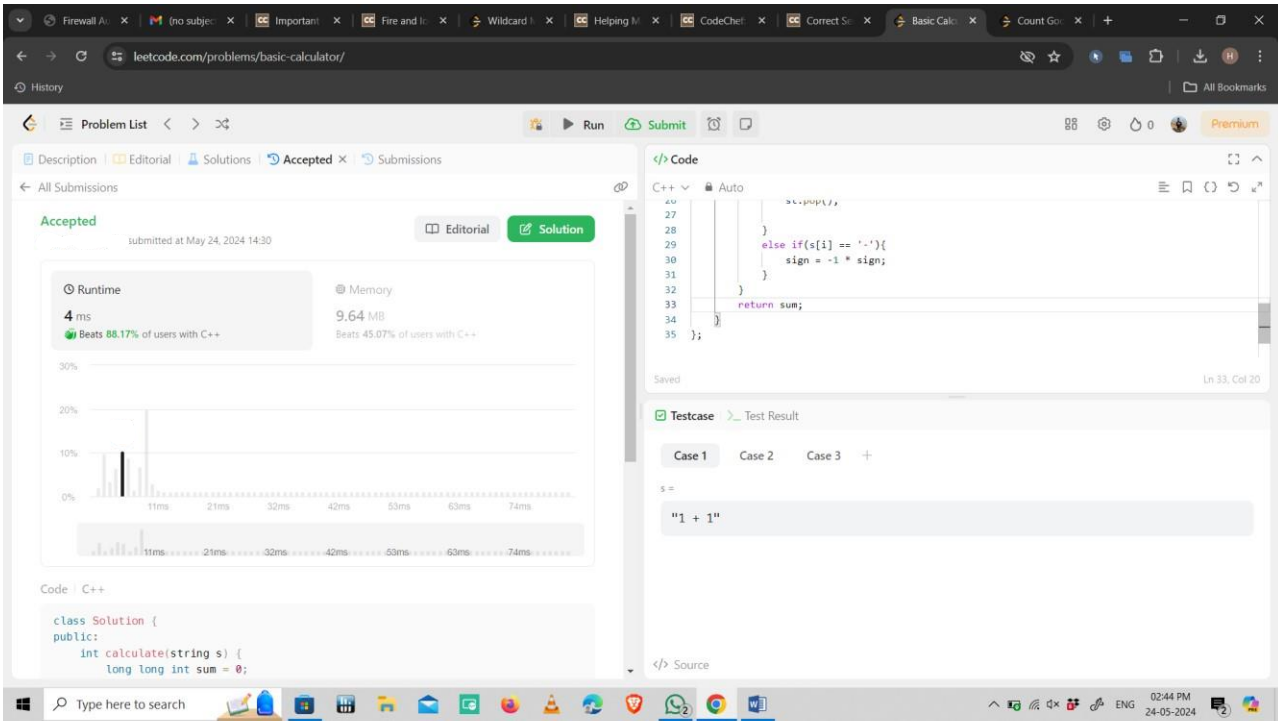
✓ Correct Answer Submission ID: 1061542126

Sub-Task	Task #	Result (time)
1	0	Correct (0.00)

Subtask Score: 100% Result - Correct

Total Score = 100%

g)



leetcode.com/problems/basic-calculator/

Accepted

submitted at May 24, 2024 14:30

Runtime

4 ms

Beats 88.17% of users with C++

Memory

9.64 MB

Beats 45.07% of users with C++

Code | C++

```
class Solution {
public:
    int calculate(string s) {
        long long int sum = 0;
```

```
                    st.pop();

                }
                else if(s[i] == '-'){
                    sign = -1 * sign;
                }
            }
            return sum;
        }
};
```

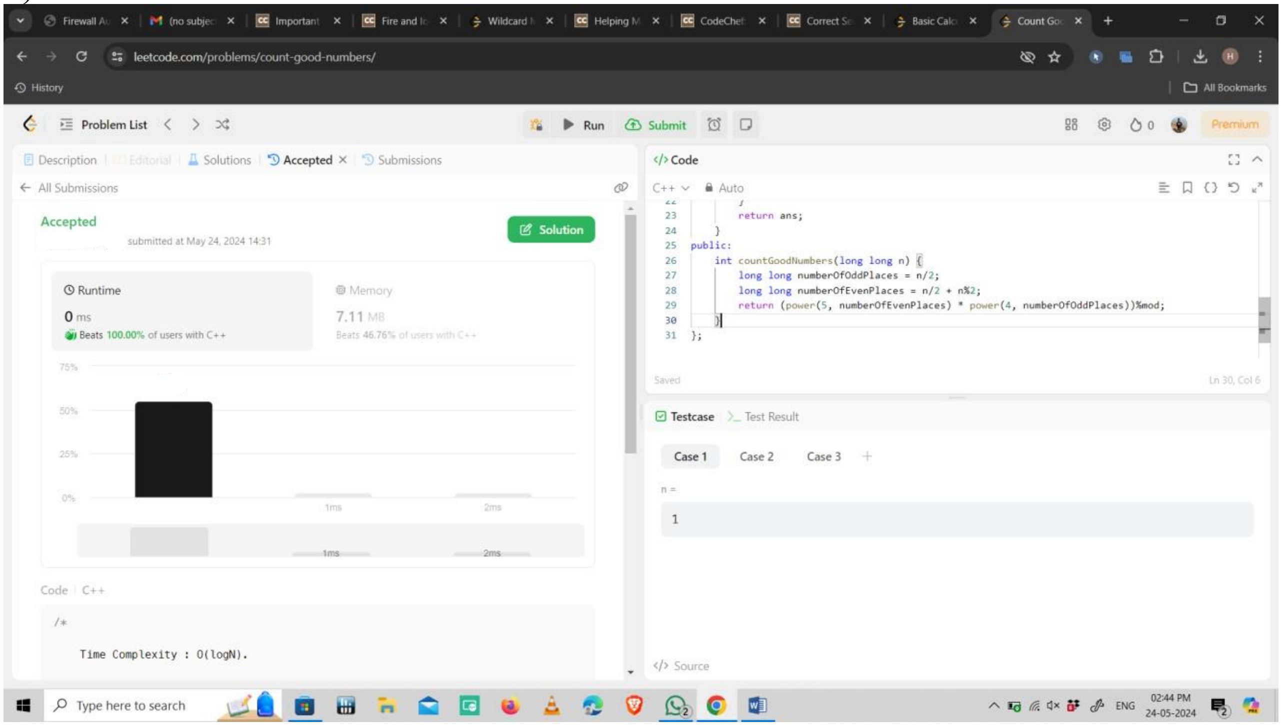
Saved

Ln 33, Col 20

s =

"1 + 1"

h)



leetcode.com/problems/count-good-numbers/

Accepted

submitted at May 24, 2024 14:31

Runtime

0 ms

Beats 100.00% of users with C++

Memory

7.11 MB

Beats 46.76% of users with C++

Code | C++

```
/*

    Time Complexity : O(logN).
```

```
            }
            return ans;
        }
public:
    int countGoodNumbers(long long n) {
        long long numberOfOddPlaces = n/2;
        long long numberOfEvenPlaces = n/2 + n%2;
        return (power(5, numberOfEvenPlaces) * power(4, numberOfOddPlaces))%mod;
    }
};
```

Saved

Ln 30, Col 6

n =

1