

Олимпиада СПбГУ по информатике 2021/22 учебного года

A	B	C	D	E	F	Sum
100	100	100	100	58	8	466

Task A ()

```
#include <bits/stdc++.h>

#define int long long

using namespace std;

signed main()
{
    int n; cin >> n;
    vector <pair <int, int>> arr(n);
    for (auto& i: arr) {
        int a, b; cin >> a >> b;
        while (a % 10 == 0) {
            a /= 10;
            b += 1;
        }
        i = {a, b};
        //cout << "! " << a << " " << b << endl;
    }

    multiset <pair <int, int>> d;
    for (auto [a, b]: arr)
        d.insert({b, a});

    int cnt = 0;
    while (!d.empty()) {
        vector <pair <int, int>> cur;
        while (!d.empty() && (cur.empty() || d.begin()->first == cur[0].first)) {
            cur.push_back(*d.begin());
            d.erase(d.begin());
        }

        cnt = cur[0].first;
        int sum = 0;
        for (auto [b, a]: cur)
            sum += a;
        if (sum % 10 != 0) {
            //last = sum % 10;
            break;
        }
        int zeros = cur[0].first;
        while (sum % 10 == 0) {
            sum /= 10;
            zeros += 1;
        }
        d.insert({zeros, sum});
        cnt = zeros;
    }

    cout << cnt << "\n";
}
```

Task B ()

```
#include <bits/stdc++.h>

using namespace std;

signed main()
{
    int n; cin >> n;
    vector<int> arr(n);
    for (auto& i: arr)
        cin >> i;

    for (int i = n - 1; i >= 0; --i) {
        while (arr[i] > 0) {
            cout << "Flip_and_wait" << endl;
            int need = i + 1;
            while (need > 0) {
                string s; cin >> s;
                int cur = (s.size() - 3) / 2;
                need -= cur;
                if (need > 0)
                    cout << "Wait" << endl;
            }
            arr[i] -= 1;
        }
    }
    cout << "Stop" << endl;
}
```

Task C ()

```
for _ in range(int(input())):
    s = [i for i in input()]
    n = len(s)
    if '?' in s:
        for i in range(n // 2):
            if s[i * 2] == '?':
                s[i * 2] = s[i * 2 + 1]
            else:
                s[i * 2 + 1] = ('0' if s[i * 2] == '1' else '1')
    else:
        for i in range(n // 2):
            if s[i * 2] == s[i * 2 + 1]:
                s[i * 2] = '?'
            else:
                s[i * 2 + 1] = '?'
    print(''.join(s))
```

Task D ()

```
#include <bits/stdc++.h>

#define int long long

using namespace std;

const int MOD = 998'244'353;
vector<int> facts = {1, 215582594, 638474417, 185226044, 876712294, 832944090,
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184344327, 111700697];
const int k = 100'000;

const int full = MOD - 1;

int mypow(int x, int y)
{
    if (y == 0)
        return 1;
    if (y % 2 == 1)
        return (mypow(x, y - 1) * x) % MOD;
    int t = mypow(x, y / 2);
    return (t * t) % MOD;
}

signed main()
{
    int n; cin >> n; n += 1;

    int zeros = n / MOD;
    if (n >= MOD * MOD)
        zeros += 1;

    int step = n / MOD;
    int res = mypow(full, step);
    n %= MOD;

    if (n > 0) {
        res = (res * facts[n / k]) % MOD;
        for (int i = (n / k) * k + 1; i <= n; ++i)
            res = (res * i) % MOD;
    }
    cout << zeros << " " << res << "\n";
}

```

Task E ()

```
#include <bits/stdc++.h>

using namespace std;

signed main()
{
    ios_base::sync_with_stdio(false);
    cin.tie(0);

    int n; cin >> n;
    vector<int> arr(n);
    for (auto& i: arr)
        cin >> i;

    int Q; cin >> Q;
    while (Q--) {
        int a, b, d; cin >> a >> b >> d; b -= 1;
        int res = 0;
        for (int i = a; i <= b; ++i)
            res += (d - 1) / arr[i] + 1;
        cout << res << "\n";
    }
}
```


Task F ()

```
#include <bits/stdc++.h>

using namespace std;

const int D = 3000;

signed main()
{
    int n; cin >> n;
    vector <pair <int, int>> arr(n);
    for (auto& i: arr)
        cin >> i.first >> i.second;
    reverse(arr.begin(), arr.end());

    vector <int> nums(D * 2 + 1, 0);
    nums[0 + D] = 1;
    int m = nums.size();

    for (auto [a, b]: arr) {
        vector <int> nums2(m, 0);
        for (int i = 0; i < nums.size(); ++i) {
            if (i - b >= m) {
                continue;
            }
            int left = max(0, i - b);
            if (i - a < 0)
                continue;
            int right = min(m - 1, i - a);
            nums2[i] = *max_element(nums.begin() + left, nums.begin() + right + 1);
        }
        nums = nums2;
        nums[0 + D] += 1;
    }

    cout << *max_element(nums.begin(), nums.end()) << "\n";
}
```