

Олимпиада СПбГУ по информатике 2021/22 учебного года

A	B	C	D	E	F	Sum
100	100	100	80	58	0	438

Task A ()

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

void fast_IO()
{
    ios_base::sync_with_stdio(false);
    cin.tie(0);
    cout.tie(0);
}

signed main()
{
    fast_IO();
    int n;
    cin >> n;
    vector < pair <int, int> > v(n);
    for (int i = 0; i < n; i++){
        int a, b;
        cin >> a >> b;
        while (a % 10 == 0){
            b++;
            a /= 10;
        }
        v[i] = {b, a};
    }
    sort(v.rbegin(), v.rend());
    int len = n;
    while (len >= 2 and v[len - 1].first == v[len - 2].first){
        int k = v.back().first, a = 0, b = k;
        while (!v.empty() and v.back().first == k){
            a += v.back().second;
            v.pop_back();
        }
        while (a % 10 == 0){
            b++;
            a /= 10;
        }
        pair <int, int> p = {b, a};
        vector < pair <int, int> > del;
        while (!v.empty() and v.back().first < b){
            del.push_back(v.back());
            v.pop_back();
        }
        v.push_back({b, a});
        while (!del.empty()){
            v.push_back(del.back());
            del.pop_back();
        }
        len = v.size();
    }
    cout << v.back().first;
    return 0;
}
```

Task B ()

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

void fast_IO()
{
    ios_base::sync_with_stdio(false);
    cin.tie(0);
    cout.tie(0);
}

signed main()
{
    fast_IO();
    int n;
    cin >> n;
    vector < pair <int, int> > k;
    for (int i = 0; i < n; i++){
        int a;
        cin >> a;
        if (a != 0){
            k.push_back({i + 1, a});
        }
    }
    if (!k.empty()){
        cout << "Flip_and_wait" << endl;
    }
    else{
        cout << "Stop";
        return 0;
    }
    int c = 0;
    while (!k.empty()){
        string s;
        cin >> s;
        int j = 1;
        while (s[j] == 'e'){
            c++;
            j += 2;
        }
        if (c < k.back().first){
            cout << "Wait" << endl;
            continue;
        }
        k.back().second--;
        if (k.back().second == 0){
            k.pop_back();
            if (k.empty()){
                cout << "Stop" << endl;
                return 0;
            }
        }

        cout << "Flip_and_wait" << endl;
        c = 0;
    }
    return 0;
}
```

Task C ()

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

void fast_IO()
{
    ios_base::sync_with_stdio(false);
    cin.tie(0);
    cout.tie(0);
}

signed main()
{
    fast_IO();
    int n;
    cin >> n;
    string s;
    cin >> s;
    bool fl = false;
    for (int i = 0; i < s.size(); i++){
        if (s[i] == '?'){
            fl = 1;
            break;
        }
    }
    if (!fl){
        while (n--){
            if (s.size() == 2){
                if (s == "00"){
                    cout << "??\n";
                }
                else if (s == "01"){
                    cout << "?1\n";
                }
                else if (s == "10"){
                    cout << "?0\n";
                }
                else{
                    cout << "1?\n";
                }
                if (n > 0){
                    cin >> s;
                }
                continue;
            }
            int c1 = 0, c0 = 0;
            for (int i = 0; i < s.size(); i++){
                if (s[i] == '0'){
                    c0++;
                }
                else{
                    c1++;
                }
            }
            if ((c0 == 1 and s[0] == '0') or (c1 == 1 and s[0] == '1')){
                cout << s[0];
                for (int i = 0; i < s.size() - 2; i++){
                    cout << "?";
                }
                cout << s[s.size() - 1] << '\n';
            }
            else if (c0 == 0 or c1 == 0){
                cout << s[0];
                for (int i = 0; i < s.size() - 1; i++){
                    cout << "?";
                }
                cout << '\n';
            }
            else{
                for (int i = 0; i < s.size(); i++){

```

```

        if (s[i] == '0' and c0 >= c1){
            cout << "?";
        }
        else if (s[i] == '1' and c1 > c0){
            cout << "?";
        }
        else{
            cout << s[i];
        }
    }
    cout << '\n';
}
if (n > 0){
    cin >> s;
}

}
}
else{
    while (n--){
        if (s.size() == 2){
            if (s == "??"){
                cout << "00\n";
            }
            else if (s == "?1"){
                cout << "01\n";
            }
            else if (s == "?0"){
                cout << "10\n";
            }
            else{
                cout << "11\n";
            }
            if (n > 0){
                cin >> s;
            }
            continue;
        }
        if (s[0] != '?' and s[s.size() - 1] != '?' and s[0] != s[s.size() - 1]){
            cout << s[0];
            for (int i = 1; i < s.size(); i++){
                cout << s[s.size() - 1];
            }
            cout << '\n';
            if (n > 0){
                cin >> s;
            }

            continue;
        }
        int c0 = 0, c1 = 0;
        for (int i = 0; i < s.size(); i++){
            if (s[i] == '1'){
                c1++;
            }
            else if (s[i] == '0'){
                c0++;
            }
        }
        if (c0 == 1 and s[0] == '0'){
            for (int i = 0; i < s.size(); i++){
                cout << "0";
            }
            cout << '\n';
        }
        else if (c1 == 1 and s[0] == '1'){
            for (int i = 0; i < s.size(); i++){
                cout << "1";
            }
            cout << '\n';
        }
        else{
            for (int i = 0; i < s.size(); i++){

```

```

        if (s[i] == '?'){
            cout << (c0 == 0 ? "0" : "1");
        }
        else{
            cout << s[i];
        }
    }
    cout << '\n';
}
if (n > 0){
    cin >> s;
}
}
}
return 0;
}

```

Task D ()

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

constexpr const int MOD = 998244353;

void fast_IO()
{
    ios_base::sync_with_stdio(false);
    cin.tie(0);
    cout.tie(0);
}

signed main()
{
    fast_IO();
    int n;
    cin >> n;
    vector<int> v = {468660588, 478389955, 137136996,
                    203730522, 533107751, 496409701,
                    637333574, 465585441};

    int ans = 2, k = 3;
    if (n > 9e8){
        ans = v[7];
        k = 9e8 + 2;
    }
    else if (n > 8e8){
        ans = v[6];
        k = 8e8 + 2;
    }
    else if (n > 7e8){
        ans = v[5];
        k = 7e8 + 2;
    }
    else if (n > 6e8){
        ans = v[4];
        k = 6e8 + 2;
    }
    else if (n > 5e8){
        ans = v[3];
        k = 5e8 + 2;
    }
    else if (n > 4e8){
        ans = v[2];
        k = 4e8 + 2;
    }
    else if (n > 3e8){
        ans = v[1];
        k = 3e8 + 2;
    }
    else if (n > 2e8){
        ans = v[0];
        k = 2e8 + 2;
    }
    int c = 0, x = n - k + 1;
    for (int i = 0; i <= x; i++){
        ans = (ans * k) % MOD;
        k = (k + 1) % MOD;
    }
    cout << c << '␣' << ans;
    return 0;
}
```

Task E ()

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

void fast_IO()
{
    ios_base::sync_with_stdio(false);
    cin.tie(0);
    cout.tie(0);
}

signed main()
{
    fast_IO();
    int n;
    cin >> n;
    vector<int> v(n);
    for (int i = 0; i < n; i++){
        cin >> v[i];
    }
    int q;
    cin >> q;
    while (q--){
        int a, b, d;
        cin >> a >> b >> d;
        int sum = 0;
        for (int i = a; i < b; i++){
            sum += (d + v[i] - 1) / v[i];
        }
        cout << sum << '\n';
    }
    return 0;
}
```

Task F ()